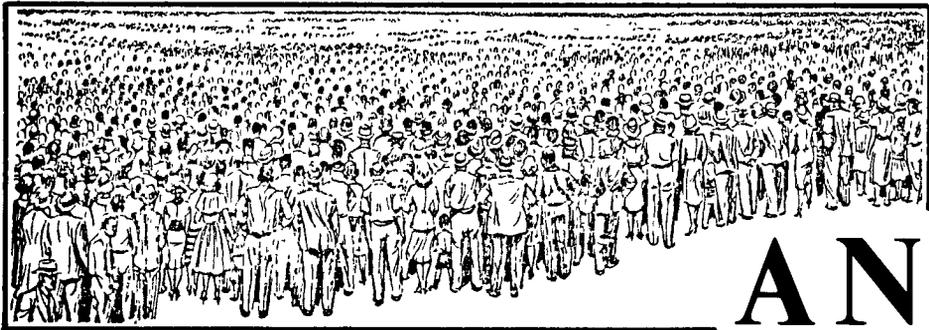


# SOCIAL IMPACT ASSESSMENT



# AN OVERVIEW

A REPORT SUBMITTED TO:  
THE U.S. ARMY ENGINEERS  
INSTITUTE FOR WATER RESOURCES  
KINGMAN BUILDING  
FORT BELVOIR, VIRGINIA 22060



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DECEMBER 1975

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A Report Submitted to the:

U.S. ARMY ENGINEER INSTITUTE FOR WATER RESOURCES  
Kingman Building  
Fort Belvoir, Virginia 22060

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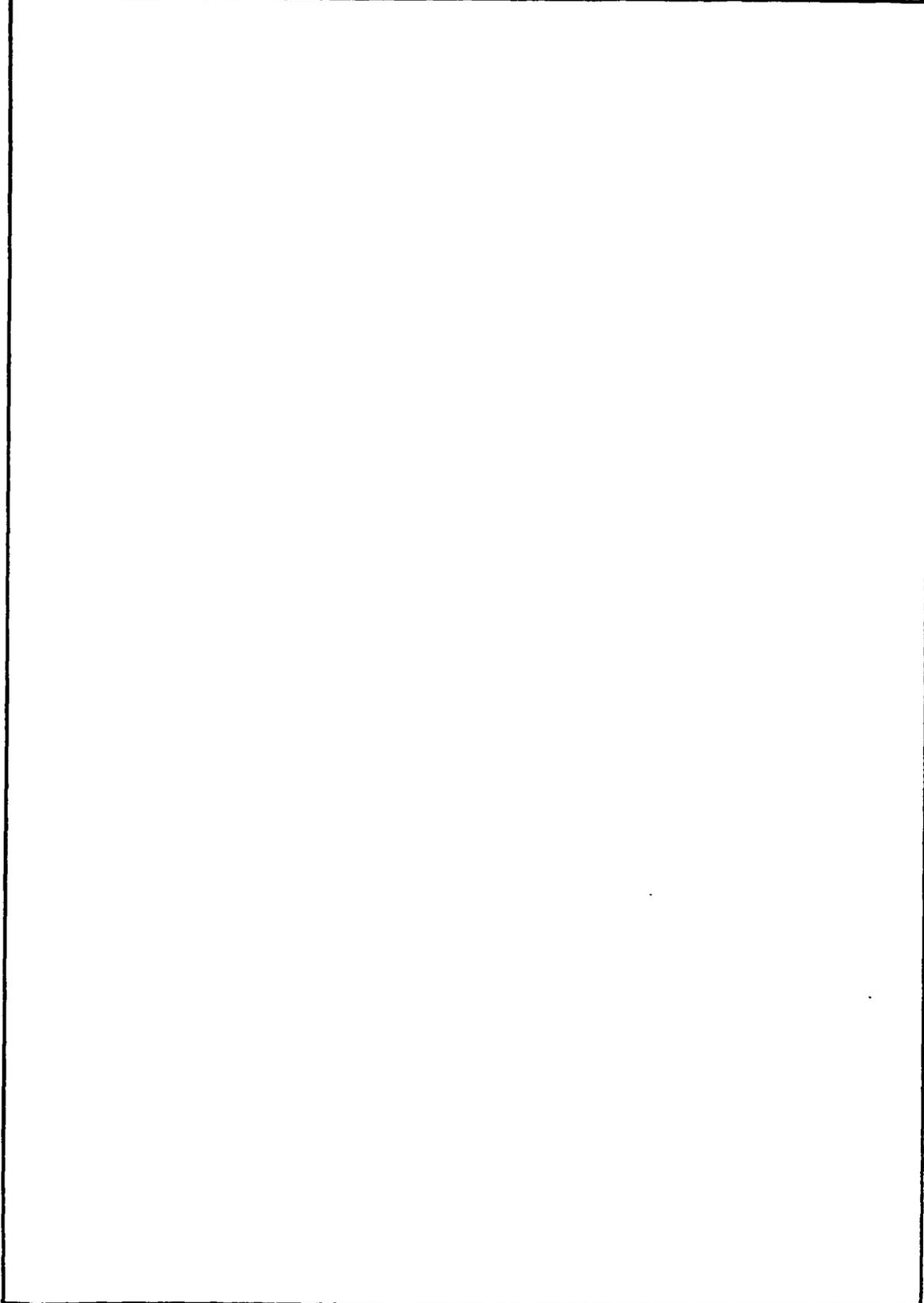
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## PREFACE

