WATER RESOURCES MANAGEMENT: POLICY ECONOMICS FOR AN ERA OF TRANSITIONS

Leonard A. Shabman

Prior to the last decade, federal water-project construction programs dominated water policy. These programs continue, but at a reduced level of funding, and the nation now is defining a new agenda of water resources issues to include water quality management and water allocation. Economists engaged in studies of water resources policy, and who seek to influence the direction of policy through research, teaching, and extension will find these exciting times. However, I will argue that these also will be frustrating times unless economists become more effective in designing water policy research and in offering policy advice. This argument can be summarized as follows.

At present a great share of economists' time is devoted to the "craft" of policy economics; that is, to extending the principles derived from economic reasoning to public policy advising and to the development and use of empirical methods. As a result, economists have let the discipline rather than the policy context set water resources research agenda. This approach to problem definition has been justified by reference to an incorrect model of the public choice process, which in turn has reduced the effectiveness of water policy advice. Increasing the effectiveness of water policy economics will require changing the way economists define water policy issues and directing more attention to strategies of policy advising. These two activities are termed the "art" of policy economics.

To illustrate this argument, I will discuss both the changing character of United States water management and the role of economists in directing future changes. The interpretation of United States water policy history and the role of policy economics is based upon a model of the public policy process which is described in the next section.

THE POLICY PROCESS

Public choice is based upon the practice of incremental politics within institutional guidelines which are subject to change with time. The following brief description of this choice process is the basis for defining the content of water policy economics research and advising.

The Temporal Logic of the Policy Process

In a stable decision environment, the choice set of alternatives is limited to those which will be incremental adjustments from the status quo. Incrementalism in decisionmaking is dictated by informational and computational limits on the ability to predict the consequences of any action; the best that can be achieved for any decision is a partial understanding of its implications. Therefore, decisionmaking can be described as "probing" based upon trial, error, and feedback as the means of discovering more about the choice environment and consequences of particular actions (Lindbloom). As a result, it is more accurate to describe choicemaking as seeking incremental movement away from problems, rather than striving to achieve some prespecified goal (Wildavsky, 1979).

Incremental choice proceeds within the fragmented structure of authority and political influence found in democratic societies. As a result, decisions, even when incremental, do not reflect a consensus on the "right thing to do." Instead, decisions arise from a process in which different partisan groups decide to agree to a choice in order to earn some (but not complete) satisfaction of their individual goals from the decisions made by the legislative and executive agencies. (Indeed, the legislators and bureaucrats themselves are part of this bargaining process.) In the process, policies *"... are better described as happening than as decided upon."* (Lindbloom, p. 523).

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Incremental politics appears disorderly. There is no hierarchical decision system in which information is collected and then interpreted as it passes from the bottom to the top of a decision hierarchy. In reality, there is no decision point; instead, as Lindbloom notes, decisions aren't made, they happen. However, the decision process has its own temporal logic. Choices are made in response to opportunities and constraints understood to be effective at the moment a decision can be made.

> *Problems and solutions are attached to choices, and thus to each other, not because of their inherent connections in a means-end sense, but in terms of their temporal proximity. The collection of decisionmakers, problems, and solutions that come to be associated with a particular choice opportunity is orderly—but the logic of the ordering is temporal rather than hierarchical or consequential (March, p. 37).*

The result is that the definition of the policy problem to be solved is a function of timing. Public issues have multiple dimensions and at any time one dimension of the issue will dictate the perception of the problem (Allison). For example, pesticide regulation is a multifaceted issue including such factors as protection of public health and costs to the farm sector. After a time, when a pesticide has been found in groundwater supplies, the problem will be seen primarily as one of ensuring public safety. Considering the same ban during a period of rapid food price increases, without its discovery in groundwater supplies, will cause the problem to be defined primarily in terms of minimizing costs imposed on agriculture. The range of solutions to a problem which are considered to be feasible also depends on timing. As one example, the likelihood of a pesticide ban will be influenced by who the environmental agency administrator is, a factor which changes with time and the electoral process.[1]

Institutions and Incremental Politics

The temporal logic of incremental politics is directed by an institutional context. Institutions as the *"set of rules, compliance procedures, and moral and ethical behavioral norms designed to constrain the behavior of individuals..."* (North, p. 201). For purposes of this discussion two specific aspects of institutions, as constraints on incremental politics, are discussed. First, the dominant ideology provides the basis for the constitutional rules which define the legitimate scope of governmental activity. Second, operating rules foster the administration of legitimized governmental authority. Operating rules are the laws, organizational forms and informal rules of order which govern how interest groups, legislatures, executive agencies, and the courts relate to each other. Operating rules must direct incremental politics so that public decisions are consistent with the dominant ideology.

