DEVELOPING FAIR PROCESSES FOR THE RE-ALLOCATION OF GROUNDWATER FOR LONG TERM SUSTAINABILITY IN THE NAMOI VALLEY
DEVELOPING FAIR PROCESSES FOR THE RE-ALLOCATION OF GROUNDWATER FOR LONG TERM SUSTAINABILITY IN THE NAMOI VALLEY

Blair E. Nancarrow
Janet A. McCreedin
Geoffrey J. Syme

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APPENDIX 1
Major Issues Resulting from Focus Group Discussions with Groundwater Licence Holders in the Upper and Lower Namoi Valleys

APPENDIX 2
The Questionnaire
1.0 INTRODUCTION

Groundwater resource management in Australia is undergoing extensive reforms. Under the umbrella of the Council of Australia Governments (COAG), the Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) and the National Landcare Program (NLP) produced a report entitled “Towards a National Groundwater Management Policy and Practice”. The report states:

“...the aim of groundwater management is to:
achieve efficient, sustainable and equitable management of the groundwater resource, whilst maximising the contribution of industry and rural regions to the effective economic and social well being of the Australian community”.

Groundwater in the Namoi Valley in northern New South Wales is over-allocated and over-used in many zones. In fact, the Upper Namoi Valley has been rated as the most stressed aquifer in New South Wales. The irrigation industry is the major user of the groundwater.

Even if all sleeper licences and unused portions of licences were revoked, the groundwater use would still not be sustainable. Therefore, to meet COAG requirements, all groundwater allocations need to be reduced, preferably through policy decisions that would cause as little impact on the local community as possible, and that would be as fair and equitable as possible.

The formulation of recommendations to assist in this regard was the main objective of the study reported here.

Figures 1 and 2 show the aquifers and management zones in the Upper and Lower Namoi Valleys.
2.0 METHODOLOGY

2.1 Issues Scoping

In late November 1997, a series of ten Focus Groups was held with groundwater licence holders in the upper and lower Namoi valleys. The purpose of the small group discussions was to identify the range of issues associated with the (over)allocation of groundwater in the valleys.

The groups consisted of invited participants of like groundwater use situations, such as 'all highly or fully developed properties'; 'all low use or sleeper licences'; or 'all conjunctive users'. The largest group had eleven participants, but most consisted of between five and seven people. Interviews were also conducted on five individual properties. A total of fifty-eight groundwater licence holders participated in discussions.

Discussions were semi-structured and addressed the following broad topics:

⇒ perceptions of the state of present groundwater levels, use and management;
⇒ considerations of possible impacts of a variety of policy options on groundwater users, and the likely impacts on communities as a whole;
⇒ perceptions of fair and equitable ways to solve the problems.

Appendix 1 outlines the main points which resulted from the discussions. No attempt was made to verify or analyse the issues, although they were ordered under headings to aid reading. This report was sent to all who had participated in the focus groups for comments on its accuracy. This then provided the basis for the structuring of a survey questionnaire which was sent to all groundwater licence holders in the Upper and Lower Namoi Valleys in February 1998.

2.2 The Questionnaire

The questionnaire (see Appendix 2) was designed to be self-administered.

Specifically, after providing background information and ensuring understanding of water management terms, the questionnaire investigated:

- irrigators' attitudes to lay philosophies of water allocation\(^1\) in general;
- the importance of various attributes associated with farming;
- perceptions of changes that had been occurring in the community over the past ten years, the possible impact that reducing groundwater allocations may have on the community, and considerations of actions that could lessen any negative effects of groundwater re-allocation;

\(^1\) Previous research (e.g. Syme and Nancarrow, 1992; Syme and Nancarrow, 1996; McCredin et al 1997; Syme and Nancarrow, 1997) had shown that perceptions of fairness and equity in water allocation originated from a combination of overarching environmental philosophies and ethical principles, and specific attitudes to local situations.
• perceptions of management and use of groundwater across zones and valleys;
• fairness and equity issues;
• the acceptability of a series of possible management options for the re-allocation of groundwater Upper and Lower Namoi Valleys;
• relevant demographic details; and
• irrigators' perceptions of groups of groundwater licence holders who were perceived to be least affected and most affected by a loss of groundwater allocation.

2.3 The Sample

A list of all groundwater licence holders was obtained from the New South Wales Department of Land and Water Conservation. These licence holders were approached to request participation in the survey in one of the three following ways.

a) Licence holders who had been interviewed in November 1997 issues scoping exercise had all agreed to participate in the survey when previously asked. The questionnaire was sent to them with a covering letter, a reply paid envelope, and maps of the groundwater zones in the Upper and Lower Namoi Valleys.

b) Those licence holders who had listed telephone numbers were personally contacted, provided with information about the study, and asked if they would be willing to participate in the survey. The questionnaire was then sent to those who agreed to participate, with a reply paid envelope, a covering letter and maps of the groundwater zones.

c) The remaining licence holders who could not be contacted by telephone (no telephone number listed or no answer after three attempts) were sent the questionnaire with a more comprehensive covering letter explaining the study, a reply paid envelope and maps of the groundwater zones.

Regardless of how many groundwater licences were held by an individual, only one questionnaire was forwarded. Respondents were asked to record details of all groundwater licences on the front cover of the questionnaire.

Tables 1 and 2 outline the contact and response details for each of the above groups for the Upper and Lower Valleys and each groundwater management Zone. It is evident that the more personalised the form of contact with the licence holders, the greater the response rate that occurred. However, the overall response rate was extremely satisfactory and is comparable with that of many door to door interviewer administered surveys.

The response numbers for each Valley shown in Table 1 are classified according to the respondents' mailing addresses. However, some people were associated with properties in both Valleys. Therefore, for analytical purposes, those respondents were assigned to a particular Valley according to where their greatest allocations were held. That is, Table 1 shows 75 respondents in the Lower Valley, but in the analysis, 77 respondents were classified in that Valley (and hence 210 in the Upper Valley).
### TABLE 1
RESPONSE RATE TO REQUEST TO PARTICIPATE IN SURVEY

<table>
<thead>
<tr>
<th>Participant Contact</th>
<th>Sent</th>
<th>Returned</th>
<th>% Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Valley</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus group participant</td>
<td>33</td>
<td>25</td>
<td>75.8</td>
</tr>
<tr>
<td>Telephoned invitation</td>
<td>190</td>
<td>124</td>
<td>65.3</td>
</tr>
<tr>
<td>Letter of invitation (no personal contact)</td>
<td>131</td>
<td>63</td>
<td>48.1</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td>354</td>
<td>212</td>
<td>59.9</td>
</tr>
<tr>
<td>Lower Valley</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus group participant</td>
<td>20</td>
<td>14</td>
<td>70.0</td>
</tr>
<tr>
<td>Telephoned invitation</td>
<td>69</td>
<td>40</td>
<td>58.0</td>
</tr>
<tr>
<td>Letter of invitation (no personal contact)</td>
<td>55</td>
<td>21</td>
<td>38.2</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td>146</td>
<td>75</td>
<td>51.4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>500</td>
<td>287</td>
<td>57.4</td>
</tr>
</tbody>
</table>

1. 4 refusals to telephone invitation to participate
2. 1 refusal to telephone invitation to participate

### TABLE 2
NUMBER OF PROPERTIES REPRESENTED IN THE SURVEY IN EACH GROUNDWATER MANAGEMENT ZONE

<table>
<thead>
<tr>
<th>UPPER VALLEY</th>
<th>LOWER VALLEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
<td>N</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>251</td>
</tr>
</tbody>
</table>

NB: The total number of properties is greater than the total number of respondents as some respondents owned more than one property
2.4 Feedback and Discussion of Draft Recommendations

At the completion of the data analysis, draft recommendations were formulated for discussion with the survey participants.

All respondents were invited to attend a presentation of results of the survey and discussion of the draft recommendations. The presentations were held separately for the Upper and Lower Namoi Valleys in June 1998.

The discussion at both these meetings provided input for the finalisation of Section 5 of this report.
3.0 RESULTS

The following outlines the major results for the sample as a whole, and separately for the Upper and Lower Valleys for major points of comparison where statistically significant differences occur (p<.01).

3.1 Characteristics of the Sample

3.1.1 Water allocation and use

Respondents were asked to provide details of the water allocations for each property they owned or managed for groundwater only use and conjunctive use at 0% surface water allocation. Details of water use activity (i.e. inactive; semi-active and fully active) were also obtained from the DLWC. From this information, three water use/allocation variables were created for the analysis: type of user; allocation group; and use group.

The type of user variable indicated groundwater only or conjunctive user. That is, if any of the respondent’s properties had a conjunctive licence, that respondent was categorised as a conjunctive user. There was a higher proportion of conjunctive users in the Lower Valley than in the Upper Valley and this difference was statistically significant. See Table 3.

<table>
<thead>
<tr>
<th>Type of User</th>
<th>Upper Valley</th>
<th>Lower Valley</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Groundwater Only</td>
<td>195</td>
<td>92.9</td>
<td>47</td>
</tr>
<tr>
<td>Conjunctive User</td>
<td>15</td>
<td>7.1</td>
<td>30</td>
</tr>
</tbody>
</table>

The variable, allocation group, was calculated by summing all allocations for all of each respondent’s properties, for both groundwater only and conjunctive allocations at 0% surface water. After consideration of the distribution of the totals, four groups were created as shown in Table 4. Again, there was a statistically significant difference between valleys in that the Lower Valley had a greater proportion of the higher allocation groups.
Table 4

<table>
<thead>
<tr>
<th>Allocation Group</th>
<th>Upper Valley</th>
<th></th>
<th>Lower Valley</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Low allocation</td>
<td>100</td>
<td>47.6</td>
<td>24</td>
<td>31.2</td>
<td>124</td>
<td>43.2</td>
</tr>
<tr>
<td>Medium allocation</td>
<td>63</td>
<td>30.0</td>
<td>22</td>
<td>28.6</td>
<td>85</td>
<td>29.6</td>
</tr>
<tr>
<td>High allocation</td>
<td>41</td>
<td>19.5</td>
<td>25</td>
<td>32.5</td>
<td>66</td>
<td>23.0</td>
</tr>
<tr>
<td>Ultra-high allocation</td>
<td>6</td>
<td>2.9</td>
<td>6</td>
<td>7.8</td>
<td>12</td>
<td>4.2</td>
</tr>
</tbody>
</table>

The *use group* variable was calculated through the product of a numerical value assigned to the water use activity (i.e. 0 for inactive; 0.5 for semi-active; and 1 for fully active) by the amount of allocation for each property. These values, although not absolute, provided an indication of relative water use between respondents and were divided into four groups, again after consideration of the distribution of values. These groups are shown in Table 5.

Table 5

<table>
<thead>
<tr>
<th>Wateruse Group</th>
<th>Upper Valley</th>
<th></th>
<th>Lower Valley</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>No use</td>
<td>46</td>
<td>21.9</td>
<td>7</td>
<td>9.1</td>
<td>53</td>
<td>18.5</td>
</tr>
<tr>
<td>Some use</td>
<td>113</td>
<td>53.8</td>
<td>24</td>
<td>31.2</td>
<td>137</td>
<td>47.7</td>
</tr>
<tr>
<td>Higher use</td>
<td>45</td>
<td>21.4</td>
<td>39</td>
<td>50.6</td>
<td>84</td>
<td>29.3</td>
</tr>
<tr>
<td>Highest use</td>
<td>6</td>
<td>2.9</td>
<td>7</td>
<td>9.1</td>
<td>13</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Again, there was a statistically significant difference between valleys in that the Lower Valley had a greater proportion of the high use groups.

There was a statistically significant correlation between the variables *allocation group* and *use group* (.739; p=.01). However, inspection of the data showed there was sufficient difference in the classification of the groups in the two variables to warrant retention of both variables for future analyses.

3.1.2 Demographics

Respondents were asked to provide details on the length of time they had lived in the Namoi Valley; the length of time they’d had a groundwater licence in the Namoi Valley; commercial produce from their properties; age and gender. Tables 6 to 10 provide details of the sample demographics.
### TABLE 6
LENGTH OF RESIDENCE IN THE NAMOI VALLEY

<table>
<thead>
<tr>
<th>Option</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>2.8</td>
</tr>
<tr>
<td>Between 6 and 10 years</td>
<td>6.0</td>
</tr>
<tr>
<td>Between 10 and 20 years</td>
<td>11.6</td>
</tr>
<tr>
<td>Between 20 and 30 years</td>
<td>13.7</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>65.8</td>
</tr>
</tbody>
</table>

### TABLE 7
LENGTH OF OWNERSHIP OF GROUNDWATER LICENCES IN THE NAMOI VALLEY

<table>
<thead>
<tr>
<th>Option</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>7.1</td>
</tr>
<tr>
<td>Between 6 and 10 years</td>
<td>12.1</td>
</tr>
<tr>
<td>Between 10 and 20 years</td>
<td>31.9</td>
</tr>
<tr>
<td>Between 20 and 30 years</td>
<td>19.5</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>29.4</td>
</tr>
</tbody>
</table>

### TABLE 8
COMMERCIAL PRODUCTS FROM PROPERTIES

<table>
<thead>
<tr>
<th>Main Products</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock</td>
<td>61.5</td>
</tr>
<tr>
<td>Cereals</td>
<td>59.8</td>
</tr>
<tr>
<td>Cotton</td>
<td>45.5</td>
</tr>
<tr>
<td>Sorghums</td>
<td>44.7</td>
</tr>
<tr>
<td>Pasture fodder</td>
<td>18.9</td>
</tr>
<tr>
<td>Barley</td>
<td>18.0</td>
</tr>
<tr>
<td>Legumes</td>
<td>14.3</td>
</tr>
<tr>
<td>Corn/Maize</td>
<td>12.3</td>
</tr>
<tr>
<td>Soybeans</td>
<td>11.5</td>
</tr>
</tbody>
</table>

NB: %s do not add to 100 as up to five responses were allowed.
In some cases, more than one person answered the questionnaire. Therefore, two age categories and two genders were recorded in those situations.

**TABLE 9**
RESPONDENTS' AGE CATEGORIES

<table>
<thead>
<tr>
<th>Age Category</th>
<th>% of Person 1 (N=281)</th>
<th>% of Person 2 (N=16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to 19 years</td>
<td>0</td>
<td>6.3</td>
</tr>
<tr>
<td>20 to 24 years</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25 to 29 years</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>30 to 39 years</td>
<td>13.5</td>
<td>6.3</td>
</tr>
<tr>
<td>40 to 49 years</td>
<td>28.1</td>
<td>6.3</td>
</tr>
<tr>
<td>50 to 59 years</td>
<td>33.1</td>
<td>12.5</td>
</tr>
<tr>
<td>60 to 64 years</td>
<td>8.5</td>
<td>25.0</td>
</tr>
<tr>
<td>65 to 69 years</td>
<td>7.5</td>
<td>18.8</td>
</tr>
<tr>
<td>70 to 74 years</td>
<td>5.3</td>
<td>6.3</td>
</tr>
<tr>
<td>75 years and over</td>
<td>2.1</td>
<td>18.8</td>
</tr>
</tbody>
</table>

**TABLE 9**
RESPONDENTS' GENDERS

<table>
<thead>
<tr>
<th>Gender</th>
<th>% of Person 1 (N=279)</th>
<th>% of Person 2 (N=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>91.4</td>
<td>23.8</td>
</tr>
<tr>
<td>Female</td>
<td>8.6</td>
<td>76.2</td>
</tr>
</tbody>
</table>
3.2 Ways People Think about Water Allocation

Before considering the Namoi situation specifically, respondents were asked to respond to twenty-five general philosophical statements on water allocation using a five point agree/disagree scale. The results are shown in Tables 10, 11 and 12.

