

# Grant Sims

Sims Pastoral, Pine Grove  
(near Lockington)

## Farming for Sustainable Soils Project Case Study



Ken, Grant and Hunter Sims



### FARM FACTS

42km west of Echuca, Victoria

### ENTERPRISES:

Irrigated and dryland cropping

### PROPERTY SIZE:

2,200 hectares owned, plus  
1,410 ha share farmed. (3,500  
hectares cropped in 2015).  
110 ha is laid out for irrigation.

### AVERAGE ANNUAL RAINFALL:

400 mm

### ELEVATION:

103 m AHD

### WATER RIGHT:

350 ML

### MOTIVATION FOR CHANGE

To move away from a farming system that relied on chemicals to a more natural system. To improve soil health, increase soil cover, phase out of livestock and be more profitable.

### INNOVATIONS

- > Development and application of liquid chemical application to soils at the time of sowing
- > Focus on soil health, cover cropping

### KEY RESULTS

- > Improved soil health and soil structure
- > Improved crop yields
- > Improved profitability

### INTRODUCTION

Grant Sims is a cropping farmer at Pine Grove, near Lockington in north central Victoria. Grant farms in partnership with his wife Naomi and his parents Ken and Wendy. Wendy is the coordinator of the 'Farming for Sustainable Soils' Lockington Group.

### FARMING WITH LIQUIDS

Grant says "I met Colin Bowey, an agronomist, and he introduced us into liquids about eight years ago. Because it was during the dry years it took two to three years before we saw any changes.

"We work with a company called Cropping Solutions (CS) that puts together the base ingredient we use called CS Red – it is a biological multi liquid blend with all the macro and micro nutrients put together with organic structures and a heap of other beneficial ingredients that are highly available that the soil needs.

"We also use another product, an organic liquid calcium, called CS Calx which is also highly available.

"I have a few good mates, Fraser Pogue and Luke Barlow in particular, who are both good croppers and run the same program as us with liquids. We talk a lot and bounce ideas off each other.

"Fraser has been going with liquids for a few years and because he is on irrigation he can speed up the establishment of the system.



Grant explains how the mixing tanks and fill line works

"Now that we have some experience behind us we are bringing dryland paddocks up a lot quicker out of the pasture phase.

"We used to apply 30 litres of CS Red and 5 litres of CS Calx per hectare on the home block here at Pine Grove, but Cropping Solutions have since concentrated both products to reduce freight costs.

"So now we use 15 litres of the concentrated CS Red with 2.5 litres of the concentrated CS Calx. Up at the Terricks we apply 12.5 litres of CS Red and 5 litres of CS Calx. So those are our main ingredients.

"We do add a small amount of UAN when we sow cereals and canola. Through this system we are able to maintain yields with around a quarter of the N used conventionally

"If you do the conventional nitrogen budgeting, it doesn't add up.

"It pays in the canola as we are finding our oil content is up around 47 per cent and we are still getting the yields. We don't spread urea anymore, we did half a paddock last year in one that was very wet, it costs more and we got no extra yield. Last year some of our barley had 20 tillers on the one plant with no extra nitrogen.



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“Our calcium levels have been lifted from about 20% to 50% with our liquids program. Sodium levels are down from around 16% to 5-6%, and just 1.5% on the home block.”

## CALCIUM WORKS WONDERS IN OUR SOILS

“All the soils up on our Terricks’ block are heavy clays and were high in sodium (up to 16%). We knew we needed more calcium to flush the sodium out of the soil. Although we get a good response with gypsum, we find there is an initial benefit and then the gypsum leaches through the profile so you are back to the start again.

“In 2010 we had a problem paddock that was not pulling off as much yield up at the Terricks. We knew we had good enough levels of phosphorous and other elements, but the paddock was lacking calcium. So we went out with 30 litres of straight calcium, a little bit of UAN, and some zinc, and that’s all. That year it yielded the same as every other crop where all the fertilisers had been applied. It made us question what was going on.



