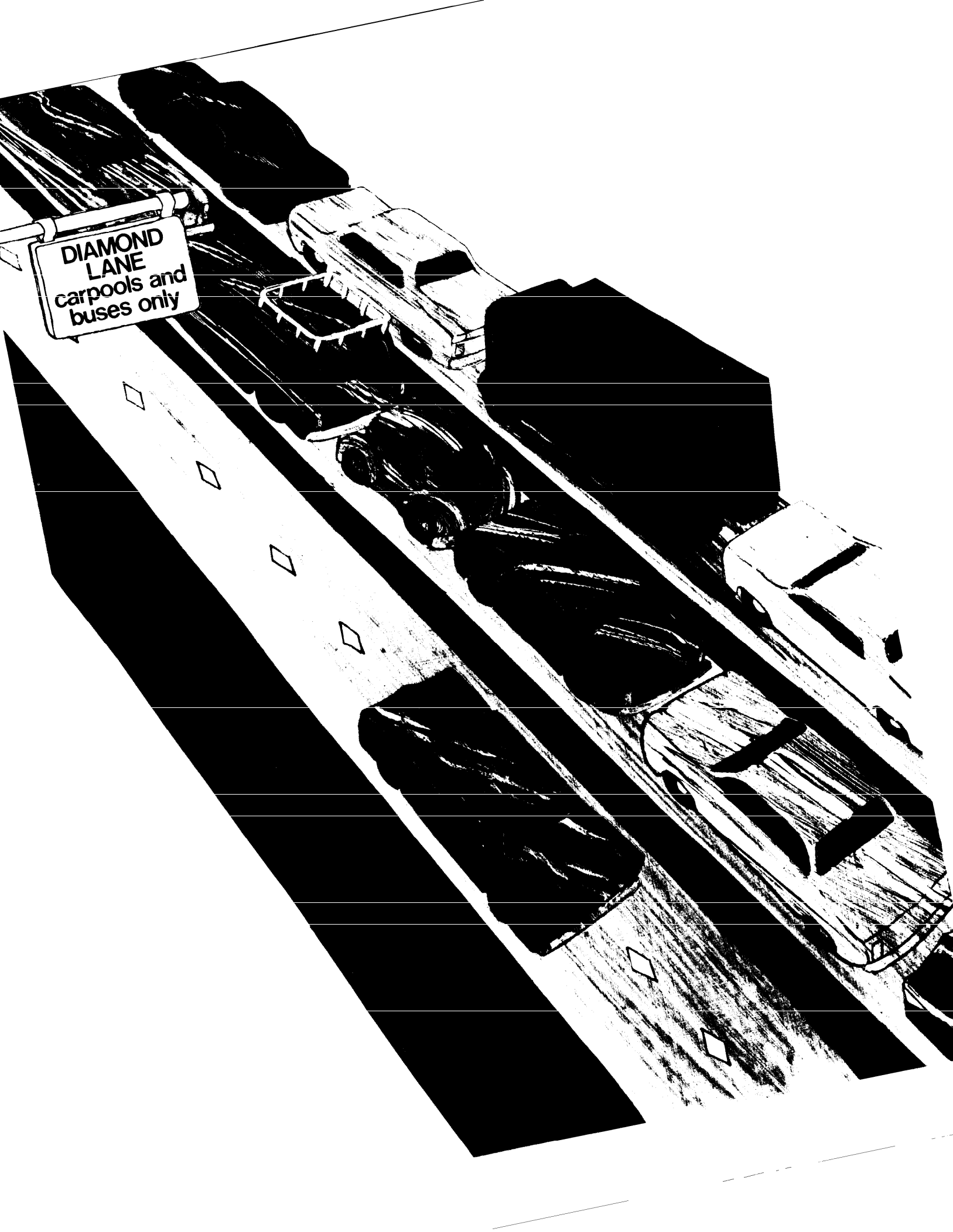


VI. Socioeconomic Research



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VI. Socioeconomic Research

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VI. Socioeconomic Research

INTRODUCTION

The Office of Research and Development (ORD) Plan is replete with references to needed socioeconomic research. It would seem beyond question that the value—indeed the necessity—of such research is clearly recognized and fully appreciated. In particular, the National Environmental Policy Act calls for interdisciplinary approaches combining the methods of the natural and social sciences and the design arts. Yet so little follows in the way of reasoned proposals and structured programs as to cast serious doubt on ORD's commitment to research in this area.

