"Custodians" or "Investors": classifying irrigators in Australia's Namoi Valley

G. Kuehne[1] & H. Bjornlund[1,2]
[1]*University of South Australia, Australia*
[2]*University of Lethbridge, Canada*

Abstract

This paper examines groundwater irrigators' perceptions of the community processes of developing water-sharing plans (WSP) within the Namoi Valley of New South Wales. The groundwater resource is over-allocated, and in some areas, over-extracted. It is a complex situation that has not necessarily been effectively managed by any party, government or licence holders. The result is that the government is now attempting to rectify the over-allocation of water entitlements through the WSP that have been jointly developed by irrigators, community members and government representatives. The WSPs in some instances will result in significant reductions to water entitlements. A mail-out questionnaire was sent to irrigators followed by personal interviews with irrigators and other stakeholders. Licence holders are dissatisfied with the process; they strongly believe that the process has been seriously flawed. The survey indicates that licence holders are planning to make a number of management responses to cope with the impact of the WSP, many of which are driven by considerations other than economic or financial. These findings should help policy makers to more accurately target farmers when planning significant changes.
Keywords: groundwater, water sharing plans, Namoi Valley, farmer typology.

1 Introduction

This paper explores some of the issues involved in the journey towards sustainability for a group of irrigators who are reliant on one of Australia's most stressed aquifers. The aim of the research is to explore the reasons why farmers behave in the way that they do; what influences them when they make decisions

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and why the decisions that they make may not necessarily be driven only by financial and economic factors.

By extension, it is also of interest to consider why some organisations dealing with farmers appear to have failed to identify any diversity of behaviour assuming farmers respond as a homogenous whole.

This research began with an exploratory survey of groundwater licence holders, which was designed to uncover their understanding of the situation regarding reductions to water entitlements, the effect that this is having on them, the responses that they are making to the reductions, and the influences that have led them to make these responses. Follow-up personal interviews were undertaken with licence holders to explore and expand on the findings from the survey.

Qualitative questions in the survey, gave licence holders an opportunity to express a range of feelings including frustration, confusion and uncertainty (Kuehne and Bjornlund [1]). These responses show that the issue is laden with emotion and that the research needs to be approached with tact and discretion.

Questions arising from the initial survey were –

- Why do irrigators gain their information about the water reductions from sources other than the responsible department?
- Why has the department been so strongly criticised by licence holders?
- Why are licence holders not making economically rational decisions? Why are they not selling or leasing their water when it might be the most economically advantageous option?
- Is it possible to divide farmers into groups to better predict their behaviour?

2 The study area

Irrigation has been carried out in the Namoi Valley of Northern New South Wales (NSW) in a substantive way for about forty years (see table 1), and has developed concurrently with Australia's modern cotton industry. Irrigation in this valley covers an area of 119,040 hectares (Powell *et al.* [2]), of which approximately 40,000 hectares are irrigated using groundwater, varying with seasonal conditions. Even with such a short history adjustments now need to be made to ensure future sustainability.

Averaged across the more than 700 groundwater licences in the valley, the extraction is about 233 ML per licence. Using the same per licence average, the estimated annual aquifer recharge is 281 ML. The real significance of the problem facing these licence holders comes from the fact that each of these licences entitles the holder on average to extract 600 ML from the aquifer (NGT [3]). The implication of this over allocation is that if all licence holders activate their licence and withdraw what they are legally entitled to use, they would be using more than double the sustainable yield. While the valley as a whole, currently, is not using more than the sustainable yield, there are problem areas.

The valley is divided into thirteen hydrogeologically distinct zones and four of these are currently being used unsustainably (Namoi groundwater management committee [4]).

The reasons for the over allocation are: 1) a lack of scientific research quantifying the available recharge; 2) the responsible State Government department sought to encourage the use of water up until the 1970s; 3) it was thought that the resource could be "mined" for a period of time, and then recharge would occur when wet years returned; and 4) water, at least initially, was not highly valued which meant that some of the licences granted were expected to remain inactive (Kuehne and Bjornlund [1]).

