Brian Englefield grows wine grapes at Robinvale for Brown Brothers, a major wine producer. The area has a high water table and freely draining soils. Over irrigation throughout the region has contributed to a rise in the water table and this has brought with it salinity problems and irrigation management difficulties.

Brian has installed tile drains at 120 cm to try and drain excess water out of the profile. A drainage fraction of ten percent is necessary to flush the salinity out of the root zone, and Brian's aim is to restrict drainage to this ten percent. In 1991 Brian purchased a neutron probe to monitor soil water content to try and improve irrigation scheduling management and reduce deep drainage.

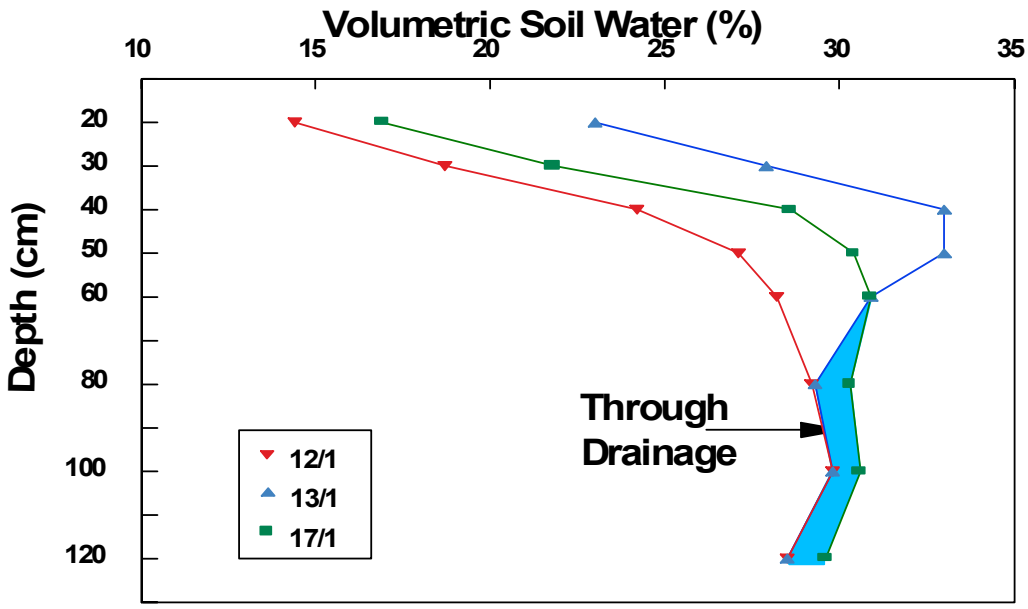

Figure 1: Deep Drainage Under Wine Grapes.

Figure 1 illustrates deep drainage at site 1 after an irrigation. A reading was taken on 12/1 just before an irrigation. On 13/1, 20 hours after the irrigation, the profile was wetter at 20, 30, 40, 50 and 60 cm, and there was no change at 80, 100 and 120 cm. Four days later on 17/1 the profile was drier at 20, 30, 40 and 50 cm, no change at 60 cm and wetter at 80, 100 and 120 cm. Water use in the 0-70 cm layer was higher (7.6 mm/day) than readings before the irrigation (5.3 mm/day). These two facts indicate that excess irrigation water was draining into deeper layers. Regularly irrigated crops do not usually use water at 80, to 120 cm, so this water has been lost to deep drainage.

As already discussed some drainage, ten percent, was desired to flush salinity down the profile into the tile drains. The full point was set for each site to try and achieve this goal. The aim at each irrigation was to wet the soil up to this full point. If the profile was made any wetter than the full point an excessive amount of water would be lost as deep drainage. A refill point was set 50 mm below the full point and the irrigation schedule was to be managed so that the profile did not get any drier than this during the season, ensuring optimum moisture conditions for the vines at all times.

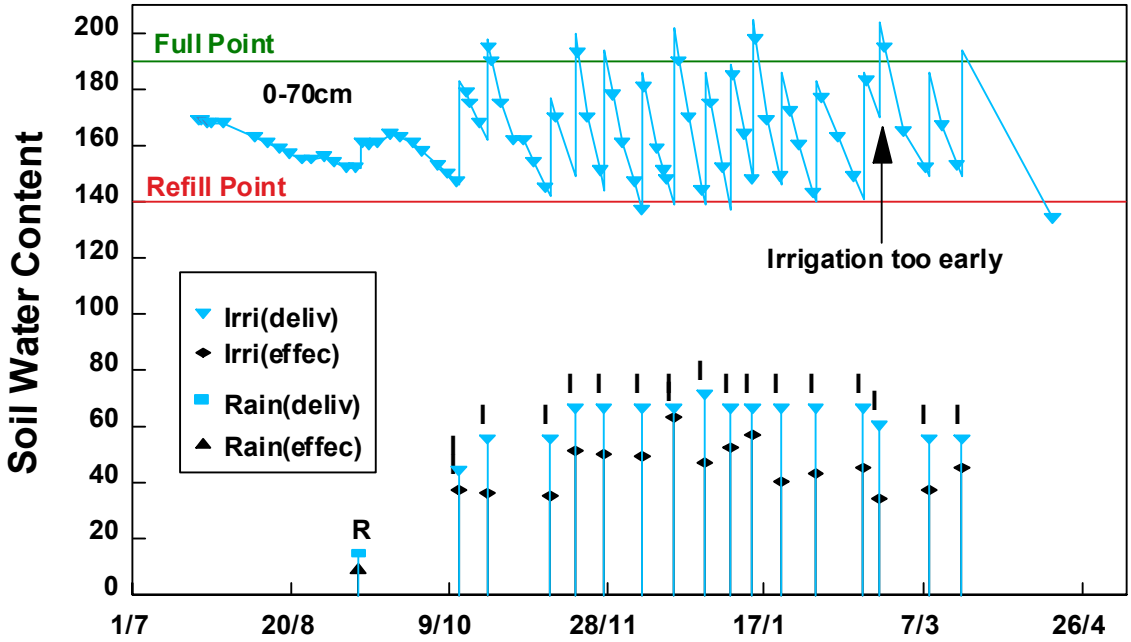

Figure 2: Soil Water Content Wine Grapes 1991/2

Figure 2 illustrates the soil water content for the 0-70cm layer throughout the season. The water content was kept between the full and refill point for most of the season. One exception was the irrigation on the 21/2 which was too early, only five days after the previous irrigation. The result was that 30 mm of the 60 mm applied was lost to deep drainage. Soil water content was never more than 5 mm below the refill point and the vines were not stressed during the season.

The resulting irrigation schedule differed from the schedule that had been used in past years. During spring it was found that over irrigation had been occurring and for this season the irrigation interval was increased from the usual 20 day interval to a 25-30 day interval depending on the crop being irrigated. In summer the crop had been under irrigated and the interval was reduced from 20 days to 7-14 days. Over the season a similar amount of water was pumped as in the past but water was used more efficiently with less water logging and drainage in spring and no moisture stress in summer. Water was used efficiently throughout the season and good yields of a high quality were obtained.

Another benefit of being able to measure the soil water content accurately is that Brian is now able to manage the system to take advantage of cheap off peak electricity. He can do this confident that soil moisture will be maintained at optimum levels. Significant savings of thousands of dollars have been possible in addition to the agronomic benefits.

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