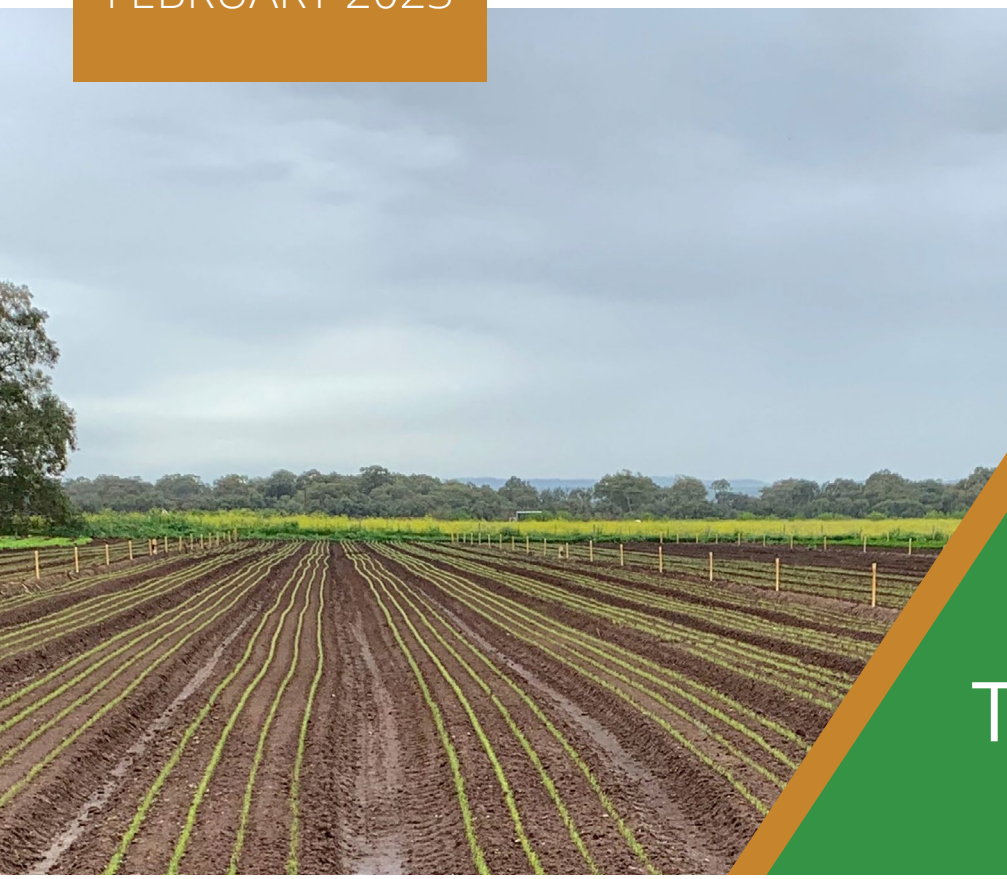
CASE STUDY:
SA COMPOST TRIAL

FEBRUARY 2023

SoilWealth NURTURING CROPS

Integrated Crop Protection PROTECTING CROPS



COMPOST BOOSTS SOIL HEALTH ON THE ADELAIDE PLAINS, SA

KEY MESSAGES

- ✔ **A demonstration site trial was held at Thorndon Park Produce on the Adelaide Plains, South Australia to showcase how the use of compost in commercial vegetable production can improve soil health, reduce the effect of saline irrigation water and decrease the use of inputs**
- ✔ **The compost treatments were found to improve soil health and marketable yield, while better managing salinity issues and reducing inputs such as water, fertiliser and labour costs**
- ✔ **Thorndon Park Produce has since expanded its use of compost, trialling pelletised compost and biological products**
- ✔ **The demonstration site trial identified salinity as a key issue facing vegetable growers in the Adelaide Plains region and facilitated resources to help growers manage the issue, as well as connections for industry members supporting the trial.**

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ABOUT THE ADELAIDE PLAINS DEMONSTRATION SITE

Thorndon Park Produce, owned and run by the De Ieso family, is a bunch line producer. The family has been growing vegetables in Australia's Northern Adelaide Plains since 1945. The growing experience of the business spans four generations of De Ieso family: Luigi, Salvatore, Danny, Chris and Anthony De Ieso.

Thorndon Park Produce operates on two sites: the main farm at Gawler River which will house a new packing facility and a farm at Waterloo Corner which hosted the Soil Wealth ICP demonstration site.

The business grows quality products such as spring onions, radish, parsley and other herbs, spinach, silverbeet, beetroot and kale (green and red) which is supplied to the South Australian Produce Market. Their bunch lines can also be found in the major supermarkets, independent groceries and other outlets.

Over the dry summer of 2017/18, Anthony recognised a range of issues with crop production at his Waterloo Corner block. In particular, Anthony faced considerable challenges in managing the effects of salinity due to spikes in the electric conductivity (EC) of his bore water (3.1 dS/m or 1965 ppm, nearly five times the optimum level, at the start of the trial). Also, the land had become less productive after years of cropping driven by the need as a bunch line grower to continuously crop throughout the year.

The initial objective of the demonstration site was to showcase compost use in commercial vegetable production to increase marketable yields and quality. This was to be achieved by improving soil health, reduce the effect of saline irrigation water and decrease the use of inputs especially fertilisers and irrigation water. Major soil health challenges were compaction and low organic matter levels.

Anthony and Danny De Ieso, Thorndon Park Produce.

WHY GET INVOLVED IN A DEMONSTRATION SITE?

This case study shows how participation in demonstration site trials can initiate ongoing changes to vegetable production systems by helping to address some key production challenges. A demo site can be the starting point that leads to new ideas, trials and networks for participating growers that often evolve quite independently from the project(s) that helped with initial trials.

