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Spash, Clive L. and Villena, Mauricio G.

University of Cambridge, Department of Land Economy

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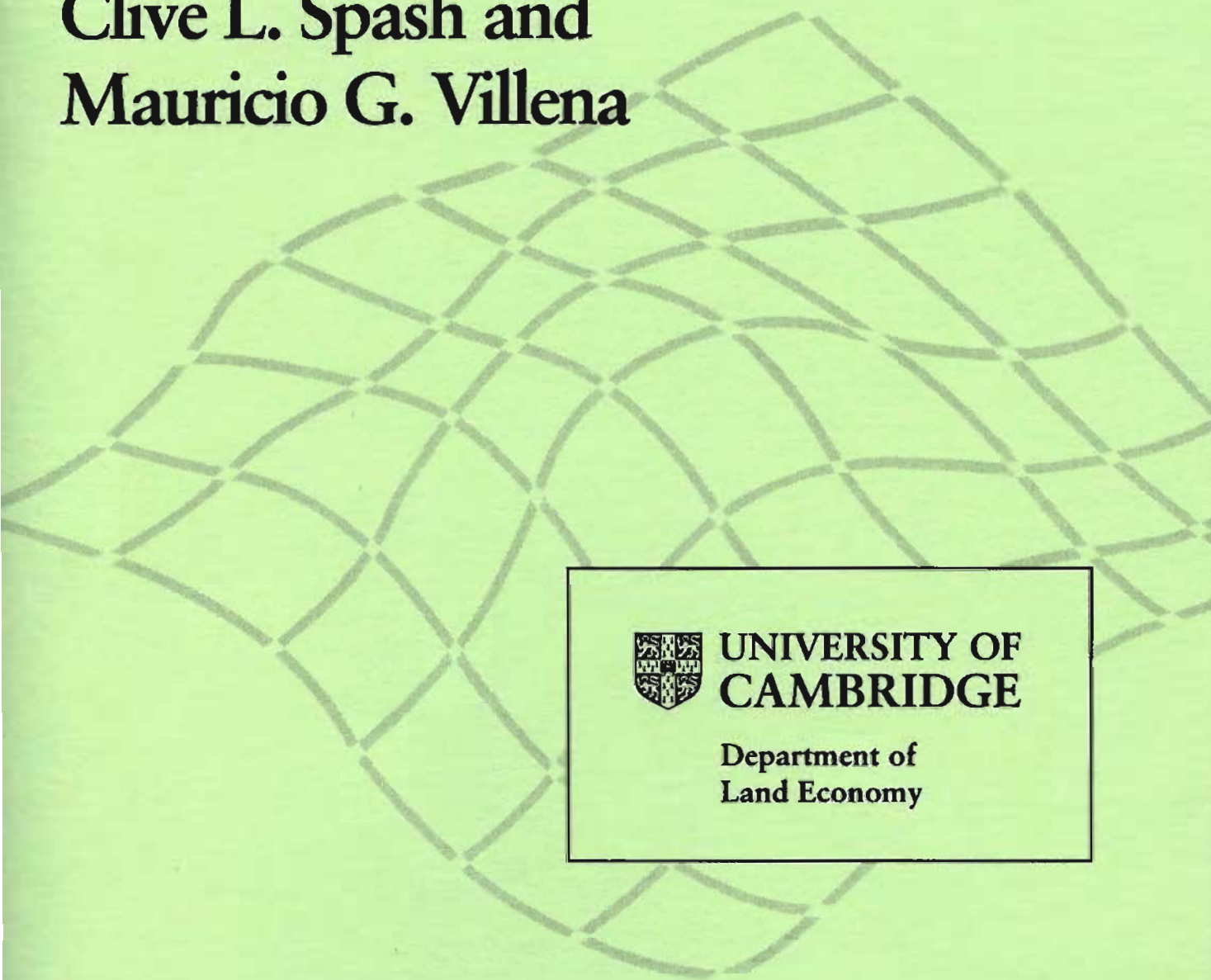
Mauricio G. Villena



UNIVERSITY OF CAMBRIDGE
Department of Land Economy

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by

Clive L. Spash and Mauricio G. Villena

Cambridge Research for the Environment (CRE),
Department of Land Economy, University of Cambridge,
19 Silver Street, Cambridge CB3 9EP

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Department of Land Economy
University of Cambridge
19 Silver Street
Cambridge CB3 9EP
Tel: 01223 337147
Fax: 01223 337130
E-mail: wt10000@cam.ac.uk

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ABSTRACT

A neglected aspect of ecological economics is the link to the social context. The socio-economic perspective extends standard economic analysis into concerns for distribution, ethics and the power of institutions which form and implement policy. We explore how an institutional perspective on ecological economics might operate and provide a distinct methodology.

In order to understand the institutional approach and how it differs from the standard economic methodology a historical overview is provided. This allows us to identify key characteristics. Theories applying the institutional approach to environmental problems are then discussed. Our main aim is to bring together the key characteristics of institutional economics with reflections upon previous environmental applications to synthesise the basic principles of a socio-economic approach to the environment. This then provides the opportunity to investigate how far the institutional approach to environmental policy differs from the general approach provided by ecological economics in terms of the preconceptions and values identified with each of these perspectives.

The paper concludes by discussing how an institutional economics methodology might be integrated with an ecological economics framework of analysis. The two approaches are found to have more in common with each other than either has with a neo-classical economics approach. A socio-economic perspective is seen as essential to developing effective policy and the institutional approach provides insights into how this might be brought into future analysis of environmental problems. However, several areas are identified where research is required if the two approaches are to be successfully integrated.

