



Ruataniwha Plains Water Storage Feasibility Study

Demand for Irrigation Water

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EXECUTIVE SUMMARY

Extreme weather conditions have plagued farmers in the Ruataniwha area of Hawke's Bay over recent years. Severe drought has been the most debilitating of these extremes, due to the frequency of the events. All of which has placed farmers under considerable pressure to be able to run their farms and financially survive. One possible way to minimise the risk of drought, would be to invest in water storage that will supply irrigation water to the Ruataniwha plains. This study investigates what level of demand there is for irrigation water, and if there is a difference in demand between the proposed irrigation zones (Appendix 2).

Survey and Focus groups

Demand for irrigation water was assessed by inviting a representative sample of landowners to attend discussion meetings. A survey asking questions about irrigation, land use and demographics was also included with the invitation. Those attending the meetings were asked to complete and return the survey by post or over the phone. The survey results were presented at each of the meetings with an update on the water storage project. Throughout each meeting clarification was sought concerning some of the most significant survey responses. Responses were also used as springboard for discussion.

Need for irrigation water and general approach toward irrigation

The overall approach and expectation from irrigation appears to be consistent throughout the sample of landowners in all areas. Irrigation gives landowners the capability to make investments in new crops, and production systems, with greater security of success. There may be other factors that could compromise production, e.g. frost, hail, disease, etc, however secure water supply with the ability to irrigate, minimises the risk of a debilitating drought.

Land use options with irrigation water

It is expected that with the addition of water, the Ruataniwha area will develop into a more integrated production system. The overall security that irrigation brings to production is huge. It gives growers and farmers the confidence to make decisions, minimising the risk of failure. With this added security, there is opportunity to develop a more integrated production system and value chain. Mutually beneficial links between hill country farmers and those on the plains are likely to be strengthened. This would see more finishing farms on the flats. Dairying is likely to increase but the greater use for irrigation will probably be in the form of dairy support i.e. growing feed for stock. Double-cropping is likely to become a more prevalent. What those crops are may change, and are likely to expand from the crop types that are currently grown.

Ability to pay

The ability for farmers to buy into the scheme and invest in on farm capital in the form of irrigation is, at present, severely limited. There needs to be further investigation to determine the extent of this. A risk assessment of how possible droughts in the next 4-5 seasons could affect the financial situation for landowners would also be beneficial. Further to that, there is a responsibility of the project team to ensure that payment assistance options, to access to water for on farm irrigation, are investigated e.g. processors assisting farmers with the investment, establishing equipment hire/hire purchase options.

Market Security

Overall, producers need security to know there is a market for whatever they are producing and that they are going to make a decent profit through the process. Although there is support for secure prices, there is varied support for supply contracts. This appears to be brought about from a distrust of processors, regularly taking advantage of farmer misfortune. Supply contracts are likely to give farmers and growers the confidence to sign up to the water storage scheme however this needs to be approached in a way that satisfies farmers concerns. Regardless of supply contracts becoming common place, producers still need commitment and adequate support from processors.

Electricity and Water Distribution

Net energy consumption of the scheme was identified as a general concern, as this may significantly affect the overall running cost. This will have a direct bearing on the cost to end users and could negatively or positively alter the affordability of accessing water. If there is potential for power generation this must be investigated. The distribution method also needs to be designed with energy savings in mind. It is understood by most, that a trade off between energy savings and capital cost is likely. When this has been investigated further and options are available for consideration (including pricing) the need for public consultation should not be overlooked.

Soil assessment

Soil type and its capacity to produce, is critical to the affordability of stored water and ultimately the success of the water storage scheme. Throughout the meetings the Takapau soils were continually identified as one that would have the greatest differential increase in production with irrigation water. It was indicated that the irrigation requirement for Hastings soils was not high, as it is often a highly producing soil without this input. Argyll soils were shown in the Landcare soils report (Webb 2010), and in meeting discussions, to have limited ability to produce, although this will depend on the suitability of crop type. Generally, soils in the Ruataniwha area are quite changeable from paddock to paddock which can affect consistency of yield and ripening. One notable exception to this is the vast areas of Takapau soil in the Tikokino, Onga Onga and Ashcott zones.

Crop water Requirements

Throughout the meetings there was an attempt to find out potential water use for various crops. Most meeting attendees were unable to give accurate figures of water usage without having to look through their water use and planting records. It is also difficult to use the council databases to obtain relevant water use levels. Further analysis must be done to obtain more accurate figures. The SPASMO water allocation calculator, which takes into account soil, climate, and crop type, is due for completion in early December. This is one option to get clarity on these figures, when this tool is available.

Which Zone?

Profitability of a given farming operation with irrigation water is directly linked to production potential of that land. In turn, this will determine the demand to access irrigation water from the scheme. The area with the greatest production potential is arguably Ashcott, followed by Onga Onga, Tikokino then Takapau. Currently there is demand in each zone for irrigation water and the differences between zones, with respect to demand, are marginal. There is a greater density of irrigation consent holders in the two northern zones with irrigation already installed, which

therefore limits the capacity for new irrigation systems (Appendix 6). Irrigation supply to these zones would mainly give security of supply to existing irrigators. If water is supplied to the two southern zones, it is likely that there will be a significant increase in new on-farm irrigation systems, as there is a large area currently without irrigation. There should also be a corresponding increase in production which could enable a boost to the local economy.

RECOMMENDATIONS

Throughout the course of this study it became apparent that further work in the Ruataniwha plains needs to be undertaken. Recommendations made throughout the report are compiled below, for easy reference. Note that there is a large amount of overlap in the following recommendations.

1. That future prefeasibility studies need to be more in depth to ensure that information being released is as accurate as possible and/or level of accuracy is clearly indicated.
2. Conduct assessments to find out the comparable cost of on-farm storage versus community scheme storage, determine the extent to which existing on-farm storage is prevalent and whether on farm storage could be incorporated as additional storage capacity for a community scheme.
3. Investigate the costs for installing irrigation, and assess the expected production rates for different soil types within each zone, to determine profitability. Resulting information would need to be made available to landowners so that they can make more informed decisions, as to whether they can access water from the scheme. It will also help them to get the most productive and cost effective system for their property. This could be disseminated through workshops, information sheets, and working with land owners one-on-one.
4. Sections of the 'Hawke's Bay Regional Council Crop Info Guide' be released for public viewing. A further scoping study of alternative suitable crops for production in Central Hawke's Bay could be undertaken if there are still gaps. This would provide growers suitable crop options that could be profitable with access to water from the storage scheme. This may need to be a supplementary project to the Ruataniwha Water Storage Feasibility Study.
5. Ensure a social impact assessment is completed which covers benefits to the farming sector and support industries.
6. Meet with rural banks to find out what the current financial situation is for most farmers and find out if there is a way the scheme can be structured that will satisfy bank lending criteria.
7. A risk assessment should be undertaken of how possible droughts in the next 4-5 seasons could affect the financial situation for landowners thereby further limiting the ability to invest and or sell property.
8. Determine if accurate cost comparisons, for accessing irrigation water, are necessary to compare irrigation from a well, surface take and from the storage scheme. To ensure accurate costing, this work should be undertaken with professionals in the irrigation and well-drilling fields, if deemed necessary.
9. To enable land owners to make informed decisions, an analysis of a range of production systems on a range of soil types needs to be undertaken. This needs to be disseminated to landowners in an appropriate way to give landowners assurance around affordability of different options. This information could also assist with the schemes risk assessment.
10. Assess several farms to get an average 'effective on-farm area' suitable for irrigation. It is necessary to know how much additional land can practicably be irrigated, to more accurately estimate irrigation demand as well as potential benefits to the local economy.

11. Processors need to investigate and implement options to enable growers and farmers to invest in water at the gate and on-farm irrigation systems. Communication between the project team and processors needs to be maintained to ensure these options are explored, so that the storage scheme has immediate uptake, thereby reducing the scheme risk. This also needs to be done to enable both suppliers and processors to gain from the availability of irrigation water.
12. Net energy cost of stored water is of a concern to the end user and could ultimately affect the affordability, and therefore reduce the uptake of stored water. If there is potential for power generation this needs to be investigated further and the use of pumping for infill and release needs to be minimised but preferably eliminated.
13. When designing the distribution system there may have to be a trade off between capital and running costs. Where possible there was a preference for minimising running costs, i.e. electricity. When this has been investigated further and priced options are available for consideration, additional public consultation should be undertaken.
14. Use the Ruataniwha ground water model to run scenarios, relevant to the water distribution option, to assess the interaction between ground water and surface water. This information would then need to be distributed to irrigators and stakeholders.
15. Use information from the Landcare report about the productive capacity of the soils to determine the potential productivity in monetary terms. This may need to be done using representative crops suitable for the area. These figures could also be used to help determine what effect different soil types will have on the affordability of stored irrigation water.
16. Use the SPASMO water allocation calculator to run various scenarios, e.g. assess annual crop water usage of several different crops, on a variety of soil types in a range of climates. This can be used to verify the existing figures available.
17. Irrigation zones to be included in the next phase of the feasibility study need a risk assessment completed. This would need to be with respect to production potential, which will ultimately affect the affordability for immediate uptake in the water storage scheme. This would include a combined ranking of the attributes and limitations such as the productive capacity of the soils and climatic risk, e.g. frost, hail, etc. Options to mitigate these risks also need to be investigated.