As indicated by the title, this document is a first response of a team of social scientists to the continuous challenge of providing an appropriate social sciences framework in the challenging effort of impact assessment by the Corps of Engineers. By assembling a group of diverse social scientists, the intended outcome was a general discussion of issues and concerns on social aspects of the assessment process and the specification of major strategies and techniques in answering continuing questions as to methodologies suited to the evaluation of water resources projects.

In view of the large and increasing literature on SIA and of the continuous efforts of the Corps, it would be presumptuous to present -- with limited time and effort -- a comprehensive compendium and specific guidelines for conducting the assessment process. What is intended here is a flexible general framework for delineating persistent problems and issues in social impact assessment. However, an effort has been made to include some form of specificity by using some relevant examples.

The key point and major argument of this document needs to be underlined in the beginning: in view of the state-of-the-art and because of the major disagreements separating social scientists, it is impossible to arrive through consensus to agreed upon definitions, specific variables, particular social indicators, and largely shared techniques for conducting social impact assessment. Yet, the group has at least achieved consensus as to the need for a variety of perspectives, with an implicit sensitivity for approaching problems of project assessment through diversified approaches. At the same time, there runs throughout the text an explicit call to obtain inputs not only from above, but also through public participation from below. Legal guidelines and inputs from proper authorities, from the public affected and from a wide spectrum of disciplines can make possible the articulation and achievement of such broad goals as to enrichment of the quality of life, the perpetuation of social cohesion, and the economic and social enhancement of communities.

This document is to be read as part of a continuing effort to provide both specificity and generalizability relative to the questions of social impact assessment. The problem of social impact assessment is elusive, the language by necessity is often obscure, the argument occasionally torturous, and the conclusions rather evasive. This should not be seen as a weakness of the social sciences in providing the rigid and precise answers expected from any "science." The current status of social impact assessment reveals not only these limitations, but it also offers an opportunity and a flexibility for being more sensitive to the demands of a given situation and to the variety of problems encountered when public projects disrupt the normal flow of daily life.

The substance of this document is to present a general conceptual model for conducting social impact assessments. It is a first attempt to present in a coherent framework the assumptions, priorities, methodological strategies

and techniques, procedures of data collection, organization and analysis of the social impact assessment to the entire project assessment process. In essence, the following document is intended to be a pragmatic response to the field planner in conceptualizing, conducting and assessing the social impact of Corps projects.

There are many ways of proceeding with the analytic requirements of each SIA step. The sequence of this document runs more or less parallel to that outlined in Section 122 Guidelines, i.e., profiling, projecting, assessing, evaluating. Such a sequence must be seen in the context of the particular argument. Thus, the present document has modified in some respects the emphasis in assessment sequence, by more in-depth elaboration of theoretical and conceptual issues. The congruence of the steps in Section 122 Guidelines and the present discussion can be seen in the juxtapositions of Figure 1. The SIA overview in this figure relates in brief form the steps of the assessment process, central methodological strategies, intended output, and reference to pertinent sections throughout the present document. Although mitigating circumstances and decision-making are included in this figure, there is no attempt at further discussion in the following text.

