What Value Viable Country Communities?*

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Abstract

Ensuring the continued viability of rural and regional communities in Australia has become a high priority politically. Economic and environmental forces are perceived as threats to viability. Declining terms of trade for agricultural commodities along with decreased relative prices for transportation and communication services have led to fewer and more concentrated regional centres. Environmental threats such as dryland salinity are perceived as potential future causes of diminished settlement densities. In Europe and the United States of America, similar political pressures to keep rural communities viable are also apparent, often as a component of the "multi-functionality" of agriculture. Given that these pressures are manifest in the form of demands for public resources, the question is whether or not the tax paying public enjoy benefits from any resultant improvement in country community viability. As an integral component of a number of recent non-market, environmental valuation exercises, the value of these benefits have been estimated. The results demonstrate a positive "existence value" held primarily by urban dwellers for country communities.

Key words: country communities, viability, choice modelling, multifunctionality.

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1. Multifunctionality in Agriculture

The last decades of the 20th century saw a shift in agricultural policy in many developed countries. Measures to support production levels through price supports and cost subsidies began to give way to policies with a focus on non-marketed aspects of agriculture. Agricultural industries have been argued to be sources of not only marketed goods and services but also non-marketed outputs including food security, environmental protection, viable rural communities, and heritage values (Anderson 2000). This "multifunctionality" view of agriculture has been condoned by the World Trade Organisation through its establishment during the Uruguay Round of the so-called "Green Box" of support measures for agriculture that are exempt for the purpose of calculating the overall level of domestic support.

While the policy emphasis has shifted away from production support and towards multifunctionality across most developed countries, it is instructive to compare the different approaches taken in Europe and the United States.

In Europe, agriculture is seen primarily as producing positive non-market environmental externalities such as species protection, aesthetic benefits, and public open space, so long as the style of production remains "traditional". Rural viability and the maintenance of traditional farming practices are perceived to be necessary prerequisites for ensuring the supply of environmental and heritage values. The alternative to traditional farming systems might involve the reallocation of agricultural land to urban development or high-intensity forms of agriculture, both of which may threaten environmental values. Hence, European countries have implemented a number of policies that pay farmers to maintain traditional, low intensity farming practices. For example, under the Common Agricultural Policy (CAP) production support has been reallocated to measures designed to protect the environment (Latacz-Lohmann 2000). In the UK the Countryside Stewardship Scheme (CSS) is used as a mechanism for enhancing countryside amenity values, whilst the Environmentally Sensitive Areas (ESA) scheme is designed to protect existing natural areas. Furthermore, many European countries place a strong emphasis on preserving the culture of country communities and villages for tourism and the non-use benefits of knowing that this way of life still exists.

By way of contrast, in the US greater policy focus is placed on managing the negative non-marketed environmental externalities arising from agriculture. Indeed, farmers and traditional agricultural practices are perceived to be part of problem rather than the solution to reversing declines in environmental quality[1]. For example, farmers are supported financially to engage in water pollution control measures rather than to produce agricultural commodities (McCann 2001). Under the Conservation Reserve Program

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[1] That is not to say that in Europe, farmers are seen as environmentally benign. Indeed nutrient run-off from farms is a major environmental issue. However, the emphasis in Europe remains on the continuation of traditional practices that are viewed as being less environmentally damaging than modern intensive agriculture.

(CRP) and other measures such as the Sod-buster and Swamp-Buster programmes, farmers have been paid to set aside land from production in order to secure environmental gain. Thus, it is apparent that in the US, the goal of pursuing multifunctionality could involve tradeoffs between the environment, agricultural production, and rural viability. However, there is also a demand in the US for protection of open space, habitat and aesthetic values (often termed viewsheds), in both peri-urban and rural areas. This is the main driver for the establishment of conservation covenants in the US. There is also some focus on the maintenance of "traditional" farming in the US but to a much lesser extent than is evident in Europe.

In Australia, the policy focus has also shifted. Policies that sought to encourage production through price support and centralised marketing schemes have been phased out. Natural resource management (NRM) has become the key phrase in agricultural policy making. Programmes such as Landcare, the Natural Heritage Fund and the National Action Plan for Salinity and Water Quality involve payments being made largely to landholders who adopt measures to reduce the negative non-marketed environmental impacts of agriculture. The view of agriculture is therefore akin to that taken in the US – agricultural practices are detrimental to the environment. For instance, species protection is advantaged by the reduction or withdrawal of agricultural practices. This is in contrast with the European situation where the continuation of traditional management practices is required to maintain the habitat of species.

