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Management of Natural Resources for Optimum Development-- Cutting the Cost of Decision- Making

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MANAGEMENT OF NATURAL RESOURCES FOR OPTIMUM
DEVELOPMENT -- CUTTING THE COST OF DECISION-MAKING

By

David J. Allee

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Management of Natural Resources for Optimum Development
-- Cutting the Cost of Decision-Making¹

by David J. Allee^{2,3/}

Abstract

Much of our research in the physical and biological sciences has stimulated change in institutions and social organization and change in the distribution of the rewards of society. Much of our research to better understand such changes has failed to produce needed adjustments in institutional arrangements. This paper reports on several avenues of academic inquiry that may produce more results in terms of new policies and programs to overcome the widely recognized institutional lag.

Social scientists working in agricultural experiment stations and other mission-oriented research organizations have long studied public programs and organizational arrangements for natural resource management. Key problems have been the failure of the market to deal with external effects such as pollution, or common property problems such as ground water depletion, or the provision of adequate public services such as technical assistance for erosion control. It is not enough to reject the market, something must be put in its place. But the design of institutional arrangements calls for new analytics. Such analysis must not only provide for the specification of criteria to judge what exists and for what should be, but also must provide strategy to achieve change. It is not enough to criticize existing agencies and programs for their shortcomings, practical proposals for reform should be our output also.

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- 1/ Presented to the North Central Research Strategy Committee on Natural Resource Use and Development, Kansas City, Mo., October 12, 1971; sponsored by the Farm Foundation.
 - 2/ Professor of Resource Economics, SUNY College of Agriculture at Cornell University and Associate Director of the Cornell University Water Resources and Marine Sciences Center.
 - 3/ Dr. Helen Ingram, Staff Political Scientist of the National Water Commission made important intellectual contributions to this paper. Some of my colleagues at Cornell and on the Institutions Panel of the National Water Commission will also recognize some of their ideas. Many of the observations in this paper are the result of background work completed for a review of the authorization and appropriation process being led by Dr. Ingram in which the author is associated.

Conventional wisdom of public administration which decries the influence of special interests, the proliferation of agencies, the existence of overlapping, duplicative and fragmented authority fails to provide an adequate basis for analysis. Political economists have developed alternative analytics that can help us identify the limits for voluntary organization, the likely pathologies of bureaucratic organizations and the mechanisms for reform. Bureaucratic "free enterprise" can deviate from optimum social behavior if it is not clearly accountable to those interests which it affects, or if the benefits are not funded by the beneficiaries in a reasonable proportion to the benefits they receive or if the services provided are not viewed by those affected as reasonably designed to serve them. Producers of public goods, because they lack the rigor of a product market, may be too free to introduce producer efficiencies or other technically derived criteria for choice that do not correspond to consumer utility. The character of common properties and public goods, if understood, can suggest guidelines for combinations of public and quasi-public organizations that provide a more optimal "fit." Indeed, given the structure of American government and society, it is probably only through federated systems of organizations that optimal management of natural resources can be achieved. Organizations must be viewed as mechanisms for reducing the costs of decision-making. Relations between them must be viewed as incentive and consent building arrangements.

Before the analytical approaches of political economists can be successfully turned into strategies for change political feasibility must be explored. This can be illustrated by water resource development. A key feature of water projects are their initiation by local groups and orientation to local circumstances. Proponents and agencies carry a project proposal through the decision system seeking financial resources and consent typically to the federal level. Consent building emphasizes the Congress and its specialized committees. Mutual non-interference and notions of distributive justice characterize the process. The system is sensitive to conflict, particularly at the local level and at each level suspends progress in the face of conflict until conflict is apparently resolved at the next lowest level. Crisis such as flood or drought, technical analytics such as benefit-cost analysis, reimbursement provisions, multiple purposes and grouping projects all play a role in consent building. Conservationist and preservationist interests which cannot be accommodated by these means tend to be excluded by various devices.

But the local constituencies for potential water projects are changing -- urbanization is diversifying them. And the old basis for national consensus for local water projects is eroding. The increasing threat of escalating a local conflict into a national issue is adding new power to the growing effectiveness of environmental interest groups at the local level. These interests have long had more of a national than a local base. Mechanisms such as the environmental impact statements required under the National Environmental Protection Act add to the leverage of these interests. One result is the decline in Congressional rewards from conventional water projects.