BACKGROUND

The Ruataniwha Water Storage Prefeasibility Study was undertaken by Hawke's Bay Regional Council and completed by Tonkin and Taylor in June 2009. This was a desk top assessment of potential water storage options and possible irrigable areas. In December 2009, approval was given by Council to progress this project to a full feasibility study. The purpose of the feasibility study was to determine the demand for irrigation water and further investigate the potential for storing water in the Ruataniwha area. The study assessing the demand for irrigation water is one of the many investigations that will form the Ruataniwha Water Storage Feasibility Study.

Since the feasibility study began, many investigations have been conducted to identify fatal flaws surrounding each of the proposed water storage sites, including geotechnical, seismic, and engineering investigations. Eight potential water storage sites and four irrigation zones have been identified to date, through the prefeasibility and feasibility studies (Appendix 2). These storage sites and irrigation zones were the basis for discussion in focus group meetings. An additional irrigation zone called Hatuma was also investigated after it was indicated that this area could benefit from irrigation water.

Since the demand investigation was completed another two on stream water storage options, A7 and D5 have been proposed. Because these sites were not considered an option at the time of the focus group meetings, they were not discussed.

PURPOSE

Assessing demand

The purpose of this study was to determine what the potential demand could be for irrigation water from the water storage scheme. This report looks at both the immediate potential interest in irrigation water as well as possible long term needs.

It was commented by Andy MacFarlane (MacFarlane Rural Business Ltd) at the Irrigation NZ 'Pathways for Rural Infrastructure 2010' conference that the economic influence of irrigation extends far beyond the area that is irrigated. The non-irrigated area of the farm can also be directly influenced by those areas that are irrigated. MacFarlane also indicated that to reduce the risk of low 'buy in' to the irrigation scheme it is necessary to give farmers confidence to take up irrigation water. To do this, enough information needs to be made available to farmers to ensure they are able to make good decisions.

This approach was also supported by Murray Harrington (Price Waterhouse Coopers) at the same conference. Mr Harrington indicated that the uptake risk becomes substantial if farmers are unable to make the on-farm investment when water is available at the gate. This risk needs to be mitigated. One way to minimise this risk is through modelling, to show farmers the value of investing and that irrigation changes farm profitability. Not only do farmers need this assurance, financiers do too.

LIMITATIONS & ASSUMPTIONS

Although the irrigation zones A (Tikokino), B (Onga Onga), C (Ashcott) and D (Takapau) have been identified on the Tonkin & Taylor map, these are not definitive and are likely to be different if the project is completed. For the purpose of investigating irrigation demand, the areas were considered as individual zones, so that comparisons could be drawn.

There have been limitations in the information available from some council databases. Although there is a large amount of quality information available from the existing databases, often the information is not in a format that is easily applied to a project such as this. Some information required a lot of manipulation to get the data into a useable format, e.g. maps. There are also limitations where technology such as water metering and telemetry are not yet commonplace, so it is difficult to see who has/has not exercised their irrigation consent. This is where discussion with landowners becomes essential.

Throughout the entire process confidentiality was essential to give people the freedom to voice their opinions. Transcripts and attendee lists will not be appended to this report for that reason.

Some landowners declined to attend the meetings, and some who intended on coming, could not make it on the day. Of those that sent in apologies, reasons were mainly around weather conditions temporarily clearing, which meant previously delayed work could be done on farm. Several attendees said in the meetings that it was a busy time of year and that it was difficult to find time to fill in the survey and attend meetings. This may mean that some findings from the meetings have a bias toward supporting the dams as those that were ambivalent or negative toward the project did not prioritise participating in the demand study, although this does not appear to be the case. Due to the nature of the study it was more likely that those with a keen interest in the project were likely to attend. The survey results covered 21541Ha of farmland. When asked if they supported continuing the water storage study, only 7.9% responded negatively. It must be noted that no one spoke out in the meetings indicating the dams should not go ahead, or that it was not a worthwhile project.

Although there were 34 attendees to the focus group meetings, in some instances there were groups of 2-3 that represented the one property. On the flip side, some attendees represented a number of properties; some covering several zones.

There are a larger number of irrigation consent holders in Zones A and B than in Zone C and D. Therefore a larger proportion of irrigation consent holders were contacted in the upper zones than that of the lower zones. If equal numbers of consent holders and non-irrigators were contacted, this would have distorted the representation.

Recommendation 1: That future prefeasibility studies need to be more in depth to ensure that information being released is as accurate as possible and/or level of accuracy is clearly indicated.

METHODOLOGY: SURVEY AND FOCUS GROUP MEETINGS

Demand for irrigation water was assessed by inviting a representative sample of landowners to attend discussion meetings. A survey asking questions about irrigation, land use and demographics was also included with the invitation. Those attending the meetings were asked to complete and return the survey by post or over the phone. The survey results were presented at each of the meetings along with an update about the water storage project. Throughout each meeting clarification was sought for some of the most significant responses to the survey, which was also used as springboard for discussion.

The easiest way to learn landowner's opinions surrounding the Ruataniwha Water Storage (RWS) project would have been to send out a blanket postal survey and wait for people to respond, collate the data and leave it at that. This method tends to achieve a high response rate however, through observations of other similar surveys responses tend to be from small block holders. Unfortunately these people are not necessarily the core customers needed for the water storage scheme as they are significantly less likely to have an effect on the local economy than those with larger farms. It is unlikely this method would have obtained a good cross section of views about the project.

This study has used a number of resources to identify who were the most appropriate landowners to contact. As a result it has been possible to obtain information that accounts for approximately 50% of the Ruataniwha plains study area.

Who to contact

Several methods were used to find out who was best to contact. This included meetings with prominent landowners, reviewing maps and analysing council water consent information. All of these methods were important in getting the most appropriate people to respond to the survey and attend the focus group meetings.

The consultation process began by meeting with local land owner's Phil King & Richard Dakin on Monday July 19. Together, they had good local knowledge of farms and farmers that covered the irrigation zones identified by Tonkin & Taylor. Building up good relationships and trust is essential to this process, as it is important to get real, unguarded, information so that the project team can make informed decisions throughout the project.

The morning was spent with Phil and Richard who provided an overview of the issues facing farmers in the various irrigation zones. Maps were reviewed which showed water consent information and land ownership parcels for each zone. Relevant points for each zone were noted. They provided anecdotal information about land uses, ownership (e.g. family owned farms, multiple farm ownership, etc), who had shown interest in irrigating and the water storage project, as well as those who had reservations about the project.

It is important to note that every effort has been made to get a variety of views about the project, including positive and negative.

Richard and Phil were also able to point out who was known to irrigate, therefore exercising their irrigation consent. This information was especially helpful as the data was not easily available to council. Water meters regulations and daily data recording, soon to be in place will resolve this.

The afternoon was spent visiting the irrigation zones with Richard and Phil to become familiar with each area, and to review the morning's discussions.

Maps

Regional Council's Geographical Information Systems (GIS) was used to produce maps of land ownership parcel sizes and data sets of information which included contact details, farm size, etc. The data set was analysed and categorised by land ownership parcel sizes for each zone. Most of the landowners that were approached had farms between 200-1,000ha. It was critical that the respondents to the survey and attendees to the focus group meetings were the right people. Staff in particular were seeking landowners and managers of relatively larger scale farms, because they are the customers that the water storage scheme needs for it to be viable. This is also where the region is most likely to realise the greatest economic gain.

Many maps have been produced from Regional Council's GIS including irrigation consent information (distribution, type and volume), soils, potentially irrigable soils, frost information (early frost, late frost and days without frost), and land use survey (2003 & 2008).

Shortlist

A short list of potential attendees for the focus group meetings was put together based on the information gathered from the meeting with Richard and Phil. Potential attendees were also based around the various maps showing water consent details, and the size of the land parcels. Information from all sources was used to identify properties and therefore landowners/managers that would give representation of a range of views from each zone.

The short list of meeting invitees were reviewed and finalised with assistance from Richard and Phil. This was then provided to the research company, SIL Research, who were contracted to distribute the focus group invitations and manage the survey.

It was equally important to encourage farmers to attend the meetings, as well as complete the survey.

Focus group meetings

SIL Research supplied 91 slides of written and graphical results from the survey which was too lengthy to present, however a selection of the survey results were presented at each of the focus group meetings.

Presenting the results at each meeting served two purposes, firstly to inform the attendees of the results, secondly it was used to prompt discussion. This discussion was very important to gain clarity on the responses given through the survey. There were several questions that were difficult to word (in a way that recipients would be prepared to answer), and traditionally difficult to get accurate responses to, such as willingness to pay. For these questions it was essential to find out what the various mind sets were when answering these and to get an understanding of the weighting that can be placed on the results provided.

Survey

The content and scope of the survey questions were decided by participants of the RWS project team. SIL Research was contracted to manage the survey, which included distribution and data analysis. Subcontracting this was necessary to ensure transparency throughout data collection and analysis. This approach was to give both the survey respondents as well as potential stakeholders (of the RWS project) reassurance that the data was handled in an independent manner: refer Appendix 1.

