Australian adults’ knowledge of Australian agriculture

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Abstract
Purpose – Agriculture is a major generator of wealth and employment in Australia. However, it faces a range of economic and environmental challenges which require substantial community support. The purpose of this paper is to examine Australian adults’ Australian knowledge of, and attitudes towards, Australian agriculture.

Design/methodology/approach – Online questionnaire survey of 1,026 adults conducted nationwide during August 2012.

Findings – Most respondents had little knowledge of even the basic aspects of the industry but they approved of farmers’ performance of their roles. Latent class analysis showed that there are two groups of consumers with low and lower levels of knowledge. The respondents’ age, rural residence and universalist values were positive predictors of agricultural knowledge.

Research limitations/implications – This was a cross-sectional, quota-based survey which examined only some aspects of agriculture. However, the findings suggest that more communication with the general public about the industry is required in order to build on the positive sentiment that exists within the community.

Practical implications – More education about agriculture in schools and higher education is indicated. Social implications – The poor state of knowledge of agriculture threatens the social contract upon which agricultural communities depend for survival.

Originality/value – The study highlights the poor state of general knowledge about agriculture in Australia. The findings could be used as a baseline against which the efficacy of future education programmes could be assessed.

Keywords Agriculture, Demographics, Survey

Paper type Research paper

Introduction
It has been argued that the states of Australia were founded on agriculture and mining and their ability during the nineteenth and early twentieth centuries to supply Britain with raw materials (Blainey, 2001). Although much of the British and Irish migration was composed of city dwellers (Fitzpatrick, 1986), the “Bush” and agriculture seem to have a special place in the Australian psyche (McKay, 1997). There may be what the CEO of the National Farmers’ Federation called the “social contract of farming” with the Australian nation (Linnegar, 2011).
However, times are changing and Australian agriculture faces many challenges (DAFF, 2012). These range from its economic sustainability and survival in a competitive international trading environment (DAFF, 2012), through to its continuing ability to provide the Australian population with access to healthy foods and to maintain the environmental sustainability on which it depends (Campbell, 2009; Cary and Roberts, 2011; Carberry et al., 2010; Larsen et al., 2008; Vanclay and Lawrence, 1995; DAFF, 2011). This is part of a more general reconsideration of the global food system (e.g. Parfitt et al., 2010; Friel et al., 2009).

Whilst the sector faces a range of challenges it is unclear if the broader Australian community appreciates or understands it. Such understanding is essential if the sector is to gain the political, social and economic resources to withstand its current challenges. As Kovar and Ball (2013) discussed, a society with an understanding of agriculture and current economic, social and environmental impacts could lessen current challenges facing agriculture through greater support and good decision making. To date there have been few studies of consumer perceptions of agriculture and as far as we can tell, none of Australian consumers’ knowledge of the agricultural sector. Lea (2005) noted that the links between food, health and the environment are strong and that consumers believe they have the power to impact positively or negatively on the environment via their dietary choices. In earlier qualitative research she showed that consumers are interested in closer links with farmers through community supported agriculture schemes (Lea et al., 2006).

Kriflik and Yeatman (2005), in a qualitative study of 26 individuals’ views of food, health and sustainability found concern about conflicting information, health risks, and the blaming of individuals for “poor” food choices. The respondents were interested in better communications about food production processes. In a related domain, the 2010 International Food Information Council, 2010 consumer survey of 750 online respondents in the USA found that many consumers hold positive attitudes towards plant and animal biotechnology, including new technologies such as nanotechnology. In particular, American consumers appear to have increasing interest in sustainable food production which influences their likelihood of purchasing biotechnological products.

Whilst these studies show that consumers may have positive attitudes towards facets of agriculture, any social contract between farming and the broader community depends on that community having a broad understanding of, and empathy with the sector. Therefore, the first aim of this study was to assess the wider community’s basic knowledge and understanding of the sector as well as consumers’ attitudes towards farmers and the sector in general.