1. INTRODUCTION

An increasing interest in economic approaches to environmental protection has occurred during the last decade and resulted in the adoption or attempted adoption of a neo-classical approach by national agencies in Europe and the USA as well as international bodies such as the World Bank. However, while policy makers seem to be appealing to economics for their environmental policy advice, there has been serious and growing criticism of the mainstream approach with an underlying concern for the lack of social and moral discourse (Bird, 1982; O'Neill, 1993; Sagoff, 1988; Söderbaum, 1986; Spash, 1995). Ecological economics has arisen as an attempt to move beyond the narrow confines of environmental economics. However, the approach is often reduced to ecology and economics without the development of new methodology and techniques that ecological economics implies, and indeed requires. The maintenance of this division of subjects also has prevented progress on the development of a socio-economic perspective which goes beyond a preoccupation with efficiency in resource allocation.

The problem lies in the characterisation of environmental problems rather than in the use of economic policy tools per se. Different arrangements under the same broad approach, such as pollution permits, will play to different power groups in society and have different consequences in terms of the re-distribution of environmental externalities, costs and benefits. A driving concern is then that inappropriate policy will be designed without a clearer conception of political economy than exists in mainstream economics.

Thus, one aspect of any new approach to the economics of the environment is a need to analyse the role of institutional structures in policy formation if economists are to avoid acting naïvely. An obvious economic school which

could offer a coherent analysis of environmental problems would seem to be institutional economics. This potential has been recognised by others who have attempted to identify key features.

Peter Söderbaum (1990; 1991; 1992), for instance, in several of his papers has argued that the adoption of a theoretical framework based on institutional economics is a better approach than the neo-classical because it has a methodology which can allow for the complex nature of current environmental problems (e.g., multidimensional, multidisciplinary, non-monetary and monetary). Among the most important characteristics of this approach, he mentions holism, emphasis on institutional arrangements, pattern modelling, and emphasis on the political element of economics. Söderbaum is clearly influenced by the work of Myrdal (1973; 1978) with regard to his concern for the role played by values and ideology in economic analysis and the impossibility of a value-free economic science. Some of his contributions include the evaluation of decision-making approaches for environmental management (especially positional analysis), paradigmatic pluralism in economics, sustainability as ecological ethics, and actor-network theory as an alternative to public choice theory (Söderbaum, 1987; 1990; 1991; 1992).

The American institutional economist James A. Swaney (1987b) provides an excellent review of the foundations and basic elements of a contemporary institutional theory of environmental control. He has also discussed some specific policy issues, for example the economics of biodiversity (Swaney & Olson, 1992), the problem of air pollution in the US (Swaney, 1987a), and the advantages and disadvantages of market and command and control environmental policies (Swaney, 1992). In several of his papers Swaney has also attempted to develop the concept of "coevolutionary sustainability", which is discussed later in this paper.

The most comprehensive reviews of the institutional approach to the environment have in fact been provided by Söderbaum and Swaney. Many of the subsequent works addressing this issue in any depth tend to refer to one or both of their reviews. For example, Dietz and van der Straaten (1992), Hodgson (1997), Jacobs (1994), Klaassen and Opschoor (1991), Livingston (1987) and Opschoor and van der Straaten (1993). Other institutional economists who have shown some concern for environmental issues are: Bromley (1978; 1991; 1995), Schmid (1989), Santopietro (1995) and Quiggin (1988).

The aims of this paper are to investigate what institutional economists have to offer ecological economics, how they approach environmental problems and to explore some alternative foundations for policy formation. A brief definition of what we take as meaning the institutional approach is presented next. A synthesis of the literature follows so as to obtain several key attributes of an institutional paradigm in terms of its general approach to policy issues. This section looks at the theoretical perspectives institutional economists have applied to the environment and pays particular attention to the work of K. William Kapp. An important concern which then arises is the value basis of the institutional approach and how this is used to address environmental problems. There appears here an appeal to a wider environmental ethic which seems to fit uneasily with the anthropocentric viewpoint of the institutional school. Some attempt to reconcile these differences is attempted by an appeal to meeting needs (as opposed to wants) and recognising the need for compatibility with nature. This last argument is explored in terms of coevolutionary development. In concluding, the central aspects of the institutional school which align with ecological economics are summarised and some policy implications of the approach sketched and contrasted with the neo-classical approach. In this way we hope to show how the institutional approach can indeed provide a rich

framework for the analysis of environmental problems and how ecological economics might benefit from a socio-economic approach.

2. CHARACTERISING THE INSTITUTIONAL PARADIGM

Throughout, institutional economics will be taken to refer to the tradition of the old school. Since the 1960s a "new" institutional economics has emerged, associated with such names as Ronald Coase, Douglas North, Mancur Olson, Richard Posner and Oliver Williamson. However, much of this new school is built upon neo-classical and utilitarian foundations and thus the approach to environmental issues can be addressed in similar terms (Hodgson, 1993). The approach to be investigated here emphasises a broader more holistic analysis.