Interviews with ORD managers disclosed that socioeconomic research occupies a low priority because they perceive no explicit congressional mandate. This perception may account for some of the uncertainty ORD managers voice as to the proper focus and thrust of socioeconomic research as well as their lack of direction in formulating meaningful research questions or realizing fruitful applications in this area.

Environmental Management

Effective strategies of environmental management, combining both “non-structural/nontreatment” and technological approaches, demand far greater inputs from socioeconomic research than the ORD Plan provides. Problems of environmental management occur on all levels of governmental responsibility—multi-State and national as well as State and local. ORD's cir-

cumscribed outlook on this research area needs broadening to comprehend the full range of problems and possibilities, present and future. (Issue 1)

Methodological Requirements

Methodological developments across a broad front of socioeconomic research are needed to support ORD's progress in environmental management and other areas of concern. Nothing resembling such a programed effort appears in the Plan, however. A systematic and sustained program of methodological development is required if substantive problems of socioeconomic research are to be successfully analyzed and solved. (Issue 2)

Organizational Requirements

Socioeconomic research is scattered and fragmented throughout the Plan. Research in this area does not now exist on a sound organizational basis within ORD. A coherent and consistent organizational structure is needed to correct deficiencies in research policy, planning, management, coordination and utilization of socioeconomic research. Failure to commit organizational resources to socioeconomic research precludes significant progress in this area. A program of socioeconomic research that is organizationally distinct but functionally integrated with other ORD research activities seems essential. (Issue 3)

VI. Socioeconomic Research

ISSUES

ENVIRONMENTAL MANAGEMENT AND SOCIOECONOMIC RESEARCH

Issue 1

The Plan does not provide evidence of an adequate, substantive effort to integrate socioeconomic research into environmental management.

Summary

“Environmental management” has not been properly or fully conceptualized by ORD; consequently, the research proposed in this area is incomplete and insubstantial. This is especially true in respect to socioeconomic research which must form a major portion of the knowledge base required. The Plan is conspicuously weak in its disregard for research on relevant social behavior and social institutions. Nonstructural/nontreatment approaches to environmental management have not been analyzed and developed to any significant depth. Similarly, the effective combination of technological and nontechnological approaches to environmental management are not explored and treated to any considerable length. There is no appreciation indicated of the policy research dimensions and implications for the area; no guiding principles of environmental management research and practice are adduced and applied. Difficult institutional problems of implementation and enforcement persist amid preoccupations with marginal control technology and industrial process improvement. A realignment of research priorities from single-purpose abatement techniques to comprehensive environmental management seems justified. In ORD’s provision of planning assistance to State and

local managers, urban environmental management is a critical area that deserves greater research emphasis. Local concerns, including citizen involvement, should not preclude attention to environmental management issues at multi-State and national levels of concern, however. Environmental management as “crisis management” should be replaced by an anticipatory research function within ORD. Overall, an enlarged conception and heightened awareness of environmental management are needed, together with an expanded and intensified research effort. While immediate research payoffs can be expected, the longer term benefits of sound environmental management are of paramount importance.

Questions

1. Does ORD construe “environmental management” as a comprehensive process for the analysis of complex environmental systems and the coordination of activities impinging on them? If so, how is it proceeding to specify and conduct needed research on this level?
2. What level of effort and commitment of resources would be needed in support of a broad program of research on environmental management ?
3. Is a research program needed to extend planning assistance to larger (multi-State and national) geographical areas and governmental entities? If so, what plans are being formulated to achieve this research purpose, since no funds are identified with it in the Plan?
4. Does ORD view its Environmental Management Subprogram as primarily one of providing planning assistance for local management of pollution abatement programs? Is this restriction in scope a decision internal to EPA?