For ease of interpretation, they are shown in terms of high (dis)agreement, where more than 80% of the sample (dis)agreed; general (dis)agreement, where between 60% and 80% (dis)agreed; and split opinion, where there was a spread of responses from "strongly agree" to "strongly disagree".

The high level of agreement on the statements shown in Table 10 provides a philosophical basis for the discussion of specific issues in determining processes for the re-allocation of groundwater. There was virtually no dissent to the acceptance of decisions resulting from fair processes; the need for long term sustainability even at the expense of business profits; the value of water other than monetary; and the inappropriateness of an unconstrained water market as a method for allocation.

**TABLE 10**

**GENERAL PHILOSOPHIES IN WATER ALLOCATION WHERE THERE WAS HIGH AGREEMENT OR DISAGREEMENT**

<table>
<thead>
<tr>
<th>(&gt;80% agreed or disagreed)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Philosophical Statement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the decision making process is fair, people should accept the final allocation decisions.</td>
<td>high agreement</td>
</tr>
<tr>
<td>Water should be allocated for long term sustainability even if it reduces the short term profits of local businesses.</td>
<td>high agreement</td>
</tr>
<tr>
<td>Water has a value other than its dollar value.</td>
<td>high agreement</td>
</tr>
<tr>
<td>All water should be put on the market and sold to those who will pay most, regardless of what it is used for.</td>
<td>high disagreement</td>
</tr>
</tbody>
</table>

Although there was less of a consensus by the various stakeholders on the philosophies in Table 11 than on those in the previous table, the general agreement provides a further basis for discussion of specific allocation issues. Most people acceded to: the need for personal sacrifices to achieve effective planning; priority for water to those who need it to make a living; compensation for affected livelihoods; the importance of water for the future over money making in the present; the inappropriateness of allocations being set by experts alone; the inappropriateness of allocation decision making through dollar cost/benefit analyses; and the inappropriateness of unconstrained use by landholders of groundwater under their land.
TABLE 11
GENERAL PHILOSOPHIES IN WATER ALLOCATION
WHERE THERE WAS GENERAL AGREEMENT OR DISAGREEMENT
(between 60% and 80% agreed or disagreed)

<table>
<thead>
<tr>
<th>Philosophical Statement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can’t really solve water sharing problems by analysing the costs and benefits in dollars.</td>
<td>general agreement</td>
</tr>
<tr>
<td>Everyone should recognise that they may have to make some personal sacrifices if we are going to have effective planning</td>
<td>general agreement</td>
</tr>
<tr>
<td>Priority for water should be given to those who need it to make a living.</td>
<td>general agreement</td>
</tr>
<tr>
<td>If new water allocation arrangements affect people’s livelihoods, they should receive compensation.</td>
<td>general agreement</td>
</tr>
<tr>
<td>Saving water for the future is more important than making money now.</td>
<td>general agreement</td>
</tr>
<tr>
<td>Water allocations should be set by experts alone.</td>
<td>general disagreement</td>
</tr>
<tr>
<td>Landholders have the right to use groundwater under their land as they see fit.</td>
<td>general disagreement</td>
</tr>
</tbody>
</table>

However, it is the philosophies in Table 12 (split opinion) where the greatest disagreement would be likely to occur when discussing specific allocation issues. And it is these philosophies where licence holders would need to be aware of the difference of opinion, and work towards resolving some of the differences. These differences tended to be associated with arguments of process; ownership and public good aspects of groundwater; economics and community good issues; environmental rights; and priority preferences between environmental and human uses.
<table>
<thead>
<tr>
<th>Philosophical Statement</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sections of the community have a right to have a say on water allocation.</td>
<td>split opinion</td>
</tr>
<tr>
<td>In water allocation, everyone should be treated equally.</td>
<td>split opinion</td>
</tr>
<tr>
<td>There are no general rules about how to share water, it depends on the situation.</td>
<td>split opinion</td>
</tr>
<tr>
<td>The only role for state government in water management should be a supervisory one.</td>
<td>split opinion</td>
</tr>
<tr>
<td>There isn’t time to wait for exact scientific knowledge, we need to act now.</td>
<td>split opinion</td>
</tr>
<tr>
<td>It would be highly unfair to take water away from those who already have allocations.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Water is owned by everyone and therefore it should be managed for the overall public good.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Groundwater under land is naturally the property of the landholder.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Regardless of economic consequences, water should be allocated to minimise conflict in the community.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Water allocations should be made to maximise the overall economic income of a community.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Since the environment was the original “user” of water, it should always have higher priority than other possible users.</td>
<td>split opinion</td>
</tr>
<tr>
<td>The natural environment has the same rights to water as people have.</td>
<td>split opinion</td>
</tr>
<tr>
<td>Water can only be allocated for human use if basic environmental sustainability has been satisfied.</td>
<td>split opinion</td>
</tr>
<tr>
<td>When it comes to water allocation, the environment is a secondary consideration to people.</td>
<td>split opinion</td>
</tr>
</tbody>
</table>
A cluster analysis was conducted using the twenty-five philosophical statements. The two cluster solution was the one most easily interpreted. A discriminant analysis was then conducted to determine which philosophical statements discriminated between the two clusters of respondents. The resulting analysis ($\lambda=.292; p<.001$) correctly classified 96% of cases to the clusters. The major discriminating statements, and the clusters' degree of agreement with the statements are shown in the following table.

**TABLE 13**  
**THE CLUSTERS' DEGREE OF AGREEMENT WITH THE MAJOR DISCRIMINATING PHILOSOPHICAL STATEMENTS**

<table>
<thead>
<tr>
<th>Discriminating Statements</th>
<th>Mean Score &amp; Degree of Agreement with Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Score</td>
<td>Agreement</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Since the environment was the original &quot;user&quot; of water, it should always have higher priority than other possible users.</td>
<td>4.3</td>
</tr>
<tr>
<td>The natural environment has the same rights to water as people have.</td>
<td>3.6</td>
</tr>
<tr>
<td>All sections of the community have the right to a say on water allocation.</td>
<td>3.9</td>
</tr>
<tr>
<td>Regardless of the economic consequences, water should be allocated to minimise conflict in the community.</td>
<td>3.9</td>
</tr>
<tr>
<td>It would be highly unfair to take water away from those who already have allocations.</td>
<td>2.2</td>
</tr>
</tbody>
</table>

From the above statements, it would appear that the two clusters of respondents are philosophically opposed and could be described as *Private Good* and *Public Good*. Figure 3 shows the relative proportions of the two clusters.

**FIGURE 3**  
**RELATIVE PROPORTIONS OF THE TWO PHILOSOPHICAL CLUSTERS OF RESPONDENTS**

15
When the philosophical clusters were compared with the three water use/allocation variables and major demographic variables including the two valleys, only the water allocation/use variables showed any statistically significant differences.

- **Type of User**
  Conjunctive users made up a significantly higher proportion (p<.01) of the Private Good Cluster (21%) than they did the Public Good Cluster (8%).

- **Allocation Group**
  A significantly greater proportion (p<.001) of the Private Good Cluster were in the High Allocation and the Ultra-high Allocation Groups (38%) compared with those in the Public Good Cluster (13%).

- **Use Group**
  A significantly greater proportion (p<.001) of the Private Good Cluster were in the Higher Use and the Highest Use Groups (47%) compared with those in the Public Good Cluster (19%).
3.3 Reasons for Farming

Respondents were asked to consider what values were important to them about farming (Kerridge, 1978). Options were grouped in four different categories based on Kerridge’s (1978) categories of values. Respondents were asked to rank them in terms of their importance. They were then asked to rank the importance of the option categories as a whole.

The rankings were firstly recoded so that the higher the score, the more important the option. The scores were then standardised to provide for the significant number of respondents who had assigned equal ranks to various options. Therefore, the option scores within each category sum to 100, as do the overall category scores.

Tables 14 to 18 present the mean standardised importance scores for the options within each category and for the categories as a whole.

### TABLE 14
MEANS FOR RANKED IMPORTANCE OF INCOME AND SECURITY OPTIONS
(Instrumental Values)

<table>
<thead>
<tr>
<th>Option</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensuring the future income of the enterprise</td>
<td>34.1</td>
</tr>
<tr>
<td>Making satisfactory income</td>
<td>28.9</td>
</tr>
<tr>
<td>Making maximum income</td>
<td>18.9</td>
</tr>
<tr>
<td>Expanding the business</td>
<td>18.2</td>
</tr>
</tbody>
</table>

### TABLE 15
MEANS FOR RANKED IMPORTANCE OF PERSONAL SATISFACTION AND SELF EXPRESSION OPTIONS
(Expressive Values)

<table>
<thead>
<tr>
<th>Option</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting a challenge and achieving the objective</td>
<td>36.4</td>
</tr>
<tr>
<td>Gaining self respect from doing a worthwhile job</td>
<td>32.4</td>
</tr>
<tr>
<td>Feeling pride of ownership of this farm</td>
<td>31.1</td>
</tr>
</tbody>
</table>
### TABLE 16
MEANS FOR RANKED IMPORTANCE OF FARMING ENJOYMENT OPTIONS
(Intrinsic Values)

<table>
<thead>
<tr>
<th>Option</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence and freedom from supervision</td>
<td>28.7</td>
</tr>
<tr>
<td>Purposeful activity, value in hard work</td>
<td>28.0</td>
</tr>
<tr>
<td>Preference for a healthy farming lifestyle</td>
<td>26.8</td>
</tr>
<tr>
<td>Enjoyment of physical work tasks</td>
<td>16.6</td>
</tr>
</tbody>
</table>

### TABLE 17
MEANS FOR RANKED IMPORTANCE OF ENJOYMENT OPTIONS FROM FARMING TRADITION AND COMMUNITY
(Social Values)

<table>
<thead>
<tr>
<th>Option</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belonging to the farming community</td>
<td>40.0</td>
</tr>
<tr>
<td>Continuing the family tradition</td>
<td>33.9</td>
</tr>
<tr>
<td>Gaining recognition and prestige from farming</td>
<td>26.1</td>
</tr>
</tbody>
</table>

### TABLE 18
MEANS FOR RANKED IMPORTANCE OF CATEGORIES

<table>
<thead>
<tr>
<th>Option</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming is...</td>
<td></td>
</tr>
<tr>
<td>a means of obtaining satisfactory income and security</td>
<td>31.6</td>
</tr>
<tr>
<td>a means of personal satisfaction and self expression</td>
<td>28.4</td>
</tr>
<tr>
<td>enjoyable in its own right</td>
<td>20.4</td>
</tr>
<tr>
<td>a means of enjoying the family tradition and farming community</td>
<td>19.5</td>
</tr>
</tbody>
</table>

It is evident that obtaining satisfactory income and security from farming was of paramount importance, with personal lifestyle preferences second most important. The enjoyment of farming and traditional/community issues were less important to respondents. This pattern of responses is similar to that demonstrated by Kerridge (1978).

There was also no significant difference between these categories of reasons for farming and the philosophical clusters; the Upper and Lower Valleys and the three water use/allocation variables.
3.4 Community Issues and Impacts

Respondents were asked to nominate up to three positive and three negative changes that they thought had occurred in their communities over the past ten years and what they thought had caused those changes. Many and varied responses were offered and Tables 19 to 22 show the main changes nominated and their perceived causes.

### TABLE 19
MAJOR POSITIVE CHANGES TO NAMOI VALLEY COMMUNITIES OCCURRING OVER THE PAST TEN YEARS

<table>
<thead>
<tr>
<th>Positive Changes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landcare/awareness of need for sustainable practices</td>
<td>20</td>
</tr>
<tr>
<td>Increased awareness of groundwater (value, quantity etc.)</td>
<td>16</td>
</tr>
<tr>
<td>Improved on-farm irrigation infrastructure</td>
<td>16</td>
</tr>
<tr>
<td>Improved water use efficiency/practices/management</td>
<td>14</td>
</tr>
<tr>
<td>Increased environmental awareness</td>
<td>13</td>
</tr>
<tr>
<td>Increased employment</td>
<td>12</td>
</tr>
<tr>
<td>Increased community income</td>
<td>12</td>
</tr>
<tr>
<td>Increased community cohesion</td>
<td>12</td>
</tr>
<tr>
<td>Improved access to new technology &amp; science</td>
<td>10</td>
</tr>
<tr>
<td>Improved community infrastructure (roads, sewerage etc.)</td>
<td>8</td>
</tr>
<tr>
<td>Greater crop diversity</td>
<td>8</td>
</tr>
<tr>
<td>Improved communication mechanisms/technology</td>
<td>6</td>
</tr>
<tr>
<td>Cotton industry</td>
<td>6</td>
</tr>
</tbody>
</table>

% values do not add to 100 as more than 1 response was allowed

### TABLE 20
CAUSES OF MAJOR POSITIVE CHANGES TO NAMOI VALLEY COMMUNITIES OCCURRING OVER THE PAST TEN YEARS

<table>
<thead>
<tr>
<th>Causes of Positive Changes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of environmental degradation</td>
<td>32</td>
</tr>
<tr>
<td>Irrigation industry</td>
<td>17</td>
</tr>
<tr>
<td>Economically efficient farming</td>
<td>16</td>
</tr>
<tr>
<td>Landcare Program/community pressure</td>
<td>15</td>
</tr>
<tr>
<td>Progress in research and technology</td>
<td>14</td>
</tr>
<tr>
<td>Increased cotton acreage</td>
<td>10</td>
</tr>
</tbody>
</table>

% values do not add to 100 as more than 1 response was allowed
TABLE 21
MAJOR NEGATIVE CHANGES TO NAMOI VALLEY COMMUNITIES OCCURRING OVER THE PAST TEN YEARS

<table>
<thead>
<tr>
<th>Negative Changes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of local essential services</td>
<td>21</td>
</tr>
<tr>
<td>Environmental disregard/increased chemicals</td>
<td>17</td>
</tr>
<tr>
<td>Loss (closure) of local employment avenues</td>
<td>14</td>
</tr>
<tr>
<td>Decreased profit margins</td>
<td>13</td>
</tr>
<tr>
<td>Government interference/increased regulation</td>
<td>11</td>
</tr>
<tr>
<td>Social pathology (eg. suicides; crime; accidents; depression)</td>
<td>9</td>
</tr>
<tr>
<td>Lowering water table/bores failing</td>
<td>9</td>
</tr>
<tr>
<td>Greed/financial gain at any cost</td>
<td>8</td>
</tr>
<tr>
<td>Diminishing local pride/concern for neighbours</td>
<td>7</td>
</tr>
<tr>
<td>Decrease in population of small towns</td>
<td>6</td>
</tr>
<tr>
<td>Property amalgamation/corporate ownership</td>
<td>6</td>
</tr>
</tbody>
</table>

% do not add to 100 as more than 1 response was allowed

TABLE 22
CAUSES OF MAJOR NEGATIVE CHANGES TO NAMOI VALLEY COMMUNITIES OCCURRING OVER THE PAST TEN YEARS

<table>
<thead>
<tr>
<th>Causes of Negative Changes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic hardship</td>
<td>15</td>
</tr>
<tr>
<td>Decreasing gap between commodity prices and costs</td>
<td>13</td>
</tr>
<tr>
<td>People making decisions without experience/qualifications</td>
<td>12</td>
</tr>
<tr>
<td>Lack of timely government action</td>
<td>12</td>
</tr>
<tr>
<td>Greed for greater profit</td>
<td>12</td>
</tr>
<tr>
<td>Rural decline</td>
<td>9</td>
</tr>
<tr>
<td>National trend to employ fewer people</td>
<td>8</td>
</tr>
<tr>
<td>Environmental destruction</td>
<td>8</td>
</tr>
<tr>
<td>Poor water resources management</td>
<td>7</td>
</tr>
</tbody>
</table>

% do not add to 100 as more than 1 response was allowed

Ninety-eight percent of those respondents who noted changes considered that some were still occurring. The changes and numbers of respondents nominating the changes that were still occurring were very similar to those outlined above in Tables 19 and 21.
Respondents were then asked to consider possible impacts on their communities if groundwater allocations were further reduced. Sixty-one respondents did not answer this section, so the total sample number for deliberation on the following impacts was 226. Only the major impacts are detailed below as once again, responses were considerably varied.