A driving force behind the development of institutional economics was escaping from the high level of abstraction of neo-classical economics and the "static flavour of orthodox price theory" (Blaug, 1992, p. 708). This movement started in America around the turn of the 19th century and the three main exponents were Thorstein Veblen followed by John Commons and Wesley Mitchell. At first glance it would seem that their topics of interest and approaches had little in common. Veblen was mainly concerned with power relationships in business, and the psychological aspects of consumer behaviour. Commons was interested in the analysis of the workings of the economic system from the viewpoint of its legal foundations, emphasising the importance and evolving nature of institutional arrangements (i.e. private property). Mitchell was devoted to amassing statistical data and their analysis, putting a strong emphasis on empirical research (he was the founder of the National Bureau of Economic Research in the USA). The dissimilarities in topics of interest, approaches and emphasis are common to many other institutional economists making characterisation of the movement far from easy.

Based on the heterogeneous character of this school, some authors have argued that institutional economics fails to represent a unified body of thought, methodology, or programme of research and even that such a movement has never existed as a differentiated kind of economics (e.g., Rutherford, 1994). This seems disingenuous and implies that several generations of economists were misguided. In fact, there appears to be relatively little internal difference of any consequence amongst institutional economists when compared with the substantial difference between themselves and economists of alternative methodological and philosophical persuasions. Miller (1978, p. 14) summarises the main characteristics unifying institutional economists as follows:
"Institutional economics is evolutionary, collective, interdisciplinary, and nonpredictive. Common to all institutional economists is a focus on conflict rather than harmony, on waste as opposed to efficiency, and on uncertainty instead of perfect knowledge. They reject uniformly the market as an unbiased allocational and distributional mechanism and have maintained consistently (and long before it was fashionable) a clear perception of the distinction between private and social costs and benefits. The existence and abuse of power and privilege, rather than the machinations of the atomistic individual, becomes a centre of interest."

The contrast with neo-classical economics is plain enough. Mainstream economics favours being regarded as a science governed by strict laws which stand over time. Therefore, there is no place for value judgements with respect to the way problems have to be analysed, and the emphasis is on the one right way to practise economics and discover "the truth". Institutional economics, on the other hand, recognises that economic systems do change over time and that economists generally deal with topics that involve uncertainty and ignorance instead of perfect knowledge. Economics is a normative science in which social objectives may guide a researcher concerning what is regarded as "efficient"

and this may change over time and space. This raises various points in relationship to the environment.

3. AN INSTITUTIONAL APPROACH TO THE ENVIRONMENT

As an open framework of analysis institutional economics encourages differences of opinion and approaches. Thus, institutional economists express different views on the definition of environmental problems and how to deal with them. For example, De Gregori (1986) argued in favour of technological optimism in the face of environmental problems, and has a position similar to neo-classical economists in that regard. This was disputed by Gowdy (1987) who favours seeing humans more as a part of nature rather than regarding nature as an enemy to be conquered. The approach here is then an attempt to synthesise key areas of broad agreement as far as possible. In the remainder of this section several such aspects are drawn out from the literature. These concern the nature of the economic system, the disciplinary approach, the role of institutional analysis and government intervention, and the incommensuarability of values.

3.1 The Economy as an Open System

While classical economists recognised certain limits upon economic activity imposed by the environment (e.g., Malthus, 1798; Mill, 1857; Ricardo, 1817), this perspective was largely lost, with regard to mainstream economics, during the first part of the 20th century. However, due to the recognition of the interdependencies of environmental and social systems the economic process must be regarded as being an open one. Kapp (1950) provided an early and thorough treatment of externalities which recognised the adverse consequences of economic growth for the environment. He saw production and consumption possibilities as dependent upon the current quantity and quality of natural

resources, which they simultaneously influence, so determining future possibilities. This view rejects an analysis of price formation by considering the economy as a closed system, where firms merely sell goods and services and pay factors of production (Munda, 1997, pp. 213-214). The role of firms and consumers is then intertwined with their impact on the environment. Thus, an institutional approach sees the economy as an open system that in order to function must extract resources from the environment and dispose of large amounts of waste back into the environment.

3.2 An Interdisciplinary Approach

The complexity of and connections between physical and social systems mean no single discipline is able to successfully address environmental degradation. This interdisciplinary view contrasts with the belief in the *ceteris paribus* assumption which encourages the study of the economy by atomistic reductionism where one variable is addressed at a time. Such a viewpoint also leads to a division of labour so that environmental economics and environmental policy are thought to be areas which can be meaningfully detached from other areas in economics and policy. As Söderbaum (1992, p. 130) points out "environmental economists are expected to take care of environmental problems and suggest a rational environmental policy, while other economists need not bother and can continue to do what they did before in fields such as agricultural and food economics, transportation economics, international economics, business economics, public finance, etc.". This scientific reductionism in socio-economics ignores interconnections and encourages individual researchers to close their minds to the contribution of other disciplines to understanding.

Kapp claimed that the interaction of the socio-economic with the physical and biological spheres (or systems of relationships) is much more complex and much less explored than the operation of any of the various systems which the conventional academic disciplines have isolated for separate study in the light of their particular objectives. Causal analysis cannot be carried on successfully in terms of one of the compartmentalised social, physical or biological disciplines. He emphasised that neither social nor natural scientists nor engineers nor public health experts, trained in their limited disciplines and familiar with only their narrow concepts and theories, would be able to focus attention on the whole relevant pattern of interaction, which, according to Kapp (1970a, p. 44) "must be the 'unit of investigation' – if we are to make headway with the causal analysis of the impairment of our environment".

