



# **Irrigation Information Report**

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**A financial decision making framework for irrigation conversion**

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# 1 Background

The Ritso Society has instigated a programme of farmer education related to the prospect of large scale irrigation development in the Central Plains area of Canterbury.

The Objective of this report is to:

***Provide farmers with a financial decision making framework and information needs and sources.***

A companion report titled “The physical and financial impacts of conversion from dryland to irrigated farming”, is designed to provide farmers with background information on the physical and financial impacts of conversion from dryland to irrigated farming.

The information in this report is provided as an overall financial decision making framework which farmers can use as a process guide to assess the financial viability of the opportunity to irrigate on their own properties. Individual circumstances may mean that other issues are also important in the decision making process.

## 2 The Overall Decision Making Process

Figure 1:

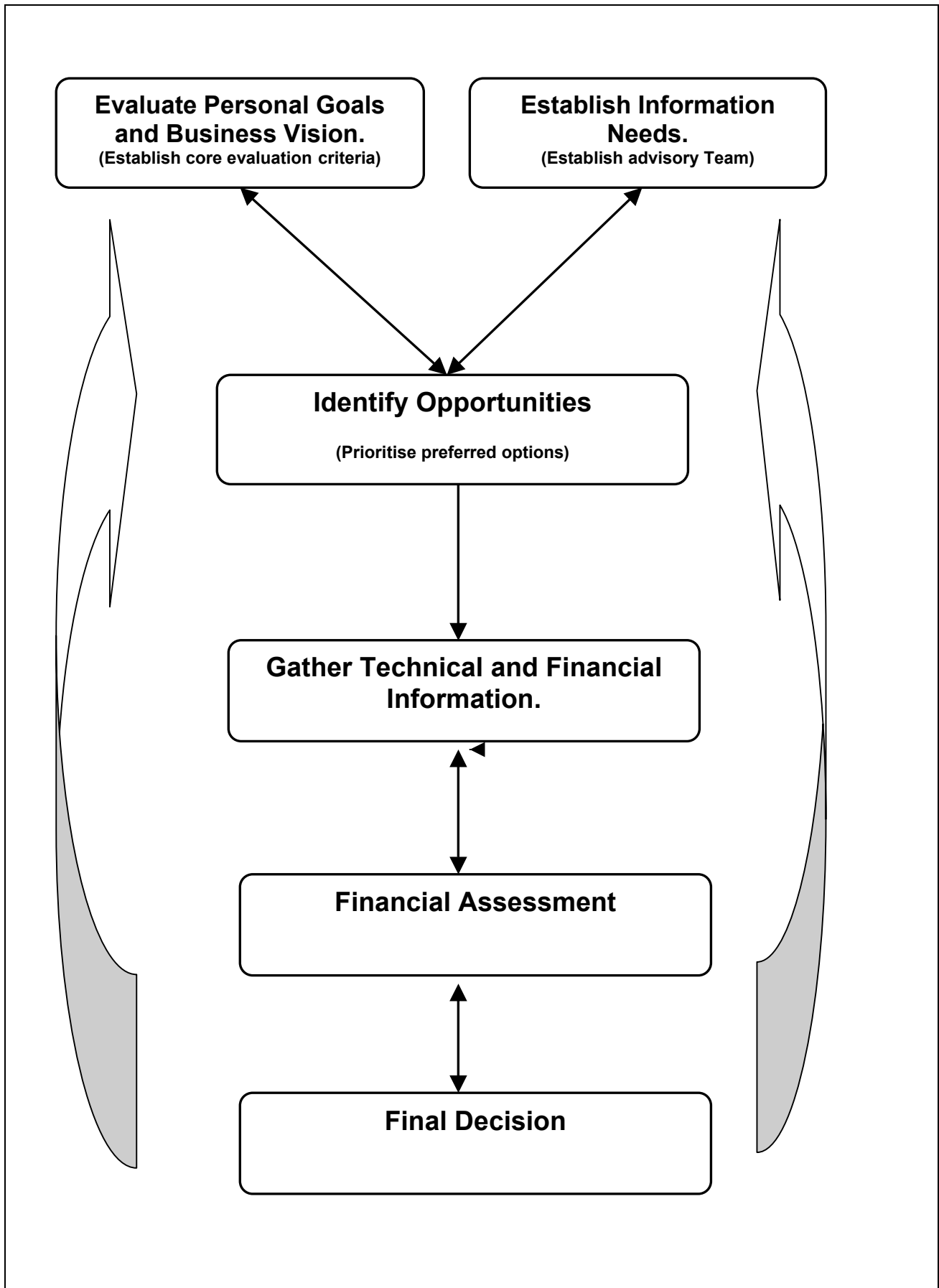


Figure 1 gives an overview of the decision making process.

The path from first considering the opportunity to irrigate through to commissioning the irrigation system and operating your new farming operation is full of evaluations and decisions that need to be made. The achievement of certain financial criteria will be key to many of these decisions. However it is important that the financial assessment and decision making is carried out within the context of your overall personal and business goals.

Sometimes an option can achieve very high financial performance criteria but will conflict with your personal visions and goals. The decision you will make is all about making the opportunity work for you so it is important to remain in control of where it takes you, not the other way around. That is why the first step in the process is to re evaluate your personal goals and business vision. These should then stand as the core evaluation criteria for any of the decisions that follow.

