NON-MARKET VALUATION
IN NEW ZEALAND

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Abstract

There is a demand for non-market valuation information in New Zealand which is likely to increase with current "more-market" policies. Information needs range from identifying non-market values, through methods for incorporating them in the decision-making process, to methods of measurement. New Zealand's unique cultural environment may preclude the wholesale adoption of approaches used elsewhere. There is a need for verification of overseas approaches. A small group of New Zealand researchers have gained competence in applying methods of measurement developed overseas and are in a position to make advances of international significance. The Centre for Resource Management intends to co-ordinate non-market valuation research in New Zealand in order to maximise the benefits of that research to all New Zealanders.

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1. Introduction

In order to identify future non-market valuation research priorities,
this publication presents a review of the state of the art of non-market
valuation. Given the Centre for Resource Management's recent publication
record in the non-market valuation field (Kerr et al., 1986; Kerr, 1986;
Kerr & Sharp, 1987), technical aspects and the description of methods are
avoided to allow concentration on the need for non-market valuation, the
premises underlying its application, and our current ability to
accurately measure non-market values. Reviewing these areas will
identify gaps in our knowledge and abilities, and will therefore
highlight potential areas for research in the future. This publication
is designed to be read in conjunction with Kerr & Sharp (1987).

Research and education into non-market values are needed because decision
makers are often unaware of the existence of non-marketed values, or of
their validity in the decision-making process. Types of non-market
values may not be commonly known, or may not be considered in the
decision-making process. Decision makers may also express a desire to
obtain estimates of non-market values, implicitly accepting non-market
valuation as a means of providing information to aid in the
decision-making process, thus signalling a need for research and
education into methods of valuation.

Some people recognise that non-market values exist, and are important
aspects of decision making, but question the approach economists adopt
when estimating these values. They may claim that non-market values
simply cannot be measured, or that their expression is solely the domain
of orators and artists.

The wide range of opinions regarding the validity and usefulness of
non-market valuation suggests that research could usefully be directed at
all areas of non-market valuation. However, since the application of
economic approaches to measuring non-market values is in its infancy in
New Zealand, it appears that concentrating research on the validity of
non-market values and of economic approaches to their measurement is most
logical. It is also important for research to continue into methods of

measurement to satisfy the agencies already expressing needs for non-market valuation information.

Research and education in the general area of values would address such things as: what things do individuals value? what are appropriate ways of measuring the value of one thing relative to another? how can individual values be aggregated to determine social value? In short, what is the justification for non-market valuation? There is also a need for research and education into measuring non-market values. Questions to be addressed would include: what sorts of information are needed by decision makers to allow them to compare non-marketed benefits with other benefits? what methods are available to meet these information needs? how should this information be manipulated to obtain measures of value? what are the costs of these approaches? what are the practical difficulties in obtaining the necessary information? how can non-market value information be incorporated into decision-making procedures?

In New Zealand some agencies recognise the validity of non-market values, and the economists' approaches to measuring them. These agencies seek guidance on methods for estimating non-market values for potential changes in management of resources for which they are responsible. It appears likely that, with the "more market" emphasis of the present government, and the restructuring of the resource and environmental management agencies, there will be an increase in demand for information on non-market values. This may occur only for the reason that non-market dollar values may be needed to argue successfully against market benefits which are measured in dollars. However, many other uses exist; for example justification of expenditure of taxpayer dollars on "non-commercial" purposes; clarification of the implications of altered property rights arrangements, including systems of allocation and management of open-access resources, the impacts of projects producing external costs and benefits, and the costs of protective laws.

Many government agencies, such as the Department of Conservation, are responsible for managing resources that provide benefits (or costs) not valued by markets. These agencies may need to resort to enumeration of the benefits provided by their services to ensure their continued funding, or to justify expansion of their domains. Other agencies are

confronted with multiple objective management requirements and restrictive budgets. These agencies need to know the marginal benefits of investing time and money in each objective to optimally allocate their budgets.