An associated aim was to examine whether there are any differences in the ways people living in metropolitan and regional areas understand the sector. There are anecdotal claims that “city people are less supportive of agriculture than ‘country’ people”, perhaps because of their greater distance from farming activities. Similarly, we also wanted to test whether people with university education know more about the sector than those with other levels of education. Education is strongly related to the acquisition of knowledge, including agricultural knowledge, from information resources such as media. Tichenor et al. (1970), for example, showed that individuals with higher socioeconomic status (usually represented by education) tend to acquire information at a faster rate than individuals of lower status.
Methods

Sampling and procedure

The Agriculture, the Environment and Food questionnaire was an internet-based survey conducted nationally during August 2012. It was designed to determine Australian adults’ knowledge and perceptions of a number of issues relating to Australian agriculture. The survey was conducted by Global Market Insights (GMI), who invited potential respondents from the company’s database of registered adults living in Australia to participate through a link to the survey. GMI recruits its panels via a mix of diverse channels including opt-in email, co-registration, e-newsletter campaigns, search engine marketing and traditional banner placements, as well as both internal and external affiliate networks. A variety of checks are used to ensure the quality of panellists including confirmation of email addresses and location, various fraud screening measures and barring of previously rejected respondents. Quota sampling was used to ensure that the ages, gender and education and state of residence of the respondents represented the proportions found in the Australian population. In total, 1,026 respondents took part in the survey.

The study was approved by the Deakin University Faculty of Health Human Ethics Committee (HEAG H47-2012).

The questionnaire was divided into several sections which included questions about: basic knowledge of Australian agriculture (based on National Farmers’ Federation (NFF), 2011, satisfaction with farmers performance of key social and environmental roles, using multiple choice formats), and a range of other agricultural issues (to be reported elsewhere).

The farming knowledge questions were assessed by 17 items, each of which offered several response items, one of which was correct. For example, approximately how many jobs do farming and associated industries provide in Australia? Five response options were given: (a) 210,000; (b) 570,000; (c) 1 million; (d) 1.6 million; (e) I do not know. The score of 1 (correct) was given if “d” was selected but if any of the remaining options was ticked, a score of 0 (incorrect) was recorded.

The familiarity section consisted of six items to ask the participants “have you heard of the following terms?” The items related to the food supply chain, carbon miles, life cycle assessment, soil management, agricultural water footprint and natural resource management. Three response options were given: yes, no, not sure.

In addition, information was gathered about the respondent’ ages, gender, educational background (left high school before year 11, completed high school, technical or trade qualifications, university education) and postcode. Postcode to Remoteness data was downloaded from the Australian Bureau of Statistics web site. The postcodes were recoded into two categories: Metropolitan (major cities only, 686 respondents) and Regional (inner and outer regional Australia, remote and very remote Australia, 340 respondents).

Individuals’ psychological characteristics such as their personal values (defined as “guiding principles” in people’s lives; Schwartz, 1992; Grunert and Juhl, 1995; Povey et al., 2000); and social ideologies or belief systems (Wang et al., 2008, 2009) are likely to influence acquisition of knowledge. In particular, universalism (appreciation of community and nature; Schwartz, 1992) may be positively related with agricultural knowledge.
Data analysis
Response frequencies for each of the items were calculated using the SPSS (version 20) FREQUENCIES programme. In addition, comparisons were made between the educational and place of residence groups, using the CROSSTABS ($\chi^2$ programme) across the variables.

In this study, we hypothesised that different knowledge patterns may exist within this sample of Australians, assessed by the 17 categorical knowledge items. To do this we used latent class analysis (LCA; Hagenaars and McCutcheon, 2002) via Mplus version 7 (Muthén and Muthén, 1998-2012). LCA is designed for use with categorical data and it is model based cluster analysis (Kaufman and Rousseeuw, 2005).

A series of LCA models were examined. To select the appropriate number of classes (or groups) and maximise model fit, a two-class model was first fit to the data and then compared with a subsequent three class model. In selecting the final model solution, a number of statistical fit indices were examined, including the Akaike information criterion (AIC; Akaike, 1987), the Bayesian information criterion (BIC; Schwarz, 1978), Lo-Mendel-Rubin likelihood ratio test (LRT; Lo et al., 2001), Entropy (Ramaswamy et al., 1993), and the loglikelihood test statistic.

