

'Winona' rises out of the ashes

IN THE first report in a special series, Growing NSW, *The Land* looks behind the gate at some of the people and enterprises respected as game-changers in their field. ABIGAIL McLAUGHLIN reports on a Central West farmer whose ideas have won him global recognition.

THIRTY-five years ago a bushfire ripped through Col Seis's family property "Winona" near Gulgong, razing everything including the fences, buildings, 3000 sheep and almost Mr Seis himself.

He ended up in hospital with burns to his body and knowing he had to start again from scratch, with no money in the bank.

As terrible as it was, the bushfire was the catalyst that resulted in "Winona" – and Mr Seis – becoming a pioneer in "regenerative agriculture" and recognised across the world for breakthroughs in reducing input costs, boosting soil carbon and significantly hiking up overall productivity.

"Looking back on it, if we hadn't had that bushfire I'd still be farming conventionally," Mr Seis said.

"They say it takes an emergency or a financial disaster to make us change. I had both."

Today Mr Seis and his son Nicholas co-manage the 840-hectare "Winona", grazing 4000 Merino sheep and pasture cropping about 200 hectares annually in cereals.

The management system developed through the years since the bushfire is a direct contrast to that beforehand.

There are now very few inputs but many comparative studies through the years have shown the soils are significantly healthier and overall production is up.

Mr Seis is the fourth generation of his family to farm in the Gulgong area, and the second to manage "Winona".

His father Harry Seis was an innovative operator who was open to new ideas.

He embraced the innovations of the time to grow crops – ploughing

land and using chemical inputs to boost his yields.

"My father was following the rules and science of his era. What he didn't realise, and nor did anyone, was that by poughing he was significantly depleting the soil, especially the carbon levels," Mr Seis said.

"The more he ploughed, the less fertile the soil became so the more chemical inputs he used. It became a vicious cycle. Costs kept rising, fertility kept falling, salinity rose, trees began to die and my father was going broke."

Like many conventionally farmed properties at the time, the granite soil on "Winona" became compacted and acidic, and organic carbon levels dropped to below 1.5 per cent.

The topsoil declined to less than 100 millimetres deep and the subsoil had become sodic. Areas of salinity were also breaking through.

And then came the bushfire.

It took about two years to physically re-build the farm and Mr Seis and his father had to look seriously about how they were going to manage the property.

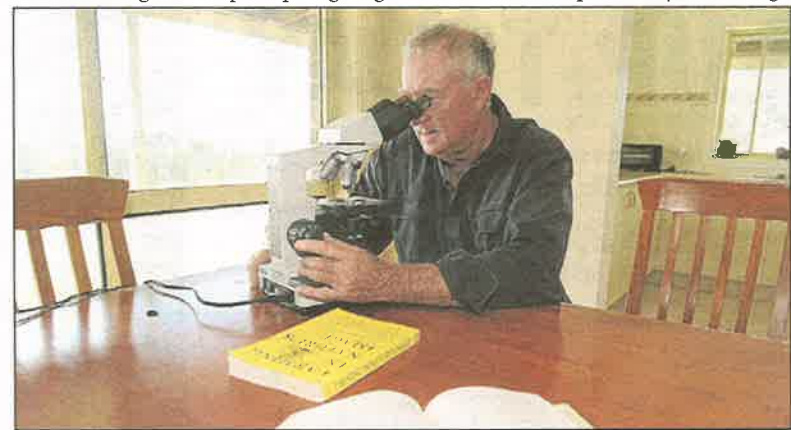
Money was tight, which forced them to go cold turkey on fertiliser, herbicides, and pesticides.

"The pastures collapsed as a consequence because they were addicted to phosphorus," he said.

"This got me thinking about using native grasses. My father had battled native grasses all his life but they kept returning despite his efforts at eradication.

"I thought if they keep trying to come back, why not let them?"

Mr Seis then studied the holistic management ideas of Allan Savory, who had developed a way of manag-



Colin Seis, "Winona", Gulgong, examines soil microbes under a microscope.