3.3 Institutional Arrangements

Following a holistic approach, institutional economists reject reducing economics to the study of the market and consistently question the institutional arrangements and set of entitlements which strongly condition the market's response. All kinds of rules in society are potentially relevant and rules associated with markets represent an important but special case (Söderbaum, 1992, pp. 131-132). The market is a useful decentralising mechanism, but fails to offer the solution to all public policy problems (Bromley, 1985, p. 794). The main idea behind these reservations, is that the market is a biased mechanism with regard to allocational efficiency and distributional equity. Markets reflect the existence of power and mix control with being controlled, and therefore terms of exchange mirror the existing advantage of negotiators (Miller, 1978, p. 16). This was the essence of Galbraith's works on the theory of the firm and modern society (e.g., Galbraith, 1958; 1979).

Monetary and non-monetary costs and benefits are always contingent on the existing institutional arrangements. The historical background to existing arrangements will determine, for example, the distribution of power and wealth in society (Tool, 1979). New institutions and rules of the game mean a different distribution of monetary and non-monetary costs and benefits (Bromley, 1989). Thus, the institutional arrangements present in society are an important aspect of environmental policy analysis. The term "institutional arrangements" typically refers to organisations, rules of the game, power relationships, entitlements and other types of control over resources (Söderbaum, 1992, p. 132).

Since efficiency calculations rest upon the current structure of institutional arrangements, which determine what is a cost and for whom, the view of efficiency as a value-free concept is obviously misleading. Bromley (1989, p. 4) argues that identifying the status quo policy choice against which others are to be compared loads the debate, and that there is no single efficient policy choice but rather one for every possible institutional arrangement. Thus, when selecting an efficient outcome a particular structure of institutional arrangements and a corresponding distribution of income are also being selected. The policy relevant decision is then about who benefits from efficiency rather than merely achieving efficiency. Since neo-classical economics adopts a particular institutional setting without any explicit consideration, and is not designed to compare alternative institutional arrangements, its contribution to environmental policy formation is questionable (Livingston, 1987, p. 292).

Indeed, according to institutional theory, the institutional arrangements governing environmental resources and their use must be adjusted to accommodate new social goals concerning the environment. As Kapp (1977,

pp. 532-533) argued, the institutionalised system of decision-making in market economies has a "built-in" tendency to disregard negative effects such as air and water pollution which are often considered "external" to the decision-making unit. For Kapp social costs are closer to the typical definition of an externality than the "total social opportunity cost" of mainstream economics, and exclude private costs. The concept of externality can be traced back to Pigou (1920) and even Marshall (1890), but their definition is different from Kapp's and they regarded the problem as limited. Kapp (1970b, pp. 841-842) rejected the term externalities because these problems are unexceptional, pervasive and systemic and not "outside the system", as the word externality implies. In order to reduce the negative effects of its applied technology, an economic unit must necessarily raise costs, or in other words, must deliberately reduce profits. Consequently, under the conditions and institutional arrangements of a system which operates in accordance with the principle of investment for profit, economic agents are forced to reduce their costs whenever possible by shifting them to be borne by other sectors, third persons, or the economy as a whole. Here there appears to be a consensus among institutional economists that the institutional arrangements in a particular society strongly influence market activity and the forces of power within this system determine who suffers the social costs of market activity.

3.4 A Need for Social Control

A common view of institutional economists in their approach to the environment is the need for some form of intervention. This view is consistent with the rejection of the market as a problem solver and emphasises a preference for environmental policies which have a mixed character, i.e. market as well as government elements. Two main reasons are given for such social control. First, institutional economists argue that society is organic and has

needs that are different from the sum of needs or wants of individuals (Swaney, 1987b, p. 1747). Hence, the value society attaches to natural resources and the environment is not merely the sum of all individual values. Since society has a much longer life expectancy than individuals, society as a whole has values that are likely to deviate from individual values. For example, an approach based on the summation of individual preferences can easily condone and even promote the extinction of species and ecosystems (Klaasen & Opschoor, 1991, pp. 109-110). Second, power is distributed neither equally nor fairly amongst individuals and organisations. Free market approaches to the environment only reflect the interests of those who currently hold power in society and will disenfranchise those who wish to protect the environment by changing the power structure. In the terminology of Karl Polanyi (1947) institutional economists reject the market mentality, and argue that a mixed economy is required (Swaney, 1987b, p. 1747).

3.5 Monetary and Non-monetary Aspects

One mistake commonly made by environmental economists and policy makers is to assume that a monetary figure can be taken as measuring all aspects of value associated with an object, e.g. its very existence. While commodification of the environment may be undertaken it leads to a perversion or disregard of the ethereal and other "non-market" factors such as species existence (Spash, 1995). Those working in the area of ecological economics have therefore signalled the importance of recognising the incommensurability of values (O'Neill, 1993).

People may value the environment on a moral basis which falls outside of the standard economic framework e.g. lexicographic preferences (Spash, 1998). More fundamentally, a philosophical foundation in preference utilitarianism has

led economics away from moral concerns and been used to justify technocentric valuation of the environment by experts who appeal to the general public for numbers to justify their policies. This is assumed to be justified by a model of free market democracy but because sections of the population may refuse to play the game and are then treated as zero valuations the process can be used to systematically exclude sections of society (Spash, 1997a). This possibility becomes of greater concern if, as some suggest, ethical and ideological issues become accentuated in relation to environmental problems (Keat, 1997). Preference utilitarianism may also side-step the question of human needs where they fail to be reflected in individual utility functions. Similarly, the approach downplays the role of individual integrity and commitment, which are associated with moral values and rules that are typically acquired through an individual's immersion in a social culture (Hodgson, 1997, pp. 48-49).