Results
Characteristics of the respondents
Over 1,000 adults (1,026) drawn from across Australia took part in the survey. Just over half were women (51.6 per cent, n = 529), and 34.1 per cent (n = 350) were tertiary graduates, 30.7 per cent (n = 307) were TAFE or technically qualified and the remainder had high school education only. Just over one-third (33.1 per cent, n = 340) resided in regional towns or rural areas (“regional” residents), the remainder lived in metropolitan areas (“metropolitan” residents).

<table>
<thead>
<tr>
<th>Items</th>
<th>% (n = 1,026)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Compared to other countries, the Australian grain industry uses less fertilizer and less tilling</td>
<td>17</td>
</tr>
<tr>
<td>2. Australian rice growers use up to 50% less water than the worldwide average</td>
<td>6</td>
</tr>
<tr>
<td>3. In Australia, almonds use the most water to produce it</td>
<td>3</td>
</tr>
<tr>
<td>4. Most agricultural land in Australia is suited to grazing of sheep and cattle</td>
<td>49</td>
</tr>
<tr>
<td>5. A lot of land in Australia is acid with low rainfall and unsuited to cropping. Beef cattle and sheep are best farmed on this type of land</td>
<td>62</td>
</tr>
<tr>
<td>6. Most Australian beef cattle are fed on grass and rainwater for most of their lives</td>
<td>32</td>
</tr>
<tr>
<td>7. Australian farmers receive minimal government support to grow food</td>
<td>43</td>
</tr>
<tr>
<td>8. Approximately 1.6 million jobs do farming and associated industries provide in Australia</td>
<td>12</td>
</tr>
<tr>
<td>9. Approximately 12% of the national gross domestic product does agriculture account for</td>
<td>16</td>
</tr>
<tr>
<td>10. In 2010-2011 the value of farm exports was $33 billion</td>
<td>7</td>
</tr>
<tr>
<td>11. About 60% of Australia’s total agricultural production is exported</td>
<td>23</td>
</tr>
<tr>
<td>12. Wheat is Australia’s most valuable export</td>
<td>27</td>
</tr>
<tr>
<td>13. 90% of Australian agricultural land is Australian owned</td>
<td>11</td>
</tr>
<tr>
<td>14. Overall, Australian farmers manage and care for 60% of the Australian landmass</td>
<td>18</td>
</tr>
<tr>
<td>15. About 90% of Australia’s daily domestic food supply is produced by Australian farmers</td>
<td>10</td>
</tr>
<tr>
<td>16. Since 1990 Australian farmers have decreased their GHG emissions by 40%</td>
<td>5</td>
</tr>
<tr>
<td>17. 94% of Australian farmers have undertaken self-funded natural resource management on their properties</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1. Percentages of correct answers to the items in Consumers’ knowledge of farming and agriculture in Australia
Basic knowledge of Australian agriculture

A major finding was the large numbers of respondents who admitted they did not know the answers to questions (Table I). The greatest uncertainty, around 50 per cent of respondents, was associated with production methods of the Australian grain and rice industries; the number of jobs associated with farming; the percentage of GNP accounted for by agriculture; the value of farm exports; farmers’ reduction in GHG emissions; and the use of natural resource management. Around one-third expressed uncertainty about the crop that uses the most water, minimal subsidisation of farmers; the percentage of agricultural production that is exported; the proportion of land in Australian ownership; and the proportion of the domestic food supply produced by Australian farmers.

Using information from the NFF (2011) the proportions of correct responses to each question could be assessed. Relatively well answered were questions about: the most common land uses (49 per cent chose grazing of sheep and cattle), the animals most suitable for arid land (62 per cent chose beef and sheep); the feeding of beef cattle (32 per cent recognised they are fed on grass and rainwater for most of their lives); subsidisation of farmers (43 per cent recognised there are minimal subsidies); and, Australia’s most valuable farm export (27 per cent chose wheat).

