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Accommodating Indigenous Cultural Values in Water Resource Management: The Waikato River, New Zealand; the Murray- Darling Basin, Australia; and the Colorado River, USA

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# **Accommodating Indigenous Cultural Values in Water Resource Management: The Waikato River, New Zealand; the Murray-Darling Basin, Australia; and the Colorado River, USA**

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## **Abstract**

This paper examines how cultural values are accommodated in natural resource management and compares and contrast the approaches used in the Waikato River in New Zealand, the Murray-Darling Basin in Australia, and the Colorado River in the USA. Economics plays an integral part in the management of rivers in these case studies and two distinct approaches are used; privatization and co-management. The paper reviews these approaches and proffers suggestions on how indigenous knowledge, cultural and social relationships, and social, cultural, and economic wellbeing may be integrated in a multi-cultural approach.

**Key words: WATER ALLOCATION, CULTURAL VALUES, CO-MANAGEMENT, NATURAL RESOURCE MANAGEMENT.**

## **Introduction**

The management of rivers and their catchments around the world are significantly affected by the claims of indigenous people. In the arid west of the United States, local indigenous tribes have or are in the process of obtaining water rights to major portions of the Colorado and Columbia rivers' flows. Likewise, in Australia indigenous claims on the Murray-Darling Basin threaten the current water allocations and add another layer of complexity to the management issues. The recently signed Waikato River Settlement in New Zealand does not address ownership of water but requires co-management between local tribes and the Crown to address the health and well-being of the river. These claims and settlements affect the management of rivers in several ways. One important aspect is the change in governance powers and functions. Another important aspect is the inclusion of cultural values in managing natural resources. This paper will focus on how cultural values may be accommodated in natural resource management from an economics perspective.

The challenges are to incorporate indigenous knowledge, cultural and social relationships, and social, cultural, and economic wellbeing in an integrated, holistic, and coordinated approach when managing the resources of a river. The three case studies show different approaches: The property rights approach in the USA, the co-management approach in New Zealand, and a hybrid approach based on property rights in Australia. The next section reviews the basic neoclassical approach to valuing and managing natural resources as it is the foundation for the management approaches. That is followed by the case studies, a discussion on the implications of how cultural values may be accommodated into the model, and recommendations for an approach that may incorporate cultural values in water resource management.

## **The Neoclassical Approach to Water Resource Management**

Economics is concerned with the allocation of scarce resources. The objective is efficiency, that is, to allocate resources in such a way that society receives the highest possible benefits. To determine how to efficiently allocate resources, the range of resource applications are carefully considered by weighing their costs and benefits. To be able to compare the various allocation options in a cost-benefit analysis (CBA), the impacts are reduced to the common denominator of money. When CBA was first developed, only the impacts on markets, or market values, were included. It became apparent that natural resource allocations may have additional impacts that are not traded in markets. Efficiency requires the inclusion of all costs and benefits, market values and non-market values. As a result, economists have developed approaches and methods to include all values in CBA.

During the last 30 years economists have devoted an extensive amount of effort to identify, account for, and address the issues involved with non-market environmental values. The results may be summarized as an approach to capture market and non-market values by employing the concept of total economic value (TEV) (Tietenberg, 2006). TEV is subdivided into three categories: (1) use value, (2) option value, and (3) non-use value. Use value accounts for the benefits from using an environmental resource. Use value can be obtained from either direct use or indirect use. Examples of direct use include water diverted from a river for irrigation, timber harvested from a forest, recreational and commercial fish harvested in a body of water, and recreational activities carried out on a water body. Examples of indirect use include ecosystem services such as purification of air and water, natural pest control, mitigation of floods and droughts, maintenance of biodiversity, and generation and renewal of soil and soil fertility.

Option value accounts for the benefit received from the ability to use the environment in the future. It is different from use value because use value accounts for the benefits received from current use while option value accounts for the benefits received from preserving a potential future use.

Non-use value accounts for the benefits received from preserving or improving resources that will never be used. Examples of non-use value are bequest value (the value of bequeathing resources to future generations) and existence value (the value of knowing a resource like a clean river exists).

