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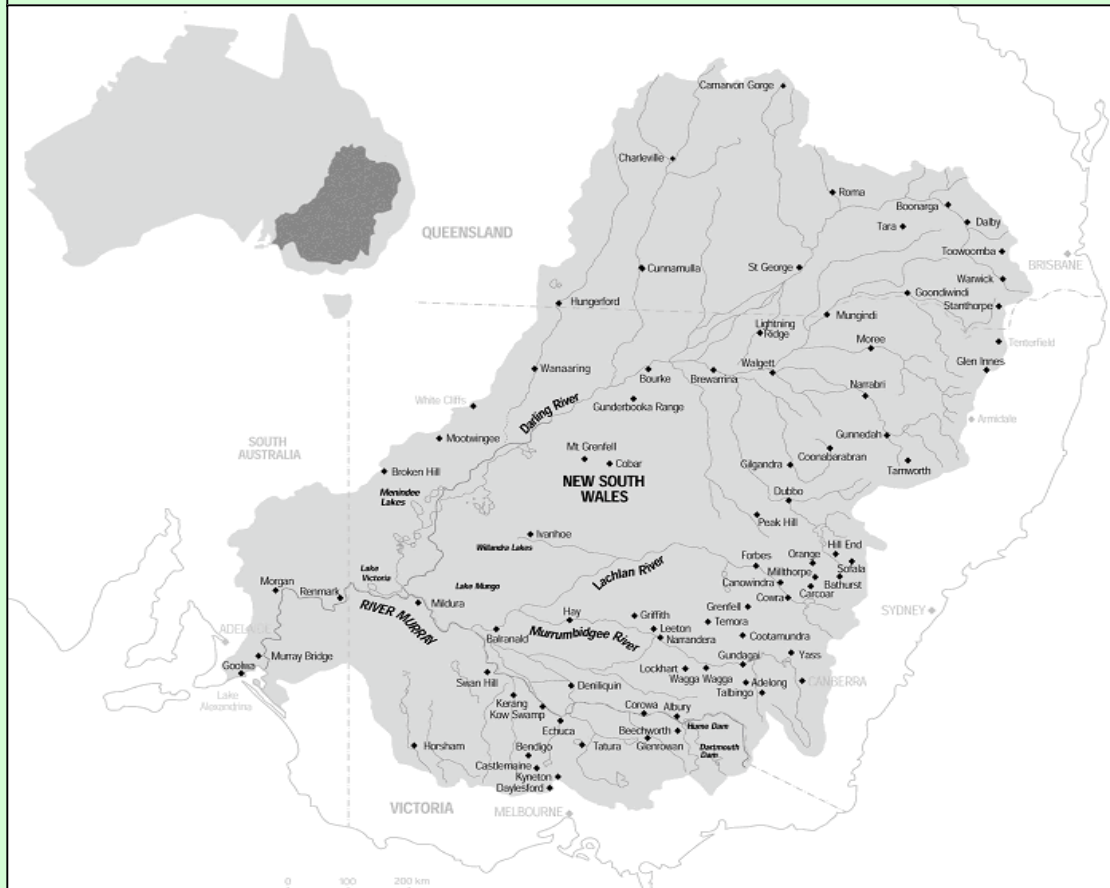
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Accommodating Indigenous Cultural Heritage Values in Resource Assessment: Cape York Peninsula and the Murray-Darling Basin, Australia

Tyron J. Venn and John Quiggin

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Schools of Economics and Political
Science
University of Queensland
Brisbane, 4072
rsmg@uq.edu.au



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Tyron J. Venn and John Quiggin²

Risk and Sustainable Management Group, School of Economics, The University of
Queensland, Brisbane Qld 4072, Australia.

In this paper we consider the problem of accommodating indigenous cultural heritage values in resource assessment and valuation. We suggest a need for price-based approaches to valuation to be replaced by or complemented with quantitative constraints, reflecting the requirement that rights should not be violated.

Keywords: indigenous cultural heritage, resource assessment, valuation

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Introduction

Since the landmark Australian High Court ruling in *Mabo v State of Queensland (No. 2) 1992*, the traditional rights of indigenous Australians to natural resources have been accorded greater legal and public recognition in natural resource management. The challenge of meeting the increasing demand from Australian policy-makers for indigenous cultural heritage values shares similarities with the demand for environmental values that arose in the early 1980s. In particular, both types of values include large non-use and indirect-use components that are not traded in markets.

Economists and other analysts have developed various methods to assess policies where tradeoffs must be made between environmental and other social objectives. The aim of this paper is to consider which, if any, of these methods are likely to be appropriate when indigenous cultural heritage values are important. Adopting the distinction between price-based and quantity-based techniques made by Venn and Quiggin (2005), it is argued that the central focus on prices, which is characteristic of standard methods of non-market valuation, is unlikely to be appropriate in indigenous cultural contexts.

The paper begins by considering several methods employed to assess alternative resource management strategies. A review of empirical studies that have valued non-traded goods and services in indigenous cultures follows. Next, factors that are likely to contribute to the failure of efforts to value indigenous cultural heritage are discussed. Attention is then turned to two case studies, those of Wik forestry on Cape York Peninsula, north-eastern Australia, and water policy reform in the Murray–Darling Basin of south-eastern Australia. We argue that quantity-based techniques (particularly goal programming) are likely to be suitable for incorporating indigenous cultural heritage in policy analysis. Concluding comments are made and possible future developments considered.

