

Research into government decision-making on environmental issues

Dobell text 18/4/95

Research into environmental decision-making is inevitably chasing a moving target. The scientific basis for government decision-making on the environment is increasingly challenged not only by growing controversy around interpretation of contested evidence, but by growing protest about the relevance of traditional research methods themselves as a basis for government decisions. [At a very general level, one might see Ehrenfeld (1978), Sagoff (1988) or Saul (1993).] Not only the information entering decisions, but also the process of arriving at it (the information) and them (the decisions) are seen as potentially incomplete and ill-suited to the ultimate purpose of public policy. [Jasanoff (1992); Nowotny (1992).]

This proposal focusses on the problems which arise because public policy, built on collective decisions, involves complex principal-agent relationships. It entails actions by one actor on the basis of information collected by others, and inferences communicated by others, possibly very distant organizationally, socially, or scientifically, and possibly responding to very different incentives. The problems of communication across the multiple information linkages and organizational boundaries inevitable in any government decisions on environmental issues are at the heart of this proposal for a national center for research into environmental decision-making.

Structuring information flows effectively to provide an appropriate scientific foundation for government decisions is not only--or even principally--a matter of efficient assembly and transfer of data. At its heart this task entails communicating, from one cadre (often scientific specialists) gathering and interpreting evidence to others (often innocent of all scientific method) charged with acting on that evidence, some sense of the message which that evidence carries about the possible risks and consequences of alternative actions, and some appreciation of the reliability or fragility of that message itself. In a federal system, such transitions across organizational boundaries occur many times, at many stages and many places in a complex sequence of inter-related processes involving myriad autonomous actors. [Bardach (1977) outlined the story some years ago; Sabatier (1995) provides a current illustration.]

So the "science" passes through many filters on the way to informing policy, and at many stages it confronts "other ways of knowing", and values clashing with traditions of scientific method and instrumental reason. In decision-making involving environmental issues, these clashes have become extreme and visible. Research into ways to improve the scientific basis for government decisions must therefore deal not just with the quality of the scientific evidence and the effectiveness with which it is assembled, communicated, aggregated and displayed--though these are obviously crucial. Such research must also explore how issues are framed by decision-makers and the public, and the way scientific evidence is interpreted and used in the broader processes reflecting these different framings of the questions.

This emphasis on the flow of information into decision processes and across the many transitions encountered in a typical risk management cycle [] suggests attention to three important strands in current literature.

The first may be considered an amended approach to decision analysis generally, with a focus on the precautionary principle and the ideas of adaptive environmental management. The work of Shrader-Frechette (1991) and Shrader-Frechette and McCoy (1993) illustrates some of the crucial issues to be

~~Frechette (1991) and Shrader-Frechette and McCoy (1993) illustrates some of the crucial issues to be addressed on the former topic, and the seminal work of Kai Lee (1993) outlines the significance of the latter, in the context of the ecosystems of the U.S. Pacific Northwest.~~

The second strand may be thought of as broadening the analysis further, to embrace other values, other traditions and "other ways of knowing", through the entrenching of broader processes of consultation and shared decision, involving a wide range of stakeholders outside traditional decision processes or scientific communities. [The work of the British Columbia Commission on Resources and Environment (1995) offers one example; Paehlke and Torgeson (1990) provide a more general discussion.] This approach introduces concerns for process, for representation, for procedural legitimacy or indeed "procedural democracy". In this context, the "right" decisions are those which flow from a broadly-based process widely acknowledged as procedurally legitimate. Regardless of their apparent scientific merit, such decisions will have the merit that they may be accepted and implemented. The concern is therefore to ensure that they also reflect sufficiently the messages embedded in the scientific information offered as a basis for decision. The new head of the Canadian Environmental Assessment Agency, in Dorais (1995), identifies these questions as critical in meeting "the enormous challenge of either keeping environmental assessment relevant and effective, or witnessing the collapse of this entire restructuring of decision-making systems, effected so laboriously since the end of the 1960s." He cites Baber (1988) in expressing reservations about the increasing weight of cumbersome hearings and consultation processes. Salter (1995), from a different perspective, argues the merits of the "democratic regulation" which she sees as feasible.

The third feature of particular interest in current work on the process of implementation of collective decisions is recognition that these are not simple one-way flows from decision into action, but rather a complex, iterative, conflictual process shot through with slippage and sabotage. [See Palumbo (1987) for a survey of relevant literature up to that date.] Recognition of some of these realities motivates a search for instruments and arrangements whereby decisions might be made self-enforcing or compliance-friendly (See Susskind (1993) for a discussion of this concept in the context of international environmental negotiations.); for a variety of alternative dispute resolution processes whereby regulation can be accomplished without all the apparatus of standard-setting and enforcement through formal regulatory processes (Raab, 1994); and, in the limit, for measures which achieve "regulation by results", in which responsibilities for implementation can be delegated or devolved, and audit accomplished informally or "closer to the ground" .

