

# STRATEGIC PLAN 2025-2029

TEA RESEARCH INSTITUTE OF SRI LANKA
TALAWAKELLE

# STRATEGIC PLAN
# 2025-2029




**MINISTRY OF PLANTATION AND COMMUNITY INFRASTRUCTURE**

**TEA RESEARCH INSTITUTE OF SRI LANKA**

**TALAWAKELLE**

**JULY, 2025**

# FOREWORD

## FROM THE CHAIRMAN, TEA RESEARCH BOARD

The Tea Research Board is pleased to present the Strategic Plan 2025–2029 of the Tea Research Institute, a comprehensive roadmap designed to guide the Institute in addressing the needs of Sri Lanka's tea industry in an increasingly dynamic and competitive global environment.

For over a century, the Tea Research Institute has played a pivotal role in the development and sustainability of the tea sector, providing scientific and technological solutions to enhance productivity, quality, and resilience. This Strategic Plan is a testament to TRI's commitment to excellence and its adaptive approach to addressing emerging challenges such as climate change, high production costs, labor shortages, and shifting market demands.

In the formulation of this Strategic Plan, careful attention has been paid to aligning TRI's research priorities with the requirements of the national tea industry and broader development goals of Sri Lanka. The plan focuses on strategic interventions in crop improvement, crop and soil management, mechanization, ecosystem, environmental and economic sustainability, quality enhancement including value addition, and stakeholder-oriented technology dissemination, while prioritizing research areas that will bring the highest impact to stakeholders and advancement in technology across the tea value chain. Identification of stakeholder needs for the formulation of this Strategic Plan has been done via a comprehensive survey and feedback from all stakeholder groups. As such, the TRI has followed an objective and evidence-based approach in prioritizing its research Program for the 2025-29 period in accordance with the stakeholder needs and the identified potential to address current and future challenges.

The Tea Research Board recognizes the critical role played by the dedicated scientists, administrative staff, and stakeholders who have contributed their expertise and insights in the preparation of this Strategic Plan. Their collective efforts have ensured that the plan is practical, forward-looking, and aligned with the aspirations of all those involved in Sri Lanka's tea industry.

The TRI identifies that having its full cadre of research and technical staff is an essential pre-requisite for successful implementation of this Strategic Plan. This will be challenging in view of the TRI's current strength of research and technical staff, which stands below 50%. Developing competence and expertise in emerging advanced technologies among the current TRI scientists and attracting a new generation of scientists to the TRI are further pre-requisites for TRI research to be effective and relevant in addressing emerging challenges in the global and local economic landscape. It is expected that this Strategic Plan will provide strong justification and a foundation to solicit policy maker support to upgrade the TRI to become a Centre of Excellence which is on par with similar research institutes elsewhere in the world.

We are confident that the successful implementation of this Strategic Plan will enable the Tea Research Institute to continue its leadership role in tea research and technology development, thereby contributing significantly to the socio-economic development of Sri Lanka and securing the future of the Ceylon Tea brand in the global market.

**Prof. W A J M De Costa**
**Chairman, Tea Research Board**
June, 2025

# PREFACE

## FROM THE DIRECTOR OF TEA RESEARCH INSTITUTE OF SRI LANKA

It is with great pride that I present the Strategic Plan 2025–2029 of the Tea Research Institute of Sri Lanka, marking another significant milestone in our journey of serving the nation's tea industry for over a century. This Strategic Plan has been meticulously developed to align with the evolving challenges and opportunities facing Sri Lanka's tea sector, ensuring that our research, development, and technology transfer activities continue to contribute to the growth, sustainability, and global competitiveness of Ceylon Tea.

Sri Lanka's tea industry is at a critical juncture, contending with rising production costs, shifting global consumer preferences, and the growing impacts of climate change. At the same time, opportunities abound for value addition, product diversification, and technological advancement. Through this Strategic Plan, the Tea Research Institute reaffirms its commitment to pioneering research in crop improvement, mechanization, climate change adaptation, and quality enhancement, while ensuring that innovations reach stakeholders across the tea value chain in a timely and practical manner.

The formulation of this plan has been a collaborative effort, with valuable inputs from scientists, estate managers, smallholders, policymakers, and industry stakeholders. It embodies a shared vision for a resilient, profitable, and environmentally responsible tea sector in Sri Lanka.

As we implement this Strategic Plan, the Tea Research Institute will continue to strive towards scientific excellence, stakeholder engagement, and institutional agility, ensuring that Sri Lanka's tea industry not only sustains its proud legacy but also thrives amidst future challenges.

I extend my sincere gratitude to all who have contributed to the development of this Strategic Plan and invite all stakeholders to partner with us in its successful implementation for the continued prosperity of Sri Lanka's tea industry.

**Dr. Mahasen A B Ranatunga**
Director, Tea Research Institute of Sri Lanka
June, 2025

# ACKNOWLEDGEMENT

The Tea Research Institute of Sri Lanka extends its sincere appreciation to all individuals and institutions that have contributed to the preparation of the Strategic Plan 2025–2029.

We wish to express our gratitude to the Ministry of Plantation Industries and Community Infrastructure, the Tea Research Board, the Sri Lanka Tea Board, the Tea Small Holdings Development Authority, National Institute of Plantation Management, Planters Association, Tea Exporters Association, Colombo Tea Traders Association, Private Tea Factory Owner's Association, Estate Owners Association/Medium Scale Tea Growers, Tea smallholdings Development societies, State Owned Estates, Regional Plantation Companies, Input Dealers, Members of the Scientific Advisory Committee, Members of the Consultative Committee on Estates, Members of the Consultative Committee on Research, Members of the Experiment & Extension Forums, Ex-TRI Officers, Officials of the TRI Estates and all other stakeholders who provided invaluable insights and constructive feedback during the consultative process. Their guidance has been instrumental in shaping the direction and priorities of this Strategic Plan.

TRI wish to express special thanks to Prof. W A J M De Costa, the Chairman of the Tea Research Board for guiding the TRI prioritization of research projects in a systematic approach.

Also, the untiring efforts of the Dr. H W Shyamalie, Head of the Agricultural Economics Division, who served as the Coordinator for formulating the TRI strategic plan for the period of 2025-2029.

We also acknowledge the dedicated efforts of the TRI's scientists, extensionists, technical and administrative staff, whose commitment and professionalism ensured the timely preparation of this document.

The collective contributions of all stakeholders have enriched this Strategic Plan, making it a comprehensive and practical framework for the future development of tea research and technology transfer in Sri Lanka. We look forward to the continued support and collaboration of all partners in implementing this Strategic Plan to enhance the sustainability, productivity, and competitiveness of Sri Lanka's tea industry.

**Tea Research Institute of Sri Lanka**
June, 2025

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# ABBREVIATIONS

| | | |
|---|---|---|
| AERs | - | Agro-Ecological Regions |
| CADMAR | - | Composite Approach to Decision Making in Agriculture |
| CCE | - | Consultative Committee on Estates |
| CCR | - | Consultative Committee on Research |
| CIS | - | Commonwealth of Independent States |
| COP | - | Cost of Production |
| CP | - | Corporate Plan |
| CTTA | - | Colombo Tea Traders Association |
| E&E | - | Experiment & Extension Forum |
| GDP | - | Gross Domestic Production |
| HRD | - | Human Resource Development |
| IPM | - | Integrated Pest Management |
| IWM | - | Integrated Weed Management |
| MPCI | - | Ministry of Plantation and Community Infrastructure |
| MSTG | - | Medium Scale Tea Growers |
| NIPM | - | National Institute of Plantation Management |
| PA | - | Planters' Association |
| PGRP | - | Plant Growth Promoting Rhizobacteria |
| PTFOA | - | Private Tea Factory Owners' Association |
| R&D | - | Research and Development |
| RPC | - | Regional Plantation Company |
| SAC | - | Scientific Advisory Committee |
| SLINTEC | - | Sri Lanka Institute of Nano Technology |
| SLTB | - | Sri Lanka Tea Board |
| STaRR | - | Small Tea and Rubber Revitalization Project |
| SWOT | - | Strengths, Weakness, Opportunities and Threats |
| TEA | - | Tea Exporters Association |
| ToT | - | Training of Trainers |
| TRB | - | Tea Research Board |
| TTO | - | Technology Transfer Office |
| TRISL | - | Tea Research Institute of Sri Lanka |
| TSDS | - | Tea Smallholdings Development Societies |
| TSHDA | - | Tea Small Holdings Development Authority |
| TSHDA | - | Tea Small Holdings Development Authority |
| USD | - | United States Dollar |
| VP | - | Vegetatively Propagated |

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# EXECUTIVE SUMMARY

Sri Lanka is home to one of the world's oldest and most renowned tea industries, with commercial cultivation dating back to 1867. Globally recognized for producing premium "Ceylon Tea," the country has earned a strong reputation for exceptional quality in the international tea market. Tea continues to play a vital role in Sri Lanka's economy and society, significantly contributing to national development.

The tea industry significantly contributes to the national GDP and remains the country's leading cash crop. In 2024, Sri Lanka produced 262.159 million kilograms of tea, earning approximately USD 1,435.9 million in foreign exchange (TEA, 2025). The sector supports the livelihoods of around 1.5 million people, including estate workers and individuals engaged throughout the broader tea value chain. Beyond its economic importance, the tea industry contributes meaningfully to rural development and environmental sustainability. Tea plantations help improve rural infrastructure, enhance water infiltration, reduce soil erosion, and contribute to carbon sequestration, playing a role in climate change mitigation.

The Tea Research Institute (TRI) of Sri Lanka is mandated "to conduct, assist, and encourage scientific and technological research into and investigations of all problems and undertake the collection and dissemination of data to promote investment in tea research." Its current research and development program spans a broad range of focus areas, including crop improvement, land productivity enhancement, climate change adaptation and mitigation, mechanization of field practices, nursery and crop management, tea processing technology, and made tea quality enhancement. Additionally, TRI emphasizes the development of value-added tea products, exploration of the health benefits of tea, resource planning, technology dissemination and services to stakeholders. These initiatives have been instrumental in improving the productivity, quality, and global competitiveness of Sri Lankan tea. Over its 100 years of dedicated service, TRI has firmly established itself as a pioneer in tea research, building strong partnerships at both national and international levels.

The 2025-2029 Strategic Plan of the Tea Research Institute outlines a comprehensive framework for the next phase of development, covering nineteen critical areas. The strategic plan comprised of an executive Summary, introduction (tea's importance to Sri Lanka, Sri Lankan tea (production & productivity), the markets for Sri Lankan teas, earnings and profits, cost of production, value addition, privatization of tea industry, tea smallholdings, background and history of Tea Research Institute, organizational vision, mission of the organization), past performance of the Institute, present status of the Institute (SWOT Analysis, main issues in the tea sector), Goals & objectives, priority strategies for addressing challenges in tea industry, functions of supportive Divisions towards achieving institute's Goals, prioritization procedure, prioritized Research & Development & Technology Transfer programs, Strategic plan of R & D program, Human Resource Development (HRD), Infrastructure Development, and supportive Divisions/Units.

# INTRODUCTION

## 1.1. The Tea Scenario

Before formulating strategic plans for tea research in Sri Lanka, it is crucial to first understand the broader context of the tea industry, both locally and globally. This understanding provides the foundation upon which the Tea Research Institute (TRI) will shape its research agenda, while also identifying the structural and behavioral changes needed to sustain and enhance the industry's global competitiveness.

The global tea market is becoming increasingly competitive, with mounting pressure from emerging and established tea-producing countries. To preserve and expand Sri Lanka's market share, the industry must adopt a focused approach, reclaiming traditional markets while also tapping into new and growing ones. Over the coming decade, strategic emphasis will be needed on diversifying tea products, elevating quality standards, and expanding value addition to meet the evolving expectations of global consumers.

In this dynamic and challenging landscape, the TRI is poised to play a pivotal role in securing Sri Lanka's position as a leading tea producer. Through innovative research and development in areas such as cultivation practices, processing technologies, and product innovation, TRI will help the industry overcome emerging challenges, leverage new opportunities, and continue to uphold its esteemed reputation for producing premium "Ceylon Tea."

### 1.1.1. Tea's Importance to Sri Lanka

Tea production in Sri Lanka spans across 23 Agro-Ecological Regions (AERs) and is broadly classified into three elevation zones, such as low Country (0–600 m), mid Country (600–1200 m), and Up Country (above 1200 m). With approximately 267,186 hectares under cultivation, tea remains a cornerstone of the national economy. Sri Lankan teas are categorized by elevation, with low-grown teas contributing around 61% of total production, followed by high-grown teas at 23% and mid-grown teas at 16% (SLTB, 2023). However, intensifying global competition makes it imperative for the country to focus on enhancing quality, diversifying its tea portfolio, and exploring new market opportunities to retain and expand its share in the international tea trade.

Tea production is primarily divided between two key sectors: large-scale estates and smallholdings. Both sectors are vital to the industry and to the national economy, particularly through their export contributions. The industry's future success hinges on its ability to improve productivity while addressing long-standing issues and adapting to emerging challenges. Moreover, in an increasingly sustainability-conscious global market, the Sri Lankan tea industry must align itself with social and environmental responsibility standards to ensure its long-term viability.

As the country's highest net foreign exchange earner, the tea industry brought in USD 1.43 billion in 2024 (Ministry of Plantation, 2024). It provides direct employment to approximately 700,000 individuals, with many more relying on tea-related industries for their livelihoods. Of the total tea cultivation area, about 74.4% is managed by the smallholder sector, which consistently outperforms the estate sector in terms of productivity. This is largely attributed to the widespread adoption of high-yielding vegetatively propagated (VP) tea in the smallholder sector. In contrast, the estate sector

comprising state-managed estates and Regional Plantation Companies (RPCs) continues to face challenges such as aging tea bushes and declining yields. Despite these issues, the smallholder sector has emerged as the backbone of Sri Lanka's tea industry, contributing between 70% and 75% of national tea production and playing a critical role in sustaining the industry's growth and resilience.

### 1.1.2. Sri Lankan Tea: Production and Productivity

Sri Lanka's tea production has experienced notable fluctuations over the decades. At the time of Independence, production stood at 136 million kilograms and rose to 225 million kilograms by 1968. However, following the nationalization of estates in the early 1970s, output declined, reaching just 179 million kilograms by 1983. A turning point came in the 1990s with the privatization of estates and improvements in estate management, which led to a steady recovery. By 2023 and 2024, Sri Lanka recorded tea production of 256 million kilograms and 262.16 million kilograms, respectively, reaffirming its status as the world's second-largest tea exporter.

Despite these achievements, the country continues to struggle with low productivity. In 2024, the average yield was only 1,200 kilograms of made tea per hectare, one of the lowest among major tea-producing nations. To remain competitive globally, both the estate and smallholder sectors must improve their productivity significantly.

## 1.2. The Markets for Sri Lankan Teas

Sri Lankan tea continues to maintain a strong presence in global markets, largely due to the distinctive "liquoring" quality of its western-grown teas. These teas are highly valued in traditional export destinations such as the United Kingdom, Ireland, Western Europe, Japan, Pakistan, and Egypt. The unique "Ceylon" character is especially appreciated in Western Europe and North America.

In contrast, Sri Lanka's robust low-grown teas are particularly popular in Middle Eastern countries, Russia, and the Commonwealth of Independent States (CIS), where there is a strong preference for orthodox teas.

In 2024, Iraq became the largest importer of Sri Lankan tea, accounting for 13.94% of total exports, up from 12.56% in 2023, an increase of 3,882 metric tons. Russia followed, importing 24,987 metric tons (10.17% of total exports), compared to 22,889 metric tons (9.46%) in 2023, marking a growth of 2,098 metric tons. The United Arab Emirates (UAE) and Turkey also remained key markets. The UAE's imports rose to 21,133 metric tons (8.6%), up from 19,611 metric tons (8.11%), while Turkey imported 17,734 metric tons (7.22%), from 16,395 metric tons (6.78%). Notably, China showed a modest increase in tea imports as well, reaching 11,565 metric tons (4.71%), up from 10,672 metric tons (4.41%) in 2023.

As long as Sri Lanka continues to focus on enhancing productivity and preserving the high quality of its teas, these key markets are expected to remain stable and offer continued opportunities for long-term growth (Ministry of Plantation, 2024; Central Bank of Sri Lanka, 2024; TEA, 2025).

## 1.3. Earnings and Profits

In 2024, Sri Lanka's tea exports were valued at US$1,430 million, a marked improvement over the US$1,310 million earned in 2023. This increase in export earnings, despite an improvement in export volumes from 241.9 million kg in 2023 to 245.79 million kg in 2024, highlights a crucial shift toward higher value realization per unit of tea. This trend reflects the premium positioning of Sri Lankan tea in global markets. The rise in FOB prices, which jumped from Rs. 1,643.11 per kg in 2022 to Rs. 1,770.44 per kg in 2023, demonstrates the resilience of the sector and its ability to command better prices, even in challenging global economic conditions. Higher global demand, particularly for Sri Lanka's high-quality orthodox teas, has played a pivotal role in driving this price increase (TEA, 2025).

## 1.4. Cost of Production

Sri Lanka has historically faced one of the highest cost of production (COP) among tea-producing countries, which remains a critical issue for the industry. Back in May 1997, the Tea Research Institute (TRI) estimated the COP for Sri Lankan-made tea at Rs. 113.10 per kg. This figure included operating costs (Rs. 88.04), capital costs (Rs. 6.50), environmental costs (Rs. 5.88), foreign exchange input (Rs. 10.38), and subsidies (Rs. 2.30). At the exchange rate of that time, this was approximately US $1.95 per kg, positioning Sri Lanka as the highest among its key competitors; Bangladesh at $1.15, India at $1.10, and Kenya at $0.96 per kg. Despite this, the FOB price for Sri Lankan tea, recorded as Rs. 124.23 in 1996, provided a positive return, although not enough to significantly cushion rising production costs.

In recent years, the cost challenge has intensified. By 2023, the COP had escalated to Rs. 885.00 per kg, driven by inflation, increasing input costs, and rising labor wages and which is an increase of 38% against 2021/2022. However, the average export price of Rs. 1,643.11 per kg in 2022 still delivered a positive economic return of Rs. 1,004.12 per kg, underscoring the value proposition of Sri Lankan tea in global markets. This shows that, although COP is high, the ability of the Sri Lankan tea industry to command premium prices helps offset some of these challenges. Yet, these profits remain vulnerable to fluctuations in the international market and domestic economic pressures, making the need to address COP an urgent priority.

One of the key strategies to mitigate the rising COP is to increase crop productivity. While the cost of inputs such as imported fertilizers, pesticides, and fuel, alongside labor wages, is expected to continue rising, there are several avenues to neutralize these pressures. Implementing improved agricultural practices, optimizing input use, and expanding the mechanization of both field and factory operations are critical steps in controlling COP. TRI plays an essential role here by advancing research in these areas to help tea producers lower production costs without compromising quality.

The adoption of more sustainable and environmentally friendly agricultural practices could also have a profound long-term impact on reducing production costs. TRI's focus on agronomic practices that rely more on organic amendments, rather than synthetic inputs, offers a pathway to gradually reducing the dependency on expensive, imported fertilizers and pesticides. These practices, which include integrated pest management (IPM) using natural predators and biological control agents, would not only reduce the environmental footprint of tea cultivation but also lead to significant savings in foreign exchange.

Labor, a key component of tea production, is another area of concern as industrialization and urbanization lead to a reduction in the traditional labor force available for tea estates. This shortage has been exacerbated by the migration of younger generations towards non-agricultural jobs. To counter this, the tea industry is increasingly turning to mechanization to bridge the labor gap. Mechanized pruning, harvesting, and fertilizer application are becoming essential tools to ensure continued productivity and to reduce reliance on manual labor. Likewise, advancements in factory automation, focusing on energy efficiency and reducing wastage, are crucial in maintaining competitive production costs.

TRI's role in driving innovation is pivotal in these areas. By refining its research agenda to focus on these cost-saving measures, TRI can support the industry's efforts to address rising production costs while ensuring that Sri Lankan tea remains competitive on the global stage. A strategic shift towards environmentally sustainable and labor-efficient production methods could offer a long-term solution to the challenges posed by rising COP, helping to secure the future of Sri Lanka's tea industry.

## 1.5. Value Addition

In Sri Lanka's export driven economy, reducing the cost of production (COP) is important but equally vital are value addition, product diversification, and quality improvement. Over the years, the tea industry has made significant progress in these areas, especially in value addition, which has become a key driver of export revenue.

In 2023, value-added products such as packeted tea and tea bags played a major role in tea exports. Packaged tea alone generated USD 550 million, surpassing bulk tea exports, which earned USD 471 million. Other value-added products like instant tea and green tea also contributed to the industry's earnings. These products not only bring in higher returns but also enhance Sri Lanka's competitiveness in international markets.

Consumer trends, particularly in countries like Russia, show a growing demand for convenient tea products such as instant tea and tea bags. However, Sri Lanka's tea marketing still falls short in appealing to younger consumers who seek convenience and health-focused beverages. This gap presents an opportunity for innovation and product diversification.

The Tea Research Institute (TRI) is playing a leading role in these efforts by conducting research into instant teas and ready-to-drink formats. As global demand shifts toward convenience, TRI aims to develop high-quality value-added teas that align with evolving consumer preferences, both locally and internationally.

To stay competitive, Sri Lanka's tea exports must focus more on premium, diversified, and value-added products. TRI plans to strengthen its research in this direction and enhance collaboration with industry stakeholders, trade bodies, and marketing agencies. By aligning research and product development with market needs, TRI can help the industry reach new consumer segments and sustain its global reputation.

## 1.6. Privatization

The future success of Sri Lanka's tea industry increasingly depends on the active involvement of the private sector, which has traditionally played a crucial role in value addition, marketing, and exports. Following the privatization of estate management between 1992 and 1997, the industry saw a significant transformation. Management of 23 tea plantation companies was transferred to private ownership, leading to major changes in production methods and market strategies.

Alongside this shift, the smallholder sector has emerged as a vibrant and entrepreneurial force within the industry. Today, both smallholders and private estate management companies represented by key organizations such as the Tea Small Holdings Development Authority (TSHDA) and the Planters' Association (PA) are actively pursuing innovative solutions to improve productivity and competitiveness. These stakeholders increasingly look to the TRI and other institutions for practical, science-based support.

For TRI to effectively meet these evolving needs, strong collaboration with smallholders, estates, and their representative bodies is essential. Research efforts should be driven by real world challenges and the practical insights of tea producers. Conducting field trials and on-site experiments in estate environments is especially important to ensure that research outputs are relevant and easily adoptable.

In the estate sector, there is a growing trend of hiring external consultants and scientists and using imported technologies. While this can sometimes result in TRI's recommendations being set aside, it does not diminish the value of TRI's research. Instead, it creates opportunities for TRI to adapt, innovate, and remain aligned with emerging trends. Exposure to new practices can enrich TRI's scientific approach and keep it current with global advancements.

In today's research landscape, collaboration is key. Future progress in the tea industry will likely stem from partnerships between TRI and forward-thinking estate managers. These collaborations can foster the development of new technologies and help adapt international innovations to local conditions. By embracing this cooperative approach, TRI can strengthen its role in the industry and help ensure that Sri Lanka's tea sector remains competitive, sustainable, and resilient in a rapidly changing global market.

## 1.7. Smallholdings

The tea smallholder sector in Sri Lanka, concentrated mainly in the Mid and Low Country regions, encompasses a wide range of stakeholders, including growers, dealers, and factory owners. In the Mid Country, tea is typically grown as part of a mixed garden economy, whereas in the Low Country, tea is cultivated on lands specifically allocated for that purpose. This sector has witnessed significant growth, driven by several key factors: the premium prices commanded by Low Country teas in major export markets such as the Middle East and the former USSR, government-supported tea planting subsidy programs, and the dedicated management practices of smallholders who carefully tend to their tea holdings.

As of 2024, tea smallholdings in Sri Lanka had expanded significantly, covering approximately 198,798 hectares, whereas the area under the estate sector had declined to around 68,388 hectares.

Smallholdings now account for 74.4% of the total land under tea cultivation, with estates contributing only 26.4%. The output from smallholders has also risen markedly, with their share of national tea production increasing from 57% in 1996 to 75.5% by 2023. Notably, smallholders continue to outperform estates in terms of productivity. In 2023, their average yield reached 1,205 kg per hectare, largely due to the greater prevalence of high-yielding clonal or vegetatively propagated (VP) tea, which constitutes about 90% of smallholder plantings, compared to 45% in the estate sector (TSHDA, 2023).

A recent report highlights those smallholders now generate approximately 75.5% of the total value of Sri Lanka's tea production, underscoring growing recognition of their contribution by both the government and international organizations. However, research programs designed by the TRI for large estates are not directly transferable to the country's estimated 418,938 smallholders. Generic recommendations often overlook the specific conditions and constraints faced by smallholder farmers (TSHDA, 2023). Consequently, TRI has increasingly incorporated adaptive research and the development of intermediate technologies tailored to the distinct needs of the smallholder sector.

Training and education are essential components in enhancing smallholder productivity. Spearheaded by the Tea Small Holdings Development Authority (TSHDA), programs focused on educating smallholders about scientific cultivation methods and the effective use of fertilizers and agrochemicals are vital. Smallholders must be convinced of the necessity to adopt more scientific approaches to tea production. In this effort, the TRI is committed to providing support and training for trainers, ensuring that smallholders can access the knowledge and skills needed to optimize their tea production and contribute further to the industry's growth.

## 1.8. Tea Research Institute of Sri Lanka

### 1.8.1. Background and History

The Tea Research Institute (TRI) of Sri Lanka was established in 1925 to meet the industry's growing demand for dedicated scientific research in tea cultivation and processing. Initially operating under the Planters' Association of Ceylon, the institute was elevated to the status of a government institution in 1957. With the establishment of the Sri Lanka Tea Board (SLTB) in 1975, the TRI became one of its affiliated divisions. Today, the TRI functions under the Tea Research Board, in accordance with the Tea Research Board Act No. 52 of 1993, which was subsequently amended by Act No. 30 of 2003 and Act No. 43 of 2006. These legislative frameworks empower the TRI to conduct, support, and promote scientific and technological research, as well as to collect and disseminate relevant data to encourage investment in tea research and development.

A major milestone in the institute's history was the formulation of its first Corporate Plan (CP), covering the period from 1999 to 2003. This plan aimed to align TRI's research priorities with the needs of tea growers and other stakeholders. It adopted the CADMAR (Composite Approach to Decision Making in Agriculture) methodology to guide the prioritization and selection of research projects. Although it was originally intended to be updated annually, the continuous implementation of this plan was hindered by technical and logistical challenges.

In response, the Corporate Plan was reviewed in 2003, resulting in a revised version for the 2003–2007 period. This updated plan placed greater emphasis on fostering direct engagement between the TRI and key industry stakeholders through structured institute-to-company dialogues.

The third Corporate Plan, covering 2008–2012, was introduced in May 2007 to address emerging challenges in the local and global tea sectors. Its development was informed by a peer review committee appointed by the TRI, consisting of nine members who provided valuable recommendations during their tenure from December 2006 to March 2007.

The committee identified several future challenges for the TRI, including:

- Addressing the shortage of workers and rising energy costs.
- Developing tea cultivars with higher yield and quality potential.
- Minimizing the use of synthetic pesticides.
- Maintaining soil health and improving fertilizer use efficiency.
- Extending the economic lifespan of replanted tea.
- Establishing a scientific foundation to promote tea as a safe and healthy beverage, thereby increasing global consumption.
- Remaining at the forefront of research and technology development.

The fourth Corporate Plan for 2013–2017 was launched in December 2012, following a comprehensive evaluation of progress made during the 2008–2012 period. A key development during this time was the formation of a Scientific Advisory Committee (SAC), comprising distinguished scientists and extension specialists from external organizations. The SAC was tasked with monitoring progress and providing expert guidance, ensuring that the TRI remained focused on its goals while assessing the achievements of the second Corporate Plan (2008–2012).

Research and development (R&D) outcomes at the TRI during 2008–2012 were systematically compared against the targets set in the annual action plans. This review prompted necessary adjustments, additions, and realignments in ongoing projects, as well as the introduction of new initiatives to address emerging challenges.

Building on the review of R&D activities from 2013 to 2015, a strategic plan for 2016–2018 was formulated. This iterative planning process continued, leading to the development of a further strategic plan for 2019–2023 based on an evaluation of that period's research efforts. Currently, the sixth Corporate Plan (2025–2029) is being developed in close consultation with stakeholders.

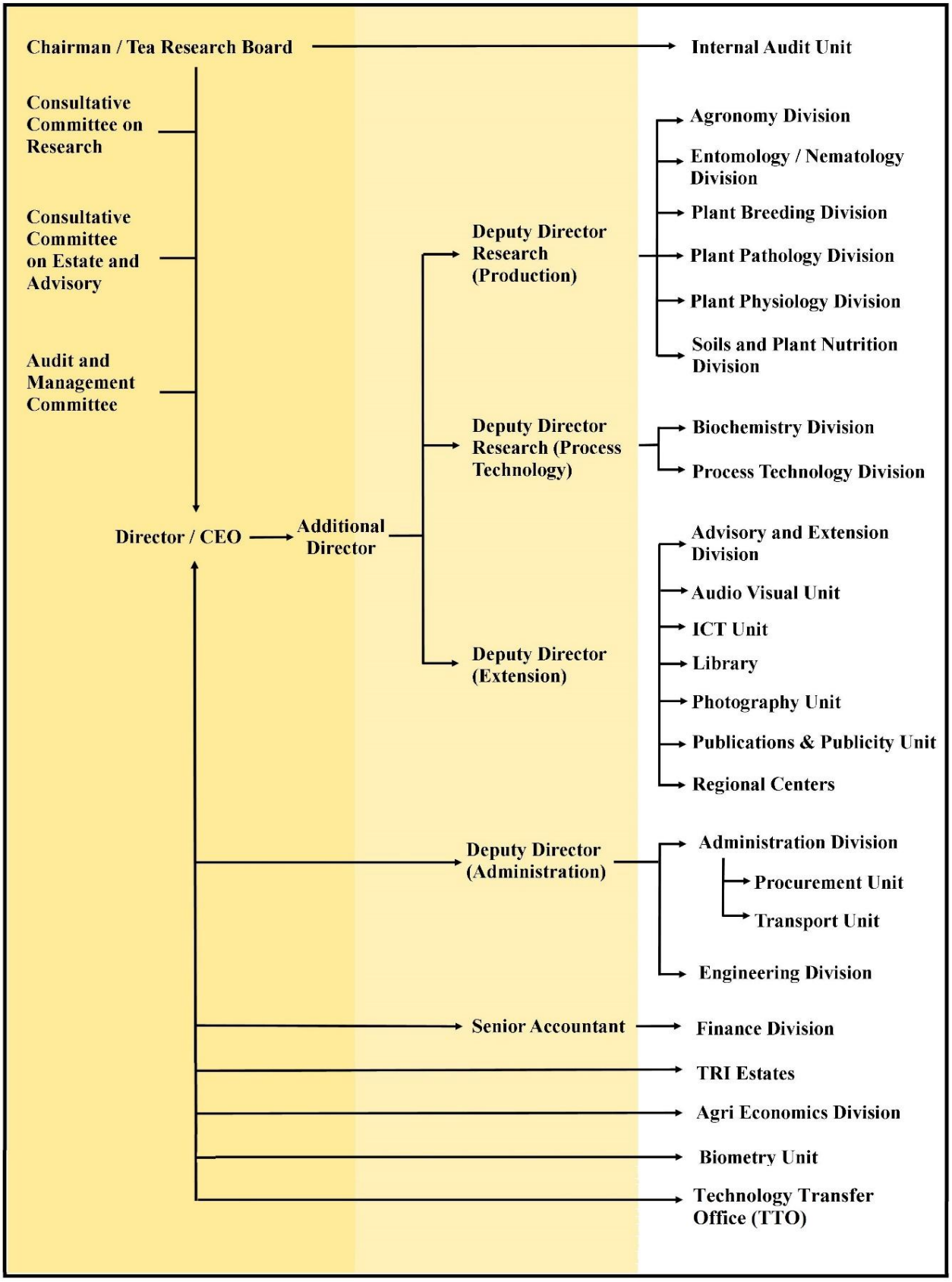
## VISION OF THE ORGANIZATION

"To achieve excellence in tea research and to provide technological guidance to the tea industry for the up-liftment of socio-economic status of Sri Lanka and to make Sri Lankan tea the most preferred tea in the world."

## MISSION OF THE ORGANIZATION

"The mission of the Tea Research Institute is to generate and transfer scientific knowledge and technologies appropriate for the stakeholders to improve productivity and quality of Sri Lankan tea in a most sustainable manner."

## Organizational Structure of the TRISL



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# PAST PERFORMANCE OF THE INSTITUTE

# (2019-2023)

Three categories, such as R&D progress, research management, and supportive services, were used to describe the status of the programs that were identified in the previous strategic plan.

## 2.1. Progress on Research and Development Projects

Under the 13 thematic areas, the progress of R&D projects was reviewed.

### 2.1.1. Crop Improvement

***New TRI 5000 Series Cultivars for Uva***

Three high-yielding cultivars (TRI 5002, TRI 5005, and TRI 5006) with drought tolerance, quality, blister blight resistance, and nematode tolerance were recommended and released for the Uva region.

***New Nematode Tolerant Cultivars for the Low Country***

Two cultivars (10/1 and 23/5) moderately tolerant to P. loosi and two cultivars (23/5 and 12/11) for Radopholus similis were identified.

***Establishment of New Hybrid Progeny***

New hybrid progeny of 188 individuals from a back-cross breeding program in 2018, the first of its kind in Sri Lanka, was established.

***Use of Radiation-Induced Mutation in Genetic Improvement of Tea***

Preliminary studies to determine the LD50 value of gamma rays for in vitro mutagenesis were conducted, and a new project with IAEA support for radiation-induced mutations using somatic embryos and nodal cuttings was initiated.

***High-throughput Genotyping to Expedite the Genetic Characterization and Dissection of Important Agronomic Traits of Tea***

Characterized metabolites of a new tea hybrid population from PBGT 41 and TRI 3055; planned for whole genome sequencing.

***Establishment of New Mother Bush Areas***

Under a special development project (2017 – 2021) funded by the ministry, TRI has established 22 ha of new mother bushes covering all 4 regions (up, mid, uva, and Low country) to disseminate planting materials of new cultivars. Another project was commenced in 2022 to expand the extent by 14 ha by 2027.

### *Optimized Liquid Culture Conditions for the Multiplication of Micro Shoots from Nodal Cultures*

Identified liquid MS medium conditions, TDZ and 10µm NAA are optimal for high multiplication rates from nodal culture, and 0.1 mg/L IAA, 1 mg/L BAP, and 0.2 mg/L GA 3 as the optimum medium for obtaining higher relative growth.

### *Optimization of Light Conditions for Photoautotrophic Micropropagation of Tea on Liquid Cultures*

Established suitable light conditions for photoautotrophic and photo-mixotrophic micro propagation of tea in liquid cultures.

- Light intensity of 30 µmol m-2 s-1 Photosynthetic Active Radiation (PAR) and Red light only or Red: Green: Blue 1:1:1 light quality is suitable for photoautotrophic micropropagation (sugar-free medium) of tea.
- Light intensity of 30 µmol m-2 s-1 PAR and Red: Green: Blue 1:1:1 ratio light quality with 15g/L sucrose liquid MS medium is also identified as suitable for photo mixotrophic micro propagation of tea.

### *Conservation and Utilization of Old Seedling Teas*

A Project was initiated to understand genetic diversity in old seedling teas, identify diversity hotspots, and develop conservation strategies.

### *Establishment of Seed Gardens to Increase the Availability of Improved Seed Materials for Drought-Prone Areas*

11 new Tea Seed Gardens have been established and 03 old gardens have been rejuvenated, under a special development project (2017 – 2021) funded by the ministry.

### *Establishment of Seed Gardens*

Established 15 seed gardens to increase production of improved seeds in drought-prone areas (Uva & Mid country), with maintenance of 11 gardens established in 2021 and rejuvenation of 03 Nos. of old seed gardens initiated.

### *In situ Conservation of the Oldest Tea Genetic Resources Preserved in Sri Lanka*

A Collaborative project (Department of National Botanic Gardens of Sri Lanka, the Tea Research Institute of Sri Lanka, and the Institute of Biology, Sri Lanka) was initiated for in situ conservation of the oldest tea genetic resources in Sri Lanka with international partners (University of Bristol and Kew Gardens, UK).

## 2.1.2. Land Productivity Improvement

### *Integrated Nutrient Management in Tea*

Based on experimental evidence, guidelines have been prepared for integrated nutrient management in tea, minimizing chemical and synthetic inputs.

An updated Guideline on Composting (Guideline 1/2021 Sinhala) in tea lands was released for stakeholders' use.

Experiments have been carried out to identify the effect of inputs, *viz.* Compost, Biochar, *Gliricidia*, Wood, and Refuse/spent tea, *etc*., on the soil quality of tea lands.

Minimizing use of synthetic/mineral nutrient sources, TRI promoted tying up with the adoption of at least key Good Agricultural Practices, viz. Burying of pruning and incorporation of pruned chips, promotion of soil tests-based use of nutrient-input approach, recycling of residues from the reclaimable tea to condition soils and factory ash to supplement K inputs, and commercializing Plant Growth Promoting Rhizobacteria (PGPR) based on bio-fertiliser in the mid-country region for practical use.

### *Development of an Economically Viable Slow-Releasing Compound Fertilizer*

Evaluated the yield response of mature tea to slow-release fertilizer.

- Highest Yield 1: 3800 kg $ha^{1}$ $yr^{1}$ with 100% N (Nano HA Urea) + 100% K (MOP) in 4 splits (35% yield increment).
- Highest Yield 2: 6563 kg $ha^{-1}$ $yr^{-1}$ with 50% N (Nano HA Urea) + 100% K (MOP) in 2 splits.

### *Evaluation of the Effects of the Application of Different Rates of Slow-Release Fertilizer*

The main objective of this study is to examine the yield response of mature tea to slow-release fertilizer produced by the Sri Lanka Institute of Nano Technology (SLINTEC) under growers' conditions to introduce an economically viable slow-releasing compound fertilizer.

Research and adaptive trials on the use of slow-releasing compound fertilizer (NANO urea hybrid) have been completed. Results revealed that annual N requirement supplied through nanohybrids in the Low Country and Uva showed a yield increment of 10–17% and 14–16%, respectively, compared with the current TRI recommendation.

### *Introduction of Micro-Nutrient Fortified Foliar Formulation based on Micro-Nutrient Status in Tea Growing Soils*

It was found that the combined application of Zn +Mn + B along with ground fertilization recorded the highest made tea yield, which is 16% higher than the present TRI recommendation (Ground + Zn) and control treatment. Adaptive trials are being carried out.

### *Estimating Crop Response to Macro Nutrients (N, P, K, S, and P) at the Agro-Ecological Region (AER) Level*

The study on the suitability of tea factory firewood ash mixed with refuse tea/compost as a nutrient source for mature tea under growers' conditions was completed and the results revealed that Wood ash at the rates of 500, 1000 kg/ha/yr with refuse tea or compost at 20 MT/ha/yr along with urea at 270N kg/ha/yr produced similar yield to present TRI inorganic fertilizer recommendation (VPLC 880).

### *Evaluation of Plant Growth Promoting Rhizobacteria (PGPR) Microbial Formulations for Low-Grown Tea*

PGPR microbial formulations were evaluated for tea nurseries in low-country tea-growing regions. Results showed a 50% reduction of N and replacement of DAP with ERP in the recommended T65 mixture, which was possible with the application of dual inoculants formulated with respective series-specific microbial strains. The patent has been obtained for the PGPR inoculants, and calling EOI for scaling up and commercialization is in progress.

### *Screening of Organic Fertilizers to Incorporate in Integrated Nutrient Management (INM) Strategies in Tea*

To ease the dependency on chemical fertilizer use, this study was carried out as a collective effort by the TRISL (TRISL) to promote organic fertilizer rich in nitrogen content for use in the integrated nutrient management approaches and sustainability of tea cultivations.

### *Application of Nano-Technology in Soil Fertility Management in Tea Lands*

Developed three metal organic framework (MOF) based materials to modify screen-printed carbon electrodes (SPCEs), enhancing the electrochemical detection of nitrate and nitrite in soil extracts

### *Screening of Solid and Liquid Organic Products for Their Suitability for Use in Tea*

Conducted a project in three phases to screen solid and liquid organic products for tea suitability.

Issued a guideline on the use of supplementary agricultural inputs in the Sinhala language titled; ඒකාබද්ධ ශාකපෝෂක කළමනාකරණය උදෙසා අතිරේක කෘෂියෙදවුම් (මාර්ගෝපදේශ අංක 02/23) (2023 ඔක්තෝම්බර්)

### *Evaluation of Two New Grasses, Hybrid Napier CO-3 and Lemon Grass, in Comparison with Mana & Guatemala*

Findings of the study were tipping weight of tea plants is significantly higher (36%) in grass rehabilitated plots than in direct planted fields, Mana, Guatemala & CO3 rehabilitated plots, produced 10-13% higher plant growth than Lemon grass plots, Hybrid Super Napier Var. Pakchong-1 produced 54% higher lopping weight than CO3 grass, and the Earthworm population in Pakchong-1 grass plots was 86% higher than CO3.

### *Soil Quality Index (SQI)*

Released guidelines and upgraded laboratory facilities at TRI Low Country Research Centre, Rathnapura. Testing soil samples from stakeholders was commenced to minimize the rehabilitation period for new planting. Field validation exercise of the SQI in smallholder tea lands conducted in collaboration with the STaRR project team.

### *Investigation on Soil Degradation by Erosion & Water Conservation of Tea Lands*

The findings of the study were that the terrace with Vetiver hedges was highly effective in controlling runoff, reducing it by 83% compared to tea only, soil loss in bare lands 12. 8 tons/ha/yr, while in lands, soil loss was only 0.8 tons/ha/yr.

### *Evaluating an Appropriate Rainwater Harvesting and Retention Method and the Effectiveness of Rainwater Use for Tea*

Evaluating the rainfall interception by shade trees and coconut trees in tea fields revealed that intercepted stem flow could be used successfully in the field for the application of wick irrigation. Wick irrigation showed high water application efficiency.

### *Development of Pest and Disease Management Strategies for Shade Trees in Different AERs*

The application of Potassium phosphite has been identified as a prophylactic treatment for managing Grevillea dieback in tea plantations.

### *Evaluating Growth Performances and Effects of Identified Shade Tree Species on Tea, and Establishing Cultural Practices*

This project was initiated in the low country (2 locations) and progressed to mid, up, and Uva locations to study alternative high-shade trees for tea plantations. *Derris microphylla* was found to be a good alternative for *Albizia moluccana* in low-growing teas with comparable effects on high-shade, growth, and yield of tea.

### *Development of Water Management Techniques for Tea in Drought-Prone Areas and Evaluating Drip and Sprinkler Irrigation Systems for Low-Grown Tea*

Two experimental sites to evaluate the efficacy of drip and sprinkler irrigations on the growth of tea in drought-prone areas were established. The evaluations were also conducted in a system where tea was inter-planted with coconut in collaboration with an external partner and the Tea Small Holder Federation Society on sprinkler irrigation.

## 2.1.3. Climate Change Impact Assessment

### *Carbon Budgeting for Different Tea Growing Regions*

It was found that the carbon budget becomes more negative with the increase of compliance to the recommendations of the TRI, i.e., establishment of high and medium shade trees into tea plantations as per the recommended densities. Further, the carbon budget is more negative in the low-grown region, followed by the mid-grown and in the high-grown region.

### *Rapid Interventions to Minimize the Adverse Effects of Climate Change on Tea*

Exogenous application of Salicylic acid at the lowest effective concentration (150 mg $L^{-1}$) would be beneficial in reducing the impact of drought and improving productivity in both immature and mature tea plants, and exogenous application of long-chain fatty alcohol was also found to be supplementary for mitigating drought stress on susceptible tea cultivars at this stage.