The best decisions are based on good evaluation backed up by quality and reliable information. Any evaluation process requires good information. In the case of evaluating irrigation development options there is a huge range of information on a diverse range of topics that must be brought together to complete a robust evaluation process.

When looking at something which is relatively new the biggest hurdle is knowing what questions to ask and who to ask. This is sometimes called the “Don’t know what you don’t know” stage. Developing a strategy to create information needs and requirements is an important step to overcoming this hurdle.

“Who are you going to call?” is the next important issue once you have compiled your list of information needs. At this stage it is worthwhile building a team of advisors and information providers that have experience in the various aspects of irrigation development. Sometimes other farmers who have been through the process are good sources of advice on information needs or references for members of your team. Some members of your team will be there because of their decision making skills rather than their technical knowledge, others may be there because you value and respect their opinions. Keeping the team fully involved in the process can make sure that things work out to your best advantage.

The opportunity to take up irrigation water on a dryland property opens up a wide range of opportunities. These range from selling the property at the increased value created by the irrigation potential through to making a complete change of farming system under irrigation like converting to dairy farming. The majority of options will fall in between these two extremes and will most likely involve a combination of both intensification and diversification of the farming enterprise.

The first step is to identify the opportunities that you see as being valid for you and then placing them in a priority order according to how they will help you meet your personal and business goals. This can be done by evaluating the options against your criteria. Once this has been completed you should have identified a preferred option, or at least a short list of options.