A demo site also provides new insights and connections for those supporting the trial, in this case AUSVEG SA and their VegNET Regional Development Officers; Adelaide and Mount Lofty Ranges Natural Resources Management (AMLR NRM) staff; Peats Soil & Garden Supplies who supplied trial compost; the Soil Wealth ICP team; and around 40 growers, agronomists, NRM and agribusiness representatives who attended the end of project workshop and field day. The cooperation of the different organisations and businesses and Anthony's enthusiasm and willingness to share were key to the success of the demo site.

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Peats Soil & Garden Supplies (Peats) donated the required compost (including transport) for the large-scale demo site, which was essential to the success of the trial due to limited funding.

Peats is a second-generation, wholly South Australian company focused on receiving, processing and marketing recyclable organic resources. It supplies a range of Australian Standard and National Association for Sustainable Agriculture Australia (NASAA) certified organic composts, soil, mulch and top-dressing products, including tailor-made products for horticulture and many other users.

Spring onions grown at Thorndon Park Produce.

TRIAL SET-UP

Criteria and desirable outcomes for the selection of treatments and therefore compost included:

- Fitting in with production (i.e. no negative effect on trial crop or following crops)
- Cost-effective implementation; avoid tying up labour and equipment; minimal use of water, fertiliser and ongoing maintenance; and preferably decreased input costs (nutrients, water, chemicals), labour and soil preparation costs
- Fitting in with the time of year that crops are planted, harvested and the next crop is planted
- Lessen salinity effect on crops and soil
- Avoid affecting soil pH, balance nutrition, lower salinity and sodicity risk
- No food safety risk
- More even water infiltration and drainage; no waterlogging
- Even crop growth and ideally increased marketable yield/pack out.

Soil and irrigation water tests were conducted prior to the trial. The trial was set up with three single treatments:

1. Untreated control (i.e. grower standard)
2. 4.5 t of blend 437 compost
3. 4.5 t of blend 437 compost mixed with 100 kg of DAP starter fertiliser.

Each treatment covered three beds (64" wheel centers) with the same cropping history, 1100 m^3 per treatment. The trial area was planted with kale and managed by Anthony using standard practices.

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KEY FINDINGS

Soil and irrigation water tests showed that soil salinity (sodium and chloride) was a major issue due to the use of saline bore water. Water salinity had increased due to a series of dry years. Organic carbon was 0.5% (i.e. very low) due to intensive cropping especially tillage.

The soil was very well supplied with all nutrients, especially phosphorus due to intensive vegetable production over many years; the pH in water was 7.6, and 7.4 in calcium chloride – the small difference between the two pH values indicates that salinity is occurring. In non-saline soils, the difference between pH in water and in calcium chloride was about 0.8 to 1.

Compost treated plots showed:

- **Heavily reduced** fertiliser use and irrigation water needs for the trial period and associated cost savings, including for labour and machinery/ equipment
- The introduction of organic matter and reduced water irrigation need allowed for **better management of the effects of salinity** on the block and improved soil drainage.
- **Healthier root growth** and better uptake of trace elements were observed and confirmed via plant testing
- **More even crop growth and quality** (colour, feel) as well as plant size resulting in a better cut out rate (marketable yield)
- **Improved crop longevity** and thus a longer harvesting period with less individual cuts
- The stronger, more even plant growth and quality led to a **reduction in labour requirements** overall. Harvesting and packhouse costs were much lower from the composted area due to reduced grading need and the high percentage of marketable produce with less wastage.

Peats compost (left) and pelletised compost (right).

Crop residues break down quickly and the ground pictured above is nearly ready for the next crop.

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LESSONS LEARNT

Based on the experience with the compost trial, Anthony commenced **using compost regularly** on the Waterloo Corner farm he is managing as part of the Thorndon Park business. This provided benefits for other crops grown there.

He also trialled several **biological products** to further enhance root growth and crop evenness. Where possible, he used short-term cover crops such as rye grass, a recommendation from the Soil Wealth ICP project.

About 18 months after the trial, Peats Soil offered **pelletised compost** as an option to customise the nutrient content of the pellets. This made it far easier to use compost as the pellets can be applied with a fertiliser spreader just to beds, while compost has to be spread over the entire area. Compost also developed a lot of dust during application, affecting staff and machinery.

Now, four years after the trial, **soil health management is a focus** for Thorndon Park Produce. Organic matter levels are within an optimum range. The water quality (river water) at the site is also good so salinity issues can be avoided. Danny ensured that drainage at the farm is installed to avoid waterlogging.

Bunching line production is very intense and there are only a few opportunities for breaks between crops to allow for cover crops. Therefore, **all crop residues are retained and returned to the soil**, and **crop rotation is used to avoid soil-borne diseases**. Compared to other vegetable farms, the variety of bunching lines grown are an advantage as they allow for crop rotation, which is usually a major challenge for vegetable producers. Cover crops are used there to make up for the lack of rotation.

Danny has been developing his own system of soil management including **suitable equipment that fits with intensive production and soil health management needs**. Compost will be used as required to maintain organic matter levels and soil testing will be used more regularly to fine-tune the fertiliser program.

A further outcome of the work in the Adelaide Plains is the recognition that **salinity is a major issue for the region**. As a result, Soil Wealth ICP prepared a practical fact sheet on salinity management and ran a webinar on the topic.

FURTHER INFORMATION

- The 'breakdown' on composts fact sheet
- Managing salinity in vegetable crops fact sheet
- Managing salinity in vegetable crops webinar recording
- Nutrition management resources fact sheet
- South Australian Grower Compost Trial case study

Mulching crop residues for return to the soil.

Acknowledgments

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