

## Keynote Address

### 225<sup>th</sup> Experiments and Extension Forum

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Tea Research Institute of Sri Lanka

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## Corporate Plan

### Tea Research Institute

### 2013-2017

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Tea Research Institute of Sri Lanka

## Major Issues in the Tea Industry

- High COP which cannot negate the existing NSA
- High cost component on workers due to wage hikes and other social costs
- High input costs: agro-chemicals, machinery, fuel etc.,
- Low productivity in all tea growing regions
- Ageing of tea and expansion of uneconomical tea lands due to poor replanting rate
- Worker Shortage
- Climate Change



## Major Issues in the Tea Industry contd...,

- Meeting energy requirements
- Food safety and hygiene protocols - commodity to a beverage
- Mandatory certifications - for production and processing to satisfy International food, environment and worker safety requirements
- Convenience Factor
- To increase our share in the international market

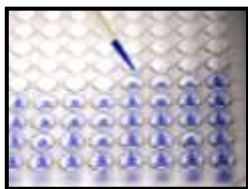


## Key Areas for Research

1. Crop Improvement
2. Land Productivity Improvement
3. Impacts of Climate Change, Adaptation & Mitigation
4. Mechanization of Field Practices
5. Nursery Management Techniques
6. Crop Management
7. Tea Processing Technology
8. Made Tea Quality Improvement
9. Value Added Tea Production
10. Health Benefits of Tea
11. Resource Planning
12. Services to Stakeholders



## 1. Crop Improvement



## 1. Crop Improvement

R&D activities are focused on incorporating desirable attributes in to existing cultivars, to increase growers' acceptability and meet the diverse needs of end users

- i. Breeding of new tea cultivars to improve productivity, quality and to face emerging challenges*
- ii. Application of molecular technology to support genetic conservation & improvement of tea*



## 1. Crop Improvement

- i). Breeding of new tea cultivars to improve productivity, quality and to face emerging challenges*

### Ongoing Research Projects

#### Thrust A1 - A 5

Development of high yielding cultivars with a yield potential of 4500 kg made tea per hectare for three AERs in the up country with high quality and resistance to BB, SHB, *Poria*, nematodes and collar canker

Development of high yielding cultivars with yield potential of 5000 kg made tea per hectare for the AERs in the mid country (wet zone) with high quality and resistance to drought SHB, BB, stem canker and nematodes

Development of high yielding cultivars with yield potential of 5000 kg made tea per hectare for the AERs in the mid country (dry zone) with quality and resistance to drought SHB, BB, stem canker and nematodes

Development of high yielding cultivars with yield potential of 7000 kg made tea per hectare for the in the low country (AERs ), resistance to drought LCLWT, SHB, stem canker and nematodes

Development of bi clonal and poly clonal seed cultivars for drought prone areas in different tea growing regions having a commercial yield of 2500 kg made tea per hectare and with resistance/tolerance to drought, SHB, ULWT, BB, canker and *Poria*



## 1. Crop Improvement *contd...*

*ii). Application of molecular technology to support genetic conservation & improvement of tea*

### Ongoing Research Projects

#### Application of molecular technology to support genetic conservation and improvement of tea

Genetic diversity & conservation studies

a. Genetic diversity of improved tea cultivars/seedling teas



b. Development of linked marker for Blister Blight to support genetic Improvement of Tea



*i). Breeding of new tea cultivars to improve productivity, quality and to face emerging challenges *contd...**

### New Research Projects

1. Development of a holistic approach in germplasm conservation, characterization and evaluation to enhance its rational utilization in tea breeding program
2. Establish a mechanism to multiply and disseminate quality planting materials of newly developed tea cultivars as well as improved seed materials and implementing quality certification systems
3. Development (screening) of tea cultivars specifically suitable for small growers who cannot afford to use high input or modern agricultural practices
4. Metabolite Profiling of tea germplasm of Sri Lanka



## 2. Land Productivity Improvement



## 2. Land Productivity Improvement

R&D address the increasing productivity through soil fertility improvement & agronomic practices

- i. Integrated approach to soil fertility management*
- ii. Improvement of land productivity through agronomic practices*