The present argument revolves around five major parts that are briefly presented here as indicative of the general philosophy and thrust of the social guidelines.

## 1. Introduction

A first step in the development of social impact guidelines is the construction of a general conceptual scheme and approach to the basic processes that may be involved, in what is a very complex and largely uncharted field. The social sciences have a variety of general, often contending, "theories" about the nature of social systems. Thus, much of the conceptual work that anyone can offer is of a sensitizing rather than operational nature. Economic and demographic data, for example, can be specified quite exactly, but the psychological, cultural and social causes of this data can often only be roughly and indirectly indicated.

Fundamental to any attempt to understand the impact of a phenomenon on social life is to realize what assumptions, beliefs, and values individuals or groups bring to bear in comprehending the social world in which they live. These frames of reference provide individuals with a structure for thinking about and a meaning system for attaching values to people, places, or things. It is, indeed, well-understood that groups with different backgrounds and experience view the world with different frames of reference, and are often unaware of the differences. The planning and impact assessment staff has to make an explicit effort to take into account its own frames of reference and how they contrast with those of the affected publics.

FIGURE 1 -- Social Impact Assessment Overview

Steps	Key Methodological Approach	Output or Desired Emphasis	Pertinent Report Sections	
<i>Profiling</i>	Critical variables	<ul style="list-style-type: none"> <li>- Presentation of general model</li> <li>- Data structuring</li> <li>- Major interrelationships</li> </ul>	1.1 2.1 2.2	2.3 2.4
<i>Projecting</i>	Forecasting	<ul style="list-style-type: none"> <li>- Generation of alternatives</li> <li>- Potential futures</li> </ul>	3.5	
<i>Impact Assessment</i>	Social Indicators	<ul style="list-style-type: none"> <li>- Description of significant impacts</li> <li>- Delineation of irreversible effects</li> </ul>	3.0 3.1	3.2 3.3
<i>Evaluation</i>	Measurement Scales and Models	<ul style="list-style-type: none"> <li>- Evaluation and display of impacts</li> <li>- Analysis of long-range consequences</li> <li>- Reformulation of alternatives</li> <li>- Consistent sets of scenarios</li> </ul>	3.4 4.1 4.2	
<i>Mitigation</i>	"Optimization" and "Suboptimization"	<ul style="list-style-type: none"> <li>- Explication of constraints</li> <li>- Compensatory measures</li> <li>- Design modifications</li> <li>- Alleviation of adverse effects</li> </ul>		
<i>Decision-making</i>	Decision Models	<ul style="list-style-type: none"> <li>- Decision outcomes</li> <li>- Quantification of judgements</li> <li>- Dealing with complexity</li> <li>- Basis for implementation</li> </ul>		

III

Cultural and political diversities in values, interests, ideology, and power or influence are an intimate part of the social reality surrounding project planning and impact assessment. In maintaining sensitivity to these many facets of the situation as perceived by the Corps planners, it is important to determine how the viewpoints of the various parties to a project are affected by and in turn affect the course of the project. The field planner can be alert to issues which may present difficulties to the Corps or the public and can use this knowledge to facilitate discussion of key issues.

Finally, the document emphasizes that any social model must be treated as tentative. Predicted impacts are always subject to updating and reevaluation. Better assessment models and procedures will only develop on the basis of accumulated attempts and continual refinement -- often of a trial and error nature.

## 2. Human Community ["Profiling"]

The term "human community" as the central concern in SIA has multiple definitions. In the broadest sense it refers to groupings of individuals with some interrelatedness and interdependence that can be defined along a multidimensional continuum from small, homogeneous and cohesive groupings living and working together in the same place, to large, heterogeneous clusterings, be they metropolitan, state, or even regional. Three aspects of human community are elaborated in the text: the ecological, structural, and cultural-phenomenological.

Having identified the potential community(ies), the suggested community profile variables may be seen as the major "state variables" defining the current state of the relevant social system. Depending on the project under consideration, the relevant field professionals must decide which sets of variables should be initially selected for data analysis. Given important variables defining the impacted social systems, a model of how these tend to be interrelated (often in complex and non-linear manner) should be drawn up.

