



The Tea Research Institute of Sri Lanka

238th MEETING OF THE EXPERIMENTS AND EXTENSION FORUM
26 July 2019

Opportunities Available for the Tea Industry through Climate Change Mitigation Efforts

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Climate change has become one of the biggest environmental concerns at global, regional and local levels. Carbon dioxide concentration on earth has increased since industrial revolution by about 40 percent and the mean temperature rise since then has reached ~ 1 °C. Human activities since industrial revolution such as fossil fuel burning and land use changes including those for agriculture have led to increased levels of carbon dioxide and other greenhouse gases in the earth's atmosphere. Climate change has affected the agriculture sector including the plantation industry mainly through changes in rainfall patterns, increased temperature, and higher frequency of extreme weather events which have significantly affected crop phenology, physiology, and productivity.

Tea crop is no exception, and soil erosion, increased pressure from pests, and water stress during droughts, etc. have necessitated having proper adaptation practices. Although adaptation is a priority, there is a universal need for mitigation of greenhouse gas emissions throughout the life cycle of tea, starting from plantations to the final product. Given the ambitious goal under the Paris Agreement to limit the temperature rise on earth within the century to 2 °C above the pre-industrial levels, mitigation action at national level has become a mandate.

Industry-level and community level socioeconomic benefits and opportunities that can be reaped through adopting various mitigation measures in tea industry besides reduction of greenhouse gas emissions will be discussed.



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Review on Climate Change Research and Development of Carbon Budget for Tea Plantations

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Recent placement of Sri Lanka at the 2nd place in the global climate risk index 2018 indicates the possibility of occurrence of frequent extreme weather events. Being a rain-fed plantation crop grown in different regions, vulnerability of tea plantations for impacts of climate change would be significant. Taking timely precautions on adaptation and mitigation measures for the reduction of impacts of climate change, is therefore important. This paper will present a review of work done to update the knowledge.

Additionally, paper will present information on carbon budget provisionally developed for tea plantations in view of assuring sustainability of the industry and preparing the greenhouse gas (GHG) inventory for tea plantations under cropland remaining cropland category of Agriculture, Forest and Other Land Use (AFOLU) sector. It was re-confirmed that tea plantations are carbon negative or climate positive. Proper establishment and management of both high and medium shade trees in the plantations will not only enhance physiology of the tea plants resulting higher yield, but also contribute significantly for maintaining negative carbon balance or environmentally positiveness.



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Differential Symptomological Expressions of *Pratylenchus loosi* under Climate Change

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Sri Lankan tea industry experiences climate change with deviations in rainfall, ambient temperature etc. over the past decades. In parallel, unusual spread and damage levels of *Pratylenchus loosi*, the key tea nematode pest were evident in all tea growing regions which could probably governed by soil temperature and moisture for their biology, behavior and distribution.

Therefore, a series of studies was conducted in *P. loosi* infested fields in six locations in Sri Lanka i.e. Cicilton (Balangoda), Delmar (Ragala), Hapugastenna (Ratnapura), Mahadowa (Passara), Nawalapitiya) and Richiland (Deniyaya). The results revealed remarkable increases in mean soil temperature above the optimal range of 18-24 °C for *P. loosi* resulting in different symptomological expressions and damage levels in tea. Contrasting deviations of rainfall and moisture in the six locations have also impacted *P. loosi*. Further, *P. loosi* showed its virulence with potential survival mechanisms and adaptations under such extreme weather conditions which was confirmed as morphometrically different, molecularly divergent *P. loosi* populations.

Unusual *P. loosi* spread and significant damage warrant location-specific nematode management and mitigation strategies for different tea growing regions. Wise use of prophylactic treatments, agronomic and cultural methods would indirectly combat climate change while assuring carbon neutrality.



Bogawantalawa Carbon Neutral Tea

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Carbon neutral status in plantations could be encompassed through maintaining strategies of renewable energy, energy management, plantation forestry, conservation forestry, social forestry, organic farming, use of bio-fertilizers, organic pesticides, water and waste footprint management, sustainable soil development, eco designing and climate action etc. Bogawantalawa Tea Estates PLC (BTE) maintains extremely rigid standards and controls across the company's entire value chain, developed in alignment with United Nations Sustainable Development Goals for shifting towards being a Climate Positive BTE. With the present dilemma the world is facing due to climate change, BTE adopted Climate Smart Agricultural practices to manage adverse effects of climate change while ensuring the environmental sustainability.

Leading the way in sustainability and causing a paradigm shift in green practices, BTE marked a great achievement in being the world's first tea growing, manufacturing and marketing company to attain the 'Uncompensated Carbon Neutral' status for product and facility.

BTE was been recognized at four International Award Ceremonies for best practices demonstrated in environmental sustainability;

1. 'New Sustainable Product' at the Global Sustainability Awards, 7th June 2018, Amsterdam.
2. 'Global Green award Winner' at the International Green Environment Awards, 17th of September 2018, Turkey.
3. 'Sustainability Leadership Award – 2018' at World Sustainability Award Ceremony, 24th October 2018, Jakarta, Indonesia.
4. 'Green Ambassador' at the Apple Awards, 12th November 2018, the Houses of Parliament in Westminster, London.

It is anticipated that BTE would be declared as a 'Climate Positive Company' by the end of this year.