Private enterprise operates in a commercial environment where profit making is the major objective. Agents may recognise that non-market values exist, but only consider them to the extent that they may affect the profit-making ability of the enterprise. The restructuring of the public sector to replace multiple purpose agencies with single purpose agencies, including the state owned enterprises, means that more government agencies will now operate with profitability as an objective, or a major constraint on their actions.

While management agencies express a need for information about non-market values, and this alone may be sufficient reason for their investigation, the benefits of increased understanding of the world obtained from non-market valuation research will, for many people, be sufficient justification for further research.

2. Need for non-market valuation

What is the problem?

Non-market valuation is a term describing a range of techniques which have been developed to meet the needs of decision makers endeavouring to allocate scarce resources to their most valued uses. Most resource allocations produce a range of benefits and costs which are not easily comparable. For example, an aluminium smelter may produce jobs, aluminium, and overseas currency. At the same time the natural environment may be dramatically transformed to meet the smelter's electricity requirements, and air pollution is a by-product of the smelting process. In making a decision about whether or not a smelter is desirable for society, we must decide whether the aspects of a smelter that are likely to improve our lifestyle (jobs, aluminium, overseas currency) are of greater advantage to society than those aspects which are likely to be disadvantageous (environmental damage, air pollution).

Non-market valuation is a group of procedures for valuing inputs and outputs (or costs and benefits) in a common metric (usually dollars), to provide information for the decision-making process. There are many types of value which are not measured in markets, including: recreational use, aesthetics, existence, bequest, maintenance of options, intrinsic worth, and changes in risks. The Environment Act 1986 establishes the legal requirement for considering non-market values in an environmental context. Some of the purposes of the Act are: " to ... Ensure that, in the management of natural and physical resources, full and balanced account is taken of ... The intrinsic values of ecosystems; and ... All values which are placed by individuals and groups on the quality of the environment".

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Approaches

One approach which may be advocated for making decisions about resource
allocations is to "leave it to the market". Adopting this approach
implies a belief that wealth is distributed fairly throughout society and
that markets work perfectly. In "perfect markets" each actor has the
power of veto, and individuals will only enter into a transaction
(exchange of rights) if that transaction is advantageous to them or
leaves them at least as well off as before. In this way "perfect
markets" continually lead to unambiguous improvements, and never to
decreases, in social welfare. The existence of: transactions costs,
public goods, externalities, non-convexities, markets with few buyers
and/or sellers, and non-constant returns to scale, amongst others,
indicate that most markets are not perfect. People do not always have
the power to veto decisions which affect them. As individuals we attempt
to make improvements to our own lives, often neglecting the effects of
our actions on others. As a society we charge the government with
ensuring that acts undertaken by individuals and groups are "in the
social interest". This objective has consistently defied definition.
However, the outcome is that actions which disadvantage some individuals
are often sanctioned, despite protests. Markets are far from perfect.
Sharp (1987) identifies and discusses some of the causes of
"market-failure".

Since markets cannot be relied upon to yield "correct outcomes", most
countries accept that there is a role for government in deciding whether
actions result in improvements to social welfare. To help them make
these decisions, a variety of procedures are used to understand the
impacts of alternative actions. These procedures include tools such as
cost-benefit analysis (CBA) and social impact analysis. The procedure
used by the United States government to address market failures with
respect to environmental concerns is outlined by Fisher et al. (1987).
Cost-benefit analysis and non-market valuation are now integral parts of
policy analyses conducted by the United States Environmental Protection
Agency, and are mandatory in proposals for some major resource modifying
projects.

The role and limitations of cost-benefit analysis

CBA results carry several important caveats (Kerr & Odgers, 1987). Principal amongst these is that values are contingent upon the existing distribution of wealth. If wealth was distributed differently individuals would value non-marketed (and marketed) goods differently. Since the value of a good to society is some function of its value to individual members of that society, social values could be different with alternative distributions of wealth. However, the distribution of wealth is only of concern if we wish to determine the social optimum. In most cases we only want to determine whether a particular change in resource allocation would make society better or worse off.

