

# Queensland Communities in Transition

Nuffield scholar, Nigel Cornish, Goondiwindi – experience provides confidence to question and implement change

Scholarships such as the Nuffield Australia Farming Scholarships offer primary producers a life-changing opportunity to travel overseas and study an agricultural topic of their choice.

Around 400 Nuffield scholars have had the chance to enhance their knowledge and skills over the past 60 years. Scholarship selection is based on the candidate's passion for farming, their interest in leading edge technology and their potential as future leaders in the industry.

Nigel Corish is a fourth-generation producer from Goondiwindi who was awarded a Nuffield Scholarship in 2014 to study how to improve fertiliser use efficiency and nitrogen uptake on both his own farm and across the industry. The experience was empowering and shifted Nigel's approach to farm management dramatically.



## HIGHLIGHTS

- Successfully increased cotton yields every year while halving the amount of water used since 2007. (based on ML per bale)
- Yields from 450 hectares of irrigated cotton reaching 17 bales a hectare.
- A 0.5% increase in soil carbon
- 2013 Young Australian Farmer of the Year.
- 2012 Australian Cotton Grower of the Year.

*"The Nuffield Scholarship showed me the benefits to stepping away from the farm and local industry to travel and learn from others. My findings surprised and challenged me but have also given me the tools to change some of our farm practices."*

Nigel Corish, Managing  
Director at New Leaf Ag.

The Corish family business consists of four mixed farming properties on the NSW-QLD border producing irrigated and dryland crops and running Angus breeder cows. Nigel's role is to oversee the properties of *Lakeland Downs* and *Woodlands*, which is part of the Corish Farm group.

Nigel's two-year scholarship was sponsored by the Cotton Research and Development Corporation and Cotton Australia and included travel to the USA, China and Europe to investigate how to reduce fertiliser and, in particular, nitrogen use in irrigated cotton production.

Rather than a technological solution, Nigel instead found many of the answers he was looking for in regenerative agriculture. He now implements many of his scholarship learnings on his own farm and is committed to sharing them with others.

### **Minimal mechanical soil disturbance and greater crop diversity for improved soil health**

Nigel was profoundly influenced by his time with USA's Gary Zimmer, who is also known as the "father" of biological agriculture. From Gary, Nigel learned that,

*"soils are living organisms that need to be fed daily. Different plants feed on different soil organisms and vice versa. Thus, the need for diversity".*

In California, Nigel explored the use of crop rotations to provide such diversity with legumes providing nitrogen and cereals providing organic matter. This complemented his findings in England of the importance of cover crops in retaining soil moisture.

In Dakota, Nigel observed that while reduced or zero till farming practices are common amongst dryland cotton farmers in Australia, irrigated cotton growers had not yet introduced the practice despite the demonstrated benefits.

### **Changes on farm:**

Tillage exposes soil organic matter stocks to microbial decomposition. It is also well known to disrupt soil structure making the soil more vulnerable to compaction. This restricts the gas exchange to roots limiting their growth and predisposes them to attacks by pathogens.

Nigel now plants a cereal crop after his winter cotton crop (provided there is sufficient moisture) that does not require deep tillage. This crop is then followed by a cover crop, such as Faba beans, in November and December. By purchasing a zero till planter, tillage is now only undertaken for compaction control, pupae busting and disease management.

Monocultures tend to gradually increase populations of plant parasitic nematodes (root-infecting fungi). By rotating between unrelated crop species, Nigel is able to disrupt the cycles of these organisms, improving soil health.





### Precision agriculture to improve fertiliser use

In Alabama, Nigel witnessed the use of precision agriculture techniques to enable producers to better understand interactions at the farming system, whole farm, and sub-paddock levels. Management zones using either yield, biomass, elevation or soil maps help ensure the use of inputs such as soil amendments, fertilisers and water are both efficient and effective. In Japan, Nigel expanded his knowledge of cutting-edge real-time soil sensing technology.