Two different approaches characterize this process. The deductive starts with a general model of social reality, appropriate profiling, and development of pertinent indicators. The inductive approach, on the other hand, although starting with some broad visions about the world around us, concentrates first on the identification of critical variables, structured into a model, assessed and evaluated through pertinent indicators. Some social scientists think that categories established prior to data collection introduce a bias which causes data to be forced into artificial categories. These social scientists argue that data will fall into "natural" categories if the researcher proceeds without preconceived notions of how data should aggregate.

The goal of a predictive model is the set of relevant quality of life variables and related indicators, not the many intervening variables that may be involved. These variables and indicators should be specified. However, social impacts are mediated by individuals as members of socio-cultural groups, through which the attitudes, values, and definitions of their situations are generated and maintained. The planner must be sensitive to these changeable community responses.

### 3. Methods - Analysis

Procedures and techniques for the collection, organization, display and analysis of data relevant to social impact assessments are discussed in this section. Basic questions such as when to collect what kind of data, what techniques are most appropriate, what sources of data to use, what analyses are most appropriate, and how these activities can be integrated to help understand and evaluate the community with and without the proposed project are discussed.

A very important issue in this section is the problem of data distortion and errors in inferences. Social data collection is especially subject to distortions which may not be easily recognized as such due to frames of reference and sociocultural conditioning of which the researcher is unaware. Social data gathered for impact assessment need to be organized and easily accessible. This involves standardization and indexing. Despite this, the validity and reliability of social data collected remain a vexing problem.

Social impact assessment requires also the construction of criteria or indices of quality of life or social well-being, and these are especially subject to a number of limitations and distortions. Quality of life data imply a set of reference values, which differ for different subgroups. Thus, the reference set used in particular cases must be specified.

Finally, social impact assessment involves prediction of possible effects and an evaluation of long-range consequences. Both of these requirements -- prediction and evaluation -- pose difficult problems for which there are presently no generally accepted solutions. The social methodology involved is only in its infancy and only simple projections or extrapolations over a few years are justified. Thus, it is essential that highly experienced social scientists familiar with the areas under study undertake the predictions and evaluations. However, as a general introduction to the area of forecasting, procedures and techniques are also briefly discussed.

### 4. Assessment and Evaluation

This section discusses the sociopolitical process of assessing and evaluating various project impacts and the limitation and constraints of the kinds of data collected. It concludes by relating social impact

assessment to the broader processes of environmental and economic assessments.

The process of evaluating the social impact of a project is essentially the process of making value judgments about the kind, degree, intensity, and duration of its effects. All parties do not perceive these in the same way. The Corps, as well as the others involved in a project, see the social impacts from their own vantage points. Thus, it is to be expected that divergent groups may see the social impact of a project differently.

The "valuative" character of this phase makes also imperative a high level of systematic and extensive citizen participation in the planning and assessment of projects in order:

- to identify goals against which alternative plans may be assessed;
- to identify points of conflict so that an equitable distribution of values and costs may be ascertained;
- to provide necessary information about perceived as well as anticipated impacts;
- to solicit the widespread community support needed for the success of the project.

However, some set of ranked goals and values must be used as a baseline for judgment, the planner must make explicit those that his group is using. A good set of impact data expressed in terms of quality of life indicators may pretty much speak for themselves, or provide a clear basis for evaluation by the groups involved through the political process. To this extent, the final decisions may be lifted from the Corps' shoulders.

##### 5. Management - Operations

In the final part of the guidelines a general discussion of the world of social scientists and its relationship to the perspective and work of engineers and planners takes place. These professional viewpoints need to be understood by the individuals involved in social impact assessment. It is especially important to know what social scientists are needed for a project and what kind of social science information is most appropriate for the project. This section concludes with some remarks concerning how these viewpoints can be integrated into the entire impact assessment process. Some recommendations are given about current attempts by the Corps in refining and applying principles of social impact assessment.