New missions for old agencies is one focus of research that can be built upon an analytical foundation of the type sketched above. For example, large regional waste treatment and water quality enhancement systems would appear to be a likely and desirable "new product" for the U. S. Army Corps of Engineers. Control of pollution from land runoff would seem to be a natural reorientation of the Soil Conservation Service. In addition to the reformulation of the existing technical assistance and small watershed programs this may provide a basis for the addition of regulatory powers long ago sought for the local conservation districts associated with the Soil Conservation Service. The test of such strategy-oriented outputs of an investigation is only partly the analytics that lead to them. Acceptance is the larger test.

Introduction

In 1965 Emery Castle challenged economists interested in natural resources to view arrangements for decision-making as part of their field. [1.] More important than analytical techniques such as benefit-cost analysis which synthesize the market are institutional arrangements that can implement whatever problem analytics are available. He noted that it is not enough to reject the market in the management of natural resources, it must be replaced with something. His call was for institutional analytics that can suggest how to bring the political and administrative resources needed to make collective decisions into line with the social returns from those decisions. These analytics must not only tell us what arrangements we should have, but provide us with strategies for achieving them and suggest when to settle for second best.

Others have seen this need in the management of natural resources and in other contexts. There is a much richer reservoir of intellectual resources available than perhaps many suspect. Castle noted the work of Buchanan, Tullock and others. But the need for both adaptive and fundamental research is clear.

First, this paper will explore some of these intellectual resources. Rationalistic reasoning about political behavior in forms familiar to economists produces some interesting findings for the problems addressed by Castle and others in the natural resources arena. Some of this work is from the "public choice" school of political economists. It is the normative content of these findings that may be most helpful but they are not without insights helpful in explaining and predicting behavior. At the same time behavioristic and empirically oriented policy specialists among political scientists have developed approaches that both add to our means of understanding what is happening, and equally important, help us develop strategies for achieving change.

Second, a sketch of the application of some of these concepts will be made to the current situation for water resource development projects. The existing pattern of decision-making will be examined and some trends identified. Hopefully this will both provide an understanding of current policy and practice and suggest strategy for change. Two such changes -- one focusing upon the Corps of Engineers, another upon the Soil Conservation Service -- will be sketched for consideration as examples of the possible outputs from such research.

Public Choice -- The Political Economy of Public Administration

Castle, in his 1965 article, makes reference to the work of James Buchanan and Gordon Tullock. In their "calculus of consent" they explore through logical constructs familiar to economists, the normative basis for collective decision-making. They are among a group of political economists who, since the late 1950's, have sustained an attack on the conventional wisdom of public administration. Woodrow Wilson and those who came after him left us with a legacy of conventional wisdom that called for perfection in hierarchical ordering, preferably in a single bureaucracy, and with notions about authority, delegation of responsibility, and monopoly of jurisdiction, that have not always served us well. The high acceptance among students of natural resource problems of the notion of a single federal natural resources agency is a product of the Wilsonian tradition. The recent erosion of unanimous support for that principle may be a symptom of this intellectual attack on the conventional wisdom. The battle plan for this attack is summarized in a recent review article by Ostrom and Ostrom in The Public Administration Review. /8.7

Herbert Simon is cited as one who effectively argued against the likelihood that there was a single hierarchical ordering which would prove to be the best form of organization. While he called for empirical verification of the efficacy of alternative organizational forms, others have also explored various logical constructs for their usefulness in choosing and designing institutional arrangements. With assumptions of rationality, maximization, self-interest, and levels of risk and uncertainty, and something about the conditions under which decisions are to be made such as the nature of public goods and services, the basis for further reasoning is laid.

The reasoning which follows is not directed toward deciding what the state should do for the citizen with the analytics providing answers to what the citizenry would want if they were really able to express their preferences. Instead, the reasoning is directed towards identifying the character of decisions likely to be made under different kinds of arrangements, recognizing that decisions will be made by decision-makers under varying kinds of stress and pressure. The focus is upon which institutional arrangements the citizens would prefer if they were really able to express their preferences.