“In January 2011 we got the flood and everyone’s paddocks up at the Terricks went quite hard with the water laying on them. The paddocks had set hard and we were hearing of clods like bricks being pulled up.

“When we went in to sow that problem paddock, we put the machine in, and dad asked if the machine was actually in the ground.

“It was just gliding through. It was the calcium. From then on we’ve upped the rate of calcium and we are getting really good results.

“Our calcium levels have been lifted from about 20% to 50% with our liquids program. Sodium levels are down from around 16% to 5-6%, and just 1.5% on the home block.



*Ken Sims and grandson Hunter in a radish crop.*

## COVER CROPPING AND BUILDING UP ORGANIC MATTER

“The diversity and the rotations we are now doing is benefitting our weed control, soil health and allowing us to focus on building as much stubble cover as possible. We observed where we had thrown squares of hay to the sheep off the back of the ute that in the next crop these areas were much higher than the rest of the crop. We knew we needed to get as much residue onto the paddock. It is too costly to buy straw and spread it. So we said let’s grow it, and we have been playing around with cover crops to get as much bulk and trash as we can on that soil to really improve things up there.

“We sow legumes, cereals, brassicas and as many species as we can for diversity and then spray at milky dough before they set seed so that we are getting the maximum N and residue into the soil and getting our money back.

“We are exploring the option of roller crimping to get away from having to spray the cover crop.

## MINIMISING CHEMICAL USE

“There are three types of farm chemicals - herbicide, fungicide, and insecticide. We have not used fungicide or insecticide for five to six years including seed dressings. We are trying to minimise our use of chemicals and that’s our next big challenge. But it’s pretty hard. We don’t want to work the ground so we need to use a knockdown. We have gone to a disc seeder to minimise soil disturbance. We hope these cover crops will suppress a lot of weeds and we won’t need to rely so much on our weed control.

“We put lime on that paddock up at the Terricks last year and it seemed to balance the soil. We had summer rain but hardly any weeds so we didn’t even bother to spray the cover crop paddock. But other paddocks that we didn’t lime have thistles and weeds popping up everywhere. These paddocks have had two summer sprays and one prior to sowing. And then once the crop starts growing through the year we will generally do a grass spray and then a broadleaf spray. So that’s four or five times we’ve gone over the ground with chemicals. It’s too much. Where we grow these cover crops we won’t even do a summer knockdown. Then there will be just the one knockdown spray in spring.



*Grant is working to keep as much cover on the soil as possible.*

## PLANNING, PRECISION AGRICULTURE AND VARIABLE AGRICULTURE

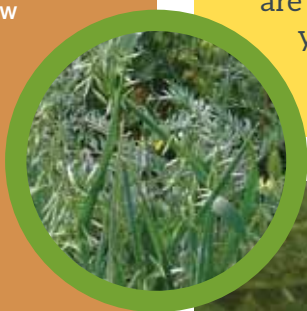
"We plan and lock in a lot of what we do a year in advance. But we are flexible with it.

Ken adds, "Ten years ago we probably cropped half as much as we do now, but we also had pasture for the sheep. If we can get the controlled traffic and soil health to a stage where they repair themselves quickly then we may reintroduce sheep into the system. We have used sheep before forage brassica crops and they have been really good for that.

Grant says, "We use precision agriculture on a 333 mm row spacing and then we inter-row sow the next year. We find it works really well for trash flow and also for peas which like to climb. We will sow the peas into a big barley stubble and the peas will climb it like a trellis.

"This year we sowed on the row because there was more moisture in the row from last year. Going to a disc from a tyne can be hard in the first year to get it tracking exactly right, so it worked out well getting it in on the row this year.

"Once we get everything limed, it is possible we might start targeting some potential areas and doing some variable rate applications. In some paddocks we have areas that have a tonne more grain and we have soil tested these areas and the rest of the paddock. Nine times out of ten it is because the areas have more organic carbon and more calcium. We used to just focus on pumping up the calcium, but I think the calcium is allowing the roots to grow and that's building the carbon and it's the plants that are actually improving the soil.



