

FACT SHEET

Real-time consignment monitoring

The Problem

Any slip-up in cold chain logistics can quickly degrade a perishable product, making it difficult to sell and contributing to food waste a loss for consumers and growers.

Monitoring

Monitoring of Australian banana supply chains (n=51) from 2020 to 2023 showed that up to 25% of domestic road freight consignments and 69% of airfreight export shipments were handled below the recommended minimum of 13-14°C for 6 hours or up to 9 days.

Exposure of fruit <13°C during consolidation, transport and/or unloading at the dock can result in development of under-peel chilling injury and the risk of rejection.



Holding bananas below 13°C risks chilling injury.

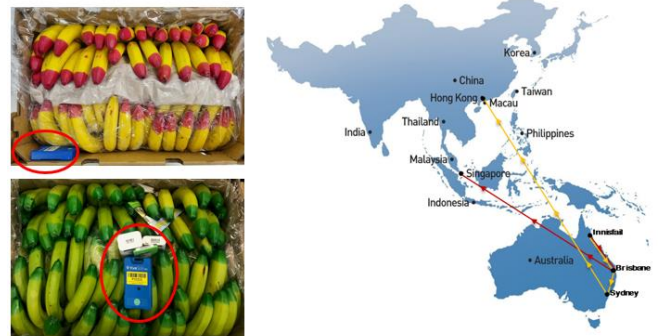


Monitoring Technology

Real-time loggers report consignment temperature and location data periodically (e.g., every two hours) via the mobile network. New generation models are available and cost \$55-220AUD (2024).

Manually download loggers can cost as little as \$12AUD (2024) each but need to be retrieved from consignments to access temperature data.

Hard wired tracking systems in trucks can provide information on fruit temperature during transport, but reliably linking the data to specific consignments remains challenging.



Portable dataloggers have been used to record conditions in domestic and export supply chains.

Costs & Benefits Of Real-Time Supply Chain Monitoring

Cost	Benefit
Datalogger hardware	Identify critical control points in your supply chain
Staff time and commitment to monitoring	Reduce rejections and food waste
May uncover the need for investment in better practices and infrastructure	Opportunity to intervene to avoid loss or divert product to another market or use
Retrieving manual download loggers can be a costly and futile exercise	Improved communication, collaboration and practices along the supply chain
Unit cost of single use autonomous portable dataloggers	More consistent product quality in the market
Time required for proper return shipping and recycling of portable loggers	Increased customer satisfaction

Domestic Supply Chain Scenario

Research conducted by the Queensland Department of Primary Industries (DPI) has shown that exposure of Ecoganic® Williams Cavendish bananas to 10-12°C for 8 hours may not damage fruit. However, exposure to these low temperatures for 24 – 48 hours will result in significant injury and food waste. While chilled fruit may be diverted to a food processor, the total retail value of an average 20-pallet consignment would reduce from approximately \$80,000AUD to as little as \$13,000AUD (indicative, 2023–24; varies by grade/market/retailer), which would not cover cost of production and transport costs.

A \$50-90AUD (2024) investment in a standard real-time temperature datalogger that provides notification of chilling events and opportunities to intervene could help avoid this loss and guide rapid decision-making if redirecting rejected fruit is required.

Domestic Supply Chain Scenario



Temperature recorded by a real-time logger during a domestic banana shipment, highlighting that fruit was warm at shed dispatch and dropped to sub-optimal ($\leq 12^{\circ}\text{C}$) levels during the consolidation stage.



Bananas that arrive in market below 13-14°C risk being rejected and diverted to another customer at considerable economic loss.

This work has been supported by the End Food Waste Cooperative Research Centre, whose activities are funded by the Australian Government's Cooperative Research Centre Program, plus co-investment from DPI and Pacific Coast Produce.

PROJECT TIMELINE

Year: 2020 - 2024

PROJECT LEADER

Name: Dr. Andrew Macnish

Email: andrew.macnish@dpi.qld.gov.au

Phone: 0475 839 609

PARTICIPANTS

John Archer, Minh Nguyen, Shanara Veivers (DPI)
Dianne and Frank Sciacca (PCP)

"...ending food waste starts with all of us."

© End Food Waste Australia Limited