The environmental externalities associated with agriculture do not constitute the only dimension of agriculture's "multifunctionality" of relevance to European, US and Australian policy. Declining terms of trade, technological improvement, and specifically the removal of price support schemes, have resulted in shrinkages in rural communities. Anderson (2000) suggests that such changes to the viability of rural communities are of concern to some societies. In particular he advances the "nostalgic attraction" that rural villages and landscapes have for urban dwellers who hold an option value for future visits to the countryside and a sense of military insecurity arising from de-population. In addition to these option and security values, urban dwellers may also enjoy cultural/bequest values of the lifestyle and history associated with country communities. Latacz-Lohmann (2000) argues that, in the European context, trade liberalisation may result in widespread abandonment and marginalisation of agriculture so that the positive environmental externalities of agriculture in those areas would be lost.

Australian rural society has undergone change as the agricultural sector has adjusted to changing economic conditions. Populations in rural areas have declined. Services provided to rural areas (and rural populations) have become more concentrated in the larger country towns and the fortunes of many small towns have waned. Furthermore, the prospects for further reductions in the viability of country communities are strong if policies designed to take land out of agricultural production and put it into conservation reserves or large- scale revegetation projects are pursued vigorously.

As is the case in the US, multifunctionality in Australian agriculture could involve trade-offs between production and the environment and between the environment and country community viability. However, it is a moot point whether or not policies designed to assist agricultural activities in rural areas are in fact merely support measures for agricultural production. Anderson (2000) judges that "some structured subsidies to address the issue of declining service provision in remote rural areas are WTO-consistent under the 'green-box' of the URAA (paragraph 2(g) of Annex 2) and the WTO's Agreement on Subsidies and Countervailing Measures (article 8.2(b))" (p490).

Empirical evidence of the extent of the demand held by urban people for viable country communities would assist in justifying such structured subsidies. There is ample evidence of policies designed to protect the viability of country communities. Recent governments in Australia have bowed to political pressure to maintain levels of telecommunication services in rural areas and have convinced banks to install charters of "social responsibility" with promises of no further branch closures. There is also clear informal evidence of the urban public's demand for maintaining the social structure of "the bush" through donations made to various media appeals in times of "rural crisis" - such as droughts, floods and fires.

However little is known about the extent of benefits arising from the continued viability of country communities. Such information on the willingness of society to pay for assistance measures is useful in determining the optimal policy package[2]. The aim of this paper is to make a contribution to that empirical evidence. It does so by detailing the results of two studies that were aimed at estimating the non-marketed values associated with the outcomes of alternative natural resource management strategies. Both studies employed the Choice Modelling technique for estimating non-market values but in different settings. The first involved the estimation of values associated with wetland management strategies in the NSW agricultural districts of Wagga Wagga and Hay, which are situated on the Murrumbidgee River Floodplain. The second study investigated values associated with the implementation of alternative natural resource management strategies in two agricultural regions – the Great Southern in Western Australia and the Fitzroy River Basin in Queensland – and across the whole of the nation. The two studies therefore offer empirical evidence on the extent of community willingness to pay for country communities specifically in three diverse regions and generally across Australia.

The paper is structured as follows. In the next section, a brief outline of the Choice Modelling technique is provided. In section 3, the results of the Murrumbidgee River Floodplain study are detailed. This is followed by section 4 which contains the results of the second study. Some conclusions are drawn in the final section.

[2] Anderson (2000) makes the important point that "the package would not include the very blunt instrument of general support to prices of farm products regardless of where in the country those goods are produced" (p491).

2. Choice Modelling

To estimate non-market values that are largely independent of any related market good, stated preference techniques are required. This category of valuation instrument involves asking a sample of people about their willingness to trade-off between the non-market good concerned and money. The Contingent Valuation Method (CVM) is perhaps the best known of these techniques. However, the CVM is limited in its capacity to break down the components of value that people experience from non-marketed goods. It involves presenting respondents with a particular scenario and asking how much they are willing to pay to change to that scenario from the status quo situation. As such it is capable only of yielding estimates of the "lumpy" change.

An alternative stated preference technique – Choice Modelling[3] – has, as a strength, the capacity to estimate not only the value of changing from one situation to another, but also the breakdown of that value into its components. It is able to yield estimates of the value of per unit changes in the attributes of the change that are important to people.

Hence, in addition to being used to estimate the value of changing to a new style of natural resource management, Choice Modelling can be used to estimate the values of the attributes of the outcomes of the change that matter to people. For instance, if a change in management will alter the number of endangered species present, the aesthetic appearance of the countryside and the recreational activities that are possible then the aggregate value of the change can be disassembled into its component values (commonly referred to as attribute implicit prices). For example, using Choice Modelling it is possible to estimate the value to respondents of reintroducing an endangered species or improving water quality so that rivers become swimmable instead of only boatable.