85 respondents (38%) thought that reduced groundwater allocations would cause new positive changes in the community, such as:

- more efficient water use/greater value given to water (N=33);
- sustainable water levels/assured supply (N=18);
- long term sustainability (N=9);
- encourage more efficient irrigation methods/techniques (N=9).

150 respondents (66%) thought that reduced groundwater allocations would cause new negative changes in the community, such as:

- uncertainty of employment - especially of youth (N=34);
- economic hardship - especially for small producers (N=31);
- loss of dollars in the wider community/towns (N=20);
- lower living standards (N=16);
- increased community anger/friction (N=13);
- greater power to the big irrigators (N=10).

63 respondents (28%) thought that reduced allocations would assist positive changes already occurring, such as:

- Landcare/awareness of need for sustainable practices (N=16);
- improved water use efficiency/practices/management (N=14);
- increased awareness of groundwater (value, quantity etc.) (N=8);
- improved on-farm irrigation infrastructure (N=7).

65 respondents (29%) thought that reduced allocations would reduce positive changes already occurring, such as:

- increased employment (N=10);
- increased community income (N=9);
- improved on-farm irrigation infrastructure (N=7);
- cotton industry (N=6);
- increased community cohesion (N=6).

47 respondents (21%) thought that reduced allocations would improve negative changes already occurring, such as:

- environmental disregard/increased chemicals (N=9);
- lowering water table/failing bores (N=5);
- land clearing/soil degradation (N=4).
77 respondents (34%) thought that reduced allocations would worsen negative changes already occurring, such as:

- decreased profit margins (N=8);
- lack of employment for the young (N=7);
- lack of local essential services (N=7);
- loss (closure) of local employment avenues (N=7).

29 respondents (13%) nominated other changes that they thought would occur as a result of further reductions in allocations, such as:

- stop poor irrigation practices (N=6);
- farms/family farms ruined (N=5).

Finally respondents were asked to nominate ameliorating actions to assist with the negative effects of groundwater allocation reductions. Table 23 shows the major responses, where again there was a large variety of suggestions offered.

<table>
<thead>
<tr>
<th>Possible Actions</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=154</td>
<td></td>
</tr>
<tr>
<td>Ensure farm viability</td>
<td>22</td>
</tr>
<tr>
<td>Fair cuts to all/don’t favour big users</td>
<td>21</td>
</tr>
<tr>
<td>Provide compensation</td>
<td>14</td>
</tr>
<tr>
<td>Efficient water management/use needed</td>
<td>14</td>
</tr>
<tr>
<td>Educate on appropriate farm management practices</td>
<td>9</td>
</tr>
</tbody>
</table>
3.5 Groundwater Management and Use

Respondents were asked to rate their agreement on a five point scale with a series of statements made by Namoi groundwater licence holders in the issues scoping phase of the study. These statements were associated with groundwater management and use issues.

Again, for ease of interpretation, these statements are presented in terms of high (dis)agreement, where more than 80% of the sample (dis)agreed; general (dis)agreement, where between 60% and 80% (dis)agreed; and split opinion, where there was a spread of responses from "strongly agree" to "strongly disagree".

Only two statements resulted in high (dis)agreement as follows.
- **high agreement**: "Each zone has a different problem".
- **high disagreement**: "The damage has already been done, so we might as well go on using the groundwater until it’s too expensive to pump it”.

A further two statements resulted in general agreement.
- **general agreement**: "People should not be cut back if their zone is recharging”.
- **general agreement**: "It’s impossible to get everyone in a zone to agree on important issues”.

The remainder of statements resulted in split opinion.
- **split opinion**: “You can’t sell groundwater because it is impossible to transfer it”.
- **split opinion**: “You can’t make different decisions for different zones because the way the boundaries are drawn is questionable”.
- **split opinion**: “Licences on the outer edge of the aquifers should be removed because you can’t pump water anyway”.
- **split opinion**: “All groundwater zones are connected, so usage in one zone affects levels in another zone”.
- **split opinion**: “There’s not enough groundwater in the Namoi Valley to allow everyone to stay in irrigated agriculture”.

After conducting a factor analysis of the nine statements and then testing for reliability, one scale was formed for use in later analyses. The name assigned to the scale outlined below is purely descriptive.

**Isolated Zone Management Scale** ($\alpha = .67$)
- **Each zone has a different problem**;
- **People should not be cut back if their zone is recharging**;
- **You can’t make different decisions for different zones because the way the boundaries are drawn is questionable** (recoded to indicate the reverse of this statement - ie. you can make different decisions in each zone);
- **All groundwater zones are connected, so usage in one zone affects levels in another zone** (recoded to indicate the reverse of this statement - ie. one zone’s usage doesn’t affect another).
This scale was then compared across groups for the three water use/allocation variables, the valleys and the philosophical clusters. Statistically significant differences occurred for a number of these variables as outlined below.

- *Conjunctive users* were significantly more in favour of the isolated zone management approach than were the *groundwater only users*. (p<.001)

- Respondents in the *Upper Valley* were significantly more in favour of the isolated zone management approach than were respondents in the *Lower Valley*. (p<.01)

- Respondents in the *Private Good cluster* were significantly more in favour of the isolated zone management approach than were the respondents in the *Public Good cluster*. (p<.001)

Respondents were then asked to comment on a series of statements that had been made by people in the Namoi Valleys when thinking about over-allocation and the various types of users.

The first statement was associated with sleeper licences.

*Some people say that if sleepers’ haven’t needed to use their water in the past, and haven’t invested money developing irrigation systems on their properties, then they should lose their licences. Do you agree?*

Table 24 shows the results of this question:

1. for the sample as a whole
2. for the Upper and Lower Valleys, where there was a statistically significant difference (p<.001) in that the respondents in the Lower Valley were far less opposed to the proposal;
3. for the Private Good and Public Good clusters of respondents where there was also a statistically significant difference (p<.001) in that the Private Good people were less opposed to the proposal.

### Table 24
**RESPONSES TO THE PROPOSAL THAT “SLEEPERS” SHOULD LOSE THEIR LICENCES**

<table>
<thead>
<tr>
<th>Respondent Group</th>
<th>YES %</th>
<th>NO %</th>
<th>MAYBE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>25.5</td>
<td>58.6</td>
<td>15.8</td>
</tr>
<tr>
<td>Upper Valley</td>
<td>20.6</td>
<td>69.1</td>
<td>10.3</td>
</tr>
<tr>
<td>Lower Valley</td>
<td>39.2</td>
<td>29.7</td>
<td>31.1</td>
</tr>
<tr>
<td>Public Good Cluster</td>
<td>16.7</td>
<td>71.3</td>
<td>12.0</td>
</tr>
<tr>
<td>Private Good Cluster</td>
<td>36.7</td>
<td>43.0</td>
<td>20.3</td>
</tr>
</tbody>
</table>

2 Definition provided.
The following table provides the major reasons for these responses.

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property was purchased and valued with a licence</td>
<td>25</td>
</tr>
<tr>
<td>Required for the future/long term viability</td>
<td>20</td>
</tr>
<tr>
<td>There are many reasons for lack of development</td>
<td>14</td>
</tr>
<tr>
<td>They missed their opportunity</td>
<td>8</td>
</tr>
<tr>
<td>There's no investment loss</td>
<td>7</td>
</tr>
<tr>
<td>They don’t need the water</td>
<td>5</td>
</tr>
<tr>
<td>Should be paid compensation</td>
<td>4</td>
</tr>
</tbody>
</table>

The second statement was associated with dozer licences.

*Some people say that most dozers are irrigators who manage their groundwater carefully and efficiently. Even though they don't use all their allocations in most years, they need all of it to get through droughts, or times when the storms don’t come. Therefore, they can’t afford to lose any of their allocations. Do you agree?*

Table 26 shows the results of this question for the sample as a whole. There were no statistically significant differences between Valleys or clusters.

<table>
<thead>
<tr>
<th>Respondent Group</th>
<th>YES %</th>
<th>NO %</th>
<th>MAYBE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>68.6</td>
<td>19.3</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Table 27 shows the major reasons for these responses.

---

3 Definition provided.
TABLE 27
MAIN REASONS FOR OPINIONS ON DOZER LICENCES

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have farmed efficiently</td>
<td>40</td>
</tr>
<tr>
<td>Insurance policy/emergency use</td>
<td>35</td>
</tr>
<tr>
<td>Don’t punish efficiency</td>
<td>9</td>
</tr>
<tr>
<td>Need fairness for all users/case by case</td>
<td>7</td>
</tr>
<tr>
<td>Everyone should lose an equal percentage</td>
<td>7</td>
</tr>
<tr>
<td>All have to take a cut</td>
<td>7</td>
</tr>
</tbody>
</table>

N=225

The third statement was associated with fully active irrigators.

Some people say that fully active\(^4\) irrigators will lose more money if their allocations were cut than would any other groundwater licence holders. All their water is associated with financial income and every ML lost means real dollars lost. Do you agree?

Table 28 shows the results of this question:

1. for the sample as a whole
2. for the Private Good and Public Good clusters of respondents where there was a statistically significant difference (p<.01) in that the Private Good people were more in agreement with the statement.

TABLE 28
AGREEMENT WITH THE STATEMENT THAT FULLY ACTIVE IRRIGATORS WILL LOSE MORE MONEY THAN OTHERS IF THEIR ALLOCATIONS WERE CUT

<table>
<thead>
<tr>
<th>Respondent Group</th>
<th>YES %</th>
<th>NO %</th>
<th>MAYBE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>40.5</td>
<td>33.9</td>
<td>25.5</td>
</tr>
<tr>
<td>Public Good Cluster</td>
<td>30.5</td>
<td>44.8</td>
<td>24.8</td>
</tr>
<tr>
<td>Private Good Cluster</td>
<td>53.5</td>
<td>24.4</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Table 29 shows the major reasons for these responses.

\(^4\) Definition provided.
TABLE 29
MAIN REASONS FOR OPINIONS ON FULLY ACTIVE IRRIGATORS

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water is income</td>
<td>13</td>
</tr>
<tr>
<td>Invested too much to lose it</td>
<td>7</td>
</tr>
<tr>
<td>Overused a depleted resource/caused the problem</td>
<td>13</td>
</tr>
<tr>
<td>All have to take a cut (even if financial loss)</td>
<td>9</td>
</tr>
<tr>
<td>Development based on over-allocated resource</td>
<td>5</td>
</tr>
<tr>
<td>Have gained more - can lose more</td>
<td>5</td>
</tr>
<tr>
<td>Diversify to crops that need less water</td>
<td>5</td>
</tr>
<tr>
<td>Not efficient water users</td>
<td>5</td>
</tr>
</tbody>
</table>

N=204

The fourth statement was associated with big water users. Some people say that the big water users should have their allocations cut by more than the smaller users, because they have caused most of the problem, and they can afford to lose more than others can before they are badly affected. Do you agree?

Table 30 shows the results of this question:
1. for the sample as a whole
2. for the Private Good and Public Good clusters of respondents where there was a statistically significant difference (p<.01) in that the Private Good people were more in agreement with the statement.

TABLE 30
AGREEMENT WITH THE STATEMENT THAT BIG WATER USERS SHOULD HAVE ALLOCATIONS CUT BY MORE THAN SMALLER USERS

<table>
<thead>
<tr>
<th>Respondent Group</th>
<th>YES %</th>
<th>NO %</th>
<th>MAYBE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>45.7</td>
<td>31.2</td>
<td>23.2</td>
</tr>
<tr>
<td>Public Good Cluster</td>
<td>58.9</td>
<td>23.4</td>
<td>17.8</td>
</tr>
<tr>
<td>Private Good Cluster</td>
<td>34.4</td>
<td>39.8</td>
<td>25.8</td>
</tr>
</tbody>
</table>

Table 31 shows the major reasons for these responses.
TABLE 31
MAIN REASONS FOR OPINIONS ON BIG WATER USERS

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need fairness for all users/case by case</td>
<td>16</td>
</tr>
<tr>
<td>Percentage loss is an equitable way to reduce allocations</td>
<td>10</td>
</tr>
<tr>
<td>Invested too much to lose it</td>
<td>6</td>
</tr>
<tr>
<td>Overused a depleted resource/caused the problem</td>
<td>18</td>
</tr>
<tr>
<td>Have gained more - can lose more</td>
<td>8</td>
</tr>
<tr>
<td>Small users not viable if lose water</td>
<td>6</td>
</tr>
<tr>
<td>Have the financial backing to change and cater for loss</td>
<td>5</td>
</tr>
<tr>
<td>Profit making is their only goal</td>
<td>5</td>
</tr>
</tbody>
</table>
3.6 Fairness and Equity Issues

Respondents were asked to rate their agreement on a five point scale with fourteen statements made by Namoi groundwater licence holders in the issues scoping phase of the study. These statements were associated with issues of fairness and equity.

Again, for ease of interpretation, these statements are presented in terms of high (dis)agreement, where more than 80% of the sample (dis)agreed; general (dis)agreement, where between 60% and 80% (dis)agreed; and split opinion, where there was a spread of responses from “strongly agree” to “strongly disagree”.

Only one statement resulted in high (dis)agreement as follows.
• high agreement: “Everyone should be left with enough water to remain viable”.

A further four statements resulted in general agreement.
• general agreement: “It’s not fair to base people’s future allocations on their history of use”.
• general agreement: “Corporate farms aren’t interested in keeping resources for the next generation”.
• general agreement: “Sleepers shouldn’t be penalised because of the over-use by others”.
• general agreement: “This country’s resources are here to be shared by all”.

The remainder of statements resulted in split opinion.
• split opinion: “Everyone should have equal rights to groundwater”.
• split opinion: “People who use water efficiently should not have their allocations cut.”.
• split opinion: “People on one source of water should not be entitled to any more than those on another source”.
• split opinion: “People who bought land assuming they had water should be able to keep it, regardless of whether they use it or not”.
• split opinion: “We should not compensate people who haven’t bothered to use their water in the past”.
• split opinion: “People in an irrigation area should not be forced into dryland farming”.
• split opinion: “Money can’t compensate for loss of water”.
• split opinion: “The only fair way is for everyone to give up some of their water”.
• split opinion: “Only the rich can afford to buy and sell water”.

After conducting a factor analysis of the fourteen statements and then testing for reliability, two scales were formed for use in later analyses.

Right to Groundwater Scale ($\alpha = .69$)
• Everyone should have equal rights to groundwater;
• This country’s resources are here to be shared by all.
**History of Use Scale \((\alpha = .59)\)**
- It's not fair to base people's future allocations on their history of use;
- People who bought land assuming they had water should be able to keep it, regardless of whether they use it or not;
- "Sleepers" shouldn't be penalised because of the over-use by others.

These two scales were then compared across groups for the three water use/allocation variables, the valleys and the philosophical clusters. Statistically significant differences occurred for a number of these variables as outlined below.

