

# Goal Attainment Scaling: an evaluation tool to assess changes in farmers' decision making

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## Abstract

*Goal Attainment Scale is an evaluation methodology that allows monitoring of how well a program or project is achieving its expected results. This paper demonstrates how this technique was used to assess the progress of farmers towards making informed decisions on irrigation modernisation activities in Northern Victoria, Australia. This tool helped capture functional and meaningful behavioural aspects of farmer's progress in decision making, which has been a challenge to assess using other available standardised measures.*

*In this study, the Goal Attainment Scale technique was used twice to determine a farmer's stage in informed decision making: firstly at the start of the program; and secondly, during follow-up visits conducted 10-12 months after the initial visit. The study demonstrated a positive shift in farmer's level of expectations for four out of five goals of the decision making process. These changes were statistically significant indicating the extension program did help farmers make informed decisions on irrigation modernisation activities.*

*The reliability of the Goal Attainment Scale as a technique to measure farmers' decision making processes was also examined and found to be robust which provided confidence in the use of this technique. The preparation of the Goal Attainment Scale guide is time consuming and any compromise in the guide construction and unreliability in follow-up interview scoring can limit the reliability of this technique.*

*The paper also highlights the learnings from the development of the Goal Attainment Scale guide and the implementation of the technique to assess changes, in particular the benefits of the shared understanding of what decision making means to the team developing the Goal Attainment Scale guide. The paper concludes that although this technique was reliably robust to measure change, it is recommended that other methods are used to generate a rich picture of why the change has occurred or not occurred.*

**Key words:** *Goal Attainment Scale, informed decision making*

## Introduction

Goal Attainment Scale is an evaluation methodology that allows monitoring of how well a program or project is progressing in achieving its expected results. It is a method originally developed for adults in the mental health field as a program evaluation tool that facilitates patient participation in the goal setting process (Kiresuk, Smith and Cardillo, 1994).

In this paper, the technique has been used to assess changes in the decision making behaviours of landowners after their involvement in the Farm Irrigation Assessment program conducted in the Shepparton Irrigation Region, Victoria. The Farm Irrigation Assessment program involved Department of Primary Industries-Farm Services Victoria extension staff communicating the irrigation modernisation principles and conducting Farm Irrigation Assessments on properties involved in the modernisation of the regional irrigation supply system. These assessments were conducted so landowners were better able to make sound decisions about the best ways of linking their farm irrigation system with modernised irrigation supply system.

Modernisation of the irrigation supply system requires landowners to make informed decisions on:

- Identifying redundant irrigation assets and outlets that could be rationalised.
- Installation of appropriate metered outlets to deliver water to their properties.
- How best to use the modernised system to achieve better water use efficiency on their farm.

Decision making is a complex process of identifying and choosing alternatives based on the values and preferences of the decision maker. There are many processes discussed in the literature as to how an informed decision is made in a particular situation and there are cases when decisions are made by reacting to a problem, rather than basing the decisions with full information on hand.

In this paper, decision making behaviours are captured in 5 steps:

1. Landowners **understanding** what they want to achieve through irrigation modernisation.
2. Landowners **gathering facts** relevant to own farm business context.
3. Landowners **considering options** available to them, given the individual farm business context.
4. Landowners **evaluating options** for making decision that best suits their situation.
5. Landowners **making decisions**.

As a part of delivering the Farm Irrigation Assessment program, Department of Primary Industries–Farm Services Victoria staff were keen to identify how the program helped people make informed decisions. An evaluation of the extension program provided by staff involved in the program was undertaken using a technique called Goal Attainment Scale. This paper highlights the use of this technique to assess the changes in decision making behaviour of landowners on irrigation modernisation activities after their involvement in the Farm Irrigation Assessment program.

### **Objectives**

The objectives of this paper are to:

- Outline how Goal Attainment Scaling has been used to assess the progress of landowners towards making informed decisions on irrigation modernisation activities.
- Underline and discuss the results that demonstrate the impact of the Farm Irrigation Assessment to help landowners make informed decisions.
- Highlight lessons learnt from the experience.
- Make suggestions for improvements.