5. In view of the evident widespread need for planning assistance to local jurisdictions on environmental management problems, how is the low funding level—\$3 million per year over the next 5 years—justified?

6. To what extent has EPA established a working relationship of environmental management programs with local jurisdictions so that research conducted by ORD is applicable and useful? Were any formal means used to elicit suggestions from these local authorities to aid in formulation of the Plan?

7. What are the limitations of “hardware” solutions (i. e., control technologies) for achieving and maintaining environmental quality, and what are the roles in this regard of lifestyle changes and institutional restructurings (in energy conservation, transportation, urban design, and the like) ?

8. What attention is being paid to new urban design concepts and land-use plans and to the development and demonstration of decentralized technology, such as sewage and solid waste reuse and energy capture at the individual home or small community level, as approaches to environmental management?

9. What ORD efforts, planned or underway, would be likely to anticipate and adjust inconsistencies between national economic and environmental goals? What is the likelihood that future resource shortages in energy, food, and materials may result in pressure to relax environmental standards and regulations?

10. Considering the potential long-term effects of large-scale technology on the world’s ecosystems, what alternative management strategies can help insure future generations against severe penalties without economic disruption in the short term?

Background

The Concept of “Environmental Management”

In the language of the Plan, environmental management involves the use of “manage-

ment techniques that improve environmental quality through nonstructural and nontreatment methods, thereby reducing required capital costs (for example, change farming methods, institute profitable industrial process changes, and modify land-use patterns) (p. 9). Socioeconomic research would appear crucial to the successful application of such methods.

Besides nontechnological methods, environmental management is further said to employ “institutional approaches to implement technological options (e.g., improve regulatory approaches, provide economic incentives or sanctions). ” The effective use of such implementation strategies strongly implies a vigorous socioeconomic research effort in technology assessment and institutional analysis. A final description is that of “comprehensive approaches to integrating all environmental programs in an efficient manner * * *.” The principles for guiding program selection and integration reside in the national environmental policy enunciated by NEPA and similar legislation. To derive and apply these principles requires a further level of research effort, that of environmental policy research.

Given this broad construction of environmental management, the task for ORD research managers is to plan, organize, and conduct a program of ‘ ‘multimedia, multidisciplinary” research to engage the broad spectrum of environmental problems. In fact, however, ORD’s concept of environmental management is constricted and its effort deficient, especially in regard to socioeconomic research. It is this conceptual failure which perhaps accounts for EPA’s difficulty in formulating significant research questions and seeing relevant program applications.

Socioeconomic Research in Environmental Management

A conspicuous weakness in the Plan is its disregard for research on the social institutions and social behavior relevant to environmental management. For example, the ques-

tion of incentives needs to be approached in a more fundamental way. Presently, short-term profit incentives militate against energy and materials conservation and the substitution of low-impact materials and technologies. Traditional economic approaches discount the future more heavily than makes sense from the standpoint of the welfare of future generations. If the overall incentive structure is to promote environmental protection and enhancement, a better understanding of social behavior and social institutions will be required.

Technological Fix

In the absence of a larger conception of what environmental management research should be about, ORD's recourse is to focus narrowly on innovations in control technology and alterations in industrial process as the principal means to achieve environmental quality objectives. Despite occasional disclaimers, this "technological fix" attitude pervades the Plan. It is unfortunate that it should persist at a time when institutional constraints appear far the most persistent and problematic, and the environmental strategy which places chief reliance on technological solutions appears more and more doubtful of success. Transportation plans in particular have proved difficult to institute and implement. Institutional problems must be confronted and understood; the difficulties in nontechnological approaches are the reason for doing research on them, not for avoiding them. In terms of research payoff in the near term, it could even be argued that these are the most promising avenues. Even so, the longer term benefits of sound environmental management are likely to be the more important ones.