The current recommendation of spraying 2% Murate or Sulphate of Potash for immature tea plants (i.e commencement of spraying before the onset of drought) can be modified accommodating the commencement of spraying these chemicals during dry weather for plants under moderate-stress conditions if spraying could not be commenced before the onset of drought for some reason or the onset of drought not precisely predicted/identified.

### *Guidelines for Climate Change Preparedness and Mitigating Climate Change*

Having foreseen the possible impacts of adverse weather conditions in the different agro-ecological regions of tea-growing areas, and long-term data analysis, the guidelines for preparedness to minimize effects have been made. Furthermore, guidelines for mitigating climate change effects on tea and establishing activities to encourage a carbon-neutral tea industry have also been made. Arrangements have also been made to establish a precision agriculture cell at TRI.

### *Investigation on Pest and Disease Response of Tea to Global Climatic Change*

To study the life cycle of the Shot hole borer at different temperatures under laboratory conditions, the project was implemented the determine the variation of the life cycle of Shot hole borer (*Xyleborus fornicatus*) at different temperature ranges.

### *Analysis of Climate Change, Identifying Vulnerable Tea-Growing Regions, and Seasonal Weather Forecasting for Different Tea-Growing Regions in Sri Lanka*

As a collaborative approach with the Department of Meteorology and TRI Talawakelle (Upcountry), Kandy (Mid-country), and Rathnapura (Low country), rainfall and temperature data records were analyzed, and forecasting and sharing with TRI Advisory and Extension Division and its Advisory Officers continued for the use in outreach activities.

## 2.1.4 Mechanization of Field Practices

### *Distribution Of Holing Machines*

Sixteen holing machines have been distributed among the members of the recipients (Tea Smallholdings Development Societies) through TSHDA to popularize the use of mechanical devices among tea growers.

### *Experiment on Foliar Micro-Nutrient Fertilizer to Minimize the Adverse Impacts of Nonselective Motorized Mechanical Harvesting*

A new experiment commenced to evaluate a new foliar micro-nutrient fertilizer mixture (Zn, Mn, and B) formulated on its ability to minimize adverse impacts resulting from nonselective motorized mechanical harvesting.

### *Development and introduction of a Motorized Selective Tea Harvester*

An innovative project commenced, “Development and Introduction of Motorized Selective Tea Harvester/s Suitable for Tea Lands in Sri Lanka (2021-2023). During the year under reference, two partners selected for the project (Arthur C Clerk Center Institute for Modern Technologies and B and N Optimums (Pvt) Ltd) continued with the designing and fabrication of prototypes of motorized selective-tea harvesters.

During the year 2023, the 2$^{nd}$ stage prototype testing is progressing. Prototypes of the machinery developed by the inventors were tested in consultation with TRISL at Rathnapura and

Talawakelle. Field testing of the machine developed by a selected supplier, taken over by the TRISL. Development of the shoot collection mechanism is continuing.

## 2.1.5. Nursery Management Techniques

### *Evaluating Different Media & Mixtures for Tea Nurseries*

The study concluded that the present method of stacking the nursery bags on soil beds is the most suitable. However, if the nursery site is having a problem with drainage, staking the plants in a stone bed is preferable

### *Evaluating Micro Irrigation Systems for Tea Nurseries*

The study found that the water requirement for a young tea plant is approximately 175 ml. This can be considered as the water requirement for the plant during the latter part of the nursery stage.

## 2.1.6. Crop Management

### *Identification of Safe Insecticides for Designing IPM For Tea Tortrix*

Emamectin Benzoate (Proclaim 5 SG) at the rate of 0.28 g/L per dose was recommended as a chemical for spot application with an extended PHI of 14 days to manage tea tortrix.

Field efficacy and residue trials of Proclaim 05 SG (Emamectin benzoate 5% w/w) were completed and recommended to control Tea Tortrix (Homona coffearia) and seasonal caterpillars.

### *Development of Trichoderma and Pseudomonas-Based Biopesticides*

A collaborative project with a private partner aimed at identifying and developing potential *Trichoderma sp.* and *Pseudomonas fluorescens* as biopesticides against root diseases has been continued.

Twelve isolates were identified as *P. fluorescens* isolates. Based on antagonistic capacity, pH, and temperature sensitivity isolates, NE 35, PTw, and LKD were selected, having potential for commercialization. Growth conditions of all the selected *Trichoderma* and *P. fluorescens* isolates were optimized for mass production, and all six isolates were formulated into powder-based products. Glasshouse and field testing of the formulated products and data generation continue towards commercialization of the identified biopesticides for the tea industry.

Continued collaborative studies on the mass production of bio-pesticides using the technical expertise and resources of the Synkromax Pvt. Co. Ltd., India. Based on the findings, a patent has been filed for Trichoderma-based biopesticide at the NIPO (Application No.21988).
A Microbial Processing Plant equipped with a modern Bioreactor was established, and its operations were commenced successfully with a view to mass multiplication of bio pesticides for field experimentation and strengthening commercialization potential.

### *New Model for Early Screening of Cultivars for Blister Blight*

A discriminant model was developed to differentiate blister blight-resistant and susceptible accessions/cultivars based on biochemical parameters of green leaf.

### *Copper Hydroxide (50% WG) and Hexaconazole EC for Blister Blight Control*

Bio efficacy and residue trials completed for Copper hydroxide 50% (WG) against blister blight. Residue data generation for Hexaconazole EC was completed.

### *Distribution and Severity of Grevillea Dieback*

A distribution and severity map has been drawn for Grevillea dieback in tea-growing regions.

### *Nano Formulations of Systemic Fungicides*

TRI, in collaboration with Sri Lanka Institute of Nanotechnology (Pvt) Ltd on R and D approaches in developing and screening biological methods for pest and disease management and nano-formulations of systemic fungicide, has been able to formulate nano-sized Hexaconazole and Entomopathogenic fungus *Beauvaria bassiana* against Blister blight and Shot-hole borer, respectively, as compared to current recommendations.

Micro-encapsulated *Beauveria bassiana* and nano hexaconazole were developed by the SLINTEC for experimentation at TRI. Laboratory bioassay to evaluate the bio-efficacy of micro-encapsulated *Beauveria bassiana* against SHB has been completed.

Bio-efficacy of Nano hexaconazole against fungal symbiont (*Fusarium ambrosium*) of the shot-hole borer was commenced to find out the minimum concentration that inhibits the fungal growth.

### *Establishment of Bio-Efficacy and Residue Data for a Nano-Copper Fungicide*

To develop integrated management strategies to control major tea diseases, screening of nano-copper formulation against blister blight disease in tea was established. It was found that the levels of Cu residue in the final product, i.e., made tea processed in the miniature scale, after copper sulphate pentahydrate (ICC60) was sprayed at 0.3%. Therefore, the levels of copper residue in copper sulphate pentahydrate-treated samples were lower than 40 ppm, the Maximum Residue Limit (MRL) allowed by the European Union (EU) for copper.

### *Bio-Efficacy Of 2 Isolates of Metarhizium Against White Grubs, Upcountry, and Low Country Live Wood Termites*

Bio-efficacy of 2 isolates of Metarhizium was evaluated against White grubs, Upcountry live wood termite, and Low country live wood termite. Promising results were achieved with the study.

### *Alternatives to Synthetic Herbicides*

TRI, in collaboration with the University of Peradeniya & NRC funding, investigates to determine herbicidal properties of green manure plants, viz. Wild Chrysanthemum (Artemisia vulgaris) and preliminary work elucidated herbicidal effects as compared to conventional synthetic herbicides.

### *New Herbicides –Alternatives to Glyphosate*

Mayoral SL has been identified as a potential herbicide for controlling weeds in tea, and recommendations will be made after completing the investigations on compliance with MRL.

### *Integrated Weed Management (IWM)*

As part of IWM approaches, investigations about the screening of Avenger AG Optima Burndown herbicide and the screening of Glufosinate Ammonium herbicide progressed during the year under review.

### *Identification and Evaluation of Potential Herbs Containing Allelopathic Properties for Weed Control.*

Thirteen pure allelochemical compounds (5 compounds from *Chrysopogon zizanioides*, 8 compounds from *Erythrina lithosperma*) were isolated using chromatographic techniques. Two out of the 13 compounds exhibited strong allelopathic activity.

### *Evaluation of Sustainable, Organic, and Low-Input Farming Systems for Tea*

The primary objectives of the project were to evaluate pest, disease, and weed management under sustainable, organic, and low-input farming systems, scientifically validate biological and natural pest, disease, and weed management practices, and develop user-friendly sustainable biological and natural pest, disease, and weed management methods. Soil sampling for in-depth studies at ETH Zurich, Switzerland, was continued with the TRIOCON trial established in St. Coombs Estate, Talawakelle.

### *Revised Advisory Circulars of Pesticide Use (PU) Series Issued*

1. Pesticide (Plant Protection Product) use in Tea (March 2023) (01/23)
2. Chemical Control of Diseases (March, 2023) (01/23)
3. Chemical Control of Weeds in Tea Lands (May 2023) (03/23)
4. Chemical Control of Insect, Mite, and Nematode Pests (March 2023) (01/23)

## 2.1.7. Tea Processing Technology

### *Optimization of Electrical Energy Efficiency in Trough Withering Using a Real-Time Heat and Mass Transfer Mathematical Model*

A microprocessor-based commercial-type withering control system that was fabricated during 2018 was further developed with wireless connectivity for sensors and actuators and a web dashboard. The web dashboard facilitates to view of online data as well as historical data of the withering process. Further, it facilitates setting/ entering the parameters such as quantity loaded on the trough, initial moisture content of green leaf, leaf temperature, and targeted withering period.

Patent was received under the title, “A Mathematical-based control system for trough withering of tea” (Patent no. 20045), which was published in the government gazette on 24th March 2023

### *Validation of Process Automation in Fluid Bed Drying*

An engineering firm collaborated, and a commercial type PLC-based monitoring and control system to the fluid bed dryer (TRI-CCC FBD) at St. Coombs tea factory was installed to validate the prototype process automation developed by TRI for the dryer in 2018. Validation trials were conducted, and the results showed that the system facilitates drying the teas within an acceptable moisture content of 3.0% (w/w, wet basis) while maintaining the rated output of the dryer and required black appearance in tea.

### *System Modification to the Existing Furnaces Used in the Tea Industry*

A semi-automatic feeding system to feed wood chips into the furnace/air heater was successfully operated in collaboration with the NERD center during 2021. The unit was demonstrated at the Institute Tea Factory at Rathnapura. Necessary modifications were made to the unit and the furnace/air heater, and six trials were conducted to establish operating parameters. Under optimum operating conditions, specific woodchip consumption for drying was found to be 0.6 kg/ kg of made tea. It is less than the conventional firewood consumption of 1.0 kg/ kg of tea for drying tea with firewood logs at the factory. Suitable moisture content in fuelwood chips for use in the conventional furnace/air heater is 25%. It took three weeks to reduce the moisture content of wood chips from an initial moisture content of 44% to a final moisture content of 25%.

### *Development of Self-Cleaning Sifter with Multiple Mesh Frames for Grading Long Leafy and Wiry Type Teas*

A Self-cleaning Sifter with multiple mesh frames was fabricated in collaboration with an Engineering Firm. Four trials were conducted to test the sifter at St. Joachim tea factory. The results showed that by using the Self-cleaning Sifter with multiple mesh frames, average throughput increased by about 65 kg/ hour, worker output increased by about 107 kg/ manhour with a reduction of 4 to 5 workers, and average selling price of tea grades increased by Rs. 22.55 compared to conventional sifting using Michie sifters. Further, the machine saved about 16 $m^2$ of space in the grading room.

### *Development of An Efficient Hot Air Supply System Through Radiating Steam and Hot Water Circulation*

Earlier, a microprocessor-based commercial-type withering control system was developed for withering leaves in troughs. The system included a hot air supply arrangement to the troughs. The hot air supply for the trough was arranged from the dryer exhaust and by automatically adjusting the hot air damper. In this study, further development of the control system is required to suit hot air supply through a hot water generator radiator system. A radiator unit was designed for the system. It was fabricated and installed in trough No.9 at St. Coombs factory by offering the job to an engineering firm. The control system was modified to control hot water flow through the radiator and to measure the inlet and outlet temperature of the hot water. The improved control system was successfully tested and validated.

### *Development of A Model Factory for Tea Processing Research*

The Institute Tea Factory at St. Joachim Estate was developed into an Experimental Process Technology Development Facility dedicated to tea processing research and development, with Rs. 50 million allocated under a special project. Major upgrades included the installation and

commissioning of a new colour sorter. The rolling room was automated through conveyorization, which involved modifying and relocating rollers and roll breakers, supported by enhanced power supply systems. Repairs were completed on six of the eight withering trough units, with materials procured for the remaining two. The stand-by tea drier was also restored to operational condition, and part of the first-floor timber loft was renovated. Structural repairs were undertaken to fix leaks in the concrete slabs above the workers' rest room and furnace room. Additionally, the roof for the ground floor was renovated, along with gutters and downpipes, while materials for similar improvements on the first floor were acquired. With these developments, the factory now functions efficiently, utilizing modernized infrastructure and machinery to support the research and development objectives of the institute.

***Development of A Combustion Control System for Air Heaters***

A combustion control system that was designed and developed to control the combustion of firewood in the Hot Water Generator at St. Coombs factory in 2021 was successfully tested and validated.

***Study on Achievable Net Outturn (NOT) in Orthodox Black Tea Manufacture***

The staff conducted a comprehensive research study. In the first component, 28 commercial trials were carried out between January 2022 and November 2023 to determine the achievable NOT. Green leaf (GL) from various sources was processed into marketable tea grades, and data on leaf quantity, moisture content, and leaf standard were collected. NOT was computed using both factory-recorded GL weights (with deductions) and actual GL weights (without deductions). In the second component, a monthly survey was conducted by SLTB officials across 33 commercial-scale tea factories from August 2022 to November 2023 to assess green leaf quality: % Moisture Content and % Leaf Standard. The findings showed that green leaf quality parameters at the St. Joachim factory were consistent with those observed across the broader factory sample. The results were presented to the Consultative Committee for Research (CCR) for their recommendation on a suitable NOT value.

## 2.1.8. Made Tea Quality Improvement

***Establishment of Geographical Indicators for Ceylon and Regional Tea***

In order to ensure the “Ceylon Tea” brand in the global tea market and establish Indicators for Ceylon and its provisionally recognized Regional Teas, a Geochemical approach using Stable Isotope Signatures and Trace Element analysis was launched, and the preparation of a database was initiated as per the Tripartite agreement among SLTB, SLAEB, and TRISL.

The important chemical constituents, which influence the flavor of black tea, such as polyphenols, caffeine, sugars, organic acids, volatile flavor compounds, and amino acids, related information collection and analysis were also carried out.

***Establishment of Inherent Sugar Concentrations in Black Tea: Low and Mid Elevations***

Statistically validated data sets on the maximum permissible inherent concentration of Fructose, Glucose, and Sucrose in made teas covering Low and Mid elevation factories were established, and accordingly, the maximum permissible levels of inherent concentrations of Fructose, Glucose,

and Sucrose in made teas have been conveyed to the Sri Lanka Tea Board for the formulation of regulations.

***Establishment of Inherent Sugar Concentrations in Black Tea from the Low Country***

Maximum Permissible levels of sugars in low-grown teas have been successfully established as Sucrose: 35 mg/g, Glucose: 20 mg/g, and Fructose: 25 mg/g. TRI has completed the study and submitted the report to SLTB to regularize and implement compliances.

## 2.1.9. Value Added Tea Products

***Development of Value-Added Tea Products***

The procedure for the commercialization of tea wine was initiated. The processes of tea sauce and encapsulation of tea aroma were developed, and the evaluation of potential applications of encapsulated tea aroma was conducted.

## 2.1.10. Health Benefits of Tea

***Investigation of Health-Promoting Effects of Sri Lankan Tea Cultivars***

A new project has been commenced to identify the potential health benefits of Sri Lankan tea cultivars and to promote in the global market, and investigate the health benefits of Sri Lankan tea cultivars/accessions for their rational utilization in tea breeding and tea crop improvement programs. Antioxidant assays, 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging capacity assay, and ferric reducing antioxidant power (FRAP) assay were optimized to quantify the antioxidant activity of black tea using a microplate reader.

Optimization of the α-amylase inhibition assay, α-glucosidase inhibition assay, lipase inhibition bioassay, and acetylcholinesterase inhibition assay were completed using 5 tea cultivars.

## 2.1.11. Socio-Economics and Resource Planning

***Investigation on Worker Turnover Intention in Tea Plantations***

Results of an island-wide survey conducted revealed that significant positive factors of worker turnover intention in tea plantations were income, time taken to reach plucking fields, recognition, working environment of the estate, supervisory support & workload. Worker turnover intention had a significant negative correlation with job satisfaction and organizational commitment. The study highlighted the importance of taking action to increase workers' job satisfaction & organizational commitment such as providing opportunities like cash plucking, and contract work, introducing a beneficial production incentive scheme, considering workers convenient in allocating fields, arranging transport facilities, creating a good working environment, supplying required materials, equipment &machinery, treating employees in a friendly manner, high supervisory support & having a special training program focus on attitudinal changes of workers as effective retention strategies.

### *Correlation Between Labor Availability and Land Productivity in Tea Plantations*

Results of an island-wide survey conducted revealed that the severity level of worker shortage has a significant impact on the productivity level of the estate, and mean productivity levels declined with the increase of worker scarcity. It highlights the necessity to promote mitigation measures such as promoting mechanization of field practices, employing different farming models, and increasing the efficiency of the existing workforce.

### *Impact of Product Innovation on Firm Performance in the Sri Lankan Tea Industry*

This study pinpoints the need to promote tea-based radical innovations in Sri Lanka rather than focusing only on incremental innovations. As a major tea producer and exporter in the world, Sri Lanka should prioritize supplying tea to the mass market. Therefore, while encouraging, teas exported for mass markets to be added value through incremental innovations within the country, much attention should be given to increasing the product range through tea-based radical innovations to assure the sustainability of the industry in the long run.

### *Factors Contributing to Tea-Based Innovations in Sri Lanka*

The study conducted in tea export firms revealed that factor conditions (i.e., human and physical resources, knowledge, capital, and infrastructure) and demand conditions (i.e., domestic demand for innovative beverage and non-beverage tea products) are favorable while related and supportive industries and firm strategy, structure and rivalry are less favorable in producing tea-based innovations in Sri Lanka.

### *Minimum Impact of the COVID-19 Pandemic on the Social Life of Tea Smallholders*

The study conducted in tea smallholdings revealed that the effect of the COVID-19 pandemic was marginal on tea production, income, food security, health, and children's education of sample smallholders. Encouraging smallholders for home gardening, online banking, online ordering of inputs, selling green leaves, and developing facilities for online education would be useful to minimize the negative consequences of shocks like COVID-19.

### *Estates Practices Alternative Worker Deployment Models*

A survey in the estate sector revealed that 61% of the estates in different tea-growing regions practiced alternative worker deployment models.

### *Causal Factors for Worker Shortage in the Tea Smallholder Sector*

The results of the study on the Investigation of worker shortage in the smallholder sector revealed that about 52% of smallholdings were facing the problem of worker scarcity. The main causative factors for labor shortage in tea smallholders were a) demand for higher wages, b) low satisfaction level of labors, c) poor youth participation in tea cultivation due to a lesser wage system, d) out-migration due to urbanization, e) higher job opportunities in urban areas, f) non-cash benefits and g) higher absenteeism due to adverse weather conditions.

### *Identification of Typology and Trajectories of Tea-Based Farming Systems by Modeling Land Use and Land Cover Dynamic Changes in Low-Country Regions*

This study was conducted to identify tea-based farming systems in the Low Country region (Rathnapura), Sri Lanka, and to evaluate the performance of present farming systems. Study The results reveal the necessity of strong intervention on revitalization of existing tea-based farming

policies and move towards a need-based target-oriented approach. Furthermore, this study emphasizes the importance of considering the diverse structure of socioeconomic settings of farm households in implementing farming technologies. Also, the revelations suggest policy implications for the development of tea intercropping systems, considering the heterogeneity of tea-based farming practices in non-traditional areas.

### *Study on Alternative Worker Deployment Model (AWDMs)*

The introduction of AWDMs to tea plantations is expected to be an appropriate concept to minimize the negative impacts of labor shortage, improve abandoned tea lands, and earn additional income for workers. A survey was conducted to identify the level of implementation and performance of the AWDMs in the plantation sector revealed that reasons for the failures of AWDMs are due to labor scarcity (level of estate labor scarcity/family labor availability), estate productivity (low-yielding tea lands), managerial policies, and labor demotivation. Although most of the estates have implemented different kinds of AWDMs, the status of these systems is not satisfactory. Furthermore, it has been identified that proper management and closer monitoring are essential for the success of any AWDMs.

### *Socio-Demographic Heterogeneity on Awareness of Health Benefits and Perceptions Towards Black Tea Consumption*

The study on socio-demographic heterogeneity on awareness of health benefits and perceptions towards black tea consumption in Nuwara Eliya District revealed that consumer awareness of health benefits is at a medium level, and education level and age showed a significant positive relationship with the awareness of health benefits of tea. Further, there are significant differences between the means of consumer perceptions among different ages, immigration statuses, education, and awareness levels.

### *Preliminary Study on Innovative Tea Producers in Sri Lanka*

The objectives of this study are to identify the importance of sample analysis on innovative/specialty teas in Sri Lanka and to include all the collected information via the case study series. During the year, six key informant discussions and 20 case studies on innovative tea producers in Sri Lanka. The brainstorming session was held on artisanal tea / handmade tea production for small and medium entrepreneurs, and one workshop titled Demonstration of Tea Drinking and Tasting of Seven Regional Teas" and Traditional Japanese Tea Making and Tasting" was conducted.

## 2.1.12. Technology Dissemination

*Table 1. No. of Technology Transfer Programs Conducted During 2019-2023*

| | Talawakelle | Rathnapura | Kandy | Passara | Deniyaya | Kottawa | Matugama | Total |
|---|---|---|---|---|---|---|---|---|
| 2019 | | | | | | | | |
| Advisory visits | 74 | 122 | 91 | 43 | 91 | 74 | 80 | 575 |
| Advisory correspondence | 335 | 270 | 180 | 151 | 393 | 170 | 83 | 1582 |
| Training programs for stakeholders | 81 | 19 | 29 | 16 | 51 | 41 | 07 | |
| Training programs for students of Higher educational institutions | 14 | 6 | 9 | 5 | | | | |
| Distribution of printed extension materials | 1151 | 271 | 163 | - | 597 | 474 | 89 | 2745 |
| Soil samples tested for pH | - | 460 | 272 | 758 | 217 | - | 131 | 1838 |
| Inspection of commercial tea nurseries | - | 15 | 64 | 82 | 83 | - | 17 | 261 |
| Field visits for survey studies | - | 2 | - | - | 10 | 20 | 15 | 47 |
| Regional technical & extension forum (RTEF) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 14 |
| Regional scientific committee activities | 4 | - | - | - | - | - | - | 4 |

*Table 1. No. of Technology Transfer Programs Conducted during 2019-2023 (Cont.,)*

| | Talawakelle | Rathnapura | Kandy | Passara | Deniyaya | Kottawa | Matugama | Total |
|---|---|---|---|---|---|---|---|---|
| 2020 | | | | | | | | |
| Advisory visits | 85 | 90 | 63 | 35 | 71 | 41 | 58 | 443 |
| Advisory correspondence | 253 | 181 | 217 | 95 | 539 | 197 | 63 | 1545 |
| Training programs for stakeholders | 16 | 4 | 27 | 11 | 29 | 35 | 9 | 131 |
| Training programs for students of higher educational institutions | 4 | 1 | 3 | | | | | 63 |
| Distribution of printed extension materials | 440 | 118 | 52 | 48 | 111 | 127 | 49 | 945 |
| Soil samples tested for pH | - | 171 | 635 | 1221 | 371 | 120 | 57 | 2575 |
| Inspection of commercial tea nurseries | - | 22 | 16 | 67 | 80 | - | - | 185 |
| Field visits for survey studies | 3 | - | - | | 65 | 13 | 11 | 92 |
| Regional Technical and Extension Forum (RTEF) | - | - | - | 1 | 1 | - | 1 | 03 |
| Regional Scientific Committee (RSC) activities | - | - | - | - | - | - | - | - |

*Table 1. No. of Technology Transfer Programs Conducted during 2019-2023 (Cont.,)*

| | Talawakelle | Rathnapura | Kandy | Passara | Deniyaya | Kottawa | Matugama | Total |
|---|---|---|---|---|---|---|---|---|
| 2021 | | | | | | | | |
| Advisory visits | 81 | 56 | 31 | 83 | 93 | 67 | 137 | 548 |
| Advisory correspondence | 245 | 55 | 32 | 81 | 539 | 149 | 67 | 1168 |
| Training programs for stakeholders | 27 | 21 | 35 | 16 | 22 | 14 | 4 | |
| Training programs for students of higher educational institutions | 16 | 1 | 1 | | | | | |
| Distribution of printed extension materials | 370 | 60 | 75 | 40 | 39 | 88 | 12 | 684 |
| Soil samples tested for pH | - | 70 | 627 | 1402 | 372 | 107 | 73 | 2651 |
| Inspection of commercial tea nurseries | 2 | 11 | 42 | 118 | 50 | - | 13 | 236 |
| Field visits for survey studies | 3 | 1 | - | - | 67 | 03 | 35 | 109 |
| Regional Technical and Extension Forum (RTEF) | 1 | - | - | 1 | - | - | - | 3 |
| Regional Scientific Committee (RSC) activities | - | - | - | - | - | - | - | - |

*Table 1. No. of Technology Transfer Programs Conducted during 2019-2023 (Cont.,)*

| | Talawakelle | Rathnapura | Kandy | Passara | Deniyaya | Kottawa | Matugama | Total |
|---|---|---|---|---|---|---|---|---|
| 2022 | | | | | | | | |
| Advisory visits | 83 | 81 | 33 | 84 | 78 | 47 | 63 | 469 |
| Advisory correspondence | 180 | 135 | 60 | 106 | 501 | 80 | 71 | 1133 |
| Training programs for stakeholders | 49 | 20 | 33 | 52 | 26 | 31 | 16 | 247 |
| Training programs for students of higher educational institutions | 7 | 6 | 7 | | | | | |
| Distribution of printed extension materials | 804 | 340 | 149 | 114 | 154 | 66 | 11 | 1638 |
| Soil samples tested for pH | - | - | 515 | 1162 | 587 | 326 | 58 | 2648 |
| Inspection of commercial tea nurseries | - | - | 47 | 27 | - | - | 05 | 79 |
| Field visits for survey studies | - | 10 | 2 | 9 | 39 | 02 | 37 | 99 |
| Regional Technical and Extension Forum (RTEF) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 14 |
| Regional Scientific Committee (RSC) activities | | | | | | | | 2 |

*Table 1. No. of Technology Transfer Programs Conducted during 2019-2023 (Cont.,)*

| | Talawakelle | Rathnapura | Kandy | Passara | Deniyaya | Kottawa | Matugama | Total |
|---|---|---|---|---|---|---|---|---|
| 2023 | | | | | | | | |
| Advisory visits | 47 | 58 | 43 | 46 | 69 | 52 | 108 | 437 |
| Advisory correspondence | 102 | 29 | 35 | 81 | 159 | 91 | 130 | 537 |
| Training programs for stakeholders | 44 | 20 | 18 | 43 | 28 | 32 | 11 | 196 |
| Training programs for students of higher educational institutions | 16 | 15 | 4 | 0 | 0 | 0 | 0 | 34 |
| Distribution of printed extension materials | 605 | 138 | 125 | 60 | 39 | 24 | 149 | 1140 |
| Soil samples tested for pH | 941 | - | - | 1394 | 461 | 212 | 130 | |
| Inspection of commercial tea nurseries | | | | 88 | 69 | - | | |
| Field visits for survey studies | | | | - | 39 | 05 | 10 | |
| Regional Technical and Extension Forum (RTEF) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 14 |
| Regional Scientific Committee (RSC) activities | - | - | 1 | - | - | - | - | 1 |

### *Experiment and Extension (E & E) Forum for the Smallholding Sector*

Four sessions of E and E (40th, 41st, 42nd, 43rd) for the smallholding sector for the officials of TSHDA, SLTB, Ministry of Plantation Industries, and Tea Smallholder Development Societies were conducted during the last five years at TRI Talawakelle and Rathnapura.

### *Experiment and Extension (E&E) Forum for the Corporate Tea Sector*

Three E and E forums (237th, 238th, 239th) were held during the last five years at the TRI Auditorium, Talawakelle.

### *Tea Techno-Park*

The concept of Agri techno-park is proven worldwide to be an effective extension tool where farmers, consumers, and the general public can gain knowledge and field experience on the adoption of recommended practices and their benefits, which helps to convince the farmers/trainees. Similarly, a tea techno-park model was developed for education, training, and tourism purposes as a public-private partnership project between the TRI and Somerset Estate of Talawakelle Tea Estates PLC. For this purpose, a suitable site was identified by Somerset Estate in consultation with the TRI, and preliminary work on the establishment of the park is in progress.

### *Adaptive Trials for Evaluating the Adaptability of New Technologies for Adoption by Farmers*

In this study, socio-economic aspects and practical issues that are encountered when implementing the technologies in the field conditions are explored. TRI 5000 series cultivars in adaptive trial sites established in Badulla, Kandy, Matara, Galle, Kalutara, and Rathnapura districts, and evaluated the trial's performance by the Staff of the Advisory Division.

### *Small Tea and Rubber Revitalization Project (STaRR)*

The following activities were completed during the year;

1. Awareness programs on Soil Quality Index (SQI) for Tea Inspectors of TSHDA.
2. Inspection of 98 smallholder tea lands identified for direct planting in Rathnapura district to assess their suitability for planting tea.
3. Training programs on the management of tea cultivation and selection of cultivars for the beneficiaries (selected tea smallholders) of the STaRR project.

### *Introduction and Establishment of Medium-Scale Model Tea Gardens on Tea Grower Lands*

This project was funded by the Sri Lanka Tea Board to establish 40 Model Tea Gardens (1 acre each) covering all the tea-growing regions. The following activities were completed during the year.

1. Inspection and selection of suitable lands for the project in all tea-growing regions.
2. Conducting training programs on establishing model tea gardens with the main focus on mechanization, irrigation, and intercropping.

### *Establishment of Automated Weather Stations with the Arthur C Clarke Institute*

Participated in selecting sites for the establishment of Automated weather stations, which is a collaborative project between the Arthur C Clark Institute and the TRI and is funded by the Ethical Tea Partnership Program. Eight sites were selected in different tea-growing regions.

### *Public-Private Partnership Extension Approach*

Extension approach of the public-private partnership model wherein partner/collaborative organizations work together on a project having mutually beneficial interests and objectives. Responsibilities in terms of time, resources, knowledge, and expertise are shared among collaborating organizations (TRI and private organizations).

### *SMS Gateway - Technical Text Messages*

Seventy-five (75) text messages relevant to seasonal issues were sent during the years 2019 - 2023.

The TRI Call Centre was established in the TRI Mid-Country Centre in the first quarter of the year, and it has been in operation for the public since June 2021. 140 calls have been attended from June to December 2021.

The MOU was signed between TRI and Dialog Axiata Company, on sharing advisory services and technical content to disseminate extension messages electronically.

### *Technical Voice Messages - Dialog Govimithuru*

Twenty-two (22) voice messages were modified and translated from Sinhala to Tamil and were sent to Dialog.

Narration of twenty-two (22) Sinhala voice messages was modified and verified.

MOU was developed for continuing "*Govimituru*" voice message service and other applications and was submitted to the Secretary of the Ministry of plantation industries and Export Agriculture for approval.

### *Preparation Of ICT-Based Materials*

Editing of the dialog *Govimituru* app was started. The MOU between TRI and Dialog Company was finalized but revised again at the final stage due to a legal issue that arose from the Dialog party.

### *Tea Information Service Call Center*

The TRI Technical Information and Advisory Service (TRI Call Centre) was in operation at Mid-Country in the year 2023, with an increasing interest from the clients.

### *Extension Service Through the Mobile Laboratory*

A project has been initiated as a special project to establish a mobile laboratory and extension unit in the year 2021 as a pilot project with the financial assistance of the Ministry of Plantations

Industries. The main objective is to make TRI analytical and extension services easily accessible to tea growers and deliver the services onsite, particularly smallholders in remote areas.

*Table 2. Awards, Patents, And Publications of the Institute*

| Year | No. of Publications | No. of Awards | No. of Patents |
|---|---|---|---|
| 2019 | 44 | 06 | 01 |
| 2020 | 39 | 03 | - |
| 2021 | 27 | - | - |
| 2022 | 33 | - | - |
| 2023 | 52 | - | 02 |

## 2.1.13. Services to Stakeholders

### *i. Analytical Services*

*Table 3. No. of Soil, Leaf, Fertilizer, and Organic Manure Analyses*

| Year | Soil | Leaf | Fertilizer | Organic Manure | Total number of analyses |
|---|---|---|---|---|---|
| 2019 | 21,200 | 1,923 | 1,538 | 370 | 25,031 |
| 2020 | 16,239, | 795 | 1,899 | 319 | 19,252 |
| 2021 | 19,754 | 1,116 | 2,735 | 691 | 24,296 |
| 2022 | 18,401 | 2,580 | 1,067 | 833 | 22,921 |
| 2023 | 16,341 | 4,962 | 2,600 | 724 | 24,627 |

### *ii. Microbial Analytical Services to Stakeholders*

Plant Pathology Division continued its services to stakeholders in analyzing microbial contaminations in made tea, water, and the factory environment. During the period under consideration, 202 samples were tested for microbial contamination.

### *iii. Nematode Analytical Service*

The nematode analytical service continued at the Nematology Laboratories at Talawakelle, Hantane, Rathnapura, and Deniyaya for the stakeholders. About 1500 samples for the STaRR Project that implemented for the smallholders. Analyzed another 500 samples and submitted recommendation reports to the stakeholders

### *iv. Root Starch Analysis*

From 2019 to 2023, 161 root samples were analysed for root starch.

### v. *Services to Tea Factories*

There were 386 advisory visits to tea factories, 69 thermometer and 47 hygrometer calibrations, 112 moisture meter calibrations, 5 microwave oven calibrations, 9 factory machinery repairs, and 340 fabrication and maintenance visits.

### vi. *Supplying of New Clonal Cuttings – ADB Mother Bush Program*

Around 18.69 million TRI 3000 and 4000 series cuttings have been issued to both small holding and estate sectors from mother bush sites during the 2019 -2013 period, against an estimated 27.55 million cuttings.

### vii. *Establishment of Tea Fields for Mechanization*

Design and establishment of a model tea field of 2 ha aiming at mechanization was undertaken in Fernlands Estate, Pudaluoya (Kaipogalla Division) in Field No. 14. This field is being monitored by TRI Advisory staff, and the experimental plan was prepared and shared with the estate.

## 2.2. Review of Research Management

As per the Tea Research Board Act, the Tea Research Institute (TRI) is mandated to conduct and promote scientific research on tea-related issues and disseminate findings to stakeholders. Research management plays a critical role at TRI, ensuring timely monitoring, evaluation, and alignment of R&D activities with national priorities and industry needs.

Internally, the progress of research projects under thematic areas is routinely reviewed by the Directorate together with Heads of Divisions. Scientific Advisory Committees (SACs), comprising external experts and academics, evaluate the performance of technical divisions. During the period 2019–2023, divisions such as Plant Breeding, Entomology, Nematology, and Advisory and Extension were reviewed under SAC guidance.

Externally, TRI's research governance is supported by the Consultative Committee on Research (CCR), which convenes periodically to review research and postgraduate programs. From 2019 to 2023, multiple CCR meetings were held, enabling structured assessment of R&D progress. The Institute also engages with the Consultative Committees on Audit and Management, and on Estates and Advisory Services, for oversight on finance, compliance, and outreach functions.

In addition, TRI actively contributed to inter-ministerial task forces, national policy forums, and technical advisory committees on agrochemicals, fertilizer use, and green economy initiatives. The Institute maintained partnerships with organizations such as the Sri Lanka Tea Board (SLTB), TSHDA, and international research entities, reinforcing its role as the apex R&D institution for the tea sector.

### 2.2.1. Review of Technology Transfer Programs

The Tea Research Institute (TRI) established its Technology Transfer Office (TTO) in 2020 to strengthen the management of intellectual property (IP), foster innovation, and enhance the commercialization of research outputs. The TTO functions as the central coordinating unit for

identifying, protecting, and transferring TRI-developed technologies to industry and stakeholders.

Since its inception, the TTO has operated virtually under the leadership of Dr. M. A. B. Ranatunga, with support from designated officers, ensuring continuity and agility in technology transfer functions. Key milestones include participation in the World Intellectual Property Organization's (WIPO) Enabling Innovation Environment (EIE) mentoring program, leading to significant advancements in IP portfolio development and commercialization planning.

Over the review period, TRI filed multiple patents, including those for a mathematical model-based control system for trough withering of tea, tea wine production, and microbial biofertilizer technologies. The successful commercialization of the tea wine technology through a licensing agreement with International Distillers Ltd marked a major achievement, earning international recognition from WIPO in 2023.

The TTO also led the development of TRI's Institutional Intellectual Property Policy, provisionally approved by the Tea Research Board and circulated among staff for implementation. Continued capacity building was supported through IP law training programs, while technology showcases at national exhibitions such as INDUSTRY 2023 and the Ministry of Industries' innovation forum increased public and industrial engagement.

Future priorities for the TTO include expanding licensing partnerships, promoting TRI innovations such as "Tea Protein," and enhancing collaborations with ICT institutions like SLIIT for smart agro-technological solutions. These efforts aim to maximize the socioeconomic impact of TRI's research while positioning the Institute as a national leader in tea-sector innovation and intellectual property stewardship.

*Table 4. Key Activities of the Technology Transfer Office (TTO), TRI (2020–2023)*

| Year | Key Activities | Details |
|---|---|---|
| **2020** | Establishment & Capacity Building | • TTO was established to manage IP and commercialization<br>• Operated virtually under Dr. M.A.B. Ranatunga.<br>• Inaugural TTO meeting held on 4th November 2020. |
| | Training & Engagement | • Participated in WIPO EIE Remote Mentoring Program (2nd Round).<br>• Attended SLIC Linkage Program (1st July 2020)<br>• Attended WIPO Patent Drafting Workshop (31 Aug – 9 Sep 2020). |
| | Technology Portfolio | • Technologies prioritized: Tea Wine and Microbial Biofertilizer Inoculant.<br>• Technology briefs and commercial partner lists prepared. |
| **2021** | Patent Activities | • New patent filed: Talc-based Trichoderma asperellum formulation.<br>• Amendments to two patents: Trough Withering System and Spicy Tea Sauce. |
| | WIPO Mentoring Program | • 3rd Round (Nov 2020 – May 2021): Focused on control systems for withering and drying<br>• 4th Round (Oct 2021): Focused on Spicy Tea Sauce. |
| | IP Policy Development | • TRI Institutional IP Policy drafted and submitted to the Tea Research Board. |
| | Staff Training | • Completed IP Law Certificate (Bar Association of Sri Lanka).<br>• Completed IP Studies Course (Osaka Institute of Technology via WIPO) |
| | Outreach | • Dedicated TTO webpage launched on TRI website |
| **2022** | Team Changes | • TTO Assistant Ms. A.R.M.A.M. Rathnayake resigned (20 Dec)<br>• Dr. H.M.C.G. Pilapitiya appointed (21 Dec). |
| | Patent Amendments | • Amendments submitted for two patents filed earlier. |
| | Commercialization Progress | • EOI issued for Tea Wine patent (Patent No. 13621)<br>• International Distillers Ltd identified as commercial partner |
| | IP Policy Implementation | • TRB provisionally approved IP Policy; circulated internally. |
| | WIPO Mentoring | • 4th Round completed on 8th March 2022 (Spicy Tea Sauce). |
| **2023** | Patent Granted | • Patent No. 20045 granted for Trough Withering Control System (24 Mar). |
| | Commercialization Milestone | • Agreement signed with International Distillers Ltd to commercialize Tea Wine (19 Jan). |
| | International Recognition | • IPO featured TRI's TTO on their homepage for its achievements. |
| | Industry Showcases | • Inventions showcased at INDUSTRY 2023 exhibition (22–25 June)<br>• "Tea Protein" presented at Ministry of Industries event (11 Dec) |
| | Strategic Collaboration | • MoU submitted with SLIIT to develop ICT-based pest detection technologies. |

## 2.2.2. Publications

*Table 5 Publications of the Institute*

| Publication | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Advisory Circulars | 04 (PU Series) | 04 (PU Series) | - | SP 11 (New) | 04 (PU Series) |
| | | | | | |
| TRI UPDATE | Volume 15 (Part 1 & 2) Volume 16 (Part 1 & 2) | Volume 17 (Part I & II) | Volume 18 (Part I & II) | Volume 19 (Issues 1 and 2) | - |
| | | | | | |
| Sri Lanka Journal of Tea Science (SLJTS) | Volume 82 (Part 1&2) | Volume 83 (Part 1 and II) | Volume 84 (Part 1 and II) and Volume 85 (Part I and II) | Volume 86 (Part I and II) | Volume 87 (Part I and II) |
| | | | | | |
| Tea Bulletin | Volume 27 (Part 1 & 2) | Volume 28 (Part I and II) | Volume 29 (Part I and II) | Volume 29 (Part I and II) | - |
| | | | | | |
| The Thathu | Volume 14 (1 & 2) | Volume 15 (I & II) | Volume 16 (I & II) and Volume 17 (Issue I) | Volume 17 (Issue 2) 18 (Issues 1 and 2) | Volume 19 (Issues 1 and 2) |
| | | | | | |
| Annual Reports | 2017 | 2018 | 2019 | 2020 / 2021 | 2022 |
| | | | | | |
| Annual Publications | 138 | 43 | 41 | 13 | 02 |
| | | | | | |
| Advisory Circular folders | 45 | 113 | 50 | 60 | 71 |
| | | | | | |
| Books | 60 | 190 | 230 | 804 | 530 |

| Publication | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Guidelines | 03 | 02 | - | - | 02 |
| | | | | | |
| Posters | 133 | 50 | 65 | 60 | 46 |
| AV Materials | 12 | 70 | 30 | - | - |
| | | | | | |
| Sales Value | 906,505/- | 95945/- | 167,525/- | 920,495/- | 827,680/- |
| | | | | | |
| Reprinting of Publications | Advisory Circular Folders | Handbook on Tea | - | - | - |
| | | | | | |
| New Books | | Guide to Identification of Weeds in Tea Lands in Sri Lanka; 1st Edition | Field Guide Book – 1st Edition (English) | Field Guide Book – 1st Edition (Sinhala) | Field Guide Book – 1st Edition (Sinhala) |
| | | | | Guideline for Compost Preparation in Tea Cultivation (tri-language books) | Field Guide Book – 1st Edition (Tamil) |
| | | | | Printing of Promotional materials; Stickers | Cost of tea cultivation: 1st Edition |
| | | | | | |
| Technical Posters | - | - | - | - | 78 Nos. |
| | | | | | |
| ISBN Nos. of New Publications | | | | 06 Nos. | 02 |
| | | | | | |
| Social Media Platform | | | 06 Nos. | | 43 updates |

## 2.3. Review of Supporting Services

### 2.3.1. Financial performances

The Tea Research Institute receives its funding from the General Treasury per the annually approved budget, covering both recurrent and capital expenditures. However, over the past five years, the Institute has received only approximately 50% of the originally requested funds. This significant shortfall has posed challenges to the effective implementation of planned research and development activities. Table 1 presents a summary of the budgetary requirements submitted by the Institute, the amounts approved by the Treasury, and the actual disbursements received over the past five years, highlighting the persistent gap between requested and received funding levels.