*The Sims new disc seeder and liquids applicator*

"Now with no subsoil moisture and the same GSR we can get those yields. Something is going on. We are getting less rain and yet still getting those yields."



*Rather than ripping, Grant prefers to use root crops, such as radishes, to improve soil structure.*

## CHANGES TO YIELD

Ken, "I think the yields have increased. We measure our water use efficiency in terms of millimetres of rain falling through the growing season. Years ago we had a string of good years, but since Grant's been home we have had more dry years. So it is a little bit hard to compare it. Everything we are doing now involves getting more roots in the ground.

Grant, "We are using our sub soil moisture a lot better now through CTF summer weed control etc. We had a couple of inches of rain in March and dad got 60 mm and I got 4 mm. Crops that didn't get that rain went a fair bit less even though it wasn't in the growing season.

## RAINFALL

"The average long term annual rainfall here is 400 mm, but we haven't been getting that. The last three years we have had 200 to 220 mm. We seem to get that, and some years we have been lucky to get some subsoil moisture in the summer. Three years ago we got the summer rain and 220 mm GSR and we had barley crops that went three tonnes to the hectare. Three years prior we got one and a half tonnes to the hectare with the same amount of rainfall.

Now with no subsoil moisture and the same GSR we can get those yields. Something is going on. We are getting less rain and yet still getting those yields.

“We have also been watching a paddock up the road which had 1% carbon and after three to four years of liquids and stubble retention we got it to 1.96%, and the cation exchange has gone from about 15 then to 25 now – which is very good.”

## RESEARCH ON THE GO

“I’ve done a trial this year with CS Calx and we are getting really good results using these liquids with lime. The lime experts will say that it takes 18 months before you see results. But we’ve been putting lime on in summer and cropping in April and in that year a paddock that has been half a tonne under preforming goes bang, straight up, with immediate results. The cropping solution guys say that because we’ve got biology, the microbes are active and chewing up that lime and making it available to the plants faster.

With lime you have to spread it and there is always the risk that it will blow away, but with the Calx we are injecting it into the soil when we crop. If we can do away with the liming then that’s one less pass we have to make and we don’t have to worry about the lime blowing away. So we are currently doing trials on this Cal X vs Lime.

Ken adds, “when we flush the lines at the end of a sowing we see the results in the crop the next year. The crop is noticeably bigger where the Calx is discharged.”

## THE MOVE AWAY FROM SHEEP

“After scaling down for a few years we finally got out of sheep in 2014. We always had sheep, and ran them on our better ground back here on the home block. We had no water on the other ground.

“To lift our averages we needed to crop more of the ‘better ground’ and for economies of scale with all of the cropping machinery we have the sheep had to go.

“With sheep you never have a day off. Life is better without sheep. There is more time to work on things and more time to spend with the family.

“At the same time we are trying to set up controlled traffic farming, and the sheep don’t really work with that. It is not to say that they are gone forever, because maybe we could work with sheep and our cover crops to improve our soils, but we are just having a break from them for now.



## SOILS AND CROPS

“We are able to store more moisture in the sub soil our exchange capacity is rising.

“Canola has a big root system and the calcium we are putting in is helping to buffer the soil allowing the plants to push through. I think with the controlled traffic we will see even better root systems develop.

“We have dug some soil pits and have seen some very good root systems. We now need to work on the subsoil, and that is where these cover crops come in again. We currently have a combined radish and pea crop growing. The plants are only eight weeks old, but the tubers on the radishes are massive.

“We pre-irrigated and sowed the radishes and peas into the moisture and they struck. The peas have really impressed me with how well they are growing. We will dig another pit in a couple of weeks and find out how the roots are growing, but the nodulation on the peas is amazing.

“The radishes are trying to scavenge nitrogen from the soil and the peas are putting it back. So they are complementing each other. For this reason we are going ahead with a combined canola and pea crop this year.

“Last year we sowed faba beans with wheat, hoping the beans would feed the wheat with nitrogen and it seemed to work. We don’t spread urea anymore. We prefer to feed the crops naturally using nitrogen-fixing plants. For our system to work we need as much trash and stubble to feed the soil as we can get.