Price and Quantity Methods for Policy Analysis

Two broad approaches to the assessment of complex resource management issues have been considered in the literature: benefit–cost analysis (BCA) and multiple criteria analysis (MCA). Venn and Quiggin (2005) argue for an alternative classification, distinguishing between price-

based and quantity-based approaches. In this section, we briefly summarise some points relevant to the current problem.

BCA is the classic example of a price-based approach. The central task in BCA is the derivation of market or shadow prices for all project outputs and inputs under consideration. Other issues considered in the BCA literature, such as discounting and the treatment of risk may be interpreted as providing time-dated and state-contingent shadow prices.

Traditional applications of BCA were seen as providing a partial valuation, focused on market benefits and costs, but also including some relatively easy to estimate non-traded benefits and costs such as time savings. Most non-market values were left for political or social evaluation processes. Increasingly, however, practitioners of BCA have aimed at ‘total economic valuation’, in which monetary valuations of non-market benefits and costs are made for all relevant factors, including impacts on ecosystem services. Thus, total economic valuation represents a purely price-based approach to policy analysis.

Total economic valuation requires techniques for eliciting monetary valuations of non-market goods and services. Elicitation techniques may also be classified as price-based or quantity-based. The obvious price-based approach to valuation of project outputs is the use of direct questions of the form ‘*How much would you be willing to pay for one additional unit of output x ?*’. Experience has shown that questions of this sort rarely yield useful responses, and a range of alternative methods have been developed, usually incorporating quantitative information.

The most popular approach has been the referendum or ‘dichotomous choice’ model in which respondents are asked to make choices between pairs of options, commonly framed as hypothetical referendums. This approach represents a substantial shift from price-based to quantity-based representations of the problem. The polar alternative to direct price questioning is choice modelling, where preferences are elicited over vectors of quantities. Choice modelling techniques have been incorporated into price-based BCA through the inclusion of a monetary payment, resulting in a mixture of price and quantity information.

To the extent that MCA values are derived by forming weighted sums of various ‘scores’ or outcome measures for a discrete set of management strategies, MCA is a price-based approach,

with practitioner or expert judgement being used in place of economic analysis to derive the relative prices. For this reason, many economists are critical of the high level of subjectivity that can enter an MCA model, asserting that any alternative can be found optimal by varying the weights, the criteria against which the performance of policy options are measured, and methods for ranking policy options against the criteria (Bureau of Transport Economics 1999; Bennett 2000; Dumsday forthcoming).

These criticisms may be valid in particular cases. However, many MCA approaches do not employ arbitrary weights and are more appropriately considered as incorporating a mixture of price-based and quantity-based information. Information about the preferences of decision-makers is incorporated in the form of quantity constraints and targets that define the decision space, and weights (shadow prices) that direct the algorithm search for optimal policies within the decision space, rather than unit prices alone.

Goal programming, an extension of linear programming to accommodate problems with multiple goals defined in non-commensurate units, is one of the oldest and most widely used continuous MCA techniques. A single objective function is still maximised or minimised subject to a matrix of (hard) constraints; however, it is actually composed of several goals (soft constraints), which are the multiple objectives the decision-makers wish to achieve. In contrast to linear programming, the actual objectives do not appear in the objective function. Instead, the objective function of a goal programming model comprises the weighted sum of unwanted deviations from the aspiration (target) levels of goals, and the aim of goal programming is to minimise the unwanted deviations. Prices are implicit in the weights placed on deviations.

In all economic problems, there is a duality between prices and quantities. At given quantities, marginal trade-offs define shadow prices. Conversely, price data may be used to estimate quantitative relationships using standard duality techniques. Thus, the issue is not to determine whether price-based or quantity-based methods are 'correct', but to determine which will make the best use of limited available information, and human and financial resources.

Non-Market Valuation in Indigenous Cultural Contexts

Price-based approaches to policy analysis require non-market valuation methods that are

founded on theory primarily developed in the context of developed market societies, where people are accustomed to trading a wide range of goods and services for money. They have been widely applied in Western cultural contexts to inform natural resource managers and increasingly to assess non-use values of tangible cultural heritage assets (mostly European and North American buildings and paintings) (Navrud and Ready 2002).

Even in the context of a developed market society, economists, ecologists and environmentalists have expressed doubts about the degree to which non-market valuation techniques can estimate total economic value (Sagoff 1988, Diamond and Hausman 1994, Carson *et al.* 2001, Nunes and van den Bergh 2001, Chee 2004). It is likely that members of indigenous cultures hold many more non-use and indirect-use values than non-indigenous people. In this context, sacred values are particularly important, and particularly resistant to price-based trade-offs.

If the value of indigenous cultural heritage cannot be captured by price-based valuation approaches, then indigenous values will be systematically underrepresented relative to non-indigenous values in price-based economic analyses of alternative resource management policies. Therefore, it is important to consider whether these methods are applicable in indigenous cultural contexts.

