Supporting Decision-Making in the Sugar Industry with Integrated Seasonal Climate Forecasting

● **Roger C Stone**[1] ● **Shahbaz Mushtaq**[1] ● **Torben Marcussen** [1] ● **Neil Cliffe**[1] ● **Lynda Brunton** [1]
● **Yvette Everingham**[2]

1. ACSC, University of Southern Queensland (USQ) , Toowoomba, Australia;
2. James Cook University (JCU), Townsville, Australia

Introduction

The Australian sugar industry is strongly influenced by both the impacts of daily weather and also seasonal climate variation. The success of the sugar industry depends heavily on capitalising on the opportunities and minimising the risks associated with climate variability along the supply chain.

The excessive rainfall events and climate of the 2010/11 season have highlighted the critical need for improvement in more consistent and reliable delivery of accurate and useful climate forecasts with the aim of minimising the risks associated with sugar delivery and harvest management along the supply chain.

Sugar production in Australia mainly occurs in discontinuous regions spanning 2100 km along the coast of eastern Australia within 50 km of the coastline. This region experiences extreme seasonal and annual variability in temperature and rainfall. Much of this inter-annual variability is due to the Pacific Ocean El Nino-Southern Oscillation (ENSO) phenomenon.

The ability to more precisely forecast the extremes in our seasonal climate patterns for all key sugar growing regions and to fully develop knowledge on how this relates to industry planning is of vital practical and financial importance to the Australian sugar industry.

Research objectives

▷ Harvested cane forecasting

Develop appropriate climate forecast methods that also incorporate utilization of a *discounted base approach*).
- This will involve the interaction of crop models with advanced climate forecast systems (at a number of scales), with further validation using Geographic Information Systems/Remote Sensing (GIS/RS systems).
- This will provide significantly more reliable, accurate and useful forecast systems in regards to (i) tonnes of harvested cane (ii) potential yield, and (iii) Commercial Cane Sugar (CCS). Furthermore, it also involves validation of mill-level sugarcane crop forecasts.

▷ Targeted climate forecasting for key sugar producing regions

Provision of regularly appraised and improved 'targeted' forecasts for nominated key sugar producing regions at weekly, monthly, seasonal, and up to 6-9 month lead periods at mill-level area scales.

- This will include the initiation of new processes that will enable the provision of warnings and alerts of extreme events (relevant to breakdowns and other stoppages, to be defined by the industry) - updated with the provision of improved models as they become available globally and on a regular basis as determined by QSL.

▷ Targeted support tools and systems

Development of appropriate decision support planning tools for 'harmonising' sugarcane harvesting management along the supply chain (managing the timing of production, harvesting, storage and logistics planning) through the provision of improved seasonal climate forecasts of relevance to all sectors in the sugar industry value chain to facilitate more dynamic and adaptable harvesting management plans.

▷ Broader global cane production assessment

Provision of global sugar production assessments to enable the Australian sugar industry to take advantage of global supply/demand conditions.

▷ Development of longer term climate scenarios

Development of longer term climate scenarios/projections (e.g. up to 2 years) that will incorporate advances developed at the UK Met Office Hadley Centre for Climate Research (UKMO) and Australian Bureau of Meteorology, made relevant for both Australian and global sugar producing regions.

▷ Communication and delivery tools

Develop new methods in communication systems in order to deliver model outputs (harvested cane, seasonal forecasts and decision support planning tools) via targeting workshops, training and extension plans.
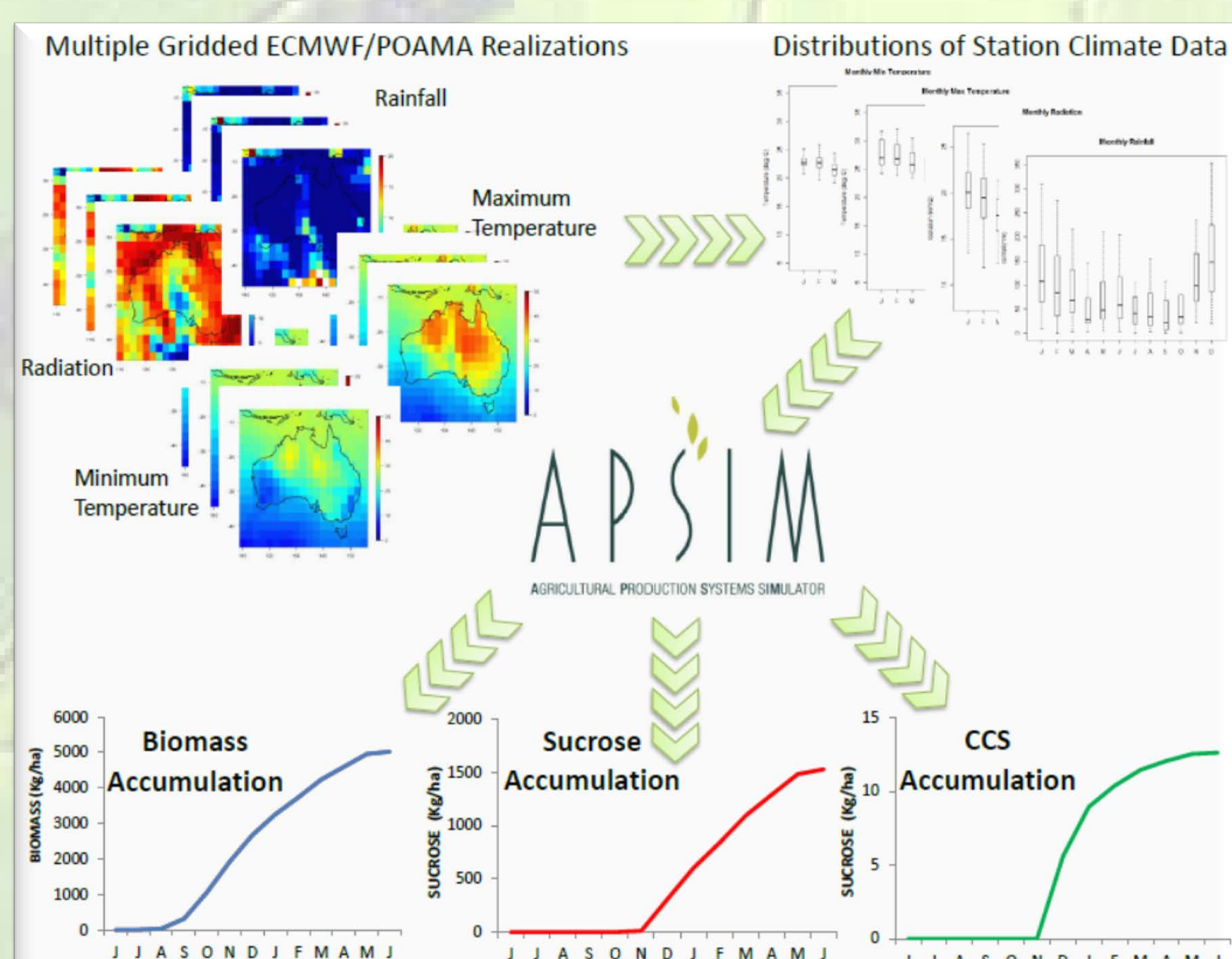
Integrated climate – crop simulation model system required to provide detailed yield forecasts.

Courtesy: Y. Everingham

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