Earlier, the argument was made that incremental politics is not goal-directed but rather is "problem avoiding." However, perceptions of broad social goals, here termed ideology, define the appropriateness of problem definitions and acceptable solutions. It governs public choice by dictating that certain actions may be taken by government because they are "right," rather than because particular groups receive special advantage from the choice (Kalt and Zupan). North states the argument as follows:

> *The allocating of resources through the political and judicial process provides ample opportunity for ideological conviction to dominate the decisionmaking process. Recent studies have shown that the best predictor of legislative voting behavior is not any evident interest group but ideological conviction as measured by the Americans for Democratic Action and other rating systems. It is not that interest group pressures are not important sources of political decisionmaking; they are.... It is rather that legislators, regulators, and the executive branch are faced with many choices which allow ideology to be the decisive factor where the costs of ideological conviction are small or negligible, interest groups are relatively evenly divided on an issue, or the diffusion of costs and benefits is so widespread and individually small that it is not worthwhile for any individual or group to devote substantial resources to interest group pressure. And finally, strong ideological conviction may, and frequently does, lead political decisionmakers to make decisions that run counter to organized interest group pressures.*
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> *But even more important, the composition and actions of interest groups themselves are not explicable in terms of interest group pressure that excludes ideological convictions. It is possible in some cases to identify interest group pressures that mirror positive net private benefits to the participants of*

[1] It is this particular aspect of actual choice which the public choice theorists critique. The rules governing incremental politics are found wanting whenever the political choices made do not serve the prespecified objective of efficiency in resource allocation (Anderson). This paper puts great weight on political rationality as a proper basis for incremental political choice. Political rationality in choice deals first with the preservation and improvement of the decisionmaking structure (Wildavsky 1968). Political rationality cares about gaining group acceptance for solutions to immediate problems while emphasizing the need to maintain the capacity for future decisionmaking; political rationality cares more for how decisions can be made and less for what particular decisions should be.

sufficient magnitude to explain such behavior; but in many it is not possible. The modern environmental movement is one such case (North, p. 56).

Much of the political debate is about ideology—issues of fairness, the appropriateness of particular values, and the legitimate scope of government. These are analytically intractable questions, without precise answers, but they are the substance of politics. Of course, the dominant ideology will change over time. Such shifts in ideology can be attributed to "intellectual entrepreneurs" who espouse and defend contrasting views of the world and ultimately are able to convince individuals and groups of the merits of their position (North, p. 51). Ideological shifts lead to institutional changes which alter the legitimate scope of government activity and provide for new operating rules which constrain subsequent periods of incremental politics.[2]

WATER MANAGEMENT INSTITUTIONS IN TRANSITION

The history of water policy in this century has been one of institutional change. Two significant periods were the middle 1930's and the early 1970's. At these times institutional shifts redefined the appropriate role of government in water resources management and changed the operating rules governing agency decisionmaking.

The Era of Federal Water Project Development

The later years of the 19th century were characterized by increasing concentration of economic power in the nation's industrial organizations and the final exploration of the western frontier. Recognition of these forces was the foundation for the progressive conservation movement which espoused two themes: (i) redistributing the nations resource wealth by public action and (ii) increasing the technical efficiency of resource use to offset an expected decline in the discovery of new sources of natural wealth. As it applied to water management, resource conservation called for the maximum development and engineering control of the nation's water resources for power production and transportation. Such development, which would occur whenever technically feasible, was justified as permitting the substitution of the continuously renewable resource of water for depletable energy and mineral resources (Pinchot). Reflecting these concerns, President Theodore Roosevelt's Inland Waterways Commission Report of 1908 called for an expanded federal role in the development of the nation's water resources to promote economic development and economic equity. However, until the 1930's there remained a public scepticism about the extension of government programs into the market economy.

It was a series of severe floods during the mid-1930's, coincident with the great depression, that moved the federal government into a major water project construction program during the administration of Franklin Roosevelt (for discussion of this period see Holmes). For many persons, the depression was evidence of the failure of the market process to provide for equitable economic growth. This belief supported a water project construction program for direct provision of jobs and to provide flood control, navigation, irrigation, and power production for expanding the agricultural and industrial base of the nation. For the next 30 years, there was social consensus on the: (i) legitimacy of public sector (primarily federal) water project development and (ii) appropriateness of storage and river control structures for flood control, navigation, hydropower, and irrigation purposes as contributors to economic prosperity. The progressive conservation movement's ideological commitment to public water development projects had finally been realized in the formation of a federal water development program during the "New Deal" of Franklin Roosevelt.

During the New Deal period, an important institutional change was the "New Deal" administrative agency (Ackerman and Hassler). This institutional adjustment was an attempt to promote the application of science to solving the problems of the nation by isolating administrative agencies from the exercise of interest group influence. Only by careful, unbiased, evaluation of technical, economic, and social facts, would there be hope for finding the best solution to the problems of modern society. In its purest form, this ideal was realized in the formation of independent regulatory commissions, but the principle extended to other agencies as well.