This difference is subtle but extremely important in the results. Concepts that underpin benefit-cost analysis and planning, programming and budgeting systems help make this point clearer. In these the analyst is assumed to know what the social objective function is. At very least, he is assumed to possess a process by which it can be revealed. In that way, knowing what the public interest is, the analyst then proceeds to produce analytics and make choices which optimize the utilization of resources relative to the outputs and value weights that he has identified. This is very much in the Wilsonian tradition of analysis. But those involved with B-C analysis and PPB for very long have probably noticed that the results they produce become so much more ammunition in a battle whose structure seems to be quite unrelated to the analytics that they have used. Special interests within and outside of government seize

upon or ignore results depending upon how they serve those interests. Thus, public choice analytics operate at a level where the introduction of a PPB program becomes one of the variables to be evaluated. For example, in some agencies the introduction of a PPB program has strengthened the hand of internal reformers and led to changes in program output that respond to new social needs. In others this has not happened. The issue for study becomes one of the effectiveness of introducing reform through the budget process rather than how the analytics of PPB should be performed.

Many economists, at the conceptual level, have viewed natural resource management as being a fairly simple substitution of public management for private at the enterprise level. The outputs are seen as mostly marketable and the costs as largely reflected by prices in input markets. The current environmental movement is demonstrating that this view of natural resource management is too narrow to survive without strong attack.^{4/} Public management of natural resources is not simply a question of overcoming problems of scale and natural monopoly. The concerns are very much with the creation or destruction of highly indivisible goods and services where potential customers cannot be easily excluded from the benefits or costs and where spillover effects or externalities are the order of the day. Viewing public agencies as substitutes for private firms in allocating resources is a start, but not enough. The view should be more of a federation of agencies, clientel groups and others affected, with the terms of the federation a critical element for study. In the words of Ostrom and Ostrom, "Public agencies are viewed as means for allocating decision-making capabilities in order to provide public goods and services responsive to the preferences of individuals in different social contexts."

The character of social preferences is certainly a question for study also. But rather than a guide to the choice of output directly, preferences are to be viewed as important data in the design of organizations which make decisions about what people want. For example, it is becoming clearer that the presumption of single peaked performance ordering and the working out of majority voting leads to less than optimal results in situations where single peakedness does not apply. Majority voting will reveal social preferences only if it is limited to a relatively homogeneous constituency. And what is an agency's constituency? And how does that constituency vote on its program? Of even greater interest is the response of the system to the development of new peaks in some kind of an n-dimensional preference space. These new preference peaks come on the scene with agency responsibilities and sense of territory already established. How does the system respond? It seems clear that a unitary organization, as opposed to a system of greater dispersal of authority and responsibility, may be less able to respond to changes in preferences.

The advent of new preference peaks almost assures that the old structure of organization will produce externalities, whatever its

^{4/} For an example of this view, see 7.7, and for an alternative that attempts a broader orientation, see 6.7.

starting form. It would seem that a representative individual who is rational and views the uncertainties of choice with understanding and insight would expect to get better results by having access to a number of different kinds of organizations capable of providing public service in response to a variety of changing "communities of interest." Problems of externalities may be more satisfactorily solved by devising overlapping jurisdictions where the local agency can respond to the bulk of a set of needs of a particular group while the larger jurisdiction accounts for the externalities that might be produced by the local entity. The problem of "producer bias" in the system calls for finding ways to cut the costs of "consumer" access. And it is not clear that this is made any easier by unifying the organizational structure.

It would seem that indeed the Wilsonian dicta for fewer and larger agencies, for more precisely articulated hierarchies, has been largely ignored in the American political process. A proliferation of governmental arrangements has responded to a multiplicity of interests. A realistic challenge is to design federated groupings of these units with arrangements that account for the externalities without losing the advantages of direct service to these many interests. As Ostrum and Ostrum suggest mechanisms for coordination, grants and aids in cost-sharing, interrelated systems of regulation between levels of government, use of the courts for judicial determination of issues, might be looked upon as ways of managing externality systems as well as resolving equity problems.

Model institutional arrangements probably cannot be designed well without a knowledge of the politics of the issues those institutes are to handle. Recognition must be given to the need for any agency to mobilize clientele support and that such support comes in many forms and at different levels. Every issue has its own kind of politics. Certainly no design could be implemented without such knowledge. The Wilsonian prescription that politics and administration should be separated must be reexamined. But even more to the point is the common presumption in our analytics that they in fact are separated. Is it reasonable to presume that administrators will be guided by the public interest when it is so hard to know what that interest is, or who represents it? A normative case probably can be made for agreement between the affected parties as an indication of optimality. On a behavioral level an effective level of agreement is obviously a prerequisite to adoption of an institutional design. Those dedicated to the applied aspects of their discipline must be responsive to need for agreement. An adaptation of one model for how consent is achieved in water resource development is sketched below.