To capture TEV, use value, option value, and non-use value are added together as follows:

$$\text{TEV} = \text{Use Value} + \text{Option Value} + \text{Non-Use Value}.$$

The challenge for economists is to accurately measure all values. Direct use values are derived from personal use and can be observed in markets in the form of market prices. Indirect use values are also derived from personal use but can seldom be observed in markets. Non-use values are derived from benefits other than personal use and cannot be observed in markets.

There are few if any directly observable market prices for option values and non-use values. Direct and indirect methods have been developed to capture non-market values. The direct method derives value from observable actions, the revealed preference method, and the indirect method derives value from expressed motivations, the stated preference method. The revealed preference method includes hedonic pricing and the travel cost method while the stated preference method includes contingent valuation (CV) and choice modelling (CM). The objective of the valuation methods is to derive shadow prices for the non-market values. When prices have been identified for market values and non-market values, CBA identifies the optimal choice from the range of possible resource allocations.

The key to the neoclassical approach to manage natural resources is monetary reductionism, that is, to reduce all costs and benefits of a project or policy to a dollar amount to be able to apply the cost-benefit rule. In 1994 the debate about the appropriateness of using the stated preferences method, in particular CV took center stage (Journal of Economic Perspectives, 1994) but has mostly been forgotten. Diamond and Hausman (1994) conclude:

We believe that contingent valuation is a deeply flawed methodology for measuring non-use values, one that does not estimate what its proponents claim to be estimating. The absence of direct market parallels affects both the ability to judge the quality of contingent valuation responses and the ability to calibrate responses to have usable numbers. . . . We do not see much hope for success (p. 63).

Since 1994, the research efforts have mainly focussed on improving survey issues and scenario building (CM) without addressing the flaws of the methodology.

Efforts to incorporate cultural considerations have focussed on using these methods to put a dollar value on them. There are many challenges when attempting to put a monetary value on cultural values but there are two that are fundamental and important. One of the challenges is how to accurately value and incorporate indigenous knowledge, cultural and social relationships, and social, cultural, and economic wellbeing by using the neoclassical approach when managing the resources of a river. Another challenge is the appropriateness of reducing

cultural values to a dollar value and the challenges it presents when working with indigenous peoples. These issues will be explored in more detail the following sections.

It is clear that CBA may not be well suited to incorporate cultural values in resource management. The reduction of cultural values to money is not appropriate. Elsewhere I have argued that the limitations of the neoclassical approach stem from considering water as any other resource, a good to be priced and traded in the market, and fail to adequately account for the non-market functions, services, and cultural values of water. Water's cultural values and ecological functions are undervalued or ignored by CBA and stated preference methods (Steenstra, 2006).

The neoclassical approach to value cultural values in water resource management continues to be the choice of policy makers around the world. In the United States, the incorporation of indigenous values in water resource management in the West has mainly occurred through property rights as a result of legal claims and court decisions. New Zealand has taken a co-management approach to include cultural values for river management without addressing property rights. Cultural values in Australia are driven by property rights claims but attempts are made to include them through a quantity based approach. The next sections will examine these approaches.

## **The Property Rights Approach and the Push to Privatization in the U.S.**

The property rights approach argues that market strategies alone can determine appropriate water uses by solving the problem of diverging private and social measures of value. It is based on the Coase theorem, which states that the clear assignment of freely tradable property rights for an environmental resource will result in an efficient allocation in the absence of income effects and transaction costs (Coase, 1960). Terry L. Anderson and Donald R. Leal concur and argue that any uncertainty regarding water as a resource can be reduced by clearly defining and enforcing water rights (Anderson and Leal, 1991; Anderson and Snyder 1997). Transferable and competitive water rights ensure that all benefits and costs are fully accounted for, according to this approach. If new and alternative uses have a higher value, the owner of the right has an incentive to reallocate water by selling or leasing it.

On the Indian reservations in the American West and among the indigenous populations around the world, there exists a great concern about the application of neoclassical economics to water. Tribal scepticism of neoclassical economics in the western United States is a result of the limitations of this approach and historical events that started around the turn of the 19<sup>th</sup> century and continues today (Steenstra, 2000).

