Climate Information for Resilient Tea Production – CI4Tea – Briefing note – Kenya

Introduction

Climate change is a global phenomenon with potential effects at the local level. Future climate projections indicates that mean annual temperature for Kenya may increase by 2.0 to 3.6°C by 2100 (Figure 1), while annual total precipitation may increase by 6-29% by 2100 (Figure 2). Tea, a leading export of Kenya, is highly climate-sensitive, and climate change could affect future tea production and quality. Since tea stakeholders have long planning horizons, it is important to analyse climate change impacts and potential adaptation options at a scale of existing tea plantations and with respect to the aspects of the climate to which tea production and quality is most sensitive.
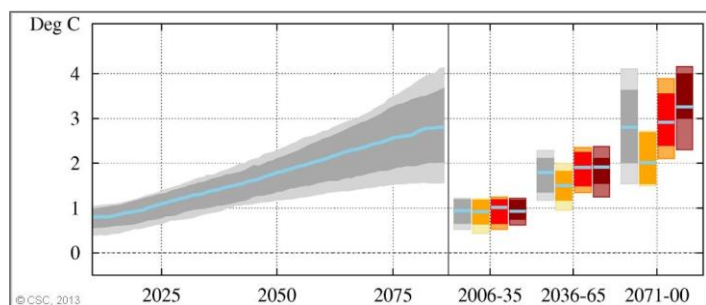

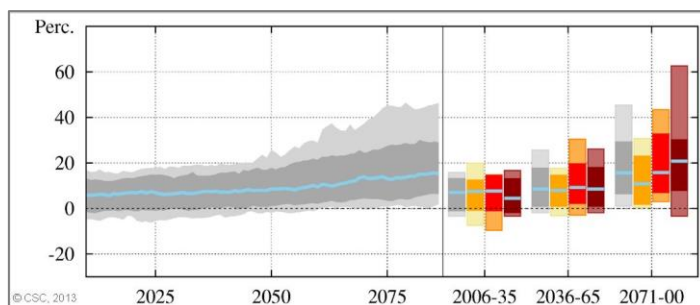Figure 1: Mean annual temperature time series for 2001-2100

Figure 2: Mean annual rainfall time series for 2001-2100

CI4Tea is a research project funded by the UK Natural Environment Research Council (NERC) and the Department for International Development (DFID) under the Future Climate for Africa programme. Working in partnership with tea producers it aims to produce tailored climate information for the tea-producing regions of western Kenya and southern Malawi, and to explore potential adaptation options for supporting medium and long-term planning in the tea sector.

Identified stakeholders in western Kenya

CI4Tea focuses on western Kenya and works with tea sector stakeholders including (to date):

- Tea Research Institute
- Tea Directorate and East African Tea Trade Association
- Tea producers: Kenya Tea Development Agency (KTDA), Kenya Tea Growers Association (KTGA), Williamson Tea, Unilever Tea Kenya Ltd., Sasini Tea, Koisaga Tea Estate Ltd., Eastern Produce Kenya Ltd., Mau Tea Multipurpose Cooperative Society and Nyayo Tea Zones Development Corporation
- County officials from western Kenya

Research approach

- Stage 1: Engage stakeholders for identifying key climate metrics for tea production and quality
- Stage 2: Analyse climate metrics using state-of-the-art climate models
- Stage 3: Use stakeholder feedback to tailor climate information for supporting long-term adaptation
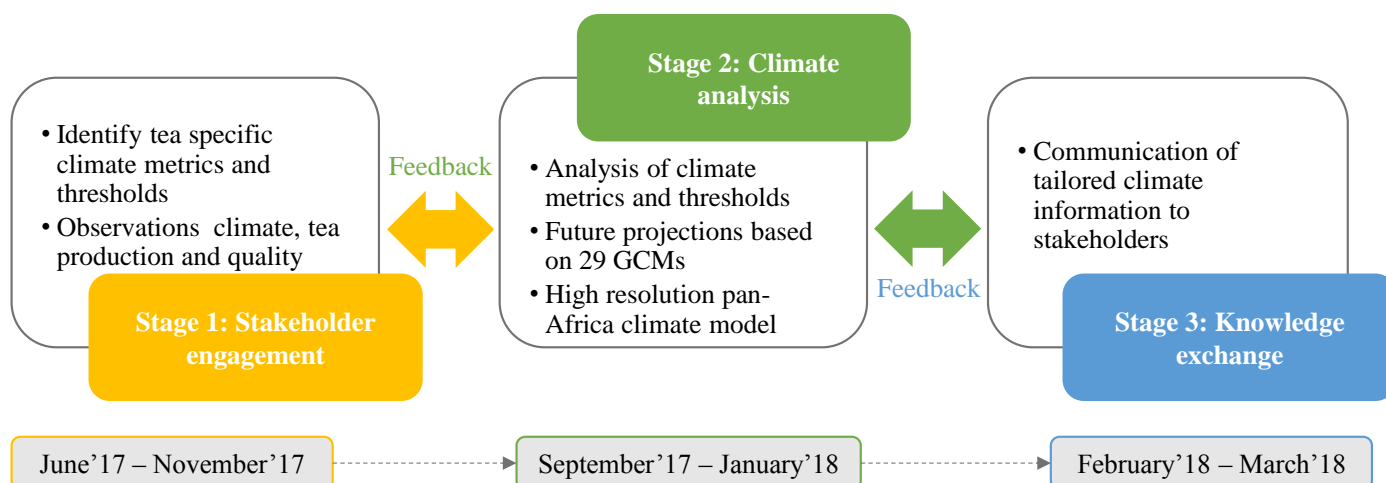