Fast Facts

- "Winona", 840ha, 20km north of Gulgong on the Central Tablelands
- 4000 Merino sheep, 200ha pasture crop (oats, wheats and cereal rye), Kelpie dog stud
- Now native grassland with more than 50 species of grass, forbs and herbs
- About \$60,000 saved annually in decreased inputs
- Improving sheep carrying capacity, wool quality and wool quantity
- No insect attacks or fungal diseases in crops or pasture
- Crop yields similar to conventional cropping (20-year oat yields averaging 2t/ha)
- Increased bird and native animal numbers and species diversity
- Improved soil health, soil structure and water holding capacity
- Soil microbial counts show significantly higher counts of fungi and bacteria
- All soil nutrients have increased by an average of 150pc
- Soil organic carbon has increased by 203pc

vided protection, as well as organic matter above and below the ground to protect the oats crop.

Technically the paddock could now be grazed, harvested for grain and then harvested again for native pasture seed, which Mr Seis sells – often to mining companies to restore denuded land.

Instead of supporting just one or two enterprises, the same patch of land had three enterprises (known as "vertical stacking") with fewer inputs.

"Before industrialised agriculture was developed, the world's grasslands and farms contained hundreds of plant species of all sorts," Mr Seis said. "And they functioned with very few problems like disease, insect attack and weeds because it was a balanced ecosystem."

"Pasture cropping returns that balance. It also creates good, rich soil with high carbon levels and good water-holding capacity."

Mr Seis continued to fine-tune the practice, using other cereal crops including wheat and rye, and drilling it into his pasture using a converted scarifier which he progressively modified.

It now has two seed boxes, liquid injection, and disc openers.

In 2010, the University of Sydney conducted a research project on "Winona", comparing the pasture cropping to the conventional management on an adjoining farm.

It found "Winona's" paddock was 83 per cent native perennial grass species and the neighbour's paddock was 88pc annual weed species.

"Winona" was found to have double the sheep stocking rate, similar crop yields, and a significantly higher soil microbial count.

There are now more than 2000 landholders across Australia practising pasture cropping, and the idea is gaining momentum overseas.

Seasonal grain cycle makes pasture cropping system tick

THE key to how pasture cropping works at "Winona" is the relationship between annual and perennial plants – the difference being the number of carbon molecules and how they affect the process by which glucose is produced in a plant, says farm owner Colin Seis.

The annual cereals such as wheat, rice, oats and barley, grow early in the season and then become less active or go dormant as temperatures rise and light intensity increases.

In contrast the perennial pastures remain dormant until temperatures

become warm enough to switch on and begin growing.

If managed properly, with the right amount of rain, the annual crop can be harvested before the pasture plants begin the vigorous part of their growth cycle.

The mix of shallow and deep rooted plants access water resources in the soil differently, which can reduce competition and increase productivity.

Cereal crops provide sugars to soil microbes, such as fungi, nematodes, and protozoa, during the time when the pasture plants are dormant,

which can improve soil fertility faster than pasture alone.

This speeds up nutrient cycling, promotes an improved water cycle, increases nitrogen content, and adds organic matter to the soil, which can build humus.

Additionally, the no-till drill lightly aerates the soil, allowing oxygen and water to infiltrate.

Another key is using grazing animals to prepare the pasture before drilling.

Grazing animals hit the perennial pasture hard which slows growth, giving the cereals a chance to grow.

Animals can also control weeds, create litter on the soil surface, supply organic nutrients for the crops, and remove dry plant residue from the pasture.

Mr Seis said his use of sheep mobs was controversial due to a concern about soil compaction, but was only a problem when there were low levels of groundcover and litter or when the ground was very wet.

Mr Seis grazes the paddock to about 100mm, creating as much litter as possible.

He uses a herbicide to control

weeds only if absolutely necessary, and then direct drills the crop.

"Because crops sown by pasture cropping are slower to develop, the crops can be sown up to two weeks earlier than usual," he said.

"As soil structure, soil health and nutrient cycling improves fertiliser rates can be reduced.

"In my case, I started with normal rates of fertiliser, (100kg of diammonium phosphate a hectare) but reduced use by 70 per cent over time and today I am starting to use organic fertiliser at very low rates."