Farmer Adoption of Scheme Supplied Irrigation Water

Kellogg Rural Leaders Program 2014

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1. Abstract

The reasons for uptake of irrigation scheme water are relatively un-researched in Canterbury of New Zealand, and while there are a number of theories why scheme water is not adopted by farmers, it is not well documented. This pilot study of nine farmers across mid and central Canterbury was set up to make an initial insight into the reasons why farmers do and do not adopt irrigation from scheme supply in attempt to provide some information to developing irrigation schemes to how they might better serve the needs of the farming and wider community to ensure a more successful scheme. Of the irrigated and non-irrigated farmers interviewed, the prominent motivations for the adoption of scheme water are financial and lifestyle driven.

2. Key Findings

Dryland farmers decision to adopt scheme supplied irrigation water is primarily governed by lifestyle, productivity and financial motivation whereas the decision to adopt scheme supplied irrigation water by existing irrigated farmers is primarily financially driven.

While the farmers were pleased with the information provided by the scheme, the interviewed farmers preferred to conduct their own assessment of their water needs and their own financial assessment tailored to their personal circumstances and preferences.

The change in landscape alone was not a driving factor for reasons of farmers not to adopt scheme supplied irrigation water. Of the five interviewed, dryland farmers who had adopted scheme irrigation water, two were proposing partial farm system changes resulting from irrigation.

The additional factors that farmers gave consideration to while appraising the viability so scheme supplied irrigation water were; resource use efficiency and management, regulation compliance, regional economic and employment implications and the ability to alter the farming system in the future. Product a quality and reliability of the ability to produce the product rated highly.

Most farmers interviewed found the scheme provided information suitable, however there was a demand for more accurate information regarding water supply costs and reliability at the early stages of scheme development and would prefer a faster design and build phase. There was noted value in being able to talk to other farmers that were recently irrigated.

It was felt that the support of the community is won and lost in the early stages of the proposal and community support could be improved with the incorporation of community assets into the scheme, more consideration given to drafting maps, and the potential opportunity to invest in a community scheme.

While all hypotheses for not adopting scheme supplied irrigation water were found to be true to some degree, the most prominent reasons discovered for not adopting scheme were lifestyle, and financial motivation (as either succession planning or debt aversion)

3. Introduction

3.1. Background

Over the decades, New Zealand farmers have tried to manage risk, improve yields and produce consistent quality product. One of the ways they have done this is to develop and install irrigation on their properties.

Traditionally water was extracted from surface or artesian water supplies and flooded over land as either wild flood or borderdyke irrigation. As the artesian and surface water supplies became harder to abstract or reticulate the required areas, farmers began to drill wells and pump water out of the ground to irrigate land.

As time has progressed and more and more users have drilled bores for use of groundwater for various industrial uses, the resource has become almost fully irrigated, but there is still more land that could be irrigated.

With water for irrigation becoming more scarce, end users have become more skilled in the use of water applying it via methods of spray rather than flood, reducing the volume required by almost half and increasing productivity along the way.

Efficiency gains have not been enough to make enough water available for those who still desire it, so farmers and regional councils are looking at large reticulated irrigation schemes to move water from rivers to those who desire it. These schemes are increasingly using large dams or ponds to store sufficient water to provide the reliability to the farmers and other end users desire.

More dams, more channels, more pipework means more cost, and while most proposed irrigation schemes use gravity to generate pressure and therefore reduce running costs, they are very capital intensive and therefore incur high annual interest and principle charges. These charges are passed on from the scheme to the farmer on an annual basis.

Despite the apparent desire of farmers for irrigation water, when schemes enter the capital raise and share issue phases of development, often they do not sell all the shares they desire and in some cases not enough to enter the construction phase.

It is the intention of this project to take brief look at why some farmers do and some farmers do not elect to adopt irrigation that is offered by irrigation schemes. The resulting findings will hopefully inform any changes required to approaches for getting uptake of irrigation scheme water by farmers.

3.2. Issues for Consideration

The Government has earmarked $35 million in the form of the Irrigation Acceleration Fund (IAF) for investment in assisting rural communities to get infrastructure proposals to the investment ready stage for farmers. This fund demonstrates the government acknowledges that irrigation is pivotal in the growth of the national economy, yet not all farmers elect to take the water when it is offered. If the government invests heavily in the investigative stages and farmers then elect not to take up the proposal, the money invested by the government is seen to be “wasted,” this may result in the reduction of available funding for rural investment in the future.

Central Plains Water Ltd (CPW) is at a pivotal stage in development with not all the required pre-construction shares sold to all stages, what is holding farmers back from taking up the share offer?