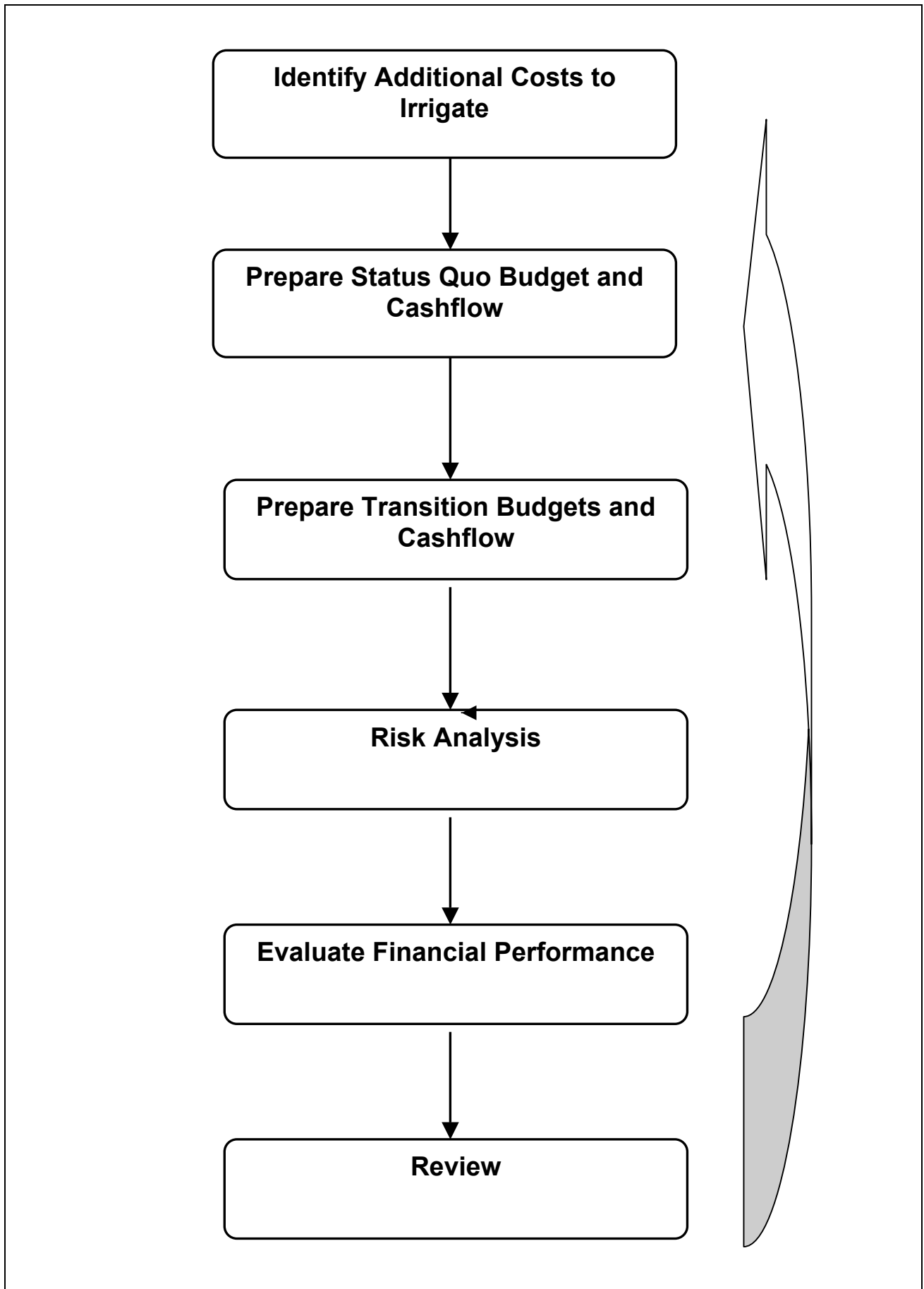
The next task is to gather together the technical and financial information that you will need to determine the financial viability of your options. This step will require some degree of choice around the type of irrigation system that you wish to use. The Farmers Irrigation Management Group has put out an excellent publication called “The Irrigation Guide – A guide to decision making when going irrigating.”

Once this has been done the capital cost and financial performance and viability of irrigation can be assessed. This report suggests an evaluation framework for this part of the decision.

At all times during the process it is necessary to check back to your original evaluation criteria and bring your advisory team into the decision making loop. You may take several attempts at the evaluation, modifying your choices as you go before you come up with the solution that best suits you.

### 3 Financial Decision Making Framework.

Figure 2:



### 3.1 Additional Costs to Irrigate.

This section outlines the additional costs related to irrigation development. They are in the form of capital costs and on and off farm irrigation operating costs.

#### 3.1.1 Capital Costs.

The capital costs to be considered are listed in Table 1.