Table 1: Key events leading to the development of sustainability issues.

Date	Event
1961	Keepit Dam completed to moderate and conserve the Namoi River. The department encouraged irrigation development to use the resource.
1961-62	Cotton successfully grown using water supplied by Keepit Dam, leading to rapid development of the irrigation industry.
1964	Keepit Dam runs dry because of drought. Surface water users look to groundwater as an alternative.
1983	Irrigators start to warn of the over issuing of groundwater entitlements.
1992-95	Drought leads to nearly double the sustainable aquifer extraction in the Namoi Valley as a whole.

After many delays, and a divisive and conflict ridden development period (Kuehne and Bjornlund [1]) and after four deferrals in three years the NSW government will on July 1st 2006 start implementing the final WSP. The NSW Government in conjunction with irrigators developed the WSP to specify the changes needed to water use and to map the way forward to sustainability. The study area was chosen because of these impending changes to water access. Some of the more over allocated zones will need to make cuts to entitlements of up to 87%. Some licence holders (9%) will have no cuts, 47% will have a cut of about 40%, 35% will have a cut from 50% to 75% and 8% will be cut 75% or more. These cuts to entitlement will have most pronounced and immediate effect on license holders who are using a substantial proportion of their entitlement (high history of use). The impact on license holders traditionally using a small proportion of their entitlement (low history of use) and license holders who have never developed their properties to use their entitlement (inactive irrigators) will be less pronounced and immediate and mainly relate to the future potential and value of their property.

The advent of the WSP is a pivotal event for many of the licence holders and will require a management response of some sort from most of them (see table 3). Nearly 90% of the high use group (those needing to make reductions in their actual water use), almost 50% of the low use group (those not needing to make any reductions in their actual water use) and almost 25% of the inactive group report that they will be making some sort of management changes.

3 Literature review

Some authors suggest that it is erroneously thought by many, that farmers only make management decisions to maximize their financial benefits (Salamon [5], Vandermersch and Mathijs [6]). Other authors suggest that it is recognized that this is not the sole motivation for farmers decisions (Austin *et al.* [7], Gasson [8]), and that other goals and values are important. Maybery *et al.* [9] talks of "a failure to appreciate the diversity and complexity of triggers that motivate decisions in agriculture". They go on to suggest that it is the "within person intricacies and processes" that are important for an understanding of landholder behaviour. As farmers from developing countries appear to make decisions based more on economic returns (Solano *et al.* [10]), it could be that the same might apply in Australia; but that a hierarchy exists where non economic factors still play an important role in the decision making as long as economic imperatives have been met. Some authors have referred to a mistake made by authorities when they assume that farmers are an undifferentiated homogenous group (Whatmore *et al.* [11] and Perrett [12]), and do not recognize the diversity within the group, Thompson [13].

Using Weber's [14] typology of "ideal types" it has been suggested by Salamon [15] that farmers can be divided into "Yeoman" and "Entrepreneurs". Others caution against this approach suggesting they are meaningful constructs but not mutually exclusive (Austin *et al.* [7]). It is recognised that these results may only apply to the actual groups studied. Salamon conducted a large number of in-depth personal interviews with Midwestern US farmers, while Austin worked with survey data that was originally gathered in-person for a study into Scottish farm pluriactivity.

Weber explains his concept of "ideal types" (Weber [14]) as being a representation of how someone would behave in a "rational purposive way". By describing this idealized situation he argues that we are better able to see how the actual irrational behaviour deviates from this ideal type. It's a methodological tool that does not imply that any one actually does belong to this rationally behaved group.

4 The hypothesis

The hypothesis is that farmers can be classified by how they might fall on a continuum with "Investor" and the "Custodian" as the opposite poles (see table 2), and that this will help to predict or explain their decision-making behaviour. While this classification has similarities with Salamon's ideal types of "Yeoman" and "Entrepreneur" (Salamon [15]), they differ importantly in the sense that the "Yeoman" category is strongly influenced by ethnicity.

