

1 – RATIONALE FOR A FARM DAM

1.1 Why build a farm dam?

There are a number of reasons to build a farm dam including:

- Additional water available for irrigation
 - o Farm runoff and local catchment runoff can be stored for later irrigation.
 - o Water harvested during times of high flow can be stored in farm dams for later use.
- Improved irrigation and drainage
 - o Tail water recycling can improve the efficiency of furrow irrigation.
 - o Low lying areas can be drained to bring them into production
- Reduced loss of chemicals and nutrients off site.
 - o Farm dams can catch runoff from irrigation and rainfall events to reduce the potential loss of chemicals and nutrients to the external environment.
- Provision of a buffer storage
 - o Farm dams can give growers more flexibility to overcome problems that might occur when their irrigation supply is irregular or too small. For example if irrigation scheme supply channels are scheduled to be closed for maintenance during a period of crop demand, water could be pumped into a farm dam in advance to provide for the crop's needs. Alternately, a farm dam could be used to store water from a bore which has a flow rate too small to allow continuous irrigation.
- Improved property values
 - o By having a farm dam, water is more likely to be available when the crop needs it, therefore crops yields could be expected to improve. This would help to stabilize and possibly increase the income flow of a farm.
 - o Assets such as farm dams (and the associated infrastructure) add value to a property.

1.2 Potential for Farm Dams in the Bundaberg Area

Estimates show that it is economically feasible to irrigate sugar cane at rates of up to 7 ML/ha/yr in the Bundaberg area. The current nominal allocation is 4.1 ML/ha/yr in the Bundaberg-Isis irrigation system, but the available allocation in recent times has only been 2.2 ML/ha/yr. This leaves a shortfall of approximately 5 ML/ha/yr between crop requirements and water availability. The median catchment runoff in the Bundaberg area is estimated to be in the order of 1 ML/ha/yr. Farm dams can be used to collect local catchment runoff and flood-harvested water to improve water availability and increase farm profitability.

1.3 Typical Scenario for a Bundaberg Cane Farm

A software package called DamEa\$y has been developed to gauge the economic potential for farm dams in the Bundaberg area. DamEa\$y was developed by Sugar Co-operative Research Centre (CRC) and Commonwealth Scientific and Industrial Research Organisation (CSIRO). The objective of DamEa\$y is to model sugar cane crop growth and farm economics in a way that enables analysis of the likely costs and benefits of various scenarios involving investments in farm dams. For more details on this program see the DamEa\$y manual. A simple example of its use is outlined below to illustrate the economics of a typical scenario in the Bundaberg area.

A typical farm in the Bundaberg area might have characteristics similar to those given in Table 1-1. Using these parameters, DamEa\$y was used to simulate the potential increase in cane yield if a 50 ML dam was constructed on this property. Note that although the nominal allocation may be around 4 ML/ha, the announced allocation over the long term may only be around 2 ML/ha.

Using historic climatic data from 1958 to 1998, the modelling found median runoff from the catchment to be 111 ML/yr with the median irrigation from the farm dam being slightly less at 91 ML/yr due to overflow, evaporation and seepage. The predicted yields for the scenario with no farm dam and with a 50 ML dam are shown in Figure 1-1.

TABLE 1-1– TYPICAL FARM SCENARIO FOR BUNDABERG AREA

Parameter	Value
Soil Type	Silt
Allocation (ML/ha)	2
Access to Out of Allocation (Y/N)	Yes
Available Catchment Area (ha)	100
Available Irrigated Area (ha)	50
Irrigation Efficiency (%)	75

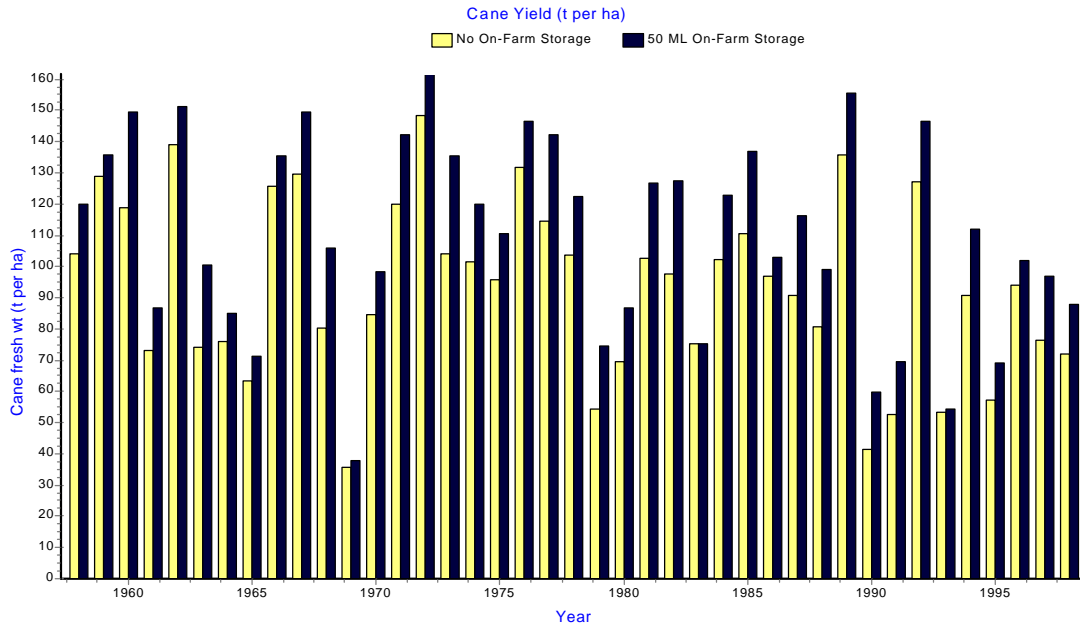


FIGURE 1-1 CANE YIELD OVER TIME FOR A FARM WITH NO DAM AND A FARM WITH A 50 ML DAM

The mean yield over the period is 94 t/ha for the farm with no dam and 111 t/ha for the farm with a 50 ML dam. Assuming a cane price of \$24/t (after harvest & levy costs), this equates to an increase in gross income of \$20,400/year over the 50 ha. The operating cost to account for pumping and labour, can be estimated at \$60/ML or approximately \$5500 for the 91 ML/yr. This gives an increase in net income of \$14900/yr. Earthworks costs for a 50 ML dam could be estimated at \$750/ML (depending on design and site), or \$37,500, with an additional \$20,000 for a pump system. Therefore, the total capital cost would be around \$57,500. This gives the dam a return on investment of 26% pa (\$14,900/\$57,500). This could be regarded as a good investment.

Note this is a general example to give an idea of the numbers and the process involved. Each case will have site-specific factors that could make the results of the analysis more or less favourable. The economic analysis for this example only takes into account the increased income due to improved cane yield. There may also be additional benefits to consider, such as those mentioned in Section 1.1.