*Table 6. Treasury Funds Requested, Allocated, and Received*

| Year | Requirement (Rs. Mn) | | | Allocation (Rs. Mn) | | | Receipts (Rs. Mn) | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Recurrent** | **Capital** | **Total** | **Recurrent** | **Capital** | **Total** | **Recurrent** | **Capital** | **Total** |
| **2019** | 484.67 | 248.71 | 733.38 | 400.00 | 68.00 | 468.00 | 379.00 | 52.80 | 431.80 |
| **2020** | 427.21 | 80.00 | 507.21 | 400.00 | 80.00 | 480.00 | 387.68 | 77.50 | 465.18 |
| **2021** | 420.00 | 100.00 | 520.00 | 420.00 | 94.46 | 514.46 | 406.50 | 78.60 | 485.10 |
| **2022** | 420.00 | 40.00 | 460.00 | 420.00 | 37.00 | 457.00 | 419.90 | 27.00 | 446.90 |
| **2023** | 438.00 | 35.00 | 473.00 | 438.00 | 35.00 | 473.00 | 429.91 | 35.00 | 464.91 |

According to the above table, there is financial data from 2019 to 2023 that reveals significant trends in the management of recurrent and capital expenditures. In the initial year, 2019, there was a significant funding gap, with only 63.8% of the total requirement allocated and 58.9% received primarily for capital expenditure. However, from 2020 onward, both allocations and receipts steadily improved, with allocation levels exceeding 90% of the requirement each year. By 2023, full allocation was achieved, and receipts reached 98.3% of the need, indicating strong financial discipline and efficient fund allocation and receipts.

*Table 7. Actual Cash Inflows and Outflows for the Last Five Years*

| Inflow/Outflow | Year (Value in Rs. Mn) | | | | |
|---|---|---|---|---|---|
| | **2019** | **2020** | **2021** | **2022** | **2023** |
| Funds from the Treasury | 431.80 | 465.18 | 485.10 | 446.90 | 464.91 |
| TRI Income | 33.16 | 24.24 | 21.81 | 35.07 | 51.87 |
| Total Funds Received | 464.96 | 489.42 | 506.91 | 481.97 | 516.78 |
| Recurrent Expenditure | 418.98 | 417.16 | 405.34 | 442.88 | 474.69 |
| Capital Expenditure | 52.77 | 61.75 | 78.58 | 33.18 | 40.22 |
| Capital Expenditure /Committed | 6.79 | 10.51 | 22.99 | 5.91 | 1.87 |

Table 2 interprets the TRI actual inflow and outflow over the past 5 years. From 2019 to 2023, the institution maintained stable financial support primarily through General Treasury allocations, while gradually enhancing its internal income streams. Total annual funds received showed a gradual upward trend, peaking in 2023 at Rs. 516.78 million. In contrast, capital expenditure and committed investments declined significantly after 2021, suggesting a

slowdown in infrastructure development or capital expansion. The financial pattern reflects a growing reliance on Treasury funding, emerging improvements in institutional income.

*Table 8. Funds Received from MPI for Special Projects and Other Funding Sources*

| Details | Year (Value Rs. Mn) | | | | | Total |
|---|---|---|---|---|---|---|
| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| Funds received | 57.52 | 121.63 | 158.15 | 61.98 | 53.06 | 452.34 |

## 2.4. Research, Advisory, and Extension Centers

### 2.4.1. Research, Advisory & Extension Centre, Ratnapura

The TRI Low-Country Research, Advisory, and Extension Center, situated in Rathnapura, has continued its significant contributions to the low-country tea sector, supporting both corporate estates and smallholdings. The center has focused on research, advisory, and extension activities, with a specific emphasis on developing drought-resistant tea cultivars, addressing pest and disease issues, and optimizing process technology for improved tea manufacturing efficiency.

#### *Key Research Activities*

From 2019 to 2023, the center has conducted a range of field and laboratory experiments through its Agronomy, Plant Breeding, Entomology/Nematology, and Process Technology divisions. These experiments have focused on developing new tea cultivars, investigating soil health, and addressing pest and disease management, including nematode infestations and bush debilitation. In addition to the ongoing maintenance of nine seed gardens and the establishment of mother bushes for the new TRI 3000 & 4000 cultivars, the Plant Breeding Division has successfully expanded these gardens across low-country estates. This effort ensured a steady supply of improved seeds to tea growers. The Agronomy Division also introduced mechanized harvesting techniques and conducted feasibility assessments for tea irrigation, promoting more sustainable agricultural practices across smallholder tea lands.

#### *Advisory & Extension Services*

The center's Advisory and Extension Officers have played a pivotal role in supporting tea growers, making over 400 advisory visits and conducting 109 training programs and seminars for tea smallholders, corporate sector stakeholders, and students. These programs have covered topics such as tea nursery management, soil conservation, pest and disease management, agronomic practices for better productivity, and mechanization in tea. The team has also organized specialized training sessions for school children, undergraduates, and NIPM apprentices, providing practical, hands-on knowledge on tea cultivation and processing.

Collaborative Forums and Seminars were organized, including the Regional Technical Extension Forum (RTEF), the Regional Scientific Committee (RSC), and various workshops aimed at improving land and labor productivity. In response to current issues raised by stakeholders, six RTEF seminars and one RSC seminar were conducted during the period concerned. The center hosted one exhibition and five mini crop clinics utilizing the mobile laboratory to disseminate information on specific topics in an accessible and engaging manner, while also raising awareness to educate the target audience

#### *Soil & Analytical Services*

The center's soil analytical laboratory, established on 2019/07/01, continued to provide vital services to stakeholders by analyzing thousands of soils, fertilizer, and organic manure samples in addition to the research management program. A brief description of the number of soils, fertilizer, and compost samples analyzed during the period of concern and their respective generation of income is given in the table below.

*Table 9. Soil, Fertilizer, and Compost Sample Analysis, and Income*

| Year | Soil Samples | Fertilizer Samples | Compost Samples | Income (Rs.) |
|---|---|---|---|---|
| Since July 2019 | 267 | 39 | 2 | 252,200 |
| 2020 | 1209 | 82 | 1 | 1,189,400 |
| 2021 | 1003 | 94 | 29 | 824,265 |
| 2022 | 1002 | 77 | 24 | 820,370 |
| 2023 | 941 | 203 | 112 | 1,579,570 |
| Total | **4422** | **488** | **168** | **4,665,805** |

From 2019 to 2023, the laboratory conducted Soil Quality Index (SQI) analyses, which supported tea growers in identifying suitable lands for direct planting. In collaboration with the STaRR project, the center assessed over 2,820 soil samples and evaluated 432 hectares of smallholder tea lands for nematode infestations and soil health.

### *Process Technology and Factory Improvements*

The Process Technology Division (PTD) at TRILCRC is vital for the tea industry, focusing on research and development in tea processing based on industry needs, and disseminating this technology. The PTD provides requested services to all low-grown tea factories, including manufacturing improvement consultations, addressing stakeholder issues in tea manufacturing, resolving tea machinery problems, and advising on energy conservation. The staff has conducted over 150 such factory visits.

PTD staff members are highly engaged in the broader tea sector. They serve on the special advisory committee and GI working groups for the Sri Lanka Tea Board (SLTB), as well as on SLSI working groups. Their expertise extends to acting as members of Technical Evaluation Committees (TEC) for numerous tea factories, such as Kalubowitiyana Tea Factories Ltd, SLSPC, JEDB, Elkaduwa Plantations, and Cooperative departmental TFs. Additionally, they are resource persons for the National Institute of Plantation Management (NIPM) and the Industrial Development Board (IDB). The team also undertakes tasks from the line ministry, directly contributing to tea policy decisions in Sri Lanka.

Between 2019 and 2023, the staff spearheaded two significant innovations: a multi-tray self-cleaning sifter for low-grown tea production, partially funded by the National Research Council (NRC), and a wood chip feeding mechanism for tea drying, developed in collaboration with the National Engineering Research and Development Centre (NERDC).

The PTD also conducted commercial trials and a comprehensive survey on the achievable net outturn of Orthodox tea manufacture, in collaboration with the SLTB. Furthermore, they organized a series of two-day residential workshops on tea manufacture at TRILCRC and actively led the special project for the development of St Joachim Tea Factory into an experimental facility, funded by the Ministry of Plantations.

The division has also spearheaded research on artisanal tea manufacturing, hosting workshops and training sessions on the same.

In collaboration with international partners such as the Arthur C. Clarke Institute for Modern Technologies, the division also advanced the development of a motorized selective harvester designed to improve labor efficiency in Sri Lanka's tea plantations. Prototypes of this selective harvester were field-tested during 2022–2023.
Undergraduate trainees from agriculture farm schools were also trained in the PTD.

### *Special Projects and Collaborative Efforts*

Several collaborative research projects were initiated, including partnerships with local and international institutions such as the University of Peradeniya, Sabaragamuwa University, and the Bangladesh Tea Research Institute. These collaborations aimed to enhance the scientific base for tea cultivation and processing, focusing on areas like climate change adaptation and pest control.

Another collaborative project with external engineering institutions (government and private) successfully designed a motorized selective tea harvester prototype, which demonstrated an enhanced tea shoot selectivity compared to existing market options.

The center actively engaged in regional and national forums, including the Industry 2023 National Exhibition, where staff showcased innovations like the Deep Fertilizer Applicator. The center also collaborated with the Tea Small Holdings Development Authority (TSHDA), Sri Lanka Tea Board (SLTB), and the Valuation Department to hold stakeholder training sessions and awareness programs on productivity improvement and tea leaf quality.

### *Infrastructure and Energy Management Initiatives*

In an ongoing effort to improve energy efficiency, the TRI Low-Country Center implemented energy-saving measures that resulted in significant reductions in electricity consumption. The center also continued upgrading its infrastructure, including the installation of a digital PABX telephone exchange and new transportation facilities for staff.

## 2.4.2. Research, Advisory & Extension Centre, Hantana

The TRI Mid-Country Research, Advisory, and Extension Centre in Hantana has been a key player in supporting the mid-country tea sector, conducting research, extension, and advisory services for both corporate tea estates and smallholders. The center's focus has been on improving tea cultivation practices, pest management, soil health, and the mechanization of field operations. Its work has supported the productivity and sustainability of tea estates in the Kandy and Matale districts.

### *Key Research Activities*

From 2019 to 2023, the center conducted various field and laboratory experiments, managed by the Agronomy, Entomology/Nematology, Soils and Plant Nutrition, and Plant Breeding Divisions. These research activities were aimed at addressing critical issues such as nematode infestations, soil fertility, shade management, and the development of bio-organic fertilizers. The Agronomy Division continued experiments on different rehabilitation grass species, shade trees, and post-emergent herbicides, while ongoing meteorological data collection provided important climate-related insights for mid-country tea cultivation.

The Entomology/Nematology Division focused on trials to screen new tea cultivars and grass species for resistance to nematodes, including *Radopholus similis*. Hundreds of soil and root samples from both estates and smallholders were analyzed to diagnose nematode infestations, leading to improved pest management strategies. Additionally, the Soils and Plant Nutrition Division conducted trials on bio-organic and mineral fertilizers and evaluated the pH buffering activities of different soil types to enhance soil health across the mid-country tea plantations.
The Plant Breeding Division resumed activities after a seven-year hiatus, focusing on the expansion of mother bush areas for TRI cultivars. The division also initiated genetic improvement projects in collaboration with the International Atomic Energy Agency (IAEA), experimenting with gamma ray irradiation to improve tea cultivars.

### *Advisory & Extension Services*

The center's Advisory and Extension Officers have been instrumental in delivering training programs and conducting advisory visits. From 2019 to 2023, they conducted numerous training sessions for tea growers, executives, and students from higher education institutions. These programs covered critical topics such as harvesting techniques, soil management, mechanization, compost production, and the use of bio-organic fertilizers.

The center worked closely with the Tea Small Holdings Development Authority (TSHDA) to organize Regional Technical and Extension Forums (RTEF) for both corporate and smallholder sectors, focusing on nematode management, weed control, and the use of ICT in tea cultivation. Additionally, the center continued to support the Short Message Service (SMS) Gateway and Dialog Govimithuru Mobile Voice Message Service, providing tea growers with timely advice and technical content.

### *Soil, and Analytical Services*

The center's soil and plant nutrition division continued providing soil testing and analytical services, including pH and carbon level measurements. Throughout 2019–2023, soil samples

from estates and smallholders were analyzed for nematode infestations, nutrient deficiencies, and overall soil health. These services contributed to enhancing tea productivity and supporting sustainable farming practices. Moreover, the division collaborated with national working groups on developing standards for biofertilizers, ensuring the alignment of its practices with broader industry goals.

### *Process Technology and Mechanization*

The center played a pivotal role in advancing mechanization in mid-country tea plantations. Training programs were conducted on mechanized harvesting and pruning techniques, and several estates were equipped with selective harvesting machinery. The center also participated in trials and collaborative projects with local and international partners, such as the Tea Board and FAO/RDAL projects, aimed at establishing mechanized tea gardens.

### *Special Projects and Collaborative Efforts*

Collaborative research and outreach initiatives were a key focus for the center. Several research projects were conducted in partnership with institutions such as the University of Peradeniya, Sri Lanka Tea Board, and international partners, focusing on areas like bio-organic fertilizers, pest management, and genetic improvements in tea.

The center also actively participated in national forums, including the National Symposium on Tea and regional exhibitions, to disseminate research findings and provide guidance on improving tea productivity. A significant achievement was the establishment of a demonstration plot for pruning and compost production, which served as an educational resource for stakeholders.

### *Infrastructure Development*

Infrastructure improvements were ongoing, with expansions in the mother bush areas for TRI 5000 and 6000 series cultivars. The center also received new equipment for compost production and improved its telecommunication capabilities, including the installation of a TRI Call Centre, enabling efficient communication with stakeholders and tea growers. Additionally, the center implemented energy-saving measures and continued upgrading its facilities to support research and advisory activities.

## 2.4.3. TRI Advisory & Extension Centre, Passara

The TRI Advisory & Extension Centre in Passara has played a significant role in supporting the tea sector of the Uva region, offering both research and extension services for corporate estates and smallholders. The center has focused on improving tea cultivation practices, pest management, soil conservation, and post-harvest handling. It has also contributed to advancing the use of mechanization in tea farming and enhancing the adoption of best practices in the region.

### *Key Research Activities*

The research division continued several field trials under the supervision of relevant divisions from the TRI head office. These included germplasm upkeep, root studies on TRI 5000 series cultivars, and screening of cultivars against nematodes for the Uva region. Other trials included polyclonal seed garden upkeep and rehabilitation grass trials to assess the effectiveness of grass species in soil restoration. In addition, the Plant Breeding Division conducted observation trials in Uvakelle and Demodera Estates to evaluate the commercial adaptability of TRI 5000 series tea cultivars.

The Mother Bush project has been one of the center's flagship activities, contributing to the distribution of new tea cultivars to tea growers in the Uva region. In 2019, the center issued approximately 336,850 cuttings, meeting around 84% of its target. This was further improved in 2020 when 558,820 cuttings were issued, and by 2022, 661,400 cuttings were distributed. In 2023, the center exceeded its target by issuing 644,600 cuttings from the Mother Bush site.

### *Advisory and Extension Activities*

From 2019 to 2023, the center organized numerous advisory visits, training programs, workshops, and seminars for tea growers, factory owners, and students. In 2019, the center conducted two Regional Technical and Extension Forums (RTEFs) focusing on topics such as pest management and drought control. A series of training programs were conducted throughout the year, including training on manual and machine plucking, safe use of agrochemicals, nursery management, and minimizing post-harvest losses. The center also conducted awareness programs on improved tea cultivars suitable for the Uva region and replanting practices for smallholders.

In 2022 and 2023, the center continued to hold RTEF programs, discussing issues like climate change impacts, micro-irrigation techniques, and the economic analysis of fertilizer application. The center also organized numerous training programs, such as plucking for smallholders, soil conservation, and integrated pest management. Field demonstrations on burring of pruning, forking, and draining were conducted, and post-harvest losses were addressed through specific awareness programs for factory staff and tea smallholders.

### *Infrastructure Development*

The center continued its infrastructure development efforts, particularly through the Sustainable Land Management Project, funded by FAO. This project involved planting one hectare of the TRI 5000 series mother bush, as well as the establishment of vermicompost and vermi-wash units. Additionally, the construction of an Automated Weather Station was initiated in 2020 with the

support of the Arthur C. Clarke Institute for Modern Technologies, enhancing data collection for climate-related studies and better irrigation management in the region.

### *Special Projects, and Collaborations*

The TRI Passara Centre has actively collaborated with local institutions and stakeholders, including the Sri Lanka Tea Board, Tea Small Holdings Development Authority (TSHDA), and FAO. These collaborations resulted in successful farmer-centered organic trials and seed garden establishment at Welimada, Haliela, and Passara TSHDA sites. The center also played a key role in the Farmer Field School program, educating tea growers on sustainable agricultural practices and the safe use of pesticides.

## 2.4.4. TRI Advisory & Extension Centre, Kottawa

The TRI Advisory and Extension Centre at Kottawa has played an essential role in advancing tea cultivation practices in the region. Its extension activities encompass a range of services, including advisory visits, training programs, research trials, and collaborative projects aimed at improving tea productivity and quality. The center has worked closely with tea smallholders, plantation managers, factory officials, and research divisions to ensure sustainable practices and enhanced tea production.

### *Key Research and Extension Activities*

Over the years, the center has carried out numerous training programs, seminars, and workshops for both tea smallholders and the staff of corporate estates. Training sessions on plucking, pruning, and mechanical harvesting have been organized to improve productivity and efficiency across the tea sector. Specific programs aimed at productivity enhancement and pest management have been conducted for smallholders, nursery holders, and members of tea smallholding societies. These initiatives are designed to address issues such as soil fertility, pest control, and drought mitigation.

Additionally, the center has played a key role in supporting the Mother Bush project, which focuses on distributing improved tea cultivars to tea growers in the region. The project has been highly successful, with over 150,000 cuttings issued in 2019 alone. This number increased to over 450,000 cuttings in 2020, showcasing the growing demand for new, pest-resistant cultivars. The project continues to support growers in adopting TRI 3000 and 4000 series cultivars that are better suited to the region’s unique agricultural conditions.

### *Training and Awareness Programs*

The center has organized numerous awareness programs and extension services to educate both large estate staff and smallholder farmers. Seminars on soil fertility management and the use of new VP tea cultivars have been conducted to ensure that tea growers in the region are equipped with the latest knowledge on best practices. In addition, training programs on nursery management, pest disease management, and soil conservation have been tailored to meet the specific needs of the local tea industry.

Programs such as "Sahakampana," which focus on improving green leaf quality, have been a significant part of the center's outreach activities. These programs, in collaboration with the Sri Lanka Tea Board, aim to provide valuable insights on how to improve leaf quality, reduce post-harvest losses, and enhance overall tea production. The center has also been involved in organizing crop clinics, providing essential support and guidance on tea cultivation practices and pest management, all of which contribute to a better-quality tea product.

### *Infrastructure Development*

The Kottawa Center has focused on infrastructure development to support its research and extension activities. The access road from the main entrance to the guest house has been reconstructed. Field development activities, such as the installation of a sprinkler irrigation system for newly established mother bushes, are helping to improve water management and ensure the sustainable growth of tea plants. The expansion of the VP tea nursery has also been a

key initiative, allowing the center to raise thousands of nursery plants, which are then sold to tea growers or used for infilling programs.

### *Research Trials and Adaptive Projects*

The center has collaborated with various research divisions on trials aimed at evaluating the performance of new tea cultivars, specifically the TRI 5000 series. These trials have been carried out in different agro-ecological regions, including Mawanana, Unanwitiya, Kottawa, and Akmeemana, to assess the commercial viability of these cultivars under grower conditions. These trials have been instrumental in providing insights into the best-performing cultivars, thus guiding future cultivation practices for the region.

### *Special Projects and Collaborations*

The center has also been actively involved in several special projects and collaborations with other institutions, including the Tea Small Holdings Development Authority (TSHDA) and the Sri Lanka Tea Board. Notably, the center has contributed to the Model Tea Farm Project, which aims to demonstrate the best practices in land preparation, tea planting, and aftercare operations. Collaboration with foreign institutions has been another hallmark of the center's outreach activities, with several familiarization programs conducted for visitors from countries like China, England, and Sweden.

## 2.4.5. TRI Advisory & Extension Centre, Deniyaya

The TRI Advisory & Extension Centre in Deniyaya has played an integral role in supporting tea cultivation across the low-country region. Focused on improving productivity and sustainability, the center offers a range of research, advisory, and extension services, targeting both smallholders and large estate owners. The center is particularly active in promoting the adoption of best practices in plucking, pruning, pest management, and the management of tea bush health, with significant emphasis on mechanization and modern agronomy practices.

### *Key Research Activities*

Over the years, the TRI Deniyaya Centre has conducted several trials in collaboration with various divisions of the TRI. Notably, the Plant Breeding Division has maintained multiple trials for the TRI 5000 series cultivars, including LVP phase III trials at Indola, Kiruwanaganga, and Deniyaya estates. These trials aim to enhance the resilience of tea crops, particularly in relation to nematode infestations and Shot Hole Borer (SHB) management. In addition, the center has been monitoring adaptive trials for TRI 5000 series cultivars in smallholder lands across the region, with collaboration from the Plant Breeding Division and Tea Smallholder Development Authority (TSHDA).

The Mother Bush project is central to the center's research efforts, as it ensures the distribution of high-quality TRI 5000 series plants to tea growers in the region. For example, in 2021, the center successfully maintained 3,682 plants of the TRI 5000 series Accession Nos. 84 and 23/5 at its premises, and additional plants were raised for sites across Matara district, including Kotapola and Eramudugoda.

### *Advisory & Extension Activities*

From 2019 to 2023, TRI Deniyaya has been heavily involved in extension services, including training, advisory visits, and field days for tea growers. In 2019, a special program was launched in collaboration with the Low-Country Proprietary Planters Association to promote shear plucking among young pluckers in proprietary estates, aiming to increase plucking efficiency. In the same year, TRI Deniyaya organized awareness sessions on managing SHB, LCLWT, and nematodes for the field staff of RPC estates in the region. These initiatives were designed to address the bush debilitation problem prevalent in the area.

The center also partnered with the Entomology Division to raise awareness about the safe use of agrochemicals, ensuring that the overuse of chemicals was minimized. In 2020, the center conducted field days on drought mitigation practices, responding to seasonal tea cultivation challenges. The center continued to play a critical role in skill development for smallholders, particularly those involved in the 500 Nursery program, where it worked closely with TSHDA to ensure best practices in nursery management.

In 2022 and 2023, the center organized a range of public and private events, including crop clinics with mobile laboratory services and specialized training sessions on replanting tea and improving productivity in tea nurseries. These efforts were aimed at both improving tea leaf quality and equipping smallholders with the knowledge to effectively manage their plantations.

### *Infrastructure Development*

The TRI Deniyaya Centre has been actively developing its infrastructure to support its research and extension activities. This includes the construction of two leader drains to manage water flow within the TRI 5000 series mother bush block. The nursery expansion project, funded by GL 340, has successfully increased the nursery capacity to accommodate 20,000 plants. Additionally, the center has initiated an organic fertilizer unit under the Green Agriculture policy, aimed at promoting sustainable fertilizer use among tea growers in the region.

### *Special Projects and Collaborations*

The center has continued to collaborate with various stakeholders, including the Sri Lanka Tea Board, TSHDA, and international bodies such as the FAO. These collaborations have allowed the center to run several successful initiatives, such as the Farmer Centered Bio Fertilizer trials and specialized training programs for factory officials and smallholders. In 2022, the center also organized a public-private partnership (PPP) program to uplift the knowledge of tea fertilizer suppliers.

Furthermore, TRI Deniyaya has been involved in the dissemination of findings from various research trials, including the adaptive trial on wood ash application for tea cultivation and the development of model tea lands to mitigate tea bush debilitation. These projects have empowered both estate managers and smallholders to adopt best practices in crop management.

### *Outreach and Awareness Programs*

Apart from the extensive research and extension programs, TRI Deniyaya has also engaged in several awareness-raising activities. These have included seminars on blister blight management strategies, awareness programs on replanting, and crop clinics held in collaboration with the Sri Lanka Tea Board. The center has also participated in national and regional events, including the National Symposium on Tea 2023, where it presented key findings on the status of tea nurseries and the perceptions of nursery holders in Galle and Matara districts.

## 2.4.6. TRI Advisory & Extension Centre, Matugama

The TRI Advisory & Extension Centre in Matugama has played a vital role in enhancing the quality of tea cultivation and management in the Kalutara district. With a focus on smallholder tea farmers, corporate estates, and regional stakeholders, the center has facilitated improvements in various aspects of tea production, including mechanization, pest management, and soil conservation, while also promoting best agricultural practices. The Centre's outreach efforts have contributed significantly to the region's tea sector, focusing on increasing productivity and quality through research, training, and extension activities.

### *Key Research Activities*

The center has been actively involved in multiple research trials and projects, with a strong focus on improving tea cultivars and enhancing field practices. Over the years, several adaptive trials were established in collaboration with the Plant Breeding Division and the Tea Small Holdings Development Authority (TSHDA). These trials primarily focused on the TRI 5000 series cultivars, with sites in Pelawatta, Horana, and Meegahatanna, aimed at evaluating their suitability for smallholder lands. These trials were periodically monitored to track progress and assess the adaptability of the cultivars.

In addition to these trials, the center also explored new field experiments. These included a trial on mechanical harvesting at Soyza Estate, a collaboration with the Agronomy Division. Furthermore, an investigation on nematode infestations in Mahakalupahana was conducted in partnership with the Entomology Division, aiming to tackle pest issues impacting tea production in the region.

The Mother Bush Project has been a core initiative at the center. With the help of the Mother Bush coordinator and the Plant Breeding Division, the center has successfully initiated TRI 5000 series mother bush areas in various locations, including Vogan Estate and RRI Niwithigalakale premises. The project focuses on providing high-quality planting materials for the tea industry. In 2022, 2900 plants of TRI 5000 series cultivars (12/11, 23/5, and TRI 4049) were established at 0.82 ha of land to ensure a steady supply of quality tea plants for the region.

### *Advisory & Extension Activities*

The advisory and extension activities at the Matugama Centre have been robust, with numerous Regional Technical and Extension Forums (RTEFs) held over the years. These forums have brought together key stakeholders, including TRI, TSHDA, SLTB officials, and tea development society members, to discuss important topics such as organic manure application, water management, bush debilitation surveys, and the use of soil quality indices for tea cultivation. The forums have also addressed issues like the impact of substandard agrochemicals on tea production and the profitability challenges faced by smallholders.

Training programs have been a significant part of the center's activities. The staff has conducted various plucking and mechanization training sessions for both smallholders and corporate estates. These sessions focus on improving the quality of made tea through better harvesting practices and the mechanization of field operations. For example, in 2020, the center organized a plucking training program, which included mechanization training, aimed at improving tea cultivation standards among proprietary estates. In 2022, the center conducted more than 20

"Sahakampana" training programs in collaboration with the Tea Board and Tea Small Holdings Development Authority (TSHDA). These programs focused on improving the quality of tea, particularly in terms of post-harvest practices and quality leaf management.

### *Special Projects and Collaborations*

The center has actively collaborated with a range of local stakeholders, including the Sri Lanka Tea Board, TSHDA, and various tea factories. The Mother Bush Project and seed garden initiatives have been instrumental in ensuring the dissemination of improved tea cultivars to smallholders in the region. In 2023, the center also focused on enhancing public-private partnerships by organizing programs with tea fertilizer suppliers, factory owners, and other stakeholders. These initiatives were aimed at improving awareness of the latest TRI recommendations and facilitating the adoption of modern agricultural practices.

### *Outreach and Awareness Programs*

In addition to training and advisory services, the center has organized several awareness programs to raise understanding about critical issues like soil fertility management, post-harvest losses, and the importance of quality tea leaf production. For instance, the center organized a series of mini crop clinics with the TRI mobile laboratory in January 2023, which involved analyzing soil samples and discussing pest management, soil fertility, and the characteristics of new tea cultivars with the community. These efforts have directly contributed to enhancing the management and quality of tea production in the region.

# PRESENT STATUS OF TRI

## 3.1. SWOT Analysis

The main purpose of analyzing the present status of the institute is to identify the strategies that will best align the organization's resources and capabilities to the requirements of the environment in which the organization operates. The most renowned tool for analysis of the overall strategic position of the institute and its environment is SWOT analysis. By analyzing a research institute's internal strengths and weaknesses as well as external opportunities and threats, a SWOT analysis can assist in determining its current situation and potential for the future. This framework may direct the institute for strategic decision-making, solving its shortcomings, finding opportunities for innovation, reducing potential risks, and improving its strengths.

### 3.1.1. Strengths

Strengths are the qualities that enable us to accomplish the institute's mission. These are the beneficial aspects of the institute, which include human capabilities, human & financial resources, *etc*.

1. Function as the National Research Institute for tea research
2. Well-established infrastructural facilities of the institute, including main and regional stations located in the different tea-growing areas
3. Availability of qualified, trained, experienced, and committed staff
4. Well-tested organizational structure
5. Hundred years of accumulated knowledge and experience of tea research
6. Long-standing recognition that motivates employees to be with the organization
7. Support from stakeholders whenever the organization requires this
8. Availability of a strategic Plan to meet the stakeholder demands

### 3.1.2. Weaknesses

Weaknesses are the qualities that prevent an institution from accomplishing its mission and achieving its full potential. These need to be minimized/eliminated to reduce their influence on the institute's success and growth.

1. Lack of staff to undertake planned R&D activities
2. Difficulties in retaining trained staff due to the remoteness of the location and poor remuneration of staff due to their being governed as a statutory board. This entails lower salary schemes and structures when compared with the private sector, and the lack of balancing compensation from government incentive schemes enjoyed by the public sector.
3. Inadequate funds
4. No proper performance-evaluation systems and no rewards for motivating employees
5. Inability to access guaranteed funds on time for meeting recurrent and capital expenditure.

6. Inadequate HRM planning in recruiting staff and retaining trained, experienced staff
7. Poor attitude of staff towards work due to a lack of motivation and a lack of awareness of corporate goals
8. Inability to change with changing world conditions and retain a competitive advantage
9. Non-focused attitudes of staff due to a lack of prioritization and monitoring to suit changing environments
10. Insufficient repair and maintenance of instruments
11. Poor administrative and finance support for the research activities due to a lack of awareness of corporate goals

### 3.1.3. Opportunities

Opportunities are presented by the environment within which the institute operates. The institute can take advantage of conditions in its environment to plan and execute strategies that enable it to become more successful.

1. The importance of tea in the national economy gives prominence to the institute
2. Tea market expansion and tea industry diversification
3. Potentials for improvement of productivity and profitability of the industry
4. Continued demand from stakeholders for innovations that encourage employees to keep working on new technologies
5. Possibility of undertaking collaborative research with other national and international institutions, and sharing resources
6. Potentials to get donor funds for R&D activities
7. Availability of external reward systems for the career advancement of scientists
8. Competition for R&D and extension with the Government institutes and the private sector
9. Availability of advanced technologies
10. Availability of an educated human resource base in the country

### 3.1.4. Threats

Threats arise when conditions in the external environment jeopardize the reliability. They compound the vulnerability when they relate to the weaknesses and are uncontrollable.

1. Sinking profitability of the industry due to increasing competition from other tea-producing countries
2. Political & economic instability of the country
3. Government regulations on delimiting funds and the recruitment of staff
4. Complex government procedures
5. Slackened government attention to and recognition of the industry
6. Better employment opportunities for the staff locally and overseas, creating external brain drain
7. Poor national attitude towards local professionals.
8. Make adjustments due to climate change

## 3.2. Major Challenges in the Tea Industry

The Sri Lanka tea industry has continued to face multiple challenges. The challenges identified for the Sri Lanka tea industry under the present context are presented below.

### 3.2.1. Environmental

- Climate Change impacts on the growth and yield of tea
- Shortage of sustainable firewood supply for the processing of tea and unavailability of affordable alternative energy sources
- Mandatory certifications for production and processing to satisfy international food, environmental, and worker safety requirements
- Changes in the areas where diseases and pests are prevalent, as well as the emergence of new diseases and pests

### 3.2.2. Social

- Lacks sufficiently skilled workers to implement new technologies for cultivation and production activities
  Discrepancies in profit sharing and a lack of communication among the important participants in the tea value chain

### 3.2.3. Economical

- Strong competition in the black tea market
- High COP due to high wage-related cost and input cost such as agro-chemicals, fuel, and machinery
- Lack of an effective program to make the cost of production competitive with the COP in other tea-producing countries.
- Poor investment capacities of key players in the tea industry for the tea sector development
- Political & Economic instability of tea-importing countries
- Non-Tariff Trade barriers from importing countries

### 3.2.4. Technological

- Low bush, land, and labour productivity in tea plantations
- Declining soil fertility in tea lands, especially in the up and mid-country
- Unsatisfactory level of technological adoption due to the basic and specific inputs required to use such technologies, and knowledge not being readily available.
- Technologies are not readily available at the market/grower's, or producer's doorstep in a way that growers and producers can easily use them.
- Lack of alternative technical recommendations at different levels (e.g., low-input technologies, commercial scale technologies, smart technologies) to suit the different strata of stakeholders operating in the value chain of the tea industry.
- Unavailability of a precise national-level database for policy decisions and resource allocations.

- Noncompliance with the guidelines, norms, and recommended practices by the stakeholders in the tea industry

# GOALS AND OBJECTIVES

## 4.1. Goals

The goals of the TRI are:

1. To develop appropriate technologies and effectively disseminate them to the stakeholders for improving land and worker productivity, quality of the final product, and profitability of the stakeholders for uplifting their socio-economic status.
2. To improve the required infrastructure and human resources for achieving goals in tea research.
3. To develop and maintain a better working environment in the Institute, by improving the standard of laboratories and through appropriate changes in research & extension centers, to retain staff of a high standard and to implement performance-based merit schemes, applicable to all staff for effective undertaking of Research & Development activities and technology transfer.

## 4.2. Objectives of the Tea Research Institute for the Next Five Years (2025-2029)

1. Introducing innovative solutions for industry needs
2. Implementing an island-wide program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars, and providing planting materials in required quantities to the growers in order to face the challenges in tea industry and to achieve tea production and export earnings targets of the tea industry.
3. Implementing research programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes, and the quality of tea production.
4. Identifying, developing/improving, and establishing appropriate soil and crop improvements, crop protection, agronomic, adaptation, and mitigation strategies to minimize the potential impacts of climate change on the tea industry, and implementing programs to educate growers about them.
5. Identifying and developing appropriate cultivation equipment, machines, and irrigation systems for field cultivation activities with the aim of reducing production costs, finding solutions to the shortage of skilled labor, and increasing input efficiency in tea fields.
6. Developing new nursery technologies and improving existing ones to produce commercial-scale recommended tea and shade tree nurseries, at the minimum cost, and transporting them without damage.
7. Identifying, developing, recommending, and monitoring the integrated approaches for the management of pests (Diseases, Insects/Mites/Nematodes and Weeds) that have a potential economic impact on productivity and the sustainability of tea, the environment, and shade trees, and the consumer requirements of the tea plantation.
8. Improving the tea processing technology and factory operations to improve the quality of final products and to conserve energy.
9. Addressing the energy issues in tea processing by establishing economically viable fuelwood plantations and exploring alternative energy sources.
10. Developing methods to enhance made tea quality, value addition, and product diversification, inclusive of Artisanal tea and specialty tea, etc.
11. Identifying the health benefits of different Sri Lankan tea cultivars, tea grades, and teas produced from different processing methods.

12. Fostering worker wellness and dignity for reducing worker shortage and improving worker productivity through alternative worker deployment and income-generating models.
13. Establishing a comprehensive database on Agronomic Profile, Land Use Pattern, Socio-Demographic and Human Resources, Entrepreneurship opportunities, etc., in the corporate sector tea plantations and linking the database with the other databases of the sister organizations.
14. Enhancing the global competitiveness of the Sri Lankan tea
15. Disseminate new tea technology information efficiently to users and improve the skills of those involved in tea cultivation and production processes.
16. Regularly assessing the level of adoption of TRI recommendations by the stakeholders of the tea industry
17. Strengthening the tea value chain in the tea sector
18. Providing analytical and other services in an efficient manner
19. Establishing model estates/fields for different agronomic operations in different tea growing regions for educational purposes and for monitoring the performance.

# PRIORITY STRATEGIES FOR ADDRESSING CHALLENGES IN THE TEA INDUSTRY

The following Strategies were identified to address the needs of the industry.

## 5.1. Crop Improvement

Crop improvement remains the cornerstone of ensuring a sustainable, profitable tea industry by delivering planting materials that combine high yield with resilience to pests, diseases, and abiotic stresses. Although TRI has released numerous high-yielding cultivars over the decades, only a handful now dominate 80 % of vegetative propagation (VP) plantings, and many lack built-in tolerance to biotic threats or drought. Reliance on agrochemicals is increasingly untenable due to both rising input costs and stringent maximum residue limits (MRLs) imposed by global markets. Furthermore, climate change demands that new cultivars perform reliably under shifting environmental conditions. To meet these challenges, TRI's R&D program is evolving from traditional selection toward a holistic, multidisciplinary breeding pipeline that integrates molecular tools and biotechnological advances.

## 5.2. Land Productivity Improvement

High land productivity reduces COP as a result of the efficient use of all the cost-related resources in an estate (land, labor, material, and other inputs). Of the labor-related costs, the cost of plucking, being the highest, can be greatly reduced by increasing land productivity. Low bush density (greater number of vacancies), debilitated tea bushes, and lack of inputs are a few of the common causes of low productivity of tea lands in Sri Lanka.

### 5.2.1. Integrated approach to soil fertility management

Integrated soil fertility management is essential to restore and sustain the productive capacity of Sri Lanka's century-old tea soils. Healthy soils act like well-managed banks, releasing nutrients in plant-available forms while conserving organic matter and microbial communities. However, long-term cultivation has depleted organic reserves, reduced fertilizer response, and increased nutrient losses. Because soil properties vary widely across agro-ecological regions (AERs), TRI research emphasizes site-specific diagnostics using advanced instrumentation and skilled analysis to track subtle physical, chemical, and biological changes. Biological innovations that recruit native microbial consortia to enhance nitrogen and phosphorus availability, improve stress tolerance, and suppress pathogens are being trialed alongside traditional conservation measures like terracing and incorporation of pruning. TRI continues to refine fertilizer recommendations through periodic soil testing, while training growers in proven rehabilitation and conditioning protocols. By coupling cutting-edge lab and field research with farmer education, the Institute aims to rehabilitate degraded tea soils, boost yields, and reduce production costs sustainably.

### 5.2.2. Improvement of land productivity through agronomic practices

Improving land productivity in tea plantations is crucial for enhancing yield and reducing the cost of production. Key agronomic strategies include infilling vacancies, adopting good agricultural practices (GAPs), replanting, and diversifying crops on unproductive lands. Among these practices, special emphasis is placed on enhancing soil fertility, managing shade effectively, and introducing intercropping systems. These practices not only boost yield but also improve soil health and resilience. In degraded or low-yielding tea lands, particularly in the Low and Mid elevations facing climate-related challenges, monoculture tea cultivation is becoming increasingly unviable. As a result, TRI prioritizes research on land suitability classification and alternative cropping models, especially to support tea smallholders managing limited land areas. Proper shade management is also vital as it helps mitigate environmental stress, enhances fertilizer use efficiency, and contributes to improved soil conditions. Though preliminary studies have been conducted, further detailed and long-term investigations across diverse soil and climatic zones are needed to establish effective and sustainable productivity-enhancing practices.

## 5.3. Climate Resilience and Sustainability

Climate change poses a significant threat to tea productivity, particularly in Sri Lanka's Low-grown, Mid-grown, and Uva regions, due to increasing temperature extremes and erratic rainfall patterns. To adapt and mitigate these challenges, the Tea Research Institute emphasizes the need for effective soil conservation strategies to minimize erosion during intense rainfall and to enhance soil moisture retention during dry periods. Shade management in tea fields is identified as a key adaptive measure, providing protection against temperature extremes, improving soil conditions, and enhancing fertilizer use efficiency. Further, adopting appropriate irrigation techniques and rainwater harvesting can help maintain a consistent soil moisture regime throughout the year. Additionally, increasing soil organic matter content is crucial for improving both moisture retention and overall soil fertility. Although some of these interventions have been previously explored, comprehensive, long-term research is necessary across diverse agro-ecological zones to develop site-specific climate-resilient practices for the tea sector.

## 5.4. Mechanization of Field Practices

Research on the mechanization of field practices in tea cultivation was undertaken to address the issues of a lack of labor and to increase labor productivity.

Mechanization of tea harvesting is essential to address Sri Lanka's low field productivity, escalating labor shortages, and rising production costs. Developing and adapting harvesting devices requires a holistic approach that balances end-product quality, field terrain, capital and operating expenses, and available skill levels. Research must focus on designing and refining prototypes that can navigate steep and uneven tea slopes, minimize leaf damage, and match the selective plucking standards of manual tea pluckers. Rigorous field trials are needed to evaluate machine performance in terms of labor productivity gains, reduction in physical strain, faster completion of harvesting operations, and overall cost-effectiveness. By investing in such targeted R&D, optimizing blade configurations, power sources, and handling

ergonomics, the industry can significantly lower labor inputs, improve plucking consistency, and ultimately enhance both yield and tea quality.

## 5.5. Nursery Management Techniques

Effective nursery management is critical for ensuring a vigorous and uniform supply of planting materials. Traditionally, TRI-recommended soil mixes drawn from rehabilitated grasslands and subsoils (< 30 cm depth) have been used to raise healthy tea nursery plants, but scarcity of these sources has led growers to adopt smaller "battery" bags and alternative media such as tea waste, paddy husk, and coir dust. These substitutes often underperform, resulting in poor plant establishment. Research must therefore reassess plant growth in reduced-volume bags and systematically evaluate a range of novel media blends to identify cost-effective, scalable potting mixes that match or exceed standard TRI formulations. In addition, the research is focused on introducing user-friendly soil sterilizing techniques for tea nurseries.

## 5.6. Crop Management

Tea in Sri Lanka, as a perennial monoculture, is uniquely vulnerable to a broad spectrum of pests, diseases, insects, mites, nematodes, and weeds that vary by plant age, season, and region. Historically managed through heavy agrochemical use, the industry now faces rising input costs and stricter international MRLs, necessitating a shift toward more sustainable Integrated Pest and Disease Management (IPM & IDM) strategies. Recognizing the limitations of a pesticide-centric model, TRI promotes a rational, ecologically responsible approach that prioritizes biological control, conservation of natural enemies, and agronomic or cultural methods to build plant resistance. These strategies must be tailored to perennial, seasonal, and emerging pest threats while minimizing economic, health, and environmental impacts.

Therefore, IPM needs are as follows;

- Introduction of resistant and tolerant tea cultivars developed specifically to address pest damage in different agroecological areas of the main tea-growing regions
- Develop and introduce cost-effective, environmentally and user-friendly integrated pest management practices
- Promote precision agricultural theories for assuring environmentally friendly, economically feasible tea cultivation systems
- Prioritize biological and cultural methods of pest control
- Strengthen pest surveillance and monitoring using GIS for forecasting
- Replace existing pesticides with new generation pesticides
- Establish MRLs, PHIs, and REIs to suit international standards on product, system, and worker safety
- Encourage the use of TRI-recommended GAPs and GMPs
- In service training for pesticide handlers, i.e., field staff, spray operators, and growers, and certification

Tea being a beverage crop, every effort is made to ensure that pesticide applications are a last resort and leave no or only trace residues below stipulated MRLs.