### **What is Goal Attainment Scaling?**

Goal Attainment Scaling is an evaluation methodology that involves the development of an outcome based scale to measure an individual's or group's progress towards achieving identified goals. Goal Attainment Scales are generally developed to focus on the goals that are targeted for change by a specific program. At its simplest, this involves setting a broad goal, implementing a program, determining how well each nominated sub-goal area has been achieved at various times during the life of the program, and using this information to determine any changes that are required in future activities (Kiresuk and Lund 1978).

Goal Attainment Scaling has been commonly used in the mental health field to assist therapists and patients to assess the progress towards achieving individual and organisational goals. Goal Attainment Scaling has also been commonly used in the fields of education, rehabilitation, medicine, corrections, nursing, social work and chemical dependency (Kiresuk, Smith and Cardillo 1994). In Australia, Goal Attainment Scaling was used by "Primary Industries and Resources South Australia" as an assessment tool that required stakeholders "to participate in evaluating and seeking consensus on the most important aspects of the goals to be achieved within a particular time frame, and the range of expected outcomes of the activities" (Primary Industries and Resources SA 1998 p.3).

Kiresuk, Smith and Cardillo (1994) describe the following nine step process as a training guide to assist in the development of a Goal Attainment Scale:

- Step 1: Identify the issues that will be the focus of the treatment.
- Step 2: Translate the selected problems into at least 3 sub-goals.
- Step 3: Choose a brief title for each sub-goal.
- Step 4: Select an indicator for each sub-goal.
- Step 5: Specify the expected level of outcome for the sub-goal.
- Step 6: Review the expected level of outcome.
- Step 7: Specify somewhat more and somewhat less than expected level of outcomes for the sub-goal.
- Step 8: Specify the much more and much less than expected levels of outcome.
- Step 9: Repeat these scaling steps for each of the three or more sub-goals.

Figure 1 shows the layout of a typical Goal Attainment Scale.

|                                                           |               |                        |                        |                        |
|-----------------------------------------------------------|---------------|------------------------|------------------------|------------------------|
| Date of Initial Observation:                    /    / 20 |               |                        |                        |                        |
| Date/s of Follow Up Observations:        /    / 20        |               |                        |                        |                        |
| <b>Description of the Overall Goal to be Attained:</b>    |               |                        |                        |                        |
|                                                           | <b>Rating</b> | <b>Sub-Goal Area 1</b> | <b>Sub-Goal Area 2</b> | <b>Sub-Goal Area 3</b> |
| Weights (if any)                                          |               |                        |                        |                        |
| Description of the best <b>expected</b> result            | +2            |                        |                        |                        |
| Description of a better than <b>expected</b> result       | +1            |                        |                        |                        |
| Description of the <b>expected result</b>                 | 0             |                        |                        |                        |
| Description of a less than <b>expected</b> result         | -1            |                        |                        |                        |
| Least favourable <b>expected</b> result                   | -2            |                        |                        |                        |
| Name of Observer: _____                                   |               |                        |                        |                        |
| Date        /        /20                                  | SCORE:        |                        |                        |                        |
| Name of Observer: _____                                   |               |                        |                        |                        |
| Date        /        /20                                  | SCORE:        |                        |                        |                        |

**Figure 1. Typical Goal Attainment Scale**

When developing a Goal Attainment Scale, it is important that the sub-goal areas and the related outcomes are clear, consistently defined and observable. When developed in this way, others are able to use the Goal Attainment Scale to decide on a score, even if they have not been involved in its preparation providing that they have been adequately trained to interpret the observations appropriately.

**Methods**

**Development of Goal Attainment Scale Guide**

Department of Primary Industries-Farm Services Victoria staff were involved in conducting Farm Irrigation Assessments at two locations within the Shepparton Irrigation Region, the Central Goulburn and Shepparton Irrigation Areas. The Central Goulburn Irrigation Area is centred on the town of Tatura and the majority of properties where Farm Irrigation Assessments were conducted are commercial farms. This is in contrast to properties assessed in the Shepparton Irrigation Area where the majority were occupied by life-style landowners living close to the city of Shepparton.

Department of Primary Industries-Farm Services Victoria developed a Goal Attainment Scale to determine and assess the progress of landowners towards making informed decisions about irrigation modernisation activities.

