

EnviroSCAN®

The Original and Still the Best in Potatoes!

Abstract

Paul Frost an agronomist with SAFRIES Pty Ltd reports that using Sentek's complete soil moisture monitoring solution, the EnviroSCAN® has offered returns of an extra \$2000 per hectare and increased yield. Additionally the EnviroSCAN® has conserved water usage and maximized fertilizer uptake.

Introduction

In an effort to improve water efficiency and yield, SAFRIES Pty Ltd provides its contract growers with an EnviroSCAN® soil moisture monitoring system for trial purposes for two seasons as an introduction to the system. After this introductory period, growers may choose to purchase their own system and receive ongoing agronomic support from SAFRIES.

SAFRIES is a commercial processor of Russet Burbank potatoes, used for French fry production, in the South East region of South Australia. Paul Frost, an agronomist for SAFRIES, provides support and consultation to contract growers using the EnviroSCAN® systems.

The EnviroSCAN® is a complete soil moisture monitoring system. The EnviroSCAN® is a system that continuously measures soil moisture over multiple depths in a crop's root zone pinpointing, how often and how much to irrigate. EnviroSCAN® provides a clear continuous picture of crop water use and water management in the root zone.

The two EnviroSCAN® systems owned by SAFRIES have been in use in various contract growers' crops for the past four years to monitor moisture levels in the sand over clay soil. With Paul's assistance, growers are able to monitor the soil moisture levels and adjust them accordingly to increase yields, manage the risks associated with growing crops on sand over clay soils more effectively.

The data obtained by the EnviroSCAN® sensors is collected by a central logger and then downloaded by the grower by a variety of telemetry methods. The EnviroSCAN® software program converts this information into graphical form to give growers a better understanding of moisture levels in the soil profile.

Potato tubers for French Fries need to meet stringent quality and size standards. Sentek's Irrigation and Hydrology Manager Peter Buss stated, "Moisture stress at any stage of the growing cycle can have a negative effect on tuber size and quality, affecting the ability of the crop to meet these standards."

He went on to state, "previous experience monitoring crops with EnviroSCAN® has shown that potato crops capture most of their water requirements from the top 10-20cm of soil." By reducing the duration of irrigation events to wet the bottom of the active root zone, leaching of water and nutrients into the lower regions of the soil

profile can be reduced, ensuring resources are not wasted as well as achieving increases in tuber size and quality.

Yield Results

For one SAFRIES grower, the use of EnviroSCAN[®] and Paul Frost's support have resulted in consistent yield increases over the past three harvests. Each of these harvests yielded crops 6-26% higher than the district average.

Table 1. Comparison of SAFRIES average yield against the district average

| Year | SAFRIES Average Yield | District Average Yield | % Increase over District Average |
|------|-----------------------|------------------------|----------------------------------|
| 1998 | 55.56 T/ha | 52.0 T/ha | 6.8% |
| 1999 | 52.57 T/ha | 44.3 T/ha | 18.7% |
| 2000 | 59.295 T/ha | 46.9 T/ha | 26.4% |

During this three-year trial one SAFRIES grower suggested the benefits of continuous soil moisture monitoring have included:

26% increase in yield compared to district average

Figure 1. Comparison of SAFRIES average yield against the District Average yield

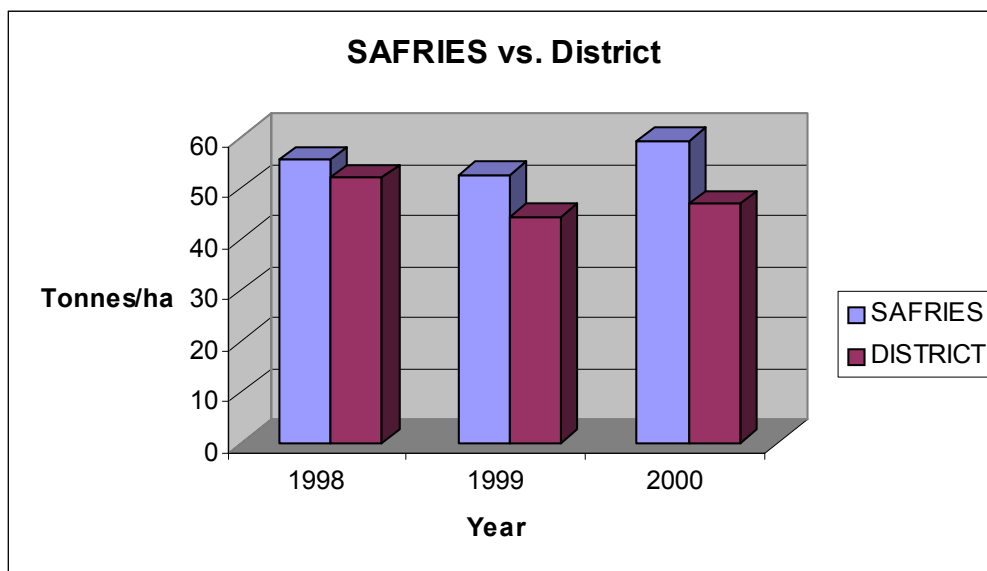


Figure 2 Comparison of Yields with irrigation scheduling by EnviroSCAN against Previous Average yields