In brief, Choice Modelling allows the estimation of values associated with natural resource management changes, including the estimation of the values of the "attributes" of change. The impacts of change on those attributes do not have to be positive. Hence, while changing management strategies may positively impact species protection, it may have detrimental impacts on the viability of the surrounding country communities. The overall value of the change is therefore comprised of positive and negative impacts – internally off-setting each other.

The studies reported in the next two sections involved presenting Choice Modelling questionnaires to respondents depicting alternative natural resource management strategies that yielded both positive environmental outcomes and, in some cases, negative impacts on the viability of rural communities. Specifically, respondents were asked to make choices between alternative NRM strategies and the status quo. The willingness to make a monetary trade-off between the options was assessed through the inclusion of a payment associated with the alternative strategies. By making their choices between the

[3] See Bennett and Blamey (2001) for an exposition of the Choice Modelling technique in the context of estimating non-market environmental values.

options presented, respondents demonstrate their willingness to pay for alternative scenarios of management and for unit changes in the attributes used to describe the alternatives. Given that one of those attributes in both studies reflected the continued viability of country communities, the survey enabled estimates to be made for the value that respondents place on this non-market good.

3. *The value of retaining farm populations in the Murrumbidgee River Floodplain*[4]

Methodology

The primary purpose of the Murrumbidgee River Floodplain (MRF) choice modelling exercise was to estimate values associated with alternative wetland management strategies in the region. The alternative management strategies involved potential reallocations of resources from agricultural uses to conservation. Respondents were presented with three alternatives per choice question: A status quo management strategy, and two different wetland protection strategies that required respondents to pay a one-off environmental levy.

Respondents were told that the wetland protection strategies would generate positive environmental impacts including increases to the area of healthy wetlands, the population of water and woodland birds and the population of native fish. These three impacts were used as attributes in the Choice Modelling application. However, a reallocation of agricultural resources to wetland protection may also have a negative impact on farm viability in the region meaning that some farmers could leave their farms and the region. Information set out in the Choice Modelling questionnaire specified that, while compensation would be paid to farmers and irrigators for any costs associated with the changes to wetland management, some farmers could end-up selling their properties and leaving the region. Thus one of the attributes used in the questionnaire to describe the outcomes of the alternative management strategies was defined as the number of farmers leaving the region as a result of the changed wetland management strategies. A fifth attribute – a levy to pay for the implementation of the alternative strategies – was included to provide the monetary numeraire.

The value ascribed by respondents to the farmers leaving attribute can thus be attributed to the impacts of:

- wetland owners forced to leave the region due to reduced grazing and timber harvesting opportunities; and
- irrigators who may sell some of their water thereby reducing potential production levels.

The effect of "farmers leaving" on respondents may arise for a number of reasons. First, they may feel sympathy for the farmers and their families who leave and for those whose

[4] Full details of the research are provided in Whitten and Bennett (2001).

businesses rely in part on those farmers and their families. These are “non-use” values when held by people living outside the region and not directly affected. This group of people may also hold option values for future visits to rural Australia as well as cultural/heritage values. Those respondents living in the region may exhibit these non-use values for their friends and neighbours but they may also express the “use” value they have for their own livelihoods and access to services and facilities.

Survey mechanics and sample characteristics

Table 1 describes the specifics of the choice modelling survey in the MRF. The sample was drawn from across four geographic locations: Wagga Wagga and Griffith (in the region); Canberra (upstream of the region); and, Adelaide (downstream of the region). The average response rate of 30.2 percent across all samples compares favourable with other CM surveys in Australia. The median age of respondents was older than the population for the sample areas, and respondent’s income and educational qualifications were also generally higher than the wider population. Seventy-eight percent of respondents had visited the region and only 10.3 percent did not intend to visit in the future indicating the potential for option and bequest values.