By the final cut off date (01/09/10), 42 out of 67 surveys sent had been completed and returned, a completion rate of just over 70%. The total area of the 42 farms included in this study was 21541Ha. Of the 42 farms, 26% (11 farms) came from both Tikokino and Takapau, 22% (9) from Onga Onga, 21% (9) from Ashcott and 5% (2) from Hatuma.

Once the surveys had been returned, SIL Research managed the data analysis. They entered, cleaned and coded the data in the SPSS Data Analysis program and ran an initial analysis. All responses were separated into categories of Zone and Total in order to allow comparison between the proposed irrigation zones. Raw data was returned in an Excel spreadsheet and analysed data was returned in a Power Point format.

FOCUS GROUP RESULTS

The discussions throughout the meetings generally varied between those who do and don't irrigate, more than differences between zones, however when it came to views around irrigation in general, all groups tended to identify similar key benefits and concerns. Where there were notable differences between the zones, the comments have been discussed in the following categories. Areas that could affect the potential up take of stored water, either positively or negatively have also been discussed.

Key quotes and issues have been broken down and discussed in several categories:

- Need for irrigation water
- Land use options with irrigation
- Ability to pay
- Market security
- Electricity and water distribution
- Soil assessment
- Crop water requirement
- Overall Demand in different zones

NEED FOR IRRIGATION WATER AND GENERAL APPROACH TOWARD IRRIGATION

Although there is a lot of uncertainty about the affordability of signing up to the irrigation scheme, there were many affirmative comments about irrigation. For most, irrigation is considered as an insurance policy. Investment in irrigation gives certainty and confidence around investing in crops because there is greater assurance of consistent production. This was most frequently held view about irrigation and was not limited to any particular zone.

“Yeah exactly, you can deliver on time.”

“I mean water gives you certainty, doesn’t it. If you want to change the land use, and you’ve got water, you’ve got certainty that the thing’s going to work. So you would make an investment with confidence.”

“It just gives you that surety; it gives you a more guaranteed outcome so people get an investment.”

For some, irrigation is so integral to their farming system that they ‘can’t survive without it’ or simply that ‘the place is not much good without water’. Some view irrigation in these areas as essential for the farming system rather than simply ‘insurance’. Comments with this much force appeared to be more prevalent in the upper zones. In the early days of irrigation in Ruataniwha, water was arguably easier to access in the northern zones, mainly from a physical perspective but also through the consenting process (initially), and financially (at the time). Because of this, and possibly additional environmental factors, irrigation has been present for much longer and is more operationally condensed in the northern regions than further south. So it appeared that the knowledge base around irrigation practices and costing was far greater in the northern area.

Some landowners that did not take the opportunity to access water while consents were easily accessible can now see benefits of irrigation but are unable to get access to water. Some have recently been looking at other water supply options, as opposed to drilling a bore. There were several comments around wanting on-farm water storage but of being advised by Regional Council not to pursue this.

“... you’ve looked at storing water on your own property and we have too and you know it’s just a definite no, black and white.”

Recommendation 2: Conduct assessments to find out the comparable cost of on-farm storage versus community scheme storage, determine the extent to which existing on-farm storage is prevalent and whether on farm storage could be incorporated as additional storage capacity for a community scheme.

Lack of Knowledge

In some of the meetings for the more southern zones, views around irrigation did not appear to be as certain as those in the northern zones. Some of the comments showed more caution around irrigation. There are possibly several reasons for this, such as farms located in areas that were usually summer safe and until recently they had not considered irrigating. It could also be because of the much lower frequency of consents in these areas, meaning that there is not as much exposure to irrigation practices, costing, and potential production. Therefore, there could be some hesitation in the unknown.

“Five out of the last five years we have been (*short of water*). ... we’ve never really considered irrigation in the past because we haven’t been able to get ground water so it hasn’t been a possibility anyway. But yes we do get the summer rainfall that even Waipuk doesn’t get.”

“...I just rely on anecdotal gossip ... who assure me it (*the scheme*) won’t currently (*work*) but that may or may not change in the near future - who knows but I guess on that basis I’m reasonably interested. I’m not falling over myself but you’ve got to be interested and you probably have to be involved.”

Having said that, for others in the lower zones there is an urgency to get access to irrigation water.

“in the last three years of climate have cost me, and it’s a ... lot of money, and quite frankly I could have financed an irrigation scheme for some time what I’ve spent in the last three years to feed and keep my stock going. So for me it’s a no brainer”

Recommendation 3: Investigate the costs for installing irrigation, and assess the expected production rates for different soil types within each zone, to determine profitability. Resulting information would need to be made available to landowners so that they can make more informed decisions, as to whether they can access water from the scheme. It will also help them to get the most productive and cost effective system for their property. This could be disseminated through workshops, information sheets, and working with land owners one-on-one.

Capital Investment

In some Ashcott and Tikokino meetings, several viewed the reason to install irrigation as a capital investment decision “in some people’s minds that’s one of the reasons why they would put water on, because it improves their capital asset.” It has become “a long term strategic view, not just a short term insurance thing”.

“But the reason for investing in irrigation is more than just immediate financial returns, it gets capitalised into your land value and a whole lot of other things...”

Reservations

Some existing irrigators, and a number of those who had tried irrigation in the past, had slight reservations about what could be achieved with irrigation. Some that had previously tried irrigation indicated that production did not necessarily increase dramatically, but merely provided consistency from season to season. The results from the different soil types and climatic conditions on each farm may account for the varying views. It should be noted that concerns were also raised about what would happen to current irrigation consents if the scheme went ahead (discussed in more detail further in the report). Without further analysis of on-farm irrigation system costs and production achieved, it is difficult to determine if these views are based on fear of losing their consent to irrigate or simply due to differences in the resource and climate.

“And the big benefit you see from that is just pure certainty?

For me it is. I think so yeah. Hopefully lifting the production on the crops a little bit but you know it doesn’t always make that much difference. “

“The people that have got existing water rights - once the water storage comes in, what happens to those water rights? Do they remain the same or are they downgraded? The people that haven’t got water rights, do they get preference over the ones that have already got water rights to this water scheme?”

“Has that thought been discussed at Regional Council level; about closing down all takes on a section, and get everyone onto this water storage?”

The overall approach and expectation from irrigation appears to be consistent throughout the sample of landowners in all areas. Irrigation gives landowners the capability to make investments in new crops, and production systems, with greater security of success. There may be other factors that could compromise production, e.g. frost, hail, disease, etc, however secure water supply with the ability to irrigate, minimises the risk of a debilitating drought.

LAND USE OPTIONS WITH IRRIGATION WATER

The land uses possible in the Ruataniwha without irrigation have largely been limited to sheep and beef. In the case of drought, these farmers have been subject to fluctuating prices, and usually lose out. The presence of irrigation gives growers and farmers more security in knowing that their investment in the land will be a success. With this certainty comes flexibility in what can be produced and when.

Out of the 42 survey respondents, beef was the most frequently stated land use followed by Sheep and Cropping. Beef accounted for over 10,000Ha of land use across all respondents and was the predominant land-use by zone with the exception of Ashcott and Hatuma, was the predominant land use by zone. This was followed by Sheep, which accounted for a total of 6579Ha across all zones then Cropping with 3634Ha.

All of the survey respondents were asked if they had considered a change in land use, in the last five years. Over 50% indicated that they had considered a change to 'cropping' and 33.3% a change to 'dairy'. There was some variation by zone, however 'cropping' and/ or 'dairy' was the most frequently considered land use change (22 respondents).

Of the 22 respondents who stated that they do not irrigate, all of them stated that they would consider a change in land use if irrigation water were available. Across all zones, cropping was the most frequently cited potential land use, with 21 out of the 22 respondents indicating this would be considered. With the exception of Hatuma, Dairy was the next most frequent response across all zones, being mentioned by ten respondents (detailed survey results available on request).

Initially it was thought that water from the scheme would mean dairying would take over the Ruataniwha area. Although dairying is still high on the list of possible land uses, cropping by far had the greatest interest. This was identified through the survey then confirmed during the focus group meetings. Land use options spoken about in the meetings, for the most part was an extension of farmers existing knowledge and on-farm practices. Cropping is something that most farmers already have knowledge about and is not significantly different to what they currently do. For many it fits into their farming systems and their lifestyles. This is possibly why cropping featured so highly in the survey results and in discussions. Also, many farmers were adamant that they don't want to go dairying; they don't want to milk cows.

"... I'm not naturally a dairy farmer and I would really prefer not to. If I wanted to be a dairy farmer I'd be a dairy farmer."

"People would select cropping because it's not much of a deviation away from their existing field of knowledge."

“If we had irrigation, cropping would probably intensify I would think, but it would depend on the cost of that irrigation as to what sort of crops you could actually justify. I mean you probably wouldn’t justify growing wheat or barley, irrigating from the scheme so ... you’d then have to look at different crops that would justify that sort of expense.”

“Probably increase the cropping side I’d say. Or change the farming practice to dairying.”

Alternative crops

There was some uncertainty about the possibilities when it came to alternative crop types. There may be different options that are far more profitable than the ones currently being considered or currently grown. It was suggested that more investigation needed to be done on what crop type options there could be. There may be crops for Asian or Indian markets that growers are completely unaware of.