Internationally, a number of studies have attempted to value elements of indigenous cultural heritage with price-based techniques (Godoy *et al.* 1995; Melnyk and Bell 1996; Haener *et al.* 2001; Boxall *et al.* 2003; Adamowicz *et al.* 2004). Australian studies include analyses of commercial benefits from indigenous cultural heritage (Janke 1998; Zeppel 2001) and the replacement value of subsistence production (Altman 1987; Asafu-Adjaye 1996). However, all of these studies focussed on use values only and there appears to be no history of total economic valuation of indigenous cultural heritage.

A choice modelling study by Rolfe and Windle (2003) appears to be the only published attempt to estimate non-use values of indigenous cultural heritage protection in Australia and possibly the world. That research assessed tradeoffs between the development of water resources and associated impacts on environmental and indigenous cultural heritage protection in the Fitzroy Basin of central Queensland.

Three groups of people were sampled in the study - the indigenous population of Rockhampton, and the general populations of Rockhampton and Brisbane. The indigenous group valued cultural heritage protection much higher than the general population groups, who were found to be more concerned about environmental issues. However, many indigenous residents of Rockhampton are not traditional owners from the Fitzroy Basin, being spiritually connected with land distant from the study area (Windle pers. comm., 2005). Partly as a result of such considerations, Rolfe and Windle (2003) did not aggregate indigenous and non-indigenous valuations of cultural heritage, choosing instead to leave the decision about relative weights for each group's valuation to policy-makers.

Challenges of Non-market Valuation of Indigenous Cultural Heritage

Adamowicz *et al.* (1998) reviewed North American indigenous value systems and found that, in addition to the traditionally identified contingent valuation method (CVM) biases, there are likely to be several areas where non-market valuation efforts may fail. Many impediments to successful application of CVM are also applicable to other stated preference techniques, including choice modelling. An adaptation of the Adamowicz *et al.* (1998) classification of failings follows, with six additional factors (asterisked) likely to be relevant in studies valuing Australian indigenous cultural heritage. These factors are briefly discussed in an Australian context.

- (i) Challenges in eliciting individual valuation responses from indigenous people because of:
 - (a) lack of substitutability between goods;
 - (b) unfamiliarity with the purchasing power of money and the absence of an alternative numeraire*;
 - (c) poor English and numeracy skills*;
 - (d) the low level of knowledge and understanding that indigenous people have about non-indigenous forms of natural resource management*;
 - (e) problems of interviewer and compliance bias*
 - (f) the property rights regime perceived by the respondent;
 - (g) the tendency for indigenous people to accumulate and share wealth among

- larger groupings of individuals than households*; and
- (h) low satiation limits for some indigenous people.
- (ii) Challenges in aggregating the responses of indigenous people because of:
 - (a) the political decision-making system in indigenous communities;
 - (b) gender, generational and other demographic effects on values attributed to cultural heritage;
 - (c) cultural diversity between traditional owner groups*; and
 - (d) the need to distinguish between traditional owner groups and the local indigenous community*.
- (iii) Challenges in aggregating indigenous and non-indigenous responses because of:
 - (a) the use of different numeraires to value cultural heritage;
 - (b) systematic differences in income levels; and
 - (c) differences in political structures.

Challenges eliciting individual valuation responses from indigenous people

Substitutability between various goods and services is critical for non-market valuation. However, some natural resources, places, stories and artefacts may be sacrosanct and non-negotiable for particular indigenous clan groups. Adamowicz, *et al.* (1998) described such goods and services as *taboo*. Smith (2001) summarised Australian and international ethnographic research that describes types of sacred values and explains why they may be considered invaluable. In reference to valuation of indigenous access to traditional land in Australia, Godden (1999, p. 18) asserted that:

valuation techniques for non-marketed goods may simply be inappropriate if indigenous peoples' valuation of land is non-utilitarian... It may make as little sense to ask an indigenous person their WTA [i.e. willingness to accept compensation] for the loss of access to traditional living areas from which they derive ceremonial/religious values as it would be to ask a devout Christian how much they would need to be compensated in monetary terms to forswear any practice of their religion. It is not that the estimation is difficult – in the conventional sense of problems with estimating values in contingent markets – but that the entire idea of forswearing for monetary compensation is simply nonsensical.

Stated preference techniques that elicit willingness to pay (WTP) money or willingness to accept (monetary) compensation (WTAC) are appropriate only when respondents have a sound

appreciation of the purchasing power of money. Many Australian indigenous communities do not and there is no feasible alternative numeraire.

For many indigenous Australians, English is a second, third or fourth language. Poor reading, writing and numeracy skills are common in indigenous communities, which will affect survey comprehension and limit the capacity of respondents to articulate their preferences.

Indigenous Australians from remote communities have been observed to answer questions with responses they believe the interviewer wants to hear. Interviewer bias is a general problem in survey research but is particularly prominent in Australian indigenous culture because of this cultural predisposition.

Non-market valuation techniques are endogenous to the type of property rights regime the respondent perceives. Adamowicz *et al.* (1998) explained that for people who are used to thinking of access to resources being managed under a communal property rights system, it may be difficult for individuals to estimate how their own individual utility is affected by changes in property rights. Furthermore, there may be an ethical dimension associated with the current legal distribution of property rights between indigenous and non-indigenous people. Australian indigenous respondents are likely to protest at being asked their WTP for access to cultural goods and services that they regard as a traditional property right.

The tendency for Australian indigenous people to accumulate and share wealth among larger groupings of individuals than households suggests that an individual may find the task of estimating their personal WTP from the extended family budget challenging. As Quiggin (1998) notes, the existence of altruism within and between households creates serious difficulties for analysis based on WTP concepts, even when households are well-defined.