This "affirmation of expertise" (Ackerman and Hassler, p. 4) was part of a general social trend which in the early part of this century, came to see science as the tool for human betterment (Hart, p. 516). To permit expert judgement to govern agency decisions, the New Deal agency's

[2] An alternative explanation for institutional change is offered by public choice theory. In this view structural changes in the economy can alter implicit price relationships and call forth adjustments in resource allocation. Institutional changes necessary to permit this reallocation are induced by the opportunity for efficiency gains (Anderson and Hill).

legislative mandate provided only the most general policy direction (Lowi). *"Instead of imposing a hard and fast solution to a complex and changing problem, the legislature should invite the agency to organize the expert knowledge required for intelligent regulation"* (Ackerman and Hassler, p. 5). The courts were only to ensure that agency decisions were not "arbitrary and capricious"; that is, to ensure that serious consideration was given to relevant data and expert opinion. The court was not to second-guess the agency, substituting its judgement for the agency expert (Shapiro).

In water policy, the creation of the independent Tennessee Valley Authority (TVA) was a product of the hope that expert technical analysis could direct the nation's water development program. The TVA ideal embodied what had become the "pure doctrine" of river basin development (Wengert). The doctrine stressed that there were three components to rational water management: a river basin focus, development of multipurpose water storage projects and promotion of social and economic change. Individual water projects were to be developed in rational relation to river basin plans developed by experts.[3] Extension of this commitment to the expert public bureau also gave the Corps of Engineers, Bureau of Reclamation, and Soil Conservation Service the ability to direct their own programs, although these agencies were not as insulated from political interference as the New Deal regulatory agencies. As a result, for many years the recommendations of these water project construction agencies were rarely questioned, because of the belief in Congress that a project planned by them was technically sound and consistent with the social purposes of the nation's water program (Shabman, 1972).

The Environmental Movement and the New Environmental Agency

During the 1960's, the dominant resource conservation ideology began to shift away from the legacy of the progressive conservation movement. Building upon the writings of Henry Thoreau, George Perkins Marsh and the more recent work of Aldo Leopold, the environmental movement was grounded in the argument that people's manipulation of nature for solely material gain was unethical. However, blending this ethical argument with the argument that human survival depended upon a harmonious relation with the natural world had the most widespread impact on public thought. The intellectual leadership for this composite view included such persons as Rachel Carson, Paul Erlich, Rene Dubos, and Barry Commoner. These people wrote extensively and persuasively during the 1960's and 1970's, pointing out what they saw as the increasing contamination of the natural world and warning of dire consequences of people's unrestrained exploitation of natural systems was not changed.

One result of the environmental arguments was a questioning of the historical construction premise of United States water management. The nation had built a large capital stock of dams and water delivery systems since the 1930's, but as the nation moved into the 1970's, the concept of a capital stock in water resources was expanded beyond physical works to include the remaining free flowing rivers and environmental amenities associated with them. Accompanying this change was the view that water resources decisions must focus on using what we have rather than on seeking to expand the supply of physical works. By the late 1960's, the social consensus supporting the federal water development began to collapse, funding, in real terms, for new water development projects fell, and there have been no funds appropriated for new project starts by the Corps of Engineers or Bureau of Reclamation since 1976.

The ideology of the environmental movement also provided a legitimate base for new laws which redirected the focus of water resources policy and management. For example, the 1972 Federal Water Pollution Control Act Amendments, later reauthorized as the Clean Water Act of 1977, focused attention of water quality rather than water development and had a stated goal of zero discharge of wastes into the nation's waters by 1985, signaling the intent to reallocate property rights to use of the nation's water away from waste discharges.[4] Although economists have maligned the zero discharge goal, it was a political symbol of the legislative acceptance of the new environmental ideology.[5]

A second institutional shift, coinciding with the environmental movement, was a reassessment of the ideal of the New Deal agency. The attempt to give agencies maximum flexibility in their legislative mandates, so they could make decisions by expert judgment, was being called into question. The evidence was accumulating

[3] The New Deal agency could find and implement "best" solutions to water management problems. In this intellectual environment, planners sought to develop economic evaluation tools such as benefit-cost analysis to promote scientific choice and it was from this base that the development of benefit-cost analysis in the federal agencies proceeded (Maass, 1970). However, in later years the belief in the utility of benefit-cost analysis as a decision tool receded (Shabman,1984).

[4] The 1948 Water Pollution Control Act expanded federal involvement in water management to water quality protection, but did not usurp state authority for setting water quality standards and regulating waste-water discharge (Davies). Despite several subsequent amendments to the Act, it was not until 1972 that significant changes were made.

[5] The Act's interim goal of swimmable and fishable waters is no less a statement of this ideological committment.

that interest group politics had often been as significant in agency decisions as the application of expertise. Regulatory agencies were said to be "captured" by those they were to regulate subverting the broader purposes of their regulatory mandate (Ackerman and Hassler). Spending decisions were said to be made in response to a pork-barrel politics where an "iron-triangle" of agency personnel, interest groups and congressional subcommittee members set spending priorities to serve the interests they represented, subverting the desire to have decisions made to serve a rational plan of development (Lowi). Indeed, as early as the 1950's, the federal water project construction agencies were used as examples of the failures of "pork barrel" politics to promote a rational pattern of water development projects (Maass, 1951). However, support for project development agencies remained strong until the 1970's, when support for water projects as an appropriate water management alternative declined.