A resource reallocation yields a potential Pareto improvement if it would be possible to distribute wealth, after the reallocation, in such a way that no-one was disadvantaged by the change. Cost-benefit analysis identifies whether a potential Pareto improvement exists. It can therefore be seen as an imperfect screening device, or information system. That distributional implications may still be judged unfavourably implies that even proposals which pass the CBA screen are not necessarily desirable.

The merit in CBA is that information can be provided on impacts on particular groups within society. It then falls upon decision makers to place relative weights on the benefits and costs falling on each of these groups. CBA is unable to make decisions, but does provide information to assist in making decisions.

The role of non-market valuation

If costs and benefits cannot be expressed in a single numeraire it is not possible to obtain clear guidance from CBA. In the earlier smelter example, because the value of a unit of overseas currency cannot be directly compared with the value of a lost natural environment, CBA is unable to indicate whether an aluminium smelter would be a good or a bad thing for society. Non-market valuation is a set of procedures for valuing things like natural environments and pollution, using the money

numeraire adopted by CBA. Because non-market valuation has been developed "for CBA" it takes on the assumptions and value judgements of CBA [see Kerr & Odgers (1987) for elaboration of these].

Does non-market valuation solve the decision makers' dilemma?

Without some well-defined social welfare function, allowing a range of impacts across individuals to be compared, the need to make value-laden decisions cannot be avoided. This does not imply that such a welfare function, if it existed, would be devoid of value judgements, simply that in the absence of such a statement of social values any resource allocation decision embodies the values of the decision maker. In making decisions about what is best for society it is desirable that the preferences of society, rather than those of the decision maker, are used. The problem remains to provide satisfactory indicators of society's preferences.

Arrow's Impossibility Theorem (see Feldman, 1980: Chapter 10 for an easy to follow discussion) confirms there is no perfect way of determining social preferences. The decision makers' dilemma cannot be solved; at some stage of the decision-making process decision makers must employ some of their own perceptions of social justice. In coming to this conclusion one is forced to admit that non-market valuation is no better, or worse, than a host of other possible approaches to providing information on the relative social worth of alternative resource allocations. However, given the current preoccupation with producing perfect market-like outcomes, non-market valuation appears to be a particularly useful tool since it is designed to estimate demand if perfect markets existed, with the existing income distribution.

3. State of the art

What is known?

The last 25 years have seen a remarkable growth in knowledge about non-market environmental values. During this period the first theoretically sound valuation method, Clawson's travel costs method (Kerr, 1987), has been refined and accepted to such a degree that it is commonly applied in many decision-making contexts. For example, in the United States this method is used by the Forest Service and the Fish and Wildlife Service to measure the values of recreational experiences, the Environmental Protection Agency to assess the costs of new laws, and the Water Resources Council to value natural environments threatened by water development projects. Other theoretically valid valuation methods have been developed. Principal amongst these are the contingent valuation (Bishop and Heberlein, 1987) and hedonic price (A. Fisher, 1987) approaches[1].

During the last 10 years there has been a growing interest in defining non-market values for environmental amenities. Initially analysts were concerned about use values (e.g. the value of a fishing day). Other values have since been recognised as important. Amongst these values are non-use, preservation-type values, such as existence and bequest values, and values related to risk and uncertainty, such as option and quasi-option values (Kerr and Sharp, 1987a).

Measurement of existence, bequest and option values has been attempted (Brookshire et al., 1983; Walsh et al., 1984), indicating that the

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[1]The travel costs method uses behaviour in the travel market to impute values to resources for which travel is a necessary prerequisite to use. The contingent valuation method creates an hypothetical market. Parameters in this market are changed and individuals are asked to reveal their behaviour in the market, contingent upon a given set of parameters. The hedonic price method uses the fact that environmental attributes cannot be separated from other goods that are exchanged in markets, such as housing and employment. Behaviour in these associated markets is used to impute a value to those environmental amenities. See Kerr & Sharp (1987) for further clarification.

contingent valuation method may be an appropriate measurement tool, and that non-use values may be significant elements of total value (over 50% of total value in the Walsh study). The significance of non-use values in New Zealand is illustrated by Kerr's study of existence benefits associated with scenic river preservation (Kerr, 1985).

