Ecological Economics at the Cross-roads

by
Clive L. Spash
University of Cambridge

This piece is based upon a more extensive and inclusive article addressing both mainstream and ecological economic approaches. Sections are reproduced here with the permission of White Horse Press, Cambridge, UK. (http://www.erica.demon.co.uk/EV.html). The original article is:

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Abstract:
A group of people can be identified who teach that ecological economics is nothing more than a name for the link between mainstream economics and ecology. A new movement and paradigm are unnecessary for such ends. This viewpoint is argued to be inconsistent with the roots and ideas of the ecological economics movement. There is clearly a divergence between the conformity to neo-classical economics favoured by resource and environmental economists and the acceptance of more radical critiques apparent in ecological economics. Thus, elements of ecological economics are increasingly incompatible with those practising neo-classical environmental economics who try to reduce all concepts to fit within the confines of their models. Ecological economics is seen here to be synthesising various types of economics (e.g. socialist, institutional, environmental) and moving back to explicit inclusion of ethical issues in the mode of classical political economy.

Introduction

For many people ecological economics is indistinguishable from agricultural economics, resource economics, or environmental economics. Yet, there are significant differences amongst which the most obvious is recognition of the need to fundamentally change the current approach to economic analysis. Mainstream economists regard sub-disciplines which question the orthodoxy as inferior pursuits and have therefore resisted the message that environmental and natural systems are distinctive elements of human production and welfare. Ecological economics has grown, particularly in the last decade, for several reasons, including frustration with the sub-disciplinary status of environmental economics, the apparent failure to impact legislation, and the disregard shown for natural science information on the environment by other economists.

A dominant lead has been preoccupied with linking standard economic and ecological models, rather than looking for a paradigm shift. This has encouraged researchers to subscribe to ecological economics while producing research results which would fit comfortably within neo-classical environmental economics. As a result, confusion has continued over defining what the subject involves. Thus, particularly in the United States, ecological economics has been adopted

by many as a revitalised environmental economics, while those avoiding it see the subject as at best a poor substitute for environmental economics and at worst bad economics by self-promoting natural scientists.

However, the aspirations of ecological economics are far greater than merely providing a new lease of life for established disciplines and lie in the development of new ideas and an interdisciplinary research agenda to explore alternative paradigms. This paper tries to throw light on developments relating to ecological economics in the latter part of the 20th century. Those seeking detail about the ecological critique of economics between the 1860s and the 1940s should refer to Martinez-Alier (1990).

The Relationship with Environmental Economics

In general, the literature by economists on the environment in the first part of this century reflected concerns about conservation issues (as wise use not preservation) related to agriculture and forestry and established a theoretical approach to non-renewable resource depletion which is still fundamental to resource economics. Specialists in sub-disciplines addressed these topics while mainstream economics developed theories which by assumption implied economies could operate independently of either natural resource constraints or assimilative capacity and so further marginalised environmental issues.

Ciriacy-Wantrup (1952) can be seen as stimulating the development of environmental economics. His work in the 1950's inspired many who would establish environmental economics as a distinct sub-discipline in the 1960's and 1970's (e.g., Krutilla, 1967). Among his contributions is the concept of a safe minimum standard which is now often cited as a rejection of the conventional treatment of risk under cost-benefit analysis and a recognition of the importance of uncertainty as a distinct type of unpredictability. Some argue the safe minimum standard provides a bridge between economists and ecologist (e.g., Tisdell, 1993 p.148).

While Kapp (1950) was an early critic, for many, the formal spread of an apparent environmental concern within mainstream economics was progressive. This was and continues to be regarded as an opportunity to get the message across to politicians and fellow economists that the environment and economy interact in fundamental ways. However, neither have seemed particular moved by what environmental economists have been saying. The main response to this

neglect, apparent within environmental economics for sometime, has been to regard politicians and the political process as barriers to rational policy development.