Kapp (1970a) pointed out that monetary valuation fails because actual markets are far from perfect and mostly oligopolistic, and because the consequences of environmental disruption and benefits from environmental improvement are highly heterogeneous and cannot be compared quantitatively with one another or with control costs. Hence, Kapp rejected even the principle that social costs and social benefits were quantitatively comparable. In providing social benefits environmental protection has diffuse effects throughout society; and no one should be excluded from their enjoyment. The political character of this sort of decision reinforced Kapp's rejection of cost-benefit analysis as a tool that could help in environmental policy formation.

The recognition of the circular interdependence between ecology and economy also implies that a broad spectrum of variables needs to be included in any analysis of environmental problems. This view is consistent with the holistic approach advocated by Söderbaum (1994, p. 195) which emphasises

multidimensional thinking. Many of the relevant factors in the analysis of environmental problems are non-market in character, and difficult to quantify or measure in terms of prices, and therefore non-monetary information is required. A strategy of disaggregation, such as environmental impact assessments, multi-criteria decision analysis and various forms of systems analysis are then seen as preferable to cost-benefit analysis. Söderbaum (1987; 1994) has proposed a positional analysis where the non-monetary part of impacts is described in terms of flows (referring to periods of time) as well as stocks or positions (referring to points in time). In general terms, the main aim of positional analysis is to illuminate decision situations with all their conflicts rather than to "solve" the problem in a unanimous way. Conclusions are conditional and relate to possible value standpoints. In this sense the analysis encourages open debate with respect to values and ethics.

4. THE VALUE BASIS OF AN INSTITUTIONAL APPROACH

Neo-classical economists, with their analytical focus on rational optimising agents with exogenously determined preference functions, recommend policies based on individual incentives and disincentives. Through calculable monetary incentives and disincentives the behaviour of utility maximising individuals is meant to be altered in such a way that environmental degradation and resource depletion can be reduced to an optimum level. Monetary incentives form the key to forcing users of environmental "goods and services" to take account of the costs imposed upon others by their behaviour.

One aspect of criticism of this approach focuses upon the utilitarian foundations of environmental economics. Some authors, for instance, have claimed that environmental policies based only upon rewards and punishments downplay individual integrity and neglect the whole issue of "commitment" and the social

relations that surround it (Hodgson, 1997, p. 53; Spash, 1995, p. 281). People are seen to be motivated by more than self-interest, and regarding co-operation and altruism as utility maximising behaviour is a narrow and tautological explanation. Hodgson (1997) argues that individuals are to some extent motivated by self-interest and that policies based on pecuniary and monetary incentives have a place in the formulation of environmental policy, but that such policies can be reinforced by complementary appeals to moral values. Specifically, policies promoting cultural values such as social commitment and trust can supplement environmental policy based on monetary incentives.

The institutional approach to the environment, as outlined in the previous section, advocates a more open discussion about the values and ideology which are always present in economic analysis despite its claims to be a value-free science (Myrdal, 1973; 1978). In epistemological terms neo-classical economists remain positivists, while institutional economists exhibit an open interest in subjective aspects of knowledge. This requires that economists be more aware of the implicit value judgements in their research, and make them explicit in studies which are of public interest and where a decision has to be made by non-experts. In the same way, institutional economists suggest that economists should try to consider different perspectives with respect to ethical and ideological viewpoints.

In relation to environmental issues, any approach to understanding requires adopting a perspective on natural and social systems. "Hence, an economics of the natural environment includes views on natural systems, social systems, and the interactions between them" (Swaney, 1987b, p. 1745). Ethical judgements are also relevant to the quantity and quality of natural resources the current generation decides to leave behind for future generations (Dietz & van der Straaten, 1992, p. 44). Conflicts between interests and interested parties are the

normal state of affairs for environmental problems rather than the exception. In such situations the scholar can contribute meaningfully by trying to interpret the ideas of progress or development of the opposing parties (by asking, for instance, what are the values of those who are for or against a particular project). Hence, some institutional economists have suggested that hermeneutics can become an interesting epistemological option (e.g., Söderbaum, 1992, p. 132).

Certain institutional economists appeal for a wider ethical basis of value (Swaney, 1987b). This can be linked to Aldo Leopold (1987) who criticised the utilitarian ethics of the Progressive Conservationists, such as George Marsh, Frederick Turner, and Gifford Pinchot (see Nash, 1976). He paid attention to the need for a balance between humans and nature, and the means to achieve that balance. Leopold's work recognised the complexity and interdependence of ecological systems, and emphasised the importance of taking care of these systems in order to ensure human survival. Based on the fact that some ecosystems are very fragile, and on the ignorance surrounding the full effects of breaks in the ecological chains, Leopold claimed that neither self-interest nor legislation were sufficient to protect the environment and that a new ethic was needed. This was his non-utilitarian land ethic, where non-human animals, trees and ecosystems would be considered as entities with moral standing. However, underlying the institutional approach there seems to be an appeal to scientific evidence about the potential consequences of environmental change for human life. Leopold's work on a conservation ethic has thus been interpreted from an anthropocentric viewpoint. This mitigates any right of other entities by placing human survival first. For example, Swaney (1987a, p. 1744) states that "Leopold did not advocate that we elevate other species to the importance of people, but rather that we extend rights of existence (and derivatively a

habitable environment) to all flora and fauna, because it is in our own survival interest to do so".