Thus in the evolution to the "third generation" of environmental decision-making concerned with global atmospheric risks, it will be important to trace these innovations in process, and their impacts on the way in which scientific evidence is brought into, and used in, collective decisions taken at various levels, and at different stages in the policy formation and implementation process. The component of the work to be undertaken by Dobell will address itself to this literature and analysis of its significance for management of human activities with substantial environmental consequences.

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Appendix

COLLECTIVE DECISIONS, SOCIAL INSTITUTIONS AND THE POLICY PROCESS

Threats to the integrity of regional and global ecosystems, to ecosystem health and to human health, dominate most lists of public policy concerns. Within some social science elements of the research program this topic may be visualized in three groups of studies, focusing on the way in which concerns with economic well-being, ecosystem health and risks to human health come together in collective decisions on the organization of human activities and the allocation of resources.

There is general support for an economic (consequential or "rational") approach to the collective decision problems involved in managing human activity within an ecosystem. An economic approach appropriate to problems of ecosystem dynamics must, however, be substantially more comprehensive than the traditional consequential structure of benefit-cost analysis.

This economic approach must "integrate environmental considerations with economic decisions"; this entails all the apparatus of full-cost pricing, resource accounting, contingent valuation, and the like --already a very challenging undertaking, but one in which many analysts, research groups, and consultative processes are now engaged.

Even with this much extended version of benefit-cost analysis, there will be many considerations which cannot be captured and quantified. Profound uncertainty and highly assymmetric distributions of risks and costs will demand much more general methods of risk-benefit analysis.

Beyond this computational element of the analysis, there will be inevitable ambiguities and uncertainties which can only be addressed in a more general deontological framework taking into account the rights and concerns of the individuals, stakeholders, and other entities which "ought" to have standing in the matter.

This proposal for research into one aspect of environmental decision-making amounts to saying that examine how the economic (consequentialist) analysis is being extended within a much broader ethical framework reflecting different cultural traditions, and with attention to a much fuller specification of consequences, including those identifiable only through fuller analysis of the indirect and long-term feedbacks through natural systems onto the human condition.

One could only hope to illustrate these ideas in application to a very limited set of very specific case studies, which is what is envisaged in this proposal.

Social Accounting and Indicators of Sustainable Development

The current state of the literature can be summarized as in Dobell (1991). "The theory on rational analysis for government decisions is well documented and well known. The approach assumes that a causal scientific model describing tolerably well the facts of the natural or social world in which we live can be assembled, with choices or courses of action identified, the consequences of each isolated, the values appraised, and preferences as between the alternatives established. On the basis of such analysis, appropriate decisions in the public interest can be reached by government acting legitimately on behalf of the populace or, with the right sets of prices and discount rates, and the right sorts of institutional arrangements and economic instruments, such decisions may in some cases be delegated to properly working markets.

Either way, given the new interest in sustainability and consequent concerns for environmental variables, these processes must be informed by better information on the state of the environment, resource accounting, environmental accounts, sustainable development indicators, and the like.

The pricing, valuation and accounting problems to be faced in translating environmental impacts into an economic framework are well summarized in Pearce et al (1989) and Solow (1992), and the necessary indicator structure is explicitly specified in Hodge (1992).

On the accounting side, academic and governmental work programs are directed toward resource accounting, the development of satellite environmental accounts, and some synthesis into state of environment reports and sustainable development indicators [see Bird and Rapport (1986), Careless (1990), Hodge (1991, 1993), Repetto et al (1989) and Wells (1987)].

In the analytical literature, many innovations in estimating "willingness to pay" through contingent valuation methods, estimation of option values and future prices, and incorporation of scientific uncertainties into risk-benefit analysis have been reported [see Crocker (1988), Gunton and Vertinsky (1990)]. [Note added: Fundamental difficulties in such processes have also been revealed in a growing body of empirical work. (See Knetsch (1995) for an authoritative survey.)]

On the more difficult question of achieving some effective analytical integration of environmental and economic considerations, there has been much work but substantial doubts remain [see Boulding (1988), Brown (1990), Meyer (1990)]. In particular, the art of environmental impact assessment remains controversial [see Canadian Environmental Advisory Committee (1989)], and the question of environmental protection legislation and standard-setting very much a subject for "further consultation" [see Government of Alberta (1990), Government of British Columbia (1991)].

