

# Implementation and demonstration of resource-efficient irrigation systems for the Lucerne Seed Industry

- Location:** South Australia: - Keith, Upper South East of South Australia
- NRM Region:** South East Natural Resource Management Region
- Industry:** Lucerne Seed
- Group:** BW & RD Smart, “Akeringa”
- Issue:** Water use efficiency in irrigated lucerne seed production
- Key Outcomes:**
- New irrigation technology with significant potential benefits for the sustainability of Lucerne Seed industry
  - Significant water saving, with reduced weed, pest and disease problems
  - Potential to grow higher value crops in the future

## Background

The lucerne seed industry in the Upper South East of South Australia produces approximately 75% of the total lucerne seed production in Australia. The lucerne seed industry in the Upper South East has been based mainly on flood irrigation systems, with water drawn from local aquifers at a depth of 4 to 5 metres. While these systems have served the industry well in the past, increased pressure for limited water resources, plus an increase in salinity of some ground water supplies, has created the need to be more innovative in the use of water.

“Akeringa”, based near the township of Keith, is one of three properties operated by the Smart family business. ‘Akeringa’ is a mixed farming enterprise with sheep and cattle grazing and broad acre crop production including canola, wheat, beans, lupins and barley. The lucerne seed enterprise also produces hay.

## The Project

The project involved installing a state-of-the-art sub-surface drip irrigation system across 40 hectares on the Smart family’s Keith property, and setting it up for Lucerne seed and hay production. Installation involved ripping the paddock to 30cm depth every 60cm apart, and laying down the drip lines, connecting them to a secondary feeder line which, in turn connected to a primary feeder line, which supplied the water from a central pumping and filtration system.

The system is computer-controlled, being linked back to the farm office via telemetry. According to Brendon Smart, installation was a complex, labour intensive process, with little technical support available in Australia. In addition, limestone near the soil surface created extra challenges when ripping and laying the dripper line, including the need to take care not to pinch off the line preventing water flow.

## Outcomes

The project cost approximately \$6,000 per hectare to install, with NLP providing \$2,500 per hectare, the rest made up by the farm business and significant support from other industry supporters.

The system requires a high-maintenance program to ensure the lines and drippers remain functional. This includes flushing the lines on a regular basis with hydrochloric acid, and feeding herbicide through the lines to prevent roots growing into the dripper outlets. Both these functions are computer controlled.

In the first year of operation lucerne seed yields were increased by 20% over flood irrigation. There were fewer summer weed, pest and disease problems because the soil surface remained dry, with a less humid crop canopy. This resulted in significant savings in herbicide and pesticide use.



**Old Technology – open channels, flood irrigation.(Photo: Mark Stanley)**



**Drip irrigation tape – a crucial part of the technology (Photo: Mark Stanley)**

Total water used for the seed crop was 3.6 mgl per hectare, which was 0.4 mgl less than with centre pivot and 11.4 mgl less than with flood. Other advantages of the system included much less stress on the lucerne plants due to the ability to accurately regulate water supply to the plants, which should increase the life of the stand; being able to continue to water the crop when cutting for hay, increasing the number of cuts able to be gained from the stand; and the ability to fertilize the crop through the drip system, increasing fertilizer efficiency.

The operation of the system has proved to be exceptional, with the telemetry technology enabling very easy operation. The system saved approximately 200 hours of labour compared to operating a flood system over one season.

The public interest in the project was very high. The two field days at the site attracted over 150 people. A large sign on the project site and facing a major road attracted significant attention in the district.

## The Future

With a carefully managed and maintained hygiene system in place, Brendon predicts the system will last a farming generation. Brendon is excited about the future possibilities of the sub-surface drip irrigation system, with the opportunity to grow higher value crops in the future, which would add to the financial viability of the investment. The cost of the system can be justified against the raft of benefits it delivers. Monitoring of salt in the profile is seen as essential to enable effective management of the same.



Brendon Smart with sub-surface drip line..(Photo: Mark Stanley)



Bore pump and filtering system with computer control panel. Telemetrics back to farm office. (Photo: Mark Stanley)



The project has received broad industry support (Photo: Mark Stanley)