“We have soil tested a paddock where we had cut more hay on and compared them with a paddock where we didn’t do hay. There was quite a difference in organic carbon levels and exchange capacities.

“We have also been watching a paddock up the road which had 1% carbon and after three to four years of liquids and stubble retention we got it to 1.96%, and the cation exchange has gone from about 15 then to 25 now – which is very good.

“We have soil test results that go back a long way. Dad and his brother started direct drilling in the late 1980s. Looking at the soil tests, they had improved the soil to a point but then it seemed to sit a certain level. So we started asking ‘how can we get things better?’



*Canola has a big root system and along with calcium is helping to buffer the soil, allowing the plants to push through.*

“The soil tests are showing that we have increased our cation exchange capacity, which directly affects the ability of the soil to absorb and store water. The soluble phosphorus we are applying is giving us above normal levels of P in leaf tissue analysis of our crop plants.

We also have good levels of biology in the soil. We have been able to increase our Total Active Fungi (TAF) in and our soil above the desirable level as a percentage of the total active biological population which contributes to the rapid breakdown of stubble and trash, without the need for cultivation which then feeds back into the soil. These high levels of fungi are key to driving a more productive soil.

## FARMING WITH NATURE

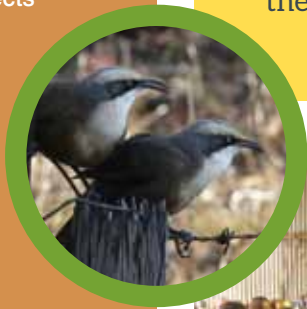
"I think it is really important to eliminate fungicides and insecticides from the system. It is terrible what they do to stubble breakdown, particularly the removal of the fungi. Now our soils are alive. We can go out in paddocks now, and find spiders everywhere. Last year when a pea crop came up, nearly every plant had a cobweb around it. When I did a swipe test I counted three spiders to every three or four grubs. I pulled up some roots last year and we found centipedes, termites and worms etc. They are turning the soil. We have worm holes now, and the plant roots go chasing down the holes which is pretty exciting.

"I have been reading a book on farming with beneficial insects and we have been setting up some natural vegetation along the edge of the crops, trying to join up patches with existing vegetation, using native trees and shrubs, to provide habitat for the beneficial birds and insects.

"We use indigenous species and aim to achieve as much flowering as we can get. We get a bloke who brings bees up here every year for the canola, and we think we are starting to get some hives around the place. We are finding blue tongue lizards as well, so there are more animals now.

## EDUCATION

"We had students from the local secondary school visit our farm this year as part of their humanities studies. The teacher wanted to get them out in the field and learn about land use, what crops or grazing we assign to what land, and why, the changes over the years, and how technologies have changed. I am a sixth generation farmer so there is a lot of history here. My grandpa used horses, and now we use big horse-powered machinery and GPS systems. I try and leave the students with positive messages about being prepared and taking opportunities in all aspects of life, whether its farming or sport.



*Taking liquids and seed to the paddock*

"On the back of these cover crops we will treat half with UAN and half without. If we can see no difference, then UAN might go after the cover crop rotation."

## GENETIC IMPROVEMENTS

I have a dairy farmer who I sell grain to. When he feeds our grain to his cows there is no grain visible in the manure and the milk count goes up. He does experiments with conventionally grown grain and always finds it in the manure even after it has gone through the roller mill.

"I think that some of the toxicities people experience such as an allergic reaction to gluten bread etc, are potentially from all the chemicals that are pumped into the grain. It would be great if we could grow the grain without the chemicals. That is what we are trying to find out. Also our crops seem to be producing a stronger grain that is less susceptible to disease. Our crops tend to take longer to ripen, which means that they are not in a hurry to chop out - which is good.

"I think the plants we are growing have a bigger root system.

## 2015 CROP

"This year I have sown Wheat (1000 ha); Barley (1000 ha); Canola (500 ha); Peas (250 ha); Oats (440 ha); Faba beans (130 ha); Cover crops (170 ha). I also have 30 ha of irrigated vetch seed crop.