Challenges in aggregating the responses of indigenous people

The conventional approach to estimating social welfare in stated preference methods is to sum the individual 'votes' of those sampled. This approach may not be useful for estimating indigenous cultural heritage values because it may not reflect actual decision-making processes nor be consistent with the indigenous group's concept of social welfare. The political decision-

making processes of many Australian indigenous cultures, particularly those in remote parts of the country, are still driven by elders rather than the votes of individual members.

In many economic valuation studies, identifying a representative sample is relatively simple. Throughout Australia, there are hundreds of indigenous cultures, each with their own distinctive cultural heritage and aspirations for the future (Reynolds 2003). Evidence from ethnographic research suggests that extrapolating findings about cultural heritage values from a set of sampled indigenous cultures to other cultures is not feasible, even if they are geographically adjacent and share similar language dialects (Martin 1993). If indigenous cultural heritage associated with a particular area can be valued, then it can only be valued by traditional owners for whom the particular sites, landscapes and stories associated with that area are of cultural importance (Lavarch and Riding 1998).

In Australia, factors including historic government policies of forced migration, assimilation and separation of family members make the task of defining the population of indigenous people for whom a particular place is of cultural importance highly challenging. Davies (2003) discussed the need to distinguish between the geography of traditional ownership of country and the geography of people's residence. Traditional owners rarely all live in the same place and many do not live on their traditional country (Forward NRM and AATD 2003).

There are also likely to be systematic differences in the way that indigenous individuals or groups within a particular clan value their cultural heritage. Clifford (2001) reported that obtaining representative views from all elements of an Australian indigenous community can only be achieved after an ethnographic study over a considerable length of time.

Challenges in aggregating indigenous and non-indigenous welfare

Relative to non-indigenous Australians, indigenous Australians typically have low incomes and many live in conditions that non-indigenous Australians could not and would not tolerate. A problem with stated preference techniques is that the economic votes of the poor count for less in the market place than the economic votes of the rich – the bias of *intragenerational incidence* (Pearce *et al.* 1994). Many non-indigenous Australians are sceptical about the existence and character of indigenous sacred sites (McWilliam 1998). The 97.6 per cent of the Australian

population who are non-indigenous (Australian Bureau of Statistics 2002) are likely to place a lower value on indigenous cultural heritage than indigenous Australians. Policy decisions based on an estimate of aggregate social welfare elicited with WTP or WTAC techniques are likely to be affected by the systematic difference in the distribution of income between indigenous and non-indigenous people, with non-indigenous valuations ‘swamping’ the valuations made by indigenous people. Although the use of equity weights has been proposed as a remedy in these circumstances, such methods are commonly criticised and rarely adopted (Pearce *et al.* 1994).

Many of the highlighted challenges to non-market valuation of indigenous cultural heritage are more naturally expressed in terms of rights than aggregate benefits and costs. This suggests a need for price-based measures to be replaced by or complemented with quantitative constraints, reflecting the requirement that rights should not be violated.

Accounting for Indigenous Cultural Heritage Values Within the MCA Framework: The Case of Wik Forestry on Cape York Peninsula

Wik, Wik-Way and Kugu people (Wik people) of Aurukun Shire on Cape York Peninsula in Queensland, north eastern Australia, aspire to economic independence. Successful native title determinations in *Wik Peoples v State of Queensland and Others 1996* in the High Court and *Wik Peoples v State of Queensland 2000; 2004* in the Federal Court, appear to have conferred upon Wik people rights to utilise timber resources for commercial purposes (Venn forthcoming). The 0.4 million hectares of *Eucalyptus tetrodonta* (Darwin stringybark) native forest on traditional Wik land, has been identified as a potential engine to drive their vision of economic independence (Venn 2004a). Balkanu Cape York Development Corporation representatives of Wik people sought an assessment of the financial feasibility of a timber industry on Wik land and the development of a suite of culturally appropriate forestry strategies that could satisfy the multiple forestry objectives of Wik people. As part of this research, Venn (2004b) assessed the potential for the BCA framework to accommodate their multiple objectives, including protection of cultural heritage. Several impediments were identified.

1. There was no penetration of the cash economy in Aurukun township until the mid-1960s and cash has only become a major part of the local economy since the mid-1970s.

Wik people are largely excluded from the market economy and are financially dependant on government programs. It is evident from casual conversation with Wik people that many individuals, particularly elders (the decision-makers) still do not have an appreciation of the purchasing power of money, including the value of natural resources on traditional land. However, Aurukun town is not a subsistence economy and no numeraire other than money appears to be feasible for eliciting WTP or WTAC.

2. The 900 Wik people of Aurukun are not a cohesive group of people, but a complex of 23 allied and competing clan groups with several distinct cultures, languages and dialects, totems and territorial affiliations, and variable status, power and authority.
3. English is not a first language for Wik people and many have poor reading, writing and numeracy skills that would seriously impede conducting a questionnaire.
4. *Gatekeepers*³ are strongly opposed to research methodologies that utilise individual questionnaires.
5. Aurukun Shire is an area where a traditional indigenous cultural environment still prevails. Most important decisions affecting clan members are made by Wik elders, not by the votes of all individuals concerned.
6. The Wik are tired of contributing to surveys, meetings and reports, which historically have never led to improved outcomes for their people.
7. Many Wik people have difficulty comprehending the potential consequences of non-indigenous forestry practices. Casual conversation indicated that Wik people regard their forest resource as being virtually infinite, such that any form of forestry disturbance, including large-scale woodchipping, could be absorbed with relatively minimal impact on cultural heritage and the environment.