While the Plan acknowledges that socioeconomic and institutional methodologies are needed "to judge environmental management options and balance these options against competing national needs" (p. 2), a more accurate gauge of ORD's commitment is the less than 1 percent of its projected budget allotted to the Environmen-

tal Management Subprogram. A substantial diversion of research funds from single-purpose abatement techniques to comprehensive environmental management seems appropriate. This is not to imply, however, that simply elevating priorities and augmenting budgets will achieve the objectives of environmental management in the absence of a well-conceived and structured research program,

Planning Assistance

According to ORD's interpretation, the Environmental Management Subprogram is intended to provide "regional" environmental planners and managers with methods to determine feasible alternative solutions to specific environmental problems and to provide techniques for arriving at least-cost solutions to such problems. This is reasonable since the implementation of many environmental laws and regulations is left to State and local governments. Strategies to achieve specified environmental objectives are recognized by ORD as varied and complex, and their development as generally beyond the financial and technical capabilities of State and local authorities. Hence, the Environmental Management Subprogram is designed to provide the planning assistance to these authorities needed for implementing Federal environmental quality programs. The funding level of \$2-\$3 million per year allotted to the Environmental Management Subprogram appears inadequate, however.

Public Participation

The Plan makes scant provision for public involvement in environmental planning, design, decisionmaking, and management. Potential users of socioeconomic research are confined to "environmental planners and managers" without recognizing the public's role mandated by Public Law 92-500 and other legislation. While mention is made of the need to research ways of presenting various environmental management alternatives to the public (p. 98), research is also required into techniques of public involvement and the analysis and evaluation of environ-

mental perceptions and preferences held by different sectors of the public.

The Urban Environment

Of special concern are problems of environmental management in the urban environment. Continuing geographical concentration of human activity will tend to further exacerbate the interrelated environmental problems confronting urban planners and managers. Local officials are devoting increasing attention to land use, transportation, housing, and municipal services as key features of the urban environment. The need appears pressing for ORD to initiate a thoroughgoing investigation of how these options can be better managed to improve the quality of urban life.

Attention to problems of urban environmental management seems lacking in the ORD Plan. This is regrettable in light of the concentration of environmental problems that accompanies the concentration of urban populations.

Multi-State and National Levels of Environmental Management Concern

The emergence of major multi-State- and national-level environmental problems would seem to warrant a deliberate ORD research effort into alternative means by which their effective management can be undertaken. Illustrative of such emergent problems is the large-scale development of energy resources in the Western States, now under study by Office of Energy, Minerals, and Industry (OEMI). Such development could precipitate a series of interrelated, multi-State problems in water resource management, air and water pollution, and in the socioeconomic conditions associated with a population influx. This is one prime example of the need to begin looking toward ways in which complex and widespread environmental problems can be dealt with. Similarly, at the national level, competing needs of economic development

and environmental quality must be analyzed and reconciled. In both cases, a central feature of environmental management research should be to develop methodologies for incorporating socioeconomic factors into a comprehensive planning and management process.

Environmental Management as Crisis Management

Inadequate provision is made for developing the anticipatory research function necessary for effective environmental management systems. Events of a "crisis" nature are accumulating at an increasing rate, and it becomes increasingly difficult for managers to respond to these in a timely fashion. The "pollutant-of-the-month" syndrome is symptomatic of the failure to anticipate research needs. Frequently, ORD cannot respond effectively to short-term information requirements because the need for R&D was not anticipated or, if foreseen, not translated into an ongoing research program. Many important policy decisions need R&D results within days to months; such research therefore *must* be anticipated well in advance.

It is impossible, of course, to predict accurately the time and nature of all future environmental "crises." There are some emergent issues that clearly warrant ORD's attention, however. Significant technological and social changes are forecast as natural resources are depleted and concerns over environmental degradation increase. While it is said that "EPA's research must be both anticipatory as well as responsive" and that a reasonable balance must be struck between short- and long-term research "to meet future and emerging environmental policy," it remains that "this Plan does not * * * reflect a level of resources sufficient to fully perform all anticipatory research and development which would allow ORD to get a headstart on newly emerging problems * * *" (p. 14). But this is not only a matter of resource constraint within ORD. It is also a question of research leadership.