Much lower proportions of respondents chose the correct answers for the remaining questions, particularly, which crop uses most water (3 per cent chose the correct answer: almonds); the number of people in farming industries (12 per cent correctly chose 1.6 million); the percentage of GNP accounted for by agriculture (16 per cent chose 12 per cent); the percentage of agricultural production that is exported (23 per cent chose $33 billion); the proportion of agricultural land in Australian ownership (only 11 per cent chose 90 per cent); the proportion of the Australian landmass card for by farmers (18 per cent chose 60 per cent); the percentage of the domestic food supply produced by Australian farmers (10 per cent chose about 90 per cent); reductions in GHD emissions since 1990 (only 5 per cent chose decreased GHG by 40 per cent) and use of natural resource management (only 3 per cent chose 94 per cent).

There was a trend for more metropolitan people to express uncertainty (e.g. answer “don’t know”; Table II). More regional residents correctly answered the questions about grain production methods used in Australia (less fertiliser and tilling; metropolitan: 13 per cent, regional: 23 per cent p < 0.01); the feeding of beef cattle (grass and water; metropolitan: 27 per cent, regional: 41 per cent, p<0.01); and the best animals for arid land (beef cattle and sheep; metropolitan: 58 per cent, regional: 71 per cent, p < 0.01).

<table>
<thead>
<tr>
<th>Item</th>
<th>Metropolitan (%)</th>
<th>Regional (%)</th>
<th>χ² (ν = 1,025, df = 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to other countries, the Australian grain industry uses less fertilizer and less tilling</td>
<td>13.10</td>
<td>23.30</td>
<td>1691**</td>
</tr>
<tr>
<td>Most Australian beef cattle are fed on grass and rainwater for most of their lives</td>
<td>27</td>
<td>40.60</td>
<td>1955**</td>
</tr>
<tr>
<td>A lot of land in Australia is arid with low rainfall and unsuited to cropping. Beef cattle and sheep are best farmed on this type of land</td>
<td>58</td>
<td>70.90</td>
<td>1602**</td>
</tr>
<tr>
<td>In general how well do you think Australian farmers do the following roles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributors to Australian Society well</td>
<td>86.10</td>
<td>91.30</td>
<td>5.13*</td>
</tr>
<tr>
<td>Carers of livestock well</td>
<td>82.90</td>
<td>88.20</td>
<td>4.48*</td>
</tr>
</tbody>
</table>

Table II. Significant χ² statistics across region

Notes: *p < 0.05; **p < 0.01
In addition, more regional respondents believed that Australian farmers are contributors to Australian society (91 vs 86 per cent, \( p < 0.05 \)) and carers of livestock (88 vs 83 per cent, \( p < 0.05 \)).

Generally, respondents with lower educational levels were more likely to answer “I don’t know” than those with trade or higher qualifications (Table III). More University educated than other respondents answered the questions about use of fertiliser and tilling and the proportion of land that is Australian owned, correctly.

**Views of farmers’ role performance**

Generally, the respondents perceived farmers to be doing well in their various roles, especially with regard to their contributions to Australian society, as carers of livestock, and their education about agriculture (Table IV). Regional respondents tended to view farmers more favourably as environmental stewards and contributors to society, than metropolitan respondents (Table II). Not as many of the tertiary educated perceived the farmers’ performance of their roles as “very well”; those who left high school before years 11 and 12 were more supportive (Table III). Regression analysis of the total approval score (Cronbach’s \( \alpha = 0.91 \)) showed that education was inversely related to overall approval (Std \( \beta \approx -0.17, p < 0.01 \)) and women were more likely than men (Std \( \beta = -0.12, p < 0.01 \)) to approve of farming activities.

**Familiarity with sustainability terms**

Respondents were most familiar with food supply chain, soil management and natural resource management (Table V). Carbon miles, life cycle assessment and agricultural water footprint were much less familiar. Regional respondents tended to be more aware of these terms than those in metropolitan areas. More tertiary educated people had heard of life cycle assessment (Table II).