Table 1: Survey mechanics and sample characteristics

Sample	**Number mailed out**	**Undelivered***	**Successful**	**Response rate**
Griffith	800	113	151	22.0%
Wagga Wagga	800	96	232	33.0%
Canberra	800	121	229	33.7%
Adelaide	400	48	120	34.1%
Total	*2,800*	*378*	*732*	*30.2%*
Visitation		**Yes**	**No**	**Maybe**
Have you visited the MRF region?		77.4%	22.6%	n.a.
Will you visit the MRF in the future?		63.3%	10.5%	26.3%
Gender		**Male**	**Female**	
Survey answered by		60.9%	39.1%	

Respondent age		**Education**	
under 25	2.3%	Completed primary only	4.2%
24-34	11.0%	Completed Year 10/Junior/Intermediate	15.5%
35-44	24.7%	Completed Year 12/Senior/Leaving	15.6%
45-54	23.3%	Diploma or certificate (trade qualification)	21.9%
55-64	17.3%	Tertiary degree	37.9%
65-74	12.9%	Other qualifications	4.8%
75 or over	8.4%		

Respondents	ACT	Adelaide	Wagga Wagga	Griffith	Overall
Age	48	52	49	52	50
Sex (%Male)	61.8%	60.2%	55.8%	66.2%	60.9%
Income	\$52,000-\$77,999	\$36,400-\$51,999	\$36,400-\$51,999	\$36,400-\$51,999	\$36,400-\$51,999
Tertiary education	52.3%	42.5%	28.4%	26.0%	37.9%
Population means					
Age	39	43	39	41	42
Sex (%Male)	48.7%	47.8%	48.5%	50.3%	48.9%
Income	\$48,699	\$30,971	\$32,850	\$33,163	\$34,322
Tertiary education	23.9%	10.4%	8.9%	6.1%	11.0%

* Undelivered surveys were those returned to sender.
Notes: Age and percentage male for individuals over 17 years of age, income is median annual household income. For all samples, the sample is significantly different from the population age at the 95 percent level of confidence.

Results

A multinomial logit model was used initially to describe the data relationships. A generic model was estimated using pooled survey data from the four sub-samples. The computer package LIMDEP was used to estimate the model parameters. The model was specified as follows:[5]

Status quo: $V_1 = ß_1$ Cost + $ß_2$ * 1 / Wetlands + $ß_3$ * 1 / Birds + $ß_4$ * 1 / Fish + $ß_5$ * Farmers leaving

Alternative 2: V_2 = ASC + $ß_1$ Cost + $ß_2$ * 1 / Wetlands + $ß_3$ * 1 / Birds + $ß_4$ * 1 / Fish + $ß_5$ * Farmers leaving + $ß_i$ ASC (socioeconomic and attitudinal variables)

Alternative 3: V_3 = ASC + $ß_1$ Cost + $ß_2$ * 1 / Wetlands + $ß_3$ * 1 / Birds + $ß_4$ * 1 / Fish + $ß_5$ * Farmers leaving + $ß_i$ ASC (socioeconomic and attitudinal variables)

Note that the model structure uses a 1/*x* form for the *wetlands*, *birds* and *fish* attribute parameter coefficients. The 1/*x* form allows for diminishing marginal value to increases in attribute levels. That is, as the increase in the attribute grows larger the willingness to pay for additional increases grows smaller. The *farmers leaving* and *cost* attributes remain linear due to the inclusion of zero as the status quo coefficient.

Tests of this initial model indicated that the critical 'assumption of independence of irrelevant alternatives' in choice modelling was violated (IIA violation).[6] Hence, a nested logit model was constructed. This structure assumes that respondents make an initial choice whether to support a levy to achieve environmental improvements or to accept the status quo environmental conditions. The upper-level decision between whether to support or not support a levy is explained by socioeconomic variables, attitudinal variables, and an inclusive value which represents the sum of expected utility from the

[5] Definitions of the variables used are provided in Appendix Table A1.1.
[6] Testing of the best performing multinomial logit model showed IIA violations at the 1 and 5 percent level.

choice alternatives nested below the “support” or “non-support” options. The levels of the attributes (wetland area, population of native birds, population of native fish, number of farmers leaving and cost) explain choices at the second level. Hence, the nested multinomial logit model estimated was:

Upper-level choice between support and not support:

$$V_{support} = ASC1 + \Sigma\, ß_i \text{ (socioeconomic and attitudinal variables)} + \alpha_1 IV_{support}$$

$$V_{no\ support} = \alpha_2 IV_{no\ support}$$

Lower-level utility associated with each alternative:

$$V_j = ASC2 + ß_1 \text{ Cost} + ß_2 * 1 / \text{Wetlands} + ß_3 * 1 / \text{Birds} + ß_4 * 1 / \text{Fish} + ß_5 * \text{Farmers leaving}$$

where $V_{support}$ is the utility associated with the levy options and $V_{no\ support}$ is the utility obtained from selecting the status quo option. An alternative specific constant (ASC1) was specified for the levy option, and the socioeconomic and attitudinal characteristics were incorporated into the model as interactions with this ASC. Inclusive value (IV) variables from the lower level of the nest were included as explanatory variables in the upper level equations. The coefficient on the inclusive value for the *no support* option (α_2) was fixed to one because only one alternative exists in the lower level nest for this option. V_j is the utility function for either the *no support* option or one of two alternative levy options.

