Effluent technology and fail-safe tools (6-63)

The advancement and affordability of new technology is allowing for the development of tools and programs to help with farm management decisions, including effluent, water, and nutrient management. These tools allow for more informed decision making, and make monitoring and recording much easier, although they do not replace first hand observation.

Software and Netware

There is a range of software and netware available for planning, monitoring, recording and integrating effluent management into the farm system. These work by capturing information from on-farm recording devices such as moisture tapes and weather stations, and the information is sent to a local computer or to the internet for access by multiple users.

Smart phones

The use of smart phones and tablets is growing rapidly. They can provide the ability to record data electronically, rapid access to answers via the internet, or text, uploading of farm instructions and many farm management packages now provide smart phone applications. There are also many freely available apps which lend themselves to manage and record tasks useful for effluent management (e.g. slope measurement apps).

Soil Moisture Monitoring

Soil moisture sensors can be placed in the soil profile for soil moisture deficit determination. This information can be used for effluent planning applications – decision rules can be applied to say when and how much to irrigate.

This data can be collected at point of source or sent via wireless or telemetry to a central point or to a cell phone. It can then be sent on to farm staff to tell them how much effluent they can safely apply that day.

Pumps

Pumping time controls and pump pressure sensors are available to make effluent systems more reliable. A combination of these can be used to help prevent unintended effluent spills and
protect equipment. For example, a low pressure cut-out would stop the pump if a hose burst, preventing it from continuing to pump effluent out onto the pasture. Conversely, a high pressure sensor would turn the pump off if there is a blockage in the system which is causing excessive pressure build up.

These two switch types are usually used together. It may take a bit of trial and error to get the settings right for your farm, especially if there are contour changes or there are long pumping distances.

**Pond or sump level alarms**

These are a float switch that will turn on when the pond/sump water level reaches a pre-set trigger level. There are several different types and it pays to get one that will fit best with your system. Flashing lights and audio alarms that can be seen or heard at a distance can be added.

More complex monitoring systems have been developed to measure pond levels. Sensors are placed above the surface of the pond, a level is preset with the sensor and it will then report on the change in depth from that point to indicate decrease or increase in depth. This is reported back to a computer or internet system. Full pond alerts can be sent via email or text for effluent planning decisions.

**Timers**

Timers can be a very cost effective means of managing effluent application safely. In sprinkler systems it can be used to apply a specified depth. For example, if you know the system applies 5mm per hour and run it for 2 hours to get 10mm applied depth. BUT the hourly application rate must be measured and known for YOUR system for this to be a safe and legal means of application.

If you rely on theoretical depth information to calculate your applied depth, you may introduce errors. For example, if it is assumed that the applicator is applying 5mm but, in reality, it is applying 9mm and you run it for 3 hours, you will apply 27mm rather than the 15mm assumed, (which may breach your consent conditions).

**Applicator devices**

*Motion sensors.* These devices are either attached to the travelling irrigator directly, (e.g. on the wheel) or towed behind the irrigator on a small trailer. When the irrigator is moving there is no signal interruption, but if the irrigator stops moving for more than a pre-set time an alarm will be sent to a nominated device. This may turn off the pump or text someone to alert them that this has happened.

*GPS tracking.* Another method of monitoring travelling applicators is with the use of global positioning systems (GPS). In this case a GPS unit is attached to the irrigator. Its position is then monitored via satellite, the signal sent to a computer or internet via a wireless or telemetric network. The advantage of this system is that runs can be recorded and overlaid on a map, and used for proof of placement. When coupled with other data, facts such as irrigation speed, application depth and nutrient application rates could be calculated. You can also use GPS to pre-set no-go areas such as waterways and wetlands. The irrigator will then turn off before it gets into these areas.

Both of these technologies rely on telemetry or wireless networks on the farm to get the data to a monitoring point. In areas where there is no cell phone coverage and variable topography (preventing line of sight signals) extra cost maybe incurred to get this technology operable.