In 1888 several Indian tribes entered into a treaty with the United States that set aside the Fort Belknap Reservation as a permanent homeland in exchange for vast areas of lands in Montana. Non-Indian settlers, mostly miners, occupied the newly acquired federal lands and filed water claims on the Milk River according to the rules established by the prior appropriation doctrine. The Indian tribes, located downstream from the settlers, were soon left without sufficient water to sustain life and maintain a permanent homeland on the reservation. Although the Indian tribes were the true first settlers of the region, water appropriation was denied. Similar scenarios and results for Indian tribes were observed around the West for the next fifty years (Steenstra, 1999). The push to privatize water excluded the politically weak and socio-economically disadvantaged native peoples from their share of water.

Eventually this inequity was addressed in the courts but remains a source of conflict in the fierce battle over water allocations in the West. The United States in *Winters v. United States* (1908) sued the settlers on behalf of the tribes to protect Indian water rights and usage. The Supreme Court in 1908 created the Winters doctrine by affirming the power of the federal government to reserve and exempt water from prior appropriation under state law and concluded that the government implicitly reserved water rights for Indian tribes at the time the reservation was created.

Scepticism about neoclassical economics is expressed in the Tribal Water Management Handbook (1988) published by the American Indian Resources Institute. It aids tribal leaders and Indian water managers in "the adoption of water policies which will sustain the health of tribal members, safeguard the heritage of its cultural traditions, and support the hope for a brighter economic future" (126). It recognizes that traditional tribal members "may see water and its use according to spiritual and community values that cannot be measured in monetary terms" (111).

To the Shoshone and Bannock Indian tribes, clean water in lakes and flowing rivers is an indispensable part of religious ceremonies in addition to irrigation, fisheries, livestock, and recreational development (Checcio and Colby, 1993). The American Indian cultures underscore water as a non-monetary resource, which is not subject to the narrow ethnocentric perspective represented in neoclassical economics:

Some values attendant on a culture's relationship with water are simply not subject to categorization, calibration, and the vagaries of market forces--in short, to the relatively narrow perspective Euro-American society has traditionally brought to bear in water-resource decision making [Burton, 1991: 45].

Reducing benefits of water into a singular dimension of money in accordance with the property rights approach is problematic at best. Costs of a water allocation such as equipment, labor, and time may easily be identified by market prices but monetizing the benefits of preserving Indian cultures, species, ecosystems, and clean rivers are very difficult if not impossible. The application of monetary reductionism to cultural and non-monetary aspects of water is arbitrary and the emphasis of economics on markets and prices is naive and simplistic; the neoclassical approach may simplify the inquiry but at a significant cost of relevance (Söderbaum, 1987: 140-43, Kelman, 1981: 33-34).

Tribal values are ignored or understated resulting in less or no water when neoclassical economics is applied. There exists a paradigm and cultural conflict between neoclassical economics and native peoples, including American Indians, Maori, and Aborigines. The push to privatize water favors non-Indians at the expense of American Indians and indigenous peoples around the world (Shiva, 2002).

## **The Co-Management Approach in New Zealand**

On December 16, 2007 the Crown signed the Waikato River Agreement in Principle with Waikato-Tainui to settle the outstanding historical claim of Waikato-Tainui over the Waikato River. As a result of the Crown's *raupatu* (confiscation) in the 1860s, the rights and interests of Waikato-Tainui in the Waikato River were ignored. Although a land settlement was signed in 1995, the river claim was set aside for future negotiations. The Waikato River Agreement does not address ownership of water but addresses the health and wellbeing of the Waikato River through the principle of co-management. The Agreement in Principle is expected to be

finalized as a deed of settlement (the settlement) in August 2008 and as settlement legislation in 2009.

The co-management approach requires more than consultation or mere consideration of cultural values; it incorporates the mana whakahaere (authority, rights of control) of Waikato-Tainui and other Waikato River Iwi into a governance framework, Guardians of the Waikato River (Guardians) and a Waikato River Statutory Board (Board), and a natural resource management framework.