The object of the research is to explore the validity of the classification variables used to build the types. The hypothesis will then be refined and tested in the final stages of the research.

The proposed typology and classification variables have been developed from the literature (Salamon [15]), the analysis of the mail-out survey and the first author's lived experience.

Table 2: Proposed typology and classification variables.

Classification variables	Investors	Custodian
Goals /Motivation	Focus on return on investment. Forward looking.	Replicate the farm, with sons all owning farms. Being recognised as a good farmer. Pride in the product. Looking forward but aware of the past.
Family Focus	Not focused or dependent on family. Family labour unlikely to be used. Succession is a business decision; with a good education their children can probably do better elsewhere.	Family-centric. Family replicates the culture. Family labour often used. There is a desire for sons (or daughters) to continue farming.
Business commitment	Money needs to "work" and will be shifted into other areas and opportunities when necessary.	Long term and committed to farming as an occupation and way of life.
Business history	Recent entrants & may be new to agriculture and the community.	Family based, possibly multi-generational business.
Attitude to Change	Prepared to respond to a changing environment.	Resistant to change. Emotional / family issues are associated with change even when voluntary.
Approach to debt	Recognition that large debts can be necessary to ensure business growth	Prefer to avoid exposure to large business debts.
Ownership of water	Resource to be bought and sold. Seen as having a capital and a productive value.	Both a right and a responsibility. A resource to be used efficiently. Not likely to be sold because it could be useful in the future
Ownership of land	Resource that is tradable. Farms will be bought and sold. More land gives more power, and the ability to generate more wealth.	Desire to leave the land in better condition for future generations. Strong connection to a property.

5 Methodology

The database of all the 730 groundwater licence holders in the Namoi Valley was provided by the department. After removing duplicate names 650 licence holders were sent survey forms. The purpose of the questionnaire was to gain an understanding of licence holders' behaviour by investigating 1) how they felt about the WSP, 2) how they plan to respond to the WSP, and 3) demographic information about them. The findings in tables 3 and 4 are based on open-ended questions coded by the researchers. Each respondent could give more than one management response or influence on major decisions. The columns in the tables

reflect all the answers given and therefore add up to more than 100%. The questionnaire was piloted in a neighbouring region facing similar issues.

The survey followed much of the Dillman method and was conducted in Aug – Sep 05 (Dillman [16]). Semi-structured personal interviews were conducted in September of 2005. The hour-long interviews were conducted at the premises of the interviewee, usually either in a kitchen or an office.

Computer analysis of the survey responses and the personal interviews was undertaken using QSR's program N6 for qualitative data analyses and SPSS for the quantitative analyses. Simple frequencies and descriptive statistics were used.

Table 3: Licence holder responses.

	High (n=44)	Low (n=53)	Inactive (n=19)
Buy extra water	41%	13%	21%
Sell or lease out water		9%	10%
Sell or lease out land			10%
Reduce irrigated area or water use	23%		
Change crop types to use less water	18%		
Change irrigation technology	30%	19%	
Water use efficiency improvements	36%		
Infrastructure improvements		24%	
Diversify away from irrigation		9%	
No action	9%	26%	32%
Don't know	2%	24%	47%

6 Results

A response was received from 36% of all license holders. Removing those that did not want to be involved in the research project reduced the useable response rate to 20%. Using Chi-squared tests proved that the survey respondents do not differ significantly from the non-respondents. However, active users of water are over represented reflecting that these license holders are going to be most affected by the WSP.

Turton describes three phases that irrigators pass through when dealing with reductions in access to water: (1) getting more water; (2) using water more efficiently; and (3) allocating water more equitably (Turton [17]). While some license holders proposed supply side solutions in the form of government investments in infrastructure to provide access to more water, most proposed management responses reflect Turton's three categories (table 3): (1) 13% to 41% expect to buy more water; (2) a significant number of high users are looking at improving their water use efficiency or changing their crop type; and (3) relatively few respondents expect to respond by selling their water. None of the high water use group and only 9-10% of the other groups contemplate selling their water. During the interviews some indicated the need to reallocate water away from cotton suggesting that this was no longer an appropriate crop to grow due to its high water requirements while many was opposed water trading

preferring that water remains tied to land, thereby effectively rejecting Turton's third phase.