<table>
<thead>
<tr>
<th>Item</th>
<th>( \leq \text{year 12} )</th>
<th>TAFE</th>
<th>University</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to other countries, the Australian grain industry uses less fertilizer and less tilling</td>
<td>14.60</td>
<td>14</td>
<td>20.60</td>
<td>6.54*</td>
</tr>
<tr>
<td>90% of Australian agricultural land is Australian owned</td>
<td>7.90</td>
<td>11.10</td>
<td>14.60</td>
<td>9.73**</td>
</tr>
<tr>
<td>Have heard of the term of life cycle assessment</td>
<td>25.50</td>
<td>39.50</td>
<td>41.40</td>
<td>21.74**</td>
</tr>
<tr>
<td>Emissions from the global agriculture sector contribute to total global greenhouse gas (GHG) emissions is 13%</td>
<td>10</td>
<td>15.90</td>
<td>22.90</td>
<td>22.17**</td>
</tr>
</tbody>
</table>

Notes: TAFE, technical and further education qualification. * \( p < 0.05 \), ** \( p < 0.01 \)

<table>
<thead>
<tr>
<th>In general how well do you think Australian farmers do the following roles?</th>
<th>Poor %</th>
<th>Good %</th>
<th>Not sure %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributors to Australian society</td>
<td>11</td>
<td>77</td>
<td>12</td>
</tr>
<tr>
<td>Carers of livestock</td>
<td>14</td>
<td>75</td>
<td>12</td>
</tr>
<tr>
<td>Educated about agriculture</td>
<td>15</td>
<td>71</td>
<td>14</td>
</tr>
<tr>
<td>Use technology to improve their business</td>
<td>18</td>
<td>67</td>
<td>16</td>
</tr>
<tr>
<td>Stewards of the land</td>
<td>17</td>
<td>66</td>
<td>17</td>
</tr>
<tr>
<td>Managers of the environment</td>
<td>25</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Business operators</td>
<td>25</td>
<td>59</td>
<td>16</td>
</tr>
</tbody>
</table>

Table IV. Respondents’ views of farmers’ role performance
Identification and prediction of agricultural knowledge groups.

The LCA revealed that two distinct groups existed within the sample, one with higher knowledge than the other (Figure 1). Inspection of Figure 1 shows that the questions about: the types of animals that suit arid land, common land use, the feeding of beef cattle on grass, the lack of major subsidisation of Australian farmers and Australia’s major commodity were better answered than the other questions and most distinguished the two groups.

Table V shows the model fit statistics derived from the LCA from the two-class latent class model and the three class latent class model when the 11 items of agriculture knowledge and covariates were included in the model. Examination of the fit indices and loglikelihood statistics in Table V shows that a two-class solution provided the most parsimonious description for the data by a smaller value of BIC and LRT p-value W 0.05 at the point of a three class model (Table VI).

The results of the multinominal logistic regression analyses are presented in Table VII. Class 1 (better knowledge) was compared with class 2 (poor knowledge) to interpret the effects of the covariates including age, gender, education, universalist values and region on the latent class membership. The estimated log odds coefficients and the corresponding log odds confidence intervals were converted into odds ratios and their confidence intervals.

<table>
<thead>
<tr>
<th>Have you heard of the following terms?</th>
<th>Yes %</th>
<th>No %</th>
<th>Not sure %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food supply chain</td>
<td>80</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Carbon miles</td>
<td>31</td>
<td>54</td>
<td>15</td>
</tr>
<tr>
<td>Life cycle assessment</td>
<td>32</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>Soil management</td>
<td>71</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Agricultural water footprint</td>
<td>55</td>
<td>50</td>
<td>16</td>
</tr>
<tr>
<td>Natural resource management</td>
<td>68</td>
<td>20</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note: n = 1,026*

![Figure 1](graph.png)

**Figure 1.** Graphical displays of item response probabilities for knowledge items across the two classes.

**Notes:** Class 1, low knowledge; class 2, lower knowledge.
The multinomial regression showed that:

- older people were more likely to belong to class 1 (low knowledge) than class 2 (lower knowledge);
- people who held strong universalism values were more likely to be in low knowledge class vs lower knowledge class than those with weaker universalist values; and
- people in countryside were more likely to be in low knowledge group vs lower knowledge group than those in the city.