Bore pumped water versus gravity pressurised water is the same cost in the upper plains areas when current energy prices are used, assuming inflation of electricity charges, pumping becomes less cost effective in time - why do existing bore irrigators not change to pressurised surface/scheme water?

In some areas power line networks are nearing or exceeding capacity at peak demand (driven by irrigation pumps, not dairy sheds as is often blamed), if irrigation demand for electricity is not reduced, the lines companies will have to carry out additional upgrades, pushing electricity prices up further.

In some Canterbury nutrient zones, the water quality outcomes as set by the regional council are labelled "not met." In order to achieve the outcomes desired, there needs to be additional water inserted into the catchment from alpine rivers to dilute some of the intensive farming effects, and convert the remaining flood irrigation to spray irrigation to reduce nutrient rich drainage. There is very little surplus alpine river water available if the schemes do not pipe (reduce losses before delivery). If farmers cannot reduce and dilute their footprint, it is likely that Environment Canterbury will force extensification of farming or heavy capital investment to remove stock from pastures at sensitive times of the year.

My calculations suggest that it is financially beneficial to pipe the schemes in both the short and the long term, why do some farmers tell me it is not an economically viable decision to pipe their schemes?

Schemes have theoretically 4.2mm/ha/day consented take rate, the on farm delivery is only 3.5mm/ha/day which is insufficient in the hottest times of the year. The farms for which I have back calculated pump hours by flow rate, farmers have been getting more water than they have been measuring. As measuring improves, and the volume we receive as farmers is aligned with what we are supposed to receive, we may find that 3.5mm/ha/day is insufficient. The only way to get more water in a fully allocated zone is to reduce your losses from distribution channels.

3.3. Literature Review

There has been a lot of work done modelling the scenarios and demonstrating the possible benefits of the adoption of irrigation and also a considerable amount of research reviewing the attitudes and behaviours of farmers with respect to risk management, of which irrigation is sometimes part of. What there does not appear to be is much research on is establishing the drivers behind what influences a farmer to adopt irrigation, other than as a drought management tool.

What the literature does find in common is that those that do irrigate typically have a more intensive and aggressive farming style, however it is does not conclude that any particular demographic of farmer is more inclined to farm intensively than another.

Bond and Wonder (1980) discuss that risk in agriculture has long had a significant impact on farmers investment decisions. Their study of 217 farmers showed that depending on the topic, the farmers preference for or aversion to risk changed. Within the results they showed that 40% of farmers were averse to risk, while only 20% showed a strong preference for risk. The study did show that if farmers showed an aversion to risk, their aversion was relatively small. The study could not conclude that aversion to risk could be correlated with any other particular combination of variables.

In 2005 Negri *et al.* conducted some theoretical modelling of climate change to estimate probable change in irrigation uptake in the United States. The modelling indicated that with a warming climate, irrigation adoption would increase, however they did note the unknown variables of the personal desires of the farmer and availability would be large contributing factors to the adoption of irrigation. What this paper does do is support Bond and Wonder (1980) findings that the variability

of the individual farmer is both difficult to predict and a large driving factor to the probable adoption of irrigation.

A paper presented to the international farm management congress in by Nartea *et al.* (2003) evaluated the option for farmers to diversify their risk management by investing in assets off farm. While the paper concluded that it could be more profitable for farmers over the longer term to invest off farm to stabilise economic returns, they also concluded that farmer were reluctant to invest in anything that they were not familiar with. Similar findings were made by Collins *et al.* (2001) when reviewing the Maungatapere Irrigation Scheme (MIS) proposal from 1980. Collins *et al.* noted that when local farmers were told if they wanted water they had to commit to horticulture, nearly all declined the water because they did not know how to or what to grow horticultural crops.

Morrison (2009) reviewed why there was a lack of adoption of decision support systems for existing irrigators. While he addressed issues facing existing irrigators and their management, he sites awareness of the products, awareness of the benefits, fear of failure resulting from poor use as drivers of adoptions. He also noted that the diffusion and targeted marketing of the product seemed to be the most effective way of optimising uptake, what he did not discuss is how you find the farmers bet targeted to adopt and promote the product.

Shenk *et al.* (2014), commented that farmers that were irrigated versus those not irrigated, did not typically have more stable incomes because they were more inclined to plant more valuable but riskier crops. Irrigation gives these farmers the ability to perform at a higher level of intensity.

Wheeler *et al.* (2012), showed that when looking at succession planning, those farms with irrigation and even more so, efficient irrigation, were more likely to have a succession plan than those farmers that had no, or lower efficiency of irrigation. Their research drew a correlation between profitability, efficient irrigation and a succession strategy.