Although the particulars of the final settlement are not known at the time of this writing, it is clear that the settlement will be centered on a vision and strategy for the Waikato River. The following proposed vision has been developed by the Guardians Establishment Committee (GEC):<sup>1</sup>

Our vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come (Guardians Establishment Committee 2008, 6).

The GEC will be replaced by permanent Guardians of the Waikato River as part of the settlement. The Guardians<sup>2</sup> will be responsible for the vision and strategy for the Waikato River. In addition to the Guardians, a Waikato River Statutory Board will be established. The Board<sup>3</sup> will have power to implement and ensure compliance to the Vision and Strategy for the Waikato River (Office of Treaty Settlements 2008).

The proposed strategy to achieve the vision, as developed by the GEC, has the following thirteen objectives and suggests the main features of the natural resource management framework:

- A. The restoration and protection of the health and wellbeing of the Waikato River.
- B. The restoration and protection of the relationship of Waikato-Tainui with the Waikato River, including their economic, social, cultural, and spiritual relationships.
- C. The restoration and protection of the relationship of Waikato River Iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural, and spiritual relationships.
- D. The restoration and protection of the relationship of the Waikato Region's communities with the Waikato River, including their economic, social, cultural, and spiritual relationships.
- E. The integrated, holistic and co-ordinated approach to the management of the natural, physical, cultural, and historic resources of the Waikato River.

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<sup>1</sup> The sixteen member of the GEC include four representatives from Waikato-Tainui, one representative each from Ngati Tuwharetoa, Te Arawa, Raukawa, and Ngati Maniapoto, seven representatives from the Crown, and one representative from the regional council, Environment Waikato. The functions of the GEC are to develop a consultation draft Vision and Strategy for the Waikato River, develop and carry out a consultation process for the proposed Vision and Strategy; and having considered the results of the consultation process, agree on a final version of the Vision and Strategy to be recommended to the Crown and Waikato-Tainui for approval and inclusion in the deed of settlement and settlement legislation.

<sup>2</sup> It is expected that membership of the Guardians will closely resemble the membership of the GEC.

<sup>3</sup> Membership of the Board is expected to consist of an equal number of Waikato-Tainui representatives and an equal number of other members, including regional councillors, representatives of local authorities, and representatives of the Crown.



- F. The adoption of a precautionary approach towards decisions that may result in significant adverse effects on the Waikato River, and in particular those effects that threaten serious or irreversible damage to the river.
- G. The recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the river.
- H. The recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities.
- I. The protection and enhancement of significant sites, fisheries, flora and fauna.
- J. The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River.
- K. The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.
- L. The promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities.
- M. The application of the above of both maatauranga Maori (Maori knowledge) and latest available scientific methods.

The strategy consists of the detailed actions needed to achieve the vision, including the development and implementation of a Cultural Health Index (CHI), a water quality enhancement strategy, a water quantity (allocation) strategy, an amenity, cultural, and recreational values enhancement strategy, best practices, etc. (Guardians Establishment Committee 2008, 7-11).

The management of the Waikato River and its catchments will be significantly affected by the settlement in several ways. One important aspect is the change in governance powers and functions. Another important aspect is the inclusion of cultural values in managing natural resources. The proposed strategy requires the incorporation of Maori knowledge, cultural and social relationships, and social, cultural, and economic wellbeing in an integrated, holistic, and coordinated approach when managing the resources of the river. It places a special importance on Waikato River Iwi cultural values as the social, cultural, and economic wellbeing to New Zealand from the Waikato River are subject to this settlement.

Currently, the Resource Management Act (RMA) 1991 is New Zealand's main piece of legislation that sets out how the environment should be managed. It is based on the concept of sustainability.

Since the 1980s, neoclassical or market based policies have been adopted by policy makers and upheld in the courts when applying the RMA. It is evident that the stated preference debate in New Zealand to date has been settled in favor of the position that some number, however flawed, is better than no number. Several sections of the RMA are often referred to as an explanation and justification for this position. Section 5(2) of the RMA recognizes the importance of economic considerations by stating that a component of achieving sustainable management of resources is enabling "people and communities to provide for their . . . economic . . . wellbeing." Section 7(b) requires "the efficient use and development of natural and physical resources." Section 17(1) addresses externalities as it states that "every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of that person." Finally section 32 requires the evaluation of "the benefits and costs of policies, rules, or other methods" before the public is notified.