## INTRODUCTION

### 1.1 General Premises

It would be a truism to repeat that concern with the "environment" has become a key preoccupation in many disciplines. Vast amounts of writing, research, concern and legislation are describing ramifications of man's actions on his ecosystem and problems resulting from the spillovers of technological advancements. However, the general social concern with the despoliation of the environment and the threat to survival has not remained abstract, but it has become part of legal and social policies designed to protect our surroundings. The cornerstone of such legal protection is the National Environmental Policy Act of 1969, which has also become a federal document of immense consequence for encouraging interdisciplinary coordination.

NEPA may be used to exemplify the shift in concern over an appropriate and careful consideration of all environmental aspects of proposed technological actions. Such an act was made possible because negative effects of a variety of public projects has become more visible, the concern over the high momentum and the fast pace of technological change has become widespread. There has also been a pervasive feeling that each person is only a secondary part to decisions about the exploitation of resources. The present market forces did not seem to be satisfactory in allocating secondary costs, and the legal system seems to be relatively ineffective in coping with technological damages. The seventies, following the environmental fervor of the late sixties, are shaping major environmental legislation concerned with comprehensive planning.

A new comprehensive future-oriented approach has come about according to Toffler in his "Future Shock" as a reaction to three basic characteristics of planning in industrial nations:

- a. obsession with economics to the exclusion of other concerns;
- b. a time bias that regards five years as a "long-range";
- c. the elitist character of planning that removes decision from the ordinary citizen and hands it over to remote experts and bureaucrats.

What makes the discussion of environment and holistic planning more urgent today is a general agreement that major environmental problems seem to threaten the very existence of humanity. In this respect, social scientists may help delineate social and cultural conditions, which give rise to environmental problems as well as to propose solutions. Since harmful effects of technology seem to constitute the essence of the "environmental problems", our approach centers around the notion that any public project or major program requires the answer to three crucial and interrelated questions:

1. How do we balance, in an equitable manner, costs and benefits involved in the alteration of the surrounding environments?
2. How do we make appropriate changes and transitions to new states without unacceptable disruptions to all systems?
3. How do we measure in a valid, reliable, and comparable manner impacts and, therefore, provide guidance for alternative planning options?

In every activity, public project, technological innovation, or program implementation that involves the commitment of significant amounts of natural and human resources, we need to examine closer what effects, in addition to ecological or economic ramifications, may befall the social structure of given communities or social groups.

In many recent reports, government directives, legislative requirements, analytical works, and other documents, explicitly or implicitly, reference is made to three conditions necessary for an appropriate response to environmental challenges:

- a. Efficiency, or growth in material development so that a solid base of economic sufficiency can be maintained.
- b. Equity, or fair access of resources and consumption to different segments of the population.
- c. Effectiveness, or the overall significance of any project or policy vis-a-vis the pursuing of certain larger social goals.

What these conditions imply is a balanced natural resource policy that recognizes the social needs of the citizens as well as larger long-range objectives of communities and the nation.