The Politics of Water Resource Development

Who affects decisions and how? What rewards and penalties are offered for involvement? Where in the structure of public affairs are the key decision points? How are consent-building relations established? In sum, how does the decision process affect the content of public policy? These questions form a basis for studying the politics of an issue, and gaining insight into the opportunities for effective agreement

about institutional arrangements or other policy proposals. A recent study of the Colorado River Basin Bill by Ingram [5.7] suggests that answers to these questions explain more of the content of at least that piece of water policy than do answers to sets of questions drawn from traditional economics or engineering. Ingram's model needs only minor modification to serve as a general behavioral hypothesis for the recent politics of water resource development.

Water resource development has been, above all else, a locally based issue, springing perhaps from the diversity of local conditions and the localized nature of the effects of development. Of course, localism is a matter of degrees, not absolutes. Even national defense policy is influenced by local interests in the location of facilities. But initiation of the proposals and the general character of policy content is nationally oriented. Initiation of a water project proposal is typically by a few locally oriented activists. They may first encourage an agency to develop some general specifications of what the project might include. Or they may work to revive interest in a proposal that has been dormant in an agency's files. A recent local drought or flood may have sparked activity by increasing the receptivity of others to a proposal to do something. Agreement is sought on the "something" rather than the reasons why.

Even after some years and many dollars of basin plans the requirement by the system for expressions of vigorous local support seems about as strong as ever. Indeed the logic of economics and engineering applied to opportunities in a basin seem to provide only a crude screening at best. Virtually every basin plan either proposes specific early action plans that are several times the likely rate of investment or ducks the priority setting problem entirely. And for good reason. The final mix is subject to agreement by a much wider group and many more factors than we have learned how to include in formal basin planning activities. In particular, we have not learned how to link local support and Congressional decision points firmly into the formal basin planning process. A plan is a trial balloon, not a set of decisions. Agencies are not likely to commit themselves to projects selected largely on technical and economic criteria so long as local support is so crucial to the consent-building relations between themselves and the others with whom they share decisions.

The process starts focused upon the project in its local context and remains that way. Over the years procedures have developed to keep the unit of decision as the project and to emphasize these points in the decision structure where the locality has the most influence. Perhaps as a result, the traditional federal water development agencies (the Corps of Engineers, the Bureau of Reclamation, the Soil Conservation Service and the Tennessee Valley Authority) are highly decentralized. Substantial decision-making authority is vested in the region, district, or state level offices. Washington headquarters are at times more like representatives of the field units, particularly to the Congress and sometimes the President, than they are centers of command. The Congress with its obvious roots back to the locality becomes the focus for legitimation, rather than the President, in the search for financial and organizational resources to carry out the project. By

keeping the unit of decision as the project its identity with respect to Congressional districts is preserved. Certainly the Office of Management and Budget -- the President's major mechanism for agency control -- does prepare, with agency help, the basic list of new planning and construction starts for each year. While not insignificant, Congressional additions and deletions are the smaller part of the final program. But the point is that by maintaining project identity the pressures on the selection of the President's list are such that it does not deviate widely from what the Congress might have prepared if it initiated it.

Looking back over the last several decades the President and the Secretaries of the several departments have found it advantageous to minimize involvement in water development. Let the localities and the agencies work out their differences, first. The potential losses from controversy between localities override potential voter gains at the individual localities. Instead, the presidential view of water projects is more apt to be as a convenient and relatively low cost place to cut expenditures in tight years and as a way to reward key Congressmen for favors in other fields of policy. Congressmen, on the other hand, either see real voter advantages from direct participation, or at least the need to be involved to protect themselves locally.

Mutual accommodation between projects forms a major basis for a national program. While this is true of many federal programs, it may be more extreme in resource development and particularly water. Navigation and power benefits are enough of an exception to demonstrate the rule. Waterways and port facilities obviously link large sections of the country together. Those that operate upon these facilities tend to be firms of at least regional significance and can identify direct self-interest in the interdependencies between projects.

The same might be said for electric utilities where hydropower is a big factor in their power sources. System interconnections mean that interdependence extends beyond the hydrologic basin boundaries.