Given these challenges to conducting a BCA, MCA was explored as an alternative approach to assess forestry policies for Wik people. Venn (2004b) reviewed the appropriateness of five MCA methods, namely linear programming, goal programming, simulation, range of values

³ Gatekeepers are people or organisations who act a sieve at the ‘gates’ of an indigenous community, only allowing entry into the community and access to key indigenous persons to people, such as. researchers, business people and government officials, whose philosophies and objectives coincide with theirs.

method and the analytic hierarchy process. The unique decision-making environment of Aurukun Shire suggested that a suitable MCA technique must possess three characteristics. First, as a result of Wik people's frustration with recent attempts to involve them in participatory land-use planning and a desire to retain the option not to 'own' the forestry strategies generated (providing the Wik with an avenue to exit the forestry evaluation process), the approach must not require Wik people to participate in the early development of alternative forestry options. Wik people would like information about a set of potential timber industry strategies that they can review in their own time and space, becoming involved in project selection and development after several forestry opportunities have been defined.

Second, the evaluation technique must provide the decision-maker with an array of performance measures and allow decision criteria to be measured in standard (traditional) units that Wik people can understand. Measurement of decision criteria in (or transformation of standard units of measurement into) non-standard units is unlikely to facilitate this. It is also important that each Wik forestry objective is individually represented in the model, as opposed to a single, proxy measure. Third, the evaluation technique must facilitate a continuous decision space, because a well-defined set of timber utilisation alternatives does not exist for traditional Wik land.

Goal programming was found to best satisfy the evaluation criteria. This method requires no formal participation of indigenous people during model development, facilitates the evaluation of forestry strategies with multiple performance criteria measured in standard units and has a continuous decision space. The only model inputs elicited from Wik people were insights into Wik forestry objectives gained via informal discussions *on country* with groups of elders. These discussions took place during rest periods while undertaking contemporary and traditional land management activities. For the purposes of goal programming, Venn (2004b) expressed Wik forestry objectives in terms of five goals, which in decreasing order of importance are to:

1. maximise total employment generation;
2. maximise employment generation *on country*;

3. maximise income generation;
4. minimise forest area harvested south of the Archer River; and
5. minimise forest area harvested north of the Archer River and outside of mining leases.

The ‘*on country* employment generation’ goal combined the cultural and social aspirations of Wik elders to facilitate better connection of people with *country* and to encourage population decentralisation. The ‘minimise forest area harvested’ goals reflect the desire of Wik people to preserve their cultural heritage, protect the environment and retain the option of managing these forest areas for other economic purposes, including ecotourism. Effectively these two goals restrict harvesting to areas where cultural heritage and environmental values are presently or will in the future be degraded by the actions of bauxite mining companies. Achievement of the income goal is measured in millions of dollars in net present value. Therefore, although the achievement of other goals is measured in non-pecuniary terms, shadow prices can be derived.

It was not possible to elicit specific goal aspiration levels from Wik people. The author interpreted Wik forestry objectives as a desire to generate as much employment and income as possible, while minimising forest harvested south of the Archer River and in particular areas north of the Archer River to as close to zero as possible. It was also impossible to elicit Wik preferences regarding tradeoffs between the performance levels of goals (goal weights). In the absence of precise preference structure information, four preference structures were examined – two of a lexicographic nature that do not permit tradeoffs between goals, and two that allow tradeoffs between all goals in accordance with weights that reflect the relative importance of each goal. It was hoped that Wik people could select preferred forestry strategies (and therefore implicitly select particular goal weights) from among those generated by the model and that this information could be used to iteratively modify goal weights until forestry strategies closely reflected actual Wik preferences. In this way, Wik valuation of *on country* employment generation, and cultural heritage and environmental conservation could be indirectly revealed.

The goal programming analysis identified optimal⁴ timber utilisation strategies for six budget constraint levels (ranging from \$0.25 million to \$10 million), four economic environment

⁴ The strict definition of goal programming is that it is a process of *satisficing*, not optimising. In this paper, the term ‘optimal’ is used in the broad sense, i.e. the optimal solution generated by goal programming.

scenarios (regarding property rights to timber and markets for timber products) and four goal weight structures from the private perspective of the Wik population of Aurukun town. When Wik elders and the Wik Timber Crew (responsible for small-scale timber production for local domestic use) were presented with a set of forestry policies generated by the goal program in December 2004, the response received was that all options developed by the goal programming model were sound. This appears to indicate that the goals and constraints set in the model have defined a decision space where Wik forestry objectives, including protection of cultural heritage, are well satisfied, and that Wik people need time to consider forestry opportunities at their own pace. At the time of writing (May 2005), the Wik are continuing to explore their forestry options with private sawmilling enterprises and other indigenous communities on Cape York Peninsula.