At the same time, in areas where environmental economics has been regarded as susceptible to criticism, for failing to address certain issues, the models have been extended. For example, environmental valuation methods have moved far from their original concentration on the direct use values of mainstream micro-economics into areas where questions relating to future generations and the existence of species are discussed. Those versed in the theoretical limits of neo-classical models have tended to regard these extensions into foreign territory as ill-advised and beyond the proper remit of economists. Thus, contingent valuation studies are attacked from within environmental economics as failing to conform to the assumption of the free market (e.g., no arbitrage) and being based upon stated, as opposed to revealed, preferences. Yet, by persisting within the relatively secure confines of mainstream neo-classical theory, environmental economics must then confine the terms of debate and so remain largely unable to adequately address or even consider central issues of concern for environmental policy. For example, concerns over the long term impact of environmental pollution are inadequately addressed as technical issues about the appropriate discount rate, while the assumption that intergenerational equity can be captured within a specific model of preference utilitarianism precludes central aspects of the ethical debate (see Spash, 1993). Thus, the requirements of neo-classical theory come into conflict with the concerns raised by environmental issues.

In order for environmental economics to maintain a position of good standing within economics requires recruiting those with strong mathematical skills and a theoretical mind-set. Those concerned with practical conservation and ecosystems management who lack that theoretical interest will therefore be discourage from pursuing environmental economics as a method to advance their understanding of economy-environment interactions, and are likely to seek more direct routes to pursue their environmental concerns. For example, one of the latest trends in economics has been for game theoretic approaches which emphasise mathematical skills. Game theory applications to environmental issues seem to have been boosted by the availability of arms negotiations models developed during the cold war and have spread to other environmental subjects such as international relations (see Patterson, 1996). While perhaps academically satisfying, this preoccupation seems no more likely to help reduce environmental problems than it did

bring about the demolition of the Berlin wall. For those concerned with achieving environmental policy changes, environmental economics therefore often appears to follow the wrong pursuits. This is unproblematic in as far as different disciplines allow specialisation and alternative disciplines exist for individuals to pursue their interests. However, for economists wishing to study the environment the choice has been absent and the approach in environmental economics often intolerant of open debate. Thus, several factors have led to discontent within environmental economics including the rather poor record of achieving policy change, the sub-disciplinary status and, perhaps most importantly, tensions between conforming to and wishing to change the mainstream economic approach.

Ecological Economics

A tradition of thought which can be classified as ecological economics can be traced back at least to the middle of the last century (Martinez-Alier, 1990). However, the current movement is founded upon the concerns of the 1960s and early 1970s for limits to growth (e.g., Boulding, 1966; Meadows et al., 1972) and the study of the flow of energy and materials in the economy based upon the work of Georgescu-Roegen (1971). In addition, the management of environmental externalities as pervasive social costs and the resulting restrictions on the applicability of cost-benefit analysis reflect the studies of Kapp (1950). However, past writers expressing such an ecological critique of economics failed to find a collective institutionalised academic niche which would establish a discipline or new paradigm. The more formal establishment of associations and journals only occurred in the late 1980s.

Ecological economics as an international society was founded around the idea of uniting two groups of academics coming from narrow methodological backgrounds, ecologists trained in natural science falsificationist methodology and neo-classical economists trained in logical positivism. Indeed, in the introduction to the first issue of the journal *Ecological Economics*, Bob Costanza stated that the subject would extend the overlap between neo-classical environmental economics and ecological impact studies and encourage new ways of thinking about linkages between ecological and economic systems. Neo-classical economics was to be included as a subset of the new discipline; something of a surprise for many environmental economists no doubt. However, a more open model of pluralism was probably intended where different ap-

proaches to the same issue are compared and contrasted rather than subsumed under a new overarching structure. More importantly, excessive concentration on the 'improved linkage' approach can been seen to have detracted from the search for and adoption of a new paradigm.

In this latter regard, the methodology of ecological economics is still refreshingly open. For example, at the risk of generalising, the European branch tends more to socio-economics and political economy while the Americans lean towards a scientific approach. The European Society for Ecological Economics (ESEE) encourages analysis of the social aspects of environmental policy and wider consideration of the place of humans within the environment. This implies a different methodology from mainstream economics while allowing for a discourse on the development of a socio-economic and ecological discipline. A distinguishing feature of the European movement is the search for co-operation with philosophers, sociologists and psychologists to explore ethical, social and behavioural fundamentals of human well-being.

