

Community Values for Public Land Use: The Case of Glen Rock Area, Queensland

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Abstract: Publicly owned natural resources such as open lands produce benefits that need to be managed for community interests on a sustainable basis. Planners dealing with such lands are confronted with a challenging task of allocating land uses, which could meet a range of economic, socio-cultural and environmental benefits while maintaining ecosystem health and capacity. An enormous amount of information is required not only on the biophysical resource but also on the community whose activities affect the way these resources are managed. As a method of increasing community awareness and participation in the planning process and eliciting support for future management strategies, a survey was conducted to assess social perspectives on a range of land uses in the Glen Rock area in Queensland, Australia. A ranking of land uses, perceived by stakeholders and the general community as important for inclusion for future management of benefits, was generated using a Multicriteria Decision Analysis based model. The preferences of the aggregate community with respect to economic, environmental and socio-cultural attributes of these land uses were also estimated using Hierarchical Preferences (HIPRE 3+) software. Results indicated that the aggregate community perceived Catchment Protection and Water Quality, Nature Conservation, Outdoor Education and Research, and Outdoor Recreation as the four highly preferred land uses for inclusion in the management of State owned or managed lands. Quarrying, Military Training and Forest Grazing were the least preferred. Among the three attributes (environmental, economic and socio-cultural) of possible land uses, environmental attribute was the highest ranked, with almost similar preference for economic and socio-cultural benefits. Although the findings of this study cannot accurately predict community attitudes and support of management plans for State owned and managed lands, it demonstrates that social dimensions can be assessed and used as input when planning for State owned and managed lands.

Keywords: Community values; Land use planning; Glen Rock, Queensland; Natural resource attributes

1. INTRODUCTION

The management of natural resources such as State forests has been shifting in the last decade towards the provision of a whole range of economic, environmental and socio-cultural benefits on a sustainable basis. This spells out that wood production is of equal concern as catchment protection and maintenance of water quality, the provision of outdoor recreation, outdoor education, ecotourism services, cultural heritage and scenic amenity values, and opportunities for forest grazing, beekeeping, quarrying and military training. Such paradigm shift resulted from an increasing social demand for a better quality of life and for greater public participation in determining sustainable management outcomes for these resources. Thus, statutory regulations require consultation with stakeholders and the community so that socially-sensitive and

ecologically sustainable strategies would deliver a range of benefits from State owned and/or managed lands.

Involving the community in decision-making implies the consideration of diverse values and demands and the resulting conflicts regarding preferred benefits from these resources. Thus, determining a social consensus and the form of participation poses a great challenge in land use decision-making. In the case of Glen Rock Regional Park, in Queensland, Australia this involves quantifying the collective values of the community using a multicriteria-based model to foster participation, awareness and transparency of process. The participation model adopted is a combination of the models described in Scoones, et al. [1995], i.e. the community was included in the planning process through functional participating teams, consultation and by

participation through incentives in the mail out survey.

1.1. Importance of Community Values in Land Use Planning

There are various expressions and interpretations of the term "value." It can be expressed as a willingness to pay, cost, importance or benefit [Gregory, et al., 1992] and may connote different meanings depending on the area of study [Brown, 1984]. Its measurement has been the subject of researches in different social science disciplines, with each discipline having its corresponding measurement techniques and methodological concerns. The assumptions in measuring values vary. For example, psychologists assume that people can reasonably give meaningful responses to clearly described tasks. On the other hand, economists hold that people, by virtue of their egocentric economic pursuits, can state or reveal their values. Decision analysts work on the basis that people have basic values for most things, and that they can hold constructive value for more complex issues for which they hold no basic value [Fischhoff, 1991].

"Value" as used in the Glen Rock area study refers to degree of associations held by the community with respect to forest uses. It follows the theory in decision analysis that individuals are capable of building social constructs for complex issues. But how does the inclusion of these public values address conflicts in natural resource use allocation? Firstly, the assessment process may promote awareness about multiple uses of State owned and managed lands and the need to manage these resources on a sustainable basis. Secondly, it may also encourage public ownership of the decision making process and elicit support from the community for land use management in the area [Keeney, et al., 1990]. Lastly, community participation may foster better understanding between different sectors in the community and the government in terms of allocation outcomes.