Each of the valuation methods discussed above has practical difficulties which limit the range of goods which may be valued, or the reliability of the values obtained. For example, data deficiencies often hinder application of the hedonic price method (A. Fisher, 1987), contingent valuation provides biased values when people surveyed are unfamiliar with the good being valued or when there is uncertainty over the outcomes (Cummings et al., 1986), and the travel costs method cannot adequately value sites which are being used by people who are partaking in activities at other sites during the same journey (Kerr et al., 1986). These concerns have stimulated a great deal of research activity to validate valuation procedures. Validation studies have taken two main approaches: inter-method comparisons, and comparisons with real or simulated markets (many of these studies are reported in Cummings et al., 1986). A more recent development has seen some economists working closely with psychologists to better understand processes through which individuals arrive at a set of relative values. These people are also concerned to determine how closely measures of value obtained in hypothetical settings (contingent valuation) are likely to coincide with values that would be obtained in markets.

In addition to practical limitations, intrinsic limitations of the travel costs and hedonic price methods limit the types of values which may be measured by these approaches. Intrinsic limitations refer to limitations imposed on the methods by the theory which underpins them. Travel costs, for example, is only applicable to measuring those values which result from visiting a resource. These "use values" may result from active uses (e.g. mountaineering), or passive uses (e.g. sightseeing). The travel costs method is based in theory about behaviour in purchasing complementary goods, the complementary good being travel. Since travel is not complementary to existence of a site, but is complementary to its use, the travel costs method is able to measure use values, but not

existence values. Some of these intrinsic limitations have recently been overcome by extensions to existing approaches. For example, the multiple site travel costs method has, to some extent, enabled the travel costs method to be used in valuing quality changes.

During the last decade no new methods of non-market valuation have been introduced, nor have there been any major changes in the ways we apply existing methods. There has been a consolidation of knowledge and experience, principally with respect to the travel costs and contingent valuation methods. There appears to be a move away from application and testing of methods towards better understanding of the economic theory behind different types of values (principally existence and option values, see for example; Fisher and Hanemann, 1987; Smith, 1987; Cory and Saliba, 1987) and increased understanding of the meanings of, and reasons for, results obtained (e.g. explanation of the discrepancy between willingness to pay and willingness to sell measures of value, see for example; Gregory, 1986; Coursey et al., 1987). The bulk of this work has occurred in the United States, with some in Europe, and occasional applications elsewhere. In the United States sufficient studies have been completed to give administrators a "feel" for the magnitudes of use values associated with a variety of activities and resources. For example, the United States Fish and Wildlife Service maintains an inventory of values obtained from non-market valuation studies, which simplifies many of the management decisions made by that agency (W. Fisher, 1987).

Where are the gaps?

Because of the intrinsic and practical limitations of the non-market valuation methods that are available, there are limits to what may be valued, and by what method. Validation studies are defining the limits of these methods.

New Zealand has only been involved in non-market valuation for less than a decade. Consequently, the few studies completed have not been able to provide clear guidelines to the limits of existing non-market valuation methods in the New Zealand context. To some extent it will be possible

to learn from studies conducted in other countries, but our unique cultural context precludes total acceptance of overseas results. The cultural setting is important for two reasons. First, we may value things differently to other people. What may be important to people of other countries only for the benefits obtained from consumption, or use, may be valued here primarily for its existence, and vice versa. Second, the different cultural views of environmental attributes may mean that hypothetical valuation approaches are not applicable when measuring values that are appropriately measured by these methods elsewhere, and vice versa. Further, our unique institutions may present different information needs or promote different responses to hypothetical valuation approaches. These issues can only be resolved by research conducted in New Zealand.