The implicit prices derived from the MRF nested multinomial logit model are shown in Table 2. They are derived from the coefficient attributes (reported in Appendix 1). The formula for *wetland area*, *birds* and *fish* implicit prices (IP) is:

$$IP = - (-ß_{non\text{-}monetary\ attribute} / \text{attribute level}^2) / ß_{monetary\ attribute}$$

And for *farmers leaving* the implicit price formula is:

$$IP = ß_{non\text{-}monetary\ attribute} / ß_{monetary\ attribute}$$

The implicit price for *farmers leaving* is a constant, while that for *wetland area*, *birds* and *fish* varies according to the level of the attribute (due to the functional form). Survey respondents are willing to pay on average $5.73 (a one-off payment per household) to prevent a farmer leaving (and thus avoid the related impacts on the community). Table 2 also reports the 95 percent confidence interval for the implicit price estimates ($4.21 to $7.35 for the farmers leaving attribute).[7] There is no significant variation in the amount that respondents are willing to pay based on where they live. That is, there is no significant difference in respondent’s willingness to pay across the four sub-samples. This

[7] Confidence intervals estimated using a random draw procedure of 200 draws, see Whitten and Bennett (2001) for more details.

indicates that the "non-use" values held by the out-of-region respondents match the "use" values generated for region residents by their living in a viable community.

Table 2: Implicit price estimates of MRF choice model attributes

		95% Confidence Interval	
Attribute	**Mean IP**	**Upper**	**Lower**
Wetland area (per 1000 ha)	$11.39	$13.71	$9.05
Number of native birds (per 1%)	$0.55	$0.79	$0.35
Number of native fish (per 1%)	$0.34	$0.45	$0.24
Farmers leaving (per farmer)	-$5.73	-$4.21	-$7.35

Note: Implicit price estimates are average one-off household values for the specified unit change in attribute level. Prices are in dollars at year 2000 levels and evaluated at the midpoint of the levels used in the survey.

The implicit price estimates clearly indicate the importance that the community places on maintaining farmer livelihoods in the region. Marginal rates of substitution can also be calculated. These reinforce the importance and value placed on the contribution of viable farms to country communities. For example, at the survey attribute level mid-points respondents are willing to trade-off:

> 1 more farmer leaving = 503 ha of extra healthy wetlands = 10.4% extra native bird numbers = 17.0% extra native fish numbers

4. *The value of maintaining country communities: A national and regional perspective*[8]

Research objective

The focus of this study was to produce value estimates for a set of generic attributes that characterise the environmental and social impacts of land and water degradation at national and regional levels. The study addressed the need to develop a better understanding about community willingness to pay for various environmental and social improvements associated with natural resource policies.

Five attributes were selected for the Choice Modelling application (Table 3). Three of the attributes pertained to environmental dimensions of resource use. The impacts of resource use changes on country communities was defined in terms of the net loss of people from country towns each year over the next 20 years. Most small country towns have experienced a diminishing population trend over the last 25 years. In this study, respondents were presented with future scenarios in which the population decline is forecast to either reduce or accelerate, depending on the type of policy implemented. A fifth attribute included in the choice model was an environmental levy. It was included as a means of estimating respondents' willingness to pay for different policy outcomes.

[8] Full details of the research are provided in van Bueren and Bennett (2001).

Table 3: Attributes selected for the choice modelling questionnaire.

Attribute	Attribute name	Unit of measurement
Species Protection	Species	The number of species protected from extinction by 2020.
Landscape Aesthetics	Look	The area of farmland repaired and bush protected by 2020
Waterway Health	Water	The length of waterways restored for fishing or swimming by 2020.
Social Impact	Social	The net loss of people from country towns each year.
Environmental levy	Cost	The amount of money households would be required to pay each year

Survey mechanics and sample characteristics

Three separate Choice Modelling questionnaires were developed in order to examine how value estimates vary across different policy contexts. One questionnaire was designed to estimate respondents' values for resource use impacts at a national level, while the other two questionnaire versions specifically referred to one of two case study regions: the Great Southern region of Western Australia and the Fitzroy Basin region of central Queensland. The same set of attributes was used in each questionnaire.