2. COMMUNITY VALUE ASSESSMENT IN PRACTICE

The assessment and incorporation of stakeholder values in forest planning has been demonstrated in the last few decades in several countries. In the USA Martin, et al. [2000] used a prescriptive approach from decision analysis. Public values also provided management insights in the case of the Red River Basin in the United States [Stein et al., 1999]. Similarly, public participation figured as a vital component of the Model Forest

Programmes in Canada to ensure that a consensus on forest management options is adopted [Sinclair, and Smith, 1999]. Several of the literature shed light into the role of forest values in forest management decisions. For example, McFarlane and Boxall [2000] gave insights and perspectives on the cognitive hierarchy, which reveal that basic values and forest values affect the political and economic actions of the public. The effects of value on behaviour are also demonstrated in the studies of Brown and Reed [2000] and Vaske and Donnelly [1999]. The assessment of public perceptions about recreational services and forest management in general have also been conducted in Europe in the last few decades as manifested in the studies reviewed by Schmithusen [1997] and in Karppinen and Hanninen [2000].

In Australia Proctor [2000] demonstrated that Multicriteria analysis could be used to analyse the preferences of various stakeholders regarding forest management options in the New South Wales Southern Region. The involvement of stakeholders in decision-making has also been part of the catchment planning process in a Western Australia case study [Ewing, et al., 2000]. Both studies clearly included highly involved stakeholders but did not assess the general consensus of the community. The Glen Rock area study takes a different path by assessing the preferences of both the highly involved members of the community and those whose degree of interest in natural resource allocation outcomes may vary. The Glen Rock study was also driven by a need for community input into the actual allocation process.

3. MODEL AND SURVEY METHODS

The Community Values Assessment (CVA) model is based on Saaty [1988] Analytic Hierarchy Process (AHP), which uses pairwise comparison to determine the relative importance of a group of alternatives. AHP is a type of Multicriteria Decision Analysis (MCDA) which provides a structured approach to simplify decision-making. The MCDA theory indicates that complex subjects can be differentiated in terms of their different qualitative and/or quantitative attributes to enable respondents to make relative comparisons. Thus, the relative value of an alternative is represented as:

$$U_i = \sum_j w_j u_{ij} \quad (1)$$

where $\sum w_j = 1$, U_i is the composite score of the alternative i , w_j is the relative weight of criterion j in contributing to higher level criteria, and u_{ij} is the score assigned to each alternative use i in

contributing to criterion *j*. A two-level hierarchy was used in the study, with 12 alternatives (forest uses) that can be instrumental to the maximisation of sustainable community benefits. Each pairwise comparison of land uses is a rigorous evaluation on which one of a set of uses is more important and to what extent. Individual values in both interest groups and the general community are generated. The aggregate community value, which is the weighted average of these group values, represents preferences as expressed in non-monetary terms. This non-monetary estimate is used as input in allocating land uses. This fits the planning scenario on public lands where most of the decisions are environmental and requiring mainly qualitative information instead of the usual data-intensive benefit-cost information [Martin, et al., 2000].

It is assumed in this study that the land uses being evaluated are mutually exclusive but have the potential for inclusion in management plans. It is also assumed that the structured survey using pairwise comparisons will help respondents think through the conflicts and vagueness of "multiple forest uses" as a collective term. It follows Mendoza and Prabhu's [2000] suggestion that pairwise comparison is a more rigorous technique of evaluation compared to rating and ranking approaches. It also hinges on Belton's [1986] recommendation for a structured approach as a means of enhancing accountability and transparency of decisions.

The Community Values Assessment Model was developed by then Queensland Department of Natural Resources (QDNR, now EPA/QPWS), Forest Resources Division to support the forest planning process. The Hierarchical Preference Model (HIPRE 3+) used to analyse preferences for the attributes of various land uses has the same theoretical basis as the CVA model.

3.1. Study Area

Glen Rock Regional Park is located about 42 kilometres south of Gatton, Queensland and is in proximity to the cities of Brisbane, Ipswich and Toowoomba and the rural communities of Gatton, Laidley and Esk. It was purchased in 1996 by QDNR to provide a range of open space benefits for the regional community as part of the South East Queensland Regional Landscape Strategy.

The Park shares 11km of its eastern boundary with Main Range National Park, part of the Central Eastern Rainforest Reserves (Australia) World Heritage Area. It has diverse landscape and supports an endangered ecosystem and

various endangered flora and fauna. It also consists of basalt lava flows that were laid down over ancient sandstones, some 25 million years ago [Stevens and Willmott, 1996]. The Park is regarded as an important aquifer recharge area.

3.2. Survey Methods

A standard survey consisting of 10 sets of questionnaires were used, with each set representing a random selection of 7 out of the 12 land use options. Each respondent evaluated 7 land use alternatives following the theory of Miller [1994] that an individual can effectively evaluate up to an average of 7 choices (or from 5 to 9 choices) due to one's limited span of absolute judgment and immediate memory.

