

## What Can We Learn From Ecological Economics?

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**Environmental economics, the economics of natural resources, sustainable development, green economics, sustainability science, bioeconomics, ecodevelopment, etc.: the disciplines and concepts situated at the crossroads of environmentalism and economics are many. This article examines “ecological economics,” a field that has achieved academic recognition and launched numerous debates.**

As Europe’s sovereign debt crisis deepens, ecology seems to be very low on its list of priorities. The struggle between neoliberal austerity and Keynesianism has made it possible to overlook the fact that the current situation is also, in a sense, an environmental crisis. In a “full world”,<sup>1</sup> it is pointless to try to repeat the economic feats of the postwar decades. Henceforth, our challenge is to live as well as we can with the limited resources at our disposal. This ambition, along with an equitable distribution of resources, is the goal of the research field known as ecological economics (“EE” hereafter). What could be more important than to turn to EE for answers to our most pressing concerns? For the last several decades, EE has indeed grappled with the problems that lie at the center of contemporary debates, such as nature’s value, the sustainability of growth, the resilience of socio-ecological systems, and the connection between sustainable development and participation.

It is interesting how often these days (particularly at international forums) one stumbles upon discussions of issues that EE has been debating for years. For example, the UNDP, in its latest *Human Development Report* (2011), explicitly endorsed “strong sustainability,”<sup>2</sup> i.e., the non-substitutability of natural capital by other kinds of capital. In this way, the report endorsed EE’s critique of the theoretical and practical approach of mainstream environmental economists to “natural capital.” Meanwhile, however, the World Bank has called for the acceleration and “greening” of growth by positing that growth can be decoupled from its environmental impact, which implicitly suggests that natural capital is largely substitutable. This is notably the approach found in the *China 2030* report published by the World Bank in February 2012.

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<sup>1</sup> “Economics in a full world” is an expression used by the economist Herman Daly. See for instance “Economics in a full world”, *Scientific American*, September 2005.

<sup>2</sup> The “weak sustainability” approach is based on the hypothesis that natural capital can be substituted with other forms of capital. “Strong sustainability” (which is notably endorsed by ecological economists) rejects this approach, citing the existence of threshold effects, the need for “critical” natural capital, and the problem of irreversibility. In economics, sustainability refers to the ability of actors to substitute one good for another when the price of the latter increases. It implies complementarity.

If EE can shed light on these debates, it also and most importantly presents a radical challenge to economically oriented solutions, which at present tend to prevail. Yet it would be misleading to suggest that EE has clear and definitive answers to contemporary ecological issues, as its status, contours, and direction are in flux. One can even wonder if there truly is a field of inquiry unique to ecological economics, given the sheer abundance of research the term encompasses. What is the specificity of EE's field of inquiry and how does it illuminate contemporary concerns? This article offers a quick tour—albeit a necessarily incomplete and partial one—of the EE universe.

### **A Field in Constant Upheaval**

Environmental economics, the economics of natural resources, sustainable development, green economics, sustainability science, bioeconomics, ecodesign, etc.: there are so many different perspectives from which economics considers the environment that one can soon feel lost, especially since so many terms have been concocted to designate a kind of “dream economics”—bioeconomics, ecodesign, sustainable development, green economics, and so on.<sup>3</sup> Though it first appeared and received institutional recognition in the late 1980s by reviving an array of ideas from the more or less distant past (from classical economists like John Stuart Mill and Karl Marx to contemporaries such as Nicholas Georgescu-Roegen and Kenneth Boulding), EE has now emerged out of obscurity. With a number of regional associations, regular scholarly conferences, and thousands of researchers across the globe, it is fully integrated into the academy. The founding of the ISEE (International Society for Ecological Economics) in 1988 and of the journal *Ecological Economics* in 1989 have given the field stature. At present, there are numerous research centers and publications, as well as several key works and textbooks, that adhere to its approach (see the “further reading” section).