## 2. Land Productivity Improvement *contd...*, i). *Integrated approach to soil fertility management*

### Ongoing Research Projects

#### Thrust A15.

Development of regional (AERs) and/or site-specific fertilizer recommendations

Evaluating bio-film technology (a combination of bacterial and fungal usage) on soil fertility improvement in tea lands

Assessing buffering capacities of soils in the tea growing regions characterized up to series levels to refine the present method of dolomitic–limestone recommendation

### New Research Projects

1. Development/ Evaluation of economically viable slow releasing fertilizer for N,P,K and Mg
2. Introduction of micro nutrient fortified foliar formulation based on micro nutrient status in tea growing soil
3. Ascertaining mineral, nutrient, carbon, heavy metal and metalloid stocks in tea lands in Sri Lanka



## 2. Land Productivity Improvement *contd...*, ii). *Improvement of land productivity through agronomic practices*

A10. Evaluation of in-situ establishment and growth performances of various plant species within tea inter rows before uprooting, grass species and soil quality index as an alternative to soil rehabilitation techniques

A19. Development of water management techniques for young and mature tea in drought-prone areas to minimize casualties and enhance yield

A34. Development of shade management strategies for different regions

Investigating the compatibility of stock and scion for grafting on high quality and productivity of tea

### New Research Projects

1. Investigation of feasibility of reducing the time period for reconditioning soil with grasses through Bio Film Biofertiliser (BFBF) before replanting



### 3. Impacts of Climatic Change Adaptation & Mitigation Strategies



### 3. Impacts of Climatic Change, Adaptation & Mitigation Strategies

A50. Assessment of the impact of global climate change on productivity and profitability of the tea industry

1 Assessing the impact of climate change on current agronomic practices

2 Development of drought-forecasting models

#### New Research Projects

Analysis of climate change, identifying vulnerable tea growing regions and seasonal weather forecasting for different tea growing regions in Sri Lanka

Use of molecular approaches towards development of cultivars resistance to biotic and abiotic stresses





## 4. Mechanization of Field Practices



## 4. Mechanization of Field Practices

### *i). Developing, modifying & evaluating of harvesting devices*

**A20.** Development of appropriate mechanical devices and agronomic practices to overcome labour shortage

#### **New Research Projects**

An In-depth investigation on the response of physiology, growth, yield and shoot characteristics of tea (*Camellia sinensis*) to mechanical harvesting



## 5. Nursery Management Techniques



## 5. Nursery Management Techniques

### New Research Projects

#### 1. Development of nursery management techniques

Modify current nursery management techniques eg. Nursery media/Fertiliser/shade material/ type of polythene/bag size/irrigation techniques etc., as per the latest technology developments



## 6. Crop Management



## 6. Crop Management

*i). Integrated crop protection approaches to minimize economical damage & address health, safety & environmental issues*

- A22. Development of cost-effective control methods for integrated management of SHB**
- A23. Development of integrated management strategies to control major tea diseases**
- A24. Development of integrated weed management strategies in tea**
- A45. Development of cost-effective control methods for integrated management of nematode pests in tea**
- A32 Development of sustainable organic & other farming systems for tea**



## 6. Crop Management

- i). Integrated crop protection approaches to minimize economical damage & address health, safety & environmental issues*

### New Research Projects

1. Development of improved formulations of Plant Protection Products (PPPs) to enhance pest control efficacy, environment, worker and product safety
2. Use of plant induced resistance for controlling tea blister blight



## 7. Tea Processing Technology



## 7. Tea Processing Technology

### *i). Development & improvement of tea machinery and factory conditions*

#### New Research Projects

1. Investigation on IR and fluidized bed drying in relation to quality and cost against normal fluidized bed drying
2. Development of an effective monitoring and control system for fluidized bed drying of orthodox rotorvane teas
3. Investigation on preventing of moisture absorption of teas at different stages in low country grading process
5. Removal of stalks before firing in low grown tea processing