While the existence and importance of non-use, preservation-type values are generally accepted, the same cannot be said for option, quasi-option, and intrinsic values. Considerable debate continues over the validity, sign, and estimation procedures for these values. Of particular concern are quasi-option value and intrinsic value since, even if they are considered valid, they theoretically cannot be measured (measurement will never be possible, rather than simply not possible with current methods, Kerr & Sharp, 1987a). Understanding of the option value concept is increasing. It is now apparent that in some instances the sign of option value is unambiguous, while in others it is indeterminate (see, for example, Plummer & Hartman, 1986). It is important to know when those cases occur and the likely magnitude of option value when its sign is ambiguous. These cases will require more reliance on subjective valuation of outcomes by decision makers, but economic theory may yet be able to offer more guidance.

Theoretical work indicates that, in many instances, measures of value based on willingness to pay should be almost identical to measures of value based on willingness to sell (Willig, 1976). Empirical work does not confirm this theory, and the discrepancy remains unexplained. This discrepancy is most concerning since it is not possible to determine whether the underlying economic theory is wrong, or if biased estimation procedures are at fault. It has been suggested that people may treat losses and gains in quite different manners, indicating that economic

theory needs to be revised to more fully account for psychological phenomena. This is an area which research will clarify, however results may not be transferable between countries if cultural factors are important in determining people's reactions to alternative valuation formats.

While much work is directed at refining and understanding the main non-market valuation methods referred to earlier, there is also a continuing search for new valuation methods, or alternative ways of presenting information about values. For example, staff of the United States Forest Service are currently investigating the types of benefits obtained from recreation (e.g. social recognition, achievement, affiliation). They are also analysing how well different recreational activities provide these benefits. Most of the search for new valuation methods is directed at hypothetical valuation methods, to create methods which provide incentives for people to provide truthful responses. It is possible to come up with non-market valuation procedures which ensure that telling the truth is the best policy for survey respondents. However, these procedures are so complicated that many people have difficulty in understanding the process. Consequently, true responses may not be obtained. The task at hand is to find simple processes providing incentives to answer truthfully, or to find processes which do not provide incentives for truthful answers, but which respondents answer truthfully anyway.

Research in progress

Current research in non-market valuation overseas focuses on the option value debate and validation of estimation methods. Advances are being made on the theoretical basis for existence values and on understanding the correct values to be used in particular decision-making contexts. Work is also proceeding on measuring non-use values and testing for biases. Some United States agencies are compiling inventories of values for resources of interest to them. A small group, lead by the United States Forest Service resource valuation team at Fort Collins, is initiating the co-ordination of economic and psychological approaches to resource valuation.

To the author's knowledge, only two non-market valuation studies are in progress within New Zealand (June 1988). Dr Ted Bilek, of the School of Forestry at Canterbury, has a student investigating non-market values in a Christchurch suburban forest. This study is receiving technical support from Dr Sharp at the Centre for Resource Management. I am presently involved in a study that seeks to identify demand curves for recreational facilities provided by the Department of Conservation. This study recognises that non-market valuation methods have uses beyond estimation of benefits, and is an attempt to predict behavioural outcomes. It goes beyond other studies in attempting to integrate psychological and economic approaches to predicting behaviour and assessing value. Preliminary results indicate that this joint approach explains behaviour better than either approach independently, and it is producing some exciting insights into the interactions of attitudinal and economic parameters which influence behaviour.

Other people active in non-market valuation in New Zealand include: Dr Anton Meister, Massey University, and Dr Basil Sharp, Centre for Resource Management. Mr Peter Clough and Mr Bill Kirkland are former students of Dr Meister, who have worked with him on non-market valuation studies. Mr Clough is currently employed at the New Zealand Institute for Economic Research, and Mr Kirkland at the Ministry of Agriculture and Fisheries. Dr Ross Cullen, Otago University, has provided critical analysis of non-market valuation studies conducted in this country. Mr Barry Harris has practical experience with both travel cost and contingent valuation approaches. Mr Harris is employed by the Waikato Valley Authority, which places him in a unique position to integrate economic theory with the needs of a management agency.