It involved:

- Setting a broad goal and implementing a program.
- Determining how well each nominated sub-goal area had been achieved at various times during the life of the program.
- Using this information to determine any changes that are required in future activities (Kiresuk T and Lund S, 1978 and Kiresuk T, Smith A and Cardillo J, 1994).

The Department of Primary Industries-Farm Services Victoria developed the 'Informed Decision Making Goal Attainment Scale guide'. A similar scale has been developed in the past to assess the effectiveness of stakeholder partnership health in delivering complex natural resource management outcomes (Maskey, Lawler, Cumming and Sampson, 2008).

As a first step, important indicators of informed decision making were identified during a workshop conducted to develop the guide. The workshop process helped to consolidate the different views of informed decision making and establish a shared understanding within the group. Through this process, the group was able to outline 5 steps of the informed decision making process. These steps included:

1. Landowners recognising irrigation modernisation issues and understanding what they want to achieve through irrigation modernisation.
2. Landowners exploring facts relevant to their own farm business context and understanding the changes to be made.
3. Landowners considering options available to them, given the individual farm business context.
4. Landowners being able to evaluate the design, management and cost options for making change.
5. Landowners making decisions on overall farm development.

The approach to the development of the informed decision making process was important as it enabled staff to internalise a shared understanding of what process landowners were likely to be going through to make an informed decision, what this meant to the group and how the principles were developed from their contributions.

The five steps of informed decision making were then used as goal areas in the Goal Attainment Scale. As well as naming these goal areas, the team also develop an aim for each of these goals. For each goal area, the group described its aim as the best results or observation if the goal was fully achieved.

In keeping with the process of developing the Goal Attainment Scale as described by Kirsuk and Lund (1978), indicators for each goal were established and used to describe outcomes. Development of indicators started with the “expected level” of outcomes and then indicators that were “much more” and “much less” than the expected level.

The development of an agreed Goal Attainment Scale required several meetings. These meetings included many discussions about which ‘observables’ would be used as indicators to assess the subjective attainment of goal areas for each of the five informed decision making steps. Obviously, the goals need not necessarily be quantified, but it must be stated so that two independent observers could agree on whether it had been attained. The key was to have each outcome level defined by concrete behaviours that could be directly observed or reported.

Figure 2 illustrates the final Informed Decision Making Goal Attainment Scale Guide. This scale shows the main goal along the top of the scale, aims and range of expected levels explored through the Goal Attainment Scaling process.

#### **Use of the Goal Attainment Scale Guide**

The Farm Irrigation Assessment program started with Department of Primary Industries-Farm Services Victoria staff visiting the landowner’s property. The purpose of this consultation was to enable the staff to discuss with landowners various issues around irrigation modernisation and how their property could be connected to the modernised irrigation supply system. This included an investigation of the current level of service received by the landowner to develop recommendations of the possibility to rationalise irrigation infrastructure and details of new outlets to be installed.

Department of Primary Industries-Farm Services Victoria staff also used this opportunity to identify any existing irrigation issues and identify improvements that could be made to adopt irrigation Best Management Practices on the farm.

Farm Irrigation Assessments commenced in October 2008 and ran to the end of September 2009. Department of Primary Industries-Farm Services Victoria completed Farm Irrigation Assessment reports for 486 outlets on 284 properties. This includes 351 outlets on 184 properties in the Central Goulburn Irrigation Area and 135 outlets on 100 properties in the Shepparton Irrigation Area.

At the completion of the farm visit, landowners were scored by Department of Primary Industries-Farm Services Victoria staff as to where the landowners were considered to be in the 5-step decision making process.

From the 284 properties assessed, 20 landowners from the Central Goulburn Irrigation Area and another 20 from the Shepparton Irrigation Area were randomly selected to conduct follow up visits 10-12 months after the initial visits. It was considered that a sample of 20 landowners in each area would

provide an adequate representation of each area. It was not possible, nor necessary to interview all landowners.

There were two reasons for the follow-up visits. Firstly, it was seen as an opportunity to get feedback from landowners on the recommended changes they had made to their irrigation systems and their satisfaction with these changes and secondly, to measure changes in their decision making process by using the Goal Attainment Scale.

During the follow-up visits, a one-page questionnaire was developed to record landowners' responses to their satisfaction with the Farm Irrigation Assessment process. The questionnaire was also used to generate discussion with landowners to enable staff to make an assessment of where each landowner was in the 5-step decision making process.