**Right to Groundwater**
- *Groundwater only users* were significantly more in favour of liberal rights to groundwater than were the *conjunctive users*. \((p<.01)\)
- Respondents in the *low allocation group* were significantly more in favour of liberal rights to groundwater than were the respondents in the *high and ultra-high allocation groups*. \((p<.01)\)
- Similarly, respondents in the *no use* and *some use groups* were significantly more in favour of liberal rights to groundwater than were the respondents in the *higher and highest use groups*. \((p<.01)\)
- Respondents in the *Upper Valley* were significantly more in favour of liberal rights to groundwater than were the respondents in the *Lower Valley*. \((p<.001)\)
- Respondents in the *Public Good Cluster* were significantly more in favour of liberal rights to groundwater than were the respondents in the *Private Good Cluster*. \((p<.001)\)

**History of Use**
- *Groundwater only users* were significantly less in favour of management through 'history of use' than were the *conjunctive users*. \((p<.01)\)
- Respondents in the *low allocation group* were significantly less in favour of management through 'history of use' than were the respondents in the *ultra-high allocation groups*. \((p<.01)\)
- Respondents in the *no use groups* were significantly less in favour of management through 'history of use' than were the respondents in the *higher and highest use groups*. \((p<.01)\)
- Respondents in the *Upper Valley* were significantly less in favour of management through 'history of use' than were the respondents in the *Lower Valley*. \((p<.01)\)
- Respondents in the *Public Good Cluster* were significantly less in favour of management through 'history of use' than were the respondents in the *Private Good Cluster*. \((p<.001)\)
3.7 Possible Solutions

Respondents were asked to consider a number of approaches and actions that could be taken to address the groundwater over-allocation problem. Five different approaches were presented: *Equality and Opportunity; Rewards for Hard Work and Investment; Historical Use; Water Markets and Efficiency and Management*.

Respondents were firstly asked to rate the individual actions in each approach separately, in terms of how acceptable they thought them to be. This was done using a four point scale from 1 being totally acceptable through to 4 being totally unacceptable.

For the analysis, these scores on the scale were recoded to provide for 2 being totally acceptable through to -2 being totally unacceptable. Tables 32 to 36 show the mean scores for each action within the various approaches from those most acceptable to those least acceptable.

**TABLE 32**

**MEAN SCORES FOR ACTIONS IN THE “EQUALITY OF OPPORTUNITY” APPROACH**

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>Mean Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any reductions in allocations should provide protection for the “family farm”.</td>
<td>1.00</td>
</tr>
<tr>
<td>A viability base should be set, and licence holders with allocations less than that base should not receive cuts. (ie. 500ML in the Upper Valley &amp; 700ML in the Lower Valley).</td>
<td>0.89</td>
</tr>
<tr>
<td><em>All licence holders should have allocations cut by the same percentage.</em></td>
<td>-0.44</td>
</tr>
<tr>
<td><em>All licence holders should have allocations cut proportionally, according to the amount of water actually used.</em> (ie. small cut for small users, and larger cuts for larger users).</td>
<td>-0.39</td>
</tr>
</tbody>
</table>
### TABLE 33
MEAN SCORES FOR ACTIONS IN THE "REWARD FOR HARD WORK & INVESTMENT" APPROACH

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>Mean Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced <em>by more</em> than those who have little or no investment in their properties.</td>
<td>0.58</td>
</tr>
<tr>
<td>Irrigators who started in the Valley more than 30 years ago should not have their allocations reduced <em>- because they were responsible for establishing the industry in the area -</em> and they've taken two cuts to their allocations over those years.</td>
<td>-0.52</td>
</tr>
<tr>
<td>Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced <em>at all - because they will lose more money than those with little or no investment.</em></td>
<td>-0.75</td>
</tr>
</tbody>
</table>

### TABLE 34
MEAN SCORES FOR ACTIONS IN THE "HISTORICAL USE" APPROACH

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>Mean Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only those who have caused the problem should have their allocations cut.</td>
<td>-0.31</td>
</tr>
<tr>
<td>Ban sleeper licence development for the next ten years.</td>
<td>-0.40</td>
</tr>
<tr>
<td>Future allocations should be based on maximum annual historical usage over the 10 years prior to 1995/96, and any unused part of allocations should be forfeited.</td>
<td>-1.10</td>
</tr>
<tr>
<td>Give sleepers and dozers three years to use all their groundwater allocations or lose the unused portions.</td>
<td>-1.10</td>
</tr>
</tbody>
</table>

### TABLE 35
MEAN SCORES FOR ACTIONS IN THE "WATER MARKETS" APPROACH

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>Mean Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling within Zones.</td>
<td>-0.45</td>
</tr>
<tr>
<td>The Government should buy all unused portions of allocations.</td>
<td>-0.58</td>
</tr>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling across Zones, but confined to the Upper or Lower Valley.</td>
<td>-1.20</td>
</tr>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling across the Upper and Lower Valleys.</td>
<td>-1.50</td>
</tr>
</tbody>
</table>
TABLE 36
MEAN SCORES FOR ACTIONS IN THE
"EFFICIENCY & MANAGEMENT" APPROACH

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>Mean Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce allocations and increase the allowable amount of carry-over for an increased time period.</td>
<td>0.19</td>
</tr>
<tr>
<td>Irrigators using approved water efficient irrigation and re-use systems should not have their allocations reduced.</td>
<td>-0.20</td>
</tr>
<tr>
<td>Impose a mandatory moratorium on pumping for 3 months every year.</td>
<td>-0.76</td>
</tr>
<tr>
<td>Reduce the annual irrigation season.</td>
<td>-1.10</td>
</tr>
</tbody>
</table>

Respondents were then asked to consider the five approaches as a whole, and to rank them from 1 = most acceptable through to 5 = least acceptable. To assist in interpretation, these ranking scores were recoded so that the higher the score, the higher the acceptability. Also, to cater for the considerable number of respondents who had assigned equal ranks to various approaches, the scores were standardised so that the sum of the scores for the five approaches was 100.

Table 37 shows the mean standardised scores for the five approaches ordered from most acceptable to least acceptable. It can be seen that Efficiency and Management and Equality of Opportunity were almost of equal acceptability. Historical Use and Water Markets were seen to be least acceptable for addressing the groundwater over-allocation problem.

TABLE 37
MEAN STANDARDISED RANKING SCORES FOR ACCEPTABILITY OF THE FIVE GENERAL APPROACHES TO SOLVING THE GROUNDWATER OVER-ALLOCATION PROBLEM

<table>
<thead>
<tr>
<th>Possible Approach</th>
<th>Mean Standardised Acceptability Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFFICIENCY AND MANAGEMENT</td>
<td>25.0</td>
</tr>
<tr>
<td>EQUALITY OF OPPORTUNITY</td>
<td>24.9</td>
</tr>
<tr>
<td>REWARD FOR HARD WORK AND INVESTMENT</td>
<td>20.2</td>
</tr>
<tr>
<td>HISTORICAL USE</td>
<td>16.2</td>
</tr>
<tr>
<td>WATER MARKETS</td>
<td>13.7</td>
</tr>
</tbody>
</table>
These five approaches were then compared across groups for the three water use/allocation variables, the valleys and the philosophical clusters. The only approaches that did not result in any significant differences were *Water Markets* and *Efficiency and Management*.

**Equality and Opportunity**

- *Groundwater only users* were significantly more in favour of the Equality and Opportunity approach than were the *conjunctive users*. (p<.01)

- Respondents in the *low* and *medium allocation groups* were significantly more in favour of the Equality and Opportunity approach than were the respondents in the *high* and *ultra-high allocation groups*. (p<.01)

- Similarly, respondents in the *no use* and *some use groups* were significantly more in favour of the Equality and Opportunity approach than were the respondents in the *higher use group*. Respondents in the *highest use group* considered this approach to be significantly less acceptable again. (p<.01)

- Respondents in the *Upper Valley* were marginally more in favour of the Equality and Opportunity approach than were the respondents in the *Lower Valley*. (p=.011)

- Respondents in the *Public Good Cluster* were significantly more in favour of the Equality and Opportunity approach than were the respondents in the *Private Good Cluster*. (p<.001)

**Reward for Hard Work and Investment**

- Respondents in the *no use group* were significantly less in favour of the Reward for Hard Work and Investment approach than were the respondents in the *higher use* and *highest use groups*. (p<.01)

- Respondents in the *Upper Valley* were significantly less in favour of the Reward for Hard Work and Investment approach than were the respondents in the *Lower Valley*. (p<.01)

- Respondents in the *Public Good Cluster* were significantly less in favour of the Reward for Hard Work and Investment approach than were the respondents in the *Private Good Cluster*. (p<.001)

**History of Use**

- *Groundwater only users* were significantly less in favour of the History of Use approach than were the *conjunctive users*. (p<.01)

- Respondents in the *low* and *medium allocation groups* were significantly less in favour of the History of Use approach than were the respondents in the *ultra-high allocation group*. (p<.01)
Similarly, respondents in the no use, some use and higher groups were significantly less in favour of the History of Use approach than were the respondents in the highest use group. (p<.01)

Respondents in the Upper Valley were significantly less in favour of the History of Use approach than were the respondents in the Lower Valley. (p<.01)

Respondents in the Public Good Cluster were significantly less in favour of the History of Use approach than were the respondents in the Private Good Cluster. (p<.001)

Respondents were then asked if they thought any of the approaches were totally unacceptable for addressing the over-allocated groundwater problem. Fifty-five percent answered in the affirmative, with a further 6% being unsure. This 61% percent of the sample were then asked to note the totally unacceptable approaches.

Table 38 shows (in order of unacceptability) the percentage of this sub-sample, as well as the percentage of the total sample, who considered each approach to be totally unacceptable. It can be seen that this is consistent with the acceptability ranks shown in Table 36, and that Water Markets and Historical Use were considered to be totally unacceptable by the highest proportion of respondents.

<table>
<thead>
<tr>
<th>Possible Approach</th>
<th>% of Sub-sample N=175</th>
<th>% of Total Sample N=287</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Markets</td>
<td>56</td>
<td>35</td>
</tr>
<tr>
<td>Historical Use</td>
<td>50</td>
<td>31</td>
</tr>
<tr>
<td>Reward for Hard Work and Investment</td>
<td>28</td>
<td>17</td>
</tr>
<tr>
<td>Equality of Opportunity</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Efficiency and Management</td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>

Finally, respondents were asked to consider preferred timing for the implementation of the decided course of actions. Thirty-seven percent said it depended on what was decided; 25% said to phase it in over three years; 18% thought it should be phased in over five years; and sixteen percent said to do it immediately. Four percent suggested a variety of other options.
4.0 THE PREFERRED SOLUTION

In order to determine which combination of suggested activities would provide a favourable solution for the greatest number of respondents, the actions under the various approaches as outlined in Section 3.7 were analysed. Firstly, the percentage of respondents who rated the actions acceptable (i.e. assigning scores of either 1 or 2) was examined. This is shown in order of acceptability in Table 39.

### Table 39

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any reductions in allocations should provide protection for the “family farm”.</td>
<td>80</td>
</tr>
<tr>
<td>A viability base should be set, and licence holders with allocations less than that base should not receive cuts. (i.e. 500ML in the Upper Valley &amp; 700ML in the Lower Valley).</td>
<td>75</td>
</tr>
<tr>
<td>Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced by more than those who have little or no investment in their properties.</td>
<td>65</td>
</tr>
<tr>
<td>Reduce allocations and increase the allowable amount of carry-over for an increased time period</td>
<td>59</td>
</tr>
<tr>
<td>Irrigators using approved water efficient irrigation and re-use systems should not have their allocations reduced.</td>
<td>46</td>
</tr>
<tr>
<td>Only those who have caused the problem should have their allocations cut.</td>
<td>43</td>
</tr>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling within Zones.</td>
<td>42</td>
</tr>
<tr>
<td>Ban sleeper licence development for the next ten years.</td>
<td>40</td>
</tr>
<tr>
<td>All licence holders should have allocations cut proportionally, according to the amount of water actually used. (i.e. small cut for small users, and larger cuts for larger users).</td>
<td>39</td>
</tr>
<tr>
<td>All licence holders should have allocations cut by the same percentage.</td>
<td>38</td>
</tr>
<tr>
<td>The Government should buy all unused portions of allocations.</td>
<td>37</td>
</tr>
<tr>
<td>Irrigators who started in the Valley more than 30 years ago should not have their allocations reduced - because they were responsible for establishing the industry in the area - and they’ve taken two cuts to their allocations over those years.</td>
<td>35</td>
</tr>
<tr>
<td>Impose a mandatory moratorium on pumping for 3 months every year.</td>
<td>31</td>
</tr>
</tbody>
</table>
Table 39 cont.

<table>
<thead>
<tr>
<th>Possible Action</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced at all - because they will lose more money than those with little or no investment.</td>
<td>30</td>
</tr>
<tr>
<td>Future allocations should be based on maximum annual historical usage over the 10 years prior to 1995/96, and any unused part of allocations should be forfeited.</td>
<td>23</td>
</tr>
<tr>
<td>Give sleepers and dozers three years to use all their groundwater allocations or lose the unused portions.</td>
<td>23</td>
</tr>
<tr>
<td>Reduce the annual irrigation season.</td>
<td>21</td>
</tr>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling across Zones, but confined to the Upper or Lower Valley.</td>
<td>18</td>
</tr>
<tr>
<td>Reduce all allocations by the same percentage and then allow permanent buying and selling across the Upper and Lower Valleys.</td>
<td>12</td>
</tr>
</tbody>
</table>

It can be seen that about 60% and 80% of the sample considered at least one of the first four actions to be acceptable.

- **Any reductions in allocations should provide protection for the "family farm".**
- **A viability base should be set, and licence holders with allocations less than that base should not receive cuts.** (i.e. 500ML in the Upper Valley & 700ML in the Lower Valley).
- **Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced by more than those who have little or no investment in their properties.**
- **Reduce allocations and increase the allowable amount of carry-over for an increased time period**

While agreeing to a reduction in allocations, this series of actions provides protection for the family farm; the small licence holders; and the fully active irrigators. A measure to encourage efficiency of water use, and thus assisting with reduced allocations (increasing the carry-over period), is also proposed.

Each of these four actions was compared individually across valleys and philosophical clusters, and with the allocation/use variables. There were significant differences only with the allocation groups and the use groups and only for two of the actions.

A viability base should be set, and licence holders with allocations less than that base should not receive cuts. (i.e. 500ML in the Upper Valley & 700ML in the Lower Valley).

- Respondents in the ultra-high allocation group rated this action significantly less acceptable than did the low allocation group (p<.01).
- Respondents in the higher use group rated this action significantly less acceptable than did the low and no use groups (p<.01).
Any reductions in allocations should provide protection for the “family farm”.

- Respondents in the ultra-high allocation group rated this action significantly less acceptable than did all the other allocation groups - low, medium and high (p<.01).
- Respondents in the higher use group rated this action significantly less acceptable than did the no use group (p<.01).

To determine the extent of the support for a solution involving the four highly supported items, analyses were performed to count how many of the four items were supported by respondents. The main reason for this was to identify any people who did not find any of the four items acceptable, and to ascertain if they were associated with any particular group in the community. In this way, if any group was being isolated by the four item solution, additional action items could be added to the solution to improve acceptability, or steps could be identified to alleviate negative impacts.

Figure 4 shows the results of the acceptability count of the four item solution.

![Figure 4: Count of Acceptability of the “Four Item Solution”](image)

All of the seventeen respondents who did not find any of the four item solution acceptable did not rate any of the items at all (ie. they did not complete the questionnaire).