EE initially established itself as a research program lying at the intersection of the social and life sciences. It brought together people dissatisfied with these disciplines who agreed on several common goals: to take the problematic relationship between economic and natural systems seriously and to determine the conditions under which these systems could be “sustainable.” For the economists, the key intuition was the inadequacy of the neoclassical definition of sustainability as a “utility that does not decrease over time.” Consequently, EE is often seen as the “heterodox” cousin of environmental and natural resource economics. While this opinion is partially justified, it is worth recalling that EE's founders conceived it as a unifying project that would, in an open and pluralistic framework, welcome the neoclassical approach as one of any number of valid scholarly perspectives.<sup>4</sup>

In practice, this syncretism has often proved awkward. The question of EE's relationship with neoclassical environmental economics is the subject of never-ending debate and controversy. Even so, the distinction between weak and strong sustainability, which is often seen as the dividing line between environmental economics and EE, remains a useful

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<sup>3</sup> The concept of “ecodesign” was more fashionable at the time of the 1992 Rio conference than on the eve of the “Rio+20” summit. A term that is now popular is “green economy,” which has become the UNDP's (the United Nations Development Program) warhorse. See the report “Towards a Green Economy,” as well as the August 2011 special issue of the United Nations journal *Natural Resources Forum*, devoted to the “green economy.” As for “green growth,” it is officially promoted by the OECD, the World Bank, and many governments throughout the world.

<sup>4</sup> This conception is defended notably by Robert Costanza in his path-breaking 1989 article: “What Is Ecological Economics?,” *Ecological Economics*, 1, p. 1-7.

reference point. No economist who adheres to EE accepts the hypothesis that natural capital can be substituted ad infinitum or that “backstop technologies”<sup>5</sup> can solve the problem of scarcity.

Beyond this trademark position, EE is perhaps best characterized by its avowed methodological plurality. It borrows from “standard” economics, institutional economics, post-Keynesian economics, scientific ecology, environmental ethics, and environmental history. For EE, the common denominator between these approaches is an effort to understand the relationship between economic systems and ecosystems. According to Malte Faber, one of the movement’s pioneers, EE’s essential traits are an interest in nature, justice, and time, all of which are overlooked by standard economics. A more common definition in the field, which specifically refers to the concept of sustainable development, is that it seeks to analyze simultaneously the triptych of sustainable levels, equitable distribution, and efficient allocation.

An examination of programmatic articles and studies by scholars who adhere to EE reveals some of this field’s distinctive traits: methodological pluralism; the claim that the relationship between human beings and their milieu is characterized by value incommensurability; the centrality of uncertainty; an emphasis on such phenomena as path dependency and irreversibility; an ethical commitment to consider the interests of future generations; a belief in the (very) limited substitutability of natural capital by other forms of capital; and a systemic approach (championed in France by René Passet, one of EE’s inspirers). These ethical and methodological commitments form a set of core beliefs that give some coherence to a field that, because of its diversity, remains particularly fragile.

Perhaps even more than other disciplines aspiring to be sciences, environmental ecologists have developed normative frameworks at the same time as they have constructed analytical tools. The field is constantly developing and interrogating concepts with a normative tenor, such as “sustainability,” “resilience,” and “environmental assessment.” At the same time, it strives to fine-tune the tools needed to study these concepts empirically. While this approach undoubtedly contributes to EE’s vitality, the flip side is that its concepts and methods lack the tested and stable foundations that one finds, for instance, in neoclassical economics.

Moreover, the consolidation of subfields within EE could seriously undermine the discipline. Regional varieties of EE have begun to emerge: the European association (ESEE) is resolutely heterodox and emphasizes political ecology, while in the United States EE is closer to environmental economics. For example, Robert Costanza’s “realist” environmental economics,<sup>6</sup> which has no qualms about practicing monetary assessment on a mass scale, stands opposed to the European project (championed notably by Clive Spash) of a “social ecological economics.”<sup>7</sup>

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<sup>5</sup> For some economists, market forces lead to the creation of new technology that will always offset dwindling natural resources, which suggests that the latter are virtually unlimited. Oil sands development and ethanol production are examples of backstop technologies that could supposedly replace traditional oil.

<sup>6</sup> The article that Costanza and his coauthors published in 1997 in the journal *Nature*, entitled “The Value of the World’s Ecosystem Services and Natural Capital” was a virtuoso piece of environmental assessment that had a considerable impact.

<sup>7</sup> See C. Spash, “Social Ecological Economics”, CSIRO Working Paper Series 2009-08, June 2009.