## 5.7. Tea Processing Technology

### 5.7.1. Development & improvement of tea machinery and factory conditions

Manufacturing costs in tea factories are heavily driven by electricity, fuel, and labor. Even modest increases in energy or wage rates can sharply inflate total costs. Targeted research is therefore needed to identify and develop technologies, process improvements, and operational practices that can significantly reduce energy and labor inputs in tea manufacture, thereby enhancing factory efficiency and lowering overall production costs.

### 5.7.2. Development/evaluation of alternative energy sources in tea processing

Tea manufacture in Sri Lanka's roughly 645 factories consumes an estimated 6,600 TJ of thermal energy annually, equivalent to burning about 1.6 million $m^3$ of firewood to drive withering and drying processes. With common fuel species such as gum, rubber, and jungle trees becoming scarce and more expensive, the industry faces both supply constraints and rising costs. Prioritizing research into alternative thermal energy sources, whether through biomass diversification, agro-residue fuels, or cleaner, more efficient technologies, is therefore essential to secure a reliable, cost-effective fuel supply for tea processing.

## 5.8. Made Tea Quality Improvement

Made tea quality is central to Sri Lanka's reputation as the world's premier producer of Ceylon tea. To sustain and enhance this competitive edge, targeted research must focus on refining processing techniques that preserve leaf integrity and optimize flavor, aroma, and biochemical composition. Simultaneously, post-harvest handling protocols should be improved to reduce mechanical damage and microbial contamination. Achieving and maintaining internationally recognized hygiene and safety standards such as ISO 22000 certification will further validate Ceylon tea's status as a premium, natural beverage and open new markets demanding stringent product assurances.

## 5.9. Value Added Tea Products

Research on value addition, new product development, and product diversification was undertaken to increase foreign revenue and improve diversity and the image of tea.

Sri Lanka continues to export most of its tea in bulk form. However, shifting towards value-added products such as scented tea and tea bags can significantly increase industry earnings. Developing new products like carbonated and instant tea can attract younger consumers seeking convenience. Product diversification, such as tea wine, tea sauce, tea protein, cosmetics, can further broaden market potential. Overall, value addition, product innovation, and diversification

not only boost revenue but also generate employment opportunities, supporting the country's economic development.

## 5.10. Health Benefits of Tea

Study of the health-promoting effects of tea has become an area of paramount importance of tea, since the data generated from these studies are increasingly used as marketing tools. There are many health claims attributed to tea, but some of them have not been studied locally. In this context study of antioxidant properties of tea and its individual components has become an important criterion all over the world.

## 5.11. Resource Planning

### 5.11.1. Socio-economic studies

Sri Lanka's tea industry remains a cornerstone of the national economy, yet faces mounting socio-economic challenges that threaten its future viability. High costs of production driven by low land and labor productivity, coupled with labor shortages from out-migration and declining estate workforces, have eroded competitiveness. Addressing these issues requires a clear understanding of the sector's social and economic dynamics, including workforce demographics, absenteeism, and the aspirations of younger generations. Rigorous socio-economic research is therefore essential to inform policies and interventions ranging from labor-saving technologies and improved field practices to community development and incentive schemes that can reverse productivity declines, reduce costs, and secure the long-term sustainability of the industry.

### 5.11.2. Application of Geographic Information System (GIS) to the tea sector

The application of Geographic Information System (GIS) in the tea sector provides a powerful tool for spatial analysis, enabling planners to efficiently organize data and make informed decisions. Its use supports the national goal of sustainable land use in tea estates through improved land efficiency, soil conservation, and environmental protection. For producers, GIS aids in maximizing profitability by facilitating precision farming, effective planning, and monitoring of plantation activities. Additionally, it helps develop strategic land use plans and creates micro-level tea information systems beneficial for researchers, estate managers, and policymakers, enhancing overall decision-making and resource management in the industry.

### 5.11.3. Micro & macro-economic analysis

Evaluating the economic feasibility of innovations through cost-benefit analysis is essential before introducing new technologies to tea growers, as profitability influences adoption. New systems such as alternative worker deployment models and tea-based ecotourism should be assessed for their potential to enhance industry sustainability and income generation. Additionally, analyzing policy changes affecting plantation economies is critical to

understanding their impacts on the plantation community. This enables the formulation of effective strategies to maximize benefits and mitigate negative consequences, ensuring long-term viability and resilience of the tea industry.

### 5.11.4. Tea Marketing Studies

In the context of the Sri Lanka tea industry, market studies are very important since we produce tea mainly for export. Market research assists stakeholders in understanding consumer preferences, emerging market trends, identifying new markets, and assessing the competitiveness of the tea market, which helps in identifying opportunities for innovation, improving efficiency, and competing effectively in the global market.

### 5.11.5. Assess the adaptation of the TRI recommendation by growers

Studies are being conducted to evaluate the level of adoption of TRI recommendations in tea growers' lands and challenges faced by the growers in adopting technologies. Further, it is also intended to evaluate the identified growers' agricultural practices adopted in their tea lands, scientifically, in order to develop intermediate technologies suitable for resource-poor tea growers.

## 5.12. Technology Dissemination

The Tea Research Institute's Advisory and Extension Division (AED) is the principal conduit for transferring TRI's research outputs to estate and smallholder growers across the country. Operating from headquarters in Talawakelle and six regional centers (Rathnapura, Deniyaya, Kottawa, Matugama, Passara, and Kandy), the AED identifies on-farm technology needs, conducts adaptive trials to test new practices under real-world conditions, and provides holistic advisory support on all aspects of tea cultivation. Despite its long history as the industry's trusted information source, recent TRI studies have highlighted gaps in awareness, knowledge, and adoption of improved practices among growers. To close this "know-do" gap, AED will augment its interpersonal outreach with the following strategic measures:

i. Effective use of mass media (TV, radio, print, and internet) to rapidly raise awareness and knowledge of best practices, leveraging ICT to deliver timely, tailored content at scale.
ii. Training of Trainers (ToT) to empower estate field staff and TSHDA inspectors as para-extension workers who, once trained by TRI, can cascade technologies to grassroots operators.
iii. Public–private partnership extension models that unite TRI, TSHDA and agro-input companies to deliver research, inputs, and analytical services as integrated packages, maximizing resource efficiency and policy alignment.
iv. Expanded adaptive trials and demonstration plots, including exploration and validation of indigenous knowledge to refine innovations and build stakeholder confidence before broader rollout.

v. Strengthened analytical services and outreach activities under a unified AED umbrella, ensuring that soil, leaf, and pest diagnostics accompany each technology package.
vi. Deployment of mobile advisory, extension, and analytical units, two tailored fleets serving Up-, Mid-, Uva- , and Low-country zones to bring TRI's expertise and testing capabilities directly to remote growers.

By implementing the above new technology dissemination approaches, stakeholders could be able to get the full benefit of the TRI's valuable research efforts and research outcomes.

### 5.12.1. Evaluation adaptability of technologies

Adaptive trials are being conducted to assess the adaptability of technologies developed by the institute in tea growers' fields. This is experimental research proven, ready-to-use technology or innovation with farmers, in order to refine the technology to suit their conditions.

With this exercise, the proven research findings will be made appropriate, environmentally friendly, socially acceptable, technically feasible, and economically viable, before they reach the end users.

### 5.12.2. Advisory & extension program

The AED delivers TRI's research outputs to both estates and smallholder growers via a network of seven regional stations: Talawakelle (Nuwara Eliya), Rathnapura, Deniyaya, Kottawa, Kandy, Passara, and Matugama; each covering one or more tea-growing districts. AED officers maintain close, ongoing engagement with plantation and smallholder managers through scheduled field visits, on-call troubleshooting trips, and periodic formal meetings between TRI scientists and end-users. Technical bulletins, fact sheets, and other resource materials are regularly published and distributed to reinforce in-field training. In partnership with the Tea Small Holdings Development Authority (TSHDA), AED ensures that innovations in good agricultural and manufacturing practices are rapidly extended to smallholder communities. Whether responding to specific crop or processing challenges or conducting routine developmental visits, AED and its regional stations work together to diagnose problems, demonstrate new technologies on-site, and guide growers through implementation, thereby accelerating the adoption of TRI's research findings across Sri Lanka's tea sector.

## 5.13. Services to Stakeholders

Despite introducing technologies to the tea sector, TRI provides the following services to its stakeholders.

- Analytical facilities for stakeholders for soil, foliar, and fertilizer analysis
- Microbial analytical services to stakeholders
- Nematode analytical service
- Root starch analysis

- Services to tea factories and other divisions in the TRI
- Advisory visits to tea factories
- Thermometers calibrations, hydrometers calibrations, moisture meters calibrations for tea factories, and moisture testing of Tea samples for tea factories
- Supplying of new clonal cuttings for both the small holding and estate sector from mother bush sites –
- Commercial Nursery Inspection
- Assist stakeholders in cost estimations and calculate the value of tea bushes

## 5.14. Functions of Supportive Divisions Towards Achieving the Institute's Goals

### 5.14.1. Research Management

As per the Tea Research Board (TRB) Act, the mandate of the Tea Research Institute (TRI) is "to conduct, assist and encourage scientific and technological research into, and investigations of, all tea-related problems and disseminate such technologies and information to stakeholders and the general public". Research management plays a pivotal role in an organization where technology generation and dissemination projects are being executed as the core business. At TRI, this is achieved through a range of mechanisms. The primary objective is to monitor and evaluate the physical and financial progress of projects in terms of realizing their intended milestones, outputs, and outcomes for the benefit of stakeholders and the industry. Monitoring and evaluation of projects is ensured by internal and external reviews periodically. Internally, the progression of projects under thrusts in thematic and sub-thematic areas is being monitored and evaluated by the Directorate together with the Heads of Divisions. The Head of the divisions evaluates the progress monthly and reports to the management. In addition, the main research and extension thematic areas are evaluated by a Scientific Advisory Committee (SAC), which comprises renowned industrialists and academics together with the Directorate. Externally, there are three sub-committees that advise TRB on specialized aspects of the governance of TRI affairs. The Consultative Committee on Research (CCR) deals with all matters in relation to research, including post-graduate programs, while the Consultative Committee on Estates and Advisory Services (CCE & A) handles matters connected with two TRI estates and advisory and extension activities. The Consultative Committee on Audit and Management (CC A & M) deals with administration, management, and finance. The subcommittees comprise renowned industrialists and academics, and the representatives from key stakeholder organizations. The recommendations of the SACs and CCs are subsequently ratified at the TRB deliberations prior to implementation.

### 5.14.2. Technology Transfer Office

The Technology Transfer Office (TTO) at the Tea Research Institute of Sri Lanka plays a vital role in bridging scientific research and practical application in the tea industry.

Its major role includes identification, protection, and documentation of inventions through patents and other forms of IP. The TTO ensures adherence to the institute's IP policy, promoting fair recognition and benefit-sharing for inventors. By securing IP rights, the TTO enables the safe commercialization of technologies while safeguarding the interests of both the institute and its stakeholders.

### 5.14.3. Publications and Publicity Unit

The primary role of the Publications and Publicity Unit is the dissemination of TRI research findings to the masses of society through publications and other science popularizing activities. To achieve this objective in the present context, the Publications/ Publicity Unit has to work together with the Photography Unit, Audio Visual Unit, IT Unit, and Library to compile various publications, audio visual material, mass media productions, and other related technology transfer materials whilst organizing suitable tea technology popularizing events.

### 5.14.4. Information & Communication Technology Unit

For a research institute, information and communication technology (ICT) is essential because it makes the process simpler to collect and manage research data, collaborate on projects, share information, and access information sources, all of which improve the quality of the research and produce valuable results. The ICT unit in TRI rendered its ICT-related services to other divisions, units, regional and extension centers, as well as two estates.

## 5.15. Administration Division

The Administration Division is to ensure the efficient performance of all departments by providing support services to the institute. It acts as a connecting link between the senior management and the employees, motivates the workforce, and makes them realize the goals of the institute. Deputy Director (Administration) ensures effective strategic and operational administrative planning, monitoring, and reporting to enhance the decision-making process of the institute while overseeing all day-to-day operations of the administrative functions. Administration, engineering, purchasing, electrical, transport, motor garage, and telephone exchange unit function under the management of the Deputy Director (Administration).

## 5.16. Finance Division

Main activities of Finance Division are preparation of annual budget estimates, effective implementation of approved budget estimates and managing budget allocations, disbursing payments and receipts as approved budget estimates, payment of personnel emoluments and other allowances as per statutory and approved limits, supervision of estate accounts, maintaining adequate stock levels for uninterrupted and smooth functioning of the Institute through a stores control system, carrying out physical stocks and assets verifications at the end of every year and submission of Institute's Financial statements including for two estates to the Tea Research Board and Auditor General's Department as per statutory requirement.

## 5.17. Internal Audit Unit

The Internal Audit Unit (IAU) contributes to the smooth functioning of the institute. It monitors the institute's operations, ensures the institute adheres to relevant laws, regulations, and internal policies, and minimizes legal and financial risks.

## 5.18. Research, Advisory & Extension Centers

### 5.18.1. Research, Advisory & Extension Centre, Rathnapura

The Research, Advisory & Extension Centre is the largest Regional Center of the TRI with research, advisory, and extension facilities. Its services are mostly focused on the development of the low country tea sector, which contributes to about 75% of the national tea production, mostly through smallholdings. It has four research units, *viz.*

To meet all the needs of the low country region's stakeholders, there are sections dedicated to agronomy, plant breeding, entomology and nematology, process technology, and advisory and extension. However, Advisory and extension programs are mainly targeting the development of tea cultivation in Rathnapura, Kegalle, Colombo, and Gampaha Districts. The Administration section of the Center is responsible for providing support services to the above research and extension divisions by way of maintaining infrastructure.

### 5.18.2. Research, Advisory & Extension Centre, Hantana

The Research, Advisory & Extension Centre is situated at Hantane, Kandy also has research and extension facilities to cater to the demands of the mid-country stakeholders. The research is mainly conducted under the disciplines of Agronomy, Entomology & Nematology, Soils and Plant Nutrition, and Plant breeding, along with Advisory Extension. The Advisory and Extension Division provides Advisory and extension services to the stakeholders in Kandy, Matale Districts, and part of the Nuwara Eliya District. Its advisory services are provided to 57 state and RPC-owned estates and around 30,000 smallholdings.

Additionally, issuing planting materials for stakeholders, providing soil, and plant nutrient analytical services, and preparing ICT-based extension materials are among the other services provided to the stakeholders. The center also manages a small tea land of 11 ha and a nursery as per the TRI recommendations.

### 5.18.3. Advisory & Extension Centre, Deniyaya

The Advisory & Extension Centre, Deniyaya is primarily an Advisory and Extension center on a total of 5 acres in extent, equipped with a small-scale laboratory for soil pH, Carbon & Nematodes analysis.

Extension Centre, in consultation with the Heads of Divisions at Head office, carried out a large number of field investigations in the low-grown plantations situated in Matara and Hambantota districts and rendered advisory and extension services for both the corporate and small holding sectors. The Corporate sector in this region consists of 12 RPC estates

spread over nearly 3000 ha, while the smallholdings sector comprises nearly 63,000 smallholdings covering 27,000 ha.

### 5.18.4. Advisory & Extension Centre, Passara

This extension center is equipped with a small-scale laboratory for soil pH and carbon analysis and a field extent of 14.98 ha for field trials**,** mother bush area, and demonstration plots. It delivers training and extension, soil analytical services, and planting materials, particularly for 62 RPC estates, 33,000 smallholders, and proprietary estates. In addition, training and awareness programs are conducted for other stakeholders.

### 5.18.5. Advisory & Extension Centre, Kottawa

The Advisory & Extension Centre, Kottawa is primarily an Advisory and Extension Centre equipped with a small-scale laboratory for soil pH analysis and with a total extent of 31 hectares to carry out regional-level field trials. The center caters to the extension needs of 13 RPC estates, 28 private estates, and approximately 100,000 smallholders in the region. The total tea extent in the region is approximately 30,000 ha.

### 5.18.6. Advisory & Extension Centre, Matugama

This Advisory & Extension Centre is located in the premises of Rubber Research Institute and is primarily an Advisory and Extension Centre equipped with a small-scale laboratory that mainly provides services for soil pH analysis. Extension Centre, in consultation with the Heads of Divisions at Head office, carried out a large number of field investigations in the low-grown plantations situated in Kalutara, Gampaha, and Colombo Districts.

# RESEARCH PRIORITIZATION PROCEDURE

Optimizing resource use efficiency of the institute while taking into account the funding limitations, introducing highly impacted affordable technologies that have the capacity to solve key issues in the tea sector, prioritization of the proposed research program is essential. In the process of research prioritization, the following steps were followed.

## 6.1. Step 1- Identification of research areas and formulation of projects

The TRI scientists identified research areas under 12 strategies as mentioned in the previous chapter, in order to solve the main challenges in the tea industry within the next five years. Hundred and fifty research projects, which include applied, basic, supportive, and service projects, were identified.

## 6.2. Step 2- Obtaining feedback on the proposed research program

All identified research areas were concise into 95 research projects in order to reduce the length of the project list. Some thrusts are considered as projects, on the basis that all the projects in the thrusts have to be completed to achieve the targeted outcome/output. Using the concise project list, a stakeholder consultation feedback form was developed (Annex 1).

The sample respondents were identified to represent all the stakeholder groups in the tea value chain.

- Ministry of Plantation and Community Infrastructure (MPCI)
- Sri Lanka Tea Board (SLTB)
- Tea Small Holdings Development Authority (TSHDA)
- National Institute of Plantation Management (NIPM)
- Planters Association (PA)
- Tea Exporters Association (TEA)
- Colombo Tea Traders Association (CTTA)
- Private Tea Factory Owners' Association (PTFOA)
- Estate Owners Association/Medium Scale Tea Growers (MSTG)
- Tea smallholdings Development societies (TSDS)
- State-Owned Estates
- Regional Plantation Companies (RPCs)
- Input Dealers
- Scientific Advisory Committee (SAC)
- Consultative Committee on Estates (CCE)
- Consultative Committee on Research
- Tea Research Institute (TRI)
- Experiment & Extension Forum (E&E)
- EX TRI officers (EX TRI)
- TRI Estates

The sample comprised 304 stakeholders. The consultative feedback forms were emailed and posted to the sample stakeholders. The sample stakeholders were instructed to evaluate the research program based on the following criteria.

a) **Importance** (Rate the importance of the thrust/project for solving a current issue or increasing productivity and profitability)
    a. *Highest importance (5); Lowest importance (1)*

b) **Priority** (Rate the priority for allocation of resources during 2025-2029)
    a. *High (3); Medium (2); Low (1)*

c) **Urgency** (Rate based on the urgency of achieving results and finding solutions)
    a. *Short (3); Medium (2); Long-term (1)*

## 6.3. Step 3 – Analyzing data

Eighty respondents responded to the feedback form, and responses received for each project and additional comments were tabulated. Following the expert opinions, weightage was given to the criteria, considering the total score is 100%. The weightage given for the importance, priority, and urgency was 50%, 25% and 25%, respectively. Accordingly, the total weighted score received for the individual project was calculated, and the project list was ranked. The project that received the highest total weighted score is ranked as 1, while the project that received the least total weighted score is ranked as 95. Then the lists of individual project rankings in each strategy were prepared (Annex 2).

## 6.4. Step 4 – Prioritization of research program

The research program was prioritized based the following criteria.

- The total weighted score and rank of the project for the stakeholders' consultative feedback form
- Maximum number of projects that can be handled by each division with available resources
- Contributions of each division to the other internal/external collaborative projects
- The highly important key research areas proposed by the stakeholders
- Aligning the TRI research program to Tea sector strategic plan and the government policy framework

Then the prioritized research program of each strategy was categorized into three groups as high, medium and low priority. All the projects categorized into high priority and some projects categorized into medium priority were considered in next five-year strategic plan.

# Stakeholder Consultation Feedback on the Proposed Research Program of the TRI for the 2025 – 2029 period

## 7.1. Stakeholder Consultation Feedback

**Instructions to respondents:**

[1]Rate the importance of the Thrust or Research Program/Project for solving a current issue or increasing productivity and profitability (5 – Highest importance; 1 – Lowest importance)

[2]Priority for allocation of resources during the 2025-2028 period (High-, Medium-, or Low priority)

[3]Urgency for achieving results and finding solutions (Short-, Medium-, or Long-term)

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| 1. Crop Improvement | | | | | | | | | | | | |
| **Development of new tea cultivars to improve productivity, quality, and to face emerging challenges -TRI 6000 series** | Introduce improved high-yielding tea cultivars with tolerance to Drought, BB, SHB, Live wood termite, Poria, Nematodes, & Canker | | | | | | | | | | | |
| **Development & Promotion of bi- and poly-clonal seed stocks for drought-prone areas in different agro-ecological regions** | Increase seed stock availability for drought-prone areas | | | | | | | | | | | |
| **Establishment of seed gardens** | Increase the production of improved seeds as a source of planting materials in drought-prone areas | | | | | | | | | | | |
| **Evaluation of cultivars suitable for specialty tea production and increasing the awareness of specialty tea production among the stakeholders** | Increase the availability of suitable cultivars, processes for specialty tea production, and aware stakeholders in order to increase their income | | | | | | | | | | | |
| **Development of low caffeine and disease-resistant tea cultivars through interspecific-hybridization and embryo rescue techniques.** | Introduce low-caffeine cultivars for stakeholders | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Development of a small-scale processing system for early appraisal of suitable cultivars for specialty tea production in Sri Lanka** | Availability of machinery cultivars for specialty tea production | | | | | | | | | | | |
| **Biochemical profiling and transcriptomic analysis of L- theanine content in the segregating population of tea** | Increase the availability of cultivars having high L-Threonine content for green tea production | | | | | | | | | | | |
| **Identification of the negative regulator of caffeine synthesis gene and its utilization in developing low caffeine tea plants** | Identification of low caffeine synthesis genes for producing low caffeine tea | | | | | | | | | | | |
| **Development of machinery for artisanal/specialty tea** | Improve tea drying through steady inlet drying air temperature | | | | | | | | | | | |
| **Development of quality standards for specialty tea products** | Ensuring tea markets through quality specialty tea production | | | | | | | | | | | |
| **Development (screening) of tea cultivars specifically suitable for small growers who face specific localized issues** | Increase the availability of suitable cultivars for areas with specific issues | | | | | | | | | | | |
| **Use of in vitro techniques to supplement the breeding Programs** | Early release of new cultivars through shortening the breeding program | | | | | | | | | | | |
| **Use of Omic approaches towards the development of cultivars resistant to biotic and abiotic stresses & quality enhancement of tea** | Early release of new cultivars through shortening the breeding program, and advanced chemical, physiological, and biological properties of cultivars | | | | | | | | | | | |
| **Development of mechanisms to disseminate quality planting material** | Increase the availability of planting materials for stakeholders | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Supporting Genetic Improvement of Tea – Phase II** | Early release of new tea cultivars through shortening the breeding program | | | | | | | | | | | |
| **Exploration, Collection, Characterization, and Conservation of Tea Genetic Resources in Old Seedling Areas** | Conserve genetic resources in the old seedling areas before extinct | | | | | | | | | | | |
| **Whole genome sequencing approaches for genetic improvement and expedited translational genomics in Sri Lankan tea** | Identification of special characteristics of genes for incorporation into the plant breeding program | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 2. Land Productivity Improvement | | | | | | | | | | | | |
| ***2.1. Integrated approach to soil fertility management*** | | | | | | | | | | | | |
| **Estimating crop response to macro nutrients (N, K, Mg, S & P) at AER level** | Introduce locally available low-cost nutrient supplements. | | | | | | | | | | | |
| **Establishing dolomitic limestone requirements based on pH buffering capacity in different tea growing regions at the series level** | Enhance plant growth & development through precise dolomite application | | | | | | | | | | | |
| **Development and evaluation of economically feasible bio-stimulants to enhance the growth and yield of tea** | Improve growth & yield | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Application of NIR-technology in soil fertility management in tea** | Development of low-cost analytical techniques for soil & plant nutrients) | | | | | | | | | | | |
| **Optimization and evaluation of drone technology for fertilizer application** | Cost-effective techniques, solutions for labor shortage/timely applications | | | | | | | | | | | |
| **Enhancing plant nutrition and alleviating biotic and abiotic stresses in tea cultivation through silicon (Si) fertilization** | Enhancing growth & yield, increasing tolerance to pests & diseases, increasing fertilizer use efficiency, and reducing cost | | | | | | | | | | | |
| **Identification of nutrient utilization genes** | Reasonable/average yield for low-nutrient tea fields | | | | | | | | | | | |
| **Precision Agriculture for Nutrient Management** | Nutrient mapping to identify high and low soil fertility areas in order to reduce fertilizer quantity to be added | | | | | | | | | | | |
| **Optimizing drone spraying of foliar application of fungicides** | Introduce a cost-effective, labor-saving spraying technique | | | | | | | | | | | |
| **Developing a plant health (pest & disease) monitoring system & decision support system to support precision agriculture** | Early decision making on controlling pests & diseases to minimize crop loss | | | | | | | | | | | |
| **Developing disease severity and distribution maps for major tea diseases (Blister blight, canker, Horse hair blight)** | Early decision making on controlling disease incidences to minimize crop loss | | | | | | | | | | | |
| **Development of nano-pesticides for managing pests and diseases** | Increase the efficacy of chemicals to reduce dosage | | | | | | | | | | | |
| **Screening fertilizers, agrochemicals, machinery, and equipment** | Identify & recommend suitable inputs & machinery | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Potentials of partial replacement of inorganic fertilizers with organic materials for Tea** | Improve overall soil health & quality | | | | | | | | | | | |
| **Development of methods for the formulation of bio-organic and mineral or compound fertilizers** | Recommend low-cost locally developed bio fertilizer & reduce fertilizer importation | | | | | | | | | | | |
| **Potentials of Regenerative Agriculture techniques to restore soil fertility, health, and quality in tea growing soils (This includes studying the impact of lime, biofertilizers, gypsum, and other amendments)** | Improve soil health & reduce yield decline | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| **2.2. *Improvement of land productivity through agronomic practices*** | | | | | | | | | | | | |
| **Evaluation of CO-3 and Pak-Chong grasses and a new farming system** | Reduce cost and get income early by reducing the soil rehabilitation period | | | | | | | | | | | |
| **Study the water resources in tea lands and evaluate of micro irrigation techniques** | Increase productivity and total production | | | | | | | | | | | |
| **Evaluating identified shade-tree species, pest & disease management, and establishing cultural practices** | Introduce the most suitable shade tree species to the tea lands | | | | | | | | | | | |
| **Identification of suitable intercropping species to improve tea land productivity and study the development of terraced lands in hilly tea growing areas** | Increase income from tea fields | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Evaluation of the growth and yield of grafted tea plants** | Increase income from tea fields | | | | | | | | | | | |
| **Study new farming systems in a tea plantation** | Increase income from tea fields | | | | | | | | | | | |
| **Evaluation of the Physiological response of tea cultivars to plant density** | Introduce appropriate high plant density systems | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 3. Climate resilience and sustainability | | | | | | | | | | | | |
| **Investigation on pest and disease response of tea to global climatic change** | Reduce the adverse impacts of pests & diseases due to climate change | | | | | | | | | | | |
| **Evaluation of physiological and anatomical attributes of tea cultivars in selecting the best cultivars for better survival, growth, and yield, especially under drought, extreme temperature, and waterlogging conditions** | Reduce crop losses & casualties due to adverse climate conditions | | | | | | | | | | | |
| **Quantification of soil erosion and assessment of different soil conservation measures in tea growing areas** | Increase production and income through minimizing nutrient loss and crop loss | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| 4. Mechanization of Field Practices | | | | | | | | | | | | |
| **Evaluation of cultivar characteristics of tea amenable to mechanical harvesting** | Introduce suitable cultivars for mechanical harvesting | | | | | | | | | | | |
| **Assessing the impacts of spacing and training/pruning methods on mechanical** | Identifying appropriate Agricultural practices for productivity enhancement | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 6. Crop Management | | | | | | | | | | | | |
| **Development of cost-effective control methods for integrated management of SHB through biological, chemical, and improved formulations** | Introduce cost -effective controlling package for management to minimize pesticide usage | | | | | | | | | | | |
| **Development of integrated management strategies to control major tea diseases, through biological, chemical methods, and elicitors** | Introduce cost-effective IDM to minimize synthetic fungicide usage | | | | | | | | | | | |
| **Development of integrated weed management strategies in tea** | Introduce environmentally friendly weedicides for weed control | | | | | | | | | | | |
| **Development of integrated nematode management strategies** | Introduce nematode control methods | | | | | | | | | | | |
| **Screening new wound dressing to protect pruned cuts for incorporating the present IPM** | Introduce wound dressing to minimize wood rot formation | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Developing integrated management strategies for Up Country Live Wood Termite** | Introduce control methods for UCLWT | | | | | | | | | | | |
| **Refining techniques for sampling, laboratory and field experimentation, surveys, for studying insect and mite, and nematode pest damage** | Development of protocols for laboratory experiments | | | | | | | | | | | |
| **Identification and evaluation of semiochemicals against insects, mites, and nematodes** | Develop parameters to differentiate resistant & susceptible cultivars for pests & diseases | | | | | | | | | | | |
| **Establishment of the anatomical, biochemical, molecular, and physiological basis of major pests** | Identify techniques to screen suitable cultivars | | | | | | | | | | | |
| **Exploring beneficial microbes as plant health promoters in nutrition and disease management in tea** | Preserve soil health and biodiversity in organically cultivated tea lands | | | | | | | | | | | |
| **Optimizing drone spraying of foliar application of fungicides** | Introduce a cost-effective, labor-saving spraying technique | | | | | | | | | | | |
| **Developing a plant health (pest & disease) monitoring system & decision support system to support precision agriculture** | Early decision making on controlling pests & diseases to minimize crop loss | | | | | | | | | | | |
| **Developing disease severity and distribution maps for major tea diseases (Blister blight, canker, Horse hair blight)** | Early decision making on controlling disease incidences to minimize crop loss | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Development of nano-pesticides for managing pests and diseases** | Increase the efficacy of chemicals to reduce dosage | | | | | | | | | | | |
| **Screening fertilizers, agrochemicals, machinery, and equipment** | Identify & recommend suitable inputs & machinery | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| *ii. Integrated crop protection approaches, to minimize economic damage & address health, safety & environmental issues& meet consumer requirements* | | | | | | | | | | | | |
| **Evaluating and managing pest, disease, and weed incidences, Precision Agricultural methods in organic farming, and climate-smart protection lines** | Aware organic tea producers of pest & disease and weed incidences | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 7. Tea Processing Technology | | | | | | | | | | | | |
| ***(i) Development & improvement of tea machinery and factory conditions*** | | | | | | | | | | | | |
| **Development of a dust-removing system for a fluid bed dryer** | Improve the working environment & worker productivity | | | | | | | | | | | |
| **Development of a control system for rolling tea in an orthodox roller.** | Ensure tea quality & grade mix | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Development of a control system for rolling tea in Rotorvanes in Orthodox- Rotorvane tea manufacture** | Ensure tea quality & grade mix, and energy saving. | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| ***(ii) Development/evaluation of alternative energy sources in tea processing*** | | | | | | | | | | | | |
| **Developing an energy monitoring and management system for tea factories** | Reduce energy cost through optimizing energy usage | | | | | | | | | | | |
| **Development of a control system to optimize energy efficiency in steam boilers and Hot Water Generators in tea factories** | Save Electrical and thermal energy | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 8. Made Tea Quality Improvement | | | | | | | | | | | | |
| **Optimization of the manufacturing process to develop Theaflavin-rich tea** | Attract specific tea markets | | | | | | | | | | | |
| **Study on self-life & keeping quality of teas packed in paper & paperboard** | Ensure tea markets through developing trust in Sri Lankan tea | | | | | | | | | | | |
| **Studying the level of microbial contamination in different steps in tea manufacturing** | Meet food standards by minimizing microbial contamination | | | | | | | | | | | |
| **Identifying factors affecting the blackness and curliness of Low Country teas** | Screening made tea quality of cultivars | | | | | | | | | | | |

| Research Thrust/Research Program | | **Importance[1]** | | | | | ***Priority[2]*** | | | **Urgency[3]** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Developing a reliable technique for detecting adulterants in made tea glycol in made tea** | Ensure market through enhancing thrust on improving the health and safety of Sri Lankan Tea | | | | | | | | | | | |
| **Development of quality standards for bulk and tea bag materials** | Develop standards & regulations to assure consumer health | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 9. Value Added Tea Products | | | | | | | | | | | | |
| **Development of innovative value-added tea-based food and beverages** | Product diversification to increase price and income | | | | | | | | | | | |
| **Development of innovative cosmetic formulations using active ingredients present in tea** | Product diversification to increase price and income | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| **10.** Health Benefits of Tea | | | | | | | | | | | | |
| **Effect of the consumption of Sri Lankan black tea and value-added black tea formulations on blood lipids: A randomized controlled trial** | Use as a marketing tool to assure the tea market | | | | | | | | | | | |
| **Evaluating the potency of active biochemicals in tea for nutraceutical and pharmaceutical applications** | Value-added health tea products lead to ensuring specific tea markets | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **In-depth study on the bioavailability and health benefits of active compounds in Tea** | Use as a marketing tool to assure the tea market | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| 11. Resource Planning | | | | | | | | | | | | |
| ***i. Socio-economic studies*** | | | | | | | | | | | | |
| **Introduction of Decent work to the tea plantations** | Improve the living standards of workers | | | | | | | | | | | |
| **A study on the influence of ergonomic factors in adopting mechanical devices in tea fields in Sri Lanka** | Improve worker productivity, improve the working environment for decent work, and reduce work drudgery | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| *ii. Application of Geographic Information System (GIS) to the tea sector* | | | | | | | | | | | | |
| **Develop a Digital map and the tea land inventory of the corporate sector** | Optimum utilization of resources in tea plantations, land, water resources, and minerals | | | | | | | | | | | |
| **Demonstrate and popularize GIS-based decision making for the plantation industry in Sri Lanka** | Decision-making in land use changes | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| *iii. Micro & macro-economic analysis* | | | | | | | | | | | | |
| **Impact assessment of fiscal, monetary, and trade policies on the tea sector** | Aware policymakers of the impacts of the policies on the sustainability tea industry | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **Investigation on the impacts of crop diversification in the tea sector** | Optimum use of resource efficiency | | | | | | | | | | | |
| **Development of Sustainable tea tourism models for tea plantations in Sri Lanka** | Increase the tea plantations' income through adopting appropriate sustainable tourism models | | | | | | | | | | | |
| **Development of precise forecasting methods for tea production and tea prices** | Aware stakeholders of forecasted tea production & price | | | | | | | | | | | |
| **Investigation on factors to be considered in wage determination in the tea sector in Sri Lanka** | Support to introduce a salary structure for plantation workers | | | | | | | | | | | |
| **Investigating Tea Growers' Knowledge and Perceptions of Climate Change, and Determinants of Implementing Adaptation Strategies in Tea Areas Highly Vulnerable to Climate Change** | Improve the level of climate change adaptation strategies | | | | | | | | | | | |
| **Evaluating research recommendations, micro-analyses, and divisional activities** | Introduce socioeconomically feasible recommendations to stakeholders | | | | | | | | | | | |
| ***iv.*** *Tea marketing studies* | | | | | | | | | | | | |
| **Agri-preneureship development in medium-scale tea growers** | Identify potential activities and develop them as entrepreneurs | | | | | | | | | | | |
| **Investigation on perceptions of tea consumers and market trends** | Increase the income of tea producers and ensure quality tea products for consumers | | | | | | | | | | | |
| **Studying Circular Economy in Tea Value Chain Trends** | Increase resource use in the tea value chain | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |

| Research Thrust/Research Program | | Importance[1] | | | | | *Priority*[2] | | | Urgency[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Evaluation* | ***Benefits to the stakeholders*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** | ***High*** | ***Medium*** | ***Low*** | ***Short-term*** | ***Medium-term*** | ***Long-term*** |
| **13.** Technology Dissemination | | | | | | | | | | | | |
| **i.** *Evaluation adaptability of technologies* | | | | | | | | | | | | |
| **E-extension approaches to enhance the knowledge of tea growers at a mass scale with low cost** | Timely dissemination of technical information to a large group at the lowest cost | | | | | | | | | | | |
| **Evaluation of the present status and adaptability of technologies/GAPs recommended by TRI**. | Develop databases to make decisions for extension, development agencies, and policymakers | | | | | | | | | | | |
| **Establishment of an In-service Training Center** | Facilitate the technology transfer process of stakeholders | | | | | | | | | | | |
| **Strengthening smallholder tea organizations in Sri Lanka through commercialization** | Improve the income and living standards of medium and small-scale tea growers | | | | | | | | | | | |
| **Development of blockchain techniques to monitor the quality of made tea and enhance the traceability** | Ensure market accessibility, reduce chemical contamination of Ceylon tea, and traceability of chemical usage in the value chain | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |
| *ii.* *Advisory & extension program* | | | | | | | | | | | | |
| **Advisory and Extension activities and public-private partnership for extension** | Effective dissemination of technologies | | | | | | | | | | | |
| Any other research projects suggested by the respondents | | | | | | | | | | | | |

# Prioritized Research Areas

## 7.2. Prioritized Research Areas

*Table 10. Strategies Ranked based on Mean Rank*

| Thematic Area No. | Title of Thematic Area | Sub-categories | No. of Projects | Mean Rank |
|---|---|---|---|---|
| 12 | Technology Dissemination | Advisory and Extension Program | 1 | 7 |
| 7 | Tea Processing Technology | Development/Evaluation of Alternative Energy Sources in Tea Processing | 2 | 11 |
| 7 | Tea Processing Technology | Development and Improvement of Tea Machinery and Factory | 3 | 15.33 |
| 4 | Mechanization of Field Practices | Mechanization of Field Practices | 2 | 24 |
| 8 | Made Tea Quality Improvement | Made Tea Quality Improvement | 7 | 24.43 |
| 5 | Nursery Management Techniques | Nursery Management Techniques | 3 | 25 |
| 11 | Resource Planning | Socio-Economic Studies | 2 | 25 |
| 9 | Value-added Tea Products | Value-added Tea Products | 2 | 26.5 |
| 11 | Resource Planning | Micro- and Macro-Economic Analysis | 7 | 34.14 |
| 12 | Technology Dissemination | Evaluation of the Adoption of Technologies | 5 | 35.8 |
| 10 | Health Benefits of Tea | Health Benefits of Tea | 1 | 44 |
| 11 | Resource Planning | Application of Geographic Information Systems (GIS) to the tea sector | 2 | 46.5 |
| 11 | Resource Planning | Tea Marketing Studies | 3 | 51 |
| 2 | Land Productivity Improvement | Integrated Approach to Soil Fertility Management | 12 | 51.83 |
| 3 | Climate Resilience and Sustainability | Climate Resilience and Sustainability | 3 | 55.67 |
| 6 | Crop Management | Integrated Crop Management Approaches | 16 | 57.13 |
| 1 | Crop Improvement | Crop Improvement | 17 | 67.59 |
| 2 | Land Productivity Improvement | Improvement of Land Productivity through Agronomic Practices | 6 | 70.83 |
| 6 | Crop Management | Development and Evaluation of Sustainable Farming Systems | 1 | 89 |

*Table 11. Thrust (Thematic) Areas Ranked based on Mean Total Weighted Score*

| Thematic Area No. | Title of Thematic Area | Sub- categories | No. of Projects | Mean Weighted Score |
|---|---|---|---|---|
| **12** | Technology Dissemination | Advisory and Extension Program | 1 | 84.79 |
| **7** | Tea Processing Technology | Development/evaluation of alternative energy sources in tea processing | 2 | 84.28 |
| **7** | Tea Processing Technology | Development and Improvement of Tea Machinery and Factory | 3 | 83.82 |
| **8** | Made Tea Quality Improvement | Made Tea Quality Improvement | 7 | 83.33 |
| **9** | Value-added Tea Products | Value-added Tea Products | 2 | 83.28 |
| **4** | Mechanization of Field Practices | Mechanization of Field Practices | 2 | 83.02 |
| **5** | Nursery Management Techniques | Nursery Management Techniques | 3 | 82.61 |
| **11** | Resource Planning | Socio-Economic Studies | 2 | 82.56 |
| **12** | Technology Dissemination | Evaluation of the Adoption of Technologies | 5 | 81.77 |
| **11** | Resource Planning | Micro- and Macro-Economic Analysis | 7 | 81.5 |
| **10** | Health Benefits of Tea | Health Benefits of Tea | 1 | 80.5 |
| **11** | Resource Planning | Application of Geographic Information Systems (GIS) to the tea sector | 2 | 80.24 |
| **11** | Resource Planning | Tea Marketing Studies | 3 | 79.3 |
| **3** | Climate Resilience and Sustainability | Climate Resilience and Sustainability | 3 | 79.01 |
| **2** | Land Productivity Improvement | Integrated Approach to Soil Fertility Management | 12 | 78.72 |
| **6** | Crop Management | Integrated Crop Management Approaches | 16 | 78.14 |
| **2** | Land Productivity Improvement | Improvement of Land Productivity through Agronomic Practices | 6 | 75.92 |
| **1** | Crop Improvement | Crop Improvement | 17 | 75.29 |
| **6** | Crop Management | Development and Evaluation of Sustainable Farming Systems | 1 | 70.63 |

## 7.3. Rank of the project under different thematic areas

*Table 12. Crop Improvement*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 14. Development of mechanisms to disseminate high-quality planting material | 87.63 | 3 |
| 10. Development of quality standards for specialty tea products | 84.90 | 6 |
| 9. Development of machinery for artisanal/specialty tea | 81.40 | 36 |
| 4. Evaluation of cultivars suitable for specialty tea production and increasing awareness of specialty tea production among the stakeholders | 80.50 | 45 |
| 1. Development of new tea cultivars to improve productivity, quality, and to face emerging challenges - TRI 6000 series | 78.37 | 60 |
| 2. Development & promotion of bi- and poly-clonal seed stocks for drought-prone areas in different agro-ecological regions | 77.58 | 67 |
| 11. Development (screening) of tea cultivars specifically suitable for small growers who face specific localized issues | 76.30 | 74 |
| 12. Use of in vitro techniques to supplement the breeding Programs | 76.02 | 76 |
| 6. Development of a small-scale processing system for early appraisal of suitable cultivars for specialty tea production in Sri Lanka | 75.78 | 78 |
| 16. Exploration, Collection, Characterization, and Conservation of Tea Genetic Resources in Old Seedling Areas | 75.26 | 81 |
| 15. Supporting Genetic Improvement of Tea – Phase II | 75.25 | 82 |
| 3. Establishment of seed gardens | 74.67 | 83 |
| 13. Use of Omic approaches towards the development of cultivars resistant to biotic and abiotic stresses & quality enhancement of tea | 72.80 | 85 |
| 17. Whole genome sequencing approaches for genetic improvement and expedited translational genomics in Sri Lankan tea | 67.91 | 91 |
| 5. Development of low caffeine and disease-resistant tea cultivars through interspecific-hybridization and embryo rescue techniques | 67.12 | 93 |
| 7. Biochemical profiling and transcriptomic analysis of L-theanine content in the segregating population of tea | 65.46 | 94 |
| 8. Identification of the negative regulator of the caffeine synthesis gene and its utilization in developing | 63.04 | 95 |