The RMA, however, takes a much broader perspective than the neoclassical cost-benefit analysis approach to managing natural resources. Section 5 requires that sustainable management includes the present and future environmental, cultural, social and economic wellbeing. In addition, the RMA includes provisions to take into account indigenous cultural values under sections 6(e), 7(a), and 8. In essence, the RMA requires the inclusion of all impacts and recognizes the special status of iwi in natural resource management.

It is not clear from the RMA how these impacts are to be taken into account. Not surprisingly, the RMA does not and should not specify a methodology or approach. Policy makers nevertheless have adopted in large measure the principles of CBA. In practice, a section 32 analysis has rarely taken the form of a purely quantitative analysis like a formal cost-benefit analysis or a purely qualitative analysis like an impact statement but is most often a hybrid analysis. It is a common practice, however, to focus on cost-benefit analysis, the quantitative aspects of a policy in hearings and formal proceedings as the Environment Court appears to consider quantitative analysis to be more objective evidence in support of a resource allocation.

Cultural values in natural resource management are currently accounted for by consulting iwi in some form with mixed results. The extent of consultation and the influence of cultural values on a policy vary by region as they are a result of the relationship between policy analysts and local iwi. This is in part due to the weak language of the RMA which requires that cultural values are “taken into account,” “regarded” or “recognised and provided for” (sections 6, 7, and 8) and the low participation rate of iwi in the process (Blackhurst et al., 2003; Whangaparita et al., 2003). Although local governments increasingly appreciate the need to understand and incorporate Maori cultural values, the conflict between the neoclassical approach of sustainability that underpins the RMA and sustainability based on Maori ideology remains an obstacle (Awatere, 2008).

The Waikato River Settlement appears to be a step forward in accommodating cultural values in natural resource management by addressing the governance and management structures for a water resource. It requires the incorporation of Maori knowledge, cultural and social relationships, and social, cultural, and economic wellbeing in an integrated, holistic, and coordinated approach when managing the resources of the river.

## **The Quantity Approach in Australia**

Recognizing the conflict between the price-based approaches of neoclassical economics and multiple criteria analysis with indigenous cultural values for natural resources, Tyron J. Venn and John Quiggin (2006) suggest quantity-based approaches. They argue that the focus on prices is not appropriate and that indigenous cultural values are better expressed in terms of rights or as “quantitative constraints, reflecting the requirement that rights should not be violated” (338).

The quantity approach does not reject the neoclassical approach or multiple criteria analysis but points out the duality between prices and quantities and that quantity-based methods, are more appropriate and better suited to consider cultural values. It avoids price estimates of spiritual, sacred, and other cultural values. Rather it solicits from custodians of indigenous cultures qualitative information of what an environment should look like.

To various indigenous people of the Murray-Darling Basin of south-eastern Australia, clean water in a flowing river is an integral part of their cultures for such purposes as ceremonies, religious places, dreamtime stories, burial places, habitat for clan totem beings, and sources of

foods and tools. Because cultural values associated with water are essential, particular levels of water quality and water quantity are non-negotiable and not easily priced. Quantity-based methods could obtain the minimum acceptable water quality and water quantity levels in a catchment to define the requirements or constraints that protect cultural values. It is argued that a “quantity-constraint approach is more consistent with the . . . indigenous world view” (Venn and Quiggin, 342).

In the Basin, the State of Victoria and the Yorta Yorta people signed a co-management agreement covering over 50,000 ha of crown land and waterways in 2004 (Victorian Department of Justice and Victorian Department of Sustainability and Environment, 2004). Formal processes have been established allowing indigenous representation on some resource management committees (Morgan et al., 2004). Indigenous representation is an example of Australia’s co-management effort. Cultural values may be qualitatively identified on resource management committees but a method to evaluate the trade-offs between cultural values, environmental values, and domestic and industrial uses of water does not exist. The quantity approach does not resolve the paradigm and cultural conflict between neoclassical economics and indigenous peoples but overcomes the fundamental challenge of reducing cultural values to monetary terms.