On both occasions the Goal Attainment Scale guide was completed by department staff, not by the farmers themselves. This method of collecting data is an indirect measurement because it represented the observer's perceptions of behaviour rather than landowners individually scoring where they were in the 5-step decision making process. It is important to realise that data collected from one method is not inherently better than data collected from others. That is, data obtained through an indirect method from Department of Primary Industries-Farm Services Victoria staff is not 'less true' than data obtained by directly asking landowners.

#### **Reliability of the Goal Attainment Scale technique to measure change**

The Goal Attainment Scale was used to measure change to the landowners' decision making process. It was important for the users of this tool to understand the reliability of this technique. When several goal areas have been identified and scaled in this way, one should review the scales to determine if it contains errors that may render follow-up scoring problematic (Kiresuk and Lund, 1978).

One criteria of reliability was to make sure the scales are specific enough so that two independent scorers can agree on which level best describes where the landowner are in their decision making process.

During follow-up visits, two Department of Primary Industries-Farm Services Victoria staff independently scored where they thought the landowners were in Steps 1-5 of the decision making process. The scores generated from two officers were compared and analysed using a correlation technique to understand the reliability of the Goal Attainment Scale technique. The results of the reliability test will be discussed in the Findings Section of this paper.

#### **Calculation of the Goal Attainment Score**

Once a Goal Attainment Scale has been determined and recorded at the start and follow-up visit, it is possible to calculate a Goal Attainment Score - an average of the outcome scores for various goal dimensions. The computation of scores were done as outlined in Kiresuk and Lund (1978) and Kiresuk, Smith and Cardillo (1994).

The Goal Attainment score conversion table for equally weighted scales was used to calculate the score for our purpose. A Goal Attainment score of 50 indicates that a series of goals have on average been met at the 'expected' level. A score of less than 50 indicates that attainment has tended to fall short of expectations while a score of more than 50 indicates that it has tended to exceed expectations.

The summary Goal Attainment scores were calculated for all 40 landowners in the sample and these scores were used to understand the changes in their decision making process.

#### **Calculation of the Goal Attainment Change Score**

A Goal Attainment change score is determined by subtracting the summary Goal Attainment score calculated on the basis of the landowner's stage (Steps 1-5) at the time of the first Farm Irrigation Assessment visit from the summary score obtained during the follow-up visits after the intervention.

A negative score indicates retrogression; a score near zero indicates little or no change; a positive score indicates progress. The Goal Attainment change score can demonstrate the effectiveness of the program - in this case the Farm Irrigation Assessment process.