But where else has interdependence been a factor in the national acceptance of federal water development programs? Concern for national use of environmental quality values may provide such a focus in the future, but in the past acceptance has been based more upon the belief that water development projects produce regional development and upon the needs of inter-regional consent-building.

This is not to say that water projects have failed to serve nationally expressed goals. Flood control, development of farm land, outdoor recreation facilities, urban water supply are the substance of numerous and repeated statements of national policy. The point is that the strength for the national policies lies back at the locality and forces a different kind of behavior on the part of government than would be true otherwise.

It is, of course, the agencies that plan and carry out the individual projects. With their structure and discipline, traditions and rewards, they are the most obvious participants. Competing with other agencies and among themselves for budget, program and influence -- perhaps

as vigorously as comparable private corporations -- they must strive to accommodate those that support and those that oppose them. Coming as it does from a competition conditioned society, agency leadership is, and probably should be, charged first and foremost with agency survival. Rewards of promotion, recognition and support in future decisions go to those who effectively serve the long-run interests of the organization. In a well functioning democracy this should correspond with the long-run interests of those affected by the agency -- but that is for the normative portion of any analysis.^{5/}

As a result, agencies are concerned with local support if those who share in their decisions are concerned with local support. But, of course, their interests go much further. In self-protection, if for no other reason, they have an interest in technical competence. At some level of detail they gain substantially in winning acceptance from the integrity of the services they offer. Maintaining this integrity is important to the recruitment and retention of at least nominally qualified professionals. And the individual professions involved dictate some of the elements of acceptable performance. Other rules of the game are laid down in the process of consent-building with other participants. Engineers may have created benefit-cost analysis and economists may have toughened it by constant criticism, but it is probably the Congress that finds it the most useful. It provides a screening, cutting down the field of choice through an accepted device, very often in cases where some other factor, more painful to articulate, is also involved. Considerable resources and expertise are required to challenge a benefit-cost analysis.

Engineering and economic feasibility are the most explicitly developed rules of the game for the agencies. Financial feasibility is often cited and appears largely as a formal test of local support. Agreement to meet cost-sharing rules laid down for that class of project is a kind of equity test in showing willingness to carry the same burden others have been asked to carry. Failure to pass this test endangers mutual accommodation and gives competitors an advantage. Likewise, there are rules about the existence of a federal interest, particularly in flood protection and navigation projects that only benefit a small number of beneficiaries.

But perhaps above other rules of the game which the agencies are called upon for compliance, and with less in the way of formal guidelines, are the demonstration of high local support and "low" levels of controversy. Congressional hearings on the competing projects run for months and provide a severe test for both proponents and opponents. Projects potentially competing for either authorization or an appropriation number in the tens of hundreds. Those that can marshal supporters in Washington to demonstrate local need have the better chance of moving from study to authorization, to appropriation, to completion. Controversy or a loss of support is often adequate grounds for deferral -- allowing other projects to come first.

^{5/} A current project being led by Robert Kalter at Cornell is exploring information systems and their effect on planning. Part of the study is an exploration of this normative point. See [9.7].

Conflict easily overloads the decision mechanisms at higher levels. It is there that a relatively small number of people with strong veto power must process a large number of projects. Congressional committees, the Office of Management and Budget, the Secretaries' offices have a strong incentive to refer projects back to the field rather than to attempt resolution of conflict themselves.

Agencies respond to these realities in many ways. Multiple-purpose principles have not only served technical efficiency objectives but have also aided in the formation of local coalitions and in accommodation of potential objections. Since they control the major information gathering and analytical resources the agencies tend to put their efforts where the potential for agreement and support is the highest.

Extended technical reviews, the current interest in multiple-objective planning and in public participation programs all have some of their roots in this process of building consent. Each allows for the management of conflict at an early and in the long run a less threatening stage of project development. Early accommodation, if possible, is preferred. Demands by reviewers in the agency hierarchy for more refined technical data, on geology or hydrology as examples, may stem from the excesses of professionalism, but it may also be a defense mechanism by the specialist against expected attack. Explicit planning for environmental, regional and social well-being objectives as well as the traditional objective of national economic efficiency, may provide a measure of flexibility. If the recommended plan became untenable it is easier to shift.

