Monitoring to Improve the Quality of Mango Exports

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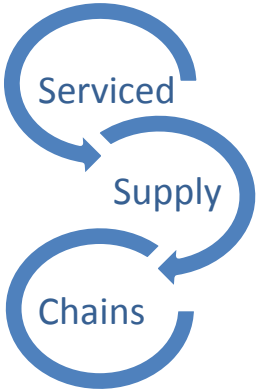
HIA Project AM15002
"Serviced Supply Chains"



Increase the value and profitability of Australian horticulture export businesses by improving the "freshness", consistency and reputation of Australia's exports into Asia,

and the reputation of our export chains

Horticulture Innovation Australia

Queensland Government

Department of Economic Development, Jobs, Transport & Resources

State Government Victoria

University of Southern Queensland

manbulloo LIMITED

Since 1948 MONTAGUE fruit & family

Sweetee

中國科學院 CHINESE ACADEMY OF SCIENCES

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Horticulture business opportunity

- ASEAN fruit and vegetable consumption predicted to increase by ~100% between 2007 and 2050[1].
- Significant opportunities for Australian Horticulture, but:
  - ~20% wastage from farm to retailer[2]
  - Competition from other export countries
  - “Clean, green, fresh” can/will be copied
- High quality value chain, consistency, integrity, service is much harder to copy
  - Our unique competitive advantage?

1.https://www.crawfordfund.org/wp-content/uploads/2014/05/penm.pdf
2. Kader 2005

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Project Objectives

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Monitoring to Improve

"We can not improve what we do not know"

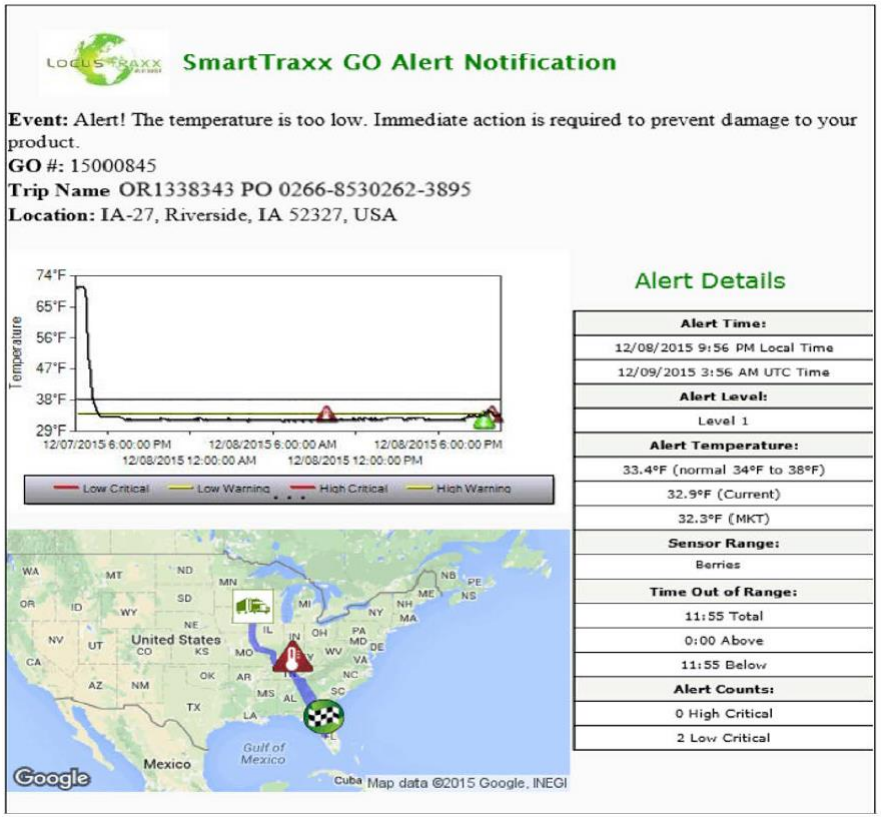
- Compare technologies to efficiently monitor and report conditions (e.g. temperature) and product quality from farm to retail
  - Investigate feasibility of monitoring other conditions (e.g. volatiles)
- Demonstrate the above technologies in commercial shipments of co-investing chains
- Compare monitored conditions and product outturn quality
- Recommend where practice change is required
- Train importer chain members in outturn assessment and reporting
- Strengthen trust and transparency in the export chain

Comparing monitoring systems

Monitoring system	Advantages	Disadvantages
Chart recorder	Temperature can be monitored continuously over time. Low unit cost.	High labour cost in physical retrieval. Low data resolution.
Digital dataloggers	Continuous monitoring. Data analysis. Alert function.	Require physical retrieval and data download. High labour cost.
RFID	Parallel reading of several sensors. Automatic data download. Semi-real time data acquisition.	Data downloaded only when sensors are within close range of a hub.
SIM-based	Continuous and automatic real time temperature and location data acquisition. Low labour cost.	Higher unit cost. Network incompatibility in some countries. Data only downloaded when near mobile towers.