The key further step in putting implementable flesh on these analytical skeletons is in the development of economic instruments and market mechanisms to create appropriate incentive systems and to permit offloading of some detailed regulations and regulatory apparatus. While these developments have to be seen essentially as fundamental institutional changes, they also pose considerable analytical challenge [see Block (1990), British Columbia Round Table (1991), Doern (1990), IRPP (1990), Kneese and Schultze (1975), Project 88 (1988), Tietenberg (1989)]."

Realization of a full process for reporting on progress toward sustainability entails development of summary sets of indicators of sustainability which synthesize a variety of underlying bio indicators, measures of ecosystem health, and potential impacts on human health. These summary indicators coupled with corresponding indicators of economic well-being (including some recognition of concerns with the interpersonal or intergenerational distribution of economic impacts) may be taken as the basic input data needed for informed public debate and policy formation.

Extensive work on economic instruments for achievement of environmental goals demands concrete exploration in pilot projects in local ecosystems. Theoretical and empirical study of a range of economic instruments, property rights, and tenure arrangements must be coupled with alternative institutional structures which offer alternatives to formal government regulation in the management of resources and the mitigation of impacts from human activities on the environment. Possible application of this work has been the subject of a variety of international meetings at the OECD and elsewhere; the outcomes of these discussions will be surveyed to determine how they may be relevant to the specific case studies identified in this proposal. Through the participation of theoretical and applied economists and business managers in the work of the Integrated Assessment Panel, the policy implications of contemporary work on these topics can be explicitly developed in the context of concrete case studies..

Environmental Policy and Democratic Decision-making

Allocative decisions with respect to the physical environment, particularly those involving the fate of wilderness areas, strain conventional policy making mechanisms to the breaking point. Increasingly, there are pressures to reform and democratize decision making processes affecting the environment (Paehlke and Torgerson, 1990). In response to these pressures, an astonishing array of new players have emerged on the environmental policy making scene including roundtables, community planning boards, public review agencies and commissions (Dobell, 1991; Howlett, 1990; Filyk and Cote, 1992).

One of the most ambitious experiments in environmental decision making in North America to

date is being undertaken in the province of British Columbia under the auspices of the Commission on Resources and Environment ("CORE"). Created by special legislation enacted in 1992, CORE is charged with responsibility for developing a comprehensive land use strategy for the province of British Columbia. It is pursuing this mandate for shared decision-making through multi-stakeholder consultations conducted at regional and local planning tables.

Two highly promising avenues of interdisciplinary research are suggested by the CORE initiative. The first concerns the implications of this decentralized, participatory model of decisionmaking for the theory and practice of parliamentary democracy. Over the past decade, particularly within the political science literature, there have been increasing calls for new "forms of democracy" which more effectively take account of interests typically excluded from traditional elite-dominated policy making processes (Held and Pollitt, 1986; Bobbio, 1987; Paehlke and Torgerson, 1990; Resnick, 1990). In this sense, CORE represents not only an important departure in terms of environmental policy making, but is significant as an experiment in democracy.

The CORE initiative also presents rich possibilities for research by virtue of its deployment, in a variety of concrete settings, of techniques and principles emerging from the proliferating literature on alternative dispute resolution ("ADR") in the environmental context. Interest in ADR, within environmental policy making circles, has grown rapidly in recent years, particularly in the United States (Susskind and Weinstein, 1980; Lake, 1980; Emond, 1984; Meeks, 1985; Kaplan, 1988; Wondolleck, 1988; Grad, 1989; Peterson, 1992). The CORE process - involving multiple parties negotiating simultaneously at a number of tables - puts consensus-based decisionmaking to what may well be its most rigorous test yet.

Risk, Fairness and Analytical Support in Public Decisions,

As indicated above, the focus of this project is the collective decision process itself, and the way in which academic knowledge might usefully be brought to bear in support of such decisions. In examination of each site, existing and new information and data bases will be exploited, with an approach which nests decision criteria in a hierarchical framework beginning first with fundamental principles of individual rights and basic institutions (what might be called "procedural rationality"); then considers communitarian concerns with group interests and collective rights, in what Brown [] has called "traditional rationality"; and then, within that setting, addresses the question of consequential analysis or "economic rationality" where the scientific evidence must help to define the opportunity costs or (in a setting of financial restraint and finite resources) alternatives foregone as a result of adherence to fixed groundrules such as BACT which seem to ignore the concept of assimilative capacity or deny the possibility of an acceptable risk, ecological or health. (In particular, such consequential analysis must recognize that adverse economic impact and job loss itself translates quite directly into risks to human health.) The notion of comparative risk assessment becomes a central, if controversial, element of such analysis.

This attempt to answer questions as to critical loads and ecological limits requires the available science to be brought to bear in establishing thresholds relevant to social decisions. These will of course be site-specific, but will reveal, in the illustrative examples to be examined, general features of the decision problems and the decision processes under study. Recent work on "Risk and Fairness" within the long-standing project on Risk and Policy at the International Institute for Applied Systems Analysis (IIASA) identifies the alliterative triplet <parity, priority, proportionality> to describe the interaction of scientific concerns with philosophical criteria such as equality of treatment or equality of outcome.