Using the Dillman approach [Dillman, 1978], both interest groups and the general community were surveyed using a questionnaire. Interest groups consisted of 36 community members who were considered highly involved in the planning process. About 300 households who live within a 50-kilometre radius of Glen Rock Regional Park represented the general community. There was a response rate of 25% (75 returns) from the general community of which there were 54 useful returns. All of the interest group returned their questionnaire. The aggregate community sample size (n=84) was the total number of respondents from both interest groups and the general community.

4. RESULTS AND DISCUSSIONS

4.1. Interest Group and Community Preferences

The order of preference of the interest group (Figure 1) and the general community (Figure 2), with respect to a range of forest uses that need to be managed in publicly owned natural areas such as the Glen Rock Regional Park, were dissimilar. The interest group preferred environment-related uses whereas the general community indicated a preference for both environmental and production-related uses. The preference for environmental uses by the interest group could be attributed to the high level of interest with land use issues, their higher educational level (Table 1) and in their higher frequency of visits to State owned lands (Table 2). This follows the findings of Dietz, et al., [1998] and Theodori and Luloff [2000] that education level is an important factor affecting environmental attitudes and degree of community interest.

It is worthy to note a strong similarity in the

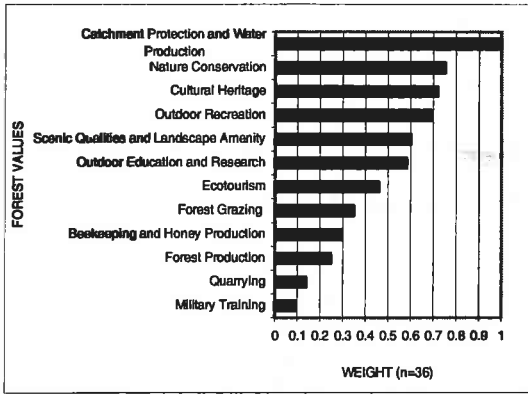


Figure 1. Interest group values.

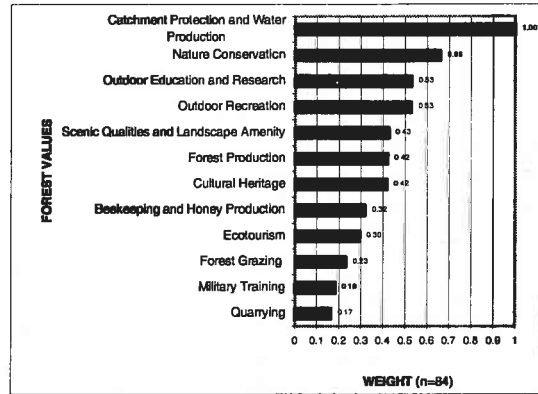


Figure 3. Aggregate community values.

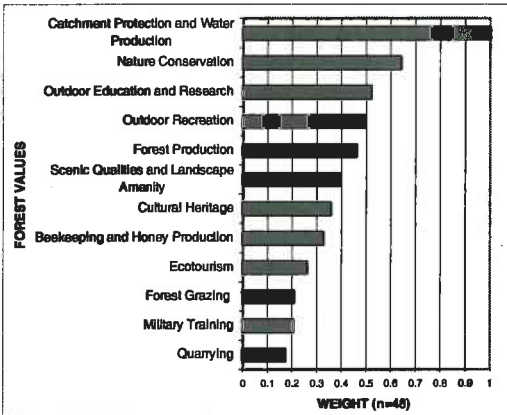


Figure 2. General Community Values.

highest preferred and lowest preferred values, suggesting that highly involved members of the community such as the interest group do not differ markedly in their values from the general community. A statistical analysis proved there was no significant difference between the scores of the two groups. The overall strength of preference for catchment protection and nature conservation also suggests a strong conservation ethic of the aggregate community in the Glen Rock region.

4.2. Preferences of the Aggregate Community

Figure 3 shows the land use values preferred by the aggregate community, which was estimated by giving a weight of 80% to the general community and 20% to the interest group. The aggregation follows the concept of Covello et al. [1988] that the community consists not only of the highly involved (such as the interest groups) but also attentive, browsers and uninterested members of society. Of the 12 land use values the aggregate community considered catchment protection, nature conservation, outdoor education and research and recreation as the four highest assigned values that should be managed for the

greatest interest of the community. The three least preferred land use options were quarrying, military training and forest grazing.

4.3. Demographic Characteristics of Interest Group and the General Community

There was greater participation in the surveys by males in both interest groups and the general community (Table 1). In both groups there was greater participation by those aged between 46-60 years. About 25% of the interest group were university graduates while the general community consists mainly of high school graduates (25%).