## EE's Key Research Fields

In its effort to transcend the limits inherent in monetary assessments of the environment, EE sought from the outset to develop alternative assessment tools consistent with the principle of value incommensurability.<sup>8</sup> Consequently, in the 1990s, many scholars turned to **multi-criteria analyses** (MCA), in which several assessment criteria (e.g., economic, social, and ecological factors) are used without reducing them to a single unit of measurement, contrary to traditional cost-benefit analyses. Though they were initially highly technical and often used primarily in complex mathematical software, MCA were swiftly borrowed—and reinvented—by ecological economists.<sup>9</sup> They turned them into flexible conceptual and methodological frameworks, incorporating a vast array of disparate indicators, in which the assessment process is just as and perhaps even more important than the ultimate result. Most importantly, by avoiding the systematic aggregation of different criteria, MCA provided a way of structuring environmental issues in a way that makes the political character of assessment explicit.

The advent of MCA most likely cannot be separated from the rise of **participatory approaches**, which have become very fashionable in recent decades. They have been important for economics as a way of resolving the impasses of social choice theory and critically elaborating the economics of wellbeing,<sup>10</sup> as well as for environmental science, as a way of transcending traditional science's limitations when faced with the complexity and uncertainty that is characteristic of most ecological problems.<sup>11</sup> At present, participatory processes have been used in one form or another in a wide array of EE research fields (including institutional analysis, territorial prospective initiatives, risk management, political ecology, etc.).

At the same time that ecological economists have turned to multi-criteria and multi-actor assessments of environmental problems, they have also searched for **non-monetary indicators** to analyze the (un)sustainability of economic systems. In its early stages, EE applied the laws of thermodynamics to economic processes and used solar energy units (pioneered in the work of the American ecologist Howard T. Odum) to analyze economic systems. Since then, synthetic indicators have been regularly proposed, each new one triggering a fresh controversy. These include, among others: human appropriation of net primary productivity (HANPP), material flow analysis (MFA), and the environmental footprint, which became popular well beyond academia and inspired new indicators, such as the water footprint (also known as “virtual water”). Such a diversity of indicators can often lead to non-univocal conclusions: one and the same activity can result in better HANPP and an inferior environmental footprint. Yet this in no way constitutes a shortcoming. On the contrary, it illustrates one of EE's foundational principles: the impossibility of “reconciling”

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<sup>8</sup> This term refers to the insoluble conflict involved in choosing a single unit of measure for comparing several environmental policy alternatives. See J. Martínez-Alier, G. Munda, and J. O'Neill, “Weak Comparability of Values as a Foundation for Ecological Economics,” *Ecological Economics*, 26(3), 1998, p. 277-286.

<sup>9</sup> See G. Munda, “Social Multi-Criteria Evaluation: Methodological Foundations and Operational Consequences,” *European Journal of Operational Research*, 158, 2004, p. 662-677.

<sup>10</sup> See J. K. Arrow, *Social Choice and Individual Values*, Yale University Press, 1951, and D. W. Bromley, “The Ideology of Efficiency: Searching for a Theory of Policy Analysis,” *Journal of Environmental Economics and Management*, 19, 1990, p. 86-107.

<sup>11</sup> S. O. Funtowicz and J. R. Ravetz, “The Worth of a Songbird: Ecological Economics as a Post-Normal Science,” *Ecological Economics*, 10 (3), 1994, p. 197-207.

multiple indicators and the resulting need for political arbitration are the reasons for continued interest in MCA and participatory approaches.

Let us conclude this overview by mentioning another important EE subfield that is mainly found in Europe: the study of **environmental conflicts** occurring at the global level. This approach, which draws on third-world political ecology, examines environmental conflicts in southern countries to show how material relations of a center-periphery variety are perpetuated on a global scale. Recasting dependency theory's<sup>12</sup> notion of "unequal exchange," these ecological economists speak of "ecologically unequal exchange." Because of the generalization of the export-oriented policies in poor countries, the latter send more goods to rich countries than they import. Civil society's reaction to this state of affairs has created a powerful incentive for internalizing these externalities (which Martínez-Alier calls the "ecology of the poor)."<sup>13</sup>

### Debates Old and New

Let us now consider a number of specific claims and topics that continue to be vigorously debated some twenty years after EE's inception.

One might expect consensus around EE's normative commitments and agreement regarding the definition of concepts as central as that of sustainability. Yet this is not the case. While some believe that sustainability consists in internalizing all externalities, others prefer to jettison the concept of externality in favor of such notions as joint production (i.e., all productive activity pollutes) and stocks (all resources available for production are limited),<sup>14</sup> which they see as more descriptive and heuristic. This example, which involves debates that are several decades old, shows the persistence of disagreements between economists and non-economists in the field.