4. Directions for future research in New Zealand

Research conducted in New Zealand has indicated that approaches to non-market valuation employed elsewhere do not necessarily work well here (Leathers et al., 1985). The implication for New Zealand is that, if non-market values are to be employed as aids to decision making, then valuation methods must be validated in New Zealand. This has not yet been done.

Resource management agencies have demonstrated a demand for estimates of non-market values derived using economic approaches. Some New Zealand amenities that have been valued, or that agencies have requested values for, are:

Amenity	Agency requesting information
Mt Cook National Park*	Dept of Lands & Survey
Hunting/Backcountry recreation*	NZ Forest Service
Hut, camping and visitor centre fees*	Dept of Conservation
Roading impacts	National Roads Board
Water pollution*	Catchment boards
Instream flows*	NWASCA
Aesthetic/Existence values*	Ministry of Works & Development
Instream flows	Dept of Conservation
Recreational fisheries*	Min. of Agriculture & Fisheries
Recreational fisheries	NZ Salmon Company
Lake recreation*	Dept of Lands & Survey
Skifield*	Dept of Lands & Survey
Forest recreation*	Christchurch City Council
Existence and use of wetlands*	Min. of Agriculture & Fisheries

* Indicates that an attempt was made to estimate non-market values, not necessarily successfully.

While many of these agencies are no longer in existence, it is likely that those replacing them will have an even greater need for estimates of non-market values because of the "more-market" environment in which they operate. Examples of this are provided by recent requests from the Department of Conservation to estimate instream flow values. These values were to be used in conducting an argument in dollar terms to reduce the diversion of water for electricity generation from streams within a national park. Department of Conservation officials were concerned that arguing in non-dollar terms would be unlikely to succeed

In the face of the real dollars earned from electricity generation. In a similar vein, to meet cost-recovery requirements, the same department is using non-market valuation procedures to assist in setting fees for recreational facilities and designing appropriate mechanisms for collecting fees.

The small number of people resident in New Zealand with experience in non-market valuation means that not all of these requests for information have been addressed. In some situations the agency seeking information has not fully understood the magnitude of such an undertaking and has not contacted the consultant in sufficient time to allow a study to be completed. There is a lack of information about non-market values within organisations that may find their measurement useful, and a shortage of consultants able to undertake this type of research. The Centre for Resource Management has attempted to address these problems by producing graduates knowledgeable in the available methods, as well as adopting a wider information dissemination role by co-ordinating public workshops and producing publications (e.g. the National Workshop on Non-market Valuation methods and their use in Environmental Planning, which was held at the University of Canterbury, 1985).

In many instances decision makers only need an indication of the orders of magnitude of non-market values. Because only a few non-market valuation studies have been completed in New Zealand, this sort of information is not currently available. Further, it is not clear how much variance is associated with an activity in different locations, or under different conditions (e.g. fly fishing versus spin fishing, fishing the Tongariro River versus fishing the Mataura River, climbing Taranaki versus climbing at Mt Cook or The Darrans, hunting rabbits versus hunting thar). The expense involved in a non-market valuation study could be avoided in many instances if information on values obtained from past studies was available to decision makers. To ensure that this information was accessible to those needing it and those providing information, it would have to be held in one location. Past studies provide valuable information for current decision making and appropriate methodologies indicating that non-market values possess some public good elements, especially in the early stages of application in a country. The funding agency bears all the costs of implementing a study, while the

benefits accrue to many agencies. This implies a role for government in initiating non-market valuation research.

Priorities for non-market valuation research in New Zealand are: to more fully understand the usefulness and implications of using non-market values in decision making, and to verify the applicability of existing methods of non-market valuation for use in New Zealand.