Comparing monitoring systems

- Minimal intervention, real-time dataloggers



Monitoring mango shipments

- Several ‘R2E2’ mango shipments were monitored during the 2016/17 season
  - Sea and air shipments to Asia
- Four temperature monitoring systems were tested
  - HOBO (Onset Computers), Xsense (BT9), Go XL (Locus Traxx), Controlant (PakSense)
- Shipping temperatures varied with the transport mode and tray position
- Fruit outturn quality mirrored handling conditions

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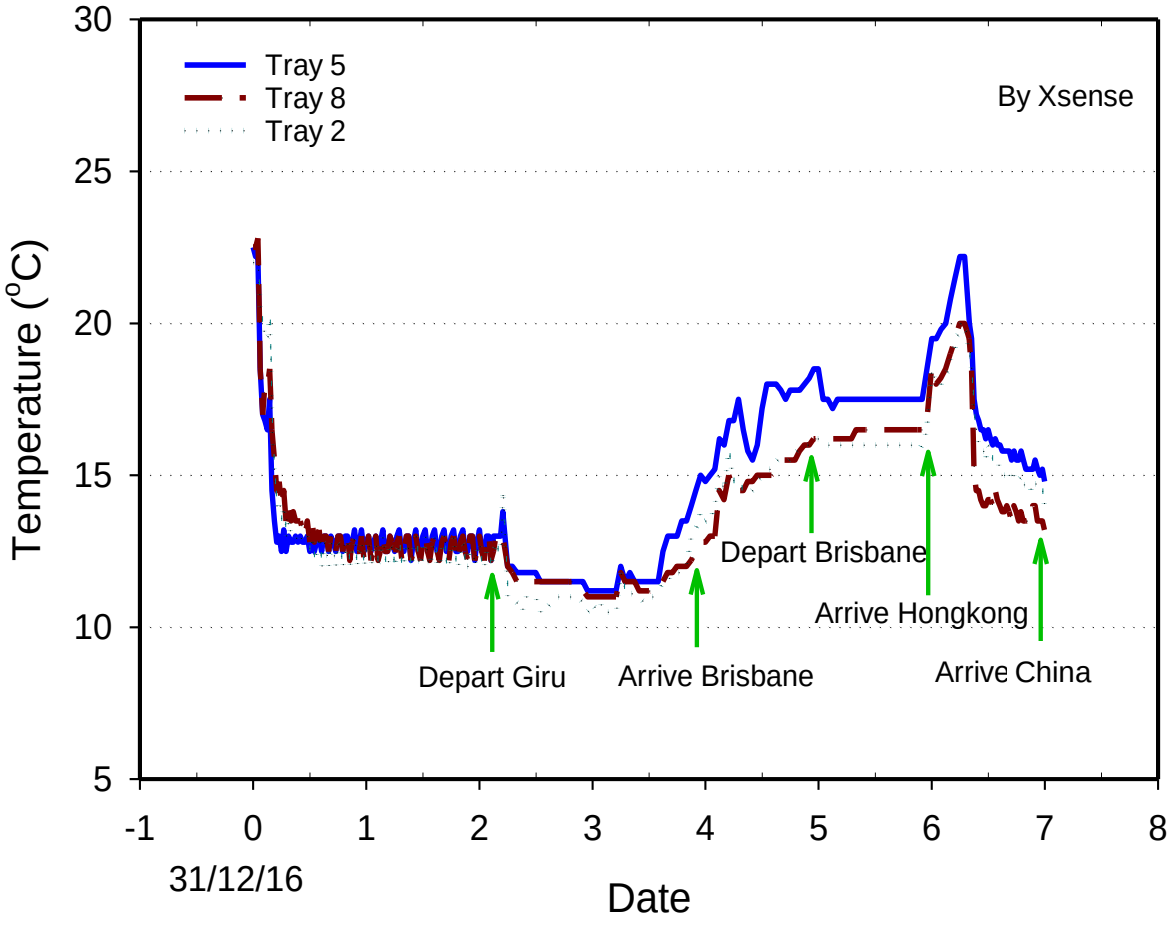
Monitoring mango shipments



- Fruit were pre-cooled adequately on farm
- Fruit temperatures increased at the freight forwarder
- Some warming occurred during clearance
- Fruit were cooled during transport to mainland China