Accommodating Indigenous Cultural Heritage in Water Reform Policies in the Murray Darling Basin

The Murray–Darling Basin covers 1 million square kilometres in four states and the Australian Capital Territory in south eastern Australia. The region is home for about 2 million people and accounted for 41 per cent of the total value of national farm-gate agricultural output in 2001 (adapted from Australian Bureau of Statistics 2003). Rapid expansion of irrigation in the Basin during the 20th century led to nearly 100 per cent of normally available flows being allocated and water in many catchments being overallocated (Adamson *et al.* 2005). This has resulted in the deterioration of river health, including salinisation, waterlogging, algal blooms and death of centuries-old river red gums (*Eucalyptus camaldulensis*).

Quiggin (2001) provided an overview of the environmental problems of the Murray–Darling Basin from an economics perspective. Water policy reform in the Basin has been a priority for Australian governments since the Council of Australian Governments (COAG), the peak intergovernmental forum involving federal, state and territory governments, agreed to a water reform framework in 1994 (Adamson *et al.* 2005).

The Basin is the traditional homeland of many distinct indigenous cultures, including the Wiradjuri, Yorta Yorta, Snowy Mountain Nations, Barapa Barapa, Wamba Wamba, Muthi

Muthi, Nyampa, Latji Latji, Wadi Wadi, Wergaia, Barkanji and Ngarrinjeri (Morgan *et al.* 2004). In 2001, there were almost 70,000 indigenous people resident in the Basin, representing 15 per cent of the national indigenous population (Taylor and Biddle 2004).

Indigenous residents are socio-economically disadvantaged relative to non-indigenous residents. The unemployment rate among indigenous people in the MDB in 2001 was approximately 25 per cent — over four times the level for the non-indigenous population. About one-fifth of the indigenous labour force was employed by work for welfare programs (Taylor and Biddle 2004).

Each cultural group comprises several separate clans with their own territorial affiliations and unique cultural heritage associated with the riverine environment. This heritage is expressed and evidenced in many ways, including as:

- sources of traditional foods (wild game, fish and plants);
- sources of traditional tools, arts and crafts;
- classrooms for passing on indigenous knowledge to children;
- settings for Dreamtime stories;
- habitat for clan totem beings;
- religious places;
- burial places;
- physical evidence of traditional occupation, including campsites, shell middens, fish traps and scarred trees;
- venues for traditional ceremonies;
- battlegrounds in the wars of resistance against Europeans;
- clan or tribe boundary markers; and
- recreational areas.

Land and water degradation arising from past and current resource management policies is destroying culturally important places and landscapes, and endangering local populations of various species of native flora and fauna with which local indigenous cultures have evolved (Forward NRM and AATD 2003; Morgan *et al.* 2004). For many reasons, but particularly

because of their spiritual and cultural ties to the rivers, creeks, billabongs and wetlands on traditional *country*, indigenous people want to be involved in natural resource management in the Basin (Langton 2002; Murray Darling Basin Commission 2002).

Water rights of indigenous people of the Murray–Darling Basin

Across the Basin, the contemporary legal rights of indigenous people to beneficial use of land, water and other natural resources amounts to only a small fraction of the total resources. To protect and revitalise their traditional cultures, indigenous people of the MDB seek rights to (Morgan *et al.* 2004):

- be substantively involved in policy and decision-making regarding the MDB;
- be directly involved in environmental management in the MDB;
- use and take water;
- use and enjoy other natural resources, for example through hunting and fishing;
- protect cultural heritage and identity;
- economic development;
- self-determination; and
- enjoy the same level of human rights as non-indigenous Australians.

The *Native Title Act 1993* (Fed) generates uncertainty about the existing property rights in water in the Murray–Darling Basin. The native title rights to customary uses of natural resources, including those that are dependant on inland water, are guaranteed by this legislation, but the ability of indigenous people of the Basin to exercise these rights is affected by the allocation of water to other purposes. If future water use developments impair or extinguish native title rights, then the Act requires that native title holders be compensated. However, the procedure by which indigenous people would be compensated for impaired or extinguished rights to maintain their cultural heritage is unclear (Altman and Cochrane 2003).

As at May 2005, there have been three determinations of native title in the Murray–Darling Basin – *Deniliquin Local Aboriginal Land Council 2001* and *Lawson v Minister for Land and*

Water Conservation for the State of New South Wales 2004 (on behalf of the Barkandji people) in the Federal Court, and *Members of the Yorta Yorta Aboriginal Community v Victoria 2002* in the High Court. In contrast to the success enjoyed by the Wik on Cape York Peninsula, native title was found to have been extinguished without the need for compensation to be paid to the indigenous claimants in all three cases.

In the most publicised case, the Yorta Yorta sought native title rights over 1,860 square kilometres of crown land and waterways scattered within traditional estate boundaries around the Murray, Ovens and Goulburn Rivers in Victoria and New South Wales. The native title rights claimed included: the right to use, occupy, inhabit and possess the area and the mineral and other natural resources found in or below the area; the right to restrict access of others; and the right to exercise their rights, obligations and duties in accordance with their traditional laws and customs. The Yorta Yorta were the first (and at the time of writing are still the only) indigenous Australians to have had their native title claim rejected on the basis that the traditional laws and customs of the original inhabitants are no longer observed by the claimants.