*Table 13. Integrated Approaches to Soil Fertility Management*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 8. Precision Agriculture for Nutrient Management | 83.10 | 22 |
| 2. Establishing dolomitic limestone requirements based on pH buffering capacity in different tea growing regions at the series level | 82.96 | 24 |
| 5. Optimization and evaluation of drone technology for fertilizer application | 82.32 | 28 |
| 3. Development and evaluation of economically feasible bio-stimulants to enhance the growth and yield of tea | 81.79 | 34 |
| 1. Estimating crop response to macro nutrients (N, K, Mg, S & P) at AER level | 80.07 | 48 |
| 12. Potentials of Regenerative Agriculture techniques to restore soil fertility, health, and quality in tea growing soils (This includes studying the impact of lime, biofertilizers, gypsum, and other amendments) | 79.26 | 52 |
| 4. Application of Near InfraRed technology in soil fertility management in tea | 79.02 | 53 |
| 9. Investigation on biochar complexes enriched with nanoparticles and their effects on tea plant growth and soil quality | 78.83 | 55 |
| 6. Enhancing plant nutrition and alleviating biotic and abiotic stresses in tea cultivation through silicon (Si) fertilization | 77.30 | 68 |
| 10. Potentials of partial replacement of inorganic fertilizers with organic materials for Tea | 76.76 | 71 |
| 11. Development of methods for the formulation of bio-organic and mineral or compound fertilizers | 76.09 | 75 |
| 7. Identification of nutrient utilization genes | 67.17 | 92 |

*Table 14. Improvement of Land Productivity through Agronomic Practices*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 6. Evaluation of the Physiological response of tea cultivars to plant density | 79.78 | 50 |
| 2. Study the water resources in tea lands and evaluate of micro irrigation techniques | 78.74 | 56 |
| 5. Studying new farming systems in tea plantations | 77.95 | 65 |
| 1. Evaluation of CO-3 and Pak-Chong grasses and new farming systems | 75.27 | 80 |
| 3. Evaluating identified shade-tree species for pest & disease and establishing pest & disease | 72.49 | 86 |
| 4. Evaluation of the growth and yield of grafted tea plants | 71.30 | 88 |

*Table 15. Climate Resilience and Sustainability*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 2. Evaluation of physiological and anatomical attributes of tea cultivars in selecting the best cultivars for better survival, growth, and yield, especially under drought, extreme temperature, and waterlogging conditions | 80.3 | 46 |
| 1. Investigation on pest and disease response of tea to global climatic change | 78.70 | 57 |
| 3. Quantification of soil erosion and assessment of different soil conservation measures in tea growing areas | 77.98 | 64 |

*Table 16. Mechanization of Field Practices*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 2. Assessing the impacts of spacing and training/pruning methods on mechanical harvesting | 83.21 | 21 |
| 1. Evaluation of cultivar characteristics of tea amenable to mechanical harvesting | 82.84 | 27 |

*Table 17. Nursery Management Techniques*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 3. Introducing user-friendly soil-sterilizing techniques | 83.80 | 16 |
| 1. Nursery management techniques for enhancing root and shoot growth in tea plants | 83.00 | 20 |
| 2. Introducing user-friendly, alternative tea propagation techniques | 81.02 | 39 |

*Table 18. Integrated Crop Management Approaches*

| **Research Topic** | **Total Weighted Score** | **Rank** |
|---|---|---|
| 4. Development of integrated nematode management strategies | 83.29 | 19 |
| 3. Development of integrated weed management strategies in tea | 82.85 | 26 |
| 2. Development of integrated management strategies to control major tea diseases, through biological, chemical methods, and elicitors | 82.28 | 29 |
| 12. Optimizing drone spraying of foliar application of fungicides | 82.09 | 32 |
| 5. Screening new wound dressing to protect pruned cuts (to be incorporated into the current Integrated Pest Management package) | 80.97 | 40 |
| 6. Evaluating crop and soil management practices on low country Live Wood Termite (LCLWT) infestation | 80.97 | 41 |
| 16. Screening fertilizers, agrochemicals, machinery, and equipment | 80.60 | 43 |
| 1. Development of cost-effective control methods for integrated management of Shot Hole Borer through biological, chemical, and improved formulations | 78.37 | 59 |
| 13. Developing a plant health (pest & disease) monitoring system & decision support system to support precision agriculture | 77.85 | 66 |
| 7. Developing integrated management strategies for Up Country Live Wood Termite (UCLWT) | 77.07 | 69 |
| 14. Developing disease severity and distribution maps for major tea diseases (Blister blight, Canker, Horsehair blight) | 76.38 | 73 |
| 15. Development of nano-pesticides for managing pests and diseases | 75.85 | 77 |
| 11. Exploring beneficial microbes as plant health promoters in nutrient and disease management in tea | 75.57 | 79 |
| 8. Refining techniques for sampling, laboratory and field experimentation, surveys, for studying insect, mite, and nematode damage | 73.49 | 84 |
| 10. Establishment of anatomical, molecular, and physiological basis of major pest infestations | 71.96 | 87 |
| 9.Identification and evaluation of semio-chemicals of tea plant against insects, mites and nematodes | 70.57 | 90 |

*Table 19. Development and Evaluation of Sustainable Farming Systems*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 1.Evaluating & managing pest, disease & weed incidences under sustainable, organic & low input farming systems | 70.63 | 89 |

*Table 20. Tea Processing Technology*

| Sub-categories | Research Topic | Total Weighted Score | Rank |
|---|---|---|---|
| *I. Development & improvement of tea machinery and factory conditions* | 1. Developing an energy monitoring and management system for tea factories | 84.58 | 9 |
| | 2. Development of a control system to optimize energy efficiency in steam boilers and Hot Water Generators in tea factories | 83.98 | 13 |
| | 2. Development of a control system for rolling tea in an orthodox roller | 83.94 | 14 |
| *ii. Development/ evaluation of alternative energy sources in tea processing* | 1. Development of dust dust-removing system for a fluid bed dryer | 83.82 | 15 |
| | 3. Development of a control system for rolling tea in Rotorvanes in Orthodox-Rotorvane tea manufacture | 83.71 | 17 |

*Table 21. Value-added Tea Products*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 1. Development of innovative value-added tea-based food and beverages | 86.75 | 4 |
| 2. Development of cosmetic formulations using active ingredients present in tea | 79.80 | 49 |

*Table 22. Made Tea Quality Improvement*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 6. Developing a reliable technique for detecting adulterants in made tea | 89.38 | 1 |
| 5. Study on factors affecting Net Outturn (NOT) of made tea from green leaf | 84.70 | 8 |
| 3. Studying the level of microbial contamination in different steps in tea manufacturing | 84.48 | 10 |
| 7. Development of quality standards for bulk and tea bag materials | 82.12 | 30 |
| 2. Study on shelf-life & keeping quality of teas packed in paper & paperboard | 82.09 | 31 |
| 1. Optimization of the manufacturing process to develop Theaflavin-rich tea | 82.08 | 33 |
| 4. Identifying factors affecting the blackness and curliness of Low Country teas | 78.48 | 58 |

*Table 23. Health Benefits of Tea*

| Research Topic | Total Weighted Score | Rank |
|---|---|---|
| 1. Effect of the consumption of Sri Lankan black tea and value-added black tea formulations on blood lipids: A randomized controlled trial | 80.50 | 44 |

*Table 24. Resource Planning*

| Sub-categories | Research Topic | Total Weighted Score | Rank |
|---|---|---|---|
| i. *Socio-economic studies* | 2. A study on the influence of ergonomic factors in adopting mechanical devices in tea fields in Sri Lanka | 83.99 | 12 |
| | 1. Introduction of 'Decent Work' to the tea plantations | 81.13 | 38 |
| ii. *Application of Geographic Information Systems (GIS) to the tea sector* | 1. Develop a digital map and a tea land inventory of the corporate sector | 80.87 | 42 |
| | 2. Demonstrate and popularize GIS-based decision making for the plantation industry in Sri Lanka | 79.61 | 51 |
| iii. *Micro & macro-economic analysis* | 4. Development of precise forecasting methods for tea production and tea prices | 83.99 | 11 |
| | 3. Development of Sustainable tea tourism models for tea plantations in Sri Lanka | 81.15 | 37 |
| | 1. Impact assessment of fiscal, monetary, and trade policies on the tea sector | 80.13 | 38 |
| | 2. Investigation on the impacts of crop diversification in the tea sector | 78.98 | 54 |
| | 6. Investigating tea growers' knowledge and perceptions of climate change, and determinants of implementing adaptation strategies in tea areas highly vulnerable to climate change | 81.70 | 35 |
| iv. *Tea marketing studies* | 2. Investigation on perceptions of tea consumers and market trends | 83.44 | 18 |
| | 1. Agri-preneureship development in medium-scale tea growers | 78.08 | 63 |
| | 3. Studying circular economy in the tea value chain trends | 76.39 | 72 |

*Table 25. Technology Dissemination*

| Sub-categories | Research Topic | Total Weighted Score | Rank |
|---|---|---|---|
| *i. Evaluation of adoption of technologies* | 1. E-extension approaches to enhance the knowledge of tea growers at a mass scale with low cost | 87.64 | 2 |
| | 5. Development of Blockchain techniques to monitor the quality of made tea and enhance traceability | 83.25 | 20 |
| | 2. Evaluation of the present status and adoption of technologies/GAPs recommended by TRI | 82.89 | 25 |
| | 3. Establishment of an In-service training center | 78.25 | 62 |
| | 4. Strengthening tea smallholder organizations in Sri Lanka through commercialization | 76.82 | 70 |
| *ii. Advisory & extension program* | 1. Advisory and Extension activities and public-private partnerships for extension | 84.79 | 7 |

# Prioritized Research & Development, and Technology Transfer programs

## 7.4. Prioritized R&D and Technology Transfer Programs

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 1. CROP IMPROVEMENT | | A.1. Development of tea cultivars with high yield, high quality, and tolerance to biotic & abiotic stresses to all tea growing AERs in Sri Lanka | A1.1 | Development of tea cultivars - TRI 6000 Series for up-country | Divisional | Plant Breeding – 100% | Medium |
| | | | A1.2 | Development of tea cultivars - TRI 6000 Series for mid-country | Divisional | Plant Breeding – 100% | Medium |
| | | | A1.3 | Development of tea cultivars - TRI 6000 Series for up-country semi-dry zone: uva | Divisional | Plant Breeding – 100% | Medium |
| | | | A1.4 | Development of tea cultivars - TRI 5000 / 6000 Series for low country | Divisional | Plant Breeding – 100% | Medium |
| | | | A1.5 | Development of low caffeine and disease-resistant tea cultivars through interspecific hybridization and embryo rescue techniques | Inter-divisional | Plant Breeding – 80%, Wayamba University – 20% | Medium |
| | | | A1.6 | Supporting Genetic Improvement of Tea through Mutation Breeding Techniques – Phase II | Divisional | Plant Breeding – 100% | Medium |
| | | A51. Conservation, characterization, evaluation and utilization tea genetic resources in Sri Lanka | A51.1 | Establishment and upkeep of field gene banks | Divisional | Plant Breeding – 100% | Medium |
| | | | A51.2 | Exploration, collection, characterization and conservation of tea genetic resources in old seedling areas | Inter-divisional | Plant Breeding – 50%, Advisory & Extension – 40%, University of Sabaragamuwa – 10% | Medium |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 1. CROP IMPROVEMENT | | A59. Screening lines for biotic and abiotic stress, made tea quality and amenability for mechanical harvesting in all tea growing regions | A59.1 | Screening lines for tolerance/resistance to major pests (SHB, LCLWT, and Tea nematodes) | Inter-divisional | Entomology & Nematology 80%<br>Plant Breeding - 20 % | Medium |
| | | | A59.2 | Screening lines for tolerance/resistance to major diseases in tea (Blister blight and canker) | Inter-divisional | Plant Pathology 90%<br>Plant Breeding 10% | High |
| | | | A59.3 | Screening lines for drought tolerance | Inter-divisional | Plant physiology 70%<br>Plant Breeding 30% | Medium |
| | | | A59.4 | Screening lines for quality | Inter-divisional | Process Technology-50%<br>Plant Breeding-30%<br>Biochemistry-20% | High |
| | | | A59.5 | Screening lines for mechanical harvesting | Inter-divisional | Agronomy -70%<br>Plant Breeding-30% | High |
| | | A 60. Evaluation of cultivars suitable for specialty tea production and increase the awareness on specialty tea production among the stakeholders | A60.1 | Evaluation of cultivars suitable for specialty tea production | Inter-divisional | Plant Breeding – 50 %<br>Process Technology - 25 %<br>Advisory & Extension -10%<br>Biochemistry – 15 % | High |
| | | | A60.2 | Development of a small-scale processing system for early appraisal of suitable cultivars for specialty tea production in Sri Lanka | Inter-divisional | Plant Breeding– 40 %<br>Process Technology– 30%<br>Biochemistry-20% Uva Wellassa University-10% | High |
| | | | A60.3 | Increase the awareness of the stakeholders on specialty tea production | Inter-divisional | Plant Breeding-40%<br>Process Technology -10%<br>Advisory & Extension-20%Biochemistry-10%,<br>Agric. Economics-10%<br>Plant Pathology-10% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 1. CROP IMPROVEMENT | | | A60.4 | Development of quality standards for specialty tea products | Inter-divisional | Biochemistry-30%, Process Technology-20%,Plant Breeding-20%,Plant Pathology-20%, Agric. Economics-10% | High |
| | | B | B128 | Use of in vitro techniques to supplement the breeding Program | Divisional | Plant Breeding – 100% | Medium |
| | | D | D/Breed | Routine divisional activities - Technology dissemination & services assigned because it is essential | Divisional | Plant Breeding – 100%) | Medium |
| | | | Dev 1 | Establishment of seed gardens to increase the production of improved seeds as a source of planting materials in drought-prone areas | Inter-divisional | Plant Breeding – 75%<br>Advisory & Extension – 25% | High |
| | | | Dev 2 | Expansion of Mother Bush Areas (GL 395) | Inter-divisional | Plant Breeding – 75%<br>Advisory & Extension– 25% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 2. LAND PRODUCTIVITY IMPROVEMENT | Integrated approach to soil fertility management | A15 . Development of regional (AERs) and/ or site-specific fertilizer/ dolomite recommendations | A15.1 | Estimating crop response to macro nutrients (N, K, Mg, S & P) at AER level | Inter-divisional | SPND -50%<br>Advisory & Extension - 50% | High |
| | | | A15.4 | Establishing dolomitic limestone requirements based on pH buffering capacity in different tea growing regions at the series level | Divisional | SPND -100% | High |
| | | | A15.8 | Development and evaluation of economically feasible bio-stimulants to enhance the growth and yield of tea | Inter-divisional | SPND - 70%<br>Biochemistry - 10%/Plant Physiology - 10% Process Technology-10% | Medium |
| | | | A15.9 | Application of NIR-technology in soil fertility management in tea lands | Inter-divisional | SPND -70%<br>Biochemistry-30% | Medium |
| | | | A15.10 | Enhancing plant nutrition and alleviating biotic and abiotic stresses in tea cultivation through silicon (Si) fertilization | Inter-divisional | SPND- 50%<br>Plant Pathology- 20%<br>Plant Physiology- 20%<br>University of Peradeniya-10% | Medium |
| | | A 61. Precision Agriculture in tea | A61.1 | Nutrient Management for Precision Agriculture | Inter-divisional | SPND -80%<br>Agric. Economics- 20%) | Medium |
| | | | A61.2 | Optimizing drone spraying of foliar application of fungicides | Inter-divisional | Plant Pathology-50%<br>Drone service providers-40%<br>Agric. Economics 10% | Low |
| | | | A61.3 | Optimization and evaluation of drone technology for fertilizer application | Inter-divisional | SPND -50% Agronomy - 15%<br>External -30%<br>Agric. Economics- 5% | Medium |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 2. LAND PRODUCTIVITY IMPROVEMENT | | | A61.4 | Development of plant health (pest & disease) monitoring system & decision support system to support precision agriculture | Inter-divisional | Plant Pathology-50% Entomology & Nematology-20% External collaborator-30% | High |
| | | | A61.5 | Development of nano-pesticides for managing pests and diseases | Inter-divisional | Entomology & Nematology-40% Plant Pathology -20% SLINTEC – 40% | Low |
| | | A62. Regenerative Agriculture practices in tea | A62.1 | Use of biochar as a soil amendment to improve and restore soil health and productivity, and a nature-based solution (NBS) and a strategy for climate change mitigation in tea plantations | Divisional | SPND -100% | High |
| | | | A62.2 | Potentials of partial replacement of inorganic fertilizers with organic materials for Tea | Inter-divisional | SPND -90% Biochemistry-10% Process Technology-10% | Medium |
| | | | A62.3 | Development of methods for the formulation of bio-organic and mineral or compound fertilizers | Divisional | SPND -100% | Medium |
| | | | A62.4 | Potentials of Regenerative Agriculture techniques to restore soil fertility, health, and quality in tea growing soils | Divisional | SPND-100% | High |
| | | | A62.5 | Investigation on biochar complexes enriched with nanoparticles and their effects on tea plant growth and soil quality | Inter-divisional | SPND-50%, Biochemistry- 20%, Plant physiology- 10%, University Putra Malaysia – 20% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 2. LAND PRODUCTIVITY IMPROVEMENT | | B | B 149 | Potentials of weed-derived natural bio-stimulants in enhancing the growth of tea | Inter-divisional | SPND-70%, Plant Physiology-20% and Biochemistry-10%. | Medium |
| | | | B 150 | Identification of nutrient utilization genes | Inter-divisional | SPND - 60%/ Plant Breeding - 20%/ University – 20% | Low |
| | | | B 151 | Investigations of the potentials of amino acid bio-stimulants in arresting the yield decline in tea | Inter-divisional | SPND-70% Plant Physiolog-30% | High |
| | Improvement of land productivity through agronomic practices | A10 Evaluation of alternative soil rehabilitation techniques for cost effectiveness and sustainability | A10.2 | Evaluation of new grass spp. for reduction of rehabilitating period and improve soil quality | Inter-divisional | Agronomy -80%/ SPND-10%/ Agric. Economics-10% | Low |
| | | A19 Development of water management techniques in tea lands | A19.1 | Evaluation of micro irrigation techniques and rainwater harvesting for drought vulnerability of tea | Inter-divisional | Agronomy-70%/ Agric. Economics-30% | High |
| | | A34 Development of shade management practices for different tea growing regions | A 34.1 | Identification of new shade-tree species and pest & disease management, and establishing cultural practices | Inter-divisional | Agronomy -65% , Advisory & Extension-5% Entomology & Nematology-5% Plant Pathology-5% Plant Physiology 10% Biochemistry- 5% | Low |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 2. LAND PRODUCTIVITY IMPROVEMENT | | A 63<br>Development of environmentally sustainable and economically viable agricultural farming systems in tea | A63. 1 | Assessment of high land productivity and high input planting methods for maximizing tea crop production through optimized cultural practices tea | Inter-divisional | Agronomy-50%<br>Advisory & Extension-5%<br>Biochemistry - 5%<br>Process Technology- 5%<br>SPND - 5%<br>Entomology & Nematology-10%<br>Plant Pathology-5%<br>Agric. Economics- 5%<br>Plant Breeding-5%<br>Plant physiology-5% | High |
| | | | A63. 2 | Effect of intercropping on tea yield, quality, and resource utilization efficiency | Inter-divisional | Agronomy -70%<br>Entomology & Nematology - 10%<br>Plant Pathology- 10%<br>Agric. Economics 10% | High |
| | | | A63. 3 | Application of terrace faming system for slopy tea land | Divisional | Agronomy- 100% | High |
| | | | A63. 4 | Evaluation of physiological responses of tea to high-density planting | Inter-divisional | Plant Physiology - 80%<br>Agronomy -10%<br>Plant Breeding 5%<br>Biochemistry- 5% | Medium |
| | | | A63. 5 | Development of Module-based Vertical Tea Systems (MVTS) for Sustainable and Resilient Tea Production in Sri Lanka | Inter-divisional | Plant Breeding 10%-Plant Physiology 10%<br>SPND- 10%<br>Biochemistry- 10%<br>Faculty of Technology, University of Colombo -60% | Low |
| | | | A63. 6 | Evaluating economic impacts of farming systems in tea sector | Inter-divisional | Agric. Economics-60%<br>Agronomy-40% | Medium |
| | | | D/AGRO | Activities of Agronomy Division | Divisional | Agronomy -100% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 3. CLIMATE RESILIENCE AND SUSTAINABILITY | | A64<br>Development of smart climatic adaptation package for tea growers to ascertain climate change impacts | A64.1 | Evaluation of bi-clonal & poly – clonal seed stocks and the breeding products developed through mutation breeding as alternative planting materials | Inter-divisional | Plant Breeding – 70%<br>Advisory & Extension – 30 % | High |
| | | | A64.2 | Determination of the trajectories and magnitudes of climate change in different tea-growing regions | Inter-divisional | Agronomy - 70%<br>Agric. Economics - 30% | High |
| | | | A64.3 | Enhancing climate resilience through soil and crop management | Inter-divisional | Agronomy - 40%<br>SPND - 40%<br>Plant – Physiology- 20% | High |
| | | | A64.4 | Determination of the impacts of climate change on crop yield and the quality of made tea | Inter-divisional | Agronomy - 50%<br>Biochemistry - 50% | High |
| | | | A64.5 | Quantification of soil erosion and assessment of different soil conservation measures in tea growing areas | Inter-divisional | Agronomy-90%<br>Agric.Economics-10% | Medium |
| | | | A64.6 | Evaluation of Physiological, Biochemical, and Anatomical Responses of Tea Plants Under Drought, Temperature Extremes, Elevated $CO_2$, and waterlogging conditions. | Inter-divisional | Plant Physiology 60%, Plant Breeding -10%, Biochemistry- 5% Process Technology- 5%, Advisory & Extension 5%<br>Agric. Economics (5%) University of Peradeniya (5%) University of Bristol, UK (5%) | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 3. CLIMATE RESILIENCE AND SUSTAINABILITY | | | A64.7 | Carbon Sequestration and budgeting for tea cultivation | Inter-divisional | Plant Physiology 75%<br>Plant Breeding-5%<br>SPND-5%<br>Agronomy-5%<br>Advisory & Extension-5% Agric. Economics-5%) | High |
| | | | A64.8 | Enhancing climate resilience through soil and crop management | Inter-divisional | Plant Physiology 65%<br>SPND-20%<br>Agronomy-10 %<br>Plant Breeding-5% | High |
| | | | A64.9 | Assessing the contribution of climate change to changes in pest and disease dynamics of tea | Inter-divisional | Entomology & Nematology- 50%<br>Plant Pathology-50% | Medium |
| | | B | B131 | Investigation of rapid interventions to minimize the adverse effects of climate change on tea | Inter-divisional | Plant physiology 75%,<br>SPND-5%<br>PlantBreeding-5%<br>Biochemistry-5%<br>ITI-5%<br>University of Peradeniya-5% | High |
| | | | B147 | Investigating tea growers' knowledge and perceptions of climate change, and determinants of implementing adaptation strategies in tea areas highly vulnerable to climate change | Inter-divisional | Agri. Econ. 90%<br>External collaborations - 10% | Medium |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 4. MECHANIZATION OF FIELD PRACTICES | | A20. Development of appropriate mechanical devices and agronomic practices to overcome labor shortage | A20.11 | Assessing the impacts of spacing and training/pruning methods on mechanical harvesting | Divisional | Agronomy-100% | High |
| | | | A20.12 | Assessment of the effect of machine plucking on tea quality parameters | Divisional | Agronomy-100% | High |
| | | B | B130 | An ergonomic analysis of harvesting devices in tea cultivation, Sri Lanka - Enhancing worker adoptability and productivity | Inter-divisional | Advisory & Extension Division-60%/ Agric. Economics-40%) | High |
| 5. NURSERY MANAGEMENT | | A.53 Development of nursery management techniques to develop healthy nursery plants | A53.1 | Evaluating different media & media mixtures for nurseries to reduce the soil use | Inter-divisional | Agronomy -90% Advisory & Extension-10% | High |
| | | | A53.7 | Survey on soil availability for tea nurseries | Inter-divisional | Agronomy -90% Advisory & Extension-10% | High |
| | | | A53.8 | Evaluation of the applicability of hydroponics for tea nurseries | Inter-divisional | Agronomy -90% Advisory & Extension-10% | High |
| | | | A53.9 | Introducing user-friendly, alternative tea propagation and soil-sterilizing techniques, and protected tea nursery concepts | Inter-divisional | Entomology & Nematology-75% Agronomy-25% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 6. CROP MANAGEMENT | | A65<br>Development of integrated pest management strategies to control Insect, Mite and Nematode pests | A65.1 | Development of integrated pest management strategies to control insect and mite pests | Divisional | Entomology & Nematology-100% | High |
| | | | A65.2 | Development of integrated nematode management strategies to control the tea nematode | Divisional | Entomology & Nematology-100% | High |
| | | | A65.3 | Developing severity maps for major pests | Divisional | Entomology-100% | Low |
| | | A24.<br>Development of integrated weed management strategies in tea | A 24.2 | Screening fungal agents for controlling Borreria latifolita | Inter-divisional | Agronomy -60%,<br>Plant Pathology -40% | High |
| | | | A24.5 | Reduction of weed seed bank by application of residual herbicides and continuous use of mulches | Inter-divisional | Agronomy 90%<br>Agric. Economics 10% | High |
| | | B | B29 | Refining techniques for sampling, laboratory and field experimentation, surveys, for studying insect and mite, and nematode pest damage | Divisional | Entomology & Nematology–100% | Low |
| | | | B69 | Identification and evaluation of semiochemicals against insects, mites, and nematodes | Inter-divisional | Entomology & Nematology-60%<br>Biochemistry-40% | Low |
| | | | B100 | Establishment of the anatomical, biochemical, molecular, and physiological basis of major pests | Inter-divisional | Entomology & Nematology-60%<br>Plant Physiology-20%<br>Biochemistry-20 % | Low |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 6. CROP MANAGEMENT | | A23. Development of integrated management strategies to control major tea diseases | A23.6 | Investigations into pathogen biology and disease epidemiology to develop disease severity and distribution maps for major tea diseases (Blister blight, canker, Horse hair blight) | Inter-divisional | Plant Pathology- 50% Agric. Economics -30% Advisory & Extension- 10% External collaborator 10% | Medium |
| | | | A23.7 | Development of integrated strategies for the management of major tea diseases through cultural, biological, chemical, and elicitor-based approaches | Inter-divisional | Plant Pathology -80% Biochemistry -5% SPND -5% External collaborator- 10% | High |
| | | B | B152 | Unrevealing the structure and functions of the tea rhizosphere microbiome through metagenomics | Inter-divisional | Plant Pathology- 40% SPND -40% University of Colombo - 10% University of Jayawardhanapura - 10% | Medium |
| | D/PATH and D/ENTO-Divisional activities | A66. Screening fertilizers, agrochemicals, machinery and equipment | A66.1 | Evaluation of bio-degradable nursery polythene in tea fields and its effect on plant growth | Inter-divisional | Agonomy-90% Agric. Economics- 10% | High |
| | | | A66.2 | Screening plant protection products, maximum residue levels, and pre-harvesting intervals (PHIs), for managing major diseases in tea | Inter-divisional | Plant Pathology-80% Process Technology- 10% Agric. Economics- 10% | High |
| | | | A66.3 | Screening new wound dressing to protect pruned cuts for incorporating the present IPM | Inter-divisional | Entomology & Nematology-50% Plant Pathology -50% | Medium |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 6. CROP MANAGEMENT | | | A66.4 | Screening of insecticides and miticides against Tea pests, and MRL studies | Inter-divisional | Entomology-80%<br>Agric. Economics - 10%<br>Process Technology - 10% | Medium |
| | | | A66.5 | Screening synthetic herbicides and establishing residue levels and post-harvesting intervals (PHI) for sustainable weed management | Inter-divisional | Agonomy-80%,<br>Process Technology -20% | High |
| | | | A66.6 | Screening of new fertilizers and soil amendments for increased nutrient use efficiency in tea | Divisional | SPND-100% | High |
| | Integrated crop protection approaches, to minimize economic damage & address health, safety & environmental issues & meet consumer requirements | A32. Evaluation of sustainable, organic & low-input farming systems for tea | A 32.3 | Evaluating and managing pest, disease, and weed incidences, Precision Agricultural methods in organic farming, and climate-smart protection lines | Inter-divisional | SPND-50%,<br>Entomology & Nematology-25%<br>Plant Pathology-10%<br>Agronomy-10%<br>Agric. Economics-5% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 7. TEA PROCESSING TECHNOLOGY | Development & improvement of tea machinery and factory conditions | A 48. Development & improvement of tea machinery and factory conditions | A 48.10 | Development of dust dust-removing system for a fluid bed dryer | Inter-divisional | Process Technoogy-70%<br>External collaboration-30% | High |
| | | | A 48.12 | Development of a control system for rolling tea in an orthodox roller. | Inter-divisional | Process Technology-60%<br>External collaboration-40% | High |
| | | | A 48.16 | Development of control system for rolling tea in Rotorvanes in Orthodox- Rotorvane tea manufacture ) | Inter-divisional | Process Technology-60%<br>External collaboration-40% | High |
| | Development/ evaluation of alternative energy sources in tea processing | A 25. Development of technologies to reduce the cost of energy used in tea processing | A25.10 | Developing an energy monitoring and management system for tea factories | Inter-divisional | Process Technology-50%<br>External collaboration-50% | High |
| | | | A25.11 | Development of a control system to optimize energy efficiency in steam boilers and Hot Water Generators in tea factories | Inter-divisional | Process Technology-60 %<br>External collaboration-40% | High |
| 8. MADE TEA QUALITY IMPROVEMENT | | A.46 Development of technologies to enhance made-tea quality and made-tea keeping quality | A46.3 | Optimization of the manufacturing process to develop Theaflavin-rich tea | Inter-divisional | Process Technology -70 %<br>Biochemistry-30% | High |
| | | B | B140 | Studying the level of microbial contamination in different steps in tea manufacturing | Inter-divisional | Plant Pathology-75%,<br>Process Technology-25% | High |
| | | | B58 | Identifying factors affecting the blackness and curliness of low-country teas | Inter-divisional | Process Technology-25%<br>Biochemistry-25%<br>Plant Breeding-25%<br>Plant Physiology-25% | High |
| | | | B153 | Study on factors affecting net outturn made tea to green leaf | Divisional | Process Technology-100% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 8. MADE TEA QUALITY IMPROVEMENT | D/TECH Divisional activities | A67 Advancing simple and reliable analytical techniques for ensuring made tea quality, detecting adulteration, and verifying packaging standards | A67.1 | Development of reliable techniques for detecting adulterants in tea | Divisional | Biochemistry-100% | High |
| | | | A67.2 | Development of quality standards for bulk and tea bag materials | Inter-divisional | Biochemistry-35%<br>Process Technology-35%<br>Plant Pathology-20%<br>External collaboration-10% | High |
| 9. VALUE ADDED TEA PRODUCTS | Value addition, new product development, and product diversification | A30 Development of value-added tea products | A30.12 | Development of innovative value-added tea-based food and beverages | Inter-divisional | Biochemistry-65%<br>External or Commercial collaboration-30%<br>TTO-5% | High |
| | | | A30.13 | Development of innovative cosmetic formulations using active ingredients present in tea | Inter-divisional | Biochemistry-65%<br>External or Commercial collaboration-30%<br>TTO-5% | Low |
| | | | B154 | Study on sustainable utilization of waste and low-grade tea for the development of eco-friendly industrial products | Inter-divisional | Biochemistry-65%<br>External or Commercial collaboration-30%<br>TTO-5% | Low |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 10. HEALTH BENEFITS OF TEA | | A55 Investigation of health benefits of tea | A55.6 | Effect of the consumption of Sri Lankan black tea and value-added Sri Lankan black tea formulations on blood lipids: A randomized controlled trial | Inter-divisional | Biochemistry-40%<br>NIFS-60% | Medium |
| | | | A55.7 | Evaluating the potency of active biochemicals in tea for nutraceutical and pharmaceutical applications | Inter-divisional | Biochemistry-60%<br>External collaboration-40% | Medium |
| | | | A55.8 | In-depth study on the bioavailability and health benefits of active compounds in tea | Inter-divisional | Biochemistry-60%<br>External collaboration-40% | Low |
| | | D | D/BIOCH | Exploratory research & divisional activities | Divisional | Biochemistry-100% | High |
| 11. RESOURCE PLANNING | Socio-economic studies | B | B155 | Exploring the possibility of introducing the ILO decent work framework to alternative worker deployment models in corporate sector tea plantations in Sri Lanka | Inter-divisional | Agric. Economics- 70%,<br>External collaborator -20%<br>Advisory & Extension-10% | High |
| | Application of Geographic Information System (GIS) to the tea sector | A57 Development of the tea Atlas of Sri Lanka and GIS-based land Management Information System for the tea plantation sector | A57.1 | Develop a Digital map and the tea land inventory of the corporate tea sector | Inter-divisional | Agric. Economics-50%/Sabaragamuwa University-20%<br>SLTB -10%<br>MPCI-10%<br>All Research divisions and Advisory & Extension-10%) | High |
| | | | A57.2 | Develop a Digital map and the tea land inventory of medium-scale tea growers and tea smallholders | Inter-divisional | Agric. Economics- 50%<br>Sabaragamuwa University-20%<br>SLTB -10%<br>TSHDA -10% /MPCI -10% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 11. RESOURCE PLANNING | Application of Geographic Information System (GIS) to the tea sector | A57<br>Development of the tea Atlas of Sri Lanka and GIS-based land Management Information System for the tea plantation sector | A57.3 | Web-based Digital database, a GIS MIS for the tea plantation sector | Inter-divisional | Agric. Economics- 50%<br>Sabaragamuwa University-30%<br>SLTB -10%<br>TSHDA -5%<br>MPCI -5% | High |
| | | | A57.4 | Demonstrate and popularize GIS-based decision making for the plantation industry in Sri Lanka | Inter-divisional | Agric. Economics- 70%<br>Sabaragamuwa University-30% | Medium |
| | Micro & macro-economic analysis | A41.<br>Analyzing the impact of macroeconomic policies on the tea sector | A41.1 | Impact assessment of fiscal, monetary, and trade policies on the tea sector | Divisional | Agric. Economics-100% | Medium |
| | | B | B156 | Development of Sustainable tea tourism models for tea plantations in Sri Lanka | Inter-divisional | Agric. Economics-50%<br>Sabaragamuwa University-50% | Medium |
| | Tea marketing studies | B | B158. | Reviewing & and exploring market trends in tea to guide future research directions & market expansion | Inter-divisional | Agric. Economics -80%<br>SLTB-20% | High |
| | | A56<br>Development of Agripreneurship and Circular Economy in the Tea Industry | A56.1. | Agripreneureship development in medium & small-scale tea growers | Inter-divisional | Agri. Economics-80%<br>Collaboration with Saga University, Japan-20% | Medium |
| | | | A56.2 | Studying Circular Economy in Tea Value Chain Trends | Inter-divisional | Agri. Economics-80%<br>Collaboration with Saga University, Japan-20% | Low |
| | | | A56.3 | Studying Circular Economy in the Plantation sector and medium-scale tea manufacturers trends | Inter-divisional | Agri. Economics-80%<br>Collaboration with Saga University, Japan-20% | Low |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 11. RESOURCE PLANNING | | B | B157 | Development of precise forecasting methods for tea production and tea prices | Inter-divisional | Agric. Economics-60% Service provider of AI technique-40% | High |
| | | D/ECON | | Evaluating research recommendations and divisional activities | Inter-divisional | Agric Economics-60% All Research divisions-40% | High |
| 12. TECHNOLOGY DISSEMINATION | | Thrust A68. E-extension approaches to enhance the knowledge of tea growers at a mass scale with low cost | A68.1 | Development of mobile applications and development of supportive technical content to transfer of technical information. | Divisional | Advisory & Extension-100% | Medium |
| | | | A68.2 | Use of social media to disseminate the technologies | Divisional | Advisory & Extension-100% | High |
| | | | A68.3 | Development of a Web-based extension | Inter-divisional | Advisory & Extension-25%, Publication - 35%, Information Communication Technology- 30%, All Research divisions - 10% | Medium |
| | | | A68.4 | Development and implementation of e - e-extension services (Call Center & short messages) | Divisional | Advisory & Extension-100% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 12. TECHNOLOGY DISSEMINATION | Evaluation adaptability of technologies | A69<br>Evaluation of the present status and adaptability of technologies/GAPs recommended by TRI | A69.1 | Diagnostic Census in the Corporate Estates sector in different regions | Divisional | (Advisory & Extension – 100%) | Medium |
| | | | A69.2 | Diagnostic survey in the smallholding sector in different regions | Inter-divisional | Advisory & Extension – 40% TSHDA 60% | Low |
| | | | A69.3 | Diagnostic survey in medium-scale sector in different regions | Inter-divisional | Advisory & Extension – 60% SLTB-40% | Low |
| | | A70<br>Establishment of an In-service Training Center | A70.1 | Establishment and maintenance of an In-service training center | Inter-divisional | Advisory & Extension-50% All Research Divisions-50% | Low |
| | | | A70.2 | Provide the residential training to the technical officers who are in the service | Inter-divisional | Advisory & Extension-15%<br>Technology-5%<br>Agric. Economics-10%<br>TSHDA-50%<br>SLTB-20% | Low |
| | | A71.<br>Empowering the tea smallholders and extension workers | A71.1 | Investigation of the Cooperative management model for RPC estates Contribution | Inter-divisional | Advisory and Extension -50% Agric. Economics-50% | Low |
| | | | A71.2 | Strengthening tea smallholder organizations in Sri Lanka through commercialization | Inter-divisional | Advisory & Extension-15/Technology-5%<br>Agric. Economics-10%/TSHDA-50%<br>SLTB-20% | Medium |
| | | A72<br>Development of Blockchain techniques to monitor the quality of made tea and enhance the traceability | A72.1 | Integrate the corporate estate, private tea factories, brokers, and exporters' production, agrochemical handling, and blending-related database using blockchain techniques to monitor the MRL and traceability issues | Inter-divisional | Advisory & Extension-60% Plant Pathology-10%<br>Entomology & Nematology-10%<br>Biochemistry-10% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 12. TECHNOLOGY DISSEMINATION | Advisory & extension program | A73 Advisory and Extension activities and public-private partnership for extension | D/ADV | Development and maintenance of auditoriums and information centers of the head office and regional stations, and maintenance of the database managed by the Advisory & Extension Division at the main station. | Divisional | Advisory & Extension-100% | High |
| | Advisory & extension program | A73 Advisory and Extension activities and public-private partnership for extension | D/ADV1 | Routine Advisory and Extension Activities | Divisional | Advisory & Extension-100% | High |
| | | | D/ADV 3 | Establishment of M & E unit and carry out monitoring and evaluation of extension activities, and conducting social research | Inter-divisional | Advisory & Extension-65% All Research Divisions 35% | Medium |
| | | | D/ADV5 | Public private participatory extension Program | Inter-divisional | Advisory & Extension-70% All Research Divisions-30% | Medium |
| | | | D/AR 3 | Adoptive Research for TRI's new Technologies and maintenance of demonstration sites | Divisional | Advisory & Extension-100% | Medium |
| | | | D/ADV 9 | Developing the GAP standard and monitoring | Inter-divisional | Advisory & Extension-70% All Research Divisions - 30% | Low |
| | | | D/ADV 10 | Popularization of Mechanization | Inter-divisional | Advisory & Extension-70% All Research Divisions-30% | High |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 13.SERVICES TO STAKEHOLDERS | Analytical Services | C | C/PATH | Developing and maintaining facilities for performing microbial analysis of made teas, and the factory environment, including water quality | Divisional | Plant Pathology-100% | High |
| | Analytical Services | C | C/SPND | Developing and maintaining regional analytical laboratories/ facilities at Talawakelle, Rathnapura, Passara, Galle, and Hantana, and establishing a mobile laboratory for soil, plant, and fertilizer analysis, which would offer analytical and diagnostic services | Divisional | Soils and Plant Nutrition - 100% | High |
| | | | C/Phys | Service of root starch analysis prior to pruning | Divisional | Plant Physiology -100% | High |
| | | | C/BIO | Developing and maintaining facilities to perform quality parameter assessments and adulterant analyses of made teas as a service for stakeholders in the tea sector | Divisional | Biochemistry-100% | High |
| | | | C/PATH | Developing and maintaining facilities for performing microbial analysis of made teas, and the factory environment, including water quality | Divisional | Plant Pathology-100% | |
| | | | C/ENTO | Developing and maintaining facilities to assess pest damage | Divisional | Entomology-100% | |
| | | | C/NEM | Developing and maintaining a nematode diagnostic service | Divisional | Nematology-100% | |
| | | | C/AGRO | Services of the Agronomy Division | Divisional | Agronomy -100% | |

| Strategies | Sub areas | Thrust | Classification | Title of the Project | Divisional / Inter-divisional | Percentage Contribution by Divisions | Priority Level |
|---|---|---|---|---|---|---|---|
| 13.SERVICES TO STAKEHOLDERS | Analytical Services | C | C/TECH | Services of the Technology Division | Divisional | Technology -100% | |
| | Other Services to Stakeholders | C | C/ADV1 | Design & Production of Teaching & Extension Materials | Inter-divisional | Advisory & Extension 40%<br>Public Private Partnership-35%<br>Publication -30% | Medium |
| | | | C/ADV2 | Coordinating the supply of VP cuttings of promising cultivars (mother bush Program) | Divisional | Advisory & Extension-100% | High |
| | | | C/SIA | Stakeholders' interactive activities | Inter-divisional | Advisory & Extension-70%<br>Public Private Partnership-30% | High |
| | | | C/TECH Service activities | Advisory visits to tea factories | Divisional | | High |
| | | | | Conducting lectures, training programs & seminars on tea manufacture. | Divisional | | High |
| | | | | Analyzing made tea samples from stakeholders for moisture content and chemical parameters. | Divisional | | High |
| | | | | Calibrating measuring instruments/equipment received from stakeholders | Divisional | | High |
| | | | C/MECH Service activities | For different research & administrative purposes, attending to fabrication, repairs, service & maintenance of machinery & its parts, equipment & its parts, vehicles, buildings, etc. at TRI | Divisional | | High |

# GOAL 1

# RESEARCH AND DEVELOPMENT STRATEGIC PLAN

# 2025-2029

To develop appropriate technologies on tea and effectively disseminate them to the stakeholders for improving land and worker productivity, quality of the final product, and profits of the stakeholders, for uplifting their socio-economic status.