3.4. Hypotheses

Based on the research above and the contact I have had with farmers I have developed what I think to be the six key reasons farmers choose to adopt scheme supplied irrigation, or not. They are:

1. Lack of information available specific to individual land holders, meaning no decision is made and therefore stay with the current system.
2. Aversion to additional debt or cannot present a robust enough business case to be able to attain finance.
3. Comfortable with the status quo.
4. Do not want to knock over trees.
5. Do not think it is financially justified.
6. Do not understand the longer term or wider implications of not changing the current system, land use or scheme.

4. Method

This pilot study of nine farmers has been set up to assess motivations behind irrigation water supply selection from a matrix of farmers. A conceptual matrix is outlined below.

Matrix of Participation:

	No Change of Water	Change of Water
Small System Change	• *Do not take scheme water if dryland.* • *Do not take scheme water is already well supply.* • *Continue farming the way they have been.*	• *Take scheme water if already has well.* • *Take scheme water and convert dryland to irrigated.* • *Continue farming the same system at the same or a heightened level of intensity.*
Big System Change	• *Do not take water but drastically change farming system.* (not focused on)	*eg: conversion from dryland to irrigated*

Farms 1,2,3 fit into the top right box of the matrix of participation. These farms are adopting scheme irrigation water and have not yet got irrigation.

Farms 4 and 5 also fit into the top right box but they are already irrigated and are changing from bore to scheme water supply.

Farms 6 and 7 fit into the bottom right box as they were traditionally dryland farmers and are going to adopt scheme supplied irrigation water and will be significantly changing their farming operations.

Farms 8 and 9 fit into the top left box, they have not adopted irrigation and have not changed system.

There were no farms selected for the bottom left box.

I have approached a range of irrigation schemes in the mid and central Canterbury area and asked to speak to some of the farmers that did and did not subscribe to the irrigation water recently offered.

As I progressed with interviews I found it increasingly difficult to get farmers who did not take irrigation water to participate in the process, therefore there are only two interviews with farmers that did not take on irrigation water.

Because my farmer selection process was of nominated people that would give answers, I expect that the information they provide may not be entirely representative of farmers as a whole.

Throughout the process, often the interviewees gave opinions on colleagues thought processes, while I have recorded these comments, I have tried not to give too much consideration to them in the discussion.

The interviews were laxly structured and oriented around six topics and questions:

1. Why/why not is the scheme a good idea?
2. Where do you source your information from to inform the decision making?
3. How much/what effect is the proposed activity likely to have on the way you farm?
4. How have you worked out the costs and benefits of scheme water supply to your operation?
5. What wider sector/longer term implications have you considered when making your decision?
6. What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

From the interviews, I have tried to look for and analyse systematic responses to evaluate what has influenced the farmer to make the decisions they have made and to see if there are any commonalities in thought processes between farmers.

5. Discussion of Findings

5.1. To Adopt or Not - Dryland

When firstly looking at whether or not farmers decided to adopt the scheme irrigation or not, the farmers interviewed were not necessarily motivated by one common thing, but rather those who did not choose to irrigate (but were at least interested in the idea of irrigation) were not motivated because they were comfortable with their farming system, they were in the later rather than earlier stages of their farming careers, did not want high levels of debt, did not have any successors wishing to farm, and did not want to have to manage additional staff.

Nartea *et al.* (2003) discussed farmers reluctance to invest in something with which they were not familiar. While the farmers in this study did source information and familiarised themselves with irrigation, most interviewees passed comment of farming colleagues that had not taken the options of irrigation water due to a lack of understanding, but similarly, the interviewees believed that many that did not understand, did not want to understand.

The farmers that did adopt the scheme irrigation had done a lot of investigation or were historically familiar with irrigation. These farmers also wanted to lift productivity and provide stability to quality and profitability of their system, while all considered the succession of the land to their children or the next generation of farmers. This is consistent with the findings of Stock and Forney (2014) who highlight the New Zealand farmers freedom and independence to do and try what they like as being the reason why 87% of farmers are their own boss.

All the farmers that took scheme water also have built storage dams and/or taken scheme supplied stored water to give them the reliability they need.

The uptakers of scheme irrigation water were not depicted by any age or demographic, but those that did not take scheme water were of an older demographic.

5.2. To Adopt or Not - Irrigated Already

The decision to adopt scheme irrigation water or not by those already with bore water was financially based. These farmers already knew the benefit of irrigation water, but were looking at costs of production. These findings were supported by Morrison (2009) who noted the awareness of the benefits and fear of failure resulting from poor use as drivers of adoptions.