A commonly cited problem is that of too many projects in the planning stage and a large backlog of authorized projects. Some \$15 billion worth of projects are authorized -- roughly ten times the annual rate of investment. An agency has a difficult management problem. Starting more planning efforts gives more scope for reallocation of effort away from those where conflict arises or support declines. But stretching out the planning and authorizing period increases the strain on local supporters. However, more completed project plans increases the pressure on the system to increase total funding. And a planning start is a form of reward and so is an authorization, neither are as good as a project under construction, but better for a Congressman and local activists than nothing at all. Hence, the tendency to start many projects into the planning phase seems well rooted in the incentives provided to the participants.

Conditions for Change in Water Development

A number of factors point toward change in the traditional water resource development process. Local constituencies are less homogeneous due to urbanization. The national consensus on water development -- its national constituency if you will -- has shifted, perhaps losing much of its effectiveness. Environmental interests while gaining nationally are also developing the capability, and thus the threat, of escalating local issues to a national level. The result is a decline of Congressional rewards for conventional projects.

Urbanization has done more than simply put traditional rural interests into an apparent numerical minority and thus raising the costs of achieving consent for traditional water development. The locally initiated development process may be shaken at its very roots. It has been sustained by an important offset to the costs of participation by local leadership. Local leaders work hard just to get their community's project undertaken for planning by an agency. They work through the whole process of reviews and decisions for the project to be finally authorized and, after more effort, included in the list of new starts for funding. Such effort does not begin to be rewarded by any likely resulting money income enhancement for these participants. Indeed too large a personal stake in the result reduces their credibility. They are rewarded by earning their own self esteem and that of their neighbors. But this route to esteem is under attack. Perhaps more important other ways to serve come with urbanization. The weakening of a national consensus about the value of water development may have a direct feedback on the local leadership reward structure. The result is a shift in the cost of decision-making.

Also to the point, the water planner, if he ever could, cannot now simply act as a technician to a simple, monolithic, local power structure which provided him with judgments as to goals and objectives. Agency planners, to sustain their programs, must at least act as brokers between groups with different values and goals. In the more highly fragmented situations someone must provide a very strong effort to mobilize support. With increasingly complex local interest structures, putting together that local coalition becomes increasingly difficult. More and more often the appeal of multiple purpose projects and offering more traditional project features in a local package are not enough to achieve agreement.

At the national level, waterway interests have represented an effective constituency for navigation projects, an almost exclusive function of the Corps of Engineers. But more important at the national level than group activity has been a climate of acceptance of federal water resource development projects as a legitimate means to achieve local growth objectives. Along with growing acceptance of arguments that navigation projects are less needed to keep railway rates in check other approaches to achieve regional development are finding favor. More recently the whole question of economic growth being good for a region has come under sharp questioning. "Growth is good" and "water brings it" are both still very much alive but under strong fire.

At one time power interests may also have provided a significant national base for project support. But almost all of the large cheap hydro power sites have been developed. Pump storage offers some attraction but is about as feasible alone as combined with other purposes. Power interests are more concerned about coal and atomic fueled plants.

Environmental groups have become a major national force, have created a climate of acceptance for environmental protection and have demonstrated effectiveness in escalating local conflicts into national issues. Whether the index is national polls or Congressmen's mail, public opinion has shifted. Pollution control and keeping stream beds and

dam sites in their natural state have become the beneficiaries of this shift to new consensus. Where full federal funding for certain flood control facilities was a possible shift in policy 30 years ago, it is now possible to stop a Cross-Florida Barge Canal when it is almost half completed. The threat of an environmental-development issue moving from the local level to the national arena is enough to affect the traditional process of project approval and funding at its very heart. This has been re-enforced by the Section 102 environmental impact statements under the National Environmental Protection Act and the functioning of the Federal Council of Environmental Quality.

New Missions for Old Agencies

What can we build upon an analytical base like that sketched out so far? We could review the likely consequences of various proposals for reform. That none will be panaceas for any given set of ills seems clear. Separation of basin planning from the agencies that do construction might change the balance of group access and lead to somewhat different accommodation between interests within the range of technical alternatives available. Consolidation of some of the federal agencies could work out advantageously to some interests some of the time and not in other cases. While changes seem to favor environmental interests over developmental interests currently, the net effect of a federal Department of Natural Resources is open to debate. Shifts in state activity and influence, various basin and regional federal-state arrangements, program authorizations and appropriations instead of on a project basis, revenue sharing, regional budgets and other informational devices, public participation, changes in interest group support by public agencies including the universities, multiple-objective planning, and facilitation of multiple means, are just some of the possibilities.