Figure 3: Flow diagram of the project stages and their timeline

Climate information at local scale

To understand potential future changes in temperature and rainfall for tea growing regions in western Kenya:

- We will use CP-4Africa climate model which provides high resolution information at 4.5km.
- We will also use 29 global climate models at 50km resolution to translate climate information to tea estate scale using long-term climate observations from tea estates (Figure 4).
- We will analyse how particular temperature and rainfall thresholds may be exceeded in the future and provide stakeholders with graphical and descriptive information. For example, the tea plant experiences heat stress above 27°C. Figure 5 shows how the number of days above 27°C have increased in the recent past at Timbilil station in Kericho.
- This information will be combined with analysis of historical tea production and quality to determine potential impact of climate change on tea production and quality.

Climate observations at local scale   Future projections at 50 km scale   Future climate at local scale
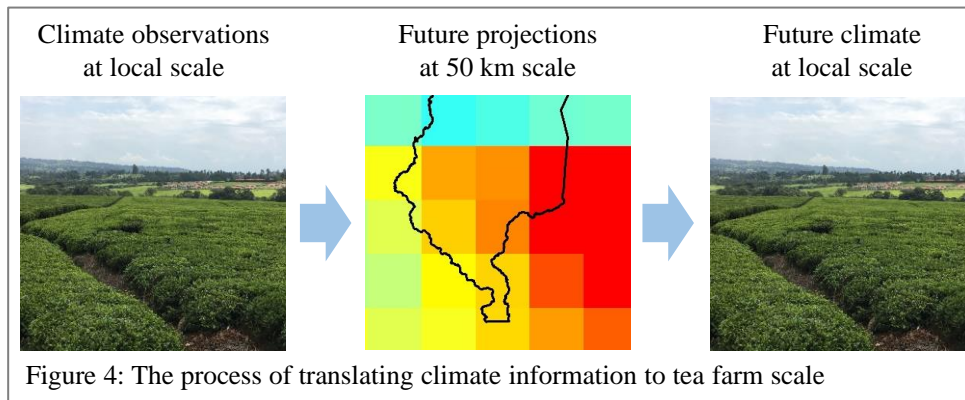
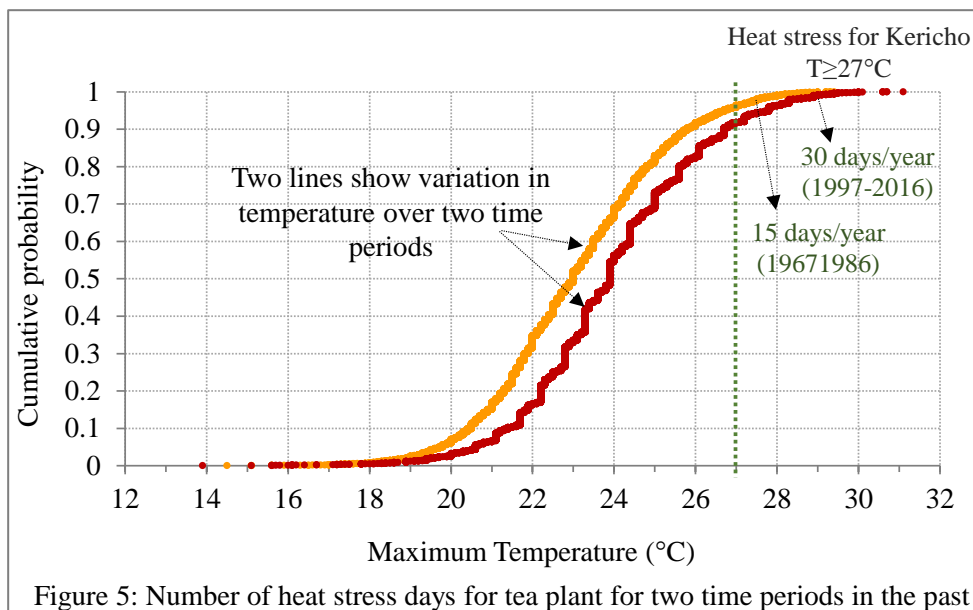Figure 4: The process of translating climate information to tea farm scale

Figure 5: Number of heat stress days for tea plant for two time periods in the past

Outcomes of CI4Tea project

- Information on how future climate change may affect thresholds of temperature and rainfall in different seasons will help stakeholders better understand how future changes could affect tea production and quality.
- Since information will be generated at the tea estate scale, it will help tea producers identify and prioritise adaptation options for existing, replanted or already irrigated areas.
- The medium and long-term climate information will help stakeholders plan at different time horizons while thinking about low regret, immediate or long-term adaptation options and would help inform initiatives for climate change adaptation across the tea sector to improve sustainability.

Information required for next steps

To produce tea estate scale tailored climate information, we will need:

- Detailed information on key thresholds, climate metrics such as consecutive hot days or rainy days that affect tea production and quality for specific seasons or months through our questionnaire.
- Daily long-term (20-30 years) climate observations and daily/monthly production and quality data.

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