Both deep well users evaluated the cost of the scheme compared to the cost of inflating electricity charges over their farming career and made a decision based on this, the other deep well user that was short of water and calculated the additional benefit of supplementary feed they could replace with pasture production and added that to their analysis.

Both of these farmers intended to use their wells as backup for reliability and both commented that some of their farming colleagues with shallower wells had turned down the scheme supplied water because it was financially more economical to pump from a well for their remaining farming careers.

5.3. Information Sourcing and Cost Benefit

While the interviewed farmers had found field days, seminars and hand outs provided by the scheme on the economics of irrigated and non irrigated systems, all farmers interviewed noted that the most useful information to them was the upfront costs, the ongoing costs and the reliability of the scheme.

All interviewed famers had completed their own preliminary investigations into farm profitability and water requirements and 8 of the 9 interviewed had independently sourced support from independent parties on irrigation design, irrigation water requirements and farm systems. They noted that the best financial information was the farm specific whether they had done it themselves or outsourced advice.

5.4. Effects on the Farm System and Landscape

All farmers who took scheme irrigation water that already had bore supplied water were going to see no significant change to their farm or farm system as they were proposing a simple water source change.

All farmers who did not take scheme irrigation water that were dryland, were not deterred by the physical changes to the farm scape, but deterred by the changes in the farming system which while they were familiar with at an academic level, were not familiar with at a management level. Collins *el.al* (2001) noted that when local farmers were told if they wanted water they had to commit to horticulture, nearly all declined the water because they did not know how to or what to grow horticultural crops.

While the interviewed farmers did were not deterred by the probable change in landscape of the farm, they commented that some of their colleagues reasons for not irrigating was influenced by probable change in landscape.

For those farmers that were adopting scheme supplied water that were dryland, there was a split of farm system change. Some were to continue faming similar systems to what they were farming dryland, but the irrigated systems would be more intensive. Some were to change at least part of their operation, and in these cases one of the reasons for farm system change was integration of enterprises.

5.5. Wider Sector Considerations

Those that had given wider sector consideration had thought primarily about the ease of regulation management that could be managed through an irrigation scheme.

They had thought about the wider and longer term regional economic and employment implication of the success of the scheme and thought they should contribute to it.

All that did adopt scheme water and were converting to irrigation from dryland had the opinion that it was unlikely that they would be presented with another opportunity for irrigation water within their farming careers to they should take the opportunity on offer to ensure it was available to both them and the following generations.

All farmers that adopted scheme supplied water and were dryland had given consideration to or were now realising the efficiency gains of other inputs that were obtained by streamlining the layout of a farm. While this could have been achieved without irrigation, irrigation promoted the change.

Physical resource management and ability to open access to other farming systems in the future also rated highly among dryland farmers.

All farmers who adopted any irrigation commented on the need to produce a quality product with a high degree of reliability.

Those farmers that had not elected to take up scheme irrigation water and were dryland farmers, made little comment of wider region implications of the irrigation water.

5.6. What went well and Improvements to make

All interviewees were pleased with the availability of information and farmer extension that was initiated by the scheme. They felt no more farm systems needed to be provided as they preferred to do their own analysis on systems and profitability.

Two of the 3 of the 9 interviewed farmers commented on the value of field trips to recently irrigated farms and the discussions they were able to have with those farmers to try and get a real feel for the process thy might be going through.

At the farmer level, there was a desire from farmers to have a more accurate timelines set, with a greater level of transparency around the reliability, command area and costs of the scheme. Especially the variation in sunning costs that was probable.

All farmers wanted an increased level of water reliability from the earlier stages to give them more confidence.

All farmers wanted more rapid design and installation phases of the project.

At the community level, many though that the community was well involved, but two of the interviewees felt that the only the country was bought along on a community based project. It was common theme that community support was gained or lost in the early stages of the project and therefore this was a critical time to get everyone included.

There were suggestions that community resources such as recreational lakes and other flowing recreational water facilities could have been incorporated from the early stages, and this would make the project feel more inclusive to the non-rural community.

Suggestion was also made that more consideration be given to location of pipe or channel work on draft maps so that it does not appear as though back yards would be destroyed. Suggestion was made that the community could be given the opportunity to invest in certain parts of the scheme, possibly for a financial return.

6. Conclusions

The decision to adopt scheme supplied irrigation water by dryland farmers is lifestyle, productivity and financially driven.

The decision to adopt scheme supplied irrigation water by existing irrigated farmers is primarily financially driven.

