

Attitudes of Farmers about the Automation of Flood Irrigation

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1. Background

Irrigated dairying is the major farming activity in the Shepparton Irrigation Region of Northern Victoria. For better pasture quality and quantity and efficient irrigation is vital. There are various measures to improve water use efficiency on farms. Improved irrigation can be achieved by having better channel and drainage system, reuse system and automatic irrigation system.

Automation for flood irrigation has been identified as a vehicle to improve the lifestyle of farmers and improve irrigation efficiency at the farm level. Automatic irrigation will improve water use efficiency by providing an accurate cutoff of water going onto bays during irrigation. This ensures that irrigation is more efficient, it minimises ponding of water on the bay, reduces water logging of plants, reduces groundwater accessions and reduces the risk of excess water running off the bays.

As part of the ongoing role to improve irrigation management, the Shepparton Irrigation Region Implementation Committee of the Goulburn Broken Catchment Management Authority has initiated a project entitled *Improved Water Use Efficiency through Adoption of Automated Irrigation*. The project is being implemented through the Department of Natural Resources and Environment office in Tatura.

The report -*Results of Irrigated Farm Census 1997*(Douglass and Poulton, 1998) reported that only 1% of flood irrigated properties in the Shepparton Irrigation Region are automated. Because of this low uptake in the past, the Shepparton Irrigation Region Implementation has been encouraging automation on individual farms to improve irrigation productivity and efficiency.

As part of the ongoing role to improve irrigation management in the region, the Shepparton Irrigation Region Implementation has developed a new project that provides advice and a financial incentive for the installation of automatic irrigation systems. The project provides an incentive for the purchase and installation of automatic irrigation equipment. The incentive is based on a cost share between individual landowners and the Shepparton Irrigation Region Implementation with a focus on encouraging landowners to work towards the sustainable use of water resources in the Shepparton Irrigation Region. The project started from the 1st of July 2001 and is on-going till present.

What is automatic irrigation?

Automatic irrigation is the use of a device to operate flood irrigation structures so that the flow of water from one bay or set of bays to another can be changed in the absence of the irrigator.

2. The Study

2.1 Objective of the study

The overall objective of the study is to assess the attitudes, knowledge and practice change of landowners regarding automatic irrigation as a result of installing automation equipment with assistance from the incentive scheme.

The study focuses on answering some of the Key Evaluation Questions identified in the Evaluation Plan of the project. The Key Evaluation Questions are developed for each of the 7 levels of Bennett's Hierarchy model. This particular study focuses at Knowledge, Attitude, Skill and Aspiration and "Practice Change" levels of the Bennett's Hierarchy. The Bennett's Hierarchy is a model that describes how the key outputs and outcomes of the project were to be achieved.

Thus, this report provides specific information on:

- farmers' awareness of automatic irrigation systems;
- sources of information on automation;
- farmers' perception of benefits of automation;
- their views on barriers to installing automation;
- their feelings on the incentive for automation; and
- their views on the dairy industry in general.

2.2 Study area

The study area is located in the Shepparton Irrigation Region of Northern Victoria. The Shepparton Irrigation Region covers over 500,000 hectares and includes approximately 7000 rural properties. The total population is over 100,000 people. Agricultural output from the Shepparton Irrigation Region represents 14% of Victoria's farm gate value of production and has grown from approximately \$690 million in 1993/94 to \$1.04 billion in 2000. This is equivalent to 18% of the total gross output for the region (NRE 2001). Dairy farming is the most popular activity followed by horticulture in this area.

2.3 Sample size

Since the initiation of the incentive in July 2001, about 225 applications have been made for the automatic irrigation incentive. Among these, 57 farmers have installed automatic irrigation systems on their properties and have received the assistance from the incentive scheme.

In order to assess the influence of the project and particularly the incentive, 10 landowners among the 57 who have installed automation were purposeful randomly selected for the in-depth interview. The purpose of a small random sample in this case is for the credibility purpose not for representativeness, as in the case for most of the experimental studies. As mentioned by Patton (2002) purposeful random sampling was done to reduce suspicion about why certain cases were selected, not to permit statistical generalisations.

Also 10 sampled landowners were selected with the confidence that it would provide in-depth information. Patton (2002) emphasises that there are no rules for sample size in qualitative inquiry. All depends on what you want to know and the purpose of the inquiry.

2.4 Method used

The key way to help choose the appropriate method for this study was done by identifying the Key Evaluation Questions before determining the method or methods. The Key Evaluation Questions focused the evaluation and provided a direction for the collection and analysis of data (Owen and Rogers, 1999). In this regard, importance was given to the strengths, biases and assumptions associated with the method that have been chosen. This is emphasised by Shadish, Cook and Leviton(1995).