# 8.Research and Development Strategic Plan

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **1. Introducing innovative solutions for industry needs** | **1.1 Prioritization of the research Program** | Consultation stakeholder feedback survey | High | Consultation stakeholder feedback survey | Document on prioritized research needs for the tea industry | No. of research areas identified | 12 | 12 | 12 | 12 | 12 | Research Management | All the research Division & stakeholders |
| | | | | | National / International level research identified | No. of national & international level research identified | 91 | 108 | 109 | 99 | 94 | | |
| | | | | | | | | | | | | | |
| **2. Implementing an island-wide Program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars, and providing planting materials in required quantities to the growers in order to face the challenges in the tea industry and to achieve the tea production and export earnings targets of the tea industry.** | **2.1 Crop improvement aiming to increase productivity, quality, and face emerging challenges** | **Thrust A 1. Development of tea cultivars with high yield, high quality, and tolerance to biotic & abiotic stresses to all tea growing AERs in Sri Lanka** | | | | | | | | | | | |
| | | A1.1 Development of tea cultivars (TRI 6000) Series for upcountry | Medium | Hybridization activities to develop progeny materials for the tea breeding Program | Hybrids (progeny materials for the breeding Program) | No. of crosses | 750 | 750 | 750 | 750 | 750 | Plant Breeding | |
| | | | | Evaluation, monitoring & maintenance of ongoing cultivar evaluation trials | Elite tea genotypes / new improved cultivars (TRI 6000 series) for the region - | No. of ongoing trials (Progeny, Phase I, Phase II & Phase III) | 16 | 18 | 21 | 24 | 25 | Plant Breeding | |
| | | | | Establishment of new cultivar evaluation trials | | No. of new trials established (in each year) | 2 | 3 | 3 | 1 | | Plant Breeding | |
| | | A1.2 Development of tea cultivars (TRI 6000) Series for mid-country | Medium | Evaluation, monitoring & maintenance of ongoing cultivar evaluation trials | Elite tea genotypes / new improved cultivars (TRI 6000 series) for the region | No. of ongoing trials: Progeny, Phase I, Phase II, & Phase III (monitoring, maintenance & evaluation) | 7 | 7 | 7 | 8 | 8 | Plant Breeding | |
| | | | | Establish new cultivar evaluation trials | | No. of new trials established (in each year) | | | 1 | | | Plant Breeding | |
| | | A1.3 Development of tea cultivars – TRI 6000 Series for up-country semi-dry zone: uva | Medium | Evaluation, monitoring & maintenance of ongoing cultivar evaluation trials | Elite tea genotypes / new improved cultivars (TRI 6000 series) for the region - long term | No. of ongoing trials: Progeny, Phase I, Phase II, & Phase III (monitoring, maintenance & evaluation) | 6 | 7 | 7 | 7 | 7 | Plant Breeding | |
| | | | | Establish new cultivar evaluation trials | | No. of new trials established (in each year) | 1 | | | | | Plant Breeding | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **2. Implementing an island-wide Program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars and providing planting materials in required quantities to the growers in order to face the challenges in tea industry and to achieve tea production and export earnings targets of the tea industry.** | **2.1 Crop improvement aiming to increase productivity, quality, and to face emerging challenges** | A1.4 – Development of tea cultivars (TRI 5000 & 6000 Series) for Low Country | Medium | Evaluation, monitoring & maintenance of ongoing cultivar evaluation trials | Elite tea genotypes / new improved cultivars (TRI 6000 series) for the region – long term | No. of ongoing trials : Progeny, Phase I, Phase II, & Phase III (monitoring, maintenance & evaluation) | 12 | 12 | 14 | 16 | 16 | Plant Breeding | |
| | | | | Establishment of new cultivar evaluation trials | | No. of new trials established (in each year) | | 2 | 2 | | | Plant Breeding | |
| | | | | Recommend & release of 3-6 TRI 5000 Series cultivars for the low country | New improved cultivars of the TRI 5000 series for low country recommended | No. of new cultivars released | 3-6 | | | | | All the Research Divisions & Advisory & Extension | |
| | | A1.5 Development of low caffeine and disease resistant tea cultivars through interspecific-hybridization and embryo rescue techniques | Medium | interspecific-hybridization | interspecific-hybrids | No. of crosses / evaluation process | 200 / 30 % | 300 / 40 % | 300 / 30 % | | | Plant Breeding | Wayamba university |
| | | A1.6 Supporting Genetic Improvement of Tea – development of new elite tea cultivars through radiation induced mutations– Phase II | Medium | Radiation inductions / establishment and maintenance of field trials | Elite cultivars through mutation breeding | No. of radiation inductions / No. of evaluation trials established | 300 / 2 trials | 300 / 2 trials | 400 / 2 trials | | | Plant Breeding | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **2. Implementing an island-wide Program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars, and providing planting materials in required quantities to the growers in order to face the challenges in tea industry and to achieve tea production and export earnings targets of the tea industry.** | **2.1 Crop improvement aiming to increase productivity, quality, and to face emerging challenges** | **Thrust A51. Conservation, characterization, evaluation, and utilization of tea genetic resources in Sri Lanka** | | | | | | | | | | | |
| | | A51.1 Establishment and upkeep of field gene banks | Medium | Upkeep of field gene banks in TRI Talawakelle & regional centers | Tea genetic resources conserved for future tea breeding Program | No. of field gene banks maintained | 4 | 4 | 4 | 4 | 4 | Plant Breeding | |
| | | A 51.2 Exploration, collection, characterization, and conservation of tea genetic resources in old seedling areas | Medium | Exploration, collection, characterization, and conservation activities in 08 Estates in the low country | Valuable tea genetic resources identified & conserved for future tea breeding Program | % completion of the identification process of elite genotypes (genetic resources) | 65% | 100 % | | | | Plant Breeding | Advisory & Extension, University of Sabaragamuwa |
| | | **A59. Screening lines for biotic and abiotic stress, made tea quality and amenability for mechanical harvesting in all tea growing regions** | | | | | | | | | | | |
| | | A59.1 Screening lines for tolerance/resistance to major pests (SHB, LCLWT, and Tea | Medium | 1. Conduct field assessments to evaluate pest resistance/ tolerance of new accessions against SHB & LCLWT | Field assessments completed | No of assessments completed with positive results | 1 | 1 | 1 | 1 | 1 | Entomology & Nematology | Plant Breeding |
| | | | | | Resistant /tolerant cultivars identified | No. of resistant cultivars identified | | 1 or 2 | 1 or 2 | 1 or 2 | 1or 2 | | |
| | | | | 2. Conduct microplot trials to evaluate the resistance of new accessions against Tea nematodes. | Microplot trials conducted | No. of micro plot trials conducted | 1 | 1 | 1 | 1 | 1 | | |
| | | | | | Resistant /tolerant cultivars identified | No. of resistant cultivars identified | | | 1 or 2 | | 1 or 2 | | |
| | | A59.2 Screening lines for tolerance/resistance to major diseases in tea (Blister blight and canker) | High | Establishment and maintenance of trials | Trials established & maintained | No. of trails established & maintained | 2 | 2 | 2 | 2 | 2 | Pathology | Plant Breeding |
| | | A59.3 Screening lines for drought tolerance | Medium | Physiological data collection | Drought-tolerant cultivars identified | No. of trials conducted (Three) | 2 | 3 | 3 | 3 | 3 | Plant Physiology | Plant Physiology, Plant Breeding |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **2. Implementing an island-wide Program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars, and providing planting materials in required quantities to the growers in order to face the challenges in tea industry and to achieve tea production and export earnings targets of the tea industry.** | **2.1 Crop improvement aiming to increase productivity, quality, and to face emerging challenges** | A59.4 Screening lines for quality | High | 1. Manufacture green leaves of test and control cultivars. | Cultivars ranked based on made eta quality | % completion of ranking | | | | 25% | 75% | Process Technology | Plant Breeding, Biochemistry |
| | | | | 2. Testing made tea for quality attributes | Quality attributes tested | No. of tests completed | | | | 4 | 4 | Process Technology | |
| | | A59.5 Screening lines for mechanical harvesting | High | Amenability testing, yield, and shoot composition | Trials conducted to select suitable cultivars for machine plucking | No. of trials screened (minimum 1/year) | 1 | 1 | 1 | 1 | 1 | Agronomy | Plant Breeding |
| | | **Thrust A 60. Evaluation of cultivars suitable for specialty tea production and increase the awareness on specialty tea production among stakeholders** | | | | | | | | | | | |
| | | A 60.1 Evaluation of cultivars suitable for specialty tea production | High | Evaluate the performance in regional adaptive trials | Regional-specific cultivars evaluated for specialty tea production | No. of adaptive trials / No. of cultivars evaluated | 4 | 5 | 5 | 5 | 5 | Plant Breeding | Process Technology, Advisory & Extension, Biochemistry |
| | | A 60.2 Development of a small-scale processing system for early appraisal of suitable cultivars for specialty tea production in Sri Lanka | High | Fabricating and evaluating the activities of the system | Small-scale processing system fabricated & evaluated to assess specialty tea cultivars | % completion of system (01) fabrication | 20% | 40% | 30% | 10% | | Plant Breeding | Process Technology, Biochemistry , University of Uva - Wellassa |
| | | A 60.3 Increase the awareness of the stakeholders on specialty tea production | High | Conduct awareness Programs on specialty tea production /processing | Awareness Programs conducted on specialty tea production /processing | No of awareness Programs conducted | 4 | 4 | 4 | 4 | 4 | Plant Breeding | Process Technology , Biochemistry , Advisory & Extension , Agric. Economics & Plant Pathology |
| | | A 60.4 Development of quality standards for specialty tea products | High | Develop comprehensive quality standards for specialty tea products, covering all relevant quality attributes and specifications | Comprehensive quality standards developed | % completion of quality standards development | 5% | 25% | 25% | 25% | 20% | Biochemistry | Process Technology, Plant Pathology, Plant Breeding, Agric. Economics |
| | | | | Conducting awareness Programs | Awareness Programs conducted | No. of awareness Programs conducted | | 1 | 1 | 1 | 1 | | |
| | | | | Disseminate findings | Guidelines issued/ research papers published | No. of guidelines issued/No. of Research papers published | | | | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **2. Implementing an island-wide Program to select tea cultivars suitable for different lands from the recommended tea cultivars and improved seed varieties, reviewing their performance, developing improved cultivars and providing planting materials in required quantities to the growers in order to face the challenges in tea industry and to achieve tea production and export earnings targets of the tea industry.** | **2.1 Crop improvement aiming to increase productivity, quality and to face emerging challenges** | B 128 Use of in vitro techniques to supplement the breeding Program | Medium | Optimization of light intensities and light qualities for in-vitro plant growth | The system optimized to enhancement the speed, efficiency and the quality of the tea breeding Program | No. of optimized systems | 01 System | 01 System | 01 System | 01 System | 01 System | Plant Breeding | |
| | | | | Mutation inductions thorough in-vitro mutagenesis | | No. mutation inductions thorough in-vitro mutagenesis - linked with mutation breeding project obtained | 300 | 500 | | | | | |
| | | | | Regeneration of muted plants | | % completion of regeneration process | 50% | 25% | 25% | | | | |
| | | | | Mass multiplication through liquid culture | | % completion of mass multiplication process | 40% | 20% | 20% | 20% | | | |
| | | D / Breed - Routine divisional activities - Technology dissemination & Services | High | Technology dissemination | Findings disseminated to enhanced knowledge & awareness of the stakeholders on new technologies | No. of publications submitted | 4 | 4 | 4 | 4 | 4 | Plant Breeding | |
| | | | | | | No. presentations/ extension activities conducted | 20 | 20 | 20 | 20 | 20 | Plant Breeding | Advisory & Extension |
| | | | | Training of under graduate / post graduate students (research projects) | Trained scholars on Tea technologies | No. of Trainees (under graduate / post graduate) supervised | 4 | 4 | 4 | 4 | 4 | Plant Breeding | |
| | | | | | Seed gardens monitored as mechanisms to disseminate quality planting materials among stakeholders | No. of Seed gardens monitored | 25 | 25 | 25 | 25 | 25 | Plant Breeding | Advisory & Extension |
| | | | | Facilitate the issue of tea seeds to stakeholders (on request) | | No. of stakeholders / kg of seeds issued | 15 / 200 | 15/ 200 | 15 / 200 | 20 / 250 | 25 / 300 | Plant Breeding | Advisory & Extension |
| | | | | Revisiting of existing cultivar recommendations | Revised the circular - (01) | % completion of Circular revision process (process by survey / questioners) | 25% | 75% | | | | Plant Breeding | All the research divisions & Advisory & Extension |
| | | Dev. 1**:** Establishment of seed gardens to increase the production of improved seeds as a source of planting materials in drought prone areas | High | Establish & maintenance of 15 new / rejuvenated seed gardens | Seed gardens established & maintained as mechanisms to disseminate quality planting materials among stakeholders | No. seed gardens established & maintained | 15 (100 %) | | | | | Plant Breeding | Advisory & Extension |
| | | Dev. 2: Expansion of Mother Bush Areas (GL 395) | High | Expansion the exiting mother bush areas | | Total extent of the mother bush area established (ha) | 8 | 12 | 14 | | | Plant Breeding | Advisory & Extension |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.1 Land productivity improvement through integrated approaches to soil fertility management** | **Thrust A15. Development of regional (AERs) and/ or site-specific fertilizer/ dolomite recommendations** | | | | | | | | | | | |
| | | A15.1 Estimating crop response to macro nutrients (N, K, Mg, S & P) at AER level | High | 1. Imposing treatments. 2. Soil & leaf analysis | Recommendation on partial replacement of ERP and MOP with tea factory wood ash released | No. of trials conducted | 1 | | | | | SPND | |
| | | | | | Findings disseminated | No. of recommendations released | 1 | | | | | | |
| | | | | | | No. of papers published | 1 | | | | | | |
| | | A15.4 Establishing dolomitic limestone requirements based on pH buffering capacity in different tea growing regions at series level | High | 1. Imposing treatments 2. Harvesting & growth assessments. | Dolomite recommendations released based on the soil pH buffering capacity of five soil series | No. of recommendations released | 2 | | | | | SPND | |
| | | | | | Findings disseminated | No. of papers published | 1 | | | | | | |
| | | A15.8 Development and evaluation of economically feasible bio-stimulants to enhance growth and yield of tea | Medium | 1. Extraction 2. Imposing treatments on bio stimulants to tea. | Trials conducted to minimize the negative impacts of various stresses on tea yield and to enhance the nutrient use efficiency | No. of trials conducted (Two) | 1 | 2 | 2 | 1 | 1 | SPND | Plant Physiology |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | 2 | | |
| | | A15.9 Application of NIR-technology in soil fertility management in tea lands | Medium | 1. Sample collection. 2.Laboratory analysis. | Affordable and reliable leaf and soil nutrient analysis methods developed | No. of analytical methods developed | | | | 1 | | SPND | Biochemistry |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | | | |
| | | A15.10 Enhancing plant nutrition and alleviating biotic and abiotic stresses in tea cultivation through silicon (Si) fertilization | Medium | 1. Establishment of a hydroponic trial 2. Establishment of a glasshouse trial & field trials. | A method developed to alleviate biotic and abiotic stresses enhancement of nutrient use efficiency | No. of trials conducted | | 1 | 2 | 1 | | SPND | |
| | | | | | Findings disseminated | No. of papers published | | | 1 | 1 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.1 Land productivity improvement through integrated approaches to soil fertility management** | **Thrust A 61. Precision Agriculture in tea** | | | | | | | | | | | |
| | | A61.3 Optimization and evaluation of drone technology for fertilizer application | Medium | 1. Identify the dosage and speed of spraying. 2. Evaluate yield enhancement and nutrient status of leaves. | Trials established | No. of trials conducted | | 1 | 1 | 1 | 1 | SPND | Plant Pathology, Entomology & Nematology, Agic. Economics |
| | | | | | Foliar recommendations released | No. of recommendations released | | | | 1 | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | 1 | | |
| | | A61.4 Development of plant health (pest & disease) monitoring system & decision support system to support precision agriculture | High | Conduct trials to re-evaluate potential use of proposed weather parameters to monitor blister blight disease | Trails conducted | No. of trials completed | 1 | 1 | | | | Plant Pathology | Entomology & Nematology, external collaborator |
| | | | | Collect data on weather, disease severity and other data collection for blister blight monitoring and forecasting in tea | Trails conducted | No. of trials conducted | | 2 | 2 | | | | |
| | | | | | Disease monitoring and forecasting system developed | No. of system developed | | | | 1 | | | |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | | | |
| | | | | | | No. of presentations presented | | | | | 1 | | |
| | | | | Develop a mobile app for on - site calculation of fungicide mixture requirements | Mobile APP developed | No. of APP developed | | | 1 | | | | |
| | | A61.5 Development of Nano pesticides for managing pests and diseases | Low | Conduct field trials to evaluate bio efficacy of microencapsulated Beauveria bassiana against SHB in the field | Field trials conducted | No of experiments completed with positive results | 1 | 1 | 1 | | | Entomology & Nematology | SLINTEC, SLCARP |
| | | | | | Findings disseminated | No. of research papers published | | | | 1 | | | |
| | | | | | | No. patents obtained | | | | 1 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.1 Land productivity improvement through integrated approaches to soil fertility management** | **Thrust A62. Regenerative Agriculture practices in tea** | | | | | | | | | | | |
| | | A62.1 Use of biochar as a soil amendment to improve and restore soil health and productivity and a nature-based solution (NBS) and a strategy for climate change mitigation in tea plantations | High | 1. Production of biochar from different feed materials 2. Field evaluation | Recommendations on use of biochar as a soil amendments released | No. of trails conducted | | 1 | 1 | 1 | 1 | SPND | |
| | | | | | | No. of recommendation released | | | | | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | 1 | | |
| | | A62.2 Potentials of partial replacement of inorganic fertilizers with organic materials for Tea | Medium | 1. Imposing treatments 2. Harvesting & growth assessments. | Recommendations released for partial replacement of conventional fertilizers with potential organic materials. | No. of trials established | 1 | 1 | 1 | 1 | 1 | SPND | |
| | | | | | | No. of recommendation released | | | | | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | 1 | 1 | 1 | | |
| | | A62.3 Development of methods for formulation of bio-organic and mineral or compound fertilizers | Medium | 1. Isolate PGPR from the Tea rhizosphere. 2. Field evaluation. | Formulations of bio-organic fertilizers recommended to partially reduce N and P chemical fertilizers from recommended tea nursery mixtite and mature tea fertilizer mixture | No. of trails conducted | 4 | 4 | 1 | 1 | 1 | SPND | |
| | | | | | | No. of recommendation released | | | | 1 | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | 1 | 1 | 1 | | |
| | | A62.4 Potentials of Regenerative Agriculture techniques to restore soil fertility, health and quality in tea growing soils | High | 1. Field evaluation of regenerative agricultural techniques | Recommendations released to building up Soil organic matter status | No. of trails conducted | | 1 | 1 | 1 | 1 | SPND | Plant Physiology, Agronomy, Agric. Economics |
| | | | | | | No. of recommendation released | | | | | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.1 Land productivity improvement through integrated approaches to soil fertility management** | A62.5 Investigation on biochar complexes enriched with nanoparticles and their effects on tea plant growth and soil quality | High | 1. Production of biochar nanoparticles 2. Establishment of field trials | Recommendations released to improve soil health and quality, soil microbial diversity, reduce chemical inputs increase fertilizer use efficiency | No. of trials conducted | | 1 | 1 | 1 | 1 | SPND | Biochemistry, SLINTEC/ University |
| | | | | | | No of recommendations released | | | | | 1 | | |
| | | | | | Findings disseminated | No. of papers published | | | 1 | 1 | 1 | | |
| | | B 149 Potentials of weed-derived natural bio-stimulants in enhancing the growth of tea | Medium | 1. Bio stimulants extraction 2. Drought stress experiment | Natural low-cost growth stimulant to tea introduced to boost tea productivity | No. of field trials | | 1 | 1 | | | SPND | Biochemistry, Plant Physiology, University of Peradeniya |
| | | | | | Findings disseminated | No. of papers published | | | 1 | | | | |
| | | B151 Investigations of the potentials of amino acid bio-stimulant in arresting the yield decline in tea | High | 1. Extraction of bio stimulants 2. Imposing treatments & growth evaluation. | Bio stimulants identified to minimize negative impacts of various stresses on tea yield and to enhance the nutrient use efficiency. | No. of trials conducted | | 1 | 1 | 1 | | SPND | Biochemistry, Plant Physiology, University of Peradeniya |
| | | | | | Findings disseminated | No. of papers published | | | | 1 | | | |
| | | D/SPND - Divisional activities | High | Addressing the sudden stakeholder needs & routine activities | Stakeholders' requirements accommodated | % completion requirements | 100 % | 100 % | 100% | 100% | 100% | SPND | |
| | | | | | | | | | | | | | |
| | **3.2 Land productivity improvement through agronomic practices** | Thrust A10: Evaluation of alternative soil rehabilitation techniques for cost effectiveness and sustainability | Low | Assess soil quality, grass biomass, tea growth and yield | Trials conducted to improve soil quality, reduce rehabilitation time period, identify and recommend new grass sp. | No. of trials conducted (Five) | 3 | 5 | 4 | 4 | 3 | Agronomy | Agric. Economics Soil & Plant Nutrition |
| | | | | | | No. of Recommendations issued | | | 1 | | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.2 Land productivity improvement through agronomic practices** | Thrust A19. Development of water management techniques in tea lands | High | Establish irrigation system, calculate water requirement, growth and yield assessment | Trails conducted to reduce water stress during drought | No. of trials conducted (Three) | 1 | 2 | 3 | 3 | 2 | Agronomy | Agric. Economics Soil & Plant Nutrition |
| | | | | | Fertigation guidelines issued | No. of guidelines issued | | | | | 1 | | |
| | | Thrust A34. Development of shade management practices for different tea growing regions | Low | Study on shade tree, shade level, growth and yield assessment of shade trees and tea, & physiological assessment | New shade trees recommended | No. of trials conducted (Two) | 2 | 2 | 2 | | | Agronomy | Plant Physiology |
| | | | | | | No. of recommendations issued on new shade trees | | | | | 1 | | |
| | | **Thrust A63. Development of environmentally sustainable and economically viable agricultural farming systems in tea** | | | | | | | | | | | |
| | | **A63. 1** Assessment of high land productivity and high input planting methods for maximizing tea crop production through optimized cultural practices tea | High | 1. Tea fertigation trials | A new recommendation released for high-input tea cultivation | No. of trials conducted | | | | 1 | 1 | Agronomy | SPND |
| | | | | | | No. of recommendations released | | | | | 1 | | |
| | | A63.2 Effect of intercropping on tea yield, quality and resource utilization efficiency | High | Research Planning, Cultivar selection, land preparation, Research establishment and implementation, data recording | Experiments established to study maximizing land productivity, higher crop yield, and labor productivity | No. of Experiments established (Two) | 2 | 2 | 2 | 2 | 2 | Agronomy | Advisory & Extension ,Biochemistry, Process Technology, Soil & Plant Nutrition, Entomology and Nematology, Pathology, Agric. Economics, Plant Breeding, Plant physiology |
| | | A63.3 Application of terrace farming system for sloping tea land | High | | | | | | | | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **3. Implementing research Programs to introduce new technologies related to soil nutrients, water requirements, agronomic and input efficiency that can improve the soil fertility, to increase the yield components of tea bushes and the quality of tea production.** | **3.2 Land productivity improvement through agronomic practices** | A63.4 Evaluation of physiological responses of tea to high-density planting | Medium | Measurements of root, physiological data | 1. Feasible high input system | No of trials evaluated | | | 1 | 1 | 1 | Agronomy | Plant physiology, Agronomy, Plant Breeding, Biochemistry |
| | | A63.5 Development of Module-based Vertical Tea Systems (MVTS) for Sustainable and Resilient Tea Production in Sri Lanka | Low | Implementing a Module-based Vertical Tea System (MVTS) integrating vertical farming techniques, including lightweight growing media/hydroponics/aeroponics, etc., LED grow lights, and computerized environmental control systems. | 2. Module-based Vertical Tea Systems (MVTS) | No of trials | | | 1 | 1 | 1 | Plant Breeding | Plant Physiology, SPND, Biochemistry , Technology Faculty of Technology, University of Colombo |
| | | A63.6 Evaluating economic impacts of farming systems in tea sector | Medium | Case study | | No. of case studies evaluated | | | | | 2 | Agric. Economics | Agronomy |
| | | D/AGRO - Divisional activities | High | 1. Advisory activity, 2. Provide technical support for stakeholders, | Findings disseminated | No. of posters prepared | | 5 | | | 2 | Agronomy | |
| | | | | | | No. of research papers published | | 2 | 4 | 2 | 1 | | |
| | | | | | | No. of books published | 1 | | | | | | |
| | | | | | | | | | | | | | |
| **4. Identifying, developing/improving, and establishing appropriate soil and crop improvements, crop protection, agronomic, adaptation and mitigation strategies to minimize the potential impacts of climate change on the tea industry, and implement Programs to educate growers about them.** | **4.1 Climate Resilience and Sustainability** | **Thrust A64 Development of smart climatic adaptation package for tea growers to ascertain climate change impacts** | | | | | | | | | | | |
| | | A64.1 Evaluation of bi-clonal & poly – clonal seed stocks and the breeding products developed through mutation breeding as alternative planting materials | High | Evaluate new seed stocks / progenies developed through mutation breeding for drought prone areas | Regional adaptive trials conducted to evaluate climate resilience tea genotypes | No. of regional adoptive trials evaluated | | | 1 | 2 | 2 | Plant Breeding | Agronomy, Plant physiology |
| | | | | Propagation / land preparation for new trials | | % completion of propagation / land preparation process | | 10% | 40% | 50% | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **4.Identifying, developing/improving, and establishing appropriate soil and crop improvements, crop protection, agronomic, adaptation and mitigation strategies to minimize the potential impacts of climate change on the tea industry, and implement Programs to educate growers about them.** | **4.1 Climate Resilience and Sustainability** | A64.2 Determination of the trajectories and magnitudes of climate change in different tea-growing regions | High | Climate risk assessment and updating existing map using GIS, survey on adaptation of climate resilience agronomic and cultural practices, implement pilot project, identify region specific recommended adaptive practices | Updated maps | No. of maps updated for regions | | 1 | 1 | 1 | | Agronomy | , Agric. Economics, Biochemistry |
| | | A64.3 Enhancing climate resilience through soil and crop management | High | | Pilot projects conducted | No of pilot projects conducted | | 1 | 1 | 1 | 1 | | SPND, Plant Physiology |
| | | A64.4 Determination of the impacts of climate change on crop yield and the quality of made tea | High | | Recommendations issued | No. recommendations issued | | | | | 1 | | Agronomy, Biochemistry |
| | | A64.5 Quantification of soil erosion and assessment of different soil conservation measures in tea growing areas | Medium | Runoff and sediment measurement, nutrient analysis | Trials established to assess benefit soil conservation, feasibility of alternative soil conservation grass | No of trials conducted (Four) | 4 | 4 | 4 | 3 | 3 | Agronomy | Agric. Economics |
| | | A64.6 Evaluation of Physiological, Biochemical, and Anatomical Responses of Tea Plants Under Drought, Temperature Extremes, Elevated $CO_2$, and waterlogging conditions | High | Measurements of yield components, physiological data), biochemical data and anatomical data | Identification of climate resilient cultivars | No of trials conducted | 2 | 2 | 2 | 2 | 2 | Plant Physiology | Plant Breeding Biochemistry /Technology, Advisory & Extension, Agric. Economics University of Peradeniya, University of Bristol, UK |
| | | A64.7 Carbon Sequestration and budgeting for tea cultivation | High | Data collection related to carbon Sequestration and budgeting | Generation of data | No of trials conducted | | 1 | 2 | 2 | 2 | Plant Physiology | Plant Breeding, SPND, Agronomy, Advisory & Extension, Agric. Economics |
| | | A64.8 Enhancing climate resilience through soil and crop management . | High | Collection of stress-related data following the introduction of different crop management systems. | Suitable crop management system identified | No of trials conducted | | | | 1 | 1 | | SPND, Agronomy, Plant Breeding |
| | | | | | | No. of chemicals/ products tested | | | | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **4. Identifying, developing/improving, and establishing appropriate soil and crop improvements, crop protection, agronomic, adaptation, and mitigation strategies to minimize the potential impacts of climate change on the tea industry, and implement Programs to educate growers about them.** | | B131 -Investigation of rapid interventions to minimize adverse effects of climate change on tea | High | Collection of data on plant survival and productivity following the application of various chemicals/products under drought stress conditions. | Feasible approaches identified in reducing the deleterious effects of climate change on tea plants | No of trials conducted | 2 | 2 | 2 | 2 | | Plant Physiology | SPND, Plant Breeding, Biochemistry, ITI, University of Peradeniya) |
| | | | | | | No, of chemicals/ products tested | 2 | 2 | 2 | 2 | | | |
| | | | | | | No. of products identified | | 1 | 1 | 1 | | | |
| | | B147. Investigating tea growers' knowledge and perceptions of climate change, and determinants of implementing adaptation strategies in tea areas highly vulnerable to climate change | Medium | Prepare matrix for adaptation strategies | Matrices prepared to evaluate adoption level | No. of matrices prepared | 6 | | | | | Agric. Economics | External collaborators |
| | | | | Sample survey | Estates & smallholdings data collected | No. of estates/ No. of smallholdings visited | 15/150 | 15/250 | | | | | |
| | | | | Findings disseminated | Document on farmer adoptive strategies | No. of document prepared | | 1 | | | | | |
| | | | | | Policy documents prepared on adoptive capacity | No. of policy documents prepared | | 1 | | | | | |
| | | | | | Policy document prepared on investment plan | No. of policy documents prepared | | | 1 | | | | |
| | | | | | Document prepared on training needs | No. of policy documents prepared | | | 1 | | | | |
| | | D/Phys – Activities of Plant Physiology Division | High | Addressing the sudden stakeholder needs | Disseminated technology | No of publications | 2 | 3 | 3 | 3 | 3 | Plant Physiology | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **5. Identifying and developing of appropriate cultivation equipment, machines and irrigation systems for field cultivation activities with the aim of reducing production costs, finding solutions to the shortage of skilled labor, and increasing input efficiency in tea fields.** | **5.1 Mechanization of Field Practices** | **Thrust A20. Development of appropriate mechanical devices and agronomic practices to overcome labor shortage** | | | | | | | | | | | |
| | | A20.11 Assessing impacts of spacing and training/pruning methods on mechanical harvesting | High | Bringing into bearing, Plucking operations, Quality parameters | Machines developed | No. of machines developed | | 1 | | | | Agronomy | |
| | | A20.12 Assessment of effect of machine plucking on tea quality parameters | | | Recommendations issued on selective tea harvesting machines | No. of recommendations on selective harvesting machine | | 1 | | | | | |
| | | | | | Recommendations issued on suitable pruning methods for different cultivars | No. of recommendations on suitable pruning methods for different cultivars | | | | | 1 | | |
| | | B130. A ergonomic analysis of harvesting devices in tea cultivation, Sri Lanka - Enhancing worker adoptability and productivity | High | Survey and Interviews & Physical Examinations | Report on musculoskeletal pain and ergonomic risk factors. | Number of Estate visited (20) | 15 | 5 | | | | Advisory & Extension | Agric. Economics |
| | | | | | | Number of interviews conducted and response rate. (124) | 90 | 34 | | | | | |
| | | | | Anthropometric Measurements | Data on physical dimensions of tea harvesters. | Percentage of the total workforce measured. (124) | 75% | 25% | | | | | |
| | | | | Percentage of the total workforce measured. | Percentage of the total workforce measured. | Number of FDGs conducted (6) | | 4 | 6 | | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **6. Developing new nursery technologies and improving existing ones to produce commercial scale recommended tea and shade tree nurseries, at the minimum cost and transporting them without damages.** | **6.1 Nursery Management Techniques** | **Thrust A 53. Development of nursery management techniques to develop healthy nursery plants** | | | | | | | | | | | |
| | | A53.1 Evaluating different media & media mixtures for nurseries to reduce the soil use | High | Destructive and non-destructive measurement of shoot and root growth | Trials conducted to Identify better nursery media and mixture | No. of trials conducted (Two) | 2 | 2 | | | | Agronomy | Advisory & Extension |
| | | A53.7 Survey on soil availability for tea nurseries | High | | Suitable media/mixture recommended | No. of recommendation for suitable media/mixture | | | 1 | | | | |
| | | A53.8 Evaluation of applicability of hydroponics for tea nurseries | High | | Trials conducted | No. of trials established & maintained for vertical propagation system | 3 | 3 | | | | | |
| | | | | | Vertical propagation system recommended | No. of recommendations issued on vertical propagation system | | | 1 | | | | |
| | | | | | Hydroponics/hydrogen Experiments established | No. of experiments established (Three) | | | | 3 | 3 | | |
| | | A53.9 Introducing user-friendly, alternative tea propagation and soil-sterilizing techniques, and protected tea nursery concepts | High | Conduct soil fumigation trial to select soil fumigant | Soil fumigants recommended | No of trial completed with positive results | 1 | 1 | 1 | | | Entomology & Nematology | |
| | | | | | | No. of recommendations introduced | 1 | | | 1 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **7. Identifying, developing, recommending and monitoring the integrated approaches for the management of pests (Diseases, Insects/Mites/Nematodes and Weeds) that have a potential economic impact on productivity and the sustainability of tea, the environment and shade trees, and the consumer requirement of the tea plantation.** | **7.1 Integrated Crop Management Approaches** | **Thrust A65. Development of integrated pest management strategies to control Insect, Mite, and Nematode pests** | | | | | | | | | | | |
| | | A65.1 Development of integrated pest management strategies to control insect and mite pests | High | 1. Conduct field trials to evaluate the efficacy of biocontrol agents against LCLWT, and UCLWT | Field trials conducted | No of experiments completed with positive results | 1 | 1 | 1 | 1 | 1 | Entomology & Nematology | |
| | | | | | Biocontrol agents/plant protection products recommended | No of recommendations on biocontrol agents /plant protection products introduced | | | | 1 | | | |
| | | | | | Bio- pesticides commercialized | No. of Bio-pesticides commercialized | | | | 1 | | | |
| | | | | | Findings disseminated | No of research papers published | | | | 1 | | | |
| | | | | 2. Conduct field trials to evaluate the field efficacy of plant protection products (PPP) against SHB | Field trials conducted | No. of field trials conducted | 1 | 1 | 1 | 1 | | | |
| | | | | | Plant protection products recommended | No. of plant protection products recommended | | | | 1 | | | |
| | | | | | Plant protection products commercialized | No. of plant protection products commercialized | | | | 1 | | | |
| | | A65.2 Development of integrated nematode management strategies to control tea nematode | High | Conduct microplot trials to evaluate the efficacy of biocontrol agents and plant protection products against tea nematodes to select efficient nematode control strategies | Microplot trials conducted | No. of trials conducted | | 1 | 1 | 1 | | Entomology & Nematology | |
| | | | | | Biocontrol agents/plant protection products recommended | No. of recommendations introduced on biocontrol agents/No plant protection products | | | | 1 | | | |
| | | | | | Findings disseminated | No. of Research papers published | | | | 1 | | | |
| | | | | | | No. of presentations presented | | | | 1 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **7. Identifying, developing, recommending, and monitoring the integrated approaches for the management of pests (Diseases, Insects/Mites/Nematodes and Weeds) that have a potential economic impact on productivity and the sustainability of tea, the environment, and shade trees, and the consumer requirements of the tea plantation.** | **7.1 Integrated Crop Management Approaches** | A65.3 Developing severity maps for major pests | Low | 1. Sampling of roots and soil for analyzing nematode estimation | Samples analyzed | No. of samples analyzed | 1 | | | | | Entomology & Nematology | Advisory & Extension, TSHDA |
| | | | | 2. Mapping of nematode infestation in tea growing regions at Rathnapura district | Maps developed | No. of. Maps developed | 1 | 1 | | | | | |
| | | **Thrust A24. Development of integrated weed management strategies in tea** | | | | | | | | | | | |
| | | A 24.2 Screening fungal agent for controlling Borreria latifolita | High | Weed sp. and biomass assessment, Identification of fungal agent, Bio assay | Trials established to identify suitable mulch material for weed suppress, and introduce beneficial fungal agents | No. of trials conducted & maintained (Two) | 2 | 2 | 2 | 1 | 1 | Agronomy | Plant Pathology |
| | | A24.5 Reduction of weed seed bank by application of residual herbicides and continuous use of mulches | | | | | | | | | | | Agric. Economics |
| | | **Thrust A23. Development of integrated management strategies to control major tea diseases** | | | | | | | | | | | |
| | | A23.6 Investigations into pathogen biology and disease epidemiology to develop disease severity and distribution maps for major tea diseases (Blister blight, canker, Horse hair blight) | Medium | Field visits to collect data on pathogen biology, severity and distribution. | Disease maps for BB, canker & root rots developed | No. of disease distribution maps developed | | | | | 1 | Plant Pathology | Agric. Economics, Advisory & Extension, External collaborator |
| | | | | Laboratory investigations to confirm the pathogens, preparing a culture repository, fungicide sensitivity etc. | Sample estate visited | No. of field visits | 5 | 5 | 5 | 5 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **7. Identifying, developing, recommending, and monitoring the integrated approaches for the management of pests (Diseases, Insects/Mites/Nematodes and Weeds) that have a potential economic impact on productivity and the sustainability of tea, the environment, and shade trees, and the consumer requirements of the tea plantation.** | **7.1 Integrated Crop Management Approaches** | A23.7 Development of integrated strategies for the management of major tea diseases through cultural, biological, chemical, and elicitor-based approaches | High | Laboratory and field investigations to test the efficacy and growth promotion effects of previously identified biocontrol agents against major tea pathogens | Trials conducted | No. of trials conducted | 2 | 2 | | | | Plant Pathology | Biochemistry, SPND, External collaborator |
| | | | | | Bioagents produced | No. of Bioagents produced | | | 1 | 1 | | | |
| | | | | | Strategies recommended | No. of strategies recommended | | | 1 | | | | |
| | | | | | Findings disseminated | No. of papers published, No. of presentations delivered | 1 | 1 | | | 1 | | |
| | | | | Conduct field trials to test the efficacy of the elicitor-based approach in stem disease management in the low country | Elicitors tested | No. of elicitors tested | | 1 | 1 | | | | |
| | | B152 Unrevealing the structure and functions of tea rhizosphere microbiome through metagenomics | Medium | 1. Soil sampling and DNA extraction 2. Sequencing 3. Metagenomics analysis | Beneficial microbes identified in organically cultivated and conventionally cultivated tea soils | No. of papers published | | | 1 | | | SPND | Plant Pathology, University of Colombo University of Sri Jayewardenepura |
| | | D/PATH- Activities of the Plant Pathology Division | High | Conduct activities of the Plant Pathology Division | Disease incidences diagnosed | No. of disease incidences diagnosed | 3 | 3 | 3 | 3 | 3 | Plant Pathology | |
| | | D/ENTO-Divisional activities | High | Routine Divisional activities, field inspections for pest outbreaks | Inspection reports produced with recommendations | No. of reports produced | 10 | 10 | 10 | 10 | 10 | Entomology & Nematology | |
| | | **Thrust A66. Screening fertilizers, agrochemicals, machinery, and equipment** | | | | | | | | | | | |
| | | A66.1 Evaluation of bio-degradable nursery polythene in tea fields and its effect on plant growth | High | Nursery and field plant growth assessment | Trials conducted to identify the suitability of biodegradable bags | No. of trials conducted (Two) | | 2 | 2 | | | Agronomy | Agric. Economics |
| | | | | | Biodegradable bags recommended | No. of recommendations issued on biodegradable bags | | | 1 | | | | |