Farmers prefer to have the raw information on what the scheme is going to provide and cost, and conduct their own, independent assessment of their water needs and their own financial assessment tailored to their personal circumstances and preferences.

None of the interviewed farmers were personally concerned about the change in landscape of the farm once it was irrigated but noted this was one of the reasons some of their colleagues had elected not to irrigate. Of the five interviewed, dryland farmers who had adopted scheme irrigation water, two were proposing partial farm system changes resulting from irrigation.

While those that did not adopt scheme supplied irrigation water gave little consideration to the wider region, those that did adopt water were focused on resource use efficiency and management, regulation compliance, regional economic and employment implications and the ability to alter the farming system in the future. Every irrigator commented on the need to be able to produce a quality product with a high level of reliability.

While most thought the information provided was adequate, the farmers saw significant value in being able to talk to other farmers that were recently irrigated and there was a desire for more accurate information regarding supply reliability, timeliness and cost of scheme in the earlier stages.

It was felt that the support of the community is won and lost in the early stages of the proposal and community support could be improved with the incorporation of community assets into the scheme, more consideration given to drafting maps, and the potential opportunity to invest in a community scheme.

Most farmers would have preferred a more rapid design and build phase of the projects

While all hypotheses for not adopting scheme supplied irrigation water were found to be true to some degree, the most prominent reasons discovered for not adopting scheme were lifestyle, and financial motivation (as either succession planning or debt aversion)

7. References

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8. Appendices

8.1. Interview Summary Notes

8.1.1. Farm 1

FARM TYPE

- Dryland arable and sheep farm with some dairy support adopting scheme supplied irrigation, proposing to farm arable and dairy support.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Dryland is no longer an option if we are to produce product to a certain specification.
- This will be the highlight of my farming career.

Where do you source your information from to inform the decision making?

- Articles and newspapers.
- Conversations with informed people.
- Getting on committees and action groups.

How much/what effect is the proposed activity likely to have on the way you farm?

- Apart from layout, very little change to farm system, we will only see the drop off of the sheep part of the operation.

How have you worked out the costs and benefits of scheme water supply to your operation?

- My own research.
- Consultancy.

What wider sector/longer term implications have you considered when making your decision?

- There is a fair chance this is the last opportunity we will ever have to get irrigation water in this area.
- Always wanted water as I have seen what it has done for other farmers in other regions.
- Profit will be about the same but we will double production.
- Will bring peace of mind and quality of the job - good crops, grass and stock.
- Resource use efficiency - all paddocks are fenced to 144 meters so there will be no overlaps of any spreading, spraying, cultivation or drilling.
- Easier to manage nutrient loss and environmental compliance as a group rather than as an individual. The scheme provides this environment.
- Will give the opportunity to family to continue to farm. Would rather farm the exciting challenge than go snow skiing.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Did not come soon enough.
- We need something in the community to draw people in - the irrigation scheme could have helped provide some community assets to assist this. It would have also got more of the wider community onside.
- Need to get the younger generation involved, rather than the older - even if the older are paying for it. The older are too set in their ways (most of them) and the younger think a little more laterally.

- There was no shortage of information - some just are not interested in irrigation, some are anti-farming, some are anti-dairy, some are anti everything that is not what they are doing now.
- The only breakdown is the understanding that agriculture brings to the entire country.

8.1.2. Farm 2

FARM TYPE

- Dryland arable with breeding sheep operation adopting scheme supplied irrigation, proposing more intensive arable and lamb trading with some dairy support. Considering partial dairy conversion.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Was a great idea 14 years ago when I was 14 years younger but getting older now, we are still committed but less enthusiastic.
- Is an opportunity to provide irrigation water to an area that is over allocated and additional water will bring more jobs and more money into this area.
- Irrigation opens up marketing and growing opportunities not available to the dryland farmer.

Where do you source your information from to inform the decision making?

- Field days.
- Bank manager.
- Seminars on irrigation and water.
- Consultants.
- Everytime you go to an event or talk to someone you pick up something new and useful.

How much/what effect is the proposed activity likely to have on the way you farm?

- We have mostly autumn sown cereals and breeding ewes selling store lambs now. Under scheme supplied water for irrigation we will continue to be arable farmers but we will sell the ewes, grow more specialist seed crops and have dairy grazers. We are considering dairy for product diversification but that is not our passion.
- We will see many trees knocked down, but they regrow if you replant.
- We (family) are farming together as one entities now but irrigation will mean we will have at least 3 entities.
- We will have more staff which will mean more housing and more business management probably rather than being involved in the doing of the day to day tasks.
- We will see stability in our profitability.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Ourselves mostly but peer reviewed by farm consultant.