It has been proposed [e.g. by Howard Raiffa] that such participatory consensus-seeking processes might be effectively served by a common analytical and scientific support, and a major program of research at IIASA over several years has been directed toward this possibility. Its work will be utilized directly in this project. More generally, over the past couple of decades a vast literature on "post-

modern" policy sciences has addressed this problem of procedural rationality and decision-making process in the context of "other ways of knowing" and other ways of reasoning about public decisions, including particularly decisions involving risks and "tragic choices". (See Peters, French and Lindquist for extensive bibliographies.)

To grapple with the priority problems of management in the semi-enclosed international sea called the Georgia Basin, all of these issues must be addressed. The contest of ideas which pits "what is right" against what the scientist says is feasible in particular places reveals itself in many technical controversies: the value of outright bans against the appeal of finely-tuned utilization of ecological systems; the simplicity of uniform standards against the efficiency of regulations reflecting assimilative capacity and "reasonably practicable" technologies, and so on. These technical debates must be reflected in the analysis. Can the exemption for industrial usage of the commons as disposal facility be sustained as activity within the Basin increases, and indeed as technology shrinks all oceans to the scale of semi-enclosed international seas? Can such an exemption be extended to the waste and run-off from intensive urban development? If not, must the answer prove to be over-riding social ground rules which force each municipality (or each individual) to assume full responsibility for all wastes generated by banning any transfer of wastes or trade in treatment capacities among jurisdiction or across individuals? Can we estimate the costs incurred by such sacrifice of opportunities for pooling of responsibility and specialization in the processes of disposal (as well as failure to take advantage of the ecological services which could be offered by Nature without any apparent threat to the integrity of the ecosystem itself)?

Most of the relevant issues arising in such questions regarding social decisions around assessment and perception of risk to human health have been surveyed in the background paper and proceedings of the October 1982 symposium on this subject organized by the Royal Society of Canada and the Science Council of Canada. What is needed now is to try to marry this background with the decisions to be taken.

Douglas and Wildavsky (in **Risk and Culture**) provide a starting point for much of this discussion, as does the literature surveyed by Joanne Linnerooth in her 1982 IIASA working paper "Murdering Statistical Lives?". [It will be necessary to examine also the argument of Nagel (and Saul) argument that administrative decisions may follow an "official" morality rather than a personal morality: the criteria for decision may be different for a government or a government official -- but what about a group or a collective engaged in "shared decision-making"?)

The extensive program of research at IIASA on questions of risk and fairness, as well as on analytical support for such consultation and negotiation processes will provide the key link from the underlying scientific work to the social decision mechanisms, taking into account different relevant cultural and philosophical frames. A main theme of the IIASA research is that ideas of what is fair with regard to environmental policies are complex and multidimensional. The plurality of the arguments brought to environmental debates show that different people have varying judgements about fair decisions depending on the problem context and on their social alignments. This plurality does not mean that concepts of fairness cannot be systematically identified and even predicted. To the contrary, careful attention to the plurality of the policy environment can add insights to finding procedures and negotiated outcomes that are mutually acceptable.

With regard to the specific case studies, it will be important to identify the different stakeholder concerns about the equity of the outcomes: the distribution among stakeholder, future generations, and the natural environment. We can expect that different notions of fair distribution will depend on a predictable way on the social contexts of the stakeholder groups and their views of nature, that is, on their cultural identity. For example, those with strong individualistic roots will likely view the relevant ecological system as rather robust, and policy decisions should reflect a careful weighing of the costs and benefits. Alternatively, those groups with more egalitarian leanings will likely view the surrounding ecological system as exceedingly fragile, and any attempts to quantify the costs and benefits will cover

up the underlying concern that economic pursuits are in inherent conflict with the ecological values.

The important point is that different social or cultural groups will be attracted to different ideas of fairness - whether utilitarian, egalitarian, liberalarian, etc, and these attractions can be systematically explored and exploited in finding consensual agreements. Moreover, the policy context in any one case study can benefit from an understanding of the basic principles of fairness as they emerge in other policy settings. As recent work on this topic shows (e.g., Peyton Young, *Equity in Theory and Practice*, forthcoming), there are identifiable principles of fairness (the three P's mentioned above) that appear to be fundamental to most issues of distributional justice. It will be instructive to ground each case study in this broader context. Reference to the ongoing work at IIASA can provide the theoretical expertise and an interdisciplinary forum for exploring the plural ideas of fairness within the broader, international context of distributional equity in environmental policy making.

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