#### Changes on farm:

Nigel now uses Electromagnetic Soil Mapping (EM38) and yield maps to develop his own management zones. He hopes to improve the soil health in these areas by apply gypsum and manure using Variable Rate Technology. Nigel also uses Normalized Difference Vegetative Index (NDVI) imagery to assesses crop vigour (based on a mathematical interpretation of colour and near infrared data). The imagery helps Nigel identify areas of crop variability.

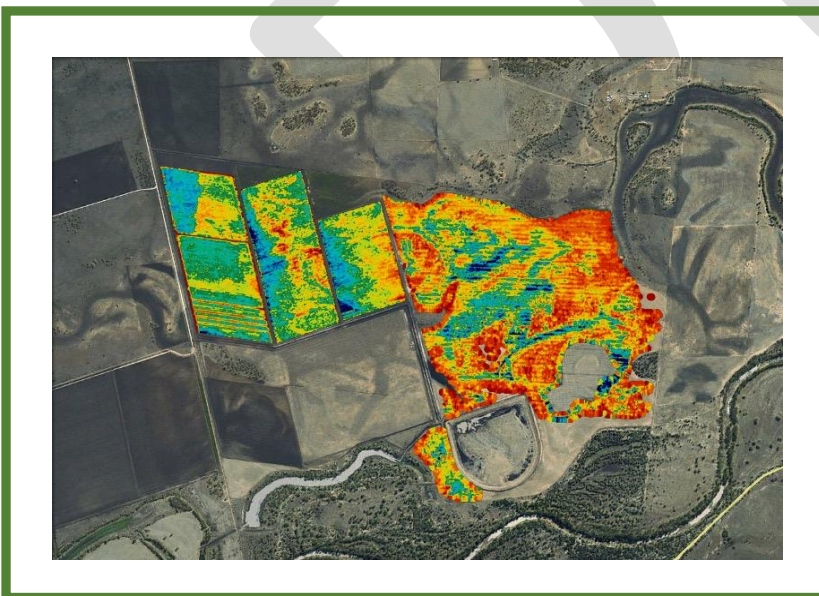
### Addition of farm organic matter

Many soils in the Goondiwindi area contain less than 1% organic carbon. (can you say what is considered to be a healthy %?) The input and decomposition rate of carbon are affected by soil type and climate as well as management. In the case of Nigel's soils, carbon levels on farm were between 0.5-0.7%. Low carbon levels make soils more susceptible to compaction, erosion and reduce its ability to hold moisture.

#### Changes on farm:

Nigel now sources manure from a local beef feedlot. He applies the manure with a spreader at a rate of 10 tonnes per hectare.

Nigel has been able to increase the soil organic content levels on his farm to 1%. A 1% increase in soil organic carbon equates to about a 2% increase in water holding capacity. Even 1% soil carbon can make a significant impact if it means water is available at critical times throughout the year during plant development.



*"We need to stop treating soil like dirt and start treating it like an asset"*

### **Irrigation efficiency**

In California, Nigel saw how the wide scale adoption and benefits of overhead sprinkler irrigation, when compared to furrow irrigation, reduced soil water logging and denitrification and the associated greenhouse gas emissions.

#### **Changes on farm:**

Nigel has doubled up siphon tubes that are used to transfer water over a head ditch bank. This increases the flow rate and ensures a uniform application and avoids water logging.

Nigel has been able to successfully increase cotton yields every year while halving the amount of water used since 2007.

### **Climate forecasting**

Nigel strongly believes farmers need the latest climate forecasting tools and information if they are to increase their productivity. He was part of the Managing Climate Variability Champion program created by the Federal Government which connects farmers directly with researchers. Farmers can also provide valuable information back to the researchers.

### **Agriculture is “cool”**

Scholars are encouraged to share their experiences and new knowledge with both the Nuffield alumni and to the broader agricultural industry.

Nigel frequently speaks at agricultural functions and actively seeks to utilise the media whenever he can to discuss and support the greater uptake of regenerative agriculture.

Nigel is also passionate about encouraging young people to see agriculture as “cool” and a rewarding career choice. This has included 6 years as a mentor with the Gateway Schools Agribusiness Program at the Goondiwindi State High School.

Since undertaking the scholarship, Nigel has continued to explore and embrace innovative and sustainable approaches to farm management.