What wider sector/longer term implications have you considered when making your decision?

- We are getting more intensive, using more chemicals and fertiliser to improve productivity, but when you get one year in five where the yield does not come, it really knocks the profitability.
- We want to be able to get the contracts for specialty seeds that we cant get as dryland farmers.
- Wet soil does not blow away - trees are a good habitat for birds which steal crop, trees take up room, trees don't help save soil in strong winds.
- More recently we have found out we cant afford to have fallow soil as it has an increased risk of leaching nitrogen. Fallow is now an integral part of our soil moisture management.
- Resource management and regulation compliance in is easier in a group than as an individual.

- Most farmers take what is offered to them and since the water was going past the gate we took up the opportunity to subscribe.
- Irrigation gives us and others many wider opportunities for the future - horticulture, viticulture, process vegetables, dairy, livestock.
- Up until recently it has been more economic around here to buy more land than to irrigate, now it is more economic to irrigate.
- We know the economics are marginal, but it will give us stability of product production, and boost revenue and employment opportunities for the region.
- The thing we don't like is more debt.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Timeframe management - it has taken much longer to do than was initially advertised.
- Did not get good community buy in to wider benefits. There were many businesses who did not support the scheme for fear of losing business. These local businesses have the ability to influence the wider community, if we offered them soft shares with a modest return on their investment that may have bought them along.
- If is a community project, but we only brought the country with us.
- The scheme got a lot of lifestylers and small land holders off side in the early stage by putting up maps with pipes going through front lawns and other things. While the pipe would not actually go there, these people did not understand this and were then off side for the remainder of the project. Put more thought into pipe placement even at conception stage.
- The area has shrunk over time as water volume available has been more accurately defined - this has given some farmers false hope - next time start with a smaller area and expand.
- Not enough public good incorporated into the scheme - could have had things like a lake (not used for storage) incorporated, and kayaking courses built into the supply races. These community good type things could have been incorporated at an earlier stage to get better public buy in.

8.1.3. Farm 3

FARM TYPE

- Dryland arable and bull beef adopting scheme supplied irrigation, now running more intensive arable and dairy support.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- While we farm in a "reliable rainfall" area, the seasons are not that reliable and we need reliable soil moisture to guarantee product volume and value.

Where do you source your information from to inform the decision making?

- Irrigation water supply company.
- Farm consultant.
- Irrigation companies.
- Irrigation consultants.

How much/what effect is the proposed activity likely to have on the way you farm?

- Irrigation is giving us opportunities that weren't available to us when we were dryland farmers. This is different cropping options and higher value crops that seed companies would not trust us to grow without irrigation.
- Has forced us to change the physical scape of the farm - no trees and all square lines to match the laterals.
- Changes the way you manage, we can now double crop with spring sown crops, where traditionally we had one crop per paddock per year and always endeavoured to be an autumn sown crop so the plant was established enough to access the deeper moisture if we did not get rain for a period of time.
- Although we have had irrigation, we have not had a dry year yet so not sure we don't think have seen any difference in yield, but it has given us peace of mind and confidence to apply what the crop needs.
- Not financially any worse off than we were before we irrigated.
- Far more efficient systems - paddock sizes are larger giving less waste land. Paddocks are square giving less overlapping of chemical, seed and fertiliser.
- Volume out the gate has increased per dollar spent growing the crop.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Budgets with our consultant and bank manager.

What wider sector/longer term implications have you considered when making your decision?

- With increasing debt, we needed to be able to guarantee yields and product quality, we saw irrigation as a way of achieving that.
- Irrigation opened up doors to higher value crops we hadn't been able to grow previously.
- See many others with irrigation growing and developing so it gives some confidence that it cant be all bad.
- Helps with family succession.
- Reliability was initially very low so we took the water on the precedence that the reliability would improve over time - it now has but at an additional cost.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- A more accurate assessment of the cost (capital and running charges) would be preferable in the early stages of scheme development and proposal.
- More accurate assessment of the reliability and what it would actually mean to the farmer on farm.
- Scheme provided very little more than a prospectus and estimate of how much water you would need, but we did not need much more information than this from the scheme.
- The best assessment is doing your own for your own farm - better to have an independent than have the man selling the water trying to tell you how much you wuill need and what it will do for you.

8.1.4. Farm 4

FARM TYPE

- Bore irrigated dairy support and arable farmer, adopting scheme supplied irrigation water and maintaining dairy support and arable system.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Power charges on deep wells are getting very high.
- Bringing more water into an area that is short in supply.