A second argument against the ideal of the New Deal agency was that pure expertise was a myth. This was especially true for environmental management where the questions needing answers often appeared scientific, but in fact transcended science (Ricci and Molton). For example, the choice to use epidemiological versus animal test evidence for establishing health risk of chemicals is a question of what one author terms "science policy" (Ashford, Ryan and Caldart). Likewise, weighting of health risks versus costs of a chemical ban is not a simple matter of scientific calculation (Crandall and Lave). In making science policy, there was reason to provide for political and judicial oversight on the exercise of agency decisions.

This shift in viewpoint about the role of expertise in public policy affected the writers of the environmental legislation of the 1970's. In much of the new environmental legislation, Congress, not the agency, set the goals, set timetables for goal achievement, and directed that the goals be attained by the application of particular technologies (Ackerman and Hassler). In the Federal Water Pollution Control Act Amendments of 1972, industrial and municipal waste dischargers were required to have increasingly sophisticated pollution control equipment at specified future dates. At each time the required technology would be, in EPA's judgment, the "state-of-the-art" in pollution control, subject to a determination that the technology was "economically achievable" (Freeman, 1980). However, Congress and the courts (through legislative provision for citizen suits) were expected to analyze EPA decisions and if necessary, substitute their judgement, after hearing from expert witnesses, for that of the agency. With this operating rule, oversight actions of Congress and the courts could ensure that no undue influence was exerted by selected interest groups on the EPA choice of technology and that issues of science policy were not submerged as issues of technical analysis.

THE PRACTICE OF WATER POLICY ECONOMICS

The remainder of this paper draws upon the preceding discussion to provide a critical evaluation of the effectiveness of the current approach to water policy economics research and advising. In addition, suggestions are offered for increasing the policy effectiveness of water resource economists.

Perspectives on Water Policy Economics

Frequently, water policy economics is misdirected by an inappropriate model of the policy process. In this model, governmental decisionmaking is comprised of a rational-analytical component and a political component. Decisions proceed in a four step sequence. First, knowledge of all alternatives for action in a particular situation is established. Second, consequences of alternative actions are determined. Third, alternatives are compared according to the preference ordering of the decisionmaker, or a hypothetical entity termed "the state." Fourth, a decision rule permits selection of a single alternative from among the choice set.

The state's decision rule is embodied in the concept of the social welfare function which includes arguments such as economic efficiency, equity, and environmental quality (Steiner). The importance of the various welfare arguments is established by a "diffuse" political process. As seen in this model, the role of the policy economist is to conduct a separate objective analysis that provides "informational inputs" (Randall, p. 90) on the impact of particular alternatives on the various arguments in the state's welfare function. However, because no particular welfare argument would dominate another, the preferred alternative, in terms of any one argument, may not be chosen. For example, a benefit-cost analyst might explain decisions which do not conform to the economically efficient choice by suggesting there was a predominance of other goals over economic efficiency.

Adherence to this choice model, as at least a normative ideal if not descriptive of reality, permits economists to define policy research problems in terms of a hypothesized economic efficiency objective, with studies drawing upon the theoretical foundation and empirical applications of neo-classical welfare economics. The policy advice to be derived from these

analyses can be easily incorporated into the choice model previously described. As a result, the policy-economics literature abounds with sophisticated methods of valuing non-market goods in order to provide for more complete benefit-cost analyses (Freeman, 1979); with proposals for innovative approaches to marginal-cost pricing publically provided goods; with demonstrations of the potential efficiency gains from substituting market and quasi-market allocation of resources for allocation by governmental administration (Anderson).

The reality is that most of this policy advice falls on deaf ears (Cochrane). Adhering to a choice model where analysis is separate from politics can be a cause of frustration. Disdaining participation in politics, economists are often left to defend the wisdom of analytically derived solutions to their own definition of policy problems, arguing that theirs is the voice of reason among partisan interests.

In fact, there are ideological strands to political debate: what is a "fair" distribution of resources, what should be the dominant values of a society, and what are the legitimate roles of government in distributing resources and shaping values. However, when economists let problems for policy analysis be solely defined by economic efficiency principles, they implicitly seek *"...to effect what can only be called a revolution in the topics for political debate"* (Kelman, p. 153). Such analyses describe desirable (e.g. efficient) policy changes by ignoring the political processes' primary concern with equity and value questions. Equity considerations in economics which are limited to proposals for lump-sum cash transfers and redistributive choices are embodied in a black-box called the state's welfare function. Adherence to the principle of consumer sovereignty requires that economic analyses accept existing preference structures rather than entering the continuous ideological debate over which preferences are appropriate and how particular preferences should be advanced by government action.

Thus, at first it may appear that economists' disciplinary orientation is ill-suited to the issues of concern in policy. However, there is an approach to policy economics and advising that can raise the demand for economics research and advice, and in my judgment, can make a contribution to the operation of the public choice process. This approach begins by recognizing the incremental nature of choice in the public sector. Decisionmakers (interest groups and government units) are "probing" to discover more about the appropriateness of problems they might address and possible solutions to these problems, where the sets of appropriate problems and possible solutions are constrained by institutions and by the influence of contending groups in the political process. However, institutional constraints are not precisely defined and are subject to change. In this decision process, incremental choices are the basis for discovering the changing nature of problems and acceptable solutions. Discovering boundaries and effectiveness of possible actions depends upon experimentation--trial and error. It is here that analysis fits. "The trouble with learning by experience is that one needs so much of it. The attraction of analysis is that one need not live through everything" (Wildavsky, 1979, p. 125). Policy analysis is a type of intellectual experiment. It expands the range of choices to be considered, as deviations from the existing situation, beyond those which might be explored if each choice had to be tested by actually taking political action.