While the pluralism expounded by this approach is refreshing, the apparent expansion of economics may worry some that colonisation of ideas is all that is intended. Previous extensions of neo-classical economics (e.g. crime, health, environment) seem to have reassured the economics profession of the universality of their approach while allowing outside critiques to be regarded as largely irrelevant. For example, the concept of total economic value has been used by some to claim all environmental values can be adequately addressed in cost-benefit analysis. Unfortunately, some research along these lines has indeed appeared under the guise of ecological economics and, despite being technically deficient even within the neo-classical paradigm, has been widely publicised, e.g., attempting to value the world's ecosystems in monetary terms. However, such work clearly deviates from what is progressive in ecological economics and also corrupts the meaning and content of concepts in both ecology (e.g. ecosystems functions) and economics (e.g. marginal valuation under *ceteris paribus*).

Others more critical of established approaches have been attracted to ecological economics by the potential to develop new paradigms. The unifying theme being the belief that effective environmental policy formation means the separate study of environmental problems without regard to economics is as misguided as the economic approach excluding the natural science perspective. This allows for the recognition that the work of environmental economists has had much to commend it in terms of identifying problems in the efficient allocation of resources and

exposing the fallacy of the assumption that economic systems can be meaningfully studied without regard to natural resources or the environment. However, the full implications of these findings, when taken to their logical conclusion, also mean realising that much of neo-classical economics is an impediment to further advancement. Yet, the pluralism preached by ecological economics encourages the continued participation of and reluctance to move beyond the two founding disciplines.

Thus, a tension has remained within ecological economics. A crude characterisation of this situation might be that there are two possible directions for ecological economics: either accept neo-classical theory as basically sound and aim to develop mathematical models linking it with ecology or, learning from past experience, accept that how economic systems interact with Nature means moving away from old approaches and developing new paradigms. The first path has in principle been trodden by resource and then environmental economics for several decades, although without specific emphasis on ecology and with wavering enthusiasm by the late 1980s. While neo-classical economics offers a type of theoretical rigour attractive to scientifically trained academics, this same rigour reduces environmental problems to narrow technical issues and deliberately excludes a range of potential options and an interdisciplinary approach. Given the critique of economics that underlies the historical writings in the area, and that drove the formation of ecological economics, the second approach seems the only sensible alternative.

Whether all those currently subscribing to the movement will follow the developing path is unclear but unlikely. Currently, there are several contending themes which might define the core of ecological economics and pulling these together without alienating certain factions will be difficult. In a past edition of *Environmental Values*, Giuseppe Munda (1997) outlined his opinion of what form some of the key concepts. These were that ecological economics is concerned about the policy consequences of its arguments, openly claims ethical positions rather than neutrality, accepts that values can be disputed and incommensurable, recognises distributional issues as a primary concern and sees the ecological concept of scale as limiting material growth. In addition, he proposed the coevolutionary paradigm as described by Norgaard (1988; 1994) as a potential unifying theme. Evolutionary dynamics are an important aspect of ecological economics which emphasise that economic and environmental systems are interacting and changing, often unpredictably, rather than static, and this implies analysing non-deterministic

processes rather than optimal paths to static equilibria. However, the particular interpretation via the coevolutionary paradigm remains a topic for open debate within ecological economics. Thus, while the subject remains open, and is for this reason attractive to many struggling to develop a comprehensive understanding of environmental values, Munda describes what is progressive in ecological economics and shows how it is moving distinctively away from mainstream economics.

As new concepts are developed within ecological economics, the 'improved linkage' route of combining existing economic approaches with natural science information seems too limiting. The themes of the developing subject area no longer sit comfortably in the mechanistic framework of environmental and resource economics and as a result the divide between the two seems set to grow. In this regard, the reader should note that the neo-classical approach is but one type of economics which has been operating within ecological economics. Institutional economics has been exerting its influence and may offer a forum for open debate more amenable to many (see Spash and Villena, 1999). Marxism and socialism have also been entering the debate with authors considering how the environment should be included in their more traditional analyses; one result has been the development of political ecology, ENRef (see for example O'Connor, 1994; Keil et al., 1998). Rethinking the role of science in society along the lines proposed by Funtowicz and Ravetz (1992; 1993) will change the perception of ecologists and economists as to their role in environmental policy formation.

