

# SIX ESSENTIAL STEPS TO IMPROVING YOUR SOIL HEALTH

By Wayne Griffin

For Maryborough cane grower Ashley Petersen, soil health has become something of a passion. So committed is Ashley to improving the quality of his soil, that he has spent 20 years trialling different farming systems and adopting many of the industry's evolving best practices. In some cases he has led the way with innovations of his own.

A fifth-generation farmer, Ashley operates a 1500 hectare cane, cattle and pineapple business with his brother David, son Leyton and nephew Nathan.

His father Lloyd also still helps out on the family farm, which is located on the outskirts of one of Queensland's tourist meccas, Hervey Bay, on the Fraser Coast.

The family also runs a successful contract harvesting business, cutting around 1500 ha of cane a year.

"We are kept pretty busy all year round," Ashley said, when *Australian Canegrower* visited the Petersen Family farm recently.

"We normally cut 500 ha of our own cane every year and on top of that there's the

100 ha of legume fallow, mainly soybean, which we take through to harvest.

"So all up we have about 600 ha in cane rotation and we're expanding some more each year into our cattle country.

"Only 200 ha of that is irrigated, so we're pretty well skewed towards dry-land farming, which hasn't been good for us this year."

At the time of our visit in mid-September, the Maryborough region was in the grip of a one in 100-year drought.

Thankfully, this eased in recent weeks, with the region receiving over half a metre of rain since late October.

The Petersens also farm approximately 40 ha of pineapples, from which they harvest 2000 tonnes per year.

Half of this goes to the Golden Circle cannery in Brisbane, while the other half goes as fresh fruit to supermarkets and shops around the country.





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"The pineapples are predominately planted and harvested in the first half of the year, ensuring year-round work for our staff, when combined with the cane harvesting business," Ashley said.

"Pineapples are quite intensive compared to cane, with 40 ha creating as much work and income as 400 ha of cane."

In addition, the farm runs 350 head of cattle, which they purchase as weaner steers and take through to the feedlot stage.

Unsurprisingly, between cane, cattle and pineapples, there is not a lot of free time.

But this has not stopped Ashley pursuing his passion for improved soil health.

It's a 20-year quest that began with a BSES controlled traffic, raised bed and high density trial in the 90s and has culminated in the Petersen's completely changing their farming system.

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*Pictured: Maryborough farmer Ashley Petersen grows 500 ha of cane on the family's 1500 ha cane, pineapple and cattle farm in Hervey Bay. Ashley says the farm's 2m dual row system has boosted plant cane yields by up to 10%.*



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One of the most important aspects of this change - the one that took the longest time to perfect and remains the most controversial - is the row spacing.

"For the last 17 years we have been on 2m row centres, with dual rows at 800 mm apart," Ashley said.

"Row spacing is a pivotal thing to the industry. It takes up a lot of energy and causes a lot of debate and arguments, many of which have been going on for 20 years.

"But we've tried all of the different systems and this is definitely the best system we've had.

"It's the best because it's the sweet spot for plant density. Our plant cane yield has been 8-10% higher than under any other system we've tried, and we have tried them all from 1.5m - 2.4m.

"When you do the economics on it, it's pretty impressive. As contract harvesters we harvest 1500 ha of cane a year, 20% of that, around 300 ha, is plant cane.

"If you've got 8-10% extra yield on that 300ha, that's at least 2500 tonnes of extra cane, which at \$40 a tonne is returning over \$100,000 a year across the harvesting group.

"You've also got the benefits of the wider swath with the harvester itself. Compared to a conventional row you can save about an hour in the paddock every day, which equates to about \$500 per shift or \$1000 per day for us running a double shift.

"That's about another \$100,000 every season to the contractor.

"So the growers and the contractor each get an extra \$100,000 per year for a one-off investment of \$50,000, which is what we had to spend to modify our harvester to be able to cut this row spacing. Other modified farm machinery is needed too, but that can be scheduled in as old gear is replaced.

"A lot of people balk at cutting up a new machine and spending that \$50,000, but if you look at it over a five-year period, for that \$50,000 outlay you're getting a \$1 million return if calculated over a lot of hectare in a large harvesting group."