This anthropocentric view is consistent with Marc Tool's principle of social value, which states that we should choose or do that which provides for the continuity of human life and the re-creation of community through the instrumental use of knowledge (Tool, 1977; Tool, 1979; Tool, 1995). This theory of value is based upon the work of Veblen and Dewey (see Tool, 1977). The emphasis on the continuity of human life implies that the environment must be preserved only to the extent that it supports human survival. This might be interpreted as requiring extensive conservation if, following Leopold, the complexity and fragility of ecosystems, and our ignorance about the potential result of breaking ecological chains, are recognised. Both the social and biotic community must be preserved, in order to avoid the loss of potential knowledge and resources which would result in restricting future options and to reduce the risk of damaging life support systems that are essential for human survival in the planet.

Consistent with these arguments Marc Tool formulated an "ethical corollary" to his social value principle, the "criterion of environmental compatibility", which establishes that the human community must live within its ecological means (Tool, 1979, p. 310). The ultimate values proposed imply environmental compatibility. The economic process is to remain within the boundaries set by basic physical, thermodynamic and ecological laws. This is required in order to preserve or support ecosystems, biological diversity and essential ecological processes to ensure human survival.

The principle of social value provides a foundation for environmental policy in human need or instrumental value. The term "needs" is used to stand for that

which people must achieve if they are to avoid sustained and serious harm, and contrasts with "wants" which are related to desires. Such wants can be individually and/or socially harmful (Hodgson, 1997, p. 58). Thus, instead of focusing on subjective utility, institutional economists advocate an approach based on an inquiry into social processes. Kapp emphasised the necessity of starting from human needs in reformulating guidelines for public action and, rather than accepting market dictates, using resources to meet these needs. He believed in working out objective standards in the form of appropriate limits of maximum tolerable or acceptable levels of concentrations of contaminants. The object of such "safety limits" being to determine the extent to which any type of disruption becomes a threat to the environment and to humans. These limits would provide standards for measuring, in physical terms, the state of the environment, but also fundamental existential minimum requirements of individual life, or social needs (Kapp, 1970a, p. 52). However, such social minima do not define an ideal or perfect state or, for that matter, an "optimal" use of resources. Instead, he argued that they may offer some operational criteria or indicators for policy-making in terms of increments for improvements. He believed that once safety limits, such as maximum permissible pollutant levels, were politically stipulated they could be translated into a broad production function (or physical investment pattern) using input-output modelling. This could then be used to identify the inputs and techniques for production as well as the outputs called for by our existential minimum needs.

However, care must be exercised in adopting such prescriptions for resolving environmental problems. As with the concept of safe minimum standards, the idea of safety limits works with a model of environmental management which assumes thresholds, definable limits and the possibility of segregation between natural functions and human activity. That is, if humans back away from nature

and limit their activity, then natural systems will be able to function in safety. The problem with this characterisation is that human intervention in the environment is all pervasive and the limits are socially defined rather than scientifically discovered. Environmental management consists of both defining inaction and deciding what action to take, and the mix between these approaches varies with the type of problem, for instance, from wilderness to built environment (Spash, 1997b). The protection of the environment being called for by Kapp is assumed to be feasible so that the only concern is how to achieve the change. However, there is a prior question concerning whether certain aspects of the environment are even within our ability to control and direct, e.g. we may influence global climate change but are unable to determine the outcome. Modern environmental problems are moving rapidly beyond the conception of threshold effects and are now redefining the evolution of ecosystems and the biosphere, e.g. genetic manipulation, biodiversity loss, global gas and chemical release.

Implementation of environmental policy based on human needs requires changing patterns of behaviour which are incompatible with the preservation of the natural environment in order to protect life support systems deemed essential for human survival. Whether this model is appropriate or not (i.e. whether we can define what is "essential") any serious effort to protect the environment will require changing human behaviour at individual and societal levels. Achieving this transition requires some form of "institutional adjustment" which assures environmental and ecological protection, restoration and continuity (Tool, 1995, p. 146). Modern institutional theory provides some principles explaining institutional adjustment. Foster (1981) developed three such principles: technological determination, recognised interdependence, and minimal dislocation. Foster's principles describe, and are meant to facilitate, adjustment of the institutional structure, particularly when technologically

induced problems arise. Indeed, Foster assumes the main source of social problems is technological change. This view is questioned by Swaney (1987a, p. 306), who stresses that changes in the environment, whether due to natural or human cause, can also strain the institutional structure, and therefore environmentally induced stress can occur without a change in technology (Swaney, 1987a, p. 306). Hence, Swaney claims a distinction between technologically and environmentally induced stress on the prevailing institutional structure is useful because it highlights that the biophysical environment is not a given, the earth is not quiescent (Swaney, 1985, pp. 857-860). This leads to a fourth principle, that of coevolutionary sustainability

5. CUMULATIVE CAUSATION AND COEVOLUTION

In the evolutionary approach suggested by institutional economists, the principle of cumulative causation is considered as central. The first institutional economist to apply this concept to the study of environmental problems was Kapp (1965) who references the works of Veblen and Myrdal. He broadly defined this principle as exposing how social processes are marked by the interaction of several factors, both economic and non-economic. These factors combine to move a system away from a position of balance or equilibrium rather than toward automatic self-stabilisation. Social processes can then be seen "...as subject to a kind of social inertia which tends to move the system in the same direction as the initial impulse." (Kapp, 1965, p. 2).