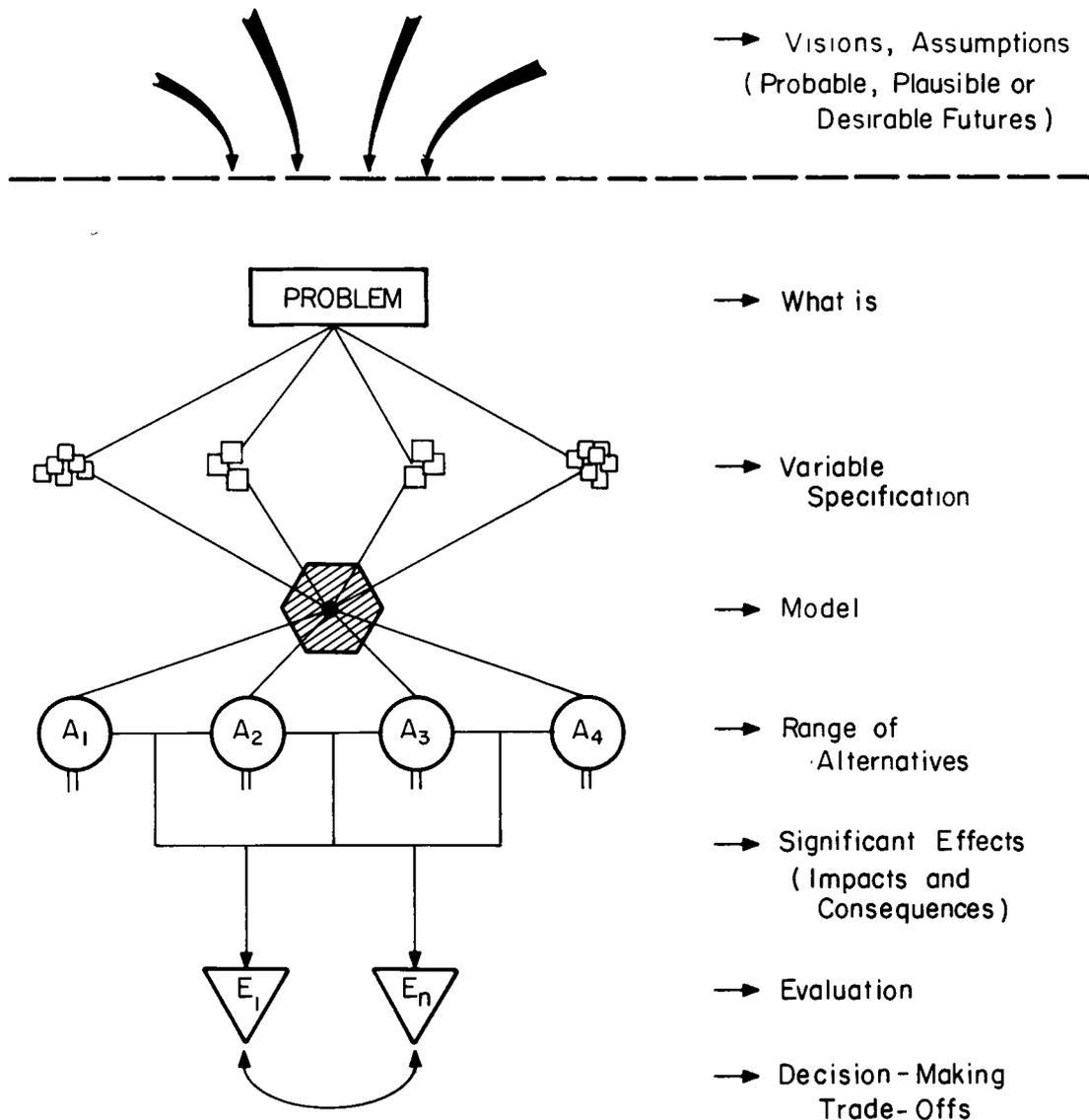
Since the focus of the present work is not an analysis of EIS or NEPA but the specific requirements of 122 Guidelines, we do not intend to repeat the discussions on the broader environmental impact statement or its legal and methodological requirements. Instead, this document focuses explicitly on the social impact components of the total Corps planning process. In general, however, for the social scientist, the problems are similar to those in other disciplines: an adequate description of ambient conditions, proper analysis of all possible impacts, and, finally, presentation of all reasonable alternatives for a proposed action. Yet, further problems arise when we try to combine essentially non-comparable items, such as the cost of the project, the social desirability of the proposed action and the intensity of impacts in some composite measure.

Environmental impact analysis often challenges sacred assumptions and the inertia of traditional approaches. Intense self-criticism, questioning of presumed objectives, and participatory planning become not only a noble cry but a requirement of integrated planning and assessment procedures. More than anything else, recent developments point to the need of articulating a vision about society and life and a basis for elaborating desired future goals which has so far been avoided in traditional planning.

In most documents anything which focuses on people is deemed a "social impact." Social impact assessment can be broadly understood as an appraisal of short- and long-range consequences of technological change on affected human communities. The interpretation of NEPA and of related documents leads, then, to the following general outline of the social impact assessment procedure:

1. Definition of the problem or felt need that suggests a particular project.
2. Determination of the impacted communities.
3. Modeling of impacted communities in terms of profile variables and relationships between them.
4. Projection of possible impacts over selected time period.
5. Projection of community model without the project over the same period.
6. Assessment of net community changes probably due to the project, with comparison of alternative versions of the project.
7. Evaluation of various impacts in terms of benefits and liabilities for different community groups.