The survey shows that even irrigators who have regularly used most of their annual entitlements (and consequently now face the largest cuts) are motivated by factors other than financial reward. They identify a range of factors that can be grouped into distinct categories (see table 4).

Table 4: Factors influencing significant decisions.

Influence	High N=76	Low N=82	Inactive N=27
I am a farmer, it's what I do	4.8%	15.9%	6.7%
Lifestyle	38.1%	43.2%	40.0%
Financial	40.5%	27.3%	33.3%
Resource quality, e.g. good soil	26.2%	25.0%	73.3%
Fit with existing way of doing things	9.5%	20.5%	6.7%
Community	9.5%	0.0%	0.0%
Family	52.4%	54.5%	20.0%

When asked about their sources of information for responding to the WSP licence holders suggested that it was much more likely that they would gain information from friends, neighbours or other farmers than they would get it from the responsible department. This is both surprising and concerning. The department has the mandate to implement the reductions to entitlements and has the knowledge necessary to inform the affected parties. The respondents criticized the government and the department for many things, including not sharing information.

During the personal interviews license holders expressed negative opinions of, and in some cases a real disdain for, the department. It could probably have been expected that the relationship would be difficult, as it is the department which have determined the level of reductions, and it is their task to implement the changes associated with the WSP.

It also appears that licence holders require someone to blame for their predicament. It does seem warranted that the department should accept some of the blame for the situation, because the over allocation of entitlements largely is a result of the department issuing more licences than what is sustainable. Many of the survey responses reinforce this belief and it appears as though licence holders would gain some satisfaction from the department admitting that they were responsible to at least some degree.

Some of the responses to the survey and the comments made during the personal interviews highlighted the irrigators' perception that the department has been difficult to deal with. They complained that the department did not provide accurate and timely information. They didn't return phone calls or make staff available. This could be a clash of cultures, but whatever the reason, it is obvious that the goal of resource sustainability would be more readily achieved if the relationship were less troubled.

The expected effect of the WSP on the community is substantial and widely recognised (Powell *et al.* [2], Wolfenden and van der Lee [18]). When fully implemented the effect will be the loss of from 190 to 400 jobs and the reduction of the valley's annual gross value of agricultural production by A$18m to A$42m. The survey respondents, when commenting on the impact of the WSP, identify both the impact that they expect on their own business as well as the impact that it will have on the community as a whole.

7 Personal interview results

Some quotations from the transcribed interviews which illustrate the different approaches between "Custodian" and "Investors" are listed below. These are some early findings that form the basis for the next stage of the research – the electronic discussion groups and the telephone interviews.

Caring for the land is important to the "Custodian"; one said, *"we can keep going ... and really improve the soil over the next ten years ... Another ten years and this place is going to be in really good shape"*.

An "Investor" described a contrasting approach to the land, *"we're using the land as one of our tools to make a dollar, no-one will deny that"*.

"Custodians" have pride in the length of time that their family have been farming, and the length of time that their property has belonged to their family; one said, *"I was born here, and my father had this place so the family has been around since the late 1800's"*.

Another "Custodian" made it quite clear, stating that *"our attachment to this country is far greater than they could ever imagine ... so you're [we're] not about to give it up easily if you [we] can ... the perception is that we're a bunch of ... wealthy, large cotton farmers ... but most of us are just ordinary people, just trying to ... educate our kids and keep our heads above water"*.

Talking about the arrival of the more entrepreneurial American cotton growers a "Custodian" said *"my experience with Americans is that it's got to be done quickly, they don't buggerize around, and that's a good thing"*.