Oneway analyses of variance were performed with all major demographic and attitudinal variables to determine if there was any common factor that could identify a possibly disadvantaged group in the community if this four item solution was adopted. However, no significant differences emerged indicating that the seventeen people were random individuals and that the four item solution was generally acceptable to all identifiable groups in the community.
Finally, the acceptability of the *four item solution* was compared with the acceptability of a *three item solution* to determine if there was sufficient gain to warrant the addition of the efficiency action item. Although only three more people were added to the "no acceptability" count, the mean acceptability count dropped from 2.6 to 2.1 with the loss of the fourth item.

Therefore, the adoption of the *four item solution* seemed the logical conclusion.

The *four item solution* was then examined for each Zone in both Valleys as shown in Table 40.

<table>
<thead>
<tr>
<th>Valley</th>
<th>Zone</th>
<th>No. of Properties Represented</th>
<th>% of Total Properties</th>
<th>No. of Respondents</th>
<th>Mean Acceptability Count</th>
<th>No. Rating No Items acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>1</td>
<td>18</td>
<td>64</td>
<td>14</td>
<td>2.2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>17</td>
<td>63</td>
<td>16</td>
<td>2.8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>32</td>
<td>56</td>
<td>31</td>
<td>2.4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>80</td>
<td>56</td>
<td>68</td>
<td>2.3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>37</td>
<td>55</td>
<td>31</td>
<td>2.5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>13</td>
<td>45</td>
<td>11</td>
<td>2.8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>5</td>
<td>36</td>
<td>5</td>
<td>1.4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>34</td>
<td>55</td>
<td>29</td>
<td>2.6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>13</td>
<td>57</td>
<td>10</td>
<td>2.8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2</td>
<td>50</td>
<td>2</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Lower</td>
<td>1</td>
<td>8</td>
<td>67</td>
<td>8</td>
<td>3.1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>100</td>
<td>5</td>
<td>3.6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>100</td>
<td>4</td>
<td>3.5</td>
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It can be seen that respondents in the Lower Valley had higher acceptability means than in the Upper Valley (mean acceptability count Upper Valley = 2.4; mean acceptability count Lower Valley = 3.1; p < .001).
However, the only Zone where the mean acceptability dropped below the half way point of two, was in Zone 7 in the Upper Valley. But it should be noted that only 36% of the properties in that Zone was represented in this sample (5 properties and 5 respondents), and two of these respondents did not rate the actions at all. Whether this lower acceptability mean rating is due to the lower sample number, or whether it is because of particular circumstances in that Zone cannot be determined here. However, it should be investigated further if this four item solution is adopted as policy.
5.0 CONCLUSIONS AND RECOMMENDATIONS

There were a number of areas where there was consensus across the sample (ie. more than 80% agreement or disagreement with statements) and it is these areas that should form the basis for planning and decision making in groundwater re-allocation in the Namoi Valley.

These agreements were associated with fair decision making processes; the value of water; the requirement for sustainable water allocation; the need for individual viability; and the inappropriateness of an unconstrained water market.

- Water should be allocated for long term sustainability even if it reduces the short term profits of local businesses.
- (disagreement) The damage has already been done, so we might as well go on using the groundwater until it's too expensive to pump it.
- (disagreement) All water should be put on the market and sold to those who will pay most, regardless of what it is used for.
- Everyone should be left with enough water to remain viable.
- Each zone has a different problem.
- If the decision making process is fair, people should accept the final allocation decisions.
- Water has a value other than its dollar value.

There was also a general consensus as to why people were farming, primarily to obtain satisfactory income and security, and also for reasons associated with personal lifestyle preferences.

The themes of these overall agreements were evident in responses to all questions, and particularly when considering possible solutions. There were a number of occasions noted throughout the report where there were statistically significant differences across Valleys, philosophical clusters, and water use/allocation groups. However, when it came to possible approaches to solving the groundwater over-allocation problem, and to the preferred solution, the areas of consensus were clear.

*Historical Use* and *Water Markets* were the least preferred approaches for *re-allocating* groundwater. That’s not to say that *Water Markets* would not be accepted for the ongoing farm operations. But the approach was clearly considered inappropriate, by all groups of groundwater licence holders, for *re-allocating groundwater for sustainability*.

The *four item solution* provided at least one acceptable action for groundwater re-allocation for all but seventeen of the sample (who did not rate the actions), and for all measurable groups in the community. However, some discussion of these items is appropriate here.

Firstly there is the issue of *self-interest*. This could be expected to be a motivating factor in respondents’ rating of acceptability of some of the items. For example, it
could be said that smaller water users would naturally rate the setting of a viability base as acceptable in an attempt to avoid allocation reductions.

Similar could be said of the fully active irrigators in providing for their self-interest in the third of the four items. And that the family farmers were ensuring that their interests were catered for over the corporate operations.

As has been shown in many studies, self-interest is both an acceptable and a normal response in cases such as these unenviable trade-offs. The literature (eg. Wilke, 1991 and Kohn, 1990) has shown that while self-interest is an important determinant of choice, it is also tempered by more pro-social motivations, such as fairness. This was apparently evident in this study.

While the viability base item provided for the protection of smaller allocations, the only allocation groups that showed any statistically significant difference in their rating of the acceptability of this action were the low and ultra-high allocation groups. The ultra-high allocation group considered this action to be significantly less acceptable than did the low allocation group. However, there was no significant difference between the low allocation group and either the medium or high allocation groups in considerations of the acceptability of setting a viability base.

Further, as shown earlier, 60% of the respondents rated more than two of the four items as acceptable, which would indicate some consideration for other than “self”.

In implementing the four item solution, there will need to be detailed discussion on how much water can be saved. This will involve the development of specific proposals based on these guidelines. These proposals will probably need to be developed on a zone by zone basis, given the agreement with the existence of different problems in each zone. In this way, it may be necessary to discuss the arbitrary number\(^5\) assigned to the viability base in this questionnaire.

In some zones, the viability base may be able to be increased, while in other zones it may need to be decreased to achieve sustainability. This in turn may increase or decrease the effectiveness of the implementation of this item/guideline. Therefore, negotiations on the development of compatible alternative guidelines may be necessary. All licence holders in each zone should have the opportunity for input on the details of the implementation of the viability base item.

The possible impacts of re-allocation of groundwater on the licence holders and the extended community must be considered. Respondents noted the positive impacts that they perceived would occur, some of which were already occurring and would be further assisted. These were associated with greater awareness of environmental problems and the need for sustainable practices, and specifically those associated with water use efficiency.

\(^5\) The 500ML in the Upper Valley and the 700ML in the Lower Valley, while having been the “numbers” used in past allocation reductions, were used here after discussions with groundwater licence holders. There was a need to provide a basis for people’s deliberations in this questionnaire rather than leaving the viability base open-ended, and licence holders seemed to think that these numbers were probably “about right” for achieving a viable operation.
However, the perceived negative impacts were associated with employment; individual and wider community economic problems; and some aspects of friction in the community. The necessity of ensuring farm viability was again advocated, as well as the requirement for education on water efficient measures and farm management practices.

A number of re-allocation proposals will be possible through the implementation of the guidelines provided by the four item solution. These should be examined in terms of their economic impact at the farm gate, as well as on the wider community. Appropriate remedial actions should then be investigated.

Finally, the timing of the introduction of re-allocation measures needs further investigation. Although 43% of the sample advocated phasing them in over three to five years (25% over three years), thirty-seven percent reserved their decisions until they knew what measures had been decided. This will need to be discussed further with licence holders, and again possibly at the individual zone level.

RECOMMENDATIONS

• Groundwater should be re-allocated in the Upper and Lower Namoi Valleys for sustainability. This should occur through the implementation of the four item solution, if necessary on a zone by zone basis.

  ⇒ *Any reductions in allocations should provide protection for the “family farm”.*

  ⇒ *A viability base should be set, and licence holders with allocations less than that base should not receive cuts. (ie. 500ML in the Upper Valley & 700ML in the Lower Valley).*

  ⇒ *Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced by more than those who have little or no investment in their properties.*

  ⇒ *Reduce allocations and increase the allowable amount of carry-over for an increased time period.*

• “History of Use” and “Water Markets” should not be used to re-allocate groundwater for sustainability. Once the “rules” have been set for re-allocation by implementing the above guidelines, Water Markets can take on whatever roles as determined by the licence holders.

• Specific re-allocation proposals should be developed as outlined above, and should be trialed on a number of properties (and/or zones as appropriate) that represent a variety of allocation and use scenarios. The trials should determine the economic impact of implementing the proposals, as well as the contribution to environmental sustainability. The economic and social impacts on the wider community from the different proposals should also be examined.
• When the final details of implementing the re-allocation policy are determined, DLWC should discuss the timing of the introduction of the policy measures with the Upper and Lower Valley groundwater users groups.

• An education program on measures for water use efficiency in irrigation should be initiated by the DLWC. Any other programs that can alleviate the economic impacts on the groundwater community should also be prioritised for action by the State Government.
6.0 REFERENCES


APPENDIX 1

MAJOR ISSUES RESULTING FROM FOCUS GROUP DISCUSSIONS WITH GROUNDWATER LICENCE HOLDERS IN THE UPPER AND LOWER NAMOI VALLEYS
1. Sustainability, Development and Farm Management

1.1 Farmers and Sustainability

- Overallocation. How much can the Valley stand?
- We need to solve the problem now. We can’t mine the water.
- Groundwater is our most important resource because it is there in times of drought.
- We must manage the water for future generations.
- Conservative (post sheep and wheat) farmers want the environment here for the future of their children.
- You can’t fight over a resource that’s not there. If the resource disappears, you’ve got nothing to argue about any more.
- In trying to strike a balance between farming and the environment - we shouldn’t take from the farmer. The farmer has to have the money to do environmentally friendly things.
- We believe in sustainability - but we don’t have to go to the maximum.
- My grandfather said that the wells went dry in the big droughts of 1910. So it’s not a new problem.

1.2 Development and Sustainability

- Development has gone as far as it can with respect to water in the valley.
- Properties in the area can’t get bigger because there is no more water - except for what they can buy.
- The wells dried up after the cotton people came. We paid for properties with water allocations and now we can’t get it.
- Present practices are unsustainable. We need to go into permaculture.
- Multi-stage turbine pumps have changed the whole game and allowed for more water to be pumped more easily from bore holes.
- The envelope gravel-packed bores are to blame.
- Don’t deprive people of the water they have under their land. The people who are mining their land and water now, know they will want that land and water in fifty years time.
- The groundwater here is self regulating because if you pump too much, you can’t get anymore.

1.3 Changing Environments

- There have been major changes in the Mooki River in the last 18 years because of changes to the overall water cycle.
- One windmill dropped from 16 feet to 42 feet in five months between October 1995 and March 1996.
- In the sixties, it was only 6 metres to the water table in Breeza. It dropped to 50 feet in just a few years.
- Trees are dying because of the groundwater table.
2. Groundwater Zones and Physical Issues

2.1 Zones, Use and Recharge

- Each zone has a different problem.
- Removal of sleeper and dozer licences won't solve the problems in Zones 3 and 8 (Upper Valley).
- Zone boundaries are questionable. Some are just roads.
- There is a need to understand the local circumstances - not necessarily by zones. The zone boundaries are arbitrary and may not group “similar circumstances”.
- Where people put their bores can affect the next properties' water levels.
- Some people are on the outer edge of aquifers and can’t get water anyway.
- If you buy a car that's a lemon, you're stuck with it. If you buy a property with no water, you're stuck with it. If we put down a bore and it’s no good, we’re stuck with it.
- The bores that are on the river banks are really pumping river water - not groundwater. Some even pump fish.
- All groundwater zones are connected. So, usage in one zone affects levels in another zone.
- Some areas are getting no recharge at all, even 5km from the river system.
- People in the good parts of the aquifer don’t want to know what their use does to the outer part of the aquifer. Some don’t know. Others suspect it, but don’t want the information.
- Zone 1 (Lower Valley) only gets recharge once the southern part of the aquifer reaches a certain level. Hot spots are being created because of pumping in the zones closer to the river.
- Will cuts in good recharge areas really help the people on the outer areas of the aquifer? How quickly will the water move to their area of the aquifer?
- In this zone, groundwater use and recharge has been stable and balanced since the mid 80s. I can appreciate that the whole valley scenario is unsustainable, and that some areas have serious problems. But, the proposal to cut allocations across the board is not fair to the zones that are stable and totally dependent on groundwater.
- Why should we be cut back if our area is recharging?
- All usable land in the zone is developed and groundwater levels are stabilised. So if you take 35% from us, it’s not helping anyone.

2.2 Groundwater Transfers

- Market transfers for groundwater won't work. It's hard to move the water.
- Selling surface water licences is OK but not groundwater. Groundwater goes with the land it is under. There are too many physical aspects.
- Temporary transfers are a good idea. It saves using the groundwater.
- Geographic location limits what you can buy.
- I’m against the transfer of licences out of areas (eg. from Gunnedah to Wee Waa).
3. General Impacts of Policy Changes & Allocation Cuts

- The policy seems to be saying “There’s a potential problem. Let’s put a few farmers out of business. Then we’ll see what happens and review it”.
- We have not been affected by the cuts only because we’ve had rain and have not had to use our full allocation.
- The whole area is virtually a monoculture (i.e. the structure is set for them) - but those of us who grow something else can’t be compared with cotton. There are different land and crop rotation requirements and different markets. If the policy only looks at cotton, others will miss out. Anyone who grows something different from cotton has to be considered too.
- Nature has always dealt with those that don’t keep up, with the small family farms that don’t grow with the times.

4. Sleeper and Dozer Issues

4.1 Rights to Water

- I’m not using the water - so why should I be cut back? It’s a capital item on which plans are made.
- Sleeper licences are rightly theirs and shouldn’t be taken away. But you could put a moratorium on sinking bores in the future.
- Sleepers should be able to drought proof their properties. They are entitled to water, but have to lose some too.
- Some people have only bought their properties a couple of years ago and intend to develop fully in the future.
- I’m putting bores in and will have a dam when I’m fully developed. I might not need the whole allocation eventually, but I don’t know yet.
- Sleeper people may have borrowed money on their licence and their land while dryland farming. So, what happens if their licences are removed?
- We need to look at the reasons why sleepers are so. It could be because a farmer has died and it will take some time before others in the family can or will use the water again.
- People who have used their water efficiently and therefore haven’t used their whole allocation will lose it. But people who have used their water inefficiently and have used their whole allocation are not punished.
- Because I’ve been collecting stormwater (etc), my official usage is down. This may be taken off me as a dozer licence.
- The government has accepted money from sleepers for many years.

4.2 Ghosts - not Sleepers

- Ghost licences - what is the point of them if they can’t get any water? Let us have part of their licences.
- Allocations have been made where there is no water and licences surrendered if they couldn’t find it.
- There are a lot of licences where they can’t get water from under their ground.
4.3 “Leave it there.”
- Why is there this push to get the unused water out from under the ground? Who is going to benefit?
- If a person has more water than he can physically use, leave it with that person, because it will stay under the ground.
- If non-users keep their licences, that water stays in the ground.
- Sleeper licences are best left in the ground - with the sleepers - not being used.
- Groundwater won't be used if the licences stay with the sleeper holders.
- It's the use of water that is the problem - not the non-use! The groundwater table is depleting with present use.

4.4 “Take it back.”
- Cut sleepers and dozers back to what they need for development now.
- Some dozers have allocations far greater than their acreage needs or can use. Remove these first.
- If dozers don't have the area to use their groundwater allocations, take it back. The markets won't stop the use. But it will reduce the value of a property.
- Losing a sleeper licence would lead to the loss of half, or more, of the value of a property.
- If people with small sleepers (eg. 100ML) started pumping, it probably wouldn't hurt. They may only need it to augment stock water. But if people with huge licences, with large sleeper components and more land to develop, used the water, it would further stress the aquifer. They shouldn't be allowed to use it.