METHODOLOGICAL REQUIREMENTS FOR SOCIOECONOMIC RESEARCH

Issue 2

The Plan's frequent references to environmentally related socioeconomic research are not embodied in concrete proposals to develop and apply the requisite methodologies.

Summary

Methodological requirements for socioeconomic research are not matched by proposed methodological developments. Deficiencies in this area prevent the use of integrated approaches to environmental-impact assessment required by NEPA. Broad recognition of needed methodological research extends to environmental problem identification, formulation of environmental management alternatives, socioeconomic impact assessment and evaluation. But these are not connected by ORD in a general framework of environmental planning methodology. Attention should be focused on:

- (1) anticipatory research on technological and social trend forecasting;
- (2) policy research on competing national needs and their implications for environmental quality goals and strategies;
- (3) integrated assessment for combining technological and nontechnological approaches to environmental management and resource development;
- (4) research into a broad spectrum of socioeconomic impacts and their distribution;
- (5) institutional analysis for implementing and enforcing environmental management options for pollution control; and
- (6) evaluation research on the effectiveness of environmental policies and

programs and the utilization of socioeconomic research results.

Among many possible approaches to developing socioeconomic methodology, environmental modeling receives major attention. The experience with Strategic Environmental Assessment System (SEAS) raises questions about the utility of large-scale modeling approaches, however. Overall, the Plan does not confirm a strong ORD commitment to pursuing a systematic and sustained effort of methodological development. A comprehensive program is required if substantive problems in socioeconomic research are to be successfully analyzed and solved.

Questions

1. What difficulties are responsible for ORD's failure to provide a concrete program of research for methodological development in the socioeconomic area? How might such difficulties be resolved?
2. Why have research efforts toward more adequate whole-systems characterization and assessment been deemphasized when the need for better ways of dealing with whole systems (environment, resources, economy, social institutions, cultural patterns, etc.) is becoming more apparent?
3. In the absence of a comprehensive program of methodological research, how can substantive results be obtained on socioeconomic questions?
4. What is being done in a concrete way to implement anticipatory research ?
5. Is there a legitimate role for ORD in environmental policy research or is the need for policy analysis fully satisfied elsewhere in EPA (e.g., the Office of Planning and Management) ?
6. What steps are being taken to institute and implement an operational methodology of integrated assessment?
7. What actions are being taken or contemplated to expand the limited scope of previous effects research, particularly in regard to "welfare effects" and distributional studies?

8. What methodological developments are needed in the area of institutional analysis? What measures are proposed for realizing them?

9. In view of the massive public investment in environmental quality programs, why has no systematic program of evaluation research to test their effectiveness been developed? What are present plans for filling this research need and what is projected over the coming 5 years?

10. Reflecting on the experience with SEAS, what is now considered to be the utility of large-scale modeling as a methodological approach to socioeconomic research? What portions of the SEAS effort can be retained and further refined?

Background

Substantive analyses in environmental management and other areas of socioeconomic research require a wide variety of methodological developments. Since environmental management involves analyzing the systemic interrelations of diverse technological and nontechnological components in intermedia and interregional contexts, the Plan accordingly calls for development of "comprehensive systems analysis and evaluation methods" (p. 98). What work is actually being done or planned along these lines is not divulged, however, and no serious attempt is made to place such development within a general framework of environmental planning methodology. Similarly, while the interdisciplinary and integrative nature of ORD's research is duly stated (p.3), the Plan omits any discussion of means to effect the methodological integration of socioeconomic with other approaches. Hence, the unified approach prescribed in NEPA remains inoperative. The need for methodological development is recognized at numerous points in the Plan, but there is nothing that resembles a programed effort to meet it. The Plan fails especially to support the methodological requirements of socioeconomic research. Major discrepancies persist between the severe methodological demands of socioeconomic

research problems and the adequacy of analytic tools presently available to solve them.

Although not stated as a coherent research program, the Plan does imply methodological developments over a wide range of socioeconomic research needs. Typical are the following:

Problem identification.—"Methodological tools should be developed for assessing environmental problems * * *" (p. 9), including the anticipation of future problems.