While Kapp recognised the importance of physical factors in the process of causation, he also stressed the relevance of social factors. Based on this thesis, Kapp claimed that a fundamental issue for environmental economics should be identifying the causal processes giving rise to the "disruption" of both the physical and social environment. Specific emphasis is then placed upon socio-

economic and legal relations in modern society and their analysis is central to understanding the process of causation of environmental disruption. In this context, Kapp (1970a, p. 42) claimed that "...to concentrate only on the physical chain of causation or to view the problem in isolation from the institutional framework in which it takes place can convey only an incomplete and therefore a false picture. In short, the causal chain is at the same time a physical and a social process." Both the physical and social systems are regarded as having specific structures and regularities and Kapp emphasised the relationships between the two. In particular he argued that, if human actions are carried out in ignorance of the existence of ecological structure and specific laws governing physical systems, the likely result would be environmental degradation. Human actions which actually cause environmental degradation might be judged completely rational and justifiable when considered in the light of "human laws" alone. However, the natural-physical and social systems are interdependent so that human action has repercussions on both in an evolutionary process.

Similarly, others have more recently claimed that a holistic systems approach to environmental problems must start with the recognition that social systems coevolve with natural systems (e.g., Gowdy, 1994; Norgaard, 1984; Norgaard, 1994; Swaney, 1985; Swaney, 1987a). Swaney has formulated this as the principle of "coevolutionary sustainability", which can be seen as an extension of the principle of institutional adjustment developed by Foster (1981) and pursuing the criteria of environmental compatibility suggested by Marc Tool. Environmental systems may evolve along development paths that are unsustainable. Thus, coevolutionary sustainability requires avoiding development paths or applications of knowledge which seriously threaten the compatibility of socio-economic and ecological systems. Specifically, environmental education of individuals, interest groups and companies is

prescribed and a call made for more environmental research to identify future problems and solutions. A more flexible and responsive institutional structure is needed to stimulate and respond to advancing knowledge and to induce behavioural adjustments (Swaney, 1987a, pp. 306-307). From these suggestions, it is clear that for Swaney the rapid penetration of new knowledge in the field of environmental protection is of great importance to ensure a sound environmental policy.

Dietz and van der Straaten (1992) have tried to extend this analysis by pointing out that new knowledge and improved insights are subject to a political process of scrutiny before being applied in environmental policy. There are then possibilities for vested interests to query new knowledge and to hamper stricter environmental regulation. This implies that the balance of power in society concerning environmental issues should receive more attention. This emphasises the importance of the social sphere in the formation and solution of environmental problems. Thus, institutional economists base their approach in ecology, economics and politics. The principle of coevolutionary sustainability can be seen as a direct application of institutional theory to the analysis of environmental problems and has been gaining wider acceptance in the work of others (Dietz & van der Straaten, 1992; Opschoor & van der Straaten, 1993; Tool, 1995).

While this shows the recognition of the interdependence of the physical and social systems as being part of an institutional economics approach to the environment, whether the specific concept of coevolution is the best formulation is more doubtful. Norgaard (1994) presents an excellent critique of the reductionist, atomistic scientific approach to economics but then argues in favour of applying the reductionist scientific concept of coevolution to economic systems. While interdependence is key to understanding socio-

ecological economics the implications of coevolution can be perverse. For example, the sign of successful and efficient coevolution in natural systems is an increased population, but a larger human population is generally accepted as counter-productive in terms of current environmental problems. Coevolution also gives the impression that social systems are inflexible because of their historical evolution in the same way that a hummingbird is committed to living from specific plants for which its beak has adapted. Yet there has historically been a range of potential socio-economic systems which can be adopted at any one time and sporadic periods of rapid change between systems. The danger here is in regarding a specific evolutionary outcome in social systems as naturally superior. The aim of applying the coevolutionary concept to socio-economics is an interesting reflection of the concern for compatibility between human and ecological systems, but in how far the concept is directly applicable in its scientific form remains questionable. As with sustainable development, the terminology may end up being used to mean different things to different people.

6. CONCLUSIONS

In this paper an attempt has been made to bring together the main tenets of an institutional approach to the environment. Here the main preconceptions and values of this alternative approach to the economics of the environment have been outlined, and some of its more important policy foundations discussed. Under institutional economics, the view of the economy as an open system indicates acceptance of the environment as an integral factor affecting the whole economic process rather than an exogenous variable. The realisation that the development of social and biotic communities is interdependent has led to the adoption of concepts of compatibility with nature and coevolution. These ideas have much in common with the development of thought in the progressive areas

of ecological economics (as opposed to status quo study of neo-classical economics and ecology).

Some of the most common characteristics ascribed to institutional economists which are relevant to ecological economics are:

1. **Open Models.** A preference for open models which recognise the interdependence of the elements of the social system. This implies a holistic model even when focused on specific problems. The concepts of ecosystems, complex relationships and the Gaia theory all reflect a similar approach in the ecology and the environmentalism which drives ecological economics.
2. **Interdisciplinarity.** Adopting an analysis which is interdisciplinary, and accepts contributions from other arts and sciences. This is also the essence of ecological economics as opposed to the study of ecology and economics, and we have argued the approach must include socio-economics to develop an understanding of political economy.
3. **Institutional Arrangements.** Recognition that the economy is more than a market, and therefore market solutions to policy problems are of limited use. Thus, emphasis is placed upon studying the institutional arrangements and sets of entitlements which strongly condition the market's response. Both ecological economics and political ecology are developing interests in alternative institutional arrangements.
4. **Social Control.** Acknowledging the need for some sort of "social control" and so holding a favourable attitude to state intervention. Ecological and moral limits to the reign of individual preferences in the market place are required by ecological economists.
5. **Non-Economic Factors.** A desire to include a broad set of factors and variables in analyses, including non-economic as well as economic variables. This links with the concern shown in ecological economics for incommensurability.

