



“Summary of article by Silvio O. Funtowicz and Jerome R. Ravetz: The Worth of a Songbird: Ecological Economics as a Post-Normal Science” in Frontier Issues in Economic Thought, Volume 1: A Survey of Ecological Economics. Island Press: Washington DC, 1995. pp. 280-283

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“Summary of article by Silvio O. Funtowicz and Jerome R. Ravetz: The Worth of a Songbird: Ecological Economics as a Post-Normal Science”

Economics has traditionally neglected uncertainties both in knowledge and in ethical issues. The economic paradigm is modeled on classical physics, and is a "normal" science in the sense articulated by Thomas Kuhn (1962). The scientific enigmas and policy riddles of global environmental policies call for a "post-normal science." Central to this concept of a post-normal science is the organizing principle of quality, which requires a new methodology and social organization of work. The irreducible uncertainties and ethical complexities inherent in some issues can thus be managed as knowledge is democratized and the peer-group is broadened to include a number of different perspectives and norms of evidence and discourse. This paper lays out the framework for valuation techniques in a post-normal science.

VALUATIONS

The "songbird" in the title refers to species and ecosystems that are irreplaceable, whose market value does not represent their true worth. Valuation issues of this kind force us to focus on what value is, what is being valued, and how valuation is done.

In the case of the songbird, valuation cannot be divorced either from the methodology used or from ethical issues. While some people argue that rational policy debates require that valuations only be done in monetary term, others object strongly when dollar values are assigned to species. In the middle lie those who reluctantly accept monetary valuation on pragmatic grounds, but are against this method in principle. At present, the burden is on those who favor preserving a wetland or a species to demonstrate - with a monetary yardstick - that the benefits of preservation are greater than the benefits of exploitation. The current convention of using money as the language of valuation constrains all valuation processes, so its adoption and use by all stakeholders in any environmental issue therefore seems appropriate.

With the development of ecological economics and a clear vision of what a sustainable future is, different conceptions of value and how it is measured will arise, and monetary values expressed through the commercial market will become only one of many forms of valuation. Operational definitions of value will reflect what is important and real, as well as the level of commitment of different stakeholders. Based on a number of legitimate perspectives, a new common language that is not dominated by any single group will evolve when negotiators recognize the irreducible complexity of the issues at stake. The problem with the present system is not only that the market is expected to determine value, but also that all valuation must be reduced to a one-

dimensional standard. New forms of valuation will not and should not be uni-dimensional, and they will be the products of negotiations and mediations in the institutionalized political process. The task is to develop a set of concepts and practices whereby all of the complementary perspectives contribute to a rational dialogue in which ethical commitments are articulated.

ELEMENTS OF A POST-NORMAL SCIENCE

This section sketches the elements of a post-normal science that can be used in the development of an ecological economics. A paper by W.D. Nordhaus (1991)¹ is used as an example to demonstrate that mainstream economists are adopting the rhetoric of an ecologically sensitive approach, although in an unselfconscious and undisciplined manner. These elements include:

Appropriate Management of Uncertainty

The many uncertainties associated with ecological problems force economists to be more cautious with quantitative arguments than they usually are. The paper by Nordhaus is full of caveats, reflecting the fact that economics applied to environmental issues does not possess the same degree of control of uncertainties as, for example, analytical chemistry. The task is to manage the uncertainties so as to get the best quality of information from them.

Managing imperfectly understood uncertainties requires explicit guidelines. A set of guidelines called NUSAP - standing for "numeral, unit, spread, assessment and pedigree" - have been developed. The first two categories of NUSAP are easily understood, but spread, assessment and pedigree describe three distinct kinds of uncertainty. Spread refers to the precision or "random error" of data; assessment refers to the degree of accuracy or "systemic error"; and pedigree describes model uncertainties, i.e., the border with ignorance or the boundaries of knowledge about the information being expressed. An analogy with target shooting can clarify these terms: we have precision if the shots cluster closely, accuracy if they are near the bulls-eye, and pedigree determines whether there is a target at all.