|                                   | <p><b>1. Understand and define issues</b></p> <p><i>Aim: Landowner understand the principles of modernisation and how it fits with their farm context</i></p> <p><b>Understanding Northern Victoria Irrigation Renewal Project principles</b></p> <p><i>Aim: Landowner understands the principles</i></p> | <p><b>Understanding goals and aspirations</b></p> <p><i>Aim: Farmers having a vision of what they want to achieve</i></p>                     | <p><b>2. Gather facts</b></p> <p><i>Aim: Landowner understands the farm context both externally and internally</i></p>                                     | <p><b>3. Consider Options</b></p> <p><i>Aim: Landowner has considered options available given the individual farm context</i></p> | <p><b>4. Rate Options</b></p> <p><i>Aim: Landowner evaluates the design, management and costs of options</i></p>                | <p><b>5. Make decision</b></p> <p><i>Aim: Landowner makes decisions on farm development</i></p> |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Most</b>                       | Landowner is <b>able to describe and explain</b> connections, backbones, meter selection, water savings and regional development.                                                                                                                                                                         | Landowner <b>fully understands</b> the potential benefits and risk of modernisation in relation to their goals and aspirations.               | Landowner <b>uses a range of farm planning tools</b> to understand their current and future farm development by <b>engaging</b> relevant external parties. | Landowner has a <b>clear understanding</b> of option(s) available to them.                                                        | Landowner has a <b>clear understanding</b> of risks, benefits and costs of options utilising third party inputs.                | Landowner is <b>confident of accepting the preferred option (s)</b> .                           |
| <b>More than</b>                  | Landowner is <b>able to talk about</b> the connections, backbones, meter selection, water savings and regional development.                                                                                                                                                                               | Landowner has <b>reasonable understanding</b> of the potential benefits and risk of modernisation in relation to their goals and aspirations. | Landowner <b>uses a farm planning tool</b> plan to understand their current and future farm development by <b>engaging</b> relevant external parties.      | Landowner has a <b>reasonable understanding</b> option(s) available to them.                                                      | Landowner has a <b>reasonable understanding</b> of risks, benefits and costs of options but <b>requires</b> third party inputs. | Landowner is <b>close to making the decision</b> on farm development.                           |
| <b>Expected level of outcomes</b> | Landowner is <b>aware</b> of modernisation principles around water savings and new meters.                                                                                                                                                                                                                | Landowner is <b>able to understand</b> the potential benefits and risks from modernisation to fit into their farm enterprise.                 | Landowner <b>uses a farm planning tool</b> to understand their current and future farm development                                                         | Landowner has the <b>some understanding of option(s) but requires third party inputs</b> for their farm context.                  | Landowner has <b>some understanding</b> of risks, benefits and costs of options but requires third party inputs.                | Landowner <b>has not enough information</b> to make a decision.                                 |
| <b>Less than</b>                  | Landowner has <b>heard about</b> modernisation principles but <b>can't describe</b> it roles.                                                                                                                                                                                                             | Landowner has <b>not made</b> any connection between modernisation and the goals and aspirations.                                             | Landowner <b>does not use any farm planning tools</b> to understand their current and future farm development.                                             | Landowner has <b>no understanding</b> of options available to them given the individual farm context.                             | Landowner <b>does not understand</b> the risks, benefits and costs of option(s).                                                | Landowner <b>has not enough information</b> to make a decision.                                 |
| <b>Least</b>                      | Landowner <b>not aware</b> of modernisation principles.                                                                                                                                                                                                                                                   | Landowner has <b>no vision</b> .                                                                                                              | Landowner <b>refuses to consider farm planning tools</b> to understand their current and future farm development.                                          | Landowner <b>refuses to consider option(s)</b> .                                                                                  | Landowner <b>refuses to consider option(s)</b>                                                                                  | Landowner <b>refuses</b> to make decisions.                                                     |

Figure 2. Decision Making Goal Attainment Scale guide

## **Analysis**

The Goal Attainment scores and the Goal Attainment change scores were used to describe various levels of expectations attained by the landowners. The Goal Attainment change score describes the impact of the Farm Irrigation Assessment program in changing the informed decision making process of landowners.

Since the Goal Attainment Scale technique allows the use of the parametric statistical tests to assess the significance of differences in scores associated with a variety of variables, statistical tests like t-test and correlation analysis are valid and were also conducted.

## **Results and Discussion**

The study demonstrated a positive shift in landowners' level of expectations during the follow-up visits for four out of five goals of the decision making process. This was evident by comparing the results between 'pre' and 'post' Farm Irrigation Assessments. This demonstrated the extension program impact on the decision making process of landowners. The shift was not observed in the level of expectation for the goal 'gathering facts relevant to the farm context'. This could be an indication that information generated through the Farm Irrigation Assessment process was sufficient, in the majority of cases, to understand the farm situation.

### **Goal Attainment Score Results**

Table 1 provides the summary Goal Attainment score for Central Goulburn and Shepparton Irrigation Areas during and 10-12 months after the Farm Irrigation Assessments.

The computation of scores as outlined in Kiresuk T and Lund S (1978) and Kiresuk, Smith and Cardillo (1994) states:

- A goal attainment score of 50 indicates that a series of goals have on average, been exactly attained.
- A score of less than 50 indicates that attainment has fallen short of expectations.
- A score of more than 50 indicates that it has exceeded expectations.

The scores were 48 and 47 for the Central Goulburn and Shepparton Irrigation Areas respectively during the initial visits. These scores then moved positively to 52 and 53 in the Central Goulburn and Shepparton Irrigation Areas respectively during the follow up visits.

The Goal Attainment score is an average of the outcome scores for 6 goals as described in the Goal Attainment Scale guide. The Goal Attainment Scale guide with 6 goals will have the potential scores ranging from 19 to 81 (Kiresuk and Lund, 1978). The actual range of scores attained by landowners is shown in table below.

