

CASE STUDY 4

LANDOWNER'S EXPERIENCE IN IRRIGATION INFRASTRUCTURE IMPROVEMENT

Background

A landowner operates a dairy farm in Tatura in the Shepparton Irrigation Region. He is thinking of buying more land and water and improve the layout for farm efficiency.

Using the 5-Step decision-making processes, the landowner made the following assessment of his property and made the decision to improve his current border-check irrigation.

STEP 1: What do I want to achieve?

The landowner wanted to evaluate options for expanding the irrigated area of his farm through the purchase of land and water and improve irrigation layout and infrastructure.

STEP 2: What are my farm's features and constraints?

In the late 1970's, before the introduction of laser-grading in the region, this farm was operating a 100 hectare partially irrigated (45 hectare) dairy farm in Tatura in the Shepparton Irrigation Region. At that time he started to re-develop the first paddock on his farm by changing the direction of the bays, widening them from 10 to 30 metres and grading to a slope of (roughly) 1:1000. He used a large tractor-pulled land-plane, borrowed from the neighbours. This work was all done without any consideration to its impact on the rest of the farm.

When a 75 mm storm followed an irrigation event, the bottom part of the paddock and the adjoining roads flooded for several days. Obviously drainage had not been considered in the "design" of these earthworks. The question was posed "how should I go about further developing my farm?".

STEP 3: What irrigation options should I consider?

During the early 1980's, border-check irrigation was the only system that was readily available in the Region. The concept of whole farm planning had only just been developed and was slowly being adopted by the more progressive farmers in the region. The landowner decided that he wanted a whole farm plan for his farm.

Specialist farm irrigation design services were starting to be developed in the Region but whole farm planning incentives were not available and farmers had to fully carry the Whole Farm Plan development and implementation costs.

The landowner's whole farm plan was the first one developed by an irrigation survey and design company in the Region. Over a 2-year period the design was discussed and changed several times, resulting in the late incorporation of a drainage re-use system and a large above ground storage dam. Two

years after starting the planning process, implementation of works began in 1982, a year of drought.

More recently the landowner has considered the possibility of changing part of his irrigation system to centre pivot. However, the part of the farm with the lighter soil types that would be most appropriate for this system had some pockets of remnant tree vegetation. The landowner was not willing to sacrifice the trees.

Also, with the new irrigation layout and the re-use system fully operational, the landowner feels that he has reduced deep drainage to the watertable although he is not sure about this; *“the dry conditions over the past five years would have helped as well!”*.

STEP 4: What needs to be included in my design, and what will it cost?

The first step in the farm re-development process was to provide drainage to the paddock with flooding problems. As no regional drainage was available, on-farm drains were constructed to collect the runoff and connected to the new above ground storage dam.

Initially bays were graded to a 1:800 slope as per the design, but after a few test runs this design slope proved to be too flat and steeper slopes were adopted for the remaining part of the farm.

When the laser-grading was done, topsoiling was not considered necessary as soil-structural problems were thought to be manageable with the application of gypsum and fertiliser. However, large field-scale trials at the Kyabram Research Institute in the early 1980's proved this approach to be incorrect. He learned from this lesson and applied topsoiling on all paddocks where more than a 10 cm cut was needed.

Cutting corners proved to be costly. During the early stages of implementation, channels and dams were filled in without first cleaning out the soft 'muck'. Settling of the wet sediments resulted in the old channels and dams soon showing up as depressions in the newly lasered bays. They had to be excavated, the softer sediment removed, filled with dry soil and re-graded.

The choice of a good contractor also proved invaluable. *“Some contractors use their head, others just do as they are told”* the landowner says, *“Try to get the one that thinks!”*. In this case the contractor picked up design errors by the surveyor and saved him from shifting dirt where it was not needed. *“It is important to constantly stay in touch with the implementation process, to continuously re-evaluate your Whole Farm Plan, and change it when necessary,”* the landowner concluded.

A good contractor can identify mistakes in designs; and good designers can identify mistakes made by contractors. Over the years the landowner has used his surveyor to check on layout and construction (eg, levels) and has had them corrected when needed.

The landowners recommendations:

- 1:800 slopes are too flat! Aim for 1:650;
- Aim for 'fast' watering of 4-5 hrs;
- Keep in close touch with your designer and re-evaluate the design several times before and, if needed, during implementation;
- Pick your contractor carefully;
- Learn from other people's mistakes and always get the most recent up-to-date information;
- Think twice before investing in sprinkler irrigation, especially if your soils are medium to heavy.

STEP 5: What options best meet my goals?

The re-development of this farm has been a process of continuous improvement. Over the years the size of the farm has increased considerably, additional water has been purchased and farm layout has been changed extensively. The option of conversion to centre pivot was considered for a light soil section of the farm but was discounted as the landowner was "*not willing to sacrifice a block of remnant vegetation that he would have to remove*".

The provision of a community drainage system to service the farm some years ago was a big step forward and offered protection from flooding during wet winters, although the prevailing drought conditions have meant that the system has not yet been put to the test.