The national version of the questionnaire was issued to a sample of households drawn at random from a telephone directory database of the Australian population. The region-specific versions of the questionnaire were issued to households from Albany and Rockhampton, which are major townships in the Great Southern and Fitzroy regions respectively. Separate samples from each of these towns were also surveyed using the national questionnaire. The sample sizes, questionnaire response rates, and socioeconomic characteristics of the samples are summarised in Tables 4 and 5.

Table 4: Sample sizes and questionnaire response rates

Questionnaire version	Sample	Sample size	Undelivered	Response rate[a]
National	National	3200	363	17%
National	Albany	1200	79	17%
National	Rockhampton	1200	101	14%
Great Southern	Albany	1200	171	16%
Fitzroy Basin	Rockhampton	1200	75	16%

[a] As a percentage of delivered questionnaires

Table 5: Socio-economic characteristics of the samples

	National	Albany	Rockhampton
Sample means			
Modal age group	45 – 54	65 +	35 - 44
Sex (% male)	61%	55%	55%
Modal annual household income	$36,400 – $51,999	$6,239 – $15,999	$6,239 – $15,999
Proportion with tertiary education	35%	23%	26%
Per cent supporting green group(s)[a]	24%	27%	13%

[a] Respondents were asked whether they donated money to a conservation organisation or whether they were a member of such an organisation.

Results

A similar nested model structure was used to model respondents' choices of alternative options as that used for the Murrumbidgee[9]. As for the first study, respondents were asked to choose between three alternatives. Two alternatives involved the payment of an environmental levy and the other alternative was a status quo option. The main differences in model structure (apart from differing significant socio-economic and attitudinal variables) are that all attributes enter the model linearly (as opposed to the 1/*x* functional form used for the Murrumbidgee) and ASC2 in the lower level choice options is assumed zero. Hence, the lower-level utility function for option *j* was specified as:

$$V_j = \beta_6 Species + \beta_7 Look + \beta_8 Water + \beta_9 Social + \beta_{10} Cost$$

where *j* is either the *no support* option or one of two alternative levy options. As in the first study, the upper-level utility associated with the support or non-support of a levy was assumed to be a function of socio-economic characteristics, attitudinal variables, and an inclusive value[10].

The sampling strategy enabled five different models to be estimated, three of which used data from the national questionnaire, and two of which were derived from the results of the case study questionnaires. The parameter estimates for these models are summarised in Appendix Table A2.2. The model results were used to calculate implicit prices for each of the attributes, as reported in Table 6. The results indicate that respondents perceive declining rural populations as a cost. Thus, in the national context, respondent households are willing to pay approximately 10 cents per annum over a twenty year time period for every 10 persons that are retained in country communities. Unlike the environmental attributes, values for retaining rural populations are invariant across the three population samples.

[9] Modelling was undertaken using the computer package Limdep. Initially a multinomial logit model was used to describe the data relationships. However, this specification was shown to result in breaches of the Independence of Irrelevant Alternatives (IIA) assumption.

[10] See Appendix Table A2.1 for a description of variables.

The case study questionnaires yielded significantly higher implicit price estimates, with values for country communities ranging between $2.24 per annum for the Fitzroy study to $0.55 per annum for the Great Southern study. Framing or scope effects could be responsible for these higher values. A framing effect is said to occur when respondents are willing to pay more for an attribute when it is assessed in a narrow context compared to when it is valued as part of a more inclusive package. It is possible that the case study questionnaire focused respondents' attention on a narrow set of impacts in a region they were familiar with, whilst the national questionnaire encouraged respondents to think more broadly. Alternatively, a scoping effect could be the dominant reason for the higher values. This refers to the situation where diminishing marginal values are observed for large changes in attribute levels, as is the case in the national questionnaire.

Another observation to be made from the case study results is that Rockhampton households value the social impacts of resource use more highly than Albany households. This could reflect the different attitudes and socio-economic characteristics of these populations. For instance, it is apparent that a smaller proportion of Rockhampton households donate money to environmental organisations than Albany households (table 5). This observation supports the finding that, relative to Albany people, Rockhampton residents place more weight on social impacts than environmental impacts. In addition to attitudinal differences, the resource issues pertaining to the Great Southern and Fitzroy Basin regions are substantially different, and this is likely to contribute to the observed differences in value estimates. The Fitzroy region is still undergoing agricultural development and land clearing whilst the Great Southern is mature.