One approach is to view change from the point of view of the agency and ask what might it do that would respond to changing needs, that would take advantage of existing technical and political resources and have some chance of acceptance. Indeed, at this point in the analysis acceptance should be a major criterion. Recommendations that simply follow from normative notions are not enough. Who is better prepared than the analyst, after working through a study of relevant political and economic concepts and facts, to put forward trial balloons?

Newly perceived needs often suggest new agencies, but obviously also offer opportunities for old agencies to add to their social product. Old agencies have advantages of experience and organizational skills. It is not likely that these agency patterns will "fit" the new missions perfectly. And the effect of this fit on the way in which new missions will be carried out is of concern. The ability of the new arrangement to balance properly the interests involved would be a key consideration.

Established patterns of communication and behavior can be utilized for new activities, perhaps using far less energy and effort than would be required to set up a new organization. Or, perhaps more to the point, one agency may be able to expand its functions with small "start-up" costs

while another may be straining to organize itself for existing assignments. Such may be the case today for traditional resource development agencies as compared to existing environmental protection agencies.

This is not to suggest that new missions can be added effortlessly by "old" agencies (and their corresponding Congressional committees). Many people have a stake in the existing mix of activities and distribution of territory. This obviously applies to established clientele of both the "old" agency and any agency already in the field. New missions or just the uncertainty that accompanies them may threaten that stake. Funds for old functions may appear to be threatened, at least in the short run, even though the total agency budgets may rise. But this may be more than offset by built-in incentives in any organization to respond to opportunities for support and growth. These include the need to form coalitions for any significant decision and to find means of accommodation between the interests involved. A larger mix of missions offers more potential of facilitating accommodation and coalition building. Also within any agency -- particularly one that has run into problems expanding its traditional program -- there is likely to be a group of "young turks" who will see a new mission as a means for more rapid advancement. Without that new mission and the opportunities it affords, these "young turks" will go elsewhere.

The following proposals are offered as trial balloons. They are not closely reasoned from the base sketched out above. Rather they each pick out one incremental move of many recently made by the agencies and extends them, sometimes applying something akin to "engineering judgment" which agency planners find so useful to explain gaps in their analytics.

The Corps of Engineers and Regional Waste Treatment Systems

The Corps is recognized by friend and foe as an efficient manager of large construction projects. Regionalization of integrated waste management appears to have many advantages of economy and effectiveness. If regionalization is to be realized in many of our multi-jurisdictional urban areas, it will require competent hardware planning and follow-through by a federal agency. Some kind of partnership with state and regional agencies will probably be necessary to achieve an adequate level of agreement. Such a role for the Corps suggests itself in part because it appears to place such public works packages in the attractive position for the Congress that water development projects once held. It is also suggested by past success in building complex agreement packages involving many levels of government and many interests -- experience that should be partly transferable at least.

A review of the politics of pollution control suggests that little may be lost and something gained by such a new mission for this old agency. Construction grants for waste treatment facilities appear to be awarded through the states to local municipalities and their contractors on a basis that is reminiscent of old style water development politics. While environmental groups have given some support to the construction grant program their major attention has been directed to the standard setting and enforcement process -- as has been true of the

environmental protection agencies. A review of the recent increase in federal appropriations first from the \$200 million per year level to \$800 million, and now well over that, further suggests this interesting division in support. While environmental and general citizen groups worked for the increases, much of the "clout" came from organizations of local governments and their officials. And in terms of who pays attention to which city gets a treatment plant grant, the environmental groups are hardly involved by comparison.

In sum, the environmental groups have been instrumental in creating an attitude of public acceptance for waste treatment investments and they contribute to the pressure for such investments through regulation. But the allocation of such investments is largely left to a system that is only partly responsive to the internal priorities of water quality management. A recent U. S. General Accounting Office report portrays the results up to 1969 -- municipal treatment investments almost wholly lost in the effect of industrial wastes or the wastes of communities that have not acted. 3.7 It is not clear that any very significant change has been made in this pattern since 1969. Local governments and their officials may be willing, at least in some regions, to give up some of the advantages of the present grant program to gain greater effectiveness.