| Objectives | Strategy | Program / Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **7. Identifying, developing, recommending and monitoring the integrated approaches for the management of pests (Diseases, Insects/Mites/Nematodes and Weeds) that have a potential economic impact on productivity and the sustainability of tea, the environment and shade trees, and the consumer requirement of the tea plantation.** | **7.1 Integrated Crop Management Approaches** | A66.2 Screening plant protection products, maximum residue levels and pre-harvesting intervals (PHIs), for managing major diseases in tea | High | Conducting efficacy and MRL trials | New plant protection products recommended | No of fungicide screened & recommended | 1 | 1 | 1 | 1 | 1 | Plant Pathology | Process Technology, Agric. Economics |
| | | A66.3 Screening new wound dressing to protect prune cuts for incorporating present IPM | Medium | Conduct field trial to evaluate field efficacy of wound dressing | Field trials conducted | No of trials completed with positive results | 1 | 1 | 1 | | | Entomology & Nematology | Plant Pathology |
| | | | | | New wound dressing recommended | No. of new wound dressing recommended | | | 1 | | | | |
| | | A66.4 Screening of insecticides and miticides against Tea pests, and MRL studies | Medium | Laboratory Bio assay | Bio assays conducted | | 1 | | | 1 | | Entomology & Nematology | |
| | | | | Field trials | Field trial conducted | | | 1 | | | 1 | | |
| | | | | Residue trials | Residue trails conducted | | | | 1 | | | | |
| | | A66.5 Screening synthetic herbicides and establishing residue levels and post-harvesting intervals (PHI) for sustainable weed management | High | Visual scoring and weed assessment | New herbicides tested | No. Weedicides tested | 1 | 1 | 1 | 1 | 1 | Agronomy | Process Technology |
| | | A66.6 Screening of new fertilizers and soil amendments for increased nutrient use efficiency in tea | High | 1. Conducting Chemical analysis<br>2. Conducting glasshouse trials<br>3. Conducting field trials | Recommendations released | No. of trials conducted<br>No. of products evaluated | 3 | 3 | 2 | 2 | 1 | SPND | Biochemistry |
| | | **Thrust A 32. Evaluation of sustainable, organic & low input farming systems for tea** | | | | | | | | | | | |
| | | A 32.3 Evaluating and managing pest, disease and weed incidences, Precision Agricultural methods in organic farming and climate smart protection lines | Medium | 1. Organic treatment preparation & application 2. Field Maintenance | Recommendations released | No. of trials conducted | | 1 | 1 | 1 | 1 | SPND | Entomology & Nematology, Agronomy, Agric. Economics |
| | | | | | Findings disseminated | No. of papers published | | | | | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **8. Improving the tea processing technology and factory operations to improve the quality of final products and to conserve energy.** | **8.1 Development & improvement of tea machinery and factory conditions** | **Thrust A 48. Development & improvement of tea machinery and factory conditions** | | | | | | | | | | | |
| | | A 48.10 Development of dust dust-removing system for a fluid bed dryer | High | 1. Develop a monitoring & controlling system for the orthodox roller. | Control systems for improved rolling of tea in orthodox rollers in tea factories developed | No. of control systems developed | | 1 | | | | Process Technology | Engineering Firm through MOU |
| | | | | 2. Testing & validating the system | System validated | No. of testing & validation completed | | 1 | | | | | |
| | | A 48.12 Development of control system for rolling tea in orthodox roller. | High | 1. Install dust removing system with controls to fluid bed dryer. | Improved Dust removing system for fluid bed dryer installed | No. of dust removing systems installed | | 1 | | | | Process Technology | Engineering Firm through MOU |
| | | | | 2. Testing & validating the system | Tested & validated system | No. of tests & validation completed | | 1 | | | | | |
| | | A 48.16 Development of control system for rolling tea in Rotorvanes in Orthodox- Rotorvane tea manufacture | High | 1. Develop controlling system for Rotorvane. | Control system for Rotorvanes developed | No. of control systems developed | | | | 1 | | Process Technology | Engineering Firm through MOU |
| | | | | 2. Testing & validating the system | Tested & validated system | No. of tests & validation completed | | | | 1 | | | |
| | | | | | | | | | | | | | |
| **9. Addressing the energy issues in tea processing by establishing economically viable fuelwood plantations and exploring the alternative energy sources.** | **9.1 Development/evaluation of alternative energy sources in tea processing** | **Thrust A 25. Development of technologies to reduce the cost of energy used in tea processing** | | | | | | | | | | | |
| | | A25.10 Developing energy monitoring and management system for tea factories | High | 1. Establish energy monitoring system for tea manufacture | Energy monitoring and management system established | No. of energy monitoring system established | | | | | 1 | Process Technology | Engineering Firm through MOU |
| | | | | 2. Testing & validating the system | Tested & validated system | No. of tests & validation completed | | | | | 1 | | |
| | | A25.11 Development of control system to optimize energy efficiency in steam boilers and Hot Water Generators in tea factories | High | 1. Develop controlling system for steam boilers and Hot Water Generators. | Control system developed | No. of control systems developed | | | | | 1 | Process Technology | Engineering Firm through MOU |
| | | | | 2. Testing & validating the system | Tested & validated system | No. of tests & validation completed | | | | | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **10. Developing methods to enhance made tea quality, value addition and product diversification, inclusive of Artisanal tea and specialty tea, etc.** | **10.1 Made Tea Quality Improvement** | B140 Studying level of microbial contamination in different steps in tea manufacturing | High | Study the changes in microbial levels during green tea manufacture, and microbial contamination in green tea end products and specialty teas | Factories sampled & analyzed | No. of sampled & analyzed | 10 | 10 | | 10 | | Plant Pathology | Process Technology |
| | | | | | Guidelines issued | No. of guidelines issued | | | 1 | | | | |
| | | B 58 Identifying factors affecting blackness and curliness of Low Country teas | High | 1. Manufacture green leaves of different cultivars parameters. | Factors affecting blackness and curliness of Low Country teas identified | % completion of identification | 30% | 100 % | | | | Process Technology | Biochemistry, Plant Breeding. Plant Physiology |
| | | | | 2. Testing made tea for chemical and sensory | Chemical & sensory evaluation completed | No. of chemical and sensory evaluations done | 4 | 4 | | | | | |
| | | B153 Study on factors affecting net outturn made tea to green leaf | High | 1. Conduct experiments to study the effect of leaf maturity, severity of damage, and pruning cycle period on NOT% % | Experiments conducted | No. of experiments conducted | | | 30% | 70% | 100% | Process Technology | |
| | | | | 2. Analyze the data and establish an achievable % NOT | Findings disseminated | No. of recommendations done | | | | | 1 | | |
| | | | | 3.Conduct awareness Programs | Awareness Programs conducted | No. of awareness Programs conducted | | | | | 1 | | |
| | | D/TECH -Divisional activities | High | Technology dissemination | Findings disseminated | No. of papers published | | 1 | 2 | | 1 | Process Technology | |
| | | | | | | No. of presentations done | | 1 | 2 | | 1 | | |
| | | | | | | No. of guidelines issued | | | | | | | |
| | | **Thrust A67 Advancing simple and reliable analytical techniques for ensuring made tea quality, detecting adulteration, and verifying packaging standards** | | | | | | | | | | | |
| | | A67.1 Development of reliable techniques for detecting adulterants in tea | High | Develop reliable, efficient, and cost-effective techniques to identify even trace amounts of adulterants in tea | Reliable, efficient, and cost-effective techniques developed | % completion of techniques development | 10% | 25% | 25% | 20% | 20% | Biochemistry | |
| | | | | Disseminate of developed detection techniques to SLTB for effective adulteration control | Developed detection techniques disseminated | % completion of developed techniques dissemination | 5% | 25% | 25% | 25% | 20% | | |
| | | | | Conduct awareness Programs | Awareness Programs conducted | No. of awareness Programs conducted | | 1 | 1 | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **10. Developing methods to enhance made tea quality, value addition and product diversification, inclusive of Artisanal tea and specialty tea, etc.** | **10.1 Made Tea Quality Improvement** | A67.1 Development of reliable techniques for detecting adulterants in tea | High | Disseminate findings | Guidelines issued/research papers published | No of guidelines issued/ No. of Research papers published | | 1 | 1 | 1 | 1 | Biochemistry | |
| | | | | Sample testing | Samples tested | No of samples tested | 100 | 100 | 100 | 100 | 100 | | |
| | | A67.2 Development of quality standards for bulk and tea bag materials | High | Develop quality determination methods | Determination methods developed | % completion of methods development | | 20% | 25% | 25% | 30% | Biochemistry, Process Technology | Plant Pathology, External collaboration |
| | | | | Finalize quality standards | Quality standards finalized | % completion of quality standards finalize | | 20% | 25% | 25% | 30% | | |
| | | | | Prepare guidelines | Guidelines prepared | No. of guidelines prepared | | | | | 1 | | |
| | | | | Disseminate findings | Research papers published/ awareness Programs conducted | No. of Research papers published & awareness Programs conducted | | | 1 | 1 | 1 | | |
| | **10.2 Value addition, new product development and product diversifications** | A30.12 Development of innovative value-added tea-based food and beverages | High | Develop innovative value added products | Innovative value-added products developed | % completion of value-added products development | 20% | 20% | 20% | 20% | 20% | Biochemistry | External or Commercial collaboration, Technology Transfer Office |
| | | | | | | No. of products developed | 1 | 1 | 1 | 1 | 1 | | |
| | | | | | Patents obtained & products commercialized | No. of patents obtained & No. of products commercialized | | 1 | | 1 | | | |
| | | | | | Findings disseminated | No. of research paper published & no. of awareness Programs conducted | | 1 | 1 | 1 | 1 | | |
| | | | | | | | | | | | | | |
| **11. Identifying the health benefits of different Sri Lankan tea cultivars, tea grades and teas produced from different processing methods.** | **11.1 Exploring the Health Benefits of Tea** | **Thrust: A55. Investigation of health benefits of tea** | | | | | | | | | | | |
| | | A55.6 Effect of the consumption of Sri Lankan black tea and value-added Sri Lankan black tea formulations on blood lipids: A randomized controlled trial | Medium | Assess potential benefits for cardiovascular health of black tea | Cardiovascular benefits identified | % completion of benefits identification | 5% | 25% | 40% | 30% | | Biochemistry | National Institute of Fundamental Studies |
| | | | | | Findings disseminated | No. Research papers published / No. of Presentations presented | | 1 | 1 | 1 | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **11. Identifying the health benefits of different Sri Lankan tea cultivars, tea grades and teas produced from different processing methods.** | **11.1 Exploring the Health Benefits of Tea** | A55.7 Evaluating the potency of active biochemicals in tea for nutraceutical and pharmaceutical applications (Biochemistry-60%/ External collaboration-40%) (Medium priority) | Medium | Identify beneficial compounds in tea & their therapeutic potential | Beneficial compounds in tea & their therapeutic potential identified | % completion of identification | | | 10% | 20% | 20% | Biochemistry | External collaboration |
| | | | | | | No. of research papers published & No. of presentations presented | | | | | 1 | | |
| | | D/BIOCH: Exploratory research & divisional activities | High | Conduct routine activities | Routine activities conducted & Biochemical analysis of tea samples completed | % completion of routine activities & sample analysis | 100 % | 100 % | 100% | 100% | 100% | Biochemistry | |
| | | | | | | | | | | | | | |
| **12. Fostering worker wellness and dignity for reducing worker shortage and improving worker productivity through alternative worker deployment and income generating models.** | **12.1 Socio-economic studies** | B155 Exploring the possibility of introducing ILO decent work framework to alternative worker deployment models in corporate sector tea plantations in Sri Lanka | High | Comprehensive desk review | Completed desk review report | | | 1 | 1 | | | Agric. Economics | University of Kelaniya |
| | | | | Conduct case studies | Case studies conducted | No. of case studies conducted | | | 2 | 3 | | | |
| | | | | Conduct awareness Programs | Awareness Programs conducted | No. of awareness Programs conducted based on the findings of case studies | | | | 5 | | | |
| | | | | Conduct pilot studies | Pilot studies conduced | No. of pilot studies conducted | | | | 4 | | | |
| | | | | | Disseminated findings | No. of publications/presentations//terminal report | | | | | 2, 1, 2 | | |
| | **12.2 Micro & macro-economic analysis** | **Thrust A41.Analysing the impact of macro-economic policies on the tea sector** | | | | | | | | | | | |
| | | A41.1 Impact assessment of fiscal, monetary, and trade policies on the tea sector | Medium | Data collecting & analyzed | Policy document prepared | No. of policy document prepared | | 1 | 1 | 1 | 1 | Agric. Economics | |
| | | B156 Development of Sustainable tea tourism models for tea plantations in Sri Lanka | Medium | Conduct case studies | Appropriate models identified | No. of case studies identified | | 5 | | | | Agric. Economics | Sabaragamuwa University |
| | | | | | | No. of appropriate models identified | | | 5 | | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **13. Establishing a comprehensive data base on Agronomic Profile, Land Use Pattern, Socio-Demographic and Human Resources, Entrepreneurship opportunities etc., in the corporate sector tea plantations and link the database with the other data bases of the sister organizations.** | **13.1 Application of Geographic Information System (GIS) for digitalization of the value chains and resources in the tea sector** | **Thrust A 57. Development of tea Atlas of Sri Lanka and GIS based land Management Information System for tea plantation sector** | | | | | | | | | | | |
| | | A57.1 Develop a Digital map and the tea land inventory of corporate tea sector | High | Develop digital maps | Digital maps developed for corporate sector | No. of maps developed | 20 | 200 | 77 | 1 base map | | Agric. Economics | Sabaragamuwa university |
| | | A57.2 Develop a Digital map and the tea land inventory of medium-scale tea growers and tea smallholders | High | Develop digital maps | Digital maps developed for smallholders | No. of maps developed | 10 | 10 | 10 | 10 | 10 | | |
| | | A57.3 Web based Digital database a GIS MIS for tea plantation sector | High | 1.Develop database<br>2. GIS MIS | Database & GISMIS developed | Level of completion (%) | 10 | 25 | 50 | 100 | | | |
| | | A57.4 Demonstrate and popularize GIS based decision making for the plantation industry in Sri Lanka | Medium | Conduct demonstrations | Demonstrations conducted | No. of demonstrations conducted | 3 | 5 | 5 | 5 | 5 | | |
| | | | | | | | | | | | | | |
| **14.Enhancing the global competitiveness of the Sri Lankan tea** | **14.1 Tea marketing studies** | B158. Reviewing & exploring and market trends in tea to guide future research directions & market expansion | High | Desk review using established market research reports, ITC database | Desk research findings on markets reported | No. of reports published on desk research findings (Annual) | | 1 | 1 | 1 | 1 | Agric. Econ | SLTB/ European Specialty Tea Association |
| | | **Thrust A56 Development of Agrepreneurship and Circular Economy in Tea Industry** | | | | | | | | | | | |
| | | A56.1. Agripreneureship development in medium & small-scale tea growers | Medium | Literature review | Completed review report | No. of reports completed | 1 | 10 | 10 | 10 | | Agric. Economics | Saga University |
| | | | | Conduct case studies | Case studies conducted | No. of case studies conducted | | | | 5 | | | |
| | | | | | | No. business models identified | | | | 5 | | | |
| | | A56.2 Studying Circular Economy in Tea Value Chain Trends | Low | Conduct comprehensive review | Reported desk research findings | No. of review reports completed | | | | | 1 | | |
| | | B157 Development of precise forecasting methods for tea production and tea prices | High | Identify models/methods of forecasting | Methods/models identified | No. of methods/models identified | | 1 | 1 | | | Agric. Economics | AI related institute |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **14.Enhancing the global competitiveness of the Sri Lankan tea** | **14.1 Tea marketing studies** | D/ECON Evaluating research recommendations, and divisional activities | High | Publish research findings | Research paper published | No. of paper published | 5 | 5 | 5 | 5 | 5 | Agric. Economics | |
| | | | | | Presentations done | No. of presentation conducted | 10 | 10 | 10 | 10 | 10 | | |
| | | | | | Research collaborations | No. of research collaboration | 3 | 4 | | | | | |
| | | | | | MOU signed | No. of MOU signed | 2 | | | | | | |
| | | | | | | | | | | | | | |
| **15. Disseminate new tea technology information efficiently to users and improve the skills of those involved in tea cultivation and production processes.** | **16.1 Technology dissemination using advanced technologies** | **Thrust A68. E-extension approaches to enhance the knowledge of tea growers at mass scale with low cost** | | | | | | | | | | | |
| | | A68.1 Development of mobile applications and development of supportive technical content to transfer of technical information | Medium | Maintaining of Tea Advisor Android app maintaining Content develop for ADB funded app developed by SLTB for Small and medium tea growers | Popularize app<br>Video and text content | No. of users<br>No. of content developed/updated | 4000<br>125 | 4500<br>20 | 5000<br>25 | 6000<br>30 | 7000<br>35 | Advisory & Extension | |
| | | A68.2 Use of social media to disseminate the technologies | High | Maintaining YouTube Channel and uploading of short videos and technical discussions. Disseminating technical content through Facebook and publicize the TRI activities (Advisory 60% Publication 40%) Maintaining WhatsApp group in RPC and Medium Scale sector and continuously delivering the technical contents through WhatsApp platforms | You Tube content<br>FB Content<br>WhatsApp group<br>WhatsApp Content | No of You Tube content developed<br>No . of FB Content developed<br>No of WhatsApp group<br>No. of WhatsApp Content Developed | 50<br>40<br>5<br>24 | 10<br>40<br>3<br>24 | 10<br>40<br>2<br>24 | 10<br>40<br>24 | 20<br>40<br>24 | Advisory & Extension | |
| | | A68.3 Development of Web-based extension | Medium | Development of Content for TRI web | Web content | No. of web content | | 12 | 18 | 25 | 36 | Advisory & Extension | Publication, Information Communication Technology , All other divisions |
| | | A68.4 Development and implementation of e - e-extension services (Call Center & short messages) | High | Advising the tea growers in two-way manner and handle their urgent requirements Providing alerts and technical information as SMS voice messages | No of individual served<br>No. of messages sent/developed | No of individual served<br>No. of SMS<br>No. of Voice messages | 750<br>24 | 1000<br>24<br>100 | 1250<br>24<br>50 | 1500<br>24<br>25 | 1750<br>24<br>25 | Advisory & Extension | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **15. Disseminate new tea technology information efficiently to users and improve the skills of those involved in tea cultivation and production processes.** | **16.2 Advisory & extension Programs** | D/ADV Development and maintenance of auditoriums and information centers of head office and regional stations and maintenance of data base managed by Advisory & Extension Division at main station. | High | Provide facilities to conduct seminars, lectures, etc., at the auditorium, educate Students and the general public<br>Properly maintain the TRI advisory & extension documents and digitalize the estate information (in retrieval form) | Public awareness Program conducted | No. of awareness Program conducted for general public<br>No. of Awareness Program conducted for students<br>No. of estates entering into the digitalized system | 40<br>40<br>100 | 40<br>40<br>100 | 40<br>40<br>110 | 40<br>40 | 40<br>40 | Advisory & Extension | |
| | | D/ADV1 Routine advisory and Extension Activities | High | Undertaking Advisory field visit/Problem diagnosing visit in Talawakelle (75), Rathnapura(60), Hantane(60), Passara (40), Kottawa(60), Deniyaya (75) and Mathugama (50) = (Total visit = 420)<br>Conducting training Program on Land productivity improvement (T- 10, R- 6, H- 6, P-5, K-4, D-4,M-4 = 39)<br>Conducting training Programs on Crop production improvement (T-15, R-8, H-6, P-6, K-5,D-7, M-5 =54)<br>Conducting training Programs on quality improvement (T-10, R-5, H-5,P-4, K-4, D-4. M-3 =35)<br>Conducting training Program on climate change resilience (T-10,R- 6, H-3, P-4, K-3,D-3, M-3=32)<br>Conducting training Programs on safe use of chemical (T- 10, R-3, H-3, P-3,K-2,D-3, M-2 = 26)<br>Conducting Training Programs on GAPs, (T- 15, R-8, H-4, P-4, K-4, D-5, M-5 =45)<br>Conducting miscellaneous training Programs (T-20, R-4, H-3, P-4, K-3, D-4, M-3= 41) | Advisory visit made and report issued<br>Enhance the knowledge and skill of the participants on particular aspect | No of visit made<br>No. of reports issued<br>No of training Program conducted | 420<br>420<br>272 | 420<br>420<br>272 | 420<br>420<br>272 | 420<br>420<br>272 | 420<br>420<br>272 | Advisory & Extension | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **15. Disseminate new tea technology information efficiently to users and improve the skills of those involved in tea cultivation and production processes.** | **16.2 Advisory & extension Programs** | D/ADV 3 Establishment of M & E unit and carryout Monitoring and evaluation of extension activities and conducting social research | Medium | Conducting of Extension research | Research findings | No of papers published | 3 | 3 | 3 | 3 | 3 | Advisory & Extension | All Research Divisions |
| | | D/ADV5 Public private participatory extension Program | Medium | Developing the links with private extension agencies in order to deliver the technologies to the end users.<br>Organizing and train Para extension workers for smallholding sector<br>Conducting Tailor made training Program | Developed contact points<br>Trained Para extension personal<br>Improved skilled group | No. of contact points linked<br>No. of Para extension workers groups developed<br>No. of training Program conducted | 100<br>2<br>10 | 50<br>5<br>10 | 50<br>5<br>10 | 25<br>10<br>15 | 25<br>15<br>20 | Advisory & Extension | All Research Divisions |
| | | D/AR 3 Adoptive Research for TRI new Technologies and maintenance of demonstration sites | Medium | Evaluate the applicability and suitability of newly developed TRI technologies for the grower's context.<br>Conducting the demonstration site | Technologies evaluated/evaluating<br>No. of Tea Techno park maintained | No. of Adoptive trails conducted<br>No. of Tea Techno - park maintained | 5<br>5 | 5<br>6 | 5<br>7 | 5<br>7 | 5<br>7 | Advisory & Extension | |
| | | D/ADV 10 Popularization of Mechanization | High | Provide technical know-how to the tea growers/operators on use of machines<br>Developed the skill groups to carry out the mechanical operations | Skilled operators developed<br>Skilled group developed | No of skill training Programs conducted<br>No of skilled group developed | 50<br>50 | 50<br>50 | 50<br>50 | 50<br>50 | | Advisory & Extension | All Research Divisions |
| | | | | | | | | | | | | | |
| **16. Regularly assessing the level of adoption of TRI recommendations by the stakeholders of tea industry** | **17.1 Diagnostic surveys** | **Thrust A69 Evaluation of the present status and adaptability of technologies/GAPs recommended by TRI** | | | | | | | | | | | |
| | | A69.1 Diagnostic Census in Corporate Estates sector in different regions | Medium | Development of questionnaire and conducting diagnosis census in Mid- Country Corporate sector<br>Conducting diagnosis census in Corporate sector in Uva, Rathnapura, Gall, Matara and Nuwara Eliya Regions | Data based developed | No of data based | 1 | 4 | 1 | | | Advisory & Extension | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **17. Strengthening the tea value chain in the tea sector** | **Establishment of Farmer companies & Development of Blockchain techniques** | **Thrust A71. Empowering the tea smallholders and extension workers** | | | | | | | | | | | |
| | | A71.2 Strengthening tea smallholder organizations in Sri Lanka through the commercialization | Medium | Proposal development for elevate the TSHDS as FC (To obtain a grant from world bank)<br>Identification of potential TSHDS to develop as FC and train them and Facilitate TSHDS to develop business plan | Approved Proposal<br><br>Identified and trained TSHDS<br>Developed Business Plans | No of proposal<br><br>No. TSHDS<br><br>No. of Business plan | 1<br><br>36 | <br><br>36<br><br>20 | <br><br><br>16 | | | Advisory and Extension | Process Technology, Agric. Economics, TSHDA, SLTB |
| | | **Thrust A72. Development of Blockchain techniques to monitor the quality of made tea and enhance the traceability** | | | | | | | | | | | |
| | | A72.1 Integrate the corporate estate, private tea factories, brokers, and exporters' production agrochemical handling and blending related database using blockchain technique to monitor the MRL and traceability issues | High | Developing of block chain technique, Collection and entering of data from different component of value chain and monitoring using the data base | Data base | % of Completion of data base for Up and mid county (total database =2) | 15% | 25% | 25% | 20% | 15% | Advisory & Extension- | Plant Pathology, Entomology y & Nematology, Biochemistry |
| | | | | | | | | | | | | | |
| **18. Providing other services in an efficient manner** | ***Analytical Services & Other Services to Stakeholders*** | C/PATH Developing and maintaining facilities for performing microbial analysis of made teas, and the factory environment, including water quality | High | Provide microbial analytical services | Made tea samples tested | No. of samples analyzed | 10 | 10 | 10 | 10 | 10 | Plant Pathology | |
| | | C/SPN : Developing and maintaining regional analytical laboratories/ facilities at Talawakelle, Rathnapura, Passara, Galle and Hantana, and establishing a mobile laboratory for soil, plant and fertilizer analysis, which would offer analytical and diagnostic services (Soils and Plant Nutrition -100%) | High | Provide analytical facilities to stakeholders | Analytical facilities provided | % completion of analytical facilities | 100% | 100% | 100% | 100% | 100% | SPND | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **18. Providing other services in an efficient manner** | ***Analytical Services & Other Services to Stakeholders*** | C/Phys - Service of root starch analysis prior to pruning (Plant Physiology - 100%) | | Provide facilities to root starch analysis | Root starch analysis provided | % completion of analytical facilities | 100% | 100% | 100% | 100% | 100% | Plant Pathology | |
| | | C/BIO Developing and maintaining facilities to perform quality parameter assessments and adulterant analyses of made teas as a service for stakeholders in the tea sector | High | Provide facilities to analysis quality parameters & adulterant f made teas | Analytical facilities provided | % completion of analytical facilities | 100% | 100% | 100% | 100% | 100% | Biochemistry | |
| | | C/ENTO: Developing and maintaining facilities to assess pest damage | High | Sample analysis for recommendations | Analytical reports produced with recommendations | No. of reports produced | 10 | 10 | 10 | 10 | 10 | Entomology & Nematology | |
| | | C/NEM: Developing and maintaining a nematode diagnostic service | High | Sample analysis for recommendations | Analytical reports produced with recommendation | No. of reports produced | 200 | 200 | 200 | 200 | 200 | Entomology & Nematology | |
| | | C/MET: Providing weather data for national forecasting | High | Provide data for national weather forecast | Weather data provided | % completion of data provided | 100% | 100% | 100% | 100% | 100% | Agronomy | |
| | | C/TECH: Services of the Technology division | High | Provide services | Advisory visits to tea factories | No. of factory visits done | 35 | 35 | 40 | 25 | 25 | Process Technology | |
| | | | | | Made tea sample analyzed for moisture & chemical parameters | No. of samples analyzed | 1,100 | 1,100 | 1,100 | 1,100 | 1,100 | | |
| | | | | | Measuring instruments/equipment calibrated | No. of instruments/equipment calibrated | 50 | 50 | 50 | 50 | 50 | | |
| | | C/ADV1 Design & Production of Teaching & Extension Materials | Medium | Producing appropriate printed materials to improve the knowledge of tea growers (Advisory and Extension 40%, PPP 35% Publication 30%) | Initiating/Revising advisory circulars, advisory pamphlets and periodicals | No. of advisory circulars<br>No. of Advisory pamphlets<br>No. of advisory periodicals | 15<br>6<br>6 | 15<br>2<br>4 | 15<br>2<br>4 | 15<br>2<br>4 | 15<br>2<br>4 | Advisory & Extension | Public Private Partnership, Publication |
| | | C/ADV2 Coordinating the supply of VP cuttings of promising cultivars (mother bush Program) | High | Coordinating the supply of planting materials of promising tea cultivars (TRI 3000 / 4000 /5000s) Monitoring of Nursery certification | Supplying of planting materials certified nurseries | No. of cutting issues Number of nurseries certified | 6 Mn 300 | 6 Mn 300 | 6 Mn 300 | 6 Mn 300 | 6 Mn 300 | Advisory & Extension | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **18. Providing other services in an efficient manner** | ***Analytical Services & Other Services to Stakeholders*** | C/SIA Stakeholders interactive activities interactive activities | High | Impart new technologies/recommendations & identify the research needs through strengthening of interaction between TRI & stakeholders Conduct the mobile extension and laboratory service, crop clinics and Exhibitors for the tea growers who are in remote areas | Conducted E & E (Plantation), E & E (Smallholding), RSC, RETF, Mobile extension Services, Crop clinics/Exhibition | No. of E & E (Plantation), No. of E & E (Smallholding), No. of RSC, No. of RETF, No. of Mobile extension Services, No. of Crop clinics /Exhibition | 2<br>2<br>3<br>14<br>36<br>6 | 2<br>2<br>3<br>14<br>36<br>6 | 2<br>2<br>3<br>14<br>36<br>6 | 2<br>2<br>3<br>14<br>36<br>6 | 2<br>2<br>3<br>14<br>36<br>6 | Advisory & Extension | Public Private Partnership |
| | | C/MECH Service activities | High | Attending to fabrication, repairs, service & maintenance of machinery & its parts, equipment & its parts, vehicles, buildings etc. at TRI | Services provided research and tea manufacture activities | % completion of services | 100% | 100% | 100% | 100% | 100% | Technology Division/Workshop | |
| | | | | | | | | | | | | | |
| **19. Establishing model estates/fields for different agronomic operations in different tea growing regions for educational purposes and for monitoring the performances.** | **Establishment of model tea estates & fields** | Development of St. Coombs Estate as model Estate – Factory Development | High | 1. Contamination free made tea production under high hygienic conditions in factory. 2.Effective rain water harvesting and using it for factory cleaning. 3. Establishing a system to maintain suitable environment in grading room to prevent moisture absorption in tea. 4. Establishing effective process monitoring and controlling system. 5. Installing online monitoring system for tea processing through digitalization. 6. Establishing separate unit for product diversification and profit enhancement. 7. Establishing factory machinery & infrastructure maintenance and preventive maintenance Program for uninterrupted manufacture. 8. Introducing new posts (technical staff) in line with modern tea manufacturing concepts. 9. Net zero C footprint through renewable energy sources. | Factory with improved infrastructure and technologies/ systems/machineries | Number of technologies/ systems/machineries | 1 | 2 | 1 | | | PTD | St. Coombs Estate |
| | | | | | Improved tea quality and thereby increased tea price | Increase in NSA (Rs.) | 5 | 5 | 5 | | | | |
| | | | | | Reduce energy for tea manufacture | Saving on energy cost to produce 1 kg tea (Rs.) | 1 | 1 | 1 | | | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **19. Establishing model estates/fields for different agronomic operations in different tea growing regions for educational purposes and for monitoring the performances.** | **Establishment of model tea estates & fields** | Development of St. Coombs Estate as model Estate – Factory Development | High | *Cont.,*<br>10. Ensuring dust free healthy environment in the factory.<br>11. Implementing waste management practices. 12. Establishing tea tourism with PPP. 13. Minimizing worker deployment through process and system automation and improving worker outputs with ensuring GMP s and consistent made tea quality through process automation. 14. Best practices for minimizing post-harvest damages in leaves. 15. Ensuring GMPs and consistent made tea quality through process automation. 16. Market-oriented manufacturing Program in different seasons. 17. Establishing skill development Program for associates. 18. Establishing testing equipment/ instruments. 19. Establishing and maintaining energy bench marks for fuel & electricity consumption | Factory with improved infrastructure and technologies/ systems/machineries | Number of technologies/ systems/machineries | 1 | 2 | 1 | | | PTD | St. Coombs Estate |
| | | | | | Improved tea quality and thereby increased tea price | Increase in NSA (Rs.) | 5 | 5 | 5 | | | | |
| | | | | | Reduce energy for tea manufacture | Saving on energy cost to produce 1 kg tea (Rs.) | 1 | 1 | 1 | | | | |
| | | Development of St. Coombs Estate as model Estate – Field Development | | 1. Development of watershed and establishment of Irrigation systems for enhancing yield and minimizing casualties. 2. Intercropping/ product diversification for profit enhancement. 3. Out-grower models for sustainable estate management and increasing worker status. 4. Establishing all GAPs towards certification. 5. Maintain replanting rate with high yielding cultivars targeting sustainability and operating tea factory at optimum capacity. 6. Enhancing Ecosystems. | Estate with advanced farming systems for tea cultivation improvement | Number of advanced farming technologies | | 2 | 1 | 1 | 1 | Agronomy (60%) | Advisory & Extension (20%), S. Coombs (20%) |
| | | | | | Improved farming technology and use of modern farming tools | Saving on cost of cultivation (Rs., Mn) | | 0.4 | 0.2 | 0.1 | 0.1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **19. Establishing model estates/fields for different agronomic operations in different tea growing regions for educational purposes and for monitoring the performances.** | **Establishment of model tea estates & fields** | Development of St. Coombs Estate as model Estate – Field Development<br>*Cont.,* | | *Cont.,*<br>7. Introducing newly improved seedling varieties for maintaining VP: Seedling ratio. 8. Appropriate mechanization approaches for all field practices. 9. Fuel wood plantation for manufacturing. 10. Establishing skill development Program for staff and Associates. 11. Effective rain water harvesting and using it for irrigation. 12. Installing online monitoring system for field operations through digitalization. 13. Residential Area Improvement to attract more workers for estate works. 14. Establishing high tech tea nursery for healthy and uniform tea plants. 15. Establishment of compost processing yard for soil fertility improvement | Estate with advanced farming systems for tea cultivation improvement | Number of advanced farming technologies | | 2 | 1 | 1 | 1 | Agronomy (60%) | Advisory & Extension (20%), S. Coombs (20%) |
| | | | | | Improved farming technology and use of modern farming tools | Saving on cost of cultivation (Rs., Mn) | | 0.4 | 0.2 | 0.1 | 0.1 | | |
| | | Development of St. Joachim Estate as a Model Estate – Factory Development | | 1. Factory building structure. 2. Contamination free made tea production under high hygienic conditions in factory. 3. Establishing effective process monitoring and controlling system. 4. Establishing separate unit for product diversification and profit enhancement. 5. Establishing factory machinery & infrastructure maintenance and preventive maintenance Program for uninterrupted manufacture. 6. Best practices for minimizing post-harvest damages in estate & bought leaf operation. | Factory with improved infrastructure and technologies/ systems/machineries for process technology development. | Number of technologies/ systems/machineries | 1 | 2 | 2 | | | PTD | St. Joachim Estate |
| | | | | | Improved tea quality and thereby increased tea price | Increase in NSA (Rs.) | | 5 | 5 | 5 | 5 | | |
| | | | | | Reduce energy consumption in tea manufacture | Saving on energy cost to produce 1 kg tea (Rs.) | | 1 | 1 | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| **19. Establishing model estates/fields for different agronomic operations in different tea growing regions for educational purposes and for monitoring the performance..** | **Establishment of model tea estates & fields** | Development of St. Joachim Estate as a Model Estate – Factory Development<br><br>*Cont.,* | | *Cont.,*<br>7. Improvement of factory premises and land scaping in par with global food processing factories and attracting tourists. 8. Introducing new posts (technical staff) in line with modern tea manufacturing concepts. 9. Solar electricity for estate community as a means of worker attraction to estate. 10. Ensuring dust free healthy environment in the factory. 11. Implementing waste management practices. 12. Minimizing worker deployment through process and system automation and improving worker outputs with ensuring GMP s and consistent made tea quality through process automation. 13. Establishing skill development Program for associates. 14. Establishing testing equipment/ instruments. 15. Establishing and maintaining energy bench marks for fuel & electricity consumption. 16. Establishing skill development Program for associates. | Factory with improved infrastructure and technologies/ systems/machineries for process technology development. | Number of technologies/ systems/machineries | 1 | 2 | 2 | | | PTD | St. Joachim Estate |
| | | | | | Improved tea quality and thereby increased tea price | Increase in NSA (Rs.) | | 5 | 5 | 5 | 5 | | |
| | | | | | Reduce energy consumption in tea manufacture | Saving on energy cost to produce 1 kg tea (Rs.) | | 1 | 1 | 1 | 1 | | |

| Objectives | Strategy | Program/ Project | Priority Category | Activity | Output/Outcome | KPI | Annual Targets | | | | | Responsibility | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | Lead Davion | Co-within TRI/ external |
| | | Development of St. Joachim Estate as a Model Estate – Field Development | | 1. Development of watershed and establishment of Irrigation systems for Replanting and minimizing casualties. 2. Establishing all GAPs towards certification. 3. Appropriate mechanization approaches for all field practices. 4. Fuel wood plantation with a view to be self-sufficient and efficient in the use of thermal energy source (In woodchip form) for manufacturing. 5. Establishing skill development Program for staff and Associates. 6. Effective rain water harvesting and using it for irrigation. 7. Installing online monitoring system for field work & cultivation operations through digitalization. 8. Residential Area Improvement to attract more workers for estate works. 9. Establishing high tech tea nursery for healthy and uniform tea plants. 10. Uplift the administration center with new technology. 11. Enhancing ecosystem | Estate with advanced farming systems for tea cultivation improvement | Number of advanced farming technologies | | 2 | 1 | 1 | 1 | Agronomy (60%) | Advisory & Extension (20%), S. Joachim (20%) |
| | | | | | Improved farming technology and use of modern farming tools | Saving on cost of cultivation Rs., Mn) | | 0.4 | 0.2 | 0.1 | 0.1 | | |

# GOAL 2

# HUMAN RESOURCE DEVELOPMENT PLAN

# (HRD PLAN) 2025-2029

To build up capacities of human resource base for achieving its objectives in R & D program

# 9. Human Resource Development Plan (2025 – 2029)

## 9.1. HRD Plan – Crop Improvement

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/ Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc | M Phil / Ph D | | | |
| Germplasm characterization and management | Molecular approaches for identification of parents for hybridization | F | | | RO/ EO /TO | 2026 | Plant Breeding |
| | Identification of novel genes for target traits | F | | F/L | RO / EO | 2026/2027 | |
| | Advance methodologies for *In vitro* conservation of germplasm | F | | | SRO/RO/ EO/TO | 2027/2028 | |
| Biodiversity Conservation of tea genetic resource | Quantitative genetics of target traits | F | | | RO, EO | 2026 / 2027 | |
| | Exploration and utilization of old seedlings populations | L | | | RO/ EO / TO | 2026/ 2027/ 2028 | |
| | Utilization of tea seed gardens for enhancement of tea genetic diversity | F | | | SRO/RO/EO/TO | 2027/2028/2029 | |
| Molecular technologies for tea breeding | Advance technologies to identify potential genotypes – Marker assisted selection | F | | | RO / EO /TO | 2027 | |
| | Omics approaches to identify candidate genes for target traits (RT-PCR, gene expression studies, biosynthetic pathways) | F | | F/ L | RO / EO /TO | 2027/2028 | |
| | Utilization of bioinformatics tools for tea crop improvement | F/ L | | | SRO /RO / EO /TO | 2026 / 2027/ 2028 /2029 | |
| | Application of Next-generation sequencing techniques in tea breeding (GBS, Illumina) | | | F/ L | RO / EO /TO | 2028/2029 | |
| | Utilization of new technologies to identify mutated genes in populations (Genetic engineering, genome editing, TILLING) | F | | F/ L | RO / EO /TO | 2028/2029 | |
| Advance plant breeding and *in vitro* techniques | Advance methodologies for cytology and cytogenetics | L/F | | | SRO/RO /EO/TO | 2026 | |
| | Mutation breeding approaches for tea breeding | F/L | | | SRO/RO /EO/TO | 2025/2026 | |

## 9.2. HRD Plan- Land Productivity Improvement

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Precision and regenerative agriculture | Soil Mapping & GIS | F/ L | | | PRO/SRO/RO/EO/TO | 2025-2030 | Soil & Plant Nutrition |
| | Adoption of modern technologies in tea cultivation | F | | | PRO/SRO/RO/TO | 2025-2030 | |
| | Soil quality and soil health improvement | F / L | | F / L | PRO/SRO/RO | 2028 | |
| | Drone technology in fertilization | F/ L | | | PRO/SRO/RO/EO/TO | 2025-2030 | |
| Soil microbiology and biotechnology | Quantification and identification of beneficial microbes | L | | | PRO/RO/EO/TO | 2025-2030 | |
| | Soil DNA extraction | L | | | RO/EO/TO | 2025-2030 | |
| | Culturing techniques | L | | | EO/TO | 2025-2030 | |
| | Soil microbiology | | F/L | | EO/TO | 2027 | |
| Data analysis | Experiment designing | L | | | RO/EO/TO | 2025-2030 | |
| | Use of statistical tools | L | | | RO/EO/TO | 2025-2030 | |
| Water management | Irrigation application to tea | | | F/ L | RO | 2028 | Agronomy |
| | Advances in micro irrigation | F/ L | | | TO | 2025/26 | |
| | Rainwater harvesting | F/ L | | | TO | 2025/26 | |
| | Advances in fertigation | F/ L | | | | 2026 | |
| Soil rehabilitation | Mountain farming systems | | F/ L | | RO/TO | 2027 | |
| | Advances in fodder grasses | F/ L | | | TO | 2026 | |
| Shade management | Advances in dendrology | F/ L | | F/ L | RO/TO | 2026/28 | |
| | Shade impact on productivity | L | | | RO | 2026/27 | |
| | Tree management safety | √ F/ L | | | TO | 2026/2027 | |

## 9.3. HRD Plan – Climate Resilience and Sustainability

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Quantification of soil erosion | Advances in erosion measurements | F/ L | | | TO | 2027 | Agronomy |
| Climate change | Stress physiology | | L | | RO | 2025 | Plant Physiology |
| | Carbon budgeting | | | F/ L | RO | 2028/2029 | |
| | Internal plant signaling | F | | | RO/SRO | 2026/2027/2028 | |
| | Anatomical techniques | L | | | TO/EO/RO/SRO | 2026/2027/2028 | |
| | Metabolomics | F | | | RO/SRO | 2026/2027/2028 | |
| | Hydraulic traits | | F/ L | F/ L | TO/EO /RO | 2027/2028/2029 | |
| | Manipulation of environmental conditions | F | | | TO/EO/RO/SRO | 2027/2028/2029 | |
| Maintaining the sustainability of tea industry | Environmental impact assessment | F | | | RO/SRO | 2026/2027/2028 | |
| Root physiology | Mini rhizotron techniques | F | | | RO/SRO | 2026/2027/2028 | |

## 9.4. HRD Plan- Mechanization of Field Practices

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Use of machines in agricultural fields and their maintenance | Advance farm machinery technology for agricultural use | F/ L | F/ L | | RO/TO/EO | 2026/2028 | Agronomy |
| Agronomic practices related to use of machinery | Precision/smart agriculture | F/ L | | | TO/EO | 2027/2028 | |

## 9.5. HRD Plan – Nursery Management Techniques

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| enhancing root and shoot growth | Formulation of soil mixtures | | F/ L | | TO/EO | 2027 | Agronomy |

## 9.6. HRD Plan – Crop Management

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Weed ecology and development of bio herbicide | Weedicide application monitoring weed seed banks | F/ L | | F/ L | RO/TO | 2026/27 | Agronomy |
| | Entomology | | | F | RO, Entomology | 2028-2030 | Entomology and Nematology |
| | Nematology | | | F | RO, Nematology | 2028-2030 | |
| | Entomology | | F | | EO/ TO | 2025-2027 | |
| | Molecular training in Entomology | F/L | | | EO/TO | 2025-2026 | |
| | Molecular training in Nematology | F/L | | | EO | 2025-2026 | |
| | Training on new technique to Integrated Pest Management | L/F | | | EO/TO | 2026-2027 | |
| | Training on isolation identification of semio-chemicals | L/F | | | EO/TO | 2026-2027 | |
| | Training on biopesticides | L/F | | | EO/TO | 2026-2027 | |
| | Training on nematode taxonomy | F | | | RO/EO | 2026-2027 | |
| | Training on insect taxonomy | F/L | | | RO/EO | 2026-2027 | |

## 9.7. HRD Plan – Crop Management Cont.,

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Disease epidemiology | Statistical methods in modeling/forecasting of tea diseases | F | | | SRO/RO | 2026 | Plant Pathology |
| | Applications of geostatistics in tea disease epidemiology and management | | | F/L | RO | 2026 | |
| | Applications of image analysis in tea disease assessment and monitoring | F/L | | | SRO/RO | 2027 | |
| Extension pathology | Developing apps on tea diseases for extension purposes | L | | | RO/EO/TO | 2026 | |
| Advanced phytopathology | Advanced microscopic/cytological techniques | F | | | RO/EO/TO | 2030 | |
| | Microbial culture preservation and repository maintenance | F | | | EO/TO | 2028 | |
| | Drone technologies for tea disease management | F/L | | | SRO/RO/EO/TO | 2027 | |
| Tea microbiology | Metagenomics data analysis | L | | | RO | 2025 | |
| | Microbiology laboratory maintenance, and microbial analysis in tea | L | | | RO/EO/TO | 2025 | |
| | HACCP auditing and certification for food | F/L | | | RO | 2030 | |
| Molecular plant pathology | Molecular biology and biotechnology techniques including gene expression analysis and recombinant DNA technology | L | | | RO/EO/TO | 2029 | |
| | Transcriptomics and genomics data analysis | F/L | | | SRO/RO | 2029 | |
| | Plant-microbe interactions | | | F | RO | 2028 | |

## 9.8. HRD Plan – Tea Processing Technology

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | PhD | | | |
| Tea manufacturing technology | Exposure on green tea manufacturing methods and machineries. | F | | | RO/EO/TO | 2026, 2027, 2028 | Process Technology |
| | Exposure on oolong tea manufacturing methods and machineries. | L | | | RO/EO/TO | 2026, 2027 | |
| | Exposure on specialty/artisanal tea manufacturing methods and machineries. | L | | | RO/EO/TO | 2028, 2029 | |
| Energy technology | Training on alternative energy | L | | | RO/EO/TO | 2028, 2029 | |
| | Energy conservation/auditing | L | | | RO/EO/TO | 2027, 2028 | |
| Workshop technology | Training on modern workshop machinery and techniques | L | | | General Mechanics | 2026, 2028 | |
| Modern technology for tea manufacture and machinery development. | Use of AI for tea manufacturing | | | | RO/EO/TO | 2028, 2029 | |
| | Training on mechatronics and IOT | L | F/L | | EO/TO | 2028, 2029 | |
| | Training on designing software. | L | | | RO/EO/TO | 2026, 2027 | |
| | Tea Process control and automation | | | F/ L | RO | 2026,2027, 2028 | |
| | Food processing and packaging | | F/L | | EO/TO | 2027, 2028, 2029 | |

## 9.9. HRD Plan – Made Tea Quality Improvement

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Instrument training | HPLC and GC instrument training | F | | | RO/ EO /TO | 2025/2026 | Biochemistry |
| | Development of quality standards for speciality tea products | | √ F/ L | | EO | 2026 | |

## 9.10. HRD Plan -Value Added Tea Products

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Product development and innovation | Sensory evaluation and consumer acceptability studies | L | | | RO/ EO/ TO | 2026/2027 | Biochemistry |
| | Boiler/ pilot plant operation related | L | | | EO/ TO | 2026/2027 | |
| | Value-added tea processing technology | | | F/ L | RO | 2027 | |

## 9.11. HRD Plan- Health Benefits of Tea

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Tea and Health | Biological effects of tea consumption | | F/ L | | RA | 2026 | Biochemistry |

## 9.12. HRD Plan – Resource Planning

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Socio-economics & resource planning | Qualitative data analysis in socio economics | √ L | | | PRO/RO | 2025/2026 | Agric. Economics |
| | Analysis on labor markets | | | | | 2017 | |
| | Advanced quantitative & qualitative data analysis techniques | √ L | | | PRO/SRO/RO | 2027/2028 | |
| | Development business plan | | | | PRO | 2025/2026 | |
| | Eco-system analysis | √ F | | | PRO/SRO/RO | 2026/2027/2028 | |
| | Environmental impact assessment | | √ L | | RO | 2027 | |
| | Forecasting methods | √ L | | | PRO/SRO/RO | 2026/2027/2028 | |
| | Resource planning | | √ L | Ph D | RO | 2026-2029 | |
| Marketing | Analysis of trade and marketing policies | √ F | | | PRO/SRO/RO | 2026/2027/2028 | |
| | Price incentive analysis | | | | PRO/SRO/RO | 2027/2028 | |

## 9.13. HRD Plan – Technology Dissemination

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | | Category of Employee | Proposed Year | Division/ Unit |
|---|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | | |
| | | | M Sc | M Phil | Ph D | | | |
| E-extension approaches | Social media applications and AI | L | | | | SAO | 2026 | Advisory & Extension |
| | Systematic designing of instruction | | | | F | AO | 2028 | |
| Extension research | Social research methodologies | L | | | | EO | 2026 | |
| | Ergonomics study on machine use | | | L | | AO | 2025 | |
| General extension methodologies | Extension/ business management | | MBA (L) | | | EO | 2027 | |
| | Public private participation on extension | L | | | F | AO | 2026 | |
| | Peer learning behaviours | | L | | | EO | 2026 | |
| | Prediction models for farmer behaviour | | | F/L | | (EO | 2028 | |
| | Adoption of GAP | | L | | | EO | 2027 | |
| Diagnosing field problem and prediction | GIS mapping | L | | | | AO, EO, EO,EO, DW EO, EO | 2025 | |
| Block chain approach | Integration and data base management related to agriculture practices to monitor the traceability | | | L | | SRO | 2025 | |
| Stakeholder interaction | Precision agriculture | | | | | | 2028 | |
| | Social marketing | | | L | | EO | 2029 | |
| | Regenerative agriculture | F | | | | SAO | 2025 | |
| | Pollution free tea production | F | | | | SAO | 2026 | |
| | Mechanization | F | | | | SAO | 2026 | |
| | Operation of farmer companies/cooperatives | F | | | | PAO | 2026 | |