The nature of the Key Evaluation Questions demanded the use of a qualitative method for the study. A qualitative method mainly involves at looking to gain deep understanding of the program and focuses on understanding the attitudes and behaviours of people. It also deals

with multiple, socially constructed realities or “qualities” that are complex and indivisible (Glesne and Peshkin, 1992).

There is a tendency of people saying that qualitative work is “subjective”, biased and unscientific. In order to overcome such criticism, the qualitative methods to be used need to be relevant, rigorous, understandable and able to produce useful results that are valid, reliable and believable. Experienced evaluators heading towards the end of long careers in the evaluation business often report that they see less and less need for large formal evaluation exercise. Instead, they often find themselves opting more and more for smaller-scale, more build-in, naturalistic, more responsive or utilisation focused approaches (Wadsworth, 1997).

In-depth interview, a qualitative method, is used for the study. The 10 farmers selected were contacted by telephone to arrange an appropriate time for the interview. The data was collected by face-to-face interview at landowner’s property with a help of a discussion guide (*Appendix A*).

An audio tape was used to record the discussion. The landowners agreed to the use of the audio tape before the interview started. The audio tape helped to focus on the interview rather than on subscribing the interview.

Immediately after every interview, main points were recorded. The record was mainly about the insights and feelings of the interviewer. These insights were than later added to the transcript of the interview.

The interviews were transcribed at the work place immediately after the interviews.

2.5 Preparation of discussion guide for the depth interview

A discussion guide for the in-depth interview was prepared to gain information about landowner’s view on automatic irrigation. The discussion guide was divided into four sections. The first section focused on general information about the dairy farm and their views on the future of dairy industry. The second inquired about the knowledge and skills of automation. The third explored the practice changes made after the installation of automatic irrigation systems and the fourth focused on their views on the government incentive.

2.6 Method of analysis

Mainly the grid method was used to describe the information derived from the primary data. The transcriptions of the interviews were broken into themes and the results from all interviews were grouped together on large sheets of paper.

3. Findings

Detailed results about the landowners farm background, their perception about their future, their awareness and their perception about the benefits and barriers of automation; their views on the incentive are discussed in the following sections.

3.1 Background information

The landowners interviewed were milking 100 to 600 cows with the similar variation in their water rights and area used. Some of the landowners were using ground water to supplement their wheel water. Most of the ground water systems were found to be saline (range of 2,700 – 4000 EC). In all instances, groundwater was being mixed with wheel water before being used to irrigate the pastures.

The study showed that there was a wide variation in the adoption of automation and this was irrespective of property size.

Four different types of automation were adopted by the landowners - pneumatic, timer, hydraulic and centrally controlled systems. There was no distinct correlation of the landowners' views on their automatic irrigation project and the different types of automation.

3.2 Experience in the dairy industry

There was a wide range of experience among the interviewed landowners. The farmers had been working in the industry for periods ranging from 5 to 53 years with half of them reporting more than 20 years of experience in the industry.

All the farms were family owned with husband and wife operating the enterprises. Half of those interviewed were also found to be employing non-family members mostly for milking purposes. The remainder were solely operated by family members, mostly husband and wife.

3.3 Perception on the outlook of the industry

The majority of the landowners were found to have a positive outlook to the industry. Nine out of ten interviewed suggested that the industry does have a good future in the long term. All the landowners were of the view that they are going through a rough patch at the moment because of the drought. The majority viewed that their works were similar to any other businesses where there are 'ups' and 'downs'.

"Yes there is a good future. There are ups and downs but it is like any other business."

- a view echoed by a landowner about the future of dairy industry.

There is also some indication that the industry is pushing landowners to become bigger to be viable. One landowner indicated that the push is towards the company farm rather than the family farm.

One landowner was ironic when he said,

"The industry has a good future except for the farmers".

This landowner was of the opinion that farmers will always struggle in this industry because of being a price taker rather than a price maker.

When asked whether they want their children to be in the industry, the majority indicated that it is up to their children to decide on this matter. Two out of ten respondents suggested that they would not allow their children to come to the industry. They were of the opinion that other jobs provided greater return than the dairy industry.

When asked about how long they planned to be in the industry, the majority indicated that they would like to be in the industry for the next 5 years or more.

3.4 Awareness about automatic irrigation systems

All the landowners were aware of the automatic irrigation systems available in the market.

Three benefits were identified by the landowners;

- Improved lifestyle and reduced labour required.
- Easier to conduct farm operations.
- Productivity related benefits.

Two landowners emphasised that they were working towards automation for the past 15 years. One indicated that he was looking for something to suit his farm for the last 15 years and was happy only last year when he saw the centrally controlled automation system.