“..., and I think there needs to be more research, not only into what can be grown. There are options for cropping farmers. At the moment we’ve got peas, barley and then we jump on the dairy guys backs.”

“...But there’s a whole lot more crops, there’s onions, spuds, reverse cycle from the Northern hemisphere, lentils, beans...”

“as soon as you put water on it you open up a whole lot of opportunities to use it for alternative land uses, sometime in the future”

A study was conducted by Crop & Food Research to develop ‘Hawke’s Bay Regional Council Crop Info Guide’ (Shaw et al, 2008) which investigates the potential of various crops and details the soil and climate conditions in the region. The region would possibly benefit from sections of this report being released for the public to view.

Recommendation 4: Sections of the ‘Hawke’s Bay Regional Council Crop Info Guide’ be released for public viewing. A further scoping study of alternative suitable crops for production in Central Hawke’s Bay could be undertaken if there are still gaps. This would provide growers suitable crop options that could be profitable with access to water from the storage scheme. This may need to be a supplementary project to the Ruataniwha Water Storage Feasibility Study.

Irrigation extends production season

There were a number of comments about the way irrigation widens the growing season. It makes it quicker to establish crops or grass at either end of the season. Faster establishment of crops opens up the option of double-cropping. This increase in earning potential adds real value to having irrigation water.

“The best thing about irrigation is the first six or eight weeks and the last six or eight weeks. The middle is just neutral; it’s the bits at the start and at the end...”

“The thing about water though, for example peas, you get into double cropping, suddenly you’ve not just got a crop of peas, you’ve got another crop following it, whether it be a feed crop for stock or another bean crop, possibly peas and beans. Or peas and sweet corn and suddenly the value of your water becomes real”.

“It (*irrigation*) takes the variation out and it gives you a longer growth period so you’re doing a bit of grass at either end of the rain, like coming into the late December/January and then starting earlier in the end of January/February period, you get the benefits there, guaranteed re-strike of your fodder crops and getting early grass re-sown.”

Irrigation allows farmers to sow grass at the end of the growing season and get it established quickly. This means that you can get finishing stock on the farm to graze, and gain weight much faster compared with no irrigation. It also reduces the farmer’s risk of having to sell off stock due to drought and being subject to poor financial returns. It all gives the farmer flexibility and certainty which adds to the value and affordability of irrigation water.

“Yeah, like for us I would have a crop of peas, and then a crop for lambs, then into young grass. ...”

“And it sets you up for the winter a little bit.”

Dairy production system

A lot of cropping (feed crops) is done to support dairy farming with a feed crop as opposed to irrigating grass. It was emphasised in the meetings that if there is additional dairying as a result of the water storage scheme, a significant amount of dairy support would be needed. This would also require irrigation and the cost structure of this would be quite different from growing a cash crop. If this is undertaken as part of an existing dairy operation, the productivity and profitability of the dairy farm would be leveraged against the crop and cost for irrigation water. This is as opposed to a cash crop, where the crops value is in its sale price.

“...you may find that irrigation isn’t necessarily for dairying as it doesn’t take place on the actual dairy farm, it takes place on all the maize farms just down the road.”

“But you see us as dairy farmers, the land that we would like to irrigate is not to convert it into dairying, it’s so we’ve got a supply of crops (stock feed) that we want to put into the dairy farm. ...know that it’s going to be guaranteed. “

“...So is there another hectare of dairy support, what do you reckon the ratio would be?

... it would be on the top side of 50% I would suggest.”

Wider benefits of irrigation

It is expected that the benefits of irrigation and the access to irrigation water, will not be localised to just those properties with water access. The wider benefits will be looked into through a social impact assessment. However one benefit relevant to this study is the potential gains by hill country farmers as a result of more secure stock feed. Farmers on the plains are working more and more with hill country farmers striking up deals for share farming. It is expected that these links will continue to get stronger with the addition of irrigation water.

“you’d go and talk to a couple of guys at the back there ... tell them to lamb late, use these specific size and I’ll guarantee you a store price of such and such. You know you can finish x amount of lambs, you’d get all sorts of value chains being put together.”

“I’ll deal direct with the farmer and he supplies me with the lambs and I finish them and he’s happy at the end of the day and no money’s going between us and he pays me a cheque when I’ve got them all finished at a certain weight, and he takes his share out of it and I take my share. We’re just share farming it that way.”

Recommendation 5: Ensure a social impact assessment is completed which covers benefits to the farming sector and support industries.

Frost limitations

There are additional factors that limit production in the Ruataniwha area. The most significant risk, in addition to drought, for most areas is frost (Appendix 8, 9, 10). In the Ashcott irrigation zone there is an area that has a wider window for frost free periods (Appendix 10), so has the lowest risk of the areas studied. Technologies are available such as wind machines that could minimise this risk.

Unknowns

It must be noted that there are several unknowns in a study like this. It is acknowledged that the landowners and managers spoken to throughout this study may not necessarily be the same owners and managers in five or ten year's time. Some South Island water storage schemes experienced significant land ownership changes within the first ten years of operation. There is another unknown around what crops could be grown in the future. What is grown today might be completely different from that of tomorrow. This makes it very difficult to estimate what the landscape will look like if the water storage scheme goes ahead.

It is expected that with the addition of water, the Ruataniwha area will develop into a more integrated production system. The overall security that irrigation brings to production is huge. It gives growers and farmers the confidence to make decisions, minimising the risk of failure. With this added security, there is opportunity to develop a more integrated production system and value chain. Mutually beneficial links between hill country farmers and those on the plains are likely to be strengthened. This would see more finishing farms on the flats. Dairying is likely to increase but the greater use for irrigation will probably be in the form of dairy support i.e. growing feed for stock. Double-cropping is likely to become a more prevalent. What those crops are may change, and are likely to expand from the crop types that are currently grown.

ABILITY TO PAY

The single greatest concern raised in each meeting was the affordability of the scheme. These concerns ranged from the affordability of investing in infrastructure (i.e. construction of the dams and distribution system), the ability to purchase water at the gate, through to the installation of irrigation on-farm.

Concerns around affordability of building the dams were minimised when it was clarified that landowners are not being looked at to fund the infrastructure investment. The likely commercial structure would involve a large scale entity funded by external parties with the ability of farmers to buy into shares over time.

Existing debt levels

With the extreme weather conditions over the last 4-5 growing seasons, land owners in Central Hawke's Bay have been under considerable pressure. It is fair to say that for most, farm equity has been significantly eroded over this period. The level of existing on-farm debt must be taken into consideration through the development of the water storage project. Throughout these meetings it is evident there is a willingness to invest in irrigation, but this is irrelevant if finance access is limited. There was no obvious distinction between the zones, as comments of this nature were prevalent throughout all the meetings.

"The reality is now a lot of farmers would struggle to find the capital; they're struggling to find the capital to run their operations now."

"It would be interesting now if you went out there in the present state of the level of indebtedness on farms; that even if they said they could they probably can't get the money."

"The funding is a critical side. The other thing you've got to be careful of is that, 10 years down the track, and well even say another five droughts, the ability of those who own the land to actually front up with capital to do something will be a whole lot more eroded than what it is currently."

Recommendation 6: Meet with rural banks to find out what the current financial situation is for most farmers and find out if there is a way the scheme can be structured that will satisfy bank lending criteria.

Recommendation 7: A risk assessment should be undertaken of how possible droughts in the next 4-5 seasons could affect the financial situation for landowners thereby further limiting the ability to invest and or sell property.

Affordability at the gate

The ability to pay for irrigation water at the gate was the utmost concern. The initial capital costs identified in the prefeasibility study of \$7,394 - \$9,428 per hectare was raised in many of the meetings. At these levels, attendees indicated that most farming systems would not be able to accommodate these prices, with the possible exception of dairy and some high value cropping.

Affordability Concern – Non-Irrigators

Affordability of accessing irrigation water from the scheme was identified as a potential issue in meetings with both irrigators and non irrigators. However, it was difficult to ascertain what land owners could afford to pay per hectare within their current farming systems. Many, non irrigators especially, could not indicate what was affordable as they had not worked out what the expected production and returns would be on their respective soil types. In addition to that, if irrigation water was made available 100% of current non irrigators said they would consider a change of land use. Although most had a rough idea of the land-use they were likely to consider, many were vague on the detail necessary to pursue those land-uses, as they had not looked into the option in detail. Therefore, non-irrigating landowners were generally not in a position to indicate what charge to access water at the gate, would be affordable. None the less, cost is a significant concern.

“...So to be actually investing five to ten thousand a hectare just to get it to the gate, I think you would be pushing something up hill”.

... Work out what farmers can afford to pay, ... But if you come out at nine grand you might never sell it.

Affordability Concern – Current Irrigators

In the ‘current irrigator’ meetings there was also a concern that accessing water at the gate would not be affordable. It could be argued that discussions around affordability with the irrigators have more weighting, as they should have a better understanding of potential production increases, limitations and costs associated with irrigation. Misapprehensions about price appear to have

stemmed from the per hectare costs to access water released in the prefeasibility study and then accentuated by anecdotal discussions. It seems that farm consultants, and landowners have put too much reliance in these costs which require further investigations before they can be considered accurate.

“I know it’s a long term project but financially we just couldn’t do it. There would have to be some really good indicators out there and guaranteed prices to make it fly. As you know I’m doing a little bit more irrigation anyway and have a fairly good idea of some of the cost structures involved which anything with irrigation is hideous”.

“I think that’s the scary thing that we’re all worried about if they open the door, everyone will rush in and try and do it and then they’ll realise that we can’t make enough money off it”.

The water use assumption made in the prefeasibility study was 4,000m³/ha/year to be supplied at approximately \$7,394 - \$9,428 per hectare. For some land uses such as dairying this volume of water is a relatively accurate assumption. For other land uses such as cropping, early figures on water requirements show that, this is a significant over estimation, and possibly only half this volume would be required. Many landowners have based their assumptions on prefeasibility costings, which theoretically could be halved. This only accentuates landowner concerns. Until the Ruataniwha Water Storage Feasibility Study has progressed, more accurate costing cannot be provided.

Concern over existing consents

There appeared to be hesitation about the affordability of irrigation in general from some consent holders. Some were very conservative as to the benefits of irrigation saying things like “...in the dry year it’s minimised our loss, it hasn’t given us gains so much...” It is very likely that this is the case however it also seemed that the benefits of irrigation were being down played, as there was concern around the future of existing consents. This is possibly just a perception of the meetings however, and cannot be determined until further analysis is done on the productivity of soils and likely financial returns.

“you’ve already paid a premium for the land because it’s got water attached to it and then if we have to go and pay it again, it’s not fair.”

When some land owners in Ashcott (zone C) were asked, “what would make it worthwhile for existing irrigators to ‘buy into’ the system?” Considerably negative comments were raised about existing irrigation consent holders, having to give up their consents. This was despite having previously discussed the possibility of pressurised water at the gate.

“To switch, I think you’re confusing the issue, even bring it up because you’ve got to take it, as a bore holder, it would be pretty unreasonable to expect (*consent removal*) unless there is a breach of conditions for that consent to be removed. ...they’d have a pretty testing case to actually remove something...”

A similar question was asked in the Onga Onga zone meeting however, they identified some benefits by shifting to the scheme. These benefits would depend on the security of their existing water supply. The more compromised the current water supply, the greater the benefit of moving to the water storage scheme. It was also indicated that some sort of incentive would be necessary to get existing irrigators to shift to the scheme, if this is the preferred option.

“The only benefit of going into the scheme is if the low flow is substantially adjusted in surface water”.

“Or if the well’s, we’ve got no idea what Council is thinking at this stage, they say that surface water is connected to underground water, but what implication that is going to make for underground water we don’t know yet”.

“But if you’re compensated ... Without some sort of financial assistance you wouldn’t even consider it. But if you had some, it would be at what level would you consider it, wouldn’t it. But without that you would just say no, stick to what you’ve got, cause we’ve already paid for it”.

The possibility of useable water at the gate (i.e. pressured water) that requires little or no pumping was looked upon favourably. This has been discussed in more detail in the ‘Electricity and Water Distribution’ section of this report.

Cost comparison of access to water

Some discussions indicate that a comparison needs to be made between the cost to access water via traditional methods (bore and river takes) then compare this with the potential cost of water from the storage scheme. Figures were discussed in a number of the meetings, with some costs appearing to be quite accurate whereas others were very much anecdotal. As it is getting more difficult to access water in Ruataniwha through traditional means, it may not be necessary to compare these costs.

Recommendation 8: Determine if accurate cost comparisons, for accessing irrigation water, are necessary to compare irrigation from a well, surface take and from the storage scheme. To ensure accurate costing, this work should be undertaken with professionals in the irrigation and well-drilling fields, if deemed necessary.

Annual fees

Questions arose in many meetings about ongoing annual fees and how this will affect the affordability equation. Unfortunately this cost will not be determined until later in the water storage feasibility study.

“The extra question to that though (*referring to power savings*) is what are going to be your ongoing overhead charges of being part of the system? That could well negate that power cost”.

Information transfer

In several meetings it was suggested that there was a need for some accurate figures around affordability to access the scheme and install on-farm irrigation. It was indicated in one meeting that the project team have a “responsibility to try and make it as clear and as transparent as possible to the potential investor now. ...whether it’s bought or sold will depend on the banker“. This information could serve two purposes – firstly, it could be used to determine the likely uptake as a risk assessment for the scheme and secondly, as a way of informing land owners so they can make more knowledgeable decisions.

“... I’m no expert on irrigation and just the cost of it, I wouldn’t know where I’m heading. So you’ve got to have some guidance in that respect, if you’re looking at different alternatives.”

“...because if you’re like me who’s never been irrigating, you’ve got no clue and most of your respondents are probably like that, so that survey...”

Recommendation 9: To enable land owners to make informed decisions, an analysis of a range of production systems on a range of soil types needs to be undertaken. This needs to be disseminated to landowners in an appropriate way to give landowners assurance around affordability of different options. This information could also assist with the schemes risk assessment.

Soil – productive capability

The productive capability of soils is essential to the affordability of both water access at the gate, and on-farm irrigation. If the soil cannot produce enough with the addition of irrigation landowners will not be able to justify the additional expense. This is discussed further in the ‘soil’ section of this report.

Obstacles to installing irrigation

There are additional on-farm costs to install irrigation that need to be taken into account when assessing the affordability for landowners. One landowner stated that ‘There’s a lot of cost in moving trees, tracks, compliance costs that are horrific with the council’. Even the need to shift power poles and transformers can be a significant cost. It may not be possible to irrigate the land area that people have indicated they would like to, unless some of these obstacles are shifted.

Recommendation 10: Assess several farms to get an average ‘effective on-farm area’ suitable for irrigation. It is necessary to know how much additional land can practicably be irrigated, to more accurately estimate irrigation demand as well as potential benefits to the local economy.

The ability for farmers to buy into the scheme and invest in on-farm capital in the form of irrigation is, at present, severely limited. There needs to be further investigation to determine the extent of this. A risk assessment of how possible droughts in the next 4-5 seasons could affect the financial situation of landowners would also be beneficial. Further to that, there is a responsibility of the project team to ensure that payment assistance options, to access to water for on-farm irrigation, are investigated e.g. processors assisting farmers with the investment, establishing equipment hire/ hire purchase options.

MARKET SECURITY

Many comments were made in each meeting about market security from a range of perspectives. There did not appear to be any pattern between the zones, as comments were generally opinions from observations and past experience. These discussions helped to determine what would give farmers and growers security to invest in irrigation and access water from the scheme.

When the survey asked farmers, what they thought the greatest issue facing their farm would be over the next ten years, 'Pricing schedules and payout rates' was cited the most at 56.1% (41 respondents).

There are two main areas where irrigation can enable market security for farmers, growers and processors. Firstly more consistent production gives farmers the confidence to sign up to long term contracts, and gives process companies the ability to offer contracts and invest in infrastructure. Of all the farms who took part in the survey, 28.6% (12 respondents) had supply contracts and 71.4% (30 respondents) did not. The zone with the highest percentage of supply contracts was Ongaonga, with four out of nine farms having supply contracts. Tikokino had the lowest percentage of supply contracts, with 2 out of 11 farms having contracts.

Being able to irrigate reduces the risk of drought and the consequential loss of production. With water, growers and farmers are able to reach targets of animal weight gain or production yield with more certainty. It also means that producers are able to supply to processors with more certainty, within a set timeframe. With added confidence in production, supply contracts are increasingly possible.

"So you can hit your dates with certainty is worth quite a lot".

Conversely, for many to feel secure to invest in irrigation they need security that there is a supplier that will take their product at a suitable price. If landowner's sign up to a water supply scheme and install irrigation, the financial risk to the farmer significantly increases and they cannot afford the market to fail them. Farmers and growers going to the extent of investing in irrigation have expressed the need for process companies to show a commitment to them. Too often process companies take advantage of farmer misfortune by dropping schedule prices. Ultimately this forces producers to look at more secure and profitable alternatives.

"...perhaps they (*referring to meat companies*) are heading towards supply contracts more and more in the future ... watering does come into that. You just look down what's happening in the South Island, sheep numbers are just plummeting because dairying is taking over".

“...So I’d like to see, if I was going to do it, I would want to see a commitment from them as well (*referring to processors*). If we make the commitment to irrigation I want a commitment from the type of farming I’m doing. If it’s cropping peas and barley that they want to sign in, they want to back us too”.

“It’s wanting to lock into a price, but also wanting to lock into a commitment that they will carry on wanting product”.

The relationship between suppliers and processors is so interlinked that one would not survive long without the other. It is therefore in the best interest of processors, to ensure there is a secure supply, to maintain a positive relationship with their suppliers.

“If McCain’s pulled the pin, we would all be gone. And that could happen in 20 years time”.

“...And if we don’t get help as a producer, well we can’t carry on and look at these options either”.

The use of supply contracts has pros and cons attached. Some farmers expressed nervousness because of the way that, in the past, processors have played farmers against each other to get the best price. However, some see that price consistency from a contract as beneficial.

“The trouble with contracts...at the end they always win because then they have a certain supply and then they go to the next fellow (*and say*), this is what he’s prepared to do it for, can you do it for that? ...”

“...You’d put a bit in each camp I would think. So you would do ‘that’ (*a given crop*) for a little bit of security, but then you would play the market on the other stuff you would try and do better wouldn’t you”.

“...Yeah I think the assurity of price, it would have to be good wouldn’t it...”

Some are concerned that with irrigation the supply companies will change the pricing structure. Some fear that when everyone has irrigation, the supply companies will drop the prices so that farmers are not much better off.

“And that happens you know I think if we put irrigation on, at the moment they know we can grow six tonne without irrigation of barley, if everybody puts irrigation in and we can grow nine tonne, well then they work the gross margins and they’ll bring the price back, that’s how they do it”.

There are also basic supply and demand issues that could arise as, if the market is flooded, prices are likely to drop. If there is going to be a consistent increase in production, new markets will need to be found to ensure there is not excess supply. Risk also needs to be spread so that there is not a complete reliance on one market, such as Australia.

“... there’s guys at the moment that are irrigating, they get a premium because the pricing is done for the ‘non irrigation’. But once everybody’s irrigating, it’s squashed. Squash price is high with a good profitable crop, but all of a sudden if you’ve got lots of people ringing John Bostock to grow squash what do you think the prices ... what’s going to happen?”

“Now if everyone starts growing them then that collapses that market. You’re going to have to get some sort of export deal going as well. You can’t rely on New Zealand, it’s too small”.

“Australia has had a lot of problems with growing what we’re supplying, but since they have had rain over there, suddenly it all changes and they’ve got an oversupply. Those companies here, McCain’s and Simplot have trimmed back because of that”.

Support for a single marketing body for New Zealand produce, was raised in several meetings. Getting better market positioning on global markets would be based on quality of produce rather than quantity of supply. This would also minimise competitors in the market undercutting the primary producer, therefore strengthening the production base. Investigating this further is outside the scope of this report however, it is important to note that there is increasing support to change the way New Zealand produce is marketed offshore.

Overall, producers need security to know there is a market for whatever they are producing and that they are going to make a decent profit through the process. Although there is support for secure prices, there is varied support for supply contracts. This appears to be brought about from a distrust of processors, regularly taking advantage of farmer misfortune. Supply contracts are likely to give farmers and growers the confidence to sign up to the water storage scheme however this needs to be approached in a way that satisfies farmers concerns. Regardless of supply contracts becoming common place, producers still need commitment and adequate support from processors.

Recommendation 11: Processors need to investigate and implement options to enable growers and farmers to invest in water at the gate and on-farm irrigation systems. Communication between the project team and processors needs to be maintained to ensure these options are explored, so that the storage scheme has immediate uptake, thereby reducing the scheme risk. This also needs to be done to enable both suppliers and processors to gain from the availability of irrigation water.

ELECTRICITY AND WATER DISTRIBUTION

Several aspects around electricity were discussed in the focus group meetings, invariably this conversation led into water distribution options. The potential for power generation was raised however the main conversation around electricity was the expense that farmers face every time they turn on their irrigation. If this expense is reduced with a piped system, it may influence their decision to sign up to the storage scheme. The pros and cons of other distribution methods such as a raced water system naturally followed on from this.

Power Generation

There was interest in most meetings about the possibility to generate electricity. Discussion around power generation was positive and supportive of incorporating it into the water storage project. Offsetting cost to the end user was possibly the main benefit identified. Although power generation was deemed a priority to potential customers of the scheme, discussion was not pursued to any great extent. At the time of the meetings dams under investigation had limited capacity for power generation (The magnitude of generation possible was in the order of kilowatts not megawatts, so not large contenders for cost savings). However, if alternative water storage sites are investigated, power generation will need consideration.

“What you need is a power company there generating power to start with, it actually helps them”.

“But it would be absolutely sensible to do it wouldn't it? (*Referring to power generation*)”

“It's got to be the most cost effective, making your own power”.

Pumping

Concern was also raised if pumping would be necessary to fill the dams. Overall, it would be preferred if pumping costs were eliminated or at least minimised, to ensure long term running costs are kept to a minimum. Attendees were reassured that energy efficiency would be a consideration through the design phase therefore this was not discussed in detail.

Recommendation 12: Net energy cost of stored water is of a concern to the end user and could ultimately affect the affordability, and therefore reduce the uptake of stored water. If there is potential for power generation this needs to be investigated further and the use of pumping for infill and release needs to be minimised but preferably eliminated.

Distribution method

Several options have been proposed to distribute irrigation water from dams, including via river, water race or piped. Results in the survey showed some variation in preferred distribution method:

- 65.0% preferred the piped method of water distribution. Across all zones, this ranged from 44.4% in Onga Onga to 100% in Ashcott. (Responses # 40)
- 33.3% moderately preferred the raced method of water distribution. 48.7% of all respondents stated that they least prefer this method, ranging from 30.0% in Tikokino to 62.5% in Onga Onga. (Responses # 40)
- 28.2% preferred and 23.1% moderately preferred the use of existing river systems as a distribution method. This method had the highest percentage of those not agreeing with it (23.1%). Responses varied by zone. (Responses # 39)

Throughout the meetings, support for a piped system was the most preferred option. Piped water distribution systems opens up the possibility of natural gravity water pressure available at the gate. Further assessment of elevations need to be done to determine the extent that this is possible, however it is very likely. The potential for power savings as a result of pressurised water at the gate is possibly one of the greater selling points for the scheme, especially if there is a need to entice existing consent holders on to stored water. An assessment of what pressure could be made available at the gate needs to be done at the distribution design stage.

The main types of irrigation used in Ruataniwha is via pivot/linear, travelling irrigator (which is usually with a gun, but occasionally with a boom), or a long line lateral system (e.g. K-line, Irripod or a derivative there of). Travelling irrigators with guns and long line lateral systems usually (but not always) have a relatively high operating pressure. It is not likely that the water storage scheme would be able to supply enough pressure for these types of systems to work, and would still require a fair amount of additional on farm pumping. However, a pivot/linear or travelling irrigator with a boom can run on significantly lower pressure and it may be possible to supply enough pressure through the scheme for these irrigation methods. Some longer pivots may still need a booster pump (often used on to overcome head-loss in the pipe lines in longer pivots) however this may be minimal. This must be looked into further when designing the distribution method.

“If it’s piped some people will be able to run their irrigator without pumping wouldn’t they, cause it would be pressurised”.

“You’d basically have to have about 20 psi to run a pivot, versus to run guns or pod type thing you probably need 90 to 100 so there’s a huge difference there and also that cost of pulling your water from 100m down is a big power bill, so they’re all benefits of arriving at the gate under pressure and clearly that would be a major”.

Even if the pressure available at the gate is minimal, potential cost savings could be huge, even if a booster pump is required. This is especially true when compared to systems pushing water 100 metres (plus) out of a well. Getting water out of the ground is often the greatest cost of running an

irrigation system. Meeting participants with irrigation systems were therefore asked roughly what they were paying in power, and answers ranged from \$46,000 annually up to \$230,000. These are not small annual power costs, and the potential to save on this should not be overlooked.

“We’re probably doing about 15,000 hours on an 80 hectare pivot and that would be costing probably about \$12,000 power bill give or take. So that’s per hectare \$150 power bill”.

It was acknowledged that a piped system may have an additional capital cost but most people had the attitude “Do it once and it’s done”. This will need to be reassessed when costing is available, however initial reaction was generally positive.

“It’s a bit like a heat pump, high capital costs and low running. Some people favour that and some people are prepared to pay a bit more annually”.

“It’s like all those things probably. If you can absorb the cost at the start it’s the best long term solution”.

Power saving to farmer was by far one of the greatest benefits to having a piped water distribution system as opposed to a water race. For the most part there was negativity around a raced system throughout the meetings which included comments such as “What a waste of land... it’s not on”, “You’ll get leakage in the shingles up there”, “...would be too much maintenance”. There was little positivity toward a raced system, although it was noted that it may need to be incorporated in the overall design.

“... if they’re open it’s the pest, diseases, and amount of riparian land you have to leave for a water race for people to go up and down. It depends how big it is, how big a volume of water you want”.

“When we had those water races, I was always losing stock”.

“You might have to have a race system at the start, and then so far down it would be piped maybe”.

There was also some negativity toward releasing water down the rivers, which was surprising. It was suggested that this type of system might favour those with river takes, and may exclude farms further away from the river however this was not fully confirmed in the meetings. Another issue with river distribution was the potential loss to ground water. If this delivery system is used, the interaction between ground water and surface water needs to be better understood. This information would then need to be relayed to irrigators and stakeholders.

Recommendation 13: When designing the distribution system there may have to be a trade off between capital and running costs. Where possible there was a preference for minimising running costs, i.e. electricity. When this has been investigated further and costed options are available for consideration, additional public consultation should be undertaken.

Recommendation 14: Use the Ruataniwha ground water model to run scenarios, relevant to the water distribution option, to assess the interaction between ground water and surface water. This information would then need to be distributed to irrigators and stakeholders.

The net energy consumption of the scheme was identified as a general concern, as this may significantly affect the overall running cost. This will have a direct bearing on the cost to end users and could negatively or positively alter the affordability of accessing water. If there is potential for power generation this must be investigated. The distribution method also needs to be designed with energy savings in mind. It is understood by most that a trade off between energy savings and capital cost is likely. When this has been investigated further and options are available for consideration (including pricing) the need for public consultation should not be overlooked.

SOIL ASSESSMENT

Soil type and their capacity to produce is possibly one of the most important factors in determining the viability and success of the water storage scheme. There was a lot of discussion around this in most meetings. Takapau, Hastings and Argyll soils (note these are soil type names, not soil types found in a given location) were focussed on at the meetings, as attendees were most familiar with these soil types.

An investigation into the soil types found in the Ruataniwha area was undertaken by Landcare as part of this study. This report has been based on the soil studies done in the same area by E. Griffiths detailed in 'Soils of Ruataniwha Plains: a guide to their management' (2004). Landcare were provided with information on the five most frequent soils found in each zone. These were then ranked on suitability for irrigation and productive potential with irrigation (Webb, 2010). Some of this work was used as a basis for discussion throughout the meetings, and maps resulting from this work have been appended (Appendix 11). A summary of the top five soils present in each irrigation zone detailing their respective production capacity (ref Appendix 4), and a break-down of all soils present in the study area showing respective hectares and percentages of each (Appendix 5), have also been included in the references. For more information refer to the Landcare soils report 'Irrigability of Ruataniwha Soils' (2010).

Takapau soil

There are large areas of Takapau soils within the Tikokino, Onga Onga and Ashcott zones. Throughout meetings, this soil was identified as one that would benefit significantly from irrigation, as it would see the greatest marginal gain. It is a relatively free-draining soil and requires less water, more frequently (compared with heavy soil). With this soil, growers can have greater control over the water available for plant up take. Lighter soils are less prone to water logging, which reduces the risk of crop damage from large rainfall events. Many suggested that it is easier to apply water than take it off.

"Takapau (*soil*) is good because the differential between irrigated and non-irrigated is huge."

Hastings soil

There was also some discussion around the heavy Hastings soil, however there were two different perspectives with this soil type. Some considered this a highly productive soil that would get benefit from irrigation with larger volumes that is less frequently applied. It was expressed that not much irrigation would be required for this soil for it to be highly productive. In some cases it can produce good crops without needing irrigation. The risk mentioned with the Hastings soil was the potential for water logging in the event of high rainfall. Damage caused by excess water can be just as detrimental for a crop as drought. This was evident in January 2010 when the Ruataniwha Plains experienced three times the average January rainfall.

Overall, the meeting attendees indicated that growers would have the greatest control and potential production gain from the lighter soils such as the Takapau soil.

“...heavier ground actually can do quite well in crops without irrigation.”

Argyll soil

Some have indicated that the stony soils such as Argyll may be difficult to manage and see a gain in production. These soils have been assessed by Landcare and are classed as having a ‘low potential for production with irrigation’. These discussions were however relative to the current land uses in the Ruataniwha area. If alternative land uses are found, then the production possible from these soils could be much greater. Viticulture may also be a possibility on some of these soils but this is not likely to happen until the current market has stabilised. Although a soil may be classed as having ‘low potential for production with irrigation’, this is all dependent on the suitability of the crop being produced.

“See that there Argyll (*pointing to the map*) ... it’s not worth doing (*referring to irrigability of the soil*).

... Yeah grapes would be alright but I think he’s going to have to spend a lot of money on windmills for a start because the frost protection late in season”

Consistency of soils

The consistency of soils could also be a factor limiting production. Irregular soil types were mentioned as being problematic to yield volumes and ripening of a single crop. The Tikokino, Onga Onga and Ashcott zones have generally large consistent areas of Takapau soils. This soil also takes up the largest area (ha) in each of the four irrigation zones. The Takapau soil has been classed in the Landcare report ‘Irrigability of Ruataniwha Soils’ (Webb, T. 2010) as having high production potential with the addition of irrigation. This adds to the affordability of the irrigation scheme in the upper irrigation zones. However there are many areas in Ruataniwha that have inconsistent soils (Appendix 3).

“...there’s a lot of factors in whether that ground is actually suited for irrigation ... you really need consistent soil type if you’re doing anything like cropping otherwise you get mixed yields and ripening. Things like that.”

“And the other thing I’d be in contention about is not all land is suitable for irrigation. It might be flat but it’s not suitable. I’ve got ... shingle ... and it’s hugely variable. ... Peas have got to be on consistent soil types and you can water the hell out of grass on shingle and still not get a lot of grass.”

Recommendation 15: Use information from the Landcare report about the productive capacity of the soils to determine the potential productivity in monetary terms. This may need to be done using representative crops suitable for the area. These figures could also be used to help determine what effect different soil types will have on the affordability of stored irrigation water.

Are the soils good enough?

Concern was raised in one of the Takapau zone meetings that the soils are not good enough. If the soil will not produce enough to make irrigation cost effective then land owners are unlikely to be able to access the water.

“Yeah it’s not good enough soil.”

...Under water, you know we were cropping it to try and make the irrigation pay, but then the land wouldn’t take it.”

...“I think that’s the bigger factor.”

“The water wasn’t expensive, if that’s what you’re asking; it was accessible, so even with water that accessible it didn’t work. It wasn’t that it wasn’t given quite a good shot actually, it wasn’t that anything was skimped on in terms of ... and a lot of people have found in this area, I think if you ask them honestly, would say to you regardless of the best intention the soil is the limiter and you know as soon as I look at that map that would be my concern, unless you’re looking at dairying, dairying is fine.”

“... I might be wrong, but I honestly don’t think that country is good enough to support what this is likely to cost.”

Whether irrigation will increase productivity enough to make water affordable, was raised in the other two Takapau meetings. Although these landowners did not insist the soils are not capable of producing enough with irrigation, they were merely indicating that potential productivity needs to be considered.

“...Well that’s going to be the make or break of the whole thing, is whether it stacks up and increases productivity.”

“You’ve got to balance up the costings against increase in production and increase in work load that you’re going to be landed with and decide well is it worth it or not?”

Production potential of each zone

Focus groups, mainly prioritised zones based on the production potential of the land with the addition of water. What can be produced largely comes down to soils and climate. According to the soil analysis, the Ashcott zone has the greatest production potential with irrigation, of 6,343ha classed with 'high' and 1,042ha classed with 'moderate' production potential. Both the Tikokino and Onga Onga zones have 4,414ha and 4,910ha respectively, classed as 'high'. The Takapau zone has much less production potential than all the other zones with 2,957ha classed as 'high' and 1,506ha classed as 'moderate' (Appendix 4).

Soil type and its capacity to produce, is critical to the affordability of stored water and ultimately the success of the water storage scheme. Throughout the meetings the Takapau soils were continually identified as one that would have the greatest differential increase in production with irrigation water. It was indicated that the irrigation requirement for Hastings soils was not high, as it is often a highly producing soil without this input. Argyll soils were shown in the Landcare soils report (Webb, 2010) and in meeting discussions, to have limited ability to produce, although this will depend on the suitability of crop type. Generally, soils in the Ruataniwha area are quite changeable from paddock to paddock which can affect consistency of yield and ripening. One notable exception to this is the vast areas of Takapau soil in the Tikokino, Onga Onga and Ashcott zones.

CROP WATER REQUIREMENT

Throughout the meetings there was an attempt to find out potential water use for various crops. This proved difficult for most and will need further investigation to get accurate data.

Most meeting attendees were unable to give accurate figures of water usage without looking through their records. It is also difficult to use council databases to obtain water use figures for several reasons. For example, the hectares that a land owner may be consented to irrigate is not necessarily the same number of hectares that is planted and irrigated from year to year; and often there are cropping rotations which Council has no record of, so even if the number of hectares cropped and irrigated is the same (from year to year), it is difficult to attribute water use to a specific crop.

Further analysis must be done to obtain accurate water requirement figures for various crops. The SPASMO water allocation calculator is a tool that takes into account soil, climate, and crop type. This is due for completion in early December and could be one method to determine these figures.

The following table has been put together through anecdotal discussions around water usage for different crops. There are several variables around actual water requirements that meeting attendees have not necessarily taken into account, such as climate and soil type. These figures cannot be considered accurate and need further analysis.

Seasonal irrigation water use on various crops (mm)

LAND USE	SEASONAL WATER USE (mm)
Dairy	300-500
Peas	100
Potatoes	260-500
Beans	Insufficient data
Onions	Insufficient data
Viticulture: Pinot, Chardonnay, Sauvignon Blanc	20mm

Recommendation 16: Use the SPASMO water allocation calculator to run various scenarios, e.g. assess annual crop water usage of several different crops, on a variety of soil types in a range of climates. This can be used to verify the existing figures available.

OVERALL DEMAND IN DIFFERENT ZONES

The main purpose of this report was to find out where the greatest demand for irrigation water is located and to find out if there was a particular zone that stood out as a viable option. No particular zone stood out, as there were equal arguments that were both positive and negative. The following illustrates some of the arguments for and against each zone as identified through the focus group meetings and other one-on-one meetings. It must be noted that in the meetings, not one person said the dams should not go ahead or that water storage was not worthwhile investigating.

The demand for irrigation water was spread quite evenly throughout the zones. It became apparent through this study that several strategic questions need to be answered, to guide areas of focus for the remainder of the project. There need to be decisions around who to support i.e. is it existing irrigators, new irrigators, or, a combination of both?

Is it best to supply existing irrigators with a more reliable water supply? Existing irrigators already have the on-farm capital investment and would then maintain the existing production level in the area. They may choose to increase the area irrigated, however given that a part of the property is already irrigated the marginal increase in irrigation would be less than a property without irrigation already installed. Therefore this option is likely to result in less addition input into the local economy than that of a non irrigated property.

Existing irrigators could be the first customers to the scheme because they already have on-farm investment in irrigation (Appendix 6). However in the meetings there appeared to be a perception that their water supply is reasonably secure. Unless there is a reason to change or there is a desire for more water, existing irrigators are not likely to need access to the stored water. If however, security of supply is compromised (for whatever reason) or more water is needed, the demand from this group could be significant and more immediate than from non irrigators.

Or, is it best to supply to those that currently cannot access irrigation water? There is a risk that uptake of water would be relatively slow, as on-farm capital investment in irrigation is not likely to have been undertaken. If the current economic climate continues this investment could take some time to occur. However, the net gain to the local economy of this option could be considerably higher, as the marginal difference in irrigated area would be greater in a non-irrigated area than that which is already partly irrigated. Therefore this group could achieve higher overall production increases.

Alternatively, **can a combination of these options be undertaken?** This type of system would have a balance between farms that already have existing on-farm investment in irrigation as well as those that do not. This would therefore maintain existing production levels, as well as enabling increased production in areas where water has previously been a limitation.

Production Potential of Each Zone

Focus groups, mainly prioritised zones based on production potential of the land with the addition of water. What can be produced largely comes down to soils and climate. According to the soil

analysis, the Ashcott zone has the greatest production potential with irrigation, followed by Tikokino, Onga Onga then Takapau. This is discussed in more detail in the soil section of this report.

“But surely if you supplied to the most productive area the market should, given five years, deal with that issue (*take up*).”

Tikokino (A) and Onga Onga (B)

The Tikokino and Onga Onga irrigation zones are considered similar in many respects. Often these zones were combined by meeting participants, when discussing which areas should be supplied irrigation water. For this reason the Tikokino and Onga Onga zones have been classed together.

The most vocal demand for irrigation water was from non-irrigators. When asked what area looked most promising, relative to the soil maps “A and B” (Tikokino and Onga Onga) was the simple response.

“ Put all the funds north.”
... “It rains more down there anyway.”

A number of the same soils are present in both zone A and B, with Takapau, Poporangi and Tikokino soils featuring in the top five soil types in both areas (Appendix 4). The quantities of each of these respective soils are also very similar, in each zone (see soil section of this report). Many of the meeting participants in these zones expressed that the greatest benefit from irrigation would be seen from the Takapau soils.

“... with Takapau soil you plant your crop and don’t have to worry ... you’re not going to get wet feet. You put the water on and you’re not going to have other crops drowned out. I know some of the heavier soils can do that, which is just my point of view.”

Hastings soil type is one of the most frequent soils in the Onga Onga zone, especially in the south east of this zone. It was stated that this heavier soil would not see as much marginal gain in productivity in comparison with the lighter soil as it is already considered a high-producing soil. Despite this, it was generally agreed that this soil would still see a benefit from irrigation, just not as significant as some of the lighter soils.

The majority of irrigation consents issued for the Ruataniwha area are in zones A and B (Appendix 6). The distribution of these consents also appears to be quite similar in these zones. This could be seen as a positive or negative with regards to potential up take (as discussed above).

Non-irrigators in this area clearly had a high demand for irrigation water. However, due to the high density of irrigation consents, there are significantly less non-irrigators in this area in comparison with Ashcott and Takapau. New irrigation potential this would therefore be less in the northern compared with the southern zones.

Ashcott (C)

This area was often mentioned by some, as a preferred area for water storage because it has large areas, of what people considered to be, ideal soils. Like Tikokino and Onga Onga, the Ashcott zone has a large area of light Takapau soils. However in Ashcott, this soil type is more predominant (by area and percentage) than that found in any of the other irrigation zones, with 4,238ha classed as a Takapau soil.

“No this light ... dry country works exceptionally well if it has food and water, simple.”

“We’re talking more around the versatility of the soil that’s there. Within Zone C (*Ashcott*) you’ve probably got more potential.”

“It’s pretty clear, it’s the area that’s got the most suitable land, the biggest area with the most suitable land.
...Ashcott and maybe Onga.”

Another benefit mentioned in zone C was the lower frost risk. The frost maps (Appendix 8, 9, 10) show a large area on the western side of this zone that is less susceptible to frost relative to the rest of the Ruataniwha area. This may reduce the inputs required when growing crops (depending on crop type and timing of growth phases).

Meeting attendees were asked if they thought Ashcott had more to offer than any other areas. The response was simply “Yeah far more.” Ashcott zone was also identified as a prime area to lease for potatoes production. Due to the rotational requirements of potatoes leasing is an ideal option for specialists in this crop.

Takapau Irrigation Zone

The Takapau zone had the most divided views when it came to the viability of water storage. There was support for irrigation water, but there was also concern about the ability to pay based on the productive capacity of the soils in this area. It was considered by some that this area is ideal for dairying but not as productive when it comes to cropping or other land uses. Anecdotal discussions indicate that this area would not be able to support diverse land uses, (such as cropping) for a sustained period. The soil analysis (Appendix 4) indicates that percentage wise a large portion soils, but in area (ha) only a small amount, of the soils in this area has ‘high’ production rating with irrigation. A high percentage of the soil in Takapau is classed as ‘moderate’. Therefore it needs to be determined if this high percentage of ‘moderate’ soil is enough to make irrigation scheme water affordable.

Another limiting factor of this area is the risk of frost (Appendix 8, 9, 10) however it may be possible to minimise this with technology such as wind machines. A concern was also raised about the dam itself, that if the Hinerangi Road site went ahead it would remove a large amount of good, flat

cropping land. If Takapau was to have a water storage scheme, a more suitable site may need to be looked into.

There were arguably more attendees from the upper zones than the lower zones however there may be several reasons for this. The area on the western end of the Takapau zone is considered more summer safe (Appendix 7). It is logical that invitees were less interested in the scheme due to generally adequate rainfall on their property. Another reason could be that at the time of the meetings it was a very busy period for dairy farmers, therefore attending the meeting was not a priority. From this it could be concluded that the far western end (i.e. the summer safe area) of the Takapau zone would not be a high priority area for receiving stored water.

Industry in the Takapau zone expressed considerable demand for irrigation water, and some meeting attendees, were very vocal in their demand for water. Those showing such strong support for the scheme were interested in growing fodder crops for dairy support. Other attendees in the more eastern areas were keen to grow more process crops and could also see the benefit of irrigation.

Despite the concerns raised about the Takapau zone, this area should not be overlooked. Further investigation is needed to find out if the limitations identified will affect affordability of irrigation water negatively. If there is an effect, it needs to be determined if this is significant enough, that accessing irrigation water from the scheme is no longer viable.

“Oh we just want it in our area that’s all, ... Let’s be honest, we’re here for ourselves, ...”

Recommendation 17: Irrigation zones to be included in the next phase of the feasibility study need a risk assessment completed. This would need to be with respect to production potential, which will ultimately affect the affordability for immediate uptake in the water storage scheme. This would include a combined ranking of the attributes and limitations such as the productive capacity of the soils and climatic risk, e.g. frost, hail, etc. Options to mitigate these risks also need to be investigated.

Hatuma Potential Irrigation Zone

The need for irrigation water was investigated around Lake Hatuma, to the east of the Takapau irrigation zone. This was not assessed as thoroughly as zones identified in the Tonkin and Taylor prefeasibility study. The significant limiting factor for this land is wet winters.

Although some parts of this zone would benefit from having irrigation in the dryer months the heavier soils are not suitable to be productive year round. The soils are generally not able to handle running stock in winter during wet periods. This makes buying into the scheme at the gate less affordable than an area where the land can produce year round. Meeting attendees said it is necessary to make money off the land, year round to justify the cost of irrigation and accessing water from the scheme.

“...the limiting factor with the property is probably still the wet winter. So if you’ve got to do the wet winter as well as the dry summer then you know, your cost to do it all is going to be quite significant”.

CONCLUSION

Profitability of a given farming operation with irrigation water is directly linked to production potential of that land. In turn, this will determine the demand to access irrigation water from the scheme. The area with the greatest production potential is arguably Ashcott, followed by Onga Onga, Tikokino then Takapau. Currently there is demand in each zone for irrigation water and the differences in demand between zones, is marginal. There is a greater density of irrigation consent holders in the two northern zones with irrigation already installed, which therefore limits the capacity for new irrigation systems. Irrigation supply to these zones would mainly give security of supply to existing irrigators. If water is supplied to the two southern zones, it is likely that there will be a significant increase in new on-farm irrigation systems, as there is a large area currently without irrigation. There should also be a corresponding increase in production which could enable a boost to the local economy.

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