Where do you source your information from to inform the decision making?

- Newspapers, articles, internet.
- Scheme information.
- Field days (scheme and non-scheme initiated)
- Neighbours and networks.

How much/what effect is the proposed activity likely to have on the way you farm?

- None expect will reduce annual electricity charges.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Using the scheme provided information on reliability and charges and an assessment of what we have been spending and using.

What wider sector/longer term implications have you considered when making your decision?

- Long term electricity charges increasing.
- Will be keeping our wells commissioned to supply the reliability rather than take on stored water. Our dairy neighbours are going to do the same.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Mostly under pressure - long term big benefits with respect to energy charges.
- Different parts of the scheme getting charged different levels of entry (stage one compared to stage two and three) we are in stage one, but seems unfair that stage two get charged more.
- Field days and presentations were good the way they were mostly run by the scheme but supported by independents from bank and other firms.

8.1.5. Farm 5

FARM TYPE

- Bore irrigated dairy farm adopting scheme supplied irrigation water and continuing dairy farming.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Bring additional prosperity and jobs to the region.
- Deliver water to people like us that are short of water and where bore water is very expensive.

Where do you source your information from to inform the decision making?

- Scheme water supply company.
- Newspaper and other readings.
- Neighbours, friends with and without irrigation.
- Field days and seminars.
- Consultancy support.

How much/what effect is the proposed activity likely to have on the way you farm?

- Going to reduce our electricity or irrigation running charges.
- Improve reliability of water supply, particularly in summer and reduce dependence on supplements - this will reduce our costs of production.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Our own calculations with second opinion from irrigation and farm consultants.

What wider sector/longer term implications have you considered when making your decision?

- Gives added reliability to the system - we did not buy stored water as we will use our own well for this. The two water sources integrate very well with each other.
- While the economics for us of electricity on the bore compared to scheme charges, is marginal, we know over time that electricity will increase and the scheme charges will remain considerably more stable.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Did not bring the wider community along well enough and incorporate enough community benefits into the sales pitch.
- Very well advertised, very good field days.

8.1.6. Farm 6

FARM TYPE

- Dryland arable and dairy support adopting scheme supplied irrigation water and converting partly to dairy and continuing part arable and dairy support.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Scheme is good because:
- We want certainty of the production season.
- Want to be able to take one major management factor out of the equation.
- Want to be able to budget accurately.
- Was brought up on an irrigated farm and when I moved to dryland farming I was familiar with the difference irrigation made to management and markets.

Where do you source your information from to inform the decision making?

- Intuitively knew it would be good for us long term so had decided to take the water before we worked out how to make the farm profitable with water.
- Own research (friends, neighbours, family experiences shared) and knowledge.
- Irrigation water supply company.
- Consultancy.

How much/what effect is the proposed activity likely to have on the way you farm?

- Have always wanted to take the water and have been involved since early stage 15 years ago.
- Went about working out what farm programmes would have to change to make it pay.
- The landscape has changed - no trees.
- To accommodate irrigation, the farm layout has been forced to be changed, we are now 144m wide in every paddock - this means no overlap with any of spraying, cultivation, spreading gear. Our input use per unit of output is going to drop.
- Will grow less winter feed and more grass for heifers and cows, grow more cereals, will consider specialist crops but not planning to grow them.
- We are converting part of the farm to dairy, and this will be complemented by the other parts that are not being converted. Will reduce our dependence on outside graziers by having our own dairy farm to use some of the end products.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Mostly gross margins but also whole farm budgets on our own but also with our farm consultant to give confidence.

What wider sector/longer term implications have you considered when making your decision?

- Have 5 boys, will help hugely in succession planning and execution.
- Consenting and resource management - strength and capacity in numbers.
- Probably the last opportunity for a very long time to get irrigation water in this area.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Got all the information we needed from the scheme and from private consultancy.
- Not much to do differently - the laggards feel left behind but they will always have their heads in the sand irrespective of how much you try to help them.
- Anyone that is pro-active is well informed.

8.1.7. Farm 7

FARM TYPE

- Dryland arable and bull beef/sheep adopting scheme supplied irrigation, proposing less land as intensive arable and more dairy support.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Need to be able to add reliability and predictability to the farming operation at an affordable cost.
- Well water in our area is both deep and scarce. While there is more available, the strata in the ground often do not yield sufficient (or any) water.

Where do you source your information from to inform the decision making?

- Scheme supplied information on reliability and costs.
- Farm consultancy for the production systems, volume of water and infrastructure requirements.