5. Fully Developed Property Issues

5.1 History
- 40 years ago, water under the ground had no value. The people who came and developed the area in the 70s, including providing the infrastructure, gave the resource value. They took the risk. They gave the resource value. Those sitting on sleeper licences have reaped the value built by others.
- Everyone says we have to be fair - we must give up water for everyone's benefit. We have to give up what we've developed over many years to provide for the “Johnny-come-latelies”.

5.2 Equity & Losses
- Fully developed properties will lose far more through cuts than the land value losses by sleepers.
- People with alternative sources - or those not using their full allocation - are not losing as much as fully developed groundwater only users. This is inequitable.
• If 10% of fully committed and efficiently used water is taken back, that, in turn, takes 10% off profits.

• To me, a 35% cut in groundwater allocation means a 35% cut in income. For others, a 35% cut doesn’t mean that. Will the Government compensate me for the loss of not just my income, but also my property value?

• Don’t punish ambition.

• The figures aren’t showing where all the water comes from, such as from storms. Fully developed people are utilising all their water and water from storms so they can’t afford to lose any of their allocations.

6. Conjunctive Issues

6.1 “For”

• We do have more security, but we thought of it thirty years ago. We went to the expense of putting bores down for our security, and we don’t want to lose what we thought of then. We gave away groundwater licences to get our conjunctive licences.

• Conjunctive licences are the most equitable way of allocating water, and are best for the environment. We only use groundwater when the river is dry.

• Conjunctive users are considered to be the bad guys - but we’ve got limited licences on both.

• All Groundwater Advisory Committee meetings tend to pick on the conjunctive users. We feel we need to start our own committee - but there are too many committees now.

• We couldn’t get through the season with the amount of irrigation we need without high flows, and they are trying to take that away too.

• We use bore water first because the pumping is slower and takes longer. But we don’t pump bore water unless we really need it because it costs a lot. ($10/ML from river, and $40/ML from a bore).

6.2 “Against”

• I’m dead against conjunctive users.

• In drought years, the groundwater only users pumped only a bit more than in normal years, but conjunctive users pumped all the extra ML used.

• In a drought year, nothing much changes for conjunctive users. They pump groundwater when the aquifer can least stand it.

• Groundwater usage didn’t change much from 1982 to 1992 but it suddenly increased dramatically because of conjunctive users. Being by the rivers, they are stopping any recharge getting out to Zone 1.

• Conjunctive people shouldn’t keep the groundwater supplement while groundwater only users take cuts. Or perhaps cut their surface water allocation too. (They are getting two bites at the cherry and have a lot of lurks and perks).

• The conjunctive use policy was wrong in the first place - but now they are dependent on it.

• Cut backs to groundwater only users and small growers (eg. 350 acres) are impacting more because they don’t have access to surface water.
7. Water Use Efficiency Issues

7.1 Water Reuse, Harvesting and Storage
- We collect and use again every bit of water that leaves our fields. Water is money.
- We can save up to 40% of water with properly designed irrigation and storage systems.
- We need better water harvesting on properties.
- Here, large volumes of rain run to waste. Someone should give cheap loans for installing storages.
- Everyone should have a dam to collect stormwater.
- We need to be able to harvest water run-off. But the EPA and DLWC are opposing harvesting run-off.
- Cheap loans should be given to encourage people to store water.
- We should all have at least as much storage from water harvesting as our water allocations. But if the water doesn't reach South Australia, some "greenie" will complain that a frog missed out.

7.2 “Use It or lose it.”
- We should be getting some brownie points for leaving it under the ground, so as not to encourage “use it or lose it.”
- If you could carry over, you wouldn't use it. If you can't carry it over, you use it.

7.3 Evaporation
- When we pump from underground to large, flat storage tanks, the evaporation is horrendous.
- There is both tail water loss and bore water loss through evaporation from dams. This is inefficient water use.
- When pumping to a storage, there is loss to evaporation and soakage.
- It should be illegal to pump groundwater into storages because of evaporation.

7.4 Reducing Use
- Reductions in allocations are naturally addressing the water use inefficiencies.
- In making irrigation water more expensive, we may reduce use.
- The financial disincentive to use more water is a good idea.
- The use of technology can delay irrigation start time and possibly lead to the utilisation of any rainfall that might occur in the mean time.
- Where is it going to go if we do cut back our usage?
8. Economic Issues

8.1 The High Cost of Groundwater
- It costs five or six times more to get groundwater on paddocks than surface water.
- It has become much more expensive to use groundwater - the cost of the well, the cost of DLWC management, the cost per ML, and the cost of pumping it (costs $40/ML to get it to the surface).
- Low extraction bores cost a lot in maintenance. A blanket cut doesn't take that into account.
- It costs a lot to pump groundwater, so people don't pump it unless they need it.
- We need a lot of money to set up big bores and pumps.

8.2 Viability/Profitability
- Resource security is the "bottom line".
- The family farm has to be viable.
- Profitability is the key and people get on the treadmill of mining their land and water.
- A cut in production of 35% is not viable for small operators. The margins don't allow for cuts in production.
- Water is too valuable to use to grow wheat. (But wheat is a good rotation crop).
- I don't think everything should be geared to big money. Monoculture is wrong. What happens if there is a world glut of cotton, for example.
- It would only take cotton prices to go down to fix the problem, because it costs too much to irrigate with groundwater.

8.3 Property Values
- Any property is worth only half as much without water.
- A water licence is a salable item with the property. If you sell the licence, that cost will come off the price of the property.
- For those of us who have borrowed on the value of our property, if we lose water, we lose money. The bank manager won't lend anymore. I have no access to alternative sources.
- We're in high recharge areas, but others are mining the water in other zones. You pay high prices for land with good water access. Less water access means lower land prices. We shouldn't have to give up what we've paid for to give to those who didn't pay for it.

8.4 Miscellaneous
- There is a contradiction between a Free Market (buy and sell) and Regulation (what you can do and can't do). How does that work?
9. Big Users & Small Users

9.1 About the Big Users.....
- Once you have a lobby group big enough to sway Ministers, it's a bit of a problem.
- The larger the operation, the more they contributed to the problem.
- The big operations don't spend their money in Gunnedah.
- The big farmers have bigger machines, but they don't employ more.

9.2 About the Small Users.....
- A small water user plans to use water to allow for the worst case scenario (i.e. drought). But all the water is needed, and we would have to sell up if we lost it.
- Small conjunctive users use mostly surface allocation and high flows and only groundwater to finish off. Groundwater costs more. Everyone should plant within the limits of allocations and use water conservatively.
- There are mainly family farms around Gunnedah (only one corporate farm). So the 10% means something.
- We need to keep family farms viable to keep out corporate farms. People go into cotton to save their farms. No-one goes into cotton because they want to.

9.3 Big - v - Small Users
- Why should smaller people lose it just to save the big ones?
- Big water users always have far in excess of their needs. They have storage capacity and the ability to use it. Small, efficient users don't have the capacity to do that. Usually, they don't use all their allocated water but do need it in times of drought.
- The conjunctive use policy is a net redistribution of groundwater from the small users to the big users.
- The fear is that a big company will come in and buy up a lot of sleeper licences and start irrigating, and small family farms will suffer.
- Growers buying out sleepers? The big operations benefit because they have the money to buy them. The small ones can't afford it.
- Selling licences (eg sleepers, etc) would be OK if the smaller licences could buy it. The bigger ones have got a lot of water already. How much do they need? The big get bigger and the small go down. Keep them out of the bidding because small people can't compete, but still need it to make a living.
- It's got to be fair to every body. It's not fair when the big get bigger and bigger and no-one listens to the little person.
- Both (i.e. small and big users) manage their water to ensure they have it in times of shortage. But the big users can do it by appearing to be using it (i.e. they pump it into surface storages) while the small user leaves it underground.
10. Government Management

10.1 Past History

- We started pumping groundwater in 1956 and there was no limit then. American cotton growers did not pioneer the groundwater as they say.
- The NSW Government wanted the water mined.
- Early bore irrigation - WCIC (Water Conservation and Irrigation Commission) had it right - i.e. farm licences based on 972 ML for 400 acres.
- In the past, management had a ceiling on property size and allocations. But that changed and the problems started.
- In the past, DLWC thought that once the water got to a certain level and it was too expensive to pump, people would stop pumping. But if it's there, people will go get it. A naïve thought.
- In the past, they thought that use and recharge were equal.
- Water Resources just kept handing out the licences to anyone who wanted them.

10.2 Management and Staffing Issues

- There is not a lot of trust in the Government.
- The DLWC is moving from a policy of mining to one of sustainability. They don't know what to do to get out of the mess.
- The allocation system is good. At least you know how much water is available.
- Leave it to the 'powers that be.' If it's a menace, they can fix it.
- Knowledgeable, experienced DLWC staff have gone and have been replaced with young academics who know nothing.
- Readings from five test bores have only been taken once in two and a half years\(^1\). Do they have up-to-date data? They don't have the staff to collect the data.
- We should believe DLWC's figures. They're probably spot on.
- The current DLWC staff receive a lot of criticism. But it was the people in the past that did the wrong thing.
- Cut backs in staff in State Government Departments is a real worry. I couldn't find an agronomist anywhere for a while.
- The Government brings in a lot of rules but doesn't enforce them.
- In the past, DLWC said they'd fill unlicensed bores with concrete - they didn't. I assume they were finally licensed.
- Some are pumping groundwater into storages outside the guidelines and no-one seems to be stopping them.
- In recent times (six years ago), if you wanted water, DLWC told you to go to your zone and see if they agreed. If they agreed, then it was OK. But this came down to personalities and petty conflicts and jealousies that are associated with past water licensing situations.
- The DLWC can't make decisions. Self regulation in zones is buck passing. You can't get everyone to agree.

\(^1\) DLWC advise that not all the original test bores are still in operation.
• Groundwater users keep trying to advise the Government by offering sane solutions - but the Government doesn’t listen. Then they come back to the users with a problem and ask them how to fix it.

• In the past, there were lots of ways to circumvent Government regulations to get licences. They didn’t come out of their offices and ask people what was going on.

• We wonder if consultation is only on the surface and if the decisions have already been made. This is the first time someone has asked us how we feel.

10.3 Uncertainty

• The DLWC aren’t doing anything. They’re just saying lots of things. We can’t plan, can’t borrow. Now, they might make annual announcements of what can be used.

• It’s very difficult to plan with all the new government policies. It’s almost not worth the battle any more.

• They keep saying that they’re going to re-define the zones. But it’s the same old story. They’re always “going to” - but never do it. They say they don’t have the resources.

• We need a clear cut policy that integrates surface and underground water.

• We need a signal from the Government.
  1. Do they want life west of the Blue Mountains?
  2. Do they want agriculture?
  3. Do they want irrigation?
  Taxes and fees are enormous. It’s across all political spectrums.

• People on the ground are not as important as a glossy brochure.

10.4 Freedom to Choose

• Everyone should be able to grow what they want to grow. But individuals will change when they want to. (ie. farmers will mostly move to best returns per ML of water). But they should be able to do what they want - and they will want to stay viable.

• It’s not good psychology to tell people what they should or should not grow.

10.5 Promises

• We were promised that after the initial across-the-board cuts, only the “hot spots” would be cut.

• Two years ago, we were told by DLWC that they wouldn’t cut licences under 1000 ML.

11. Reactive Practices

• They are forcing the issue. They are forcing people to use or sell, forcing people to try to outwit the system.

• The fear of regulation makes people do things. A lot of people are doing things and using water now in case they lose it.

• Historical usage is ridiculous. People are putting in the infrastructure just to keep the water.\(^2\)

• The person next door has not been using her water in the past, but has now given it to her son so she doesn’t lose it. And he will use it. Otherwise it would have stayed in the ground. They’ll find the cup is two thirds full.

• Conservative irrigation - keep water for droughts or use it in case you lose it.

\(^2\) DLWC advise that “historical use” will be assessed for the ten years up till 1995/96. Use after that time will not be considered.
12. Community Issues and Social Impacts

12.1 Local Community/Lifestyle

- Nothing is ever going to be the same again.
- Because we have a water licence, we are considered as 'having money.' Our children are then denied things like AUSTUDY. The impact on families is dramatic.
- For examples of likely social impacts, go back to the drought.
- Without irrigated agriculture, Gunnedah would have had greater social and economic impacts from the drought than it did.
- The lifestyle is worth it, but it's getting harder as the water is taken away.
- Community people don't interact as much any more due to time pressures etc.
- We're so busy defending our way of life, we have to employ people. The agri-politician can't keep properties going.
- If farmers go, the communities and towns are affected. Services go, or levels of services go because the numbers aren't available to keep them functioning.
- Big farms are accumulating a lot of licences but don't put anything back into the communities. The money goes back to America. Also, it doesn't allow new people to start up because they can't afford a licence. They're not interested in the next generation. They just mine the water. The towns aren't going ahead. There are more houses in Wee Waa but no more retail outlets. There is less choice of retail in Narrabri than years ago. Machinery places have put more money in, but have been forced to so they can retain their dealerships.
- The big blokes really screw down the local businesses to get supplies as cheap as possible - fuel suppliers, aerial sprayers and so on.
- Some big corporations (partly foreign owned) are answerable to their shareholders and don't care much about future resources. But they are good neighbours and cooperative.
- Young people are coming into irrigation, but dryland farmers are getting older. These will become just a few corporate farms.
- There have been a lot of new irrigators in the past few years.
- Gunnedah rate payers had to pay money for augmentation bores for town supply.

12.2 Employment

- If we had more water, we would employ someone.
- There are fewer and fewer people all the time in the area. The township is going. I've watched the deterioration over sixty years. There are fewer services. We used to be able to employ people, but we can't now. People won't come here if there is no water. The big corporations only employ people who want to make a quick dollar and they have a high turnover of staff. There are fewer people to do the community voluntary/charity work.
- The loss of water flows on - loss of crops, loss of employment of people.
- If we lose money, then the government will be paying out in dole money.
- There is a social dislocation of people who lose their water.

12.3 Blame

- I'm sick of being blamed. We've done what the experts have told us and within the rules that were set. Suddenly, they change the rules again, and no-one cares about the socio-economic
impacts. I'm sick of being blamed and having to deal with conflict by taking an adversarial stand. I'm told I'm ignorant, greedy and irresponsible.

- City people pick on irrigators and farmers rather than clean up their own mess.
- The press is very 'anti' irrigators and farmers. The city people blame farmers.
- We (irrigators) are socially unacceptable people. Irrigators still make money in the drought, whereas dryland farmers don't.
- Politicians say, "How far can we push the farmers - take water from them and give it to the environmentalists - without losing votes?" So, what is the use of all the research and good work?

13. How to do it

13.1 Allocation Cuts

- There's no point in going back over past mistakes. We just have to cut our use.
- I agree with the cuts that have begun and we need to keep cutting it.
- The government issued the allocations. They can take them away.
- They should take a percentage, not an amount.
- I will take a 35% cut to my allocation, rather than 35% of my maximum use. I haven't used all of my allocation. Conservative water use or water use efficiency should be rewarded not penalised.
- Forget about the development money. Everyone is entitled to their water, whether it's a sleeper or not. So, everyone should take a cut.
- Not cutting small allocations is not fair. Cuts should be across the board.
- Cuts must be across the board or there will be endless fights in court. Everyone has a sad story.
- Town people should also have a cut (10%) they need to know they are users of the same water too.
- There should be pro-rata reductions - i.e. small reductions for smaller users and bigger reductions for bigger users. But they are the strong lobby and it never seems to happen.
- The big ones can take a cut. Leave the small ones alone and allow them to get any extra water.
- There should be equal cuts across the board. A cut to the big people will hurt more than a cut to the small people, but the big people are hurting the resource.
- Cut all the big boys and leave the little people alone.