The paper by Nordhaus contains all three forms of uncertainty. However, despite clearly acknowledging uncertainty, the problems associated with it have not been well managed. Some of his entries have large intervals, some are unquantified, and others are based on adjustments that are ad hoc or derived from hunches. These problems notwithstanding, the final results are calculated with hyper-precision. The hyper-precision of final numbers represents an attempt to establish objective facts from intuitive fuzz. This defect of hyper-precision is not peculiar to the Nordhaus paper, but in fact is widespread in economic analysis. NUSAP provides frameworks to deal with uncertainty, to critique information offered in discussions of ecological economics, and to evaluate information as a basis for policy recommendations.

Appropriate Management of Quality

The Nordhaus paper demonstrates inappropriate management of the quality of information in relation both to its inherent uncertainties and to its function as a basis for policy. Definite policy recommendations are based on less certain conclusions. Very different policy recommendations would emerge if the author had different hunches. The hunches themselves are buried in mathematical sophistication, giving the analysis an image of quantitative science, as opposed to

what it really is: doctrine reinforced by guesswork. The important point is that it is wrong to manipulate uncertainties in information and conclusions in such a way that recommendations appear to be far more certain than can be scientifically justified.

Another problem is that value-commitments, i.e., the different weights attached to the various risks and benefits, are masked in the Nordhaus' arguments. Ecological economics must acknowledge the importance and legitimacy of value-commitments and should take ethical stances. It should be explicit about where it believes the burden of proof must lie in debates on environmental policy. Forensic advocacy and scientific research both have their place in post-normal science, but it is illegitimate to claim to use one form of discourse when actually employing the other. Quality of discussion can best be maintained by expanding the peer group to involve a multiplicity of participants and perspectives. This will require both an explicit statement of ethical principles, and development of appropriate modes of discourse, norms and institutional arrangements, all based on the organizing principle of quality of dialogue rather than on abstract truth.

Plurality of Commitments and Perspectives

The organizing principle of post-normal science is quality, which is comprised of ethics and morality. The old ideal of scientific truth is no longer attainable or relevant for policy; no single perspective can claim a monopoly on wisdom. A number of different groups, including consumers, NIMBYs, representatives of the disadvantaged, champions of the natural environment, spokespersons for industries and governments, and academics, should all be part of the decision-making process. Negotiations and mediations based on principled advocacy rather than the pretense of uncommitted scholarship should also be part of the process. An honest recognition of conflicting interests and power relationships will prevent any single group from co-opting others.

Intellectual Structures

Traditional research in science has been motivated by curiosity, and there it is reasonable to attempt to define "foundations" that can serve as the basis for unity among researchers. More recently, mission-oriented research is based on producing "corporate know-how" rather than "public knowledge," and the traditional conceptual basis of scientific research has been eliminated. In an issue-driven post-normal science, searching for foundations can be the cause of confusion. Common commitment to certain approaches, rather than shared knowledge, is the most important factor in problem solving. Commitment to a resolution of the problem will give rise to appropriate problem-solving activity and dialogue.

Social Structures

Mission-oriented scientific research is carried out in bureaucratic institutions, and is directed by managers based on the needs of the institution rather than on publicly defined issues. Moreover, many aspects of this kind of research are unknown to the public. Issue-driven post-normal science should be opened up to make research transdisciplinary and accessible to the public. Institutional changes will be needed to make this transition.

CONCLUSIONS

The worth of a songbird goes beyond questions of valuation in monetary terms; we must move beyond the commodification of all resources for the determination of their worth. The management of scientific uncertainties and value commitments is at the core of establishing an effective post-normal science.

Notes

1. W.D. Nordhaus, "To Slow or Not to Slow: The Economics of the Greenhouse Effect," The Economic Journal, 101(1991): 920-937.