But let us return to one of EE's foundational concepts, that of **strong sustainability**. While the field seems to be heading towards a moderate, more pragmatic approach that lies between weak and strong sustainability, proponents and opponents of monetizing the environment continue to disagree. Recently, a number of ecological economists contributed to the report on *The Economics of Ecosystems and Biodiversity* (TEEB). Their participation was not self-evident, given that the primary goal of the study, which was led by the Indian economist Pavan Sukhdev, was to determine the monetary value to natural capital. This demonstrates that the appropriateness of monetizing life for pragmatic purposes ("we preserve only that to which we assign a value" is the TEEB's semi-official slogan) is a matter of debate in EE. Still, such ad hoc monetary considerations are generally regarded as a lesser evil and a concession to realism. Most of EE's environmental assessment work uses methods that do not require such concessions. Thus at the other end of the spectrum, one finds efforts to build analytical frameworks for environmental assessment that are less beholden to such anthropocentric biases as monetary assessment and which take into account the integrity of

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<sup>12</sup> Dependency theory was a school of thought that emerged out of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC or CEPAL in Spanish) in the 1950s and 60s. It demonstrates that the principle of free exchange based on competitive advantage favors industrialized countries and thus keeps developing countries in a state of dependency. Its best known representative is Raul Prebisch.

<sup>13</sup> J. Martínez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, Edward Elgar, Cheltenham, 2002.

<sup>14</sup> See the debate over what a 'sustainability economics' was supposed to be in S. Baumgärtner and M. Quaas, "Sustainability Economics: General versus Specific, and Conceptual versus Practical," *Ecological Economics*, 69, 2010, pp. 2056-2059.

ecosystems. The issue then becomes how to make this kind of assessment operational in contexts in which decision-makers demand (preferably monetary) numbers.

The debate over environmental assessment is directly connected to applied forms of what is usually known as **environmental services** or ecosystemic services. This idea, popularized notably by the *Millennium Ecosystem Assessments*, is currently one of EE's unifying concepts, as it spans ecology and economics. Even so, there is less and less consensus about it: because this concept is critical to determining the environment's economic value, it opens the door to the monetization of nature, a fact that is confirmed by the current fate of payment for environmental services (PES).<sup>15</sup> The idea of environmental services is thus often criticized in EE on the grounds that the "service" approach to nature is inherently reductive and anthropocentric in a misplaced and counterproductive way.<sup>16</sup>

Another example of the difficulties that result from borrowing biological concepts can be seen with the term **coevolution**. This concept, which in EE was developed by Richard Norgaard in particular, has informed research at the intersection of history, political ecology, and various forms of evolutionism. It has proved especially useful in describing positive feedback phenomena between ecological and economic systems, as well as social adaptation to environmental change. Geoffrey M. Hodgson, one of the evolutionary approach's most ardent defenders, has championed a Darwinian ecological economics purged of any lingering social Darwinism, while using a number of universally applicable evolutionary principles. But even by the admission of one of its most fervent partisans, the coevolutionary approach is difficult to apply and has yet to produce a body of solid empirical work.<sup>17</sup> Moreover, some critics, noting the problems arising from using a weakly-defined term, have proposed a more rigorous and localized understanding of the term, one that is more consistent with its usage in biology.

The question has yet to be settled: when exporting concepts from one discipline to another, should one use their original meaning or is it permitted to take liberties (such as using them at a higher degree of generality)? Should these concepts be seen as operational, or as a body of heuristic principles with the potential to become analytical frameworks or even paradigms? To a considerable extent, these debates recall those surrounding the concept of **resilience**, that is, the capacity of socio-ecological systems to return to their normal ways of operating and developing after a major disturbance. Resilience, incidentally, is related to the concept of coevolution: many studies demonstrate the importance of controlled coevolutionary processes to the resilience of human groups. Resilience, a concept that has been studied notably by Carl Folke in Sweden through the Beijer Institute and the Stockholm Resilience Centre, presents itself as an ecological alternative to more "social" approaches to the question of the scale on which human activities occur. Operationalizing this concept, however, is particularly challenging.<sup>18</sup> As a result, it has been criticized, even from within EE.