All of the interest group respondents have visited State owned or managed lands compared to just 90% for respondents in the general community (Table 2). The interest group made more frequent visits to State owned and managed lands with about 46% visiting more than 15 times a year. On the other hand, about 89% of the general community visited these lands about 5 times a year. The overall strong recreational use of State owned and managed lands reflects current land use opportunities of these lands in this region and indicates that about 1 in 3 respondents in this region use these lands, mainly for recreation.

4.4. Preferences for Land Use Attributes

The relative preferences of the respondents with respect to the attributes of the forest land uses in the study reveal a strong environmental inclination over that of socio-cultural and economic attributes (Figure 4). There was only a slight difference in relative scores between economic and socio-cultural attributes.

Economic attributes refer to the capacity of a certain land use to generate income, employment and investment opportunities. Environmental

Table 1. Population sample demographic characteristics

	Proportion of sample (%)	
	Interest group	General community
1. Gender		
Male	80.0	63.5
Female	20.0	36.5
2. Age (years)		
18-25	0.0	4.4
26-30	11.4	0.0
31-45	25.7	33.3
46-60	37.1	40.0
61-75	22.9	22.2
76+	2.9	0.0
3. Income (\$)		
Less than 10,000	8.3	8.5
10,000 to 20,000	8.3	21.3
21,000 to 40,000	33.3	21.3
41,000 to 60,000	25.0	12.8
61,000 to 80,000	12.5	23.4
80,000 and above	12.5	12.8
4. Education		
Some Primary	5.6	5.8
Completed primary	2.8	9.6
Some high school	16.7	19.2
Completed high school	16.7	25.0
Some university	2.8	13.5
Completed university	25.0	19.2
Postgraduate	16.7	5.8
Diploma	11.1	1.9
Others	2.8	0.0

Table 2. Behavior of the Population Sample

1. Visitation of State owned or managed lands		
Visited	100.0	90.4
Did not visit	0.0	9.6
2. Number of visits per year		
1 to 5	37.1	88.6
6 to 10	14.3	9.1
11 to 15	2.9	2.3
More than 15	45.7	0.0
3. Purpose of visit		
Recreational	51.5	54.5
Educational	24.2	31.2
Employment	12.1	5.2
Cultural	7.6	9.1
Other reasons	4.5	0.0

attributes refer to the capacity of a land use to help maintain a healthy environment and conserve biodiversity of ecological ecosystems among others. On the other hand, socio-cultural attributes provide the community with opportunities to pursue spiritual, social and cultural activities within State owned and managed lands.

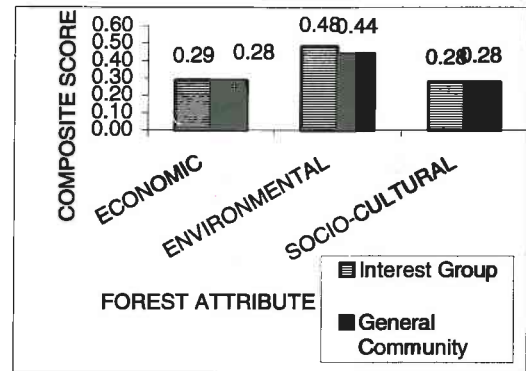


Figure 4. Relative preferences for forest use attributes.

5. CONCLUSIONS

The shift from economic-oriented management of public lands to a more socially responsive and ecologically sustainable management requires social input into land use decisions. The case of Glen Rock Regional Park demonstrated that social inputs could be quantified using a multicriteria-based model and included in land use decisions. Such inclusion of community inputs was facilitated by the existence of an established decision analysis system which incorporated citizen-expert appraisals of various land uses.

This study demonstrated that an MCDA-based model such as the CVA Model could illuminate or enhance the participation of a diverse community in land-use decision-making. Whether this type of participation is effective in promoting an acceptable level of transparency and public ownership of the process needs to be assessed in the future. Such an assessment is not yet possible since the decision-making process in the Glen Rock area is still in its formative stage.

Although useful in determining social consensus for environmental problems, results of evaluations using AHP-based models such as the CVA model can be weakened by the arbitrary rankings of alternatives, which can lead to the rank reversal phenomenon. It should also be noted that the preferences indicated by the community are not definitive with respect to how these uses are combined in actual management plans. Rather, these are relative preferences chosen under assumptions of mutual exclusiveness of land uses. Different preferences for land use combinations should be derived in the future under various levels of ecological and management compatibilities. An in-depth analysis on the relationship between social values, land use values and attitudes toward land use management actions should also be undertaken in order to

provide better predictive statements about community attitudes and support for future management plans in State owned or managed lands.

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