In 2005, there are more than 30 registered and unregistered applications for native title in progress throughout the Basin (National Native Title Tribunal 2005). Whether or not future native title claims are successful, there exist strong ethical grounds for accommodating or compensating for extinguished indigenous water rights. Ethical considerations appear to have been a major motivation behind the State of Victoria signing a co-management regional agreement with Yorta Yorta people in 2004 over 50,000 hectares (27 per cent of their failed native title claim) of crown land and waterways outside of the native title process (Victorian Department of Justice and Victorian Department of Sustainability and Environment 2004).

COAG and the Murray Darling Basin Commission (MDBC, an intergovernmental body responsible for efficiently managing the water resources of the Basin) have recently formally acknowledged the need to account for the customary rights of traditional owners in formulating water policy (Altman and Cochrane 2003; Morgan *et al.* 2004). To date, basin managers have engaged with indigenous people to identify types of indigenous cultural heritage values and establish formal processes by which indigenous people can contribute to decision-making, such as allowing for indigenous representation on various resource management committees

(Economic and Social Policy Branch 2001; Morgan *et al.* 2004). However, the problem of how to best account for tradeoffs between the rights of indigenous people to preserve their cultural heritage and the rights of the environment and domestic and commercial users of water, has not been addressed by researchers.

Resource assessment and indigenous cultural heritage in water policy analysis in the Murray–Darling Basin

Unlike the case of Wik forestry, no attempt has yet been made to quantitatively account for indigenous cultural heritage in water policy reform in the Murray–Darling Basin. The appropriateness of particular price-based and quantity-based techniques to accommodate indigenous cultural heritage values in water policy analysis will vary spatially and between indigenous cultures in the Basin. A thorough review of ethnographic research is beyond the scope of this paper and the following discussion proceeds at a general level applicable to the Basin as a whole.

Indigenous people of the Murray–Darling Basin are generally less well educated than non-indigenous residents; however, they are, on average, better educated than the Wik of north Queensland. A much greater proportion of indigenous people in the Basin have market economy work skills and experience than Wik people, including many highly educated and respected individuals. Consequently, some challenges of eliciting individual responses from indigenous people, such as unfamiliarity with the purchasing power of money, and poor English literacy and numeracy skills, are likely to be less severe in the Basin than on Cape York Peninsula. Nevertheless, major challenges remain.

In general, indigenous people are concerned that their lack of understanding about the economic and environmental issues affecting the Murray–Darling Basin, and limited human and financial capital will put them at great disadvantage relative to other stakeholders and curb the effectiveness with which they will be able to participate in decision-making about management of the Basin (NSW Department of Land and Water Conservation 2001; Forward NRM and AATD 2003). A price-based assessment would require indigenous people to consider various implications of hypothetical policy alternatives upon their individual welfare, even though many

respondents are likely to have a limited understanding about the implications of their choices.

At community meetings organised by the MDBC in 2003, indigenous people of the Basin strongly asserted their rights to cultural water flows under their legitimate claim to being the first human water users of the Basin (Morgan *et al.* 2004). Should some of the many native title applications in progress be ultimately successful, the Native Title Act would raise the legal priority of indigenous cultural water flows above other interests. Given the perceived and legal incidence of native title property rights to water, eliciting the WTP of indigenous people for water appears to be an inappropriate strategy for policy analysis.

One of the major frustrations that indigenous people of the Basin experience when working with non-indigenous people to manage cultural heritage is the discrete site based approach typically adopted (Forward NRM and AATD 2003). The supposition has been that, so long as key places such as burial and cultural artefact sites are protected by resource management strategies, other cultural heritage values will also be protected. This ignores the diversity of indigenous cultural heritage values associated with the riverine environment of the Basin, including the high level of importance that indigenous people place on overall landscape health. Particular levels of water flow are essential and non-negotiable for the maintenance of the cultural heritage of various indigenous groups, presenting a major impediment to economic methods that elicit prices.

There are also likely to be considerable challenges to overcome in aggregating individual responses of indigenous people in a price-based valuation of water allocation policies in the Basin. Even within a single management region of the Basin, a comprehensive valuation of indigenous cultural heritage is likely to involve several indigenous cultures and several clans from each cultural group. Given that the allocation of water in one part of the Basin deprives stakeholders downstream of that water, it may also be pertinent to examine indigenous cultural heritage values for people downstream of a specific study area.

Due to historical factors, many indigenous communities in the Basin comprise indigenous people who are not traditional owners of land near the community in which they live. For example, Smyth *et al.* (2004) estimated that perhaps only 15% of the indigenous population in

the Central West region of the Murray–Darling Basin are traditional owners.

Nevertheless, Sutton (1998) concluded that clan membership that associates people with a particular region has proved to be resilient in south eastern Australia, including the Murray–Darling Basin. People identify with and care for traditional country even if they have been distant from it for a considerable period of time. An ethnographic study defining the various traditional owner populations (and therefore, who can and cannot speak for *country*) will have to precede any assessment of indigenous cultural heritage values. This study would also need to identify age and gender cultural roles within each clan of each indigenous nation to ensure that a suitable sampling framework is developed to account for systematic differences in the way that indigenous individuals or groups within a particular clan value their cultural heritage.