Formulation of alternatives. --The development of alternative control technologies and management methods to effect environmental enhancement and restoration (p. 22).

Impact assessment. —Methodologies for assessing the socioeconomic impact of pollutants, including assessment of resource utilization (p. 43), and for predicting consequences of alternative pollution control strategies (p. 9).

Impact evaluation.—Methodologies for measuring the effectiveness of environmental controls (p. 9) and evaluating the total community costs and benefits of environmental programs (p. 100), including the relevant costs, risks, and benefits of feasible control options (p. 22).

Taking the Plan as a whole, a methodologically complete program of socioeconomic research would seem to require attention to at least the following six interrelated areas:

1. *Anticipatory research.* The Plan calls for research on the assessment of long-term probable trends in the production of renewable resources (p. 78), including trends in agricultural production such as "large-scale farming, conversion of marginal lands to cropland, chemical and energy-intensive practices and the likely increase in irrigation" (p. 68) and, in the area of alternative pest management, the need for "identifying emerging agronomic trends that can be made environmentally sound before coming into

general use" (p. 84). In the field of environmental management, the need is stated to make available "types of economic and environmental forecasting procedures" (p. 98). In addition, technological forecasting of both industrial and control technology seems necessary for achieving and preserving environmental quality standards over the coming decades. The identification and assessment of these social and technological trends demands a corresponding methodological development in the area of anticipatory research.

2. *Policy research.* Policy research should be directed toward the identification of environmental policy issues: What degree of environmental disruption constitutes a problem requiring public policy response and whether a particular environmental problem is better approached at national, State, or local levels; the formulation of environmental goals and policies as influenced by legislative, administrative, and legal actions; and the evaluation of socioeconomic costs and benefits of environmental policy implications across a broad spectrum of affected parties at interest. A key policy research question involves recognizing and resolving the "significant conflicts [that] may arise between energy development, production and use, community development and renewable resource activities" (p. 78), Maintaining goal consistency in the midst of "competing national needs" (p. 2) is a central issue that policy research must address.

3. *Integrated assessment.* As stated in the Plan, "Environmental, economic and social consequences of energy alternatives together must be used as a basis for EPA policies" (p. 138). But it is not apparent how this is to be approached methodologically. For instance, while it is stated that "Current scientific opinion and recent judicial proceeding indicate a need to evaluate the impact of pollutants on entire systems as well as individual species," the Plan cautions that "Unfortunately, satisfactory methods of such systems evaluation are still inadequate" (p. 43). The whole-system analyses required for environmental management have yet to be developed. Such assessments are vital to any *integrated* pro-

cedure that involves tradeoffs among economic, social, and environmental impact and between technological and non-technological factors. The methodology of technology assessment—which actually spans all six areas considered here—would be a prime candidate for assisting this development. In any event, further effort is required to derive benefit from the improved multimedia techniques called for in the Plan (p. 98).

4. *Effects research.* Continued support of "comprehensive environmental/socio-economic assessments" is cited as a basic research guideline for the Plan (p. 9). Indeed, needed research on social and economic impacts is widely noted in the contexts of alternative pollution control strategies (p. 9), renewable resources (p. 78), water quality (p. 79), pest management (p. 84), soil treatment systems (p. 88), advanced land monitoring systems (p. 108), and metropolitan development (p. 155), on levels of both community and regional impact. In light of its general applicability, social and economic impact assessment should correspondingly receive major research attention. Yet the Plan offers no real basis for predicting major advances in this vital area. Past research performance suggests a chief preoccupation with costs and not benefits, and with individual health effects to the exclusion of other "welfare" effects. Little added emphasis has been placed on distributional studies, almost totally neglected previously.

5. *Institutional analysis.* Institutional analysis is crucial to any strategy of environmental management. Environmental management effectiveness is determined by the capacity of institutions to implement environmental quality standards and by society's acceptance of their enforcement. Equally, the institutional impacts of environmental policy options must be included in any comprehensive program of "integrated assessment." While recognizing the importance of such considerations, the Plan gives no concrete suggestions on how research can accelerate methodological development in the area of institutional analysis.