There has been a positive shift in the Goal Attainment scores in both study areas when compared with 'pre' and 'post' Farm Irrigation Assessments. The t-tests demonstrate that the mean scores 'during' and 'after' the Farm Irrigation Assessments were significantly different indicating the positive impact of the Farm Irrigation Assessment process in helping landowners make informed decisions.

Table: 1 Goal Attainment Score for Central Goulburn and Shepparton Irrigation Areas

|                    | Central Goulburn Irrigation Area* |          | Shepparton Irrigation Area** |          |
|--------------------|-----------------------------------|----------|------------------------------|----------|
|                    | During FIA                        | Post FIA | During FIA                   | Post FIA |
| GAS score          | 48.4                              | 51.9     | 47.2                         | 53.1     |
| Standard deviation | 6.94                              | 9.25     | 8.31                         | 9.46     |
| Range              | 37-63                             | 35-71    | 32-60                        | 40-71    |

\* t-test indicates that the means are significant at 0.05 level; \*\* t-test indicates that the means are significant at 0.01 level

Fifty percent of the landowners in the Central Goulburn Irrigation Area had an average Goal Attainment score of 50 or more both 'during' and 'after' the Farm Irrigation Assessment. The scores ranged from 37 to 63 'during' the Farm Irrigation Assessment compared to the range of 35 to 71 'after' the Farm Irrigation Assessment.

Similarly, 35% in the Shepparton Irrigation Area had a score of 50 or more 'during' the Farm Irrigation Assessment compared to the 50% of landowners scoring 50 or more 'after' the Farm Irrigation Assessment. The score in the Shepparton Irrigation Area ranged from 32 to 60 'during' the Farm Irrigation Assessment compared to 40 to 71 'after' the Farm Irrigation Assessment.

**Goal Attainment Change Score Results**

A Goal Attainment change score is determined by subtracting the summary Goal Attainment score calculated on the basis of the landowner's status before the intervention from the summary score based on the follow-up after the intervention.

Seventy percent of landowners in Central Goulburn Irrigation Area and 95% in the Shepparton Irrigation Area had equal or positive Goal Attainment change score indicating progress in the decision making process after Farm Irrigation Assessments.

However, there were some, 30% in Central Goulburn Irrigation Area and 5% in Shepparton Irrigation Area, who had negative scores indicating regression. This means that these landowners were observed to be less inclined to make decisions and were scored lower in the decision making process during the follow up visits compared to their scores at the initial visits.

**Reliability of the Goal Attainment Scale Technique**

Reliability is defined as the stability or repeatability of a measurement method and is an important consideration in any rating or judgement procedure to be used for evaluation purpose.

Unreliability in guide construction and unreliability in interviewer scoring can both limit the reliability of the Goal Attainment Scale. The Goal Attainment Scale should be specific enough so that two independent observers can agree on which level best describes the landowners' decision making process.

The reliability of the Goal Attainment Scale technique was tested by conducting follow-up interviews with two Department of Primary Industries-Farm Services Victoria staff. The two staff independently scored where they thought the landowner was (Steps 1-5) in the decision making process. At least one of the staff had conducted the Farm Irrigation Assessment on the property. The second staff member may or may not have dealt with landowners during the initial visits. These scorings were calculated for all the sampled landowners (20 in Central Goulburn and 20 in Shepparton Irrigation Area) in the study areas.

Table 2 shows the Goal Attainment score differences between the main and the second assessors in all areas. The scores calculated from two assessors were found to be similar with the correlation coefficient ranging from 0.87 to 0.89, which is near to +1. This indicates a strong positive relationship between scores generated by two assessors.

Further, this provides evidence of the robustness of the Goal Attainment Scale Guide where the scales were specific enough for two independent follow up scorers to agree at which level best described the decision making process of landowners.