## 7. Tea Processing Technology contd...,

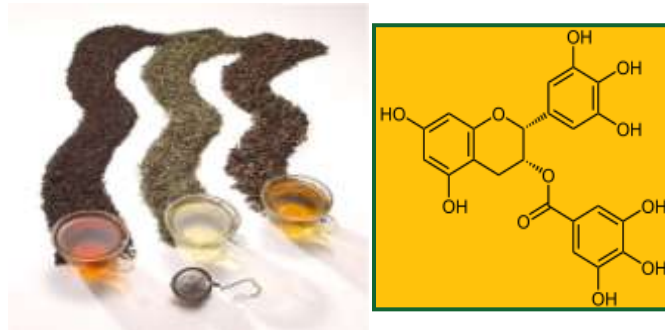
### *ii). Development/evaluation of alternative energy sources in tea processing*

#### **Thrust A42.**

**Development of economically viable systems for energy plantations as supplementary sources of energy and green manure**



## 8. Made Tea Quality Improvement



## 8. Made Tea Quality Improvement

### New Research Projects

1. Factors influencing polyphenol content and studies on developing polyphenol enriched black tea
2. Effect of tea micro nutrients on quality & flavor parameters
3. Simple techniques to identify adulterated black tea in the market



## 9. Value Added Tea Products



## 9. Value Added Tea Products

### *i). Value addition, new product development and product diversification*

#### **A30. Development of value added tea products**

- 1.Improving the process for instant black tea production
- 2.Optimizing the liquid tea-concentrate production process for commercialization
- 3.Optimizing the alcoholic tea beverage production process for commercialization
- 4.Optimizing polyphenol extraction from tea for commercialization
5. Extraction of protein from spent tea leaf



## 9. Value Added Tea Products

### i). Value addition, new product development and product diversification

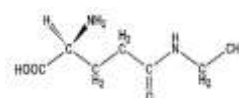
#### New Research Projects

1. Development of high quality instant milk tea mixture for vending machine
2. Preparation of a stabilized catechin mixture and other natural products from tea leaves for cosmetic applications



## 10. Health Benefits of Tea

Brain Waves	Frequency	Mental Condition
$\delta$ -wave	0.5~3Hz	Sound sleep
$\theta$ -wave	4~7Hz	Daze sleep
$\alpha$ -wave	8~13Hz	Awake, relaxation
$\beta$ -wave	14Hz~	Awake, excitation





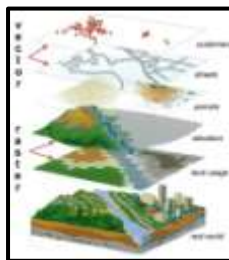
## 10. Health Benefits of Tea

### New Research Projects

1. Assessment of health benefits of Theanine in tea
2. Establishment of antioxidant activities of different types of Sri Lankan teas



## 11. Resource Planning



## 11. Resource Planning

### *On going projects:*

#### *i). Socio-economic studies*

**A31** Identification of socio-economic measures to overcome a shortage of workers in the tea sector in different regions

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

**A49** Mapping of tea lands in Sri Lanka, Establishing & maintaining a micro level tea information system

#### *iii). Micro & Macro – economic analysis*

**A41** Analysing the impact of economic policies on the tea sector

#### *iv). Assess the adaptation of TRI Recommendations by growers*

**A37** Assessment of adaption of TRI recommendation and examination of grower practices



### *iii). Micro & Macro – economic analysis*

#### **New Research Projects:**

**B109** Investigation on entrepreneurial behaviour among tea small holders

**B110** Development of a model for out grower system in tea plantation

**B113** Investigation the potential of implementing tea based ecotourism in tea plantations



## 12. Services to Stakeholders



## 12. Services to Stakeholders

### *i). Advisory & Extension Program*

- ✓ Routine Advisory & Extension Activities covering all tea growing districts
- ✓ Monitoring agricultural performance of tea plantations
- ✓ Development of Para extension aides in corporate sector
- ✓ Public-private partnership extension approach
- ✓ **New Development/Extension Projects**
- ✓ Extension and information dissemination strategy for the development of proprietary tea holdings sector
- ✓ Development of TRI Kottawa center as an organization where technical as well as material inputs are made available to the tea growers in southern region
- ✓ Establishment of soil, leaf and fertilizer analytical laboratory at Ratnapura



*Thank you*