"Ecological Economics" versus "Ecology & Economics"

Ecological Economics is currently more of a movement than a discipline because the interdisciplinary requirements make a core methodology hard to define. One approach to trying to probe the values which underlie the subject is to look at what ecological economists do. This requires identify those who ascribe to the discipline and studying their work. However, as noted, an initial policy in the ISEE was to gain wide support from established academics prepared to sign-up to the general concept of studying economy-environment interactions. Environmental economists interested in how ecology might contribute to economics joined while continuing their work as before and only some of these had a view to developing new approaches. This has resulted in the names of individuals long associated with a narrow neo-classical environmental

economics approach appearing under the banner of ecological economics.

Others, trying to draw together ecology and neo-classical environmental and resource economics, see no contradiction in being on the governing council of neo-classical associations while assuming the mantle of ecological economics. The potential contradiction is avoided for them because they study 'ecology & economics' and in doing so regard each as distinct subject areas with specific types of narrowly defined interactions. For example, Turner, Perrings and Folke (1997) "do not see ecological economics as an alternative paradigm" (p.27), refer to it as being closer to renewable resource economics than environmental economics and reduce all concerns to side constraints on economic activities (convenient for the optimal control modelling favoured by resource economists).

This perception of the movement as 'ecology & economics' can be associated with the expression of a particular set of values and concentration upon the science approach to both subjects. An individual trained in mathematics or physics who has switched into economics (not uncommon) and who is concerned about the environment might prefer the greater degree of linkage between natural science and economics emphasised by ecological economics. Similarly, an ecologist might feel their interest in economic interactions with the environment is best served by adopting neo-classical models from environmental economics and assume this is the only aim of ecological economics. These people might also satisfy their core concern, to extend the scientific approach by linking models, through association with environmental economics where a logical positivist methodology is still common and the emphasis is upon technical competence and mathematical model building skills. Technical competence is of course important to avoid misleading use of current economic tools, but extending technical competence across disciplines is a relatively limited (although often challenging) educational goal. However, what such individuals do not require is a new discipline called ecological economics because for them there is only a combined science of 'ecology & economics' based upon the two established disciplines.

Ecological economics consists of more than linking economic market models with ecological production function analysis and providing 'robust' numbers. Otherwise it would indeed merely be environmental economics renamed and could employ the same methods and methodology. As the history of environmental economics has shown, the emphasis on being a part of the mainstream school of economics has meant pushing to one side problems which fail to

conform to theoretical expectations. Examples of such problems are Georgescu-Roegen's work on entropy, Ciriacy-Wantrup's concerns about the epistemology of uncertainty, Kapp's critiques of valuation, and the general inadequacies of the underlying behavioural model as noted, for example, by Knetsch (1994). Furthermore, while environmental and resource economics has been restricted to micro-economics, ecological economics has been progressive at both micro-economic (e.g., household consumption level) and macro-economic (economic growth and sustainability) levels.

Consideration of ecology also presents fundamental insights into economics rather than a few extra constraints. Holling et al. (1995) suspect many economists ignore ecological information despite the accumulated body of evidence from natural, disturbed and managed ecosystems. In particular, they identify four key features common to the function and structure of many ecosystems which economists should bring into their subject. A précis of their points is as follows: (i) Ecosystem change is episodic rather than continuous and gradual. (ii) Scaling up from small to large is a non-linear process. (iii) Ecosystems exhibit multiple equilibria, an absence of equilibria and are destabilised by forces far from equilibria. The movement between such states maintains structure and diversity. (iv) Recognising that ecosystems have multiple features, which are uncertain and unpredictable, requires management and policies to be flexible, adaptive and experimental at scales compatible with those of critical ecosystem functions.