**Table 1: Capital Costs**

Capital Property Conversion Costs
Clean up (trees, fences etc)
Irrigation System
Cow Shed
Electricity
Housing
Other Buildings
Fencing and Lanes
Stockwater
Fertiliser
Regrassing
Machinery
Livestock
Water access costs
Supplier / Purchaser Shares
Water Company Shares

Capital conversion costs will vary significantly from property to property according to the nature of the property and the infrastructural improvements already in place. Irrigation system choice is one of the biggest determinants of total capital costs because of the variation in installation costs of systems.

In many instances changes or intensification of land use leads to a requirement to purchase new or additional shares in businesses involved in the supply of goods (e.g. fertiliser companies) or the purchase of outputs (e.g. Fonterra or meat processors).

Purchase of shares in a water supply company quite often requires a significant capital contribution in order to provide equity in the water supply company.

#### 3.1.2 Irrigation Operating Costs

**Table 2: Irrigation Operating Costs**

On Farm Operating Costs
Energy Supply
Energy
Repairs and Maintenance.
Off Farm Costs
Annual Water Charges

Operating costs of irrigation systems include electricity supply and energy costs as well as repairs and maintenance on the irrigation equipment.

### 3.2 Status Quo Budget and Cashflow

The best test of the financial viability of irrigation conversion is to estimate the financial performance of the business once it is up and running with no change (status quo); that is once all the conversion is completed and the system has had time for the development carried out to reach peak performance.

Most farmers will already have an electronic budgeting template that they use. Generally they take the format as shown in summary in Table 3.

**Table 3: Budget Format**

	Revenue
-	Farm Working Expenses
-	Interest and Rent
=	<b>Cash Farm Surplus</b>
-	Taxation
=	<b>Net Trading Profit After Tax</b>
-	Drawings
-	Principal Repayments
-	Development
-	Capital Purchases
=	<b>Disposable Surplus (Deficit)</b>

The choice of some of the key criteria to be used in the Status Quo budget is important. The first of these is the physical production parameters to be assumed and the second is the product price parameters.

Production parameters should be set at levels that are known to be sustainable in the long term. They should not reflect absolute top end performance but a more realistic estimate of what can be achieved on average year in and year out. The product price parameters used should reflect a medium term outlook for the sector that you are in.

The other important outcome of the status quo budgeting exercise is the preparation of a cashflow to determine the annual working capital requirement of the operation.

### 3.3 Transition Budgets and Cashflow.

There may be additional costs involved in the process of carrying out the conversion and making the transition to the status quo position. These costs are mainly working capital costs related to lost income during the conversion process or low income during the early conversion years. These costs can be significant and must be built into the financial analysis. This requires the calculation of budgets and cashflow for the transition years in order to determine the financial position at the time of reaching the status quo position.

The period of time that it takes for individual properties to get to the status quo level of performance will depend on a number of factors. The most significant of these will be the speed of the conversion process. Some land use diversification processes are carried out as “Greenfield” developments where the existing infrastructure is virtually completely removed and replaced with the infrastructure required for the new land use. Other conversion processes, particularly for

intensification of land use, are less aggressive and are staged over time. Often the speed of transition is determined by the nature of the property and any external constraints on the conversion process.

Generally the Greenfields type developments require more capital up front but take less time to achieve potential performance while the staged processes spread capital expenditure over time but tend to take longer to get to full productivity potential. The different cashflow impacts of these two paths can be quite significant.

### **3.4 Risk Analysis**

Although irrigation development makes a big contribution to the farm business in terms of reducing exposure to some of the risks inherent in dryland production, it is not in itself risk free. Because irrigated farming systems are generally high output systems with high capital input financial structures the degree of resilience to risk can be important, particularly in the early or transition years. There are still external and internal system factors that can create risk therefore risk analysis is a very important part of any financial decision making.

One of the most important irrigation risk factors to understand and to incorporate into financial analysis is the reliability of irrigation water supply. Quite often this is expressed as a percentage representing the proportion of time when water is available. However there are other factors such as timing, frequency, severity and duration of any restrictions that are likely to occur that are important determinants on the nature of any impacts on farm productivity. Understanding the nature of the restrictions that might occur is important in being able to incorporate them accurately into any risk analysis.