13.2 Viability Base\(^3\)

- A viability base of 700ML (could grow 250 acres of cotton or whatever of other crops) would be a 1½ man operation. It could provide for the family farm, depending on the debt level.

\(^3\) The viability base (i.e. the allocation below which it is assumed that a property could not operate viably, and so cuts have not been implemented) in the Upper Valley has been 500ML, whereas it has been 700ML in the Lower Valley.
• Development costs are the same per hectare. Therefore, a cut across the board is fairer than cuts above 500ML. There is no strong correlation between allocation and area. All should take a proportional cut.

• Locals would be happy with a viability base of less than 500ML.

• Under 700ML, you're not really in the game. If you lose more, it's not viable. So, that viability base is OK. But if the situation gets worse and big fellows lose more than 35%, then everyone should have to lose. There's not a lot of people under 700ML in the lower valley.

• Once you get back to 700ML or less, you can't use today's technology. You need to go back to "third world" practices.

• We need a minimum allocation for cotton and it's not 700ML. We need to look at social impact of the latest policy and interim management plans for the Lower Namoi Valley. The science to date is very poor.

• The inequity of the last percentage cut above 500ML should be addressed.

• It was socially unjust to cut allocations over 500ML.

• There is a minimum area of cotton that is financially viable.

• Each individual has a different viability base. So, you can't make it across the board.

• 400 acres has stood the test of time for a maximum viable irrigation licence for a family farm unit.

• Set a base line at 400 acres (972ML). Everybody should be able to irrigate 400 acres.

• We should go back to old system of limited acreage and allocation per hectare.

• Allocate on ML/ha, irrespective of what you grow.

• We all need more land and water to make a reasonable living now than in the past. 970ML will provide you with just a living. If you go under 970ML, you will fail.

13.3 Individual Assessments

• Look at who is growing what and how, and who is over-allocated. The good water managers take good care of their water.

• Look at people's crops and water use and see how much water is being used to grow how many hectares of crop on what soils. Reward the efficient user. Take water away from the high, less efficient, user.

• There should be annual estimates on what summer crops people will grow and what water they will need. Then, if you don't need water that year, it doesn't matter.

• We need to do some test cases to see what the different changes do (economically and socially) to the different water use situations.

13.4 Past and Future Use

• Historical use over the last ten years is not the way to go.

• The whole basis of allocation of water in the past has been 'history of use' - back to the 60s. So that's how it's operated in the past, and it should continue to do so.

• Do nothing about sleepers now. Let them sleep. Things will sort themselves out eventually.

• Ban sleeper licence development for say ten years.

• Give sleepers/dozers a time period to start use or lose it.

• Give sleepers three years to develop or cancel them.
• Anyone who has been sitting on a licence (single occupancy) for twenty years should be given twelve months to develop or lose it.

• Sleepers should lose 20% now, and users should lose 50% because they are using it. It's no use taking away from sleepers now because they're not using it. If sleepers decide to develop, then they should lose 50%.

• There is a good case for unlimited carryover, provided you don't use more than your allocation in a year. The best place to store it is underground.

13.5 Buy or Compensate

• Buying out would take a lot of money. But so would a 35% cut.

• Perhaps a third party could buy the allocation and keep it and not be allowed to use it.

• There should be a dollar for dollar scheme to buy water - i.e. $1 irrigator and $1 Government.

• Should it be funded by the irrigators or should it be funded by those who created the problem - the Government?

• The Government should buy back allocations or say that unused allocations should not be used in the future and set up an Anomalies Commission to assess individual differences.

• The Government made the mistakes. So, they should buy back the licences. There should be compensation to a fair value.

• We should cut everyone's allocation by half and then we go buy. Banks would be happier to lend money to do this if there was a certain outcome. But, if it suddenly goes on the market, who sets ceiling price? Otherwise big money will rush in and buy it. They can only buy back to where they are.

• We should give smaller people that were developing the opportunity to buy part of a cancelled sleeper licence to create a viable allocation (eg cancel 1000ML and buy 400ML to supplement a 300ML licence to a viable level). There should be a time limit on the development.

• Everyone needs to understand the "Mike Young proposal", and then consider if they want to go on with it. But it would need an excellent chairman.

• They want everyone to take a cut of 50% and then we buy the sleeper licences to bring our allocations back up again. That means we pay the compensation.

• Take away sleeper licences and offer compensation. But allowing the transfer of licences from sleepers would create a mess. Buyers would lose money if they then had to take a cut on their allocations and their bought allocations. What would that do to the buying price?

13.6 Limit Access

• We need to have a time when you "can't pump" during the year (eg. February to March).

• We should have mandatory moratoriums on pumping for three months of the year. We could allow people to choose their three months. But you still have to have cut backs. The big operators don't like it, and they carry a lot of weight.

• Would it be three consecutive months or three months anytime?

• There should be cut backs on irrigation acreage in droughts.

• There should be a shorter irrigation season.

13.7 Alternative Sources

• 1ML of high river flow could be substituted for 1ML of groundwater.

• There should be more access to high flows but reduced access to groundwater.
• High flows of water go down the Mooki River. There is presently an embargo on more high flow licences. Use of these flows could alleviate the groundwater problem. The government has to accept responsibility for over-allocation and they are not considering conserving any more water (storages), even though there is potential for more storages. Therefore, loss of the high flows from Mooki into the Murray-Darling system could be replaced by building of storages.

• Put in more dams - but that costs money - where will it come from? If we use the surface water, we don’t use bore water. The government can facilitate the building of dams - but not necessarily through tax payer funding.

• Can wastewater be used along the river as an alternative source?

• Can the aquifers be artificially recharged?

• Put in the water pipeline from the Kimberleys.

13.8 Implementation

• It doesn’t matter what is decided. Someone will still disagree with it.

• The final decision needs to be final - and not cut again in five years’ time or whenever. There are good prices forecast in coming years, so we need some certainty. We ‘forward sell’, so if we can’t produce it, we have to buy it.

• Ongoing monitoring is necessary.

• A moratorium on pumping would have to be enforced.

• Letting farmers choose the months to stop pumping may be hard to police.

• Any selling will have to be handled carefully.

• The issue is “who will pay the sleepers’ compensation?”

• If purchasing sleepers and dozers - will it go into a pool, or will it be one on one? Can you pay it off over years?

• There should be a mechanism for people to put their cases for starting development.

• To go to the Ombudsman or Land and Environment Court to appeal would cost too much. You have to travel down there and you can’t afford the time away from the property.

13.9 Other

• The Queensland government has allowed for everyone to have a base allocation. If you use more than your recharge, then you lose your water. But what if your neighbour’s pumping affects the bore levels? It also depends on the ability of the bores to deliver the water. Some do it faster, and replenish faster.

• Will management be zone by zone or general rules?
  A) Do it zone by zone, but see if there are useful rules that go across them.
  B) Have some general rules from the top and then adapt them at the local zone. But it’s urgent and needs to be done now. It’s created uncertainty in long term planning.

• Education is very important. The general attitude needs to change dramatically.

• If people are fiddling with their meters, they should lose their licence.
14. Community Good, Equity and Rights

14.1 Issues of Equity
• There should be equity of access because it sustains all forms of life.
• There should be equity of use of a limited resource.
• There should be equity of licence across the available resource.
• We must have equality of opportunity for supply.
• Water resources were over allocated in 1982, despite advice not to. People who had unrestricted licences before that were restricted to a volumetric licence, while new licences got more. So, the original landholders have had two cuts.
• How do you distribute the water? Historical use? No. We started to use water efficiently 20 years ago and so our allocation was cut by 50% years ago. We will now be penalised by a blanket cut of 35%. We can't cut back, but others who are not using water efficiently can cut back. It's not fair.
• Historical usage is not fair if I'm advantaged by others being disadvantaged.
• There are inequities in the average access to water by:
  - surface water only users;
  - conjunctive water users; and
  - groundwater only users.
People on one source of water should not be entitled to any more than those on another source.
• There's a fine line in the sand between what's fair and equitable and what's not and it is often based on moral issues.
• “There was nothing fair about how they handed out the licences, so why should it be fair now?”
• People not playing by the rules have benefited. “Equity for whom?” Those who put money under the table?
• People are not farming sustainably, and in breaking the rules, are profiting.

14.2 Rights
• People who bought land assuming they had water should be able to keep it, regardless of whether they use it or not.
• Why should we compensate someone who hasn't bothered to use water?
• We can drink it, bath in it, do what we like with it. It's our water.
• We're being selfish - but we're being forced to be.

14.3 The Value of Water
• How do you give a value to water (taking into account scarcity etc.) without being unjust to various social groups? There is a 'common good' component to water allocation. We have to get the equation right.
• Water equals dollars. How do we distribute the wealth?
• Money can't compensate for loss of water security.
• When water is a salable item, that's where the problem is. If someone has too much water for the land, then they won't give any up if it is worth money.

• It’s wrong to be able to sell a groundwater licence because you were given the licence in the first place as a part of the land.

• Some people in the past wouldn't stoop to the dishonesty of bribes to get a licence.

14.4 Community Good
• Groundwater belongs to people. We shouldn't have to pay.

• This country's resources are here to be shared by all. Not just by a small, greedy few.

• We've been able to raise families and live a comfortable life without being unfair to some other part of the community.

• People on the land know what happens and how it happens. The best environmentalists are the farmers.

15. Information Requirements/Research

15.1 Questions
• What happens if the aquifers are dewatered and collapse and compact in the outer areas? What happens to the rest of the aquifer in a flood event when the water can't flow upstream? Would the levels rise and cause salinity?

• How far does the water level have to drop before the aquifer collapses? No-one knows.

• Where does the water come from? How does the aquifer work and flow?

• Why have we taken a 35% cut across the board for a short term recharge problem in Zone 1? Is there a problem and where is it?

• Where is the recharge coming from? The river? It has to do with porosity and hydrogeologists don't know enough about porosity.

15.2 Comments
• We've got very poor information, and it changes from one area to another.

• In the past, the information was simply "pumped x" and "recovery was x". We've been told constantly that there is full recovery, but now they say that there isn't. If we need to cut, it's OK, but where is the reliable information? Until we get it - we're not cutting back. Where is the science to back up the percentage reductions? It's different for different properties. What are the facts?

• If someone comes and tells us where water comes from and where it goes to, and how recharge works and how quickly, then we'd give up something. We could see that it was needed.

15.3 Complaints
• The science of the Management Plan is wrong. I can not accept that a 35% reduction will happen. We need science to be re-addressed before we'll believe 35% is needed. This Government is very good at legislation by press release.

• Growers shouldn't have to pay for research to fix the problem the Government created.
APPENDIX 2
THE QUESTIONNAIRE
GROUNDWATER MANAGEMENT AND
ALLOCATION IN THE UPPER AND LOWER
NAMOI VALLEYS

SURVEY QUESTIONNAIRE
February 1998

⇒ OPTIONAL - you may leave blank if you wish

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⇒ PLEASE COMPLETE THE FOLLOWING FOR EACH PROPERTY - ANSWER 1 QUESTIONNAIRE ONLY

<table>
<thead>
<tr>
<th>DETAILS OF PROPERTIES WITH GROUNDWATER LICENCES</th>
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<tbody>
<tr>
<td>Property Name</td>
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<tr>
<td>UPPER VALLEY</td>
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<td>LOWER VALLEY</td>
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WHAT IS THIS QUESTIONNAIRE ABOUT?

Understanding and managing groundwater aquifers is very complex. In particular, it is necessary to know how much recharge water flows into the aquifers each year if we want to ensure that human usage is not "mining" the resource. That is, if we want the groundwater to still be here for generations to come, we must not use more than is naturally replaced each year. This annual amount of recharge water is known as the aquifer's SUSTAINABLE YIELD.

Over the past few years, scientific investigations have confirmed what many have suspected about the groundwater aquifers in the Upper and Lower Namoi Valleys. The groundwater is both over-allocated, and over-used.

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<th>In the Upper Namoi Valley:</th>
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<tr>
<td>Total Allocation is</td>
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<tr>
<td>Sustainable Yield is</td>
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<tr>
<td>The system is over-allocated by 140%</td>
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<tr>
<td>Total actual use is</td>
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<td>The system is over-used by 37%</td>
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<tr>
<th>In the Lower Namoi Valley:</th>
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<tr>
<td>Total Allocation is</td>
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<tr>
<td>Sustainable Yield is</td>
</tr>
<tr>
<td>The system is over-allocated by about 100%</td>
</tr>
<tr>
<td>Total actual use is</td>
</tr>
<tr>
<td>The system is over-used by 56%</td>
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So even if we could be sure that those people not using any or all of their present allocations did not do so in the future, the groundwater is still being used faster than it is being replaced. The Council of Australian Governments (COAG) has stated that all groundwater in Australia is to be managed sustainably.

This means that groundwater allocations must be reduced if the aquifers in the Namoi Valleys are to be there for future generations.
The Department of Land and Water Conservation wants to try to make sure that new allocation policy decisions cause as little impact on the local community as possible, and that they be as fair and equitable as possible. Therefore, they have asked CSIRO to help achieve this.

This questionnaire has been designed after discussions with groups of groundwater licence holders in both the Upper and Lower Namoi Valleys last November. It is being sent to all licence holders in the Valleys.

Your input and comments are extremely important if we are to properly understand what people think is “fair” - and how people think reducing groundwater allocations will affect their local communities. This information will form the basis of recommendations that will go to the Department of Land and Water Conservation.

DEFINITIONS OF TERMS

A number of different terms are used throughout this questionnaire. Below are some definitions to help create a common understanding of them.

**History of Use:**
History of Use refers to the amount of groundwater used by a licence holder in the highest water use year in the ten year period from 1985/86 to 1995/96. The highest water use figure is related to allocated water only, and does not include any carry-over or transfer.

**Sleeper Licence:**
Sleeper Licence holders are people whose *History of Use* shows that they have not used any part of their water allocations. They might be people who have never developed their properties but may intend to do so in the future. Or they may be people who have developed their properties in the past, but, for whatever reason, have not produced anything that requires water allocations for at least the ten year period.

**Dozer Licence:**
Dozer Licence holders are people whose *History of Use* is less than their water allocations. That is, their maximum use may be 25% of their allocation; or it could be 75% of their allocation; or even 99% of their allocation; but they have unused water.

**Fully Active Licence:**
Fully Active licence holders are people who have fully developed their properties and whose *History of Use* is equal to their allocation. That is, they use, and rely on, their full allocations.
A. Ways People Think About Water Allocation

Below are a number of general statements which describe the different ways that people think about sharing, or allocating water. Please tell us how much you agree or disagree with them by writing the appropriate number from the scale next to each statement.

Scale:

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>strongly agree</td>
<td>neither</td>
<td>strongly disagree</td>
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- All sections of the community have a right to have a say on water allocation.
- You can’t really solve water sharing problems by analysing the costs and benefits in dollars.
- Everyone should recognise that they may have to make some personal sacrifices if we are going to have effective planning.
- If the decision making process is fair, people should accept the final allocation decisions.
- In water allocation, everyone should be treated equally.
- It would be highly unfair to take water away from those who already have allocations.
- Priority for water should be given to those who need it to make a living.
- Regardless of economic consequences, water should be allocated to minimise conflict in the community.
- Since the environment was the original “user” of water, it should always have higher priority than other possible users.
- All water should be put on the market and sold to those who will pay most, regardless of what it is used for.
- Water should be allocated for long term sustainability even if it reduces the short term profits of local businesses.
- The natural environment has the same rights to water as people have.
- If new water allocation arrangements affect people’s livelihoods, they should receive compensation.
- The only role for state government in water management should be a supervisory one.
- There are no general rules about how to share water, it depends on the situation.
• There isn't time to wait for exact scientific knowledge, we need to act now.

