CASE STUDY 3

BORDER-CHECK IRRIGATION PERFORMANCE ON A HEAVY SOIL IN THE KATAMATITE DISTRICT, NORTHERN VICTORIA

Background

The owner operates a 200 hectare dairy farm in the Murray Valley Irrigation Area of northern Victoria. A 30 hectare section of the farm was monitored for border-check irrigation performance and pasture production under a Department of Primary Industries research project (see Figure 2 below for field site layout). The soil type on the block is predominantly heavy clay. The landowner wants to know his irrigation performance and also find whether he can improve on his current system.

Using the 5-Step decision-making processes, the landowner made the following assessment of his property and made an informed decision on the adoption of a system that best suited his property.

STEP 1: What do I want to achieve?

The landowner's objective is to evaluate the irrigation performance of the current border-check system.

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

On this property:

- Irrigation bays are approximately 350 metres long and 50 metres wide.
- Bay slope varies from 1:600 to 1:800.
- Irrigation application times ranged between 3 and 6 hours, depending on the bay slopes.
- Irrigations were managed so that water reaches the bottom of the bays with minimal run-off.
- Irrigation was cut-off when the advance front reached 175 m to 180 m, although this fluctuated, depending on the interval between irrigations.
- Runoff was collected in the re-use dam for later use on other parts of the farm.
- Irrigation was scheduled according to the recommended best management practice in the Shepparton Irrigation Region, which is after 50 mm of pan evaporation less rainfall (E-R) has occurred. This is equivalent to 40 mm of pasture water use, resulting in an irrigation interval of about 7 days.

The landowner decided to do a detailed evaluation of his current system. They moved straight to **Step 2.3.7.1** of the decision-support Guidelines.

STEP 2.3.7.1: How much water can I potentially save?

This step helped the landowner to assess his current seasonal irrigation efficiency. Since an improved irrigation system is an important element of the farm business, a review of the system performance could identify areas for improvement (eg, improving irrigation efficiency, reducing deep drainage or waterlogging).

The research project identified seasonal irrigation efficiencies for 2004/05 and 2005/06 of respectively 90 % and 96%. The seasonal irrigation efficiency for the 2004/05 was slightly reduced by an un-seasonal summer rainfall event in February 2005. However, the seasonal irrigation efficiencies are in the upper bound of reported figures for border-check systems in the literature (Clemmens 2000).

A combination of good layout design and management resulted in a matching of the infiltrated depth of water (irrigation plus rainfall less run-off) and demand. There was close correspondence between monthly measures of pasture water use (ET_a) and water supplied as rainfall plus irrigation (Figure 1 below).

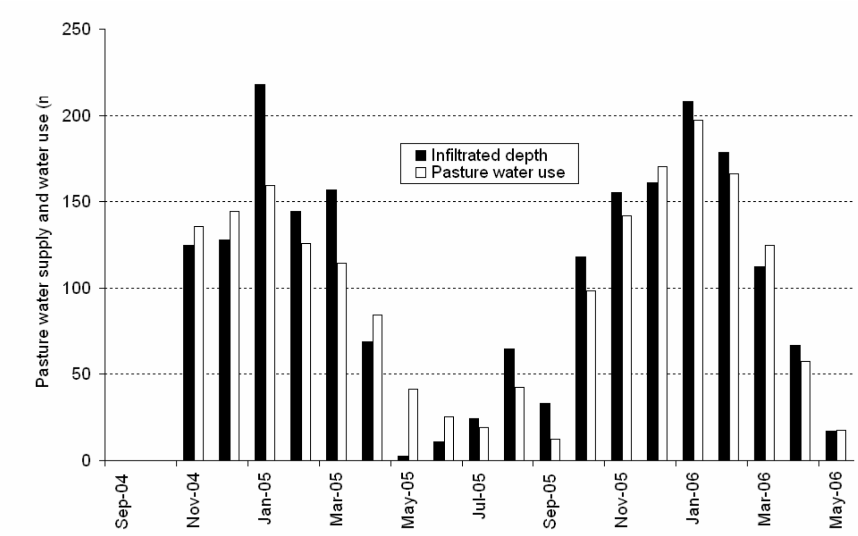


Figure 1: Comparison between monthly water supply (irrigation and rainfall less rainfall), and pasture water use for the 2004/05 and 2005/06 irrigation seasons.