With the existing grant program providing a response to initiatives made at the most local level -- both politically and technically -- there is a case for the Corps to enter the system at the regional planning level. A start has been made with a modest series of feasibility studies that have emphasized innovative technical solutions in preference to the standard technology accepted by the existing grant structure. Not only are regional multi-municipal systems featured but considerable attention is given to opportunities for land disposal rather than direct discharges to waterways. Land disposal may in turn mean some stimulating of agricultural output. Rather than simply a treatment plant and some sewers the proffered solutions also involve maintaining open space and some continued economic impact beyond construction. The opportunity may exist for quite different incidence of real costs and returns, and more to the point these schemes may be an attractive reward for Congressional allocation which is inherently more effective in producing water quality results than the existing enforcement and grant programs alone.

If the Corps were now to fashion a construction program to implement these plans and to relate this in turn to some of its other activities it might be able to fashion program packages (which might even be called basin plans) that emphasized environmental values far more than is true today. It has had incentive in the past to include low flow augmentation and wildlife refuge area creation in its project packages. It has the means through the 1899 Refuse Act to relate monitoring and enforcement to its water quality construction planning to help make public treatment investments effective -- if it had the support and incentive necessary to do so. A waste treatment construction role might provide this support and incentive.

The Soil Conservation Service and Pollution from Land Runoff

Point sources of environmental degradation have received the lion's share of attention to date. In terms of decision-making costs, this has been a rational allocation of scarce management resources. But it seems clear that more diffused sources of nutrients and particulate matter are being pointed out as needing attention. Much remains to be understood about fertilizer leaching, animal wastes, silt movement, pesticides and other presumed pollutants from the land. Meanwhile the pressure of opinion and legislative response is building for some kind of tangible programs directed at these sources.

It might be noted that the early rhetoric associated with the SCS P.L. 566 small watershed program stressed water and silt management as a joint effort. Although difficult to enforce, land treatment plans are required above the dams and channels of a P.L. 566 project. The early emphasis was on saving the topsoil and prolonging the life of the downstream improvements. The emphasis today would be on maintenance of water and habitat quality.

The state of the art of land management, especially to relate instream standards to pollution from land runoff, may be less than fully developed.^{6/} And the inhouse grasp by SCS of what is available may be less than would be desirable. Nonetheless, here is an agency with county level technical staff-in-being that has a considerable grasp of the technology of runoff management. SCS has, like the Corps, made moves to exploit the opportunity. Agreements have been sought with the Department of Transportation to provide technical assistance on highway construction runoff problems. And for the traditional farm clientele groups it is developing capability to give advice on animal waste handling as well as the usual erosion control. Supportive of this trend could be current changes in the related cost-sharing and funding programs of the U.S.D.A.

Technical assistance and cost-sharing could go far toward ameliorating the land runoff problem, perhaps far enough. Many practices that lead to keeping silt from leaving the land are of course to some degree in the self-interest of the landowner. But concern is being shown for some form of regulation to add to what technical information and cost-sharing can achieve. Iowa and Maryland have adopted some forms of such regulation. Legislation is being considered in New York to give the Soil and Water Conservation Districts power to require plans and lay down standards that are in turn to be related somehow to instream water quality standards under the supervision of the State's Department of Environmental Conservation. It may be recalled that early efforts to develop erosion control through local districts attempted to include regulatory features. In general, such districts were not given such powers. Protecting the farmer from himself didn't seem worth it then; will protecting our waters (to whatever extent they can be) from land practices seem worth it now?

^{6/} For example, the interaction between silt from land, silt from stream banks, practices on the land and instream standards, is unclear.

Those local districts have some attractive features and some drawbacks as regulatory devices in addition to mechanisms for providing technical assistance and some cost-sharing. Rural local governments often lack administrative and political resources required to carry out regulatory solutions for such conflict problems. [2.] Regulation is characterized by bargaining between the regulator and those regulated. [4.] Effectiveness would seem to be related to the degree of understanding by those to be regulated of the linkages between their acts and perceived damages to others. In addition to such a basis for acceptance, technical expertise of the regulator, self-interest by those regulated and an effective clientele of beneficiaries from the regulation would also seem to be important. Access by the beneficiaries of regulation -- as is usually the case -- may not be deemed adequate in any proposed arrangements. But fish and game interests and environmental groups could, if not provided adequate access, prevent a stable regulatory situation from developing.

The fact that the U. S. Environmental Protection Agency and the Soil Conservation Service both deal with the same appropriations sub-committee in the House of Representatives, chaired by Jaime Whitten, should not be overlooked in the analysis.

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