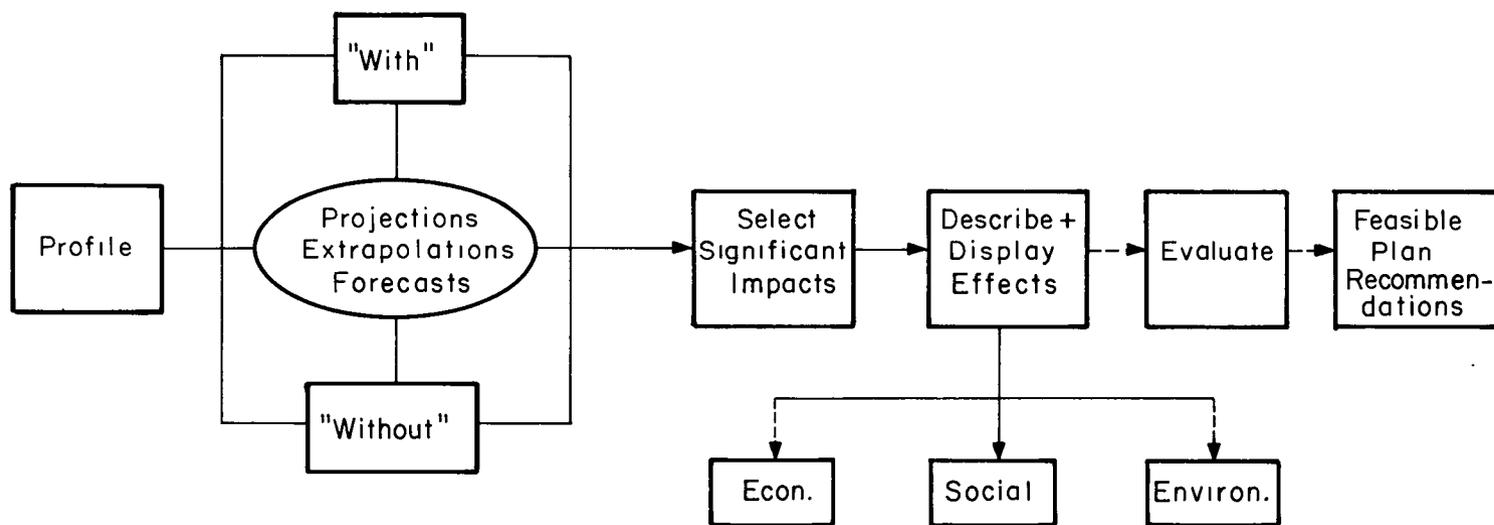
The recent environmental legislation has also made it imperative to study the integration of social sciences with natural sciences, the estimation of social costs, the effects of public projects on communities, and the social policy alternatives concerning various technological changes. In this spirit the overall approach of the present document, in conjunction with the SIA overview suggested in Figure 1, can be summarized in a descriptive diagram that shows the major areas of concern with both the letter and the spirit of NEPA and similar documents or guidelines that exemplify efforts of assessment through systematic problem solving (Figure 2). The specific derivative of this basic framework of problem solving and assessment is summary Figure 3, which exemplifies the major steps included in the 122 Guidelines. The congruence between these two schemes (and many similar efforts) underlines also the common thread and steps of all assessment efforts, namely profiling, projecting, assessing and evaluating. Before proceeding, however, with a more careful analysis of such steps (elaborated in Section 2.1), some further introductory remarks on the framework, approach, and perspectives of social sciences must be made.



- |                               |   |
|-------------------------------|---|
| 1. Problem Formulation        | Describing the problem                                  |
| 2. Variable Specification     | Cluster of critical variables and their dimensions      |
| 3. Model                      | Structuring the problem, interrelationship of variables |
| 4. Generation of Alternatives | Range of reasonable alternatives                        |
| 5. Evaluation of Alternatives | Measuring significant impacts and consequences          |
| 6. Decision - Making          | Acceptable or feasible design, mitigating circumstances |

FIGURE 2 -- Process of Problem Solving and Project Assessment

FIGURE 3 -- Social Impact Assessment and the Context of Environmental Analysis



→ = of primary concern here

- - - → = also part of the larger planning effort

## 1.2 Epistemological Perspectives

One helpful way of trying to understand the ideas, beliefs and values of individuals and/or groups is to examine the frames of reference that are used by them in comprehending the world in which they live. These frames of reference provide individuals with a structure for thinking about and a meaning system for attaching values to people, places or things.