## 9.14. HRD Plan – Research Management

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc | M Phil / Ph D | | | |
| Master in Public Administration and Management – MPA&M (University of Colombo) | Next level to academic skill development Protocols | | L | | Personal Assistant to Director | During 2026-2028 | Director's Office |
| Advanced Administrative and Executive Support Skills | Executive Assistant Certification<br>Advanced Office Management<br>Time & Priority Management<br>Project Management<br>To improve strategic thinking, multitasking under pressure, and leadership in administrative tasks. | L/F | | | Personal Assistant to Director/<br><br>Management Assistants | During 2025-2029<br><br>During 2025-2029 | Chairman/ Director/ Additional Director & Library Staff |
| Communication and Interpersonal Skills | Business Writing & Email Etiquette<br>Public Speaking / Presentation Skills<br>Conflict Resolution and Negotiation Skills | L/F | | | Personal Assistant to Director/ Management Assistants | | Chairman/ Director/ Additional Director & Library Staff |
| Digital & IT Skills | Microsoft (Word, Excel, Power Point) | L/F | | | Management Assistant | During 2025-2029 | Additional Director' s Office |
| Language | Professional English Writing & Speaking | L | | | Management Assistants | During 2025-2029 | Chairman/ Director/ Additional Director & Library Staff |
| Publications/Library & Information Science | | L | L | | Librarian | 2029 | Library |

## 9.15. HRD Plan - General Training

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| General training needs | Statistical methods | L | | | TO/EO/RO/SRO | 2026/2027/2028 | Plant Physiology |
| | Scientific writing | L | | | TO/EO/RO | 2026/2027/2028 | |
| | Good laboratory practice | L | | | TO/EO | 2026/2027/2028 | |
| | Training on statistical analysis | L | | | RO | 2026-2027 | Entomology / Nematology |
| Statistical Analysis for Biochemistry Research | Experimental design and basic statistical methods | L | | | RO/ EO/ TO | 2026/2027/2028 | Biochemistry |
| | Advanced data analysis and interpretation | L | | | RO/ EO/ TO | 2026/2027/2028 | |
| | Training on R statistical software for data analysis | L | | | RO/ EO/ TO | 2026/2027/2028 | |
| Statistical analysis for research projects | Research project data analysis | L | | | RO/EO/TO | 2026, 2029 | Process Technology |
| | Database management and handling large data | F | | | TA | 2026-2029 | Agric. Economics |
| | Statistical analysis and sampling techniques | L | | | TA | 2027/2028 | |
| Office Administration | Office management & filling system | L | | | General worker | 2026 | |

## 9.16. HRD Plan - Publications and Publicity Unit

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of Training & Whether Foreign (F) / Local (L) | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|
| | | Short Term | MSc | | | |
| Presentation & public speaking : Presentation and communication skills | Public Speaking, PowerPoint design, oral presentation techniques, video content preparation | L | | Publications Officer / Management Assistant | 2025/ 2027 | Publications / Publicity Unit |
| Administrative & management skills: Project proposal writing skills, project planning and funding | Project proposal writing techniques, logical framework, budgeting, justification writing | L | | Publications Officer | 2025 | |
| Repository and documentation management: Digital archiving and knowledge management | Institutional repository design, metadata creation, digitization practices | L | | Publications Officer / Management Assistant | 2026/ 2027 | |
| Publications/library & information science | MSc in library and information science | | L/F | Publications Officer | 2026 | |
| Administrative & management skills: Government procurement procedures | Procurement guidelines (Goods, Services), limits, formats, involved in purchasing printing services, software, etc. | L | | Publications Officer / Management Assistant | 2025/ 2027 | |
| ICT skills for publishing: Office and digital documentation tools | Advanced MS Word, Excel, PowerPoint, reference management tools (Zotero, Mendeley) | L | | Management Assistant | 2027 | |
| Digital media & communication: social media content development and analytics | Content planning, Facebook engagement strategy, digital communication tools | L | | Publications Officer/ Management Assistant | 2028 | |
| Graphic design & desktop publishing: Digital layout and design | Adobe InDesign, Canva, and infographic design | S | | Management Assistant | 2029 | |
| Professional development: Conference participation and professional affiliations | Participation in LIS, publishing, or communication conferences | L | | Publications Officer | 2025–2029 | |

## 9.17. HRD Plan – Information and Communication Technology Unit

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Information Technology & Network Administration | Enterprise IT Security Threat Management | F/ L | | | Network Administrator | 2025 | ICT Unit |
| | Managing Information Systems | | L | | EO/ Network Administrator | 2026/27 | |
| | Advanced Network Administration | L | | | TO (ICT) | 2027 | |
| | Virtualization & Cloud Computing | F/ L | | | Network Administrator | 2028 | |
| | Advanced Web/Mobile Application Security | F/ L | | | EO/ Assistant Network Administrator | 2028 | |
| | Robotics/ Intelligent Systems | F/ L | | F/ L | EO/ Network Administrator | 2029-31 | |
| Development of Agriculture Information Systems | Development of Mobile Apps/ Mobile Computing | L | | | TO (ICT)/ EO/ Assistant Network Administrator | 2026 | |
| | Agriculture Information management Systems | F/ L | | | TO (ICT)/ Assistant Network Administrator | 2027 | |
| | Advanced Mobile Apps/ Technologies | F/ L | | | TO (ICT)/ EO/ Assistant Network Administrator | 2029 | |

## 9.18. HRD Plan – Administration Division

| Specific Training Needs | Type of TRAINING & WHETHER Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | | | | | Division/Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | Short Term | Long-Term leading to Post Graduate | | | | | | | | |
| | | Degree/ M Sc / MBA / MA | PhD | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Foreign training | F / L | | | DDA, SAO, RE, AO's, PO, PRO,EA(Mechanical / Civil / Electrical) & MA's | | | | | | Administration & Engineering |
| Master of Business Administration / Master of Science / Master of Art | | F / L | | SAO, AO's, PRO, PO, RE, EA(Mechanical / Civil / Electrical) | SAO | AO | RE | AO | AO | |
| Degree in administration / management | | L | | MA's | MA | MA | MA | MA | MA | Administration |
| Degree in Civil Engineering | | L | | EA (Civil / Electrical), TO (Civil / Electrical / Filter plant / Waterworks) | EA (Elec) | TO (Civil) | TO (Civil) | | | |
| Degree logistic & supply chain management | | L | | MA's | MA | MA | | | | |
| Degree in public relation & welfare | | L | | MA's | MA | | | | | |
| Management / HRM certificate course / Diploma / administration & establishment procedure | L | | | MA's | | | | | | |
| Human resource planning / Preparation of succession plan | F / L | | | DDA, SAO, AO's | | | | | | Administration |
| Maintenance of personal files / Filing system | L | | | SAO, AO's | | | | | | |
| **Specific Training Needs** | **Type of TRAINING & WHETHER Foreign (F) / Local (L)** | | | **Category of Employee** | **Proposed Year** | | | | | **Division/Unit** |

| | Short Term | Long-Term leading to Post Graduate | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Degree/ M Sc / MBA / MA | PhD | | | | | | | |
| Clerical skills development | L | | | MA | | | | | | Administration, Engineering/ Telephone Exchange |
| Managing time for better productivity | L | | | DDA, RE, SAO, AO's,PO, PRO, EA(Mechanical/Civil/Electrical) & MA | | | | | | Administration & Engineering |
| Skill development Program | L | | | RE, EA(Mechanical / Civil / Electrical) & MA's | | | | | | Engineering |
| Training for improve the discipline, personality, attitude, team work, Personal relations | L | | | SAO, RE, AO's, PRO, PO, EA (Civil, Mechanical, Electrical), Driver, Motor Mechanic | | | | | | Transport |
| Communication skills in English for management assistants & allied grades | L | | | MA | | | | | | Administration, Engineering/Telephone Exchange |
| Development of ICT skills | L | | | MA's | | | | | | Administration & Engineering |
| Office management & filing system | L | | | DDA, RE, SAO, AO's, PO, PRO, EA(Mechanical / Civil / Electrical) & MA's | | | | | | Administration & Engineering |
| Disciplinary procedures in government organization | L | | | DDA, SAO, AO's, MA's | | | | | | Administration & Engineering |
| Developing secretarial skills & abilities | L | | | PA's & MA's | | | | | | Administration & Engineering |

| Specific Training Needs | Type of TRAINING & WHETHER Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | | | | | Division/Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | Short Term | Long-Term leading to Post Graduate | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| | | Degree/ M Sc / MBA / MA | PhD | | | | | | | |
| Food management Diploma & food carving | L | | | Guest House Keepers & Hostel Care Takers | | | | | | Administration, Engineering/Telephone Exchange |
| Government procurement procedure & E-procurement | L | | | PO & MA's | | | | | | Administration, Engineering/Telephone Exchange |
| CIDA Training Programs | L | | | RE, EA(Mechanical / Civil / Electrical) & TO's, Carpenters, Masons, Painters , Plumbers, Telephone/Electrical Linesman, MA's | | | | | | Engineering |
| Training Program on wastewater collection, treatment, disposal / Reuse & storm water drainage | L | | | TO's & Plumber | | | | | | |
| Buildings, office & hostels maintenance | L | | | EA (Civil, Electrical), TO's & Electricians | | | | | | |
| Power logic control | L | | | EA (Electrical), TO's & Electricians | | | | | | |
| Installation of electrical and household maintenance (HTM) & telecommunication/Electrical network | L | | | EA (Electrical), TO's & Electricians, Telephone / Electrical Linesman | | | | | | |
| NVQ 2,3 & 4 in carpenter, masonry, painting , plumbing, electrical, guest house keeping, mechanic & motor mechanic | L | | | General Workers | | | | | | Administration & Engineering |

## 9.19. HRD Plan -Finance Division

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Long Term Training Program | Master of Business Administration / Accounting / Management | F /L | | | | 2025-2029 | Finance Division |
| | Bachelor Degrees / Administration Accounting / Management | F /L | | | | 2025 &2028 | |
| Short term training Program | Leadership and Management training | F | | | | 2025-2029 | |
| | Leadership and Management training | F | | | | 2025-2029 | |
| | Leadership and Management training | F | | | | 2025-2029 | |
| | Leadership and Management training | F | | | | 2025-2029 | |
| | Govt. Accounting Procedures (Statutory Boards) | F | | | | 2025-2029 | |
| | Govt. Accounting Procedures (Statutory Boards) | F | | | | 2025-2029 | |
| | Presentation of Financial Statement -SLPSAS | F | | | | 2025-2029 | |
| | Presentation of Financial Statement -SLPSAS | F | | | | 2025-2029 | |
| | Tax Applicable to Semi Govt Institutions and other statuary payments ETF , EPF | F | | | | 2025-2029 | |
| | Annual Stock Verifications & Disposals stock management systems | F | | | | 2025-2029 | |
| | Public Finance and Accounting | F | | | | 2025-2029 | |
| | Payroll Management System | F | | | | 2025-2029 | |
| | Payments & Receipts Management | F | | | | 2025-2029 | |
| | Window Based Application Packages and AI technology application for Finance activities | F | | | | 2025-2029 | |
| | Imprest Accounting | F | | | | 2025-2029 | |
| | Sharoff Management | F | | | | 2025-2029 | |
| | Stores Management | F | | | | 2025-2029 | |

## 9.20. HRD Plan -Internal Audit Unit

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/ Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long term | | | | |
| | | | Degree | ICASL/ACCA/CIMA | | | |
| Auditing in accounts, administration, research projects, income generation projects, factories, estates, legal cases, government administrative procedures | University courses/ICASL, ACCCA, CIMA Courses etc. | | L | L | Internal Auditor, Audit Officer | 2025-2029 | IA Unit |
| | Government institutes Trainings | L | | - | MA | 2025-2029 | |

## 9.21. HRD Plan - Research, Advisory & Extension Centre, Hantana

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Statistical analysis for agricultural research | Office productivity suites (Advanced MS Office, Google Workspace) | F/L | | | MA | 2026 | |
| | Hospitality management & customer service short course | L | | | Hostel Caretaker (PL3) | 2026 | |
| | New electrical systems, energy efficiency & safety measures | F/L | | | Electrician | 2026 | |
| | Modern management of field works in tea plantations (Short term Practical) | L | | | Assistant Field Officer | 2028 | |

## 9.22. HRD Plan - Research, Advisory & Extension Centre, Rathnapura

| Broad Categories of Training Needs Identified | Specific Training Needs | Type of training & whether Foreign (F) / Local (L) | | | Category of Employee | Proposed Year | Division/Unit |
|---|---|---|---|---|---|---|---|
| | | Short term | Long-term leading to Post graduate | | | | |
| | | | M Sc/ M Phil | Ph D | | | |
| Human Resource Development / Administrative and financial matters | Electrical/Electronic | L | | | TO (Electrical) | 2027/2028 | Administration |
| | Energy Efficiency & Safety Measures | | | | | | |
| | Civil work | L | | | TO (Civil) | 2028/2029 | |
| | Workplace safety | | | | | | |
| | Vehicles and transport related technical trainings | L | | | MA (Transport) | 2026/2027 | |
| | (German Technical School) | | | | | | |
| | Trainings related to procurement procedures, office systems and documentation | L | | | MA (Purchasing) | 2027/2028 | |
| | Use of MS Office package | | | | | | |
| | Institutional disciplinary procedures | L/F | | | JM | 2026/2027 | |
| | Leadership | | | | | | |
| | Computer literacy | | | | | | |
| | Training related to accountancy | L/F | | | MA (Accounts) | 2027/2028 | |
| | Book keeping | | | | | | |
| | Financial software use | | | | | | |
| | Administrative Procedures & Office Management | L | | | AR | 2026/2027 | |
| | Language skills (English/Tamil) | | | | All | 2026/2029 | |
| | Computer Literacy Skills | | | | | | |
| | Leadership training | | | | | | |

# GOAL 3

# INFRASTRUCTURE DEVELOPMENT PLAN

# 2025-2029

To develop and maintain a better working environment in the Institute, by improving the standard of laboratories and through appropriate changes in research & extension centers, to retain staff of a high standard and to implement performance-based merit schemes, applicable to all staff for effective undertaking of R & D activities and technology transfer.

## 10.1. Infrastructure Development Plan

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To develop and improve required infrastructure to facilitate R&D | Maintenance repairs & development of laboratories, field office and Nurseries of the Plant Breeding Division | Repairing / Upgrading of Laboratories , field office and Nursery | Upgraded / repaired laboratories | No. of laboratories upgraded / repaired | 01 (PB Laboratory TRI, Hanthana) | 01 (PB Laboratory TRI, Rathnapura) | | 01 (PB Laboratory TRI, Talawakelle) | | Plant Breeding |
| | | | Upgraded field office / Fertilizer stores | No. of field offices / fertilizer stores upgraded / repaired | | | 01 (Field office + fertilizer stores of PB - TRI, Rathnapura | | | |
| | | | Upgrading of Nurseries/ Glass houses | No. of Nurseries / Glass houses upgraded / repaired | 01 PB Glass house - TRI, Talawakelle ) – under IAEA funded project | | 01 (PB nursery - TRI, Rathnapura) | 01 (PB nursery - TRI, Talawakelle) | | |
| To develop and improve the required infrastructure to facilitate R&D and extension activities | Maintenance, repairs & development of the Soils and Plant Nutrition laboratory at Talawakelle | Repairing of running store cupboards, under the ceiling of Laboratory building. | Repaired buildings | No. of buildings repaired | | 1 | | | | SPND |
| | | Construction of wastewater and chemical purification unit. | New purification unit | No. of purification unit purchased | | | 1 | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To develop and improve the required infrastructure to facilitate R&D and extension activities | Maintenance, repairs & development of the Soils and Plant Nutrition laboratory at Talawakelle | Construction soil sample storage room | New soil storage room | No. of soil samples stored | | | | 1 | | |
| | Maintenance, repairs & development of the Soils and Plant Nutrition laboratory at Hantana | | Repaired the Fume hood, Fertilizer stores, Chemical stores | No. of buildings repaired | | 1 | 1 | | | |
| | Maintenance, repairs & development of the Soils and Plant Nutrition laboratory, at Walahanduwa | Repairing the laboratory building | Repaired building | No. of buildings repaired | | | | 1 | | |
| | | Installation of a Fume cupboard | New fume cupboard | No. of fume cupboards purchased | | | | 1 | | |
| | Maintenance repairs & development of Soils and Plant Nutrition laboratory, at Rathnapura | Installation of a Fume cupboard | New fume cupboard | No. of fume cupboards purchased | | | 1 | | | |
| To develop and improve required infrastructure to facilitate R&D | Maintenance repairs & development of laboratories/ glasshouse | Repairing of Laboratory buildings | Laboratory buildings | No. of building repaired | | 1 | | | | Plant Physiology |
| | | Repairing of glasshouse | Glass house repaired | No. of Glass house repaired | | | 1 | | | |
| To develop and improve required infrastructure to facilitate R&D and extension activities | Maintenance repairs & development of laboratories, staff quarters and internal roads at TRI Low country Regional Center | Repairing of Laboratory buildings | Repaired buildings | No. of buildings repaired | | 1 | 1 | 1 | | Entomology / Nematology / Plant Pathology |
| | | Repairing internal roads | Repaired internal roads | No. of km of internal roads repaired | | 5km | | | | |

| Objective | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To develop and improve required infrastructure to facilitate R&D and extension activities | Maintenance repairs & development of laboratories and experimental area | Repair of roof of Nematology processing lab, culture lab and bio processing lab | Repaired roof of laboratories | No. of roofs repaired | | 1 | 1 | | | Entomology/ Nematology/ Plant Pathology |
| | | Repair of internal road to the Entomology & Nematology experimental area from the laboratory and development of path to poly tunnel | Repaired internal road | No of internal roads repaired | | | | 1 | | |
| | | Repair of the Retaining Wall adjacent to the Nematology Glass house | Repaired retaining wall | No of retaining wall repaired | | | | | 1 | |
| | | Repair of Poly tunnel | Repaired poly tunnel | No of repaired poly tunnel | | 1 | | | | |
| To develop and improve the required infrastructure to facilitate R&D | Maintenance, repairs & development of the laboratory and pilot plant of the Biochemistry Division | Repairing / Upgrading of the laboratory | Upgraded/repaired laboratory | No. of laboratory areas upgraded/repaired | | 01 (Main lab 1) | | 01 (Main lab 2) | | Biochemistry |
| To improve infrastructure facilities | Purchasing & renovation | Purchase New Office Chairs | New Office Chairs | No. of office chairs purchased | 10 | | | | | Agric. Economics |
| | | Renovation of Tea Room | Renovated Tea Room | No. of tea rooms renovated | | 1 | | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To improve service of Internal Audit(IA) | C/INTA | Partitioning work of IA Unit | IA unit partitioned | No. of units | 1 | | | | | Internal Audit |
| To initiate the online sales | Online Sales through WhatsApp and Payment Gateway | Purchase of Tablet Computer<br>Purchase of official contact nos. | Increase the income generation to the institute via Institutional sale | No. of online sales | 50 | 100 | 125 | 150 | 175 | Publication and Publicity Unit |
| To improve digital publishing capacity | Procurement of modern publishing and design software | Purchase licenses for Adobe Creative Cloud (InDesign, Photoshop, Illustrator)<br>Acquire Grammarly or equivalent editing tools<br>Install PDF editing and layout software | Increased efficiency and quality of publication production | No. of new software tools installed and used | | 3 software systems | | | | |
| To develop a digital archive for TRI publications | Updating / Maintaining an institutional digital repository (Collaborative project with Library) | Design and host a repository platform<br>Digitize back issues of SLJTS, annual reports, bulletins<br>Assign metadata and access controls | Wider accessibility and preservation of TRI publications | No. of documents digitized and uploaded | | | Repository live by 2027; annual updates | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To modernize and upgrade the physical and digital infrastructure of the Publications Unit | Renovation and modernization of the Publications Unit office/ Stores | Redesign layout | A functional, staff-friendly workspace conducive to publication work | No. of office areas renovated and upgraded | | | | | 1 | Publication and Publicity Unit |
| | | Refurnish with furniture and storage units | | | | | | | | |
| | | Improve lighting and ventilation | | | | | | | | |
| To develop and improve required infrastructure to facilitate extension activities | Maintenance repairs & development of Office, Guest House, staff quarters and internal roads at TRI Deniyaya Regional Center | Repairing of buildings | Office<br>Guest House<br>OIC Quarters<br>Driver Quarters<br>EO quarters<br>Vehicle garage<br>Soil shade for Nursery<br>Fence | No. of buildings/fence repaired | Fence | GH<br>Office<br>Soil shade<br>Fence | OIC Quarters<br>Driver Quarters | Vehicle garage | EO quarters | Advisory & Extension Center, Deniyaya |
| | | Repairing internal roads | From office to Dalu maduwa | No. of km repaired | 1km | | | | | |
| | | Construct MA quarters | Quarters constructed | No. of Quarters constructed | | | 1 | | | |
| To develop and enhance the necessary infrastructure to ensure the smooth implementation of advisory and extension services | Maintenance repairs & development of office building and office bathroom at TRI Matugama Regional Center | Partitioning the OIC and EO Rooms | Partitioned OIC and EO room | No of Partitioned OIC and EO room | | 1 | | | | Advisory & Extension Center, Mathugama |
| | | Repair and renovation of office doors and windows | Repaired and renovated office bathroom | No, of buildings repaired | | 1 | | | | |
| | | Repair and renovation of office bathroom | Repaired and renovated office doors and windows | No. of office doors and windows repaired and renovated | | | Doors 05<br>Windows 05 | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To develop and improve required infrastructure to facilitate technology dissemination in Uva Region | Maintenance repairs & development of laboratory, buildings, road and Nursery of the Uva Extension Center | Upgrading soil Laboratory | Upgraded / repaired laboratories | No. of Laboratory service upgrade | 1 | | | | | Advisory & Extension center, Passara |
| | | Repairing / Upgrading of office building | Repairing / Upgraded Office Building | No. office buildings repaired/lavatory established | | 1/1' | | | | |
| | | Upgrading of Nursery and tools store room | Nursery and tools store room upgraded | No. of Nursery and tools room upgraded | | | 1/1' | | | |
| | | Repairing D type quarters | Repaired D type quarters | No. of buildings repaired | | | | 2 | | |
| | | Repairing internal roads | Repaired internal roads | Number of km of internal roads repaired | | | | | 1.2km | |
| Infrastructure & Security | | Entrance Road Repair | Road repaired | % Completion | 20% | 80% | - | - | - | Research & Advisory & Extension center, Hantane |
| | | Fencing | Fence constructed | % Completion | - | 50% | 50% | - | - | |
| | | Vehicle Fleet Replacement | Vehicles replaced | No. of new vehicles acquired | | 1 | 1 | 1 | 1 | |
| | | Surveillance System | Surveillance System installed | % Installation | | 50% | 100% | | | |
| | | Main Entrance Board | Name board | % Completion | 80% | 20% | | | | |
| Commercial Activities | | Auditorium Renovation | Wi-Fi connected | % Completion + Wi-Fi | - | 100% | | | | |
| | | Guesthouse Renovation | Guesthouse Renovated | % Completion | - | 100% | | | | |
| To improve soil qualities | Replanting 04ha at Field No.07 | Rehabilitation with CO-3 | | | 4.0ha | | | | | Kottawa Extension Center |
| To increase the plucking area | | Replanting tea | | | | 4.0ha | | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Replace the old and unproductive debilitated teas | Replanting 2.0 ha at Field Nos.01, 02, 03 & 06 | | | | | 0.5ha | 1.0ha | 0.5ha | | |
| Conservation of soil and enhance the productivity of tea fields | Soil conservation with rubble paved leader drains and stone terraces | Paving the leader drains | | | | 700ft (linear) | 800ft (linear) | 800ft (linear) | | |
| | | Construction of stone terraces | | | | 370 (linear) | 430 (linear) | 430 (linear) | | |
| Enhance the productivity of tea fields | Establishment of shade plants as infilling for required places | Planting of medium and high shade plants | | | 50 | 200 | 150 | 100 | | |
| | Infrastructure development | Renovation of buildings, specially colour washing & repairing | | | 3 buildings (ceiling repair) | 2 staff qtrs. (colour washing and repair) | 3 staff qtrs. (colour washing and repair) | 2 staff qtrs. (colour washing and repair | | |
| | Supply drinking water | Reconstruction of Retention wall for well | | | | 400sqft | | | | |
| Protect the nursery soil | Building of a permanent soil shed for the nursery | Building of the soil shed | | | | 120sqft | | | | |
| Use replanting and demonstrations | Purchasing of machinery | Purchase Holing machine for digging planting holes | | | | 1 | | | | |

GOAL 3

# STRATEGIC PLANS OF THE SUPPORTIVE DIVISIONS

# 2025-2029

To develop and maintain a better working environment in the Institute, by improving the standard of laboratories and through appropriate changes in research & extension centers, to retain staff of a high standard and to implement performance-based merit schemes, applicable to all staff for effective undertaking of R & D activities and technology transfer.

## 10.2. Strategic Plans of the Supportive Divisions

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Research monitoring & evaluation | Research Management | Tea Research Board meeting | Meetings conducted | No. of meetings conducted | 10 | 10 | 10 | 10 | 10 | Chairman/ Director |
| | | Consultative Committee on Research | Meetings conducted | No. of meetings conducted | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | Chairman/ Director/ DDR (T)/ DDR(P) |
| | | Consultative Committee on Estate | Meetings conducted | No. of meetings conducted | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | Chairman/ Director/ DDR (T)/ DDR(P) |
| | | Audit & Management | Meetings conducted | No. of meetings conducted | 3/4 | 3/4 | 3/4 | 3/4 | 3/4 | Chairman/ Director/ SA |
| | | Scientific Advisory Committee | Meetings conducted | No. of meetings conducted | 6 | 6 | 6 | 6 | 6 | Chairman/ Director/ DDR (T)/ DDR(P) |
| | | Internal progress review | Meetings conducted | No. of meetings conducted | 20 | 20 | 20 | 20 | 20 | DDR (T)/ DDR(P) |
| | | Progress review by respective Head of the Division | Meetings conducted | No. of meetings conducted | 12 | 12 | 12 | 12 | 12 | HOD |

| Objectives | Program/ Project | Activities | Output/Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To support the institutes to achieve its goals through effective administrative assistance | Providing efficient and effective Administrative assistance as per the government regulations & institute's MOP | Provides essential services, adhere to Institute guidelines and align government circulars and the Institute's MOP | Administrative assistance provided | % completion of administrative assistance provided | 100% | 100% | 100% | 100% | 100 % | Administration Division |
| | | Ensure alignment between HR actions and organizational goals. | | | | | | | | |
| | | Prioritize initiatives for effectively attracting, motivating, Training & Development and retaining employee | | | | | | | | |
| Enhancing the living and working standards of the Institute | Upgrade the infrastructure facilities of the institute | Upgrading office premises, maintaining water facilities and electricity facilities & improving accommodation facilities. | Infrastructure facilities upgraded | % completion of infrastructural facilities upgraded | 100% | 100% | 100% | 100% | 100 % | Engineering Division |
| Assisting institutes for financial governance as per the financial regulations | Carrying out financial activities | Submission of Annul Accounts | Annual accounts submitted | % completion | 100% | 100% | 100% | 100% | 100 % | Finance Division |
| | | Completion of BOS | BOS completed | % completion | 100% | 100% | 100% | 100% | 100 % | |
| | | Annual stock verification | Annual stock verifications completed | % completion | 100% | 100% | 100% | 100% | 100 % | |
| | | Annual financial accounts | Annual financial accounts completed | % completion | 100% | 100% | 100% | 100% | 100 % | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Implementation of MIS software for TRI to save time, resources & money. | Implementation & maintenance of Information Resource Management System (MIS) | Simple data entry, automation of tasks, fast processes, improved data accessibility, various reporting, facilitates data analysis & easy decision making. | MIS implemented | No. of MIS implemented with 8 modules | 1 | | | | | ICT Unit |
| | | Escalate change requests and system errors to the developer and proper coordination with them to get problems resolved (as per the requests of MIS users). | Requests attended | No. of requests attended | 200 | 200 | 200 | 100 | 100 | |
| | | Integrate other essential modules to the system Provident Fund, Research management etc. | Module integrated | No of modules integrated | | | 1 | 1 | 1 | |
| Development/Content updating of the websites with latest technologies generated and new findings to stakeholders in a user-friendly manner with latest technology, to transmit the services. | Upgrading TRI websites | Maintenance of TRI Website as more informative & user friendly | Contents updated | No. of content updates | 80 | 60 | 60 | 80 | 100 | |
| | | Development and launching new website with revamped contents (aiming centenary celebration of TRI in 2025 and integrating new technologies in 2028 to suit to website users, devices) | Websites developed/updated | No. of websites updated | 1 | | | | 1 | |
| Maintain all information in single source (equipment & accessories are receiving on request of other divisions). | Improving ICT facilities | Inventorying all Computers, ICT equipment & accessories | Equipment & accessories inventoried | No. of equipment & accessories inventories | 12 | 12 | 16 | 16 | 16 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Effective & updated LAN with major maintenance jobs | Improving ICT facilities | Maintenance & improvement of TRI LAN, Computers & other ICT equipment | Maintenance jobs attended | No. of major maintenance jobs attended | 60 | 60 | 80 | 80 | 80 | ICT Unit |
| Undertake on-call jobs to facilitate, managing & sharing research data & quick access to other information sources. | | Provide Internet, email, file & anti-virus server facility for TRI staff | On-call jobs attended | No. of on-call jobs attended | 240 | 240 | 300 | 300 | 300 | |
| Facilitate online meetings to conduct and/or participate to management and officers | | Operating online video conferencing facilities | Online meetings operated | No. of Online meeting operated | 160 | 160 | 200 | 200 | 200 | |
| Publishing High-Quality Institutional Publications (Print & Digital) | Development of the Materials (Print / Digital / Digitized) : PPP/ Publications and Publicity Unit | Publishing of extension materials (on request of R&D Divisions) | Materials published | No. of print materials published | 2 | 2 | 2 | 2 | 2 | PPP/ Publication & Publicity Unit |
| | | Publishing of Reprints / Editions of publications | Books edited/ reprinted | No. of print books (Editions / Reprints) | 5 | 5 | 5 | 5 | 5 | |
| | | Development of e-publications materials | E - publications developed | No. of e-publications developed | 2 | 3 | 4 | 5 | 5 | |
| Timely Annual & Periodical Publications: PPP/ Publications and Publicity Unit | Annual & Periodical Publications | Annual Reports | Annual reports published | Timely publishing of AR in tri-language | 3 | 3 | 3 | 3 | 3 | |
| | | Tea Bulletin | Tea Bulletins published | No. of volumes published | 1 | 1 | 1 | 1 | 1 | |
| | | TRI Update | TRI Update published | No. of issues published | 1 | 1 | 1 | 1 | 1 | |
| | | Tae Thathu | Tae Thathu published | No. of issues published | 1 | 1 | 1 | 1 | 1 | |
| | | Publishing of SLJTS to SLJOL | Articles reviewed | No. of Articles reviewed<br>No. of volumes published | 1 | 1 | 1 | 1 | 1 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Tri-Language Documentation & Translation: PPP/ Publications and Publicity Unit | Tri-Language documentations | TRI Recommendations: Advisory Circulars/ Guidelines/ Notes | Publications distributed | No. of publications / No. of distributions | 1 | 1 | 1 | 1 | 1 | Publication & Publicity Unit |
| | | Translations of documents / materials | Documents translated | No. of documents/ reports translated | 2 | 2 | 2 | 2 | 2 | |
| Enhanced Publication Sales (Online & In-person): Publications and Publicity Unit | Sales of the Institutional Publications | In-person sales | Publications sold | No. of sales | 35 | 45 | 55 | 65 | 75 | |
| | | Online sales (payment gateway) | Publications sold online | No. of sales through online | 10 (via FB/ WhatsApp) | 25 (via FB/ WhatsApp) | 35 (via web store) | 45 (via web store) | 55 (via web store) | |
| Publicity | Digital Content Development & Marketing: Publications and Publicity Unit | Designing of FB post/E-flyers | FB posted | No. of FB posts (Events/ R&D info/Other) | 24 | 36 | 36 | 36 | 36 | |
| | | Blog post creation (for website) | Blog posts published | No. of blog posts published | - | 4 | 8 | 8 | 8 | |
| | | Facebook engagement & growth | FB updated | No. of FB updates / No. of followers growth | 24 updates / 10% increase | 36 updates / 10% increase | 36 updates / 10% increase | 36 updates / 10% increase | 36 updates / 10% increase | |
| | | Webpage updates | Webpage updated | No. of updates (Quarterly) | 4 | 4 | 4 | 4 | 4 | |
| Media Publicity | Media Relations & Publicity | Print media publicity | Paper articles printed | No. of paper articles | 2 | 2 | 2 | 2 | 2 | |
| | | TV/Radio events | Media events conducted | No. of media events | 2 | 2 | 2 | 2 | 2 | |
| | | Social media campaigns (paid promotions) | Targeted campaign conducted | No. of targeted campaigns run | 1 | 2 | 3 | 4 | 4 | |
| | | Blog posts (cross-promotion) | Blog posts done | No. of blog posts linked/cross-posted | 1 | 2 | 3 | 4 | 5 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Archives of the Publications | Institutional Repository | Digital publications archives | Publications updated | No. of digital publications updated | | | X | X | X | Publications and Publicity Unit, TRI Library, ICT Unit, NSF |
| R&D Progress Reporting and Operational Support | Reporting | Assisting Institutional events with printing | Documents printed | No. of handouts / documents printed | 5 | 5 | 5 | 5 | 5 | Publications and Publicity Unit |
| | | Assisting Training Program with printing | Certificates printed | No. of certificates printed | 5 | 5 | 5 | 5 | 5 | |
| | | Duplications of documents (In-house) | Printing jobs completed | No. of printing jobs completed | 10 | 10 | 10 | 10 | 10 | |
| | | Compilation of Progress reports | Reports compiled | No. of reports compiled | 3 | 3 | 3 | 3 | 3 | |
| | | Maintenance of photograph database | Database updated | Updates to the database | 4 | 4 | 4 | 4 | 4 | |
| | | Any other assignments | Assignments completed | No. of assignments completed / No. of events assisted | 5 | 5 | 5 | 5 | 5 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To compliance with the rules and regulations and strengthening of internal control system | Reviewing & Auditing | Reviewing the progress of implementation of the recommendations of the Auditor General's reports & conducting TRI AMC & IA meetings | Reviewing & auditing completed | % completion of reviewing & auditing | 100% | 100% | 100% | 100% | 100% | Internal Audit Unit |
| | | Auditing fixed assets inventories & stocks, vehicle & transport activities, utilization of resources (plant, machinery & equipment, research project progress, MIS/Analytical charges software/estate accounting systems, receipts, payments & advances, accounts & financial statements, estate activities, substation activities | | | | | | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Targets |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2025 | 2025 | 2025 | 2025 | |
| Land utilization | Establish a tea plot demonstrating motorized tea harvesting | Motorized tea harvesting demonstration plot | Tea cultivation / maintenance | Tea cultivated | 15 | 55 | 15 | 15 | | Research, Advisory & Extension Center, Rathnapura |
| Income generation | | | Demonstration Programs | (% completed) | | | | | | |
| Education/farmer training | | | | Tea yield increase (%) | | 20 | 30 | 50 | | |
| Study on crop growth | | | Field demonstrations | (% completed) | | | 5 | 5 | | |
| Land utilization | Establish a tea plot demonstrating motorized tea harvesting | Motorized tea harvesting demonstration plot | Tea cultivation / maintenance | Tea cultivated | 15 | 55 | 15 | 15 | | |
| Income generation | | | Demonstration Programs conducted | (% completed) | | | | | | |
| Education/farmer training | | | | Tea yield increase (%) | | 20 | 30 | 50 | | |
| Advisory and Extension | Farmer education and training | Advisory visits/training Programs | Farmers with knowledge on tea cultivation Strengthen | No. of advisory/training Programs conducted | 100 | 100 | 100 | 100 | | |
| Soil Analytical service | Analyze and give information to the farmers about the status of their tea soil | Soil analytical service | Soil samples analyzed for soil status for a better tea cultivation | No. of samples analyzed | 1200 | 1200 | 1500 | 1500 | | |
| | Strengthening staff facility to uplift the service | Increase the number of staff in SPND Rathnapura unit | Staff facility strengthen to uplift the analytical services | Staff added new | | 1 | 1 | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Targets |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| Supply of planting material | Expand the mother bush areas | Mother bush establishment and maintenance | Planting material supplied for growers | Area established (ha) | 2 | 3 | | | | |
| | Issuing of cutting to growers | Issue of cuttings for farmers for planting | | Number of cuttings issued | 3 million | 3.5 million | 5 million | 5 million | | |
| | Give information about planting material to growers to link buyers and suppliers | Mother bush site network | Information about available planting material distributed among growers | No. of (Facebook) pages created (one site continues) | 1 | 1 | 1 | 1 | | |
| To Improvement of infrastructure facilities | Renovation of Infrastructure (Buildings) to prevent costly major repairs. | Renovation and color washing of building structures. | Buildings renovated<br>Damages repaired | Number of buildings completed | 2 | 15 | 10 | 3 | | |
| | Renovation of infrastructure facilities (roads) | Tarring and repairing of the inner road system | Improved road system | Extent tarred/ repaired | 10 | 30 | 30 | 30 | | |
| | | | Research and advisory extension services and the staff/workers facilitated | (% completed) | | | | | | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To Improve working environment for R & D activities at TRI Mid Country Research, Advisory and Extension Centre | Planting Material | Mother Bush Infilling | Extent infilled | No. of Hectares (cumulative) infilled (3.1 ha) | 3 | 0.7 | 0.7 | 0.7 | 0.7 | Research, Advisory & Extension Center, Hantana |
| | | Mother Bush replanting (GL 395) | Mother bushes replanted | No. of ha replanted (1.4ha cumulative) | 0.4 | 0.4 | 0.5 | | | |
| | | Nursery Plant Production | Nursery plant produced | No. of plants (target 75,000/season) | 40000 | 75000 | 75000 | 75000 | 75000 | |
| | | Cuttings Distribution | Cuttings distributed | No. of cuttings (target 1,000,000) | 500000 | 600000 | 700000 | 800000 | 1000000 | |
| | | New Check-Roll Workers | Workers recruited/trained | No. of workers recruited & trained | 5 | 5 | | | | |
| | Advisory & Extension | Training Programs | Training Programs conducted | No. of training Programs (target 20/year | 10 | 15 | 20 | 20 | 20 | |
| | | Field Visits | Fields visited | No. of field visits (target 50/year) | | | | | | |
| | | Digital Outreach | SMS/voice message released | SMS/Voice Message campaigns status | 50 | 50 | 50 | 50 | 50 | |
| | Analytical Services | Soil & Fertilizer Testing | Staff time reported | Report time (days) & staff | <14 days, 1 staff | <10 days, 1 staff | <7 days, 1 staff 100% | <7 days Sustained 100% | <5 days | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To Improve working environment for R & D activities at TRI Mid Country Research, Advisory and Extension Centre | Analytical Services | Entomology/Nematology Re-establishment | Reopened division | Division reopened, staff, facility | Initial g | 50% Staff | Operational 50% Staff | | Sustained | Research, Advisory & Extension Center, Hantana |
| | | Plant Pathology Establishment | Division established | Division established, staff recruited | Setup Planning | Initial Setup | | Operational | Sustained | |
| | Infrastructure & Security | Entrance Road Repair | Road repaired | % Completion | 20% | 80% | | | | |
| | | Fencing | Completed fencing | % Completion | | 50% | 50% | | | |
| | | Vehicle Fleet Replacement | Vehicles acquired | No. of new vehicles acquired | | 1 | 1 | 1 | 1 | |
| | | Surveillance System | Systems installed | % Installation | | 50% | 100% | | | |
| | | Main Entrance Board | Entrance Boards installed | % Completion | 80% | 20% | | | | |
| | Demonstration & Tourism | Demonstration Blocks (Existing fields 4.4 ha) | Established demonstration blocks | Hectares established | 0.4 | | | | | |
| | | General Maintenance | Workers recruited/trained | FO and Workers recruitment | Completion | on going | on going | on going | on going | |
| | Commercial Activities | Auditorium Renovation | Auditorium renovated | % Completion + Wi-Fi | | 100% | | | | |
| | | Guesthouse Renovation | Guests renovated | % Completion | | 100% | | | | |
| | | Auditorium Rental Income | Revenue received | Revenue (LKR) | 100000 | 250000 | 500000 | 500000 | 500000 | |
| | | Yield Improvement | Yield improved | Avg. Kg/GL/Yr (target 22,000) | 17000 | 18000 | 19000 | 20000 | 22000 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To improve soil qualities | Replanting in Field No. 07 | Rehabilitation with CO-3 | Extent replanted | No. of ha replanted | 4 ha | | | | | Advisory & Extension center, Kottawa |
| To increase the plucking area | | Replanting tea | | | | 4 ha | | | | |
| Replace the old and unproductive debilitated teas | Replanting 2.0 ha at Field Nos.01, 02, 03 & 06 | Replanting tea | Extent replanted | No. of ha replanted | | 0.5ha | 1.0ha | 0.5ha | | |
| Conservation of soil and enhance the productivity of tea fields | Soil conservation with rubble paved leader drains and stone terraces | Paving the leader drains | Leader drains constructed | Length of leader drains constructed | | 700ft (linear) | 800ft (linear) | 800ft (linear) | | |
| | | Construction of stone terraces | Stone terraces constructed | Length of stone terraces constructed | | 370 (linear) | 430 (linear) | 430 (linear) | | |
| Enhance the productivity of tea fields | Establishment of shade plants as infilling for required places | Planting of medium and high shade plants | Medium & high shade trees planted | No. of shade trees planted | 50 | 200 | 150 | 100 | | |
| To improve working environment for R & D activities at TRI Mathugama | Training/Awareness/Educational Programs | Conduct training Programs | Trainings Programs conducted | No. of training Programs | 12 | 20 | 20 | 20 | 20 | Advisory & Extension center, Mathugama |
| | Soil pH Analysis | Analyze soil samples | Soil pH analyzed | No. of samples analyzed | 90 | 90 | 90 | 90 | 90 | |
| | Advisory Field diagnosis visits | Advisory visits | Advisory fields diagnosed | No. of field diagnosed | 58 | 60 | 60 | 60 | 60 | |
| | Commercial Nursery Inspection | Inspect commercial nurseries | Commercial nurseries inspected | No. of nurseries inspected | 10 | 10 | 10 | 10 | 10 | |

| Objectives | Program/ Project | Activities | Output/ Outcome | Key Performance Indicators | Targets | | | | | Division |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2025 | 2026 | 2027 | 2028 | 2029 | |
| To improve working environment for R & D activities at TRI Mathugama | Mini Crop clinic/ Crop clinic/ Exhibitions | Conduct Exhibitions | Mini crop exhibited | No. of exhibitions conducted | 8 | 8 | 8 | 8 | 8 | Advisory & Extension center, Mathugama |
| | RTEF and RSC Programs | Conduct training Programs | RTEF and RSC Programs conducted | No. of Programs conducted | 3 | 3 | 3 | 3 | 3 | |
| | Tea Factory base Extension Programs | Conduct training Programs | Tea Factory base Extension Programs conducted | No. of extensions Programs conducted | 12 | 12 | 12 | 12 | 12 | |
| | Internal and Outside meetings | Conduct meetings | Internal and Outside meetings conducted | No. of meetings | 42 | 42 | 42 | 42 | 42 | |
| | Seed Garden Project and Mother bush project visits | Organize visits | Seed Garden project and mother bush project visited | No. of visits | 24 | 24 | 24 | 24 | 24 | |
| | Other Visits | | Visits conducted | | 5 | 5 | 5 | 5 | 5 | |