Row spacing is only one aspect of the Petersen's soil health-driven system.

Earlier this year, Ashley collaborated with Sugar Research Australia, the

University of Queensland, the University of Southern Queensland, and Biological Crop Protection in running a series of soil health masterclasses across cane-growing districts.

These workshops were based on research from the recently published soil health guide - *Soil Health, Biology, Diseases and Sustainable Agriculture*.

"I have six areas that I work on to ensure we have the best soil health possible," Ashley said.

### 1/ CONTROLLED TRAFFIC

"The first one is controlled traffic - without that none of the other steps will work properly."

By reducing the compaction of soil, through the use of row-spacing, GPS and other precision technologies, growers can increase the 'sponge', which is the soil's water-holding capacity and achieve larger, healthier root zones, Ashley says.

### 2/ RAISED BEDS

The second step, raised beds, also makes it easier to control in-field traffic, he says.

However, there are many other benefits, including soil that drains more easily in wet weather, but still retains moisture in dry times.

Raised beds also eliminate the need for cutting away and filling of plant cane and provides warmer soil temperatures during cold spells, which assists growth.

### 3/ SOIL COVERAGE

"Keeping your soil covered is really important for achieving better structured, healthier soil," Ashley said.

"We put in a legume crop in November and harvest it in April, but that soybean stubble and trash just stays on top.

"We don't work that ground again, just slide the bedformer over and direct drill into that with a disc opener, which takes away all that stress getting ground ready to plant.

"So, you've got five years of cane where the soil is covered with the trash blanket, and then a year of legume.

"The only time the soil is not covered is the couple of months from when the cane comes out to when the soybean goes in and this is only on the 20% fallow portion of the farm.



"This is also the great benefit of a dual row system where the cane covers the inter-row a month or two sooner, allowing the leaves to intercept the sunlight instead of the ground, which only grows weeds.

"It also helps keep all the beneficial microbiology in the soil. There's so much under there - you just don't understand until you start looking into a microscope.

"It's only when you go to one of these soil health workshops that you realise how many small animals are under the ground that are necessary for healthy soil.

"Farming practices over the years have actually been destroying the soil habitat of these animals."

#### 4/ MINIMUM TILL

Minimum tillage not only saves moisture and decreases nutrient loss, while improving soil structure, but also has the financial benefits of saved fuel and labour costs.

Ashley believes the industry has had problems getting this important aspect of the system right.

"This is where the industry has gone wrong over the years, because we've

minimised the tillage before we've controlled the traffic, leading to yield decline," he said.

"Back in the 80s when minimum till first came in, everyone jumped on it, us included. But we didn't have controlled traffic back then, so we actually did a lot of damage, in that we stopped digging the earth up but kept compacting it with heavy machinery.

"The fact is, a lot of growers are still doing that, they're minimising tillage but not controlling traffic and that just does more harm than good."

#### 5/ ROTATIONAL CROPS AND 6/ ORGANIC MATERIAL APPLICATION

Steps Five and Six, the use of rotational crops and application of organic materials are becoming fairly standard practice across much of the industry.

The Petersens use their rotational crops, like soy and pineapple, not only as a means of improving soil health but also as an additional source of income.

Together with the application of organic materials such as mill mud, compost, manure and ameliorants, these crops also reduce input requirements - saving money and benefitting the environment.

"We put 50 tonnes/ha of mill mud on straight after that fifth year of cane. It goes on in a band on top of the bed and we'll then put soybeans directly into that.

"This combination of the mill mud and soybeans means we don't have to use much nitrogen on the plant cane."

The system is still a work in progress, as Ashley continues to trial new practices and technologies, while benchmarking his success against industry best practice.

But after 20 years of trial and error, he's satisfied they have the most efficient, productive and sustainable farming system the family has ever had.

"It's a long process and I think we've only scratched the surface to be honest," Ashley said.

"But you're continually learning and improving and that can only be a good thing for your business, the industry and the environment." ■

*Pictured: (above) It's been a dry year for growers in the Maryborough region. (Page 18) Leyton Petersen shows the covering effect of the dual row system.*