• Water allocations should be made to maximise the overall economic income of a community.

• Water allocations should be set by experts alone.

• Water can only be allocated for human use if basic environmental sustainability has been satisfied.

• Landholders have the right to use groundwater under their land as they see fit.

• Water has a value other than its dollar value.

• Water is owned by everyone and therefore it should be managed for the overall public good.

• When it comes to water allocation, the environment is a secondary consideration to people.

• Groundwater under land is naturally the property of the landholder.

• Saving water for the future is more important than making money now.
B. Why do you farm?

This section is to find out what's important to you about farming. Below are four groups (A to D) with a number of statements in each group. Please rank the statements in each group in terms of how important they are to you.

⇒ Please write your ranking number in the space before each statement.

<table>
<thead>
<tr>
<th>Group</th>
<th>Instructions</th>
<th>Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rank how important each of the following statements are... when making decisions to reach your goals from 1 = most important through to 4 = least important</td>
<td>Making maximum income, Making satisfactory income, Ensuring the future income of the enterprise, Expanding the business</td>
</tr>
<tr>
<td>B</td>
<td>Rank how important each of the following statements are... in what you gain personally from farming from 1 = most important through to 3 = least important</td>
<td>Feeling pride of ownership of this farm, Gaining self respect from doing a worthwhile job, Meeting a challenge and achieving the objective</td>
</tr>
<tr>
<td>C</td>
<td>Rank... What it is about farming that you most enjoy from 1 = most important through to 4 = least important</td>
<td>Enjoyment of physical work tasks, Preference for a healthy farming lifestyle, Purposeful activity, value in hard work, Independence and freedom from supervision</td>
</tr>
<tr>
<td>D</td>
<td>Rank... What is most important to you in the farming industry from 1 = most important through to 3 = least important</td>
<td>Gaining recognition and prestige from farming, Belonging to the farming community, Continuing the family tradition</td>
</tr>
</tbody>
</table>
Now we’d like you to consider how important each Group is, as a whole, in your reasons for liking farming.

Below are statements that describe each of the Groups on the previous page (A to D) and we would like you to rank their importance as a whole.

⇒ Please write your ranking number in the space before each group description.

⇒ Rank the overall importance of each group from 1 = most important through to 4 = least important

⇒ (A) Farming is a means of obtaining satisfactory income and security
⇒ (B) Farming is a means of personal satisfaction and self expression
⇒ (C) Farming is enjoyable in its own right
⇒ (D) Farming is a means of enjoying the family tradition and farming community
C. COMMUNITY ISSUES

1. We'd like you to think about any major changes that have been occurring in your community over the last ten years. Can you think of up to three positive and three negative changes that have occurred over that time?

Positive Changes:
1) ______________________________________________________________
2) ______________________________________________________________
3) ______________________________________________________________

Negative Changes:
1) ______________________________________________________________
2) ______________________________________________________________
3) ______________________________________________________________

2. What do you think have caused those changes?

⇒ Write the causes next to the numbers that correspond to the changes above.

Causes of Positive Changes:
1) ______________________________________________________________
2) ______________________________________________________________
3) ______________________________________________________________

Causes of Negative Changes:
1) ______________________________________________________________
2) ______________________________________________________________
3) ______________________________________________________________
3. Are any of the above changes still occurring? Circle the number next your answer

YES ..... 1  NO ..... 2  NOT SURE ..... 3

Go to Question 5

4. What changes are (or might be) still occurring?

⇒ Tick ☑ the numbers that correspond to the changes in Question 1.

<table>
<thead>
<tr>
<th>Positive Changes Still Occurring</th>
<th>Negative Changes Still Occurring</th>
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<tr>
<td>1) ...... □</td>
<td>1) ...... □</td>
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<td>2) ...... □</td>
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<td>3) ...... □</td>
<td>3) ...... □</td>
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5. Suppose it was decided that all groundwater allocations should be cut further to ensure that the groundwater aquifers don’t continue to deplete. What do you think might happen in your community?

⇒ Tick ☑ as many as apply,

then provide the details requested following your ticked response(s).

Reducing all groundwater allocations might ......

☑ cause new positive changes in the community

What new changes?

☑ cause new negative changes in the community

What new changes?

☑ assist positive changes that are already occurring Which changes? 1 2 3

Circle the number(s) that correspond with the positive changes in Question 4

☑ reduce positive changes that are already occurring Which changes? 1 2 3

Circle the number(s) that correspond with the positive changes in Question 4

☑ improve negative changes that are already occurring Which changes? 1 2 3

Circle the number(s) that correspond with the negative changes in Question 4

☑ worsen negative changes that are already occurring Which changes? 1 2 3

Circle the number(s) that correspond with the negative changes in Question 4

☑ other, please explain

⇒ If you thought only positive changes might occur, go to Section D.

If you answered any negative changes, answer Question 6 over the page.
6. What do you think could be done to help lessen any negative effects on your local community from reduced groundwater allocations?
D. ABOUT GROUNDWATER & ZONES

1. People in the Upper and Lower Namoi Valleys have said a number of things about the nature of groundwater and the management zones. Please tell us how much you agree or disagree with them by writing the appropriate number from the scale next to each statement.

Scale:

1 strongly agree
2 neither
3 strongly disagree

◊ Each zone has a different problem.

◊ People should not be cut back if their zone is recharging.

◊ You can't sell groundwater because it is impossible to transfer it.

◊ You can't make different decisions for different Zones because the way the boundaries are drawn is questionable.

◊ Licences on the outer edge of the aquifers should be removed because you can't pump water anyway.

◊ All groundwater zones are connected, so usage in one zone affects levels in another zone.

◊ There's not enough groundwater in the Namoi Valley to allow everyone to stay in irrigated agriculture.

◊ It's impossible to get everyone in a Zone to agree on important issues.

◊ The damage has already been done, so we might as well go on using the groundwater until it's too expensive to pump it.

Following are some things that people have said when thinking about the groundwater over-allocation problem. There are many ways of thinking about the different types of licence holders, and these are just some of them. We'd like to know your opinions.

2. Some people say that if sleepers* haven't needed to use their water in the past, and haven't invested money developing irrigation systems on their properties, then they should lose their licences. Do you agree? * see definitions page 2

YES ..... 1  NO ..... 2  MAYBE ..... 3

Why? _____________________________________________________________

_______________________________________________________________
3. Some people say that most **dozers** are irrigators who manage their groundwater carefully and efficiently. Even though they don't use all their allocations in most years, they need all of it to get through droughts, or times when the storms don't come. Therefore, they can't afford to lose any of their allocations. Do you agree?  
* see definitions page 2

YES ..... 1  
NO ..... 2  
MAYBE ..... 3

Why? __________________________________________________________
_____________________________________________________________
_____________________________________________________________

4. Some people say that **fully active** irrigators will lose more money if their allocations were cut than would any other groundwater licence holders. All their water is associated with financial income and every ML lost means **real** dollars lost. Do you agree?  
* see definitions page 2

YES ..... 1  
NO ..... 2  
MAYBE ..... 3

Why? __________________________________________________________
_____________________________________________________________
_____________________________________________________________

5. Some people say that the **big water users** should have their allocations cut by more than the smaller users, because they have caused most of the problem, and they can afford to lose more than others can before they are badly affected. Do you agree?

YES ..... 1  
NO ..... 2  
MAYBE ..... 3

Why? __________________________________________________________
_____________________________________________________________
_____________________________________________________________


E. FAIRNESS & EQUITY ISSUES

People in the Upper and Lower Namoi Valleys have said a number of things about what is fair and what is not fair with groundwater management and allocation. Please tell us how much you agree or disagree with them by writing the appropriate number from the scale next to each statement.

Scale:

\[
\begin{array}{cccc}
1 & 2 & 3 & 4 \\
\text{strongly agree} & \text{neither} & \text{strongly disagree} \\
\end{array}
\]

- Everyone should have equal rights to groundwater. _____
- People who use water efficiently should not have their allocations cut. _____
- It's not fair to base people's future allocations on their "history of use". see definitions, page 2 _____
- People on one source of water should not be entitled to any more than those on another source. _____
- People who bought land assuming they had water should be able to keep it, regardless of whether they use it or not. _____
- We should not compensate people who haven't bothered to use their water in the past. _____
- People in an irrigation area should not be forced into dryland farming. _____
- Corporate farms aren't interested in keeping resources for the next generation. _____
- "Sleepers" shouldn't be penalised because of the over-use by others. _____
- Money can't compensate for loss of water. _____
- This country's resources are here to be shared by all. _____
- The only fair way is for everyone to give up some of their water. _____
- Only the rich can afford to buy and sell water. _____
- Everyone should be left with enough water to remain viable. _____
F. HOW CAN WE FIX THE PROBLEM?

There are many things that could be done to help reduce groundwater use in the Upper and Lower Namoi Valleys. In the end, it may require a number of things to be done. Following are five different approaches (Groups A to E) that could be taken, and a number of actions under each approach. We'd like you to firstly consider the individual actions in each of the Groups. Please use the scale below to rate how acceptable you think each action is.

⇒ REMEMBER, THERE IS NO "RIGHT" ANSWER.

Scale:

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td></td>
<td>totally acceptable</td>
<td></td>
<td></td>
<td>totally unacceptable</td>
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⇒ Write the appropriate number from the scale next to each action statement in each of the Groups.

(A) EQUALITY OF OPPORTUNITY

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All licence holders should have allocations cut by the same percentage.

All licence holders should have allocations cut proportionally, according to the amount of water actually used. (ie. small cut for small users, and larger cuts for larger users).

A viability base should be set, and licence holders with allocations less than that base should not receive cuts. (ie. 500ML in the Upper Valley & 700ML in the Lower Valley).

Any reductions in allocations should provide protection for the “family farm”.

(B) REWARD FOR HARD WORK & INVESTMENT

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Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced by more than those who have little or no investment in their properties.

Irrigators who are fully active, and have invested in their properties, should not have their allocations reduced at all - because they will lose more money than those with little or no investment.

Irrigators who started in the Valley more than 30 years ago should not have their allocations reduced - because they were responsible for establishing the industry in the area - and they’ve taken two cuts to their allocations over those years.
(C) HISTORICAL USE

Number from scale

- Future allocations should be based on maximum annual
  historical usage over the 10 years prior to 1995/96,
  and any unused part of allocations should be forfeited.

- Ban sleeper licence development for the next ten years.

- Give sleepers and dozers three years to use all their groundwater
  allocations or lose the unused portions.

- Only those who have caused the problem should have
  their allocations cut.

(D) WATER MARKETS

Number from scale

- Reduce all allocations by the same percentage and then
  allow permanent buying and selling within Zones.

- Reduce all allocations by the same percentage and then
  allow permanent buying and selling across Zones, but confined to
  the Upper or Lower Valley.

- Reduce all allocations by the same percentage and then allow
  permanent buying and selling across the Upper and Lower Valleys.

- The Government should buy all unused portions of allocations.

(E) EFFICIENCY & MANAGEMENT

Number from scale

- Impose a mandatory moratorium on pumping for 3 months
  every year.

- Reduce the annual irrigation season.

- Reduce allocations and increase the allowable amount of
  carry-over for an increased time period.

- Irrigators using approved water efficient irrigation and re-use
  systems should not have their allocations reduced.
Finally we'd like you to consider each of the possible approaches to assist with the groundwater over-allocation problem.

1. How acceptable to you are the general approaches to the problem?

⇒ Please rank the Groups below from 1 to 5 and write the numbers in the spaces next to each Group.

RANK

1 = most acceptable  
2 = next most acceptable  
……. through to  
5 = least acceptable

<table>
<thead>
<tr>
<th>Rank</th>
<th>General Approaches to Solving the Groundwater Over-allocation Problem</th>
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<tbody>
<tr>
<td></td>
<td>Group (A): EQUALITY OF OPPORTUNITY</td>
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<tr>
<td></td>
<td>Group (B): REWARD FOR HARD WORK AND INVESTMENT</td>
</tr>
<tr>
<td></td>
<td>Group (C): HISTORICAL USE</td>
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<td></td>
<td>Group (D): WATER MARKETS</td>
</tr>
<tr>
<td></td>
<td>Group (E): EFFICIENCY AND MANAGEMENT</td>
</tr>
</tbody>
</table>

2. Do you consider any of the approaches to be **totally unacceptable** in assisting with the groundwater over-allocation problem?

   YES ..... 1          NO ..... 2          MAYBE ..... 3

↓

Go to Question 3

⇒ If YES or MAYBE, tick ☑ the Group(s) that you consider to be totally unacceptable.

☐ Group (A): EQUALITY OF OPPORTUNITY
☐ Group (B): REWARD FOR HARD WORK AND INVESTMENT
☐ Group (C): HISTORICAL USE
☐ Group (D): WATER MARKETS
☐ Group (E): EFFICIENCY AND MANAGEMENT

3. When it has been decided what needs to happen to reduce the over-allocation problem, what sort of timing should be considered to action the decisions?

⇒ Circle only one number

   do it immediately ..... 1
   phase it in over 3 years ..... 2
   phase it in over 5 years ..... 3
   depends on what is decided ..... 4
   other ..... 5

please explain __________________________
G ABOUT YOURSELF

1. How long have you lived in the Namoi Valley?
   ⇒ Circle the most appropriate number
   less than 5 years .... 1
   between 6 and 10 years .... 2
   between 10 and 20 years .... 3
   between 20 and 30 years .... 4
   more than 30 years .... 5

2. How long have you had a groundwater licence in the Namoi Valley?
   less than 5 years .... 1
   between 6 and 10 years .... 2
   between 10 and 20 years .... 3
   between 20 and 30 years .... 4
   more than 30 years .... 5

3. What does your property(s) produce for commercial purposes?


4. Which category includes your age?
   ⇒ Circle the most appropriate number
   15 to 19 years .... 1
   20 to 24 years .... 2
   25 to 29 years .... 3
   30 to 39 years .... 4
   40 to 49 years .... 5
   50 to 59 years .... 6
   60 to 64 years .... 7
   65 to 69 years .... 8
   70 to 74 years .... 9
   75 years & over .... 10

5. Please note your gender. Male .... 1 Female .... 2
This questionnaire has asked general questions about equity and fairness, and a lot of specific questions about the problems with groundwater over-allocation in the Namoi Valley. Having thought about all these issues, we’d like you to finally think about the “equity of priorities”.

1. Is there any group of groundwater licence holders that you think could afford to lose some of their water first because they would be least affected by the loss?

   YES ..... 1          NO ..... 2          MAYBE ..... 3

If YES or MAYBE, which group? ______________________________________

____________________________________________________________________

Why? ______________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

2. Is there any group of groundwater licence holders that you think should receive priority protection because they would be most affected by any loss of water?

   YES ..... 1          NO ..... 2          MAYBE ..... 3

If YES or MAYBE, which group? ______________________________________

____________________________________________________________________

Why? ______________________________________________________________

____________________________________________________________________

____________________________________________________________________
THANK YOU VERY MUCH FOR YOUR TIME

IF YOU'D LIKE TO MAKE ANY OTHER COMMENTS,
PLEASE FEEL FREE TO DO SO

We'll send you a summary of the major findings & recommendations later this year