Table 6: Mean attribute implicit prices with 95% confidence interval in parenthesis

	Species protection	**Landscape Aesthetics**	**Waterway Health**	**Social Impact**
	$ per species protected	$ per 10,000 ha restored	$ per 10 km restored	$ per 10 persons leaving
National questionnaire				
National sample	0.68	0.07	0.08	-0.09
	(0.47 – 0.88)	(0.02 – 0.14)	(0.04 – 0.16)	(-0.11 to -0.07)
Albany sample	0.27	0.21	0.00	-0.11
	(-0.03 – 0.51)	(0.14 – 0.29)	Not significant	(-0.14 to -0.08)
Rockhampton sample	0.28	0.12	0.01	- 0.09
	(0.03 – 0.58)	(0.2 – 0.3)	(0.07 – 0.14)	(-0.06 to -0.08)
Great Southern questionnaire				
Albany sample	1.55	1.84	1.56	-0.55
	(0.77 – 2.33)	(1.06 – 2.79)	(0.92 – 2.40)	(-0.88 to -0.30)
Fitzroy questionnaire				
Rockhampton sample	0.00	1.57	2.02	-2.24
	Not significant	(0.41 – 3.25)	(0.94 – 3.55)	(-3.32 to -1.55)

5. Concluding remarks

The results of the two studies presented in this paper demonstrate that both rural and urban Australians value the continued viability of country communities. This finding is robust in that it has been replicated for three diverse and geographically separated regions across a variety of rural, regional and urban populations, as well as in the national context.

It remains difficult to draw direct quantitative comparisons across the results of the two studies given their differing contexts. Most significantly, comparison is hindered through the use of two different attribute definitions. Whilst both studies were focused on the viability of country communities, they approached that concept from slightly differing angles. In the MRF study, the attribute was defined as the number of farmers leaving the region. In the second study, the number of people leaving country towns was the focus. These two attributes are not the same. For instance, farmers leaving may involve the departure of other family members and the closure of service businesses that support other members of the community who may also leave the district. Other factors that complicate the comparison include:

- The two studies employed different frames and scopes. The importance of framing and scope effects on value estimates was demonstrated in the second study.
- The first study used a one-off tax as a payment vehicle whilst the second study used an on-going, annual environmental levy. Consequently, the implicit prices derived from each study need to be adjusted to take account of the different payment frequency.

Both studies reveal a consistency in value estimates between rural and urban populations. Comparisons within each study of the values estimated for respondents living in rural and urban areas showed no significant differences. This is a result not expected a priori given that the composition of the values enjoyed by the two groups of people is different. However, it appears that the values of a viable community enjoyed directly by people living there are equivalent to the “nostalgic attraction” felt by urban dwellers for “the bush”.

There are numerous policy implications that follow from these results. Not the least of these is a justification for the redirection of wealth from the city to the country to ensure that rural and regional Australia remains viable. It is worth reinforcing the point that this should not be achieved through price intervention in commodity markets but rather through payments specifically designed to achieve the goal of maintaining country communities. Payments for environmental stewardship may assist in this quest.

The converse of the support argument is that policies impacting rural and regional Australia need to be assessed carefully for any detrimental impact on the viability of country communities. These impacts should be factored into the policy assessment process.

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Appendix 1: Murrumbidgee River Floodplain study

Table A1.1: Variable definitions – Murrumbidgee River Floodplain study

Variable	Definition
Cost	Size of one-off levy on income via income tax
Wetlands	Area of healthy wetlands (hectares)
Birds	Number of native birds as a percentage of pre-1800 numbers
Fish	Number of native fish as a percentage of pre-1800 numbers
Farmers leaving	Number of farmers who leave as a result of management changes
ASC1	Alternative specific constant equals 1 for options 2 and 3, else zero
ASC2	Alternative specific constant equals 1 for option 2 else zero
Age	Age of respondent
Sex	Gender of respondent (1 for female, 0 for male)
Adelaide	Dummy variable equals 1 for Adelaide else zero
Canberra	Dummy variable equals 1 for Canberra else zero
Griffith	Dummy variable equals 1 for Griffith else zero
Visit	Dummy variable equals 1 for respondents who visited the region else zero
Intended visit	Dummy variable equals 1 for respondents intending to visit the region else zero
Income	Log of respondent income
Tert	Dummy variable equals 1 for tertiary education else zero
Trade	Dummy variable equals 1 for diploma/trade qualification else zero
Hschool	Dummy variable equals 1 for high school qualifications else zero
Other	Dummy variable equals 1 for other educational qualifications else zero
NDT	Dummy variable equals 1 for respondents indicating they do not trust government to make levy one-off or protesting against the payment vehicle on other grounds else zero
Confusion	Dummy variable equals one for respondent reporting they were confused about survey design or information else zero
Levy	Dummy variable equals one where respondent indicated levy is not a good idea else zero