The contingent valuation method is theoretically applicable to measuring all types of non-market values. It is therefore potentially the most valuable method to verify. The hedonic price approach has relatively few practical applications, and so it can be considered the lowest priority for validation of the three commonly accepted methods. However, as studies elsewhere have shown, verification studies need not be limited to one approach (Bishop et al., 1983). The travel costs method has been the most widely used method in New Zealand, implying a need for validation of the results already obtained. Priorities for verification are therefore the contingent valuation and travel cost methods.

Cummings et al. (1986) detail "reference operating conditions" (ROC's) which must be satisfied before contingent valuation can be expected to provide estimates of value comparable to those for marketed goods. The ROC's are:

1. subjects must understand, be familiar with, the commodity to be valued,

2. subjects must have had (or be allowed to obtain) prior valuation and choice experience with respect to consumption levels of the commodity,

3. there must be little uncertainty,

4. willingness to pay, not willingness to accept compensation, measures are elicited.

In choosing cases for verification experiments in New Zealand, most will be gained by choosing cases for which both contingent valuation and travel costs approaches are applicable, and for which the ROC's are satisfied as closely as possible. If the most optimistic cases cannot provide accurate measures of value there is little hope that other cases will do so. Choice of cases to which the travel costs method is applicable restricts initial investigation to use values. This is not a

handicap, as it helps ensure that ROC's 1, 2, and 3 are satisfied.

Due to the costs of operating a simulated market in which actual cash transactions occur, verification studies in which the benefits are relatively small will be necessary to maintain research budgets within realistic limits. However, if benefits are too small there is little incentive for participants to provide carefully considered responses. Suitable case studies might include: museums, art galleries, and recreational facilities such as ski fields, amusement parks, or movie theatres.

If cases satisfying the ROC's for contingent valuation are not validated, research must be directed at determining why, and at subsequently identifying stricter conditions. If the contingent valuation method is verified for cases satisfying the ROC's, each of the conditions may then be explored systematically to understand the limits of the method in New Zealand.

5. The role of the Centre for Resource Management

The Centre for Resource Management proposes to adopt two roles to further the understanding of non-market valuation in New Zealand. These roles involve acting as a clearing house for information and continuing to perform academic research.

Clearing house role

This role involves three functions:
    (i)   advisory
    (ii)   education
    (iii)   inventory.

The advisory function entails assisting those wishing to undertake a non-market valuation study to choose an approach suitable to the case under study, to implement data collection, and to analyse data to reveal demand information. This function is primarily technique oriented, and is designed to assist agencies to implement studies to measure non-market values.

The education function involves dissemination of information about the policy context and applicability of non-market valuation to a range of resource management issues. It involves answering the types of questions which should be addressed before making a commitment to undertake a study to measure non-market values. The sorts of question which would be addressed include: why are non-market values useful to management? what do the dollar values obtained indicate? are non-market dollars comparable to market dollars? what cannot be valued? how much does it cost to obtain measures of value? This information would allow resource managers to decide whether non-market valuation methods, in general, offer them useful information (what do the values mean?), and at what cost. This function would be addressed through our internal teaching programme as well as through publications and public and private workshops.

The inventory function entails collecting and publishing the results of non-market valuation studies completed in New Zealand. Although the

number of cases is small, the Centre for Resource Management has already obtained results for all New Zealand studies that have come to our attention.

The Centre for Resource Management is the most appropriate body to undertake these roles because of its history in the field, including hosting "The National Workshop on Non-market Valuation Methods and their use in Environmental Decision Making" in December of 1985. Teaching about non-market valuation is part of our core programme for students completing post-graduate degrees in resource management. Staff of the Centre for Resource Management have already established contact with all other non-market valuation practitioners in New Zealand, as well as in Australia, the United States, Canada, and the United Kingdom. We are also in contact with many potential users of these methods.

Academic research role

This role is aimed at improving our knowledge of non-market valuation procedures, and the theory underlying them. It has four main elements:

     (i)   watchdog role
     (ii)   verification
     (iii)   experimentation
     (iv)   student research.

The watchdog role is aimed at ensuring that any studies conducted in New Zealand are implemented appropriately and the results are not misinterpreted. This function involves providing critical analyses of studies, where necessary, to ensure the methods are not abused.