Table: 2 Goal attainment scores difference between the main and second assessors

| Irrigation Area  |                                           | GAS score |
|------------------|-------------------------------------------|-----------|
| Central Goulburn | GAS score calculated from main assessor   | 51.9      |
|                  | GAS score calculated from second assessor | 52.8      |
| Shepparton       | GAS score calculated from main assessor   | 53.1      |
|                  | GAS score calculated from second assessor | 53.0      |
| Overall          | GAS score calculated from main assessor   | 52.5      |
|                  | GAS score calculated from second assessor | 52.9      |

r-value for Central Goulburn Irrigation Area – 0.871, p<0.01

r-value for Shepparton Irrigation Area – 0.899, p<0.01

r-value for both areas – 0.883, p<0.01



## **Learnings**

There have been some significant learning outcomes associated with developing and implementing the Goal Attainment Scale, including:

- **Shared understanding:**  
The development of the Goal Attainment Scale helped Department of Primary Industries-Farm Services Victoria develop a shared understanding of the **informed decision making process**. Preparing the scale allowed staff to discuss and describe what **informed decision making** means to them and then to develop specific goals and aims to provide a clearer picture of the behaviours and attitudes exhibited by landowners. This process helped team members to prepare the operational definition of the complex concept of **informed decision making** which assisted the team to better communicate this concept with each other.
- **Rigour in the process:**  
A draft Goal Attainment Scale for informed decision making was initially developed by a more experienced Department of Primary Industries-Farm Services Victoria team member. This draft was used during workshops to allow all team members to further develop and refine the scale. This added rigour through discussion of people's ideas and options. The process helped team members to internalise the concept of **informed decision making** through active participation in the development of the scale. By incorporating diverse views, a much richer definition was developed by the group than had been available in the first draft of the scale.
- **Better communication with landowners:**  
The use of the Goal Attainment Scale tool provided a structure to use during discussions with landowners and provide information to make them aware of modernisation issues. The availability of such a tool allowed discussions and advice on the various options to improve farm efficiency by linking farm related issues in their decision making process.
- **Goal Attainment Scale ratings are time-efficient and user friendly:**  
Compared to other evaluation techniques, the Goal Attainment Scale technique, after its initial development phase, is less labour intensive, easy to implement and relatively easy to analyse for accurately monitoring intervention progress and outcomes.

## **Conclusion**

The Farm Irrigation Assessment program conducted by the Department of Primary Industries-Farm Services Victoria has been an important area of work carried out to help landowners going through irrigation modernisation to make informed decisions on meter selection and rationalisation of irrigation infrastructure. The staff conducting assessments were aware that the consultation process was critical for landowners to enable them to make informed decisions on their farm irrigation infrastructure. The use of the Goal Attainment Scale technique has provided a process to monitor the progress of landowners' decision making.

The initial stage of analysis enabled identification of the stage landowners were at in terms of the 'expected' level of outcomes in the 5-step decision making process. The follow-up visits of these landowners provided evidence of the extension program impact on the *decision making process* of landowners.

This study has demonstrated a positive shift in the level of expectations during the follow up visits for four out of five goals of the decision making process. This was evident by comparing the results between 'pre' and 'post' Farm Irrigation Assessments. The shift was not observed in the level of expectation for the goal 'gathering facts relevant to the farm context'. As discussed, this could be an indication that information generated through the Farm Irrigation Assessment process was sufficient, in the majority of cases, to understand the farm situation.

The computation of Goal Attainment scores indicated a positive shift in the overall scores in both Central Goulburn and Shepparton Irrigation Areas when compared between 'pre' and 'post' Farm Irrigation Assessments. These Goal Attainment scores between the two periods

were statistically significant indicating Farm Irrigation Assessments helped landowners to make informed decisions on meter selection and rationalisation of irrigation infrastructure.

The reliability of the Goal Attainment Scale tool itself was examined and found to be robust which provided confidence in this technique given that it was developed in a rigorous manner.

The successful use of the Goal Attainment Scale in this study should not be used as a panacea for other projects or programs. As discussed, the preparation of the Goal Attainment Scale Guide is time consuming and any compromise in the guide construction and unreliability in follow-up interviewer scoring can limit the reliability of this technique.

Even though this technique is reliably robust, it is recommended that other techniques be explored to assist in the evaluation of the work (Denzin, 1989 as quoted in Patton, 2002). The use of Focus Groups, which can be used to complement the Goal Attainment Scale technique, can provide rich qualitative data and give a strong sense of what is going on with regard to the decision making process of landowners.

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