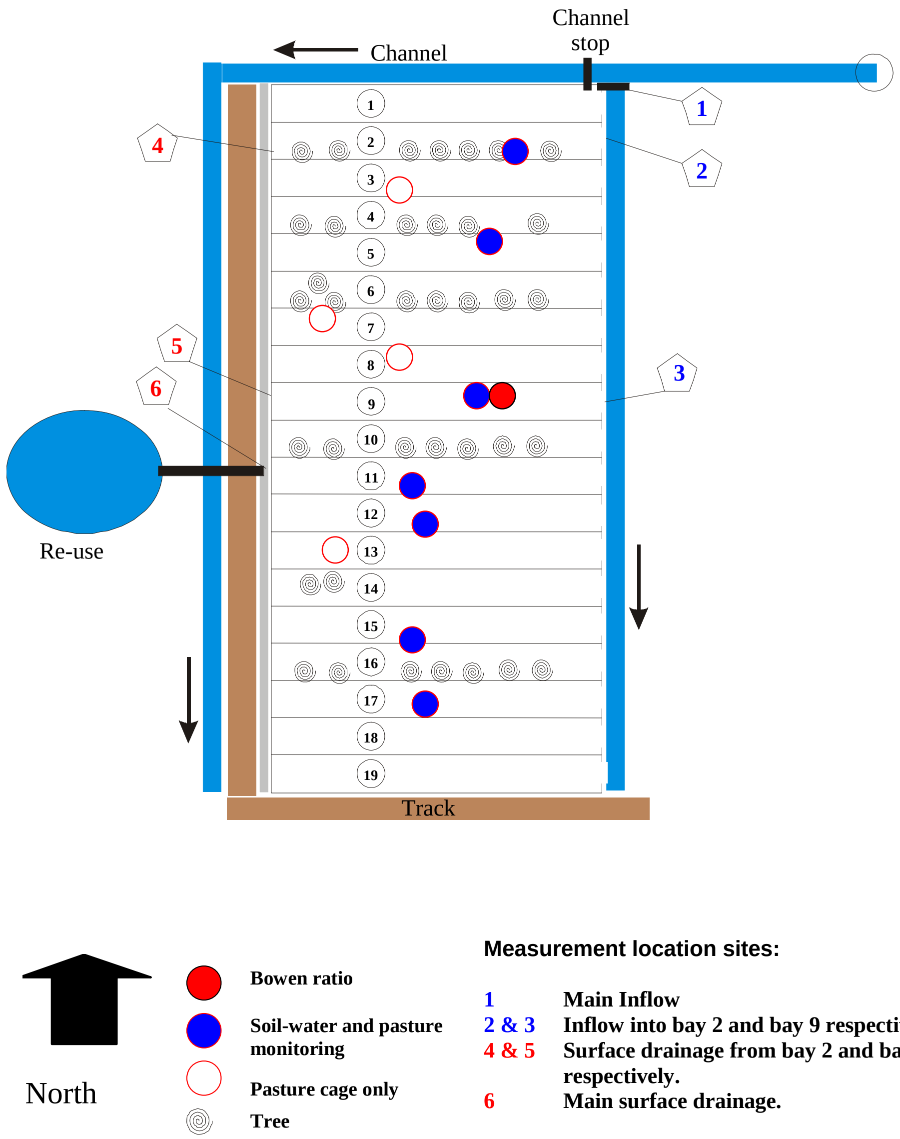
STEP 5: What option(s) best meet(s) my goals?

Following the 5-Step irrigation system selection and design Guidelines, the landowner was able to evaluate his system performance and make an informed decision on whether to change the system to pressurised irrigation or keep the current border-check. The landholder believes that his system performs efficiently, fits well with the farm situation (both current and long-term) and is very happy with his investment.

The landowner in the case study was able to use the irrigation efficiency information from the research project on his farm to evaluate irrigation performance. This resulted in the availability of better, more accurate information than would have been the case under “normal” farm conditions. However, approximate water balance information can be obtained as described under Step 2.3.7 in the Guidelines.

Figure 2: Field site layout

Comment [H1]: This needs a scale bar to indicate dimensions



Measurement location sites:

1	**Main Inflow**
2 & 3	**Inflow into bay 2 and bay 9 respectively.**
4 & 5	**Surface drainage from bay 2 and bay 9 respectively.**
6	**Main surface drainage.**