Besides learning from ecology the movement has begun to look across other divides such as ethics, psychology and politics, and to recognise the importance of methodological and value issues. For example, debates over the motives behind natural capital maintenance are poorly reflected by reduction purely to the degree to which people believe inputs are substitutable, a very mechanistic reductionism; driving issues concern ignorance being epistemologically different from risk (Faber, Manstetten and Proops, 1996) and the recognition of non-human values (Spash and Clayton, 1997). Other ethical considerations relate to the moral standing of unborn future generations and the inadequacy of debates upon appropriate interest rate derivation to even address the issue (Spash, 1993). A defining aspect of commitment to ecological economics is then the extent to which concepts, such as discounting, are seen as problematic in themselves, the issues they raise are debated and the search initiated for alternative approaches. For some economists even questioning the orthodoxy is heretical, and values and information which it

excludes must therefore be irrelevant to economics. The socio-economic approach to ecological economics accepts the need for future generations of humans to have a voice and that both intra- and inter-generational distribution are issues the current economic and political system fails to adequately address.

This concern for disenfranchised humans and the importance given to distributional issues is common amongst ecological economists. Social and community values are recognised as key to improving human well-being and therefore part of the consideration in addressing environmental problems. Appealing to a theory of human motivation based solely upon individual preferences, even when altruistic, is then somewhat contradictory. Much of environmentalism is concerned with a sense of community across space and time. An opinion shared with socialist critiques is that free market systems educate individuals to act as selfish hedonists and create self perpetuating power structures which reinforce inequity. Thus, ecological economics is also interested in exploring alternative institutions and processes. Such an institutional approach needs to consider how a variety of values can be expressed and how to prevent the loss of values which occurs when they are squeezed to fit within the free market paradigm. The aim for ecological economics must be to develop new ways of thinking about the world around us and approaches for resolving (not necessarily solving) environmental conflicts.

More controversial is the extent to which ecological economists accept that moral standing be given to non-human entities. Proops (1989 pp62, 72) has identified questions over rights for animal species, plants and depletable resources as part of the research agenda on ethical values required in ecological economics. While Costanza and Daly (1987 p.4) have noted the ability of humans to misperceive the value of natural resources which leads them to state that: "Some notion of intrinsic value must therefore be introduced as a check on human perceptions and to allow us to study the economies of nature which do not include humans". Unfortunately, they fail to expand upon their conception of intrinsic value. One possible expression of this concern might be in the development by ecologists and social scientists of the concept of ecosystem health which seems to equate ecosystems to people in that ecosystems are more than an aggregation of component species and the implication is that as entities they can be harmed, i.e., be given poor health (Costanza, 1992 pp.240-241). There also seems to be a key underlying concern in the concept of natural capital maintenance that goes beyond preservation of useful

engineering features, and this might also be described as value within ecosystems themselves. Although, naming Nature as capital is a mechanistic approach which reduces the meaning of the underlying concept, similar in effect to 'commodification' of wildlife. Thus, for ecologists studying ecosystems health and economists discussing natural capital, ecosystems are in fact often regarded as purely functional production systems serving human ends. Indeed, there appears to be a concentration upon aspects of value which contribute either directly or indirectly to human well-being. For example, while discussions on the basis for sustainability have brought the land ethic of Aldo Leopold (1987) into play, the values expressed are mostly couched in terms of poverty alleviation and intergenerational equity (see Spash and Villena, 1999). Thus, recognition that non-human entities have value beyond reduction to individual human preferences, expressed either in the market place or political arena, remains an issue for open debate in ecological economics. Any debate which does ensue will undoubtedly reflect different cultural values which themselves require greater acceptance within economics.

Neo-classical economist traditionally withdraw from such debates, claiming these matters are non-economic. They may therefore reject the results which indicate that people hold values diverging from theoretically accepted expectations, e.g., claiming studies have been poorly or unscientifically conducted. Ethical debates in cost-benefit analysis have resulted in open attacks on even philosophers studying environmental ethics let alone economists introducing such concerns. Methods, such as contingent valuation, may be rejected completely rather than asking what they actually indicate when unexpected results arise. Others try to extend the model to include any occurrence of wider concepts of value in a comprehensive cost-benefit analysis. When confronted by the possibility that non-human existence may have some value in and of itself, some environmental economists have claimed this is approximated by human willingness to pay for a poorly defined concept of another entity's existence. However, these same tools can be used to show the presence of rights based positions which can be consistent with rejecting this interpretation (Spash, 1998). The point here is that, in making values fit the *a priori* model, the concepts missing from economic theory or which fall outside the market are perverted, e.g. reducing ignorance to probabilities.