With this perspective, the policy economist must acknowledge that policy economics is the provision of advisory support to participants in the policy process and will, therefore, become client-oriented. Even if no client is specified prior to an analytical study, the effect of that study on decisions will still depend upon its use by some partisan interest in support of their own position. Alternatively, the economist might conduct an analysis and then seek to find a partisan who is in agreement with the conclusions and recommendations of the study. In this sense, policy economics begins with the "art" of "creating" (to use Wildavsky's, 1979, terms) clients for economic analyses. (The art of policy economics is discussed in the next section.)

By contrast, the craft of water policy economics is the application of both the deductive logic of economics and the empirical tools of the discipline to developing economic information for use in water policy analysis (Rhoads; Wildavsky, 1979). If analysis is viewed as a substitute for learning by explicit decisionmaking, the policy economist can offer assistance in the conduct of policy experiments by the application of the tools of a positive economics based upon development of behavioral models and testing of falsifiable hypotheses. Demonstrations of the empirical relationships among economic variables can offer the client of the policy economist insights which only might be gained by trial and error choicemaking. Likewise, the tools of operations research can be used to evaluate consequences of alternative actions.

Policy economists can also provide advisory support for the participants in the incremental decision process by making the deductive arguments that can be drawn from three key principles of economics; opportunity cost, marginalism, and incentives. However, as will

be noted later, these arguments will not be free of ideological overtones.

The principle that any choice will impose an opportunity cost, as the value of a foregone alternative, is often ignored in a political process where ideological debate is about which values are most appropriate and how these values can be advanced without regard to foregone opportunities. Therefore, the economist's professional sensitivity to the argument that there is "no free lunch" is a unique contribution in that process.[6] The marginalist perspective of economics is also a unique perspective in the policy process. Confusion between marginal and total net gains is frequent in an incremental decision process which looks to the past as a guide to the future. For example, the past success of a program is likely to be cited as justification for its expansion. The policy economist is inclined to point out that past gains are not sufficient justification for successive positive increments to a program. Finally, in a real sense, the product of the political process is the institutions which will direct individuals' behavior. Behavioral changes can be obtained by appeals to morality, by treats of sanction or by incentives (Shultze). It is the policy economist who proposes institutions which rely upon incentives for modifying peoples choicemaking behavior.

The Art of Water Policy Economics

The subsequent discussion will focus on the art of policy economics which includes two activities: (i) specifying the aspects of the policy problem which can be addressed by the analytic tools of economics and (ii) developing a political strategy of policy advising. In both cases, the challenge is to create clients who will be receptive to economic arguments and analyses. (See Meltsner for an excellent discussion of the relationship of policy analysts to policy clients.)

Specifying the Policy Problem

The existing institutional setting, and the history of an issue as a matter of public concern, give any policy issue multiple dimensions. Effectiveness of the policy economist is enhanced if these multiple dimensions are clearly understood so that the conduct of policy research and provision of advice address the dimensions of the problem relevant to policy debate. This argument will be illustrated by review of the current water policy debate over cost-sharing rules for federal water resource development.

Traditionally, only a small share of the cost of federal water projects was borne by project beneficiaries. This low cost-share burden, as a program operating rule, ensured that the ideological commitment to water development, articulated in the 1930's, would be realized. Thus, full repayment for irrigation water was continuously modified as an operating rule in reclamation projects because it conflicted with the ability to develop western agriculture (Burness, et al.). The Flood Control Acts of the 1930's and 1940's continuously modified local cost-sharing requirements so that construction of flood control works would not be delayed (Holmes). This ideological commitment to development has waned, and the cost sharing issue has become an especially visible one since the early 1970s (National Water Commission).

Noting the interest in cost-sharing reform, the water policy economist might conceptualize policy research and advice as a marginal cost pricing problem and prescribe optimal (e.g. efficient) cost-sharing rules. In fact, in the early 1970's a good deal of the research on cost-sharing was designed in this manner (Marshall, Hanke and Davis). If policy economics is treated as a provision of informational inputs on the economic efficiency argument in the states welfare function, then such marginal cost pricing studies will be justified. However, it is now obvious that the debate on cost-sharing continues, and it is also clear that these economic studies have had limited influence on that debate. Economists would increase their chances to make an effective policy contribution if they specified what makes water project cost-sharing a policy problem.