"The paddock that has been sown to peas and radish will be sprayed out in June and I will sow a cereal rye into that.

"Vetch seed is bringing \$2,500 per tonne which is very expensive at the moment. To make these cover crops work we can't be paying that price, so we try and grow the seed ourselves.

"Going forward, I would love to eliminate UAN completely. That said, I am not using much anyway.

"On the back of these cover crops we will treat half with UAN and half without. If we can see no difference, then UAN might go after the cover crop rotation.



*Grant and Echuca Secondary School students during a tour of the farm*

## ORGANIC CERTIFICATION

“Organic certification has not interested me in the past, but then my mate went to a certification day recently; it has got him really thinking. There is a big demand. So the pricing is good. Getting it to work in a broadacre sense is the difficult thing.

“I would definitely explore it and maybe put one paddock aside, these guys said it is not so difficult, but a bit daunting.

## APPLYING LIQUIDS

“I have looked at composting, and when you read what goes into compost teas, it is similar to what we are already using. But it is a whole other job to make the tea.

“We inject the liquid into the ground with the seed. The liquid goes down a 4 mm tube and squirts a line. We are getting fantastic nodulation on our peas and beans. Also we can tailor the mix that way, so when sowing canola we might add more sulphur, and when sowing legumes we use extra molybdenum to help with flowering.

“Frost wise, the year before last everyone around here got frosted with their peas, but because ours were still flowering, and were full of sugars, we had no damage to our crop. We use a product called Cropsure - it's a hormone that helps develop a bigger root system and enhances the plants ability to defend itself against diseases etc. so no need for fungicides. It also lifts the sugars in plants. It's not costly and we use it on all our crops.

“We are relying on the biology and the microbes to do a lot of the work. That's one of the reasons we have gone to a disc. When the tyne went through the soil it used to bury the stubble. And heavy stubbles just disappeared. Whereas we are now trying to keep as much of the stubble as possible on the surface to cover the soil and not let it break down as fast.

## INNOVATION

“We have bought liquid kits and played around with them. We also bought a new disc seeder and set up the liquid feeds on that. We have improved in our ability to distribute the liquid and the product has also improved in its handling ability. If you get the filtration and agitation right then you have no problems. We have also sped up our fill time and we can cover 50 hectares over 4 hours. So we cover 150 hectares in a 12 hour shift, including fill up time.

## GRAIN STORAGE

“We've put aerators on all our silos so that we don't rely as much on insecticides. By cooling the grain to below 15°C kills the pests. It makes it better for us to market our grain on farm. Once we sell the grain we will take a semi load to Geelong and bring home a backload of lime.



Top: Grant looking over an old model seeder.

Above: Grant Sims and son, Hunter.

## LOCKINGTON FSS GROUP

Grant “I reckon the group is really good. Our group is unique in a way because the bulk of the group is dairy farmers, and a couple of us are croppers.

“There have been changes on a number of farms in this area. A lot of the younger dairy farmers have started doing soil tests. Another farmer is making sure that when he buys gypsum he is getting what he pays for.

“Some members of the Wycheproof FSS group came over here for a visit back in February. We went into one paddock that has only had liquids applied for two years and another that had liquids for six years and they were amazed by the soil. It just crumbled in your hand and it was full of quarter inch worm holes. Worms love calcium. The shovel went in a long way and up came a centipede.

I've learnt a lot by going around to other farms and asking questions. It's good to be able to give something back,” says Grant.

Wendy concludes, “It is pretty clear that the Lockington FSS group is working well. Normally we would get a handful of people to an AGM, but this year we got 25 people and had no trouble filling positions on the committee. The government's funding for the group might have run out, but it has been such a positive experience that the local farmers want to see it continue.”

## MORE INFORMATION

For more information on the Farming for Sustainable Soils Program contact Phil Dyson at the North Central CMA on (03) 5448 7124 or email [phil.dyson@nccma.vic.gov.au](mailto:phil.dyson@nccma.vic.gov.au)

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