Although it can be argued that no two individuals share the same frame of reference, it is also apparent that in order for society to exist individuals have to develop a shared view of social life. The essence of social life is people doing things together. And when people do things together they influence and are influenced by others. This give and take between individuals and groups produces a social order which exerts an influence on the very individuals who create it. Such is the nature of social life and why it is possible to study the influence of the structure of society on the collective action of individuals and groups.

Thinking about society this way leads to the assumption that there are multiple frames of reference which reflect the diversity and plurality of society itself. This point is central to the Corps' activity for in planning and carrying out impact assessment the Corps has to be aware of both its own frames of reference (which are quite complex because of the various professions and disciplines involved in the assessment process), and also frames of reference of people in the impacted area.

### (a) The Corps frames of reference

The Corps of Engineers is composed throughout by professionals representing such diverse disciplines as engineering, physical science, geography, and in recent years economics, sociology, and anthropology. What professions will become involved in the work of the Corps can only be guessed at, but psychology and other fields may become integral to impact assessment teams.

The addition of these new kinds of professionals in the Corps has and will bring in not only new knowledge and new skills, but more importantly, new kinds of frameworks, and philosophies. This creates excitement and enrichment as well as puzzlement, misunderstandings, and frustrations. Thus, each profession brings in not only new information and a new perspective but also a different structure of reasoning regarding the same subject. Many scientists are quite upset by challenges to the notion that there is one logic and one truth which is universally valid.

But now the Corps is required to take social and cultural considerations into account. Extending the universalistic paradigm to which they are familiar, engineers tend to look for a universal formula for human happiness, social well-being and quality of life. (It must be added that many economists and even a considerable number of sociologists, anthropologists and psychologists do the same. In their effort to be "scientific," they emulate the Newtonian physics rather than the most recent scientific paradigm of mutual causality and heterogenization).

Not only society is heterogeneous, but also its logics may be heterogeneous. That is to say, there may be many logics (one of which is the homogenistic logic). For the sake of illustration, three logics are used as examples in order to compare their characteristics. Since they are only examples, they are not meant to be exhaustive nor mutually exclusive.

	Uniformistic Logic	Logic of Independent Events	Mutual Causal Logic
Scientific theories:	Newton's celes- mechanics.	Thermodynamics	Self-organizing noise by resonance. Conden- sation theory in astronomy
Universe:	Predetermined. Unchanging.	Decaying Universe	Self-organizing and self-generating uni- verse. Evolution.
Reasoning:	Deductive, Axiomatic.	Inductive, cumulative, additive.	Contextual, relevance- selective.
Knowledge:	One truth. If people are informed, they will agree.	Why bother to learn beyond one's own interest.	Must learn different views and take them into consideration.
Society:	Hierarchical	Individualistic	Interactionist
Ethics:	Competitive	Isolationist	Symbiotic
Social Ideal:	Homogeneity	Decentralization	Heterogeneity
Community of People Viewed as:	Ignorant, Uninformed.	Egocentric	Articulate in their own view. Essential in determining relevance.
Assessment:	"Impact" Analysis.	What does it do to me?	Feedback loops for self-reinforcement or self-cancellation.
Data Collection:	Classificational	Statistical	Analysis of patterns, context and networks.
Planning Procedure:	By "experts." Keep community uninformed or inform them in such a way that they will agree.	No planning.	Generated and parti- cipated by community people.

Uniformistic  
Logic

Logic of  
Independent Events

Mutual Causal  
Logic

---

Decision:	Dictatorship, majority rule or consensus.	Do your own thing.	Elimination of hard- ship on minorities and on any single individual.
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Thus, new conceptual frameworks and alternative interpretative schemes provide additional ways of understanding and proceeding with impact assessment. Obviously, with a plurality of frames of reference no longer can one assume that there exists a "right" or "correct" answer or solution to impact assessment. Rather than providing definitive solutions to impact assessment, these frames of reference make us extremely aware of