These results suggest that as age increases, the odds of being in class 1 (low knowledge) vs class 2 (lower knowledge) were 7 per cent higher (OR = 1.07). Respondents who held strong universalist values were 41 per cent more likely to be in class 1 (low knowledge) vs class 2 (lower knowledge; OR = 1.41). Finally, respondents who lived in rural areas were two times more likely to be in class 1 (low knowledge) versus class 2 (lower knowledge; OR = 2.00) than urban respondents.

There were no significant relationships between knowledge class membership, gender and education. Whilst educational background was related to certain items, overall it was not a significant predictor of class membership, nor was gender.

Discussion

The state of the population’s agricultural knowledge is a current issue not only in Australia, but for the whole world. As the global population expands, the problems associated with feeding the world compound (Foresight, 2011; United Nations System, 2010). Increased levels of population knowledge of agricultural systems are required to support policies for the establishment and maintenance of viable agriculture systems (Kovar and Ball, 2013).
Generally consumers’ knowledge of the sector was low. The high endorsement of the “don’t know” options shows that consumers recognise this. The spread of responses across the other options suggests that many respondents simply guessed the answers. Some issues, however, were better understood, especially the items relating to the beef industry, which may reflect the long public communications campaign run by that industry. Conversely, it is disturbing that the size, extent and value of Australian agriculture are relatively unknown in the general population. This weakens any chance of a renewal of the social contract between the community and farmers (Linnegar, 2011) since most people simply do not recognise very much about the sector. Perhaps agriculture is not unusual; similar community ignorance might apply to other industries such as the mining, automobile or entertainment industries.

Of course, these knowledge questions could be seen as being unreasonably difficult for the average member of the general public. That may be so, but nevertheless the findings highlight the magnitude of the problem facing agricultural communicators. It is to be hoped that the present findings will form a baseline against which the effects of future communication campaigns about the sector can be gauged. Much more needs to be done to communicate the high, value (in terms of finance and employment) of domestic production and the high degree of Australian ownership of the sector.

The responses to the question about farmers’ role performance show strong support for the contributions of farmers on all the roles listed in the question. Possibly, these sentiments relate to the historical development of Australia and to the special place of “the Bush” and farming in the national psyche. However, they do not appear to be based on strong knowledge of current Australian agriculture. The greater approval expressed by women and those with lesser education is consistent with our previous studies of consumers’ involvement with food; these groups tend to be more interested in food issues possibly because of their greater exposure to food issues (Worsley, 2007; Worsley and Scott, 2000).

The main predictors of consumers’ knowledge (i.e. membership of the two classes) were age, place of residence and universalism. Perhaps because of their greater experience and possibly a more agriculturally oriented education in times when agriculture was more dominant in society, older people tended to know more about the industry. Country people are closer to agricultural activities and so are likely to be more exposed to information about the industry. The positive relationship of universalist values orientation with knowledge suggests that consumers who hold pro environmental and community values are more knowledgeable about farming issues than other consumers. They are likely to respond more to agricultural issues and may be more likely to agree to the social contract view that Linnegar (2011) espouses.

The low levels of knowledge encountered in this study suggest the need for greater communication by the industry with the general public. This might take the form of communication campaigns to highlight particular issues and achievements but there is also a need to place knowledge of the food system onto the educational agenda at primary, secondary and tertiary levels. It is important that most Australians have some basic knowledge of this industry which has such important economic, environmental and health impacts on the broader community.

Although our choice of knowledge items might well be improved to cover broader aspects of agriculture in Australia the study does provide a baseline against which efforts to promote agricultural knowledge to the population might be assessed. The use of a longitudinal design would enable better assessment of the predictors of agricultural knowledge as well as the ability to monitor the progress of attempts to raise the levels of knowledge by industry and educational organisations.
Conclusions

Members of the public support farmers’ performance of their roles but know little about the industry. Age, regional or rural location and universalist values predict levels of agricultural knowledge.

More and better communication with the general public is needed. Agricultural education within primary and secondary schools and university faculties may be necessary in order to build on the positive sentiment that exists within the community.

References


DAFF (2011), Issues Paper to Inform Development of a National Food Plan, Department of Agriculture, Fisheries and Forestry, Canberra.

DAFF (2012), National Food Plan Green Paper 2012, Department of Agriculture, Fisheries and Forestry, Canberra.


Web reference

Further reading


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