6. *Evaluation research.* Evaluation research is needed to test both the effectiveness of socioeconomic research approaches and the usefulness of their results. Whether work completed and in progress is achieving established objectives is especially critical in the relatively ill -defined area of socioeconomic research. A second, and more central, question for evaluation research is not only whether socioeconomic research results are meeting user needs but also whether research applied in regulatory practice is achieving desired standards of environmental quality. In both these respects, a quality-control measure of research performance is required. A program of methodological development in this area should review and refine evaluation research methods now widely in practice and adapt them to the specific program needs of ORD.

One methodological approach in particular recurs throughout the Plan-environmental modeling. The socioeconomic research components of modeling approaches are noted in regard to predictive terrestrial ecosystem models (p. 55), comprehensive basin water quality models (p. 61), and energy development on a regional scale (p. 158). But it is in regard to SEAS that the major socioeconomic modeling effort has already taken place, and it is here that major questions of the suitability of large-scale models arise. While the Plan holds out the prospect of further development of SEAS "to support impact assessment of energy, environmental and recovery trade-offs and alternatives" (p. 115), the future of this modeling effort seems questionable.

ORGANIZATIONAL REQUIREMENTS FOR SOCIOECONOMIC RESEARCH

Issue 3

The existing organizational structure of ORD does not support the full development and proper use of socioeconomic research,

Summary

Nowhere in ORD is there a distinct organizational element concerned with socioeconomic research. The scattering of socioeconomic research throughout the Plan does not represent a clearly defined and well-managed research program. It is evident that a sound organizational base is lacking. A properly conducted program of socioeconomic research is needed both to avoid unnecessary duplication and to encourage positive developments. The need appears pressing for an organizationally distinct socioeconomic research function that is functionally integrated with all phases of ORD research activity. This need emerges at every stage in the research cycle: policy, planning, management, coordination, and use. Socioeconomic research has not been effectively brought to bear on EPA policy research needs; a closer relation of socioeconomic research to ORD policymaking seems needed. In research planning, no basis is found for determining socioeconomic research needs and for setting research priorities. The nature of the research task in the socioeconomic area has not been sufficiently well analyzed to delineate the necessary methodological developments and their substantive applications. Failure to commit organizational resources to socioeconomic research precludes making significant progress in this area. Research management is confounded by lack of established research objectives, and consequently of criteria and measures for gaging progress toward their attainment.

While some duplication of research effort is inevitable and even desirable, severe resource constraints necessitate full research coordination. There appears to be no systematic means for scanning relevant socioeconomic research and assimilating their results, however. Whether ORD is meeting the need for effective research use is not discernible from the Plan. Overall, it appears that many of ORD's failures in socioeconomic research are traceable to defective organization.

Questions

1. Are there sufficiently broad legislative

mandates for ORD to conduct needed socioeconomic research? Is there clear policy guidance for carrying out this research? If not, what steps are being taken to secure the necessary authorizations ?

2. What kinds of socioeconomic research should ORD sponsor to make regulatory procedures more effective?

3. How are socioeconomic research priorities determined within ORD? What is the basis for projecting future research needs in this area?

4. How has ORD's socioeconomic research program been affected by the recent reorganization, particularly the disbanding of the Washington Environmental Research Center (WERC) ? Have problems in the recruitment and retention of qualified researchers impeded the development of a more forceful program of socioeconomic research ?

5. How should socioeconomic research be organized to facilitate meeting the goals established by ORD?

6. How does socioeconomic research interact with other technical and scientific activities of ORD? Is there continuous interplay? Do they have reasonable physical access to each other to provide easy communication?

7. Do the EPA program offices have direct input into socioeconomic research? How are the results of such research brought into the regulatory process?

8. What steps should be taken to improve the use of socioeconomic research findings in regulatory practice?

9. What criteria should be applied in judging research performance in the socioeconomic area? What measures of research effectiveness should be used to determine how well these criteria are being met?