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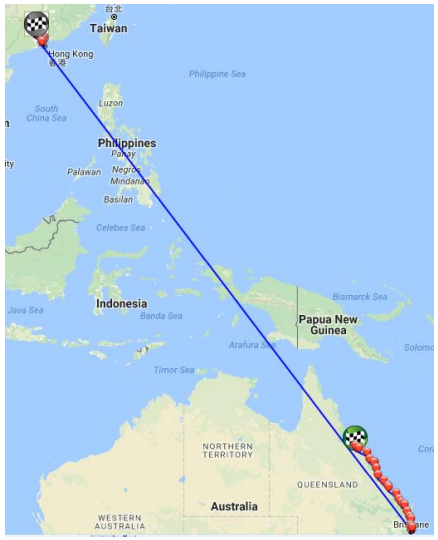
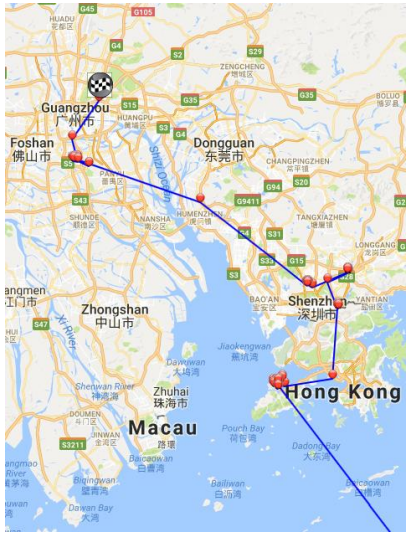
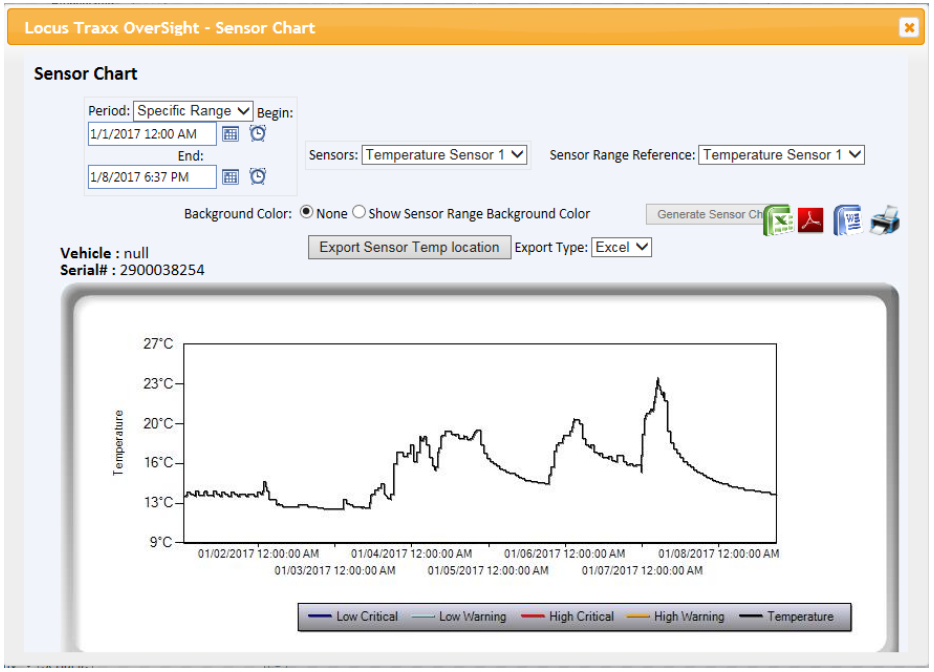
Monitoring mango shipments







- SIM-based loggers provided real-time location and temperature data from farm to retail

Monitoring mango shipments

- Variation in temperature at different positions within loads affected the residual shelf life

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Monitoring outcomes

- Knowledge of the range of temperatures fruit were exposed to during commercial shipment and relationship with remaining shelf life
- Identified areas in chain where fruit quality was compromised
- Remote monitoring helped the exporter and importer watch their fruit all the way through the chain
- It provided valuable information from which better decisions were made on how to improve handling and when and where to market the fruit

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Next steps?

- Project currently $16 million investment over 5 years
- Approach: Demonstrate the benefits using targeted co-investing chains, then “spread the word”
- Work with 5-6 commodity groups to start with
  - Mango, summerfruit and citrus engaged
  - Negotiating with table grapes and vegetables
- Other commodities/chains can co-invest in future years
- Will partner with peak bodies and service providers to increase project impact and benefit.

Thank you!