One "Custodian", who had been a grazier before becoming an irrigator, spoke about the difficulty associated with adopting new ideas when he said *"you can imagine all the emotional part of the argument. Family being around here for 2 or 3 generations, being graziers and I was the one who was moving away from it"*.

Another "Custodian" echoed similar sentiments by stating that *"dad wasn't into irrigation at all, other than as a back-up ... for the cattle and when things got tough ... so there's been a little bit of a change of focus ... my view is that you've got to try and make farming pay"*.

For the "Custodian" water is more than a resource to be bought and sold. Talking about the possibility of selling water one said *"it wouldn't enter our head. We said to the bureaucrats and the politicians ... We don't want the money. We want the water ... We're here for the long haul. I'm second generation ... our son is third. And he's put his name on a bit of land"*.

But the "Investor" sees water differently; one stated *"I said to my wife ... that's our super ... In another 15 or 20 years when I want to retire to the Gold Coast ... that water licence alone is going to be worth a hell of a lot"*.

It seems as though some "Custodians" also see water as a responsibility when he stated that *"the government has allocated you ... so many megalitres, it's your duty to make as much production as possible from each of those megalitres, I think it's your public duty, and I don't think people would argue too much about that"*.

An "Investor" described his approach to business this way, *"our imperative is one of business, and I never use the word lifestyle. It doesn't appeal to me at all when people describe themselves as having a great lifestyle when they're living in poverty"*.

Another "Investor" describes his approach to business growth this way, *"you've just got to get more and more and more land. You know irrigation is very important to us, it's king, it's king of the castle as far as we're concerned"*.

The "Custodian's" business goals are about more than just profits, one said *"we want to stay on the land, we want to remain growing crops, to do it we've got to be sustainable, and we've got to be able to do it a lot better than what were doing now"*.

The "Custodians" recognise that the "Investors" have different motivations than they have, one said that *"it's that bloke that has come in, I suppose a different type of farmer, more the type of farmer ... the business farmer ... looking at rate of return ... it was that farmer that came into these areas"*.

An "Investor" describes his entrepreneurial philosophy this way, *"if they want economic development, if they want the nation to be a stronger place, then the sort of people that are prepared to expand are people with a capitalistic type nature about them, and of course they're always going to bite off a little more than they can chew"*.

"Custodians" also feel a responsibility for the community; one said *"our little towns really need us to generate economic activity. My main driver is the little town that I live near, that my great great grandfather came to. It's dear to us all…"*.

8 Discussion and conclusions

The results from the mail-out survey show that the process of developing the water sharing plans and the quest for achieving sustainable levels of groundwater extraction has been difficult. The research suggests cultural differences between licence holders and the government. The irrigators believe that the department behaved poorly throughout the process and did not provide information willingly. Some of this criticism is about the way information was presented, even to the level of document layout and design.

Some of their responses seen in the light of Turtons' model suggest that they are at varying stages in their response to the WSP. This may lead to further conflict and explain their current dissatisfaction. These differences lead to license holders wanting to blame the department, and wanting it to acknowledge

its role in causing the problem. Licence holders do not only show concern for their own financial situation, they are concerned about the impact on the community as a whole.

The results from the personal interviews show that ideal types of "Investor" and "Custodian" could offer a useful way of looking at farmers' behaviour. The "Custodians" do demonstrate a different attitude to their land and water. They value length of tenure, and indicate difficulty with adapting to change. Their goals are broader than profit and include a desire to care for the land, use water cautiously, and to contribute to the community for the sake of the community.

On the other hand "Investors" are more focused on using their land and their water as a resource to generate income and to grow their business. It appears as though their concern for the community is seen in terms of what it can offer them.

Some of the farmers that could be described by these classifications appear outwardly similar, for example in their criticisms of the department, and only differ when their motivations are explored more deeply. Initial results suggest that it is worthwhile continuing to develop a typology of farmers based on the "Investor" and "Custodian" categories. It could be expected that the outcome of this research would be useful for those formulating and implementing policy when dealing with farmers, especially as in this case, when there is a need for cooperation over a contentious issue.

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