How much/what effect is the proposed activity likely to have on the way you farm?

- We have irrigated one third of the farm, and shifted from growing autumn cereals, breeding ewes with finishing lambs and finishing bull beef to growing winter feed crops and dairy heifer grazing with some cereals.
- Has made planning much more predictable so we can now perform at a higher level as we have security of feed supply.
- Has increased the intensity so using more contractors as employing part time staff is difficult (we only need part time staff).

How have you worked out the costs and benefits of scheme water supply to your operation?

- Consultant.

What wider sector/longer term implications have you considered when making your decision?

- Family succession. Not sure if any of the kids want to farm but at least we have the ability to give them an intensive farming opportunity.
- This is likely to be the last opportunity in our farming careers to irrigate part of the farm.
- We did not have a well so had to take stored water and build our own storage dam to provide the reliability.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Information on reliability and actual costs would have been much better if the worst case scenario was presented in the earlier stages rather than just what was expected.
- Extension of information to farmers was good - the personal contact of the scheme driving up your driveway meant you had the opportunity to ask your own specific questions - if you we had to approach the scheme we might not have asked the hard questions.

8.1.8. Farm 8

FARM TYPE

- Dryland arable and sheep breeding, not adopting scheme supplied irrigation water, continuing with arable and sheep breeding.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Scheme is a fantastic idea bringing water to the area where groundwater is no longer available.

Where do you source your information from to inform the decision making?

- Initially from scheme handouts and then presentation afternoons and field days/field trips.
- Neighbours.
- Own research.
- Nothing from the bank.
- Farm consultancy.

How much/what effect is the proposed activity likely to have on the way you farm?

- If we had taken the water we would have stopped being sheep farmers which we really enjoy.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Constructed partial budgets ourselves first and then got a second opinion from farm consultant to double check our work and suggest alternatives (if any).

What wider sector/longer term implications have you considered when making your decision?

- We enjoy farming arable and sheep and want to be able to keep doing that. While we could have taken on irrigation and debt, this would have meant more labour and more intensive system without sheep. We did not want to manage labour or debt and wanted to retain the sheep.
- If the scheme had come and offered water 5 years ago we probably would have taken it, but we are now older with no farm successors and would rather enjoy the lifestyle.
- We accept that the irrigation would have increased the value of our land if we ever sell it but we did not want the debt and intensive management style so we have to treat the block this way.
- We already have another block irrigated and the two integrate reasonably well, we can manage the drought risk reasonably well with the other block fully irrigated.
- Initially the reliability of the scheme was low which did not appeal to us, if we are investing to improve our system reliability, we need reliable water.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Should have had reliability sorted out in earlier stages - the low level of reliability gave little confidence to many that the scheme was viable.
- Scheme is trying to charge more for second stage subscribers that were not able to obtain water in stage one because the scheme would not deliver it to them. Stage one and stage two should be at the same investment level, this two tiering, while not financially constraining, its unfair and unwarranted.
- Should have been piped instead of open channel and pump system.
- Field days (to other schemes that are recently running) were invaluable.

8.1.9. Farm 9

FARM TYPE

- Dryland arable and sheep breeding with existing well consent, not adopting scheme supplied irrigation water, continuing with arable and sheep breeding.

TOPIC CENTRES

Why/why not is the scheme a good idea?

- Good idea as will bring water to those who cannot get it in a zone that is over allocated for water.

Where do you source your information from to inform the decision making?

- Did not go to famer meetings.
- Irrigation salesmen.
- Initially constructed budgets ourselves and then got a second appraisal from farm consultancy.

How much/what effect is the proposed activity likely to have on the way you farm?

- Will have no significant effect as we are not taking scheme water, but did make us consider the more and less profitable parts of their operation as it stands as dryland.

How have you worked out the costs and benefits of scheme water supply to your operation?

- Initially created a farm system and financial budget ourselves and then the bank encouraged us to get a farm consultant to help us consider other options and double check our figures.

What wider sector/longer term implications have you considered when making your decision?

- Getting nearer to retirement, while there would be a financial benefit in the long term having pressurised water compared to pumping, we have no children that want to farm and we would not likely be around to see the benefits.
- Did not want to burden ourselves with hefty debt.
- Did not want to change the farm system from what we are currently doing, we like the lifestyle and do not have to deal with staff.

What was done well by the scheme that was of particular value, what was not done well or should have been done differently?

- Costs not well established early on.
- Reliability was not high in the early stages which gave low confidence in the scheme, we felt we would be relying on the well too much which left us unable to put a value on having scheme water.