6. **Values.** Recognising the importance of value judgements in economic analysis and the normative character of all economics. Ecological economics rejects value neutrality and might be regarded as a movement which unifies those concerned about environmental degradation and future generations rather than pretending to be an objective science.
7. **Descriptive Models.** A methodological preference for descriptive models (pattern models), as opposed to predictive models. The institution is used as the unit of analysis, as opposed to the maximising individual consumer or firm.
8. **Evolution & Dynamics.** A tendency to consider economics as an evolutionary, dynamic process rather than a static equilibrium-orientated process. The principle of cumulative causation then becomes of prime importance and has been linked to coevolution which has also become a concept for discussion in ecological economics.

The divergence between the institutional and mainstream economic approaches can be quickly exemplified. Tradable permits are being promoted as the answer to such diverse problems as water pollution in a local river course to carbon dioxide in the stratosphere. There are of course various problems with such tradable permits markets when attempting actual implementation as opposed to textbook explanation. Markets are open to manipulation in a world of oligopolies, the initial distribution of permits is contentious, equity issues are relegated to a secondary status, and trading-off the damages from environmental degradation against monetary payments may be regarded as unacceptable. However, moral concerns and institutional design are regarded as outside the remit of mainstream economists, although they still feel able to give their advice and effectively lobby for certain social engineering methods (i.e. promoting taxes and tradable permits). Efficiency is seen as the proper remit of the mainstream environmental economist and therefore the price at which such

trading should occur might be expected to be a concern but this is normally neglected. Permits are normally discussed in terms of determining the quantity required to achieve a given pollution standard set by an unknown process. However, the price can be manipulated by the controlling authority adding or removing permits. This in turn affects resource allocation in other sectors of the economy. Analysis of this secondary impact would focus more attention upon the distributional and political consequences of introducing a specific scheme.

While a free market laissez faire approach is advocated to improve polluted environments the opposite may occur. In a world where oil and chemical companies have considerable political and economic power the permits market provides a good opportunity for claiming one thing (pollution is now under control) while doing another (purchasing political legitimacy for continuing to pollute). The implied trading of property rights and ensuing political validation of deliberate creation of harm raises questions over the morality of the system regardless of its efficiency (Santopietro, 1995). In addition, the choice of the status quo efficiency perspective is clearly seen to determine who bears the resulting costs. This is particularly important when the voice of those to be harmed is muted as is the case for non-human species and future generations (Spash, 1993; Spash, 1994). The emphasis upon technical efficiency also ignores the increased scale of environmental damage due to encouraging conspicuous consumption. Assuming that tradable permits will allow all kinds of impacts to be traded in monetary terms has also been criticised because of the presence of irreversibility, or limited reversibility, and uncertainty (Söderbaum, 1992, p. 127; Söderbaum, 1994, p.194). There are in addition, other environmental values which cannot be expressed in the market place.

Despite such criticisms, neo-classical theory manages to maintain a hold over certain sections of government and many academics (both economists and

ecologists). Some agencies have assumed the tools of cost-benefit analysis are applicable to any kind of environmental project or policy (e.g., Department of the Environment, 1991). This creates a political alliance between economists and politicians, where policy makers remove themselves from responsibility for policy decisions and claim a sense of technical "objectivity" in justifying the outcome on the basis of expert economic opinion. A defensive argument is often put forward, by policy makers adopting this stance, that the neo-classical alternative provides the only coherent and consistent framework for analysing environmental problems. Part of the problem here is due to the perception of the critic who ignores potential alternatives, such as multi-criteria decision analysis, environmental impact assessment, political methods for deliberative decision making and so on. If any substantial in roads into the realms of government rhetoric and, increasingly, treasury oriented political systems are to be made, the analysis of institutional alternatives seems key.

Clearly there are alternative approaches to those provided by neo-classical economics for dealing with environmental problems, although they remain in a formative stage of development. Unfortunately, there has been a tendency for the institutional literature to centre upon presenting criticisms of the neo-classical approach, rather than suggesting constructive alternatives. Despite the strength of the criticisms the need is for operational tools that permit policy makers to achieve their aims and substitute or complement the mainstream approach as necessary.

Besides regarding ecological and economic systems and their interactions as important in the analysis of environmental issues, institutional economics emphasises that social systems and institutional arrangements determine the causes and solutions of environmental problems. Thus, issues like income distribution, rules of the game, and power relationships are of prime importance.

Analyses of the forces in society, typically associated with vested economic interests, which obstruct institutional changes aimed at protecting the environment can be expected to be resisted by those same forces. Thus, the study of the institutional barriers to attaining environmental improvements is crucial, but likely to be difficult.

Socio-ecological economics should extend the scope of environmental policy by comparing alternative institutional arrangements and, where needed, proposing changes in institutions in order to resolve problems or accommodate diverse social interests. Particularly important in the institutional approach to the environment is the focus upon requiring that institutional adjustment reflect well defined human needs in order to assure environmental and ecological protection, restoration and continuity. This is an interesting approach but one which may be excessively anthropocentric as currently proposed. The emphasis on institutional adjustment is also key to environmental policy development, but whether coevolutionary sustainability is the best method of expressing the concern for compatibility between humanity and nature remains highly questionable.

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