## **Discussion**

One important lesson learned from the U.S. and Australia is that there exists a cultural and paradigm conflict between the neoclassical approach and indigenous peoples’ approach to water resource management. Attempts to analyze water resource use and cultural values in terms of prices as defined by neoclassical economics is inappropriate because it underestimates cultural values and ignores indigenous rights.

An important observation from Australia is that it is not enough to set up the institutional framework to include indigenous representation and identify cultural values. To be sure, it is a necessary requirement for indigenous peoples to be part of the governance and management structures. However, after purposes and objectives have been identified, pragmatic resource allocation choices have to be made.

The co-management approach for the Waikato River Settlement in New Zealand has not yet been developed in terms of practicable means of implementation. The settlement provides for governance and management frameworks allowing significant indigenous representation on committees and the identification of cultural values as they relate to the health and wellbeing of the river.

The absence of a well-defined approach presents the opportunity to learn from the experiences of others and to improve on those attempts and/or develop alternative approaches. Co-management calls into question the appropriateness of stated preference methods in water resource management and offers the possibility for alternative “holistic” approaches in natural resource economics.

## **Recommendations**

Effective co-management should establish a locally applicable value principle to evaluate trade-offs so that policy decisions can be made. The universal efficiency criterion of the neoclassical approach is not an appropriate value principle for such water resource policies. In the case of the settlement, the efficiency criterion ignores the application of *maatauranga* Maori. A local value principle to evaluate policy trade-offs that is based on scientific

knowledge and Maori knowledge should address and attempt to resolve the conflict between the neoclassical approach and maatauranga Maori.

A specific method, the Cultural Health Index (CHI), has been identified in the settlement to direct and prioritize resources to restore and protect the health and wellbeing of the river (Guardians Establishment Committee, 7). The CHI has recently been developed in New Zealand and has been applied to some rivers and streams on the South Island (A Cultural Health Index, 2007). It does not provide a value principle to evaluate policy alternatives but does provide quantity-constraints for cultural values of a natural environment by soliciting from custodians of indigenous cultures qualitative information of what an environment should look like. The CHI along with other yet-to-be identified and developed methods may give effect to the “holistic” aspect of the approach called for by the settlement.

Good water resource management requires that all values and impacts are incorporated in the decision making process. The CHI and other locally developed methods may illuminate the issues by providing information from many experts, including scientists, sociologists, anthropologists, historians, ecologists, economists, indigenous knowledge experts, hydrologists, etc.

The challenge that remains is how to integrate the various tools, methods, and information to evaluate policy options. Some will undoubtedly promote CBA because of familiarity and the advantages to decision makers of reducing all the information to a common denominator. Others will suggest multiple criteria analysis, another price-based approach to the extent that values or weights are derived from practitioners and experts. There is an opportunity, however, to develop an alternative integrated approach. What this approach will look like is unclear. Some aspects of an integrated approach are obvious. It will be based on a normative value principle (to be locally developed), have multiple dimensions-contain monetary and non-monetary information-, be multidisciplinary, sustainable, and multi-cultural. The outcome of the approach is multi-cultural sustainable development.

## **Conclusion**

Economics will continue to play an integral part in the management of water resources. The New Zealand experience provides an opportunity to rethink how to incorporate indigenous knowledge, cultural and social relationships, and social, cultural, and economic wellbeing in an alternative approach. A crucial part of the rethinking process is the importance and appropriateness of the stated preference methods in the yet-to-be-developed approach. Another critical part of the process is the development of a local value principle that allows the evaluation of policy options and obtains the multi-cultural sustainable development outcomes sought in water resource management.

The Waikato River Settlement is historic because it creates the governance and management frameworks to apply the principle of co-management. It may also prove historic because of the impetus to change the direction of environmental and natural resource economics from a one-dimensional approach to a holistic, integrated, and coordinated approach. The research efforts of the last thirty years have resulted in more sophisticated price-based techniques to simplify the inquiry to a single dimension of money but at a cost or relevance. With some sustained effort the relevance of economics in water resource management may be much improved.

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