

Conducting a climate change health check on temperature thresholds for mango production in the Northern Territory



Working together with the support of industry, the Earth Systems and Climate Change Hub and Northern Territory Department of Primary Industry and Resources used climate change information to gain insight into a potential climate-related vulnerability for mango production in the Northern Territory.

Rising temperatures in mango production areas look set to reduce the number of days that are suitable to trigger flowering in key commercial cultivars. Fewer days will lead to fewer flowers and consequently, fewer fruit.

This project has delivered important information for the Northern Territory mango industry and demonstrated a model for using climate change information to inform decision making.

Why use climate change information?

Increasing concentrations of greenhouse gases in the atmosphere are warming the Earth and causing large-scale changes in the climate system. This means that the climate of the past is no longer a reliable indicator of what to expect in the future.

Climate change science aims to provide some guidance in planning for this uncertain future, with climate change projections providing important indications of the likely range of plausible future climate conditions we will encounter.

First steps: a climate change health check

The Earth Systems and Climate Change Hub's climate change health check is a model for identifying, developing and applying climate change information to inform planning and decision making across a range of situations and sectors. It provides a practical framework for gauging the impact of climate change on a matter of interest.

You can think of a climate change health check like a check-up by your local general practitioner. Most times, the GP can provide you with the information you need to get yourself feeling better. However, if your GP identifies a potentially more serious health problem, a follow-up visit to a medical specialist might be needed.

Similarly, in most instances a climate change health check will provide you with enough information to gauge the impact of climate change on an area of interest or concern. It will flag key climate considerations for use in communication, planning and decision-making activities. It may also flag areas that warrant further attention, in which case the health check will form the starting point for a more detailed impact, vulnerability or risk assessment.

Area of concern: Temperature thresholds for triggering mango flowering

Flowering of mango trees leads to fruit development and determines the timing of harvest. In the Northern Territory, mango flowering is triggered by the arrival of cooler dry season temperatures around April each year. It is promoted by low night time (minimum) temperatures and can be inhibited by high day time (maximum) temperatures.

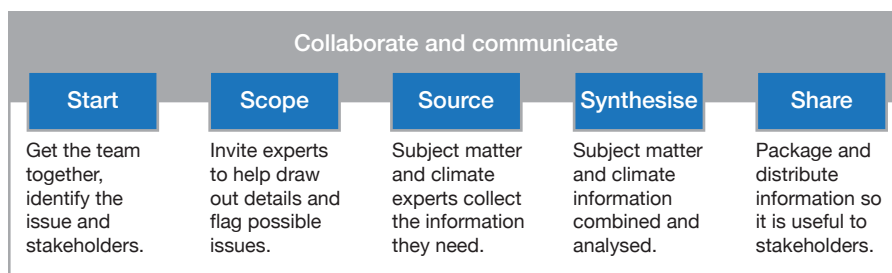
However, maximum and minimum temperatures in the Northern Territory have increased over the past 100 years, and this warming trend is set to continue. When and where will warming see temperature thresholds for flower induction crossed?

Gauging the climate change impacts

The climate change health check was conducted over five stages, underpinned by ongoing collaboration and communication.

Start: A project team comprising mango, climate and knowledge brokering specialists formed to drive the investigation. The team broadly scoped the health check, identified potential subject matter experts and key stakeholders, and drafted a communication and engagement plan to provide a framework for stakeholder engagement.

Scope: Stakeholders and subject matter experts were invited to a workshop convened to clarify the health check scope, review known information and determine information needs. This allowed for determination of appropriate climate variables, emissions scenarios, time steps and time periods for the climate change information that would underpin the health check.



Source: Our climate and mango experts sourced and developed the information that had been identified at the expert workshop. On the mango side, this included information about temperature thresholds for the cultivars identified in the scope. Climate information included both observed climate data and climate change projections.

Synthesise: The project team held a synthesis workshop to discuss the results and how they were coming together. They also discussed implications of the preliminary results and reviewed the project communication and engagement plan.

Share: The project team prepared a full technical report along with a fact sheet summarising assessment results. Other products and activities, including blog posts, articles and presentations, were also delivered to communicate the results to identified and potential stakeholders.

Informing adaptation

As temperature thresholds are crossed, the number of days where flower induction can occur will reduce, with the Darwin region particularly vulnerable in the near future. As time goes on, all growing regions are likely to see a reduced number of inductive days across all cultivars in this study.

Knowing this, mango growers can consider farm-level responses to

reduce their vulnerability, while industry considers broader scale strategic actions to support growers and maintain the market.

Broader application

The climate change health check methodology can be used to gain an insight into how other climate-sensitive elements of mango production will be impacted by climate change over time, providing growers and the industry as a whole with important information for ensuring ongoing enterprise and industry sustainability.

This methodology can be applied to the production of any agricultural commodity in any region. Similarly, the process can be applied to other industries and sectors – from energy and infrastructure through to World Heritage properties – seeking to understand the potential impacts of a changing climate.

The full impact assessment report is available on the ESCC Hub website at www.nespclimate.com.au.

For more information about the ESCC Hub's work with mango industry stakeholders in the Northern Territory, or about finding and using climate change information, please contact Hub Knowledge Broker, Mandy Hopkins on 03 9239 4649 or mandy.hopkins@csiro.au.