Table A1.2: Model results – Murrumbidgee River Floodplain study

Model statistics					
N (choice sets)		3148			
Log L		-2400.297			
Adjusted rho-square (%)		33.58			
Chi-square (constants only)		2445.566 **			
Utility function (lower level choice)	**Coefficient**		***Branch choice equations (upper level choice)***	**Coefficient**	
ASC2	0.120	**	ASC1	5.809	**
Cost	-0.122E-1	**	Income	-0.345	**
1 / Wetlands	-7831.35	**	Intended visit	-0.444	**
1 / Birds	-0.508	**	Age	0.101E-1	**
1 / Fish	-0.328	**	Tertiary education	-0.216	*
Farmers leaving	-0.700E-1	**	NDT	1.553	**
			Levy	2.111	**
Inclusive value parameters			Griffith	0.539	**
Support	0.465	**	Adelaide	-0.228	
No support	1.000				

Note: Data from all samples is pooled in Table A1.2.
ASC_1 is coded one for 'Alternative 2' else zero.
* denotes significance of parameter at the 10% level, ** denotes significance at the 5% level.

Appendix 2: National and regional impacts of land and water degradation

Table A2.1: Variable definitions – impacts of land and water degradation study

Variable	**Definition**
Species	Endangered species, measured by the number of species protected from extinction.
Look	Landscape aesthetics, measured by the area of farmland repaired and bush protected (hectares).
Water	Waterway health, measured by the total length of waterways restored for fishing or swimming (kilometres).
Social	Viability of country communities, measured by the net annual loss of population from country towns.
Cost	The environmental levy, measured as an annual levy on household income
ASC	Alternative specific constant for the levy option, assigned a value of 1 for options B and C, else zero.
Sex	Respondent's gender, assigned a value of 0 for females and 1 for males.
Age	Respondent's age category, ranging from 1 to 6 (youngest to oldest).
Income	Respondent's before-tax household income category, ranging from 1 to 8 (lowest to highest).
Green	Dummy variable assigned a value of 1 for respondents who are members of, or donate to, an environmental organisation, else zero.
Confuse	Dummy variable assigned a value of 1 for respondents who reported that they found the background information confusing else zero.
IV	Inclusive value representing the expected utility from alternatives in the lower level of the nest.

Table A2.2: Model results – impacts of land and water degradation study

Model	**1**		**2**		**3**		**4**		**5**	
Questionnaire	National		National		National		Great Southern		Fitzroy Basin	
Sample	National		Albany		Rockhampton		Albany		Rockhampton	
Model statistics										
No choice sets	2329		860		720		765		818	
Log Likelihood	-2196.05		-803.75		-645.29		-683.77		-802.10	
LRI	0.2271		0.2155		0.2419		0.2698		0.1770	
LRI adjusted	0.2251		0.2099		0.2355		0.2641		0.1709	
Utility function (lower level choice)										
SPECIES	5.49E-03	**	2.39E-03	*	2.89E-03	*	1.28E-02	**	4.07E-03	
LOOK	6.01E-08	**	1.84E-07	**	2.04E-07	**	1.52E-06	**	8.07E-07	**
WATER	6.33E-05	**	4.55E-05		7.54E-05	**	1.29E-03	**	1.04E-03	**
SOCIAL	-6.94E-05	**	-9.46E-05	**	-6.74E-05	**	-4.52E-04	**	-1.15E-03	**
COST	-8.13E-03	**	-8.78E-03	**	-1.04E-02	**	-8.28E-03	**	-5.14E-03	**
Branch choice equations (upper level choice)										
ASC	-5.85E-01	**	-1.00E+00	**	2.40E+00	**	-2.02E+00	**	9.30E-01	**
SEX	-3.24E-01	**	5.01E-01	**	-5.96E-01	**	5.70E-01	**	-6.94E-01	**
AGE	7.96E-02	**	-1.22E-01	**	-3.50E-01	**	9.03E-02		-7.39E-02	
INCOME	2.62E-01	**	2.13E-01	**	1.72E-01	**	3.48E-01	**	1.15E-01	**
GREEN	2.47E-01	**	4.50E-01	**	6.49E-01	*	1.31E+00	**	2.02E-01	
CONFUSE	-7.07E-01	**	-6.77E-01	**	-1.05E+00	**	-7.74E-01	**	-6.37E-01	**
Inclusive value parameters										
IV no support	1		1		1		1		1	
IV support	0.3434	**	0.3914	**	0.1950		0.2461	*	0.2262	

Notes: * denotes significance of parameter at the 10% level, ** denotes significance at the 5% level.