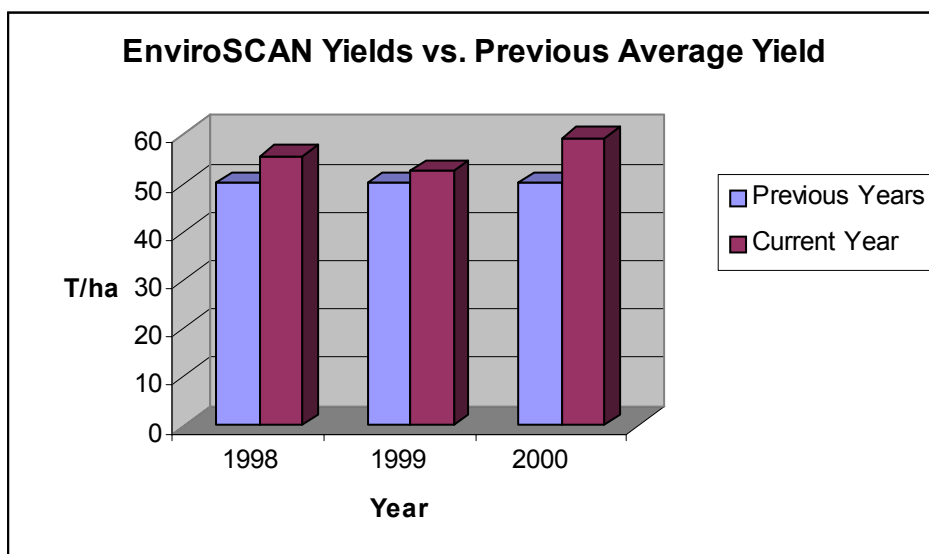


Figure 2 illustrates a comparison between the previous average yearly yield against the yield achieved in the years when EnviroSCAN[®] data was used to schedule irrigation.

The increase is approximately 5-18% over the previous average yearly yield.

Water Efficiency

At the start of a potato crops' growing cycle, soil moisture levels that encourage healthy top growth and rapid canopy cover are maintained. Later in the growing stages, a new, higher full point is established and maintained to accommodate the tuber bulking stage of the plants' development. Once tuber bulking is complete, the full point of the soil is then decreased once again, to ensure efficient water use.

With time, the use of EnviroSCAN[®] has enabled the grower to tailor the water levels according to the stage of development that the plants are in. As a result, yields have increased without having to increase the amount of water used.

Mr. Buss stated, "by being able to monitor soil moisture over the entire root zone with EnviroSCAN[®], Paul can also help growers reduce the risk of developing a shallow rooted crop, which is the likely outcome of the sub-soil drying out."

Farm Management

Beyond water management, EnviroSCAN[®] has also been able to assist in other areas of farm management, including disease and pest control. It has the ability to ensure that the optimal water requirements of the plants were matched by irrigation, thus producing a healthy crop, more resistant to disease.

In regards to nutrient management, fertiliser costs remained at \$980/Ha, however over the last three years yield increased by 3.735 tons/Ha. Better placement and retention of nutrients in the root zone due to an improved irrigation schedule increased this SAFRIES grower's return with every application of fertiliser.

Straight from the Grower

According to Paul, the 3 key benefits of using EnviroSCAN are:

- ✓ “Better and more consistent yield,
- ✓ “Higher percentage of saleable potatoes
- ✓ “Lower risk of over watering and making sub soil moisture levels too high.”

Paul believes that one of the major advantages of the EnviroSCAN[®] is its ability to continuously log soil moisture levels, because it indicates recent rainfall, irrigation events and the infiltration in the soil profile. The ability to view this information enables Paul to ensure that growers' irrigation costs are reduced and irrigation effectiveness is increased.

Another benefit of EnviroSCAN[®] to SAFRIES is its ease of use. The training and support provided by Sentek and its distributors has made EnviroSCAN[®] data interpretation an easy and profitable process.

Financial Gains

In dollar terms, the benefits of EnviroSCAN[®] are obvious as seen in the table below:

Table 2. Dollar Return per hectare on Crop Based on Price of \$193/T.

| Year | SAFRIES \$ | District Average \$ | \$ Increase/ Ha |
|-------------|-------------------|----------------------------|------------------------|
| 1998 | 10,723 | 10,036 | 687 |
| 1999 | 10,146 | 8,545 | 1,601 |
| 2000 | 11,443 | 9,052 | 2,391 |

Per hectare, this SAFRIES grower's gross income was between \$687 and \$2,391 above the district average.

Based on a 100Ha of potatoes, SAFRIES dollar return was \$68,700 to \$239,100 above the district average return.

Update

Since this case study was undertaken Paul Frost has continued to work with various growers in the lower South East of South Australia throughout 2001 and 2002. Mr. Frost stated, “we are currently running 14 EnviroSCAN[®] systems in 14 different crops in the lower South East and are continuing to monitor and schedule irrigation's according to highly accurate EnviroSCAN[®] data.”

He went onto say that the current growers that he is working with using the EnviroSCAN[®] system are continuing to have better quality crops and yield.

Additionally, Paul Frost discussed how he is using the EnviroSCAN[®] system as a research tool to confirm various hypotheses of water distribution in the potato crops.

Conclusion

The EnviroSCAN[®] system has provided and continues to provide SAFRIES with many benefits. The capabilities that enable SAFRIES contract growers, with agronomic assistance, to:

- ✓ increase irrigation efficiency
- ✓ increase return on applied water
- ✓ determine the level of crop stress
- ✓ improve nutrient input and
- ✓ increase saleable product

All of the above mentioned benefits have all assisted in boosting the profitability of SAFRIES. For over 5 years EnviroSCAN[®] together with SAFRIES has revolutionised water-monitoring management in potato crops in the South East of South Australia.

For more information on Sentek Sensor Technologies and its product range please contact Sentek Marketing Coordinator Adrian Manera at amanera@sentek.com.au or visit www.sentek.com.au to arrange a product information pack to be sent to you.

Acknowledgements

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