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<sup>15</sup> PES's offer a particularly interesting perspective, one that is revelatory of the problems in which EE and environmental economics are entangled. The journal *Ecological Economics* devoted three special issues to PES's between 2008 and 2010, while *Environment and Development Economics* devoted one in 2008. See L. Tacconi, "Redefining Payments for Environmental Services," *Ecological Economics*, 73, 2012, p. 29-36 for a comparison of EE and environmental economic's approaches to PES's.

<sup>16</sup> See for example R. Norgaard (2010), "Ecosystem Services: From Eye-opening Metaphor to Complexity Blinder," *Ecological Economics*, 69, pp. 1219-1227.

<sup>17</sup> For a discussion of coevolution in EE, see the special issue of the journal *Ecological Economics* of February 2010 (Vol. 69, Issue 4).

<sup>18</sup> See volumes 21(3) (August 2011) and 20(3) (August 2010) of the journal *Global Environmental Change* for

More generally, recourse to concepts imported from ecology has not met with the unanimous approval of ecological economists, who are quick to denounce analogies from biology as scientifically sterile and politically comforting.

We will conclude with a somewhat different problem: the idea of **degrowth**. Degrowth is a new concept with no counterpart or antecedents in other earth science disciplines. Yet its scope, which is much more normative and prospective than analytical, should not prevent ecological economists from taking it seriously. The idea is being discussed more and more systematically, albeit almost entirely in Europe. The elaborations of EE's "founders" theses (Nicholas Georgescu-Roegen, François Partant, Ivan Illich, Jacques Ellul, etc.) and regular updates to the Club of Rome's *The Limits to Growth* report (1972) set until very recently the parameters of scientific discussions about degrowth. Building on this work, a wide variety of scholarly studies have sought to operationalize the idea. A concept once seen as a catchword or an "umbrella concept," and a weapon against "greenwashing," is now driving serious EE research. Yet EE's reception of degrowth has not been unanimously enthusiastic. Many maintain that it is more productive to preserve a position of neutrality vis-à-vis growth—i.e., a position of methodological "a-growth."<sup>19</sup>

## Conclusion

There is little doubt that, at present, EE is doing science on an increasingly solid basis, that it is flourishing both inside and outside the academy, and that its inherent diversity allows it to engage with related disciplines while being remarkably innovative conceptually and methodologically. That said, one can reasonably wonder how long this discipline will last, given that environmental research is organized on a multidisciplinary basis around specific problems and objects related to major contemporary issues: the management of coastal areas, biodiversity assessment, desertification, adaptation to climate change, and so on. Many researchers feel more comfortable in multidisciplinary projects based on their specific area of expertise than in a vast scientific forum like EE, in which research areas are extremely diverse. Yet we see EE as a field that has the kind of scientific checks and balances needed to avoid the "autism" (notably related to mathematical formalization) so common in economics. It is interesting to note that a recent issue of the journal *Environmental and Resource Economics*<sup>20</sup> was devoted to a critique of this field's conventional forms and called for a more systematic comparison of theories with one another and with empirical data, in addition to a greater effort to incorporate the social sciences. Is an "environmental social science" about to be born? Will it develop within EE, while fostering a close relationship with other approaches, including neoclassical ones, or will it establish itself as a new and autonomous discipline?

In conclusion, it should be stated that while "ecological economics" is not the name of a science, it does refer to a normative and methodological horizon, as well as to a trail blazed by an array of concepts and methods. There remain many undeveloped and unexplored avenues, still very much in the planning stages, including a Regulation School EE, a

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discussion and applications of this concept.

<sup>19</sup> See the special issue of the *Journal of Cleaner Production* of April 2010 (Vol. 18 Issue 6). See, too, van den Bergh (2011), as well as the responses by degrowth proponents in the journal *Ecological Economics*. For the term "a growth," see Jeroen J.C.M. van den Bergh and Giorgos Kallis, (2012), "Growth, A-Growth or Degrowth to Stay within Planetary Boundaries?", *Journal of Economic Issues*, Vol. XLVI No. 4.

<sup>20</sup> *Environmental and Resource Economics*, January 2011 (Vol. 48, Issue 3). This is the official journal of the European Association of Environmental and Resource Economists.

Darwinian EE, a social EE, and a systematic and considered practice of transdisciplinarity. Yet none of this should make us overlook the progress that has occurred over the relatively brief period of two decades. And let us not doubt that if EE continues to serve as a scientific crucible in which major contemporary issues are considered in an open but rigorous manner, we will learn a great deal from it.

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