While the political structures of some indigenous societies of the Murray–Darling Basin have evolved to become similar to Western society, in many others decision-making is still the responsibility of elders. Particularly in the latter case, the indigenous concept of social welfare is likely to differ from the non-indigenous economic concept and therefore standard welfare estimation techniques may not meaningfully estimate indigenous welfare in the Basin. The systematic socio-economic disadvantage of indigenous people relative to non-indigenous people also presents a considerable challenge to aggregating indigenous and non-indigenous valuations of indigenous cultural heritage.

Approaches to resource assessment in the MDB

The preceding paragraphs have highlighted several challenges to accommodating indigenous cultural heritage values in a BCA framework for policy analysis in the Murray–Darling Basin. The authors do not argue that it is impossible to value indigenous cultural heritage, but rather that total economic valuation of indigenous cultural heritage will require extensive preliminary research and a large commitment of financial and human resources. If resources do not permit a comprehensive BCA (always the case?), then the BCA process will require a subjective political process to be inserted where valuation efforts fail. BCA is then no more objective than price or quantity-based MCA.

An appropriate technique for the Basin is likely to be one that facilitates an iterative engagement

process that recognises the need for indigenous people to be given sufficient time to understand and integrate technical information with their own perspectives and views. The technique must also not require indigenous people to participate in multi-stakeholder forums where they may feel disadvantaged or require indigenous people to make comparisons between water management policies about which they may know little. This is unlikely to be consistent with economists 'parachuting' into an indigenous community for several days to conduct a workshop or non-market valuation survey. However, these considerations do suggest that representation of the problem as one of choice over a convex set in quantity-space, as opposed to a price-based comparison of discrete options, is likely to provide a suitable alternative framework.

A quantity-based assessment could be performed in the Basin in a manner that avoids the major concern with price-based approaches – the lack of substitutability between cultural goods and services and other goods and services – by incorporating minimum acceptable protection levels for cultural heritage as constraints bounding the decision space. Examples include constraints on land area conserved or volume of water flow. This quantity-constraint approach is more consistent with the Australian indigenous world view and the legal incidence of property rights to water under the Native Title Act.

A focus on quantities rather than prices means that challenges associated with using money as the single decision criterion in an indigenous context, including the systematic differences in income levels between indigenous and non-indigenous people, can be avoided. Quantity-based approaches can also reduce challenges associated with aggregating indigenous and non-indigenous responses by treating them as separate (potentially non-commensurate) management objectives. However, preference weights for each management objective are still required and these will implicitly provide shadow prices.

Indigenous representatives for a quantity-based evaluation procedure could be selected by indigenous people to be compatible with the internal political regime of their traditional owner group. For example, if elders make decisions (not individual clan members) then the clan's representatives may consist of elders. Not only is this approach likely to be more consistent with traditional political structures, but successful implementation will also require a

substantially lower level of preliminary ethnographic research relative to BCA.

As found when analysing Wik forestry opportunities, goal programming appears well suited to the problem of incorporating indigenous cultural heritage into policy analysis in the MDB. Goal programming only requires that indigenous people can declare their non-negotiable cultural heritage management constraints (hard constraints) and their negotiable cultural heritage management constraints (goals). Remaining parameters and constraints can be elicited from other stakeholders and experts.

Cultural heritage constraints could be elicited through informal discussions held with elders and other custodians of indigenous cultural heritage. While it may not be possible to elicit specific quantity constraints from indigenous people, descriptive management aims, for example that a particular wetland is flooded in Spring to at least a particular level, should be sufficient for the analyst to quantitatively estimate constraint levels. Because indigenous people are the only experts on cultural heritage constraint levels, they will not be disadvantaged relative to other stakeholders.

Concluding comments

Internationally, there is a growing body of literature reporting valuations of particular elements of indigenous cultural heritage (particularly use values) for resource evaluation. However, no attempt at total economic valuation of indigenous cultural heritage values has been published. In this paper, we have argued that it is unlikely to be feasible to achieve a total economic valuation of indigenous cultural heritage using price-based non-market valuation techniques

One alternative would be to return to the ‘partial economic valuation’ approach traditionally used in BCA in which cultural values are simply excluded from the analysis. A preferable approach may be to incorporate information about cultural heritage values in the form of quantitative goals and constraints, and to analyse the problem of selecting an optimal policy or preferred set of policies from within a convex set of alternatives specified in quantity space. An advantage of such techniques is that there is no requirement to explicitly assign dollar values to indigenous cultural heritage, as is the aim in total economic valuation. In addition, quantity-based techniques can accommodate the rights of indigenous people to protect their cultural

heritage as quantity constraints on the decision space, which, relative to the BCA framework, better captures the reality that many indigenous people regard elements of cultural heritage as non-tradeable.

Goal programming, a continuous and quantity-based MCA technique, successfully generated forest management policies for Wik people while accommodating indigenous cultural heritage values as goals and hard constraints that defined the decision space. Goal programming also appears to be a promising cross-cultural policy analysis technique for water allocation in the Murray–Darling Basin.

One challenge for economists is to explore means of modifying social welfare theories and non-market valuation methods to account for the social welfare concepts, communal property rights regimes and political structures of indigenous communities. It may be more appropriate for stated preference techniques to be modified to elicit responses from the heads of extended families rather than individual members of the group. Also, gradual engagement of researchers with indigenous communities over an extended time period is required to overcome the suspicions and concerns that many indigenous people have about working with ‘outsiders’. New forms of equity weights could perhaps be investigated to facilitate aggregation of indigenous and non-indigenous welfare.

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