Cost-sharing for water projects is a *budget* problem and a *fairness* problem; cost-sharing levels are a balance of these two concerns. The budget problem is one of distributing limited federal financial resources among multiple programs. As a budget problem, federal cost-shares are set in relation to the perceived social importance of expenditures on water development relative to competing programs. Thus, the budget debate over the appropriate level of cost-sharing is an ideological debate over the legitimate roles of government in water development. The level of cost-sharing which is "correct" is conditional upon resolution of this issue, and not whether

[6] Opportunity cost is one of the more elusive concepts in economics.The impossibility of empirical money-measurement of opportunity cost, which is ultimately a subjective value of individual choicemakers and is dependent upon the choice situation, is accepted here. However, as an organizing principle for policy advice, opportunity cost is an essential tool of the economist. Admittedly partial measurement of foregone opportunities in money and non-money terms is also considered to be both practical and useful. For purposes of this paper, benefit-cost analysis can be treated as an empirical extension of the opportunity cost principle (Buchanan). However, the utility of empirical benefit measurement in the decision process is questionable (Wildavsky, 1979, pp. 155-181).

water project beneficiaries will pay the marginal cost of providing them with a service. Therefore, in the current institutional environment, it is certain that the appropriate water project cost-share rate will be that rate which discourages what is now considered inappropriate federal expenditures for water project development. There will not be much economic analyses can contribute without entering the public debate over the legitimate role of government in this activity.

However, existing projects will continue to have operation and maintenance expenses and some distribution of this cost burden must be "fairly" made. As a fairness problem, water project cost-sharing policy has been closely linked to ideas of capacity-to-pay. In the past, the commitment to water project development would not have been served by asking non-federal interests to pay more than was affordable, because to do so would have been at cross purposes with program success. Yet, there has existed a belief that non-federal interests should pay as much as they are "able-to-pay"—an imprecise, but largely agreed to, principle of political negotiation over cost-sharing policy.

Understanding this fairness dimension of the policy debate would direct policy economics research toward economic impact studies, which review the incidence of alternative cost-sharing rules in terms of who would pay, *not* who should pay. Such studies would be well received and could direct the political debate toward a consensus on the fairness of a cost-sharing policy. Indeed, as one recent example, economic impact studies isolated the effect on agriculture of full recovery of navigation system operation and maintenance costs (Congressional Budget Office). These studies demonstrated that the agricultural sector would have a significant cost burden shifted to it, and this result was deemed unfair given the economic difficulties of the farm sector. These analyses are helping to direct the search for a consensus on cost share levels for navigation projects.[7]

More generally, the models, methods, and data of the policy economist should be directed to address a dimension of a problem which is relevant to political debate. The assessment of the policy problem to ensure this result is the first aspect of "art" of policy economics. If policy economics research proceeds in this manner, there will be an improvement in the productivity of economists, where the product of their work is facilitating the policy process.

Creating the Policy Problem

Policy issues have many dimensions. However, at any time, one particular dimension of the issue dominates how it is defined as a policy problem and dictates the range of acceptable solutions. This dominant dimension of a problem can be called the "face" of the issue (Allison, p. 168). A second aspect of the art of policy economics is ensuring that research and advice are always addressing the face of each issue. For the economist, one strategy of policy analysis would be to wait to offer advice until that time when the face of an issue changes and economic information will be utilized. A more effective approach is to develop strategies of argument to increase receptivity to the available economic information. Here, the art of policy economics requires active engagement in political debate, seeking to change the face of the issue.

The Necessity of Political Economics

Economists may be reluctant to engage in ideological political debate. However, the reality is that the tools of policy economics will involve their user in such debate, even if unwillingly. The impossibility of ideologically neutral water policy economics will be illustrated by a discussion of how two basic arguments of economics—opportunity cost and the desirability of economic incentives—would be used and considered in debates over reform of water pollution law.

Water pollution law has been under review for the last several years as part of the multifaceted issue of "regulatory reform." One dimension of the regulatory reform issue is the call to review and relax the legislative commitment to the ideological goals of the 1970's environmental movement. An example of such a goal is the zero discharge goal of the Clean Water Act, which is a symbolic statement of a commitment to advance water quality improvement to technically attainable levels, without regard to costs and benefits of doing so.

Economists have become engaged in the review of such environmental goals by their support for more precise application of benefit-cost techniques to environmental regulation, using modern methods of non-market goods valuation. While many economists express a professional scepticism about the validity of

[7] Cost-sharing for soil erosion control, which began in the 1930's, illustrates a possible conflict between budget and fairness criteria. Expenditures to assist farmers in soil erosion control have been partially justified by a belief that maintenance of the nation's agricultural land base is a legitimate purpose of government and that soil erosion threatens the productivity of the land base. At the same time, the operating rules for soil erosion control cost-sharing were administered to provide equality of access of funds. However, this fairness standard reduced the effectiveness of erosion control expenditures because funds were not distributed to the most erosion prone soils. As a result, there is now interest in targeting funds to areas and lands with highest erosion rates (Batie). Thus, economic research on cost-effective targeting approaches is now in demand.

these methods and would not support their expanded use, I suspect that most economists would at least support introducing the principle of opportunity cost into the policy debate, reminding participants that ever higher environmental quality comes at a cost; that is, there is no "free lunch."

