

Australia has developed a non-invasive tool that can determine the ripeness of fruit while still on the tree.

The developers say it can eliminate produce waste through manual maturity testing and provide insights into the most efficient use of labor, thereby modernizing the way tree crop growers harvest.

The research project is supported by Hort Innovation and funding from the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program. It is being led by Professor Kerry Walsh from CQUniversity Australia.

The project sees high-resolution satellite imagery combined with data from hand-held fruit-scanning devices to better map variations in tree health, crop yield and fruit maturity.

The handheld device, dubbed the F-750 meter and developed by Felix Instruments, was designed to assess fruit maturity in the field without damaging or sacrificing any of the crop.

Using near-infrared spectroscopy (NIRS), the F-750 meter calculates a mango's dry matter content, which is a measure of the fruits starch and sugar content.

As the fruit ripens, starch is converted to sugar. So, fruit with a higher dry matter content will produce a better and more palatable taste profile.

The Australian Mango Industry Association has set specifications on dry matter to achieve acceptable eating quality and they are now offering a service to growers through Hort Innovation funding to check dry matter in the field before harvest using the device.

Hort Innovation General Manager for Research and Development, Alison Anderson, said the capabilities of the tool expanded beyond dry matter measurement to include more spatial data and analytics.

"While the tool was specifically designed to assess the ripeness in mangoes, it can be applied to other horticultural crops," she said.

"The scope of the project has extended from supporting growers in determining optimal harvesting time, to the development of automated picking technology. The device also provides insights to ensure the most efficient use of labour and the technology is already being used in other innovations, including in the development of robotic harvesting."

Professor Walsh said there was huge potential for even greater efficiencies through this research.

“If fruit is picked too early, with low levels of dry matter content, it will never develop enough sugars during ripening for an acceptable taste,” he said.

“Leaving the fruit on the tree longer creates a better tasting fruit, but at a compromise to shelf life.

“If the quality is not right, you can’t put the mango back on the tree. This leads to significant waste. We needed to be able to take our technology out into the field, to inform decisions on when to harvest. Measuring dry matter helps growers to do this.”

This research combines collaborative efforts of co-investors from the University of New England, CQUniversity, with input from the Northern Territory Government, growers and the Australian Mango Industry Association.