Apart from the issue of water reliability there are the standard risk factors in farming of:

- Market risks.
- Production risks.
- Climatic risks.
- Regulatory risks.

It is important to carry out an assessment of the degree of variability that each of these factors can create in financial performance. It is also important to be able to assess the impact of dual or multiple impacts. For example; what happens if product prices are at a low point in the same season that we experience a poor climatic season which limits production?

The most important part of any financial risk analysis is to get a feel for how sensitive the financial performance of the business is to fluctuations in any of the risk factors. At what point does the business make a loss and under what circumstances? Does it take just a small change in product prices to create a negative financial result or does it only occur at historically low product prices? It is important to understand the probability or likelihood of financial downturns occurring in order to make a decision on their significance on the business.

The other most important aspect of risk analysis is to assess the resilience of the business to any risks. Is a poor year's financial performance able to be made up in the next financial year or is it so significant that it will take several good financial years to recover.

Risk analysis can often lead to a re evaluation of the scope and speed of the conversion process.

### 3.5 Financial Performance Evaluation

The financial return from investment in irrigation can be considered from a number of perspectives;

- Farm Profitability
- Return on Capital
- Asset Value

Individual farmers will have their own idea of the sufficiency of the financial returns for each of the categories and the relative weightings that they put on each of the measures. Some may be solely interested in maximising farm profitability while others may be more interested in trading off profitability for asset growth. Most farmers will aim for an intermediate position between the two.

#### 3.5.1 Farm Profitability

Farm profitability is first reported as **Cash Farm Surplus (CFS.)**, This is a measure of the profitability of the farming operation itself.

Cash Farm Surplus = Gross Farm Revenue - Farm Working Expenses.

The next important measure is the **Disposable Cash Surplus**. This reports whether the surplus made from the farming operation is sufficient to provide for taxation, capital, re investment and give the owner sufficient return on their investment and time.

Disposable Cash Surplus = Cash Farm Surplus – tax - drawings – principal repayments – development expenditure – capital purchases.

The sufficiency of the Cash Farm Surplus and Disposable Cash Surplus will vary considerably according to the individual circumstances.

#### 3.5.2 Return on Capital

Two measures of return on capital are important.

The first is the return on **Total Farm Capital**, which is made up of the value of land, improvements, stock and plant. The return on total farm capital is a measure of the financial return to the assets employed in the farming business. The return on total farm capital in agriculture is traditionally low compared with other investment options as much of the investment return is related to the land asset and its capital value growth rather than the profitability of the farming operation.

Return on Total Farm Capital = Cash Farm Surplus / Value of land, improvements, stock and plant

The second measure is the return to the **Marginal Capital** involved in property conversion. This is a measure of the extra value created by the irrigation development in terms of the net increase in cash farm surplus and the return on the investment required to achieve the extra surplus. Generally farmers will be looking for a return on marginal capital which is greater than the borrowing cost of the capital or the opportunity cost of investing that money elsewhere (either on or off farm).

Return on Marginal Capital = Net increase in Cash Farm Surplus / Capital Conversion Cost.  
( CFS irrigated – CFS dryland)

### 3.5.3 Asset Value

One of the most significant impacts of the conversion process is to change the whole asset structure of the farming business. The **Change in Net Worth** of the land owner is an important consideration in irrigation conversion. This is because traditionally a significant proportion of the increased revenue from irrigated farming is capitalised into the asset value of the land.

$$\text{Net Worth} = \text{Value of total assets} - \text{Total debt}$$

(land, improvements, stock and plant)

$$\text{Change in Net Worth} = \text{Net Worth of irrigated property} - \text{Net Worth as dryland.}$$

### 3.6 Review

Once the financial performance parameters have been reviewed there may be a need to go back to some of the original assumptions and parameters to see how they can be changed to improve the financial performance of the investment.

