



National **Environmental Science** Programme

Trust and technology: Tracking down sources of nitrate in the Great Barrier Reef catchment

The close trust frameworks built between farmers and scientists have enabled a large sugarcane farmer in Far North Queensland to track down a source of nitrogen entering the waters of the Great Barrier Reef.

Barry Stubbs, a second-generation sugar grower operating near Miriwinni, just south of Cairns, is a participant in 'Project 25', an innovative water quality monitoring program developed under the Tropical Water Quality Hub of the National Environmental Science Program, which is funded by the Australian Government.

Project 25 fills a key knowledge and trust gap on water quality monitoring in the Great Barrier Reef catchment by providing fine-scale real-time sensor data on levels of pollutants such as nitrate in the Russell-Mulgrave river system south of Cairns. A network of sensors installed at multiple points along the river system constantly monitors pollutants and transmits that data to a smartphone app (developed in collaboration between industry and CSIRO) available to growers and scientists in real time.

Locating sources of these pollutants entering the Great Barrier Reef is a key goal of the Tropical Water Quality Hub, and being able to do so will assist decision-makers in setting realistic guidelines for the use of fertilizers, pesticides and help drive pro-environmental practice change amongst growers.

By building close trust relationships with growers in the Russell-Mulgrave catchment, Project 25 leader Dr Aaron Davis from James Cook University's TropWATER facility can deliver the kind of convincing ground-truthed data that leads to lasting practice change.

This trust was illustrated near the beginning of the recent wet season in early January when Barry Stubbs noticed a spike in nitrate levels being picked up by the sensors near his farm. He called Dr Davis and together the two managed to track down the source of the nitrate – plant cane further upstream.

Both said it was a good example of the technology working as intended, but more importantly it showed the trust that had developed between growers and scientists under Project 25.

"It was really good - Aaron drove out and we managed to find out where it was coming from using the sensors," Mr Stubbs said.

"If you had just measured it from downstream at the river mouth like it has been done in the past, you'd never be able to tell exactly where it was coming from. This is why it's good to have accurate water quality data."

"There was also something else interesting that I can see in the data, which is that plant cane – which is sugarcane that's been freshly planted season – doesn't seem to take the nitrogen up at the same rate as ratoon cane, which is cane that's grown back been cut back for harvesting."

Dr Davis noted that putting the data within reach of growers was critical to building trust frameworks.

"If scientists can make their research more relevant and accessible to farmers, they'll almost always find growers are genuinely interested in environmental stewardship," he said.

"If you can help them identify exactly where and what is causing a local water quality issue, and they trust the data, they'll certainly be open to doing something about it.

"These new sensing technologies are really changing the way scientists can communicate information to the key people who ultimately manage water quality. Having a canefarmer ring you up to track down a nitrate spike in real-time, in their own backyard, is just not something we've really been able to do in the past. But it's not just the technology, it's also the investment in cultivating relationships with farmers, listening to their needs and finding that common ground."

More information about [Project 25 is available on the NESP Tropical Water Quality Hub website.](#)



Trust: Water quality scientist Dr Aaron Davis (left) and cane grower Barry Stubbs (right) working together to find sources of nitrate as part of NESP TWQ Project 25.



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