In a presidential address for the ISEE, Richard Norgaard (1998, p.7) briefly discussed a challenge he repeatedly faces, often from fellow economists (from both the political right and

left), that 'hurting peasants to save forests is immoral'. He states that: "…the dilemma is symptomatic of a larger problem, how economics and public discourse have coevolved in a particularly dishonest and morally vacuous way. Now I ask why the choice is between the peasant and the forest that our descendants might need? Where are the people driving the BMWs today, or even those driving Fords, in this myth? Why is it that we have these debates between rich environmentalists and rich developmentalists over moral dilemmas where the rich themselves are absent?" He goes on to locate the cause of such myths within the historical development of welfare economics as a method for removing any apparent need for moral discourse or politics from the agenda of the economic policy advisor.

As Norgaard notes, such mythical dilemmas are used to defend the status quo. This can be seen in other areas such as the perpetuation of the myth of the 'tragedy of the commons' (Hardin, 1968), which has been used to deride communitarian values and promote private ownership. The historical tragedy has been the destruction by private profiteers of customs and cultures which managed resources in common and prevented over-exploitation. However, the myth of common ownership being a tragedy is far more useful for those who favour the spread of private property rights and the rule of the market. A whole set of issue about institutional arrangements, political structures and cultural relationships with non-human entities is then neatly reduced to the efficiency of private markets.

This is part of a more general methodological problem in economics where, of the two roots of economics, the engineering aspect has become dominant while the ethical approach is ridiculed as unscientific. Sen (1987) has argued that the ethical approach to economics is traceable to Aristotle and the engineering one to Kautilya, a 4th century advisor to the Indian emperor. In reintroducing the ethical element as an integral part of economics, and recognising the narrowness of reducing such issues to an engineering equation, ecological economics will take a distinct and neglected path to economic policy.

Conclusions

The argument has been put forward that two broad approaches to ecological economics have been developing: the socio-economic and the objective scientific. This latter view was termed the 'improved linkage' approach and defines a group of scholars treading the well worn path of

joining 'ecology & economics' without substantially reforming either. Rather confusingly for the external observer, this has encouraged neo-classical economists to present their work under the title of ecological economics as if it were something new. However, ecological economics is moving beyond these disciplines; for example, by placing importance upon the open discussion of ethical issues, rather than assuming resource and environmental problems can be meaningfully analysed from the ethically neutral perspective of an objective science. Ecological economics is synthesising different perspectives and is raising issues which environmental economics has been unable to address.

A central part of defining ecological economics as a distinct new subject rotates around the importance of incorporating moral values and being prepared to openly debate difficult issues, such as the set of morally considerable entities, the rights of future generations and treatment of the poor. The socio-economic aspect of ecological economics recognises a failure to account for issues of equity and culture and rejects the dominance of efficiency in economics. Some consensus exists around the key aspects of any new paradigm, which will need to include the recognition of ecosystems constraints, a concern for equity, fairness, effectiveness and efficiency in economic systems, and a regard for the moral standing of others both within current and across future generations of humans. The independent value of non-human entities remains more controversial.

As ecological economics moves away from the engineering approach to the ethical side of economics there will be a transition in which some of the methods, if not the methodology, of environmental and resource economics remain of practical use. However, ecological economics as the study of well-being in society is open to influences from several disciplines as well as attracting economists of various persuasions (e.g. socialist, institutional, environmental). The distinctive role of ecological economics is to reveal the environment as a complex collection of ethical and evaluative considerations. While many environmental economists would accept the relevance of considerations outside their analysis, they claim to leave these to the mythical 'decision-maker'. The essence of ecological economics is to reject such convenient assumptions and require the explicit inclusion of social, political and economic aspects in the analysis of the environment while being more realistic about the physical characteristics of ecosystems.

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