Typically, the policy economist imagines himself or herself in the role of objective analyst of opportunity costs, helping balance the excesses of environmental protection against other social priorities. It is useful to hear from the other side on this point. Leon Billings, who was in a key policy position (Democratic staff director of the Senate Environment and Public Works Committee) when the current water pollution legislation was written, has little respect for economists' objectivity.

> *In a brief interview, Billings began by stating that "there is a basic philosophical difference between regulatory people and economists. Economists don't care whether you achieve a reduction of pollution. They don't really care, but we really do care.... Billings... used the question asked to express distaste for economists, whom he regarded as "zealots" (Kelman, pp. 102-103).*

Economists have too often been surprised by being labeled "zealots," because of a failure to appreciate the nature of public policy. In a political context, the statement of a zero discharge goal was a reflection of the ability of the environmental movement to impose its ideological stamp upon the policy process and direct subsequent incremental pollution control decisions. Opportunity cost arguments of the policy economist are an attack on that ideological position. The argument is ammunition for the political battle over values.

A second dimension of the regulatory reform issue is the argument that the regulatory strategies of the 1970's environmental legislation result in attaining environmental improvement at higher than necessary cost. For example, the Clean Water Act requires EPA to specify waste water standards based upon the adoption of uniform waste-treatment technology for classes of industries, without regard to inter-firm differences in waste treatment costs and to differences in the natural assimilative capacity of waste receiving waters. Water quality standards are said to be "technology based" (Freeman, 1980). Reform would permit reallocation of waste treatment requirements from sources with high marginal treatment costs to those with low marginal treatment costs providing for reductions in aggregate costs with no change in aggregate waste treatment levels.

To accomplish this reform, economists have suggested taxes on waste discharge or pollution-rights markets as economic incentive systems which would secure any pre-specified level of water quality at minimum waste-water treatment cost. Since 1964, the profession has been refining the argument that economic incentive systems can promote cost-minimizing pollution control strategies (Kneese). It has become the standard fare in undergraduate environmental economics courses.

Recently, there has been some acceptance of economic incentive strategies in EPA's air quality management program and some states have experimented with water pollution rights markets (Joeres and David). However, the reality is that economists' arguments for increasing the use of economic incentives in environmental management have been rarely heeded. This is an apparently curious result because the economic incentive schemes would seem to be ideologically neutral proposals for institutional change; that is, given a water quality standard, the economist can design an institution that will achieve that standard at least cost.

However, in the context of the emergent ideology of the environmental movement, charge and rights proposals are not perceived as ideologically neutral. The environmental movement, and the laws it spawned, attempt to do more than control pollution. They are part of a larger effort to redefine the values our society holds about its natural environment. The economic analyst only cares about how economic incentives can influence people to alter polluting behavior, without regard to the particular values they hold about the importance of environmental protection. The environmentalist challenges and seeks to redirect those values through the regulatory structure. Therefore, one objection to the use of economic incentives is that they condone polluting behavior by permitting pollution if a person is willing to pay for the right to pollute.[8] Kelman describes this attitude as follows:

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[8] As another illustration, the environmental movement promotes the principle of water demand reduction under the rhetorical label of water conservation. For economists, water demand reduction is a pricing problem with the purpose being an increase in the efficiency of resource allocation. However, for the environmentalist, there is more at stake in promoting water conservation. According to Powledge, *"Conservation saves water, money and energy, of course, but it also serves another very important function: it cultivates an awareness of water. Once you make the decision to stop letting the water run while you brush your teeth, for example, using only what you really need, you think more readily about water and the larger issues—acid rain; the health of rivers, lakes and oceans; government action and inaction; and the obligation of agribusiness to the land. In effect, you begin thinking about water and its innumerable connections, not only to our transitory comforts, but to everything else in the world. And this is as it should be, for water is the stuff of everything that lives and can live upon our planet."*

If a society uses economic incentives in environmental policy, it fails to make a statement stigmatizing polluting behavior. If one believes that people may justifiably wish the societies they live in on occasion to make approbatory or stigmatory statements about certain behaviors, and if one further believes that polluting behavior should be stigmatized, then one has reason to be concerned with using economic incentives in environmental policy (Kelman, p. 23).

A second concern of the environmental movement is that economic incentive proposals will unintentionally reduce the ability of direct congressional and court oversight to ensure that the goal of clean water is vigorously pursued. The regulatory structure of the Clean Water Act requires EPA selection of both waste treatment levels and methods for waste producing firms. Technology based standards are thought to be easy to set and monitor by Congress and the courts, to reduce the likelihood of EPA "capture" by polluters and to reduce EPA's discretion in setting "science policy" without outside review (Ackerman and Hassler). In contrast, economic incentive systems would place decisions on the level and means of waste treatment at the discretion of the waste discharger who must decide whether to pay the tax (or purchase the discharge right) or treat their waste. Economists might argue that such flexibility in choice is the key to cost-effectiveness in pollution control. However, the memory of how the unsupervised New Deal agency was captured by those it was to regulate must be overcome before the economic incentive argument will be accepted.