10. What is the most effective mechanism for achieving coordination with socioeconomic environmental research done by other Federal agencies and by private researchers and institutions? What is ORD

doing to improve coordination with other organizations involved in environmental R&D and to define jurisdictional responsibilities in areas of cooperative effort critical to socioeconomic research?

Background

Underlying the lack of a comprehensive program for methodological development is a more fundamental issue: the need to conceive and structure a broad organizational process for supporting and conducting socioeconomic research. Aspects of such a process will be considered under the topics of research organization, policy, planning, management, coordination, and use.

Research Organization: While mentioned in almost all sections of the Plan, socioeconomic research is accorded only piecemeal treatment. Nowhere is it brought to a sharp focus as regards research policy, planning, management, coordination, and utilization of results. Identifiable socioeconomic research in the Plan is loosely divided between Office of Health and Ecological Effects, in respect to health and other welfare effects; Office of Air, Land, and Water Use (OALWU), in respect to nontechnological elements in its Environmental Management Subprogram; Office of Energy, Minerals, and Industry, in respect to the socioeconomic aspects of "integrated assessment"; and Office of Monitoring and Technical Support (OMTS), in respect to the SEAS modeling effort. In all these the organizational context for socioeconomic research appears precarious at best,

The prevailing organizational climate for socioeconomic research in ORD is scarcely conducive to its full development and proper use. The scattering of socioeconomic research interests and efforts throughout the Plan does not represent a clearly defined and well-managed research agenda. A properly **organized** and conducted program of socioeconomic research is needed both to avoid unnecessary duplication and to encourage positive developments. Organizational effectiveness does not of itself guarantee research effectiveness, of course. It may,

however, be a necessary condition. An organizationally separate socioeconomic research function within ORD appears necessary. At the same time, there is a counterpart need for the functional integration of such research in all phases of ORD research activity.

Research Policy: While the existing mechanisms for research policy formation are not clearly delineated in this Plan, they seem to operate to inhibit the conception and execution of a coherent and consistent program of socioeconomic research. More positive contact between research in this area and ORD policymaking appears highly desirable. There is need for high-level representation of socioeconomic research interests in ORD. The presence on the Science Advisory Board of senior members with direct experience in conducting as well as managing socioeconomic research would be a constructive first step.

Research Planning: The Plan offers no basis for determining socioeconomic research and for setting research priorities. This condition implies a lack of integration in ORD research planning rather than the "interconnected system of research pursuits" called for in the Plan (p. 20). Hence, there is no way of predicting at what stage of development socioeconomic research should be in 5 years, and no basis for planning its development in as orderly a fashion as the research function permits. The nature of the research task in the socioeconomic area has not been sufficiently well analyzed to delineate the necessary methodological developments and their substantive applications. Failure to commit organizational resources to such a plan of development virtually precludes its accomplishment.

Research Management : Because socioeconomic research appears in so fragmented a condition throughout the Plan, no clear-cut accountability for its performance can be assigned. The lack of organizational focus for this research area would appear to undermine the ability of research management to function smoothly. Because of indefinite research objectives, moreover, it is difficult to apply criteria and measures of research performance to gauge how well those objectives are being met and to schedule work and allocate resources for their accomplishment.

Research Coordination: "While EPA is clearly mandated to be the lead Agency in environmental R&D, the missions of other federal agencies necessitate environmental R&D. Therefore, EPA has the responsibility to make sure that environmental R&D capabilities in other agencies are not unnecessarily duplicated but are recognized and utilized as efficiently as possible" (p. 144). There appears to be no systematic means for scanning this research and assimilating its results, however. Besides coordination of research outside EPA, a similar problem arises within ORD because of the scattered condition of socioeconomic research.

Research Use: In socioeconomic research as in other areas, the payoff from research comes in its actual use. Prospective users are found in EPA program offices, in municipal and State environmental agencies, and in the offices of ORD itself. Users within ORD are directly affected insofar as integrated assessment and other comprehensive methodologies are involved. How well ORD is meeting the requirement of effective research use cannot be determined from the Plan. How ORD intends to improve its performance in this final research task is likewise uncertain.