Verification involves testing non-market valuation methods to determine whether they are providing estimates of values in perfect markets. Several approaches may be used. More than one method may be applied to one case to determine if consistent results are obtained. All methods could provide biased results, so consistency does not guarantee correctness. A preferable approach is to compare non-market valuation results to results from simulated markets, or to markets for close substitutes.

The experimentation function is another form of verification. This approach relies upon laboratory-type experiments to determine how people behave when asked to reveal values in the presence of variable incentives to either tell the truth or to bias responses. This approach is useful as a filtering device to determine which methods are not likely to work, and should therefore be applied before the more expensive verification studies.

By fostering student research there is the opportunity to make low cost advances in valuation theory, and testing of approaches. Student research provided the first non-market valuation results in this country (Gluck, 1974; Harris, 1981) and has tested some alternative approaches to valuation (Cairns, 1985). The range of disciplinary backgrounds of students at the Centre for Resource Management ensures that existing methods of valuation are subject to critique from many different viewpoints, and results in innovative suggestions for approaches to resource valuation. Our ability to call on support from social scientists at both Lincoln College and the University of Canterbury provides ready access to professional guidance in the disciplines of economics, psychology, sociology, statistics, recreation, resource management and marketing.

6. Conclusions

There is a demand for non-market value information in New Zealand, largely due to the economic environment in which resource administrators find themselves. If New Zealand follows patterns established elsewhere, environmental management organisations and lobby groups will increasingly look to non-market valuation to enable comparison of the benefits obtained from public and open-access resources and facilities with the financial benefits obtained from alternative uses of those resources. Increased familiarity and understanding of the methods, combined with increased pressure to use natural resources for monetary reward, are likely to result in increased public and agency acceptance of the approach, and a consequent increase in demand for applications. By validating methods now, their acceptance can be hastened, and practitioners will be better able to meet these demands when they arise. There are already indications that demand for non-market values is exceeding our ability to supply them.

Two areas of action are of primary importance. The first is to clarify what non-market values represent, to enable New Zealanders to determine if they are an appropriate source of information to aid in decision making. The second is to conduct a series of verification studies to determine the validity of the estimation procedures in the New Zealand setting. In conducting a set of verification studies the inventory of values for resources and activities in this country would be enlarged, providing information to guide decision makers. Skillful choice of cases for verification studies would maximise the benefits obtained from the expenditure of these start-up costs.

The Centre for Resource Management has pioneered the use of non-market valuation methods in this country. The process has been well grounded in economic theory, allowing the implementation of studies at a level as advanced as applications anywhere. The practical studies with which we have been involved have provided a learning experience that could never be obtained in the classroom. While the concepts behind non-market valuation are extremely simple, there are numerous practical difficulties to their implementation. The costs involved in becoming familiar with the methods and competent in their application are extremely large.

Therefore, co-operative research with those who have already invested in obtaining this knowledge brings new entrants to the forefront of the discipline more quickly, and at much lower cost, than independent research. Future research should access the body of expertise available at the Centre for Resource Management. Non-market valuation research conducted at the Centre for Resource Management has placed us at the limit of current knowledge on the topic, and we are in an excellent position to make significant advances. Almost certainly, most advances will be made from integrating inputs from a range of disciplines. The skills required to make these advances are all available in New Zealand, and the Centre for Resource Management is in a position to co-ordinate a research effort which is capable of providing exciting new knowledge, and opening up new avenues for understanding the implications of environmental decisions.

Our ability to review and evaluate the usefulness of non-market valuation methods and theory developed abroad can only be maintained by investment in human capital. To a certain extent, this may be accomplished through post-graduate research, but only if university staff are sufficiently aware of current developments to direct students appropriately. Alternatively, professional researchers could fulfill this role. Either way, there is a case for continued investment in academic research into non-market valuation theory and practice, if these methods are to be used in New Zealand.

Acknowledgements

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