A Political Strategy for Policy Economics

For the last decade, water policy has been dominated by the environmental movement's ideology. Operating rules for water quality management have been designed to promote this perspective. At the same time, the tools of water resources economics have brought economists into conflict with the new environmental ideology. In short, the face of the water quality issue has not been conducive to acceptance of water policy economists' arguments.

Although there was limited acceptance of economics in reform of water quality law, there was a demand for economists by agencies and groups who wished to dismantle the traditional water project development programs. For years prior to 1970, economists had been critical of the water development programs. These criticisms were based upon critical analysis suggesting that new water projects would not, as hoped in the 1930's, promote national and regional economic development (Eckstein, Haveman, and McKean). However, prior to the 1970's, the commitment to these programs was strong and the economists' arguments had little influence on water policy. With the 1970's, the anti water-project leadership of the environmental movement discovered that economic arguments could be marshalled in support of their position and water resource economists began to get a hearing. In this case, the face of the water project issue turned to provide a basis for acceptance of economic arguments (Shabman, 1984).

The contrast in the reception given to the arguments of water policy economists illustrates how the demand for policy economics is influenced by the institutional context of political decisionmaking. If economists wish to affect decisions in areas where their arguments have not had influence, such as water quality management, they will need to pay more attention to the political strategy (to use Kelman's term) of policy economics.

Of most importance is that a political strategy for policy economics will vary with the specific historical background and current institutional setting for an issue. However, the general outline of a political strategy for policy economics can be illustrated by examples from the issues of water quality law reform.[9] First, there must be an acknowledgment of the ideological nature of policy economics.[10] For example, the policy economist often argues that effluent taxes are payments for the right to discharge waste. A more effective political argument (e.g. not threatening to the environmental ideology) would be that such taxes are penalties for not stopping pollution. Indeed, our use of the term pollution "right" or pollution "permits" is the source of much of the political opposition to the proposals. Words reflect values and a better term is needed.

Second, policy economists need to develop arguments which change the face of issues so they are amenable to economic argument. It is in this sense that the art of policy economics is "creating" the problem to be solved. For example, receptivity to arguments for use of

[9] Foster provides an excellent discussion of these general points for the specific case of the adoption of economic incentives in air pollution regulation.

[10] This usually is recognized by practitioners of benefit-cost analysis, although there remain arguments that benefit-cost analysis can be value-free (Mishan). This value-free benefit-cost ideal is developed from the social welfare function model of choicemaking where economists are said only to provide economic efficiency information for the choice process. As already noted, the reality is that benefit-cost analysis and opportunity cost arguments are used to support ideological positions (e.g. stopping water development) or are viewed as attacks on ideological positions (e.g. the zero discharge goal).

economic incentives in pollution control would increase, if cost-effectiveness became the dominant concern in the policy process. Thus, economists might effectively lobby environmentalists to adopt this concern for cost-effectiveness by arguing that environmental protection goals will be weakened in the political process over time unless lower cost regulatory structures are put in place. In this manner, the policy economist becomes the ally of the environmentalist, while at the same time creating a receptive environment for the economic incentive argument.

As another lobbying approach, the policy economist might argue that the rigid regulatory strategy we now have for the highly technical problem of pollution control, with its intense congressional and court review, will overwhelm the information and oversight capacity of the regulatory agency, the Congress and the courts. This will ultimately compromise the goals of clean water by causing lengthy delays in goal attainment. Economists could argue that economic incentives based regulatory strategy would expedite the attainment of goals by reducing the need for detailed review of pollution control technology; that regulators should care only for the goals of clean water and not about the means of pollution control used to attain the goals.

Note that a political strategy for the policy economist (i) requires a precise knowledge of the historical pattern which produced the current institutions, and (ii) does not directly stress the "superiority" of the economists viewpoint. Also, recognize that the success of the lobbying effort is not guaranteed (Crandall). The key point is that failure to redefine issue so that receptivity to economic arguments will be increased, inevitably will reduce the effect on policy of the most carefully crafted economic analyses.

CONCLUSION

The issues on the water policy agenda during the next several years are far more numerous than those discussed in this paper. Examples include reforming states' water allocation law, expanding water quality management programs to control of non-point source pollution, and financing local government investments in water and sewer infrastructure. These issues, and others like them, will be studied by economists, but the usefulness of these studies in the policy process will depend upon economists being more attentive to the "art" of policy analysis. The only natural political constituency for economic arguments is other economists. With this base of support, we are unlikely to redirect water resource institutions; we must create the receptive environment for economic argument.

However, some economists' comparative advantage, and personal interest, will not lie in problem specification and problem creation—the art of policy economics. Many, I suspect most economists, will prefer to practice the craft of policy economics—including development of models and data. At this time, both graduate training and professional reward systems emphasize the craft aspects of policy economics. More attention to the art of water policy economics is needed. While the talented "economic artists" cannot come from graduate training alone, broadening the curriculum of students to include history, political science, and other disciplines will be an indispensable first step in expanding economists' capacity to improve water policy research, teaching, and extension. Equally important will be a free flow of economists between positions in government and the universities to permit academic economists to practice policy economics. In the final analysis, the art of policy economics can be learned, but it cannot be taught.

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