All the respondents were aware of their own automation systems that they have installed and most also were aware of other systems in the market. Two landowners had more than one automation system in their farm.

Most chose their system on the basis of the cost and the adoptability of the system in their own farm.

One farmer summarised the view of the most by saying –

“Sometime you cannot always afford the best because it is too dear. It is a trade off between what you want to get out of it and quality of life that it brings.”

Another landowner said,

“ I was not sure which one to go with. It came down to cost and ease to repair and maintenance...It was fairly simple choice once you look into it”.

Most got their information from attending Elmore and Stanhope field days. Staff employed in the automatic irrigation project had set up automatic irrigation displays at the Stanhope Field Days during the years 2001 and 2002. The display showed various types of automation that were available on the market.

Six landowners also participated in the farm walks conducted by the project staff. These farm walks were organised with the aim of providing an opportunity for landowners to hear from a fellow landowner who had installed automatic irrigation.

Most of the respondents suggested that the farm walk was very informative. The purpose of the farm walks was to let farmers hear first hand the landowner experiences with automation, the benefits they have gained and problems they may have had. The unbiased views provided during the farm walks were considered as important in assessing the reliability of the information.

There are others who mentioned getting information from local papers and radio. Some of the respondents also indicated getting information from the manufacturers of automation. One manufacturer also came to the farm to demonstrate their system. One landowner was impressed with the professionalism shown by the manufacturer and indicated that as a reason for adopting the particular technology.

Most also went to their neighbours and friends who already had an automation in their farm to learn more before adopting automation to their own farm. It showed that all the landowners did their homework to find about the operational and the general benefits and barriers of automation.

3.5 Adoption of automatic system & practice change at farm level

When asked about their expectations of installing automation, reduction in time and labour, a good night sleep and efficient watering were mentioned by most of the landowners. Flexible

timing of irrigating and the potential of improved market value of their property, were other common reasons for their adoption.

"I am looking at cutting irrigation water at the right time on each bay. Quick irrigation provided me with more pasture and also quality pasture. I am using less water."
- a landowner claiming to have saved water with automation

Among all these, improved lifestyle and the reduction in time and labour were clearly the most valued benefits of automatic irrigation as perceived by the farmers.

There was a clear distinction between farmers with regard to water savings as a benefit of automation. One group indicated that saving of water through automation was an important benefit and the second group considered

automation more as a time saving rather than water saving device.

The first group could be represented by the quote;

"I am looking at cutting irrigation water at the right time on each bay. Quick irrigation provided me with more pasture and also quality pasture. I am using less water."

The view of the second group can be captured by the quote –

"I don't expect to save water with automation because I consider my watering practices pretty good anyway. Sometimes I irrigate a bit more but it is collected in the recycle dam, which I can use later. The biggest advantage will be to save time."

Farmers were asked to identify the barriers to installing automatic irrigation systems. The barriers according to the responses can be categorised into three main categories;

- Cost factor,
- Changes to the irrigation system before installing automation.
- Technical barriers on farm.

By far the most important barrier to installing automation was "cost of the equipment". Most believed that the incentive from the project helped them to alleviate the barrier to a certain extent.

With regard to the expense as a main barrier, one landowner was critical and he explained –

"If someone is passionate about anything, they will find a way to do it".

He is of the opinion that the expense factor as a barrier is more of an excuse for not doing things than anything else. He also suggested that automation is a good incentive for younger people to come to farms.

The other common barrier mentioned was the conditions of the farm for automation. Farmers were of the view that to use the automation efficiently other works such as laser grading, installing bigger outlets needed to be accomplished first.

"The common barrier is just the mind set of some landowners. I have always done this way. I don't need it because I will slow the irrigation."
– a landowner on the barrier to automation adoption.

When asked, "what would you do differently if you have to do the activity again", the majority suggested that they were happy with what they did and will not change anything. There were a few who said that they would change few parts of their irrigation system on farm to gain more benefits from automation such as having larger

outlets.

In terms of the reliability of the equipment, the majority thought that unreliability was not a major hindrance for installing automation. The landowners considered that once they knew more about automation, unreliability was not a major barrier to installation.

The satisfaction of the farmers with their automation can be captured in the following quote –

“Reliability is great. You cannot believe that a computer screen will tell you what’s happening on farm. It does it exactly what you tell it to do. It is a magic.”

When asked about what types of advice they will provide to others, all indicated that they would encourage others to adopt automation.

One landowner summed up the advice in this way –

“Put value on your OWN time. This is a quickest way to think about automation.”

Others indicated the need to provide advice on specific aspects such as the cost, benefits and tips to handle trouble shootings during the adoption of automation.

3.6 Views on the incentive

The incentive was considered as an enormous help by all the respondents interviewed. The landowners were of the view that the incentive was a good idea to encourage people to use water more efficiently. It was indicated that the incentive not only made them adopt automation but also made farmers more aware of good water management practices.

The incentive is based on a cost share between individual landowners and the Government as funders of the project. In this way, the incentive encouraged people to invest their own money for the betterment of water use efficiency in their catchment.

“This interview that you are doing is possible because of the incentive. Without the incentive I won’t have installed the automation. If it was not automation, I would have said to you – sorry Rabi (name of the interviewer) I cannot speak to you. I am watering.”

– a landowner summing up the benefit of the incentive.

Most of the landowners indicated that automatic irrigation would not have been installed and would have remained a project of the future if the incentive had not been available. The incentive helped them to take that one big step to adopt automation on farm.

When asked, “Were you intending to go ahead with automation without the incentive”, the majority

suggested that they would have, but on a much smaller area. Two landowners indicated that they were not in a position to install automation if the incentive had not been available.

When asked about how the incentive helped them to adopt automation, they suggested that it helped them to automate a larger area. For some, the incentive also encouraged them to borrow money from the bank to install automation.

4. Summary of findings and their implications

In this section, important findings will be highlighted and some guidelines for action will be discussed.

- All the landowners interviewed were aware of the automatic irrigation systems available on the market. The study showed that all the landowners had researched issues of operating the systems together with the benefits and barriers of automation.
- “Farm walks” were one of the most common information sources on automation for landowners. The unbiased views provided during the farm walks were considered important in assessing the reliability of the information.
- Landowners pursued other sources such as field days, local papers, radio and other farmers and neighbours for information. Some also received initial information from individual manufacturers.
- Farmers identified two major types of benefits from automation. An important one was the reduction of time and labour in irrigating pastures resulting in an improvement in lifestyle. The flexibility in farm work was the other important factor recognised by the farmers as a benefit of automation. 6 out of 10 interviewed reported that the automation helped them to change their irrigation management practices resulting in saving water.
- Cost of equipment was identified as a major barrier to the adoption. Another barrier mentioned was the readiness of the farm for automation. These landowners considered that work on the irrigation system needed to be completed before they could adopt automation.
- Unreliability of the equipment was not a major concern of most landowners.
- The incentive was considered an important help by most landowners for the adoption of automation. The majority revealed that without the incentive, the installation of automation would have been a project for the future. For most, the incentive also allowed them to automate a larger area of the farm.

Recommendations

- Farmers were clear that they valued the information provided by project staff during the farm walks. This clearly showed that farm walks were a good means of providing unbiased information to the landowners and should be continued.
- Cost of equipment was identified as a major barrier to adoption. In addition to the incentive, information on ways of reducing costs, or indications of relatively low expenditure required to be presented to farmers. The cost effectiveness of this technology needs to be discussed with farmers. A study focusing on the costs and the benefits of using different automations in different situations might help in understanding their use.
- Farmers indicated that improved lifestyle was their major priority for the adoption. Project extension information should continue to include improved life style issues for farmers.
- The incentive was considered as an important factor in the adoption of automation for most landowners. It has helped to increase the adoption rate of automatic irrigation and should continue.

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Appendix A

Discussion Guide for Indepth Interview (Automation)

Landowner's Name _____

Location of the Property _____

Date of Visit _____

Interviewer _____

Background

Number of cows milked

Area Irrigated

Permanent pasture _____ ha.

Annual pasture _____ ha

Water use – wheel, drain, groundwater, above ground storage.

Number of years in dairy farming

How many family members work on this farm on a regular basis?

How many non-family employees work on this farm on a regular basis?

Knowledge and Skills (BEFORE INSTALLATION)

How much do you know about automatic irrigation systems?

What types of automatic systems are you familiar with?

Where did you learn about automation?

Did you go to any farmwalks?

Did you get enough information?

Practice Change

What are your reasons for adopting automation?

What were your expectations for installing automation?

Are the benefits you have expected met?

What did you see as a barrier to installing automation? Are there any problems that you have come across? How did you deal with it?

What would you do differently if you have to do the activity again?

Are you happy with the reliability of automation?

Views on Shepparton Irrigation Region Implementation Committee Incentive

What's your view on the Shepparton Irrigation Region Implementation Committee incentive for automation?

Were you intending to go ahead with the adoption without the incentives?

How did the incentive help you to adopt the automation?

General

Do you think there is a good future for the dairy industry? Why Yes? Why No?

How long do you plan to be in the industry?

Do you want your children to be in the industry as well?

If you have to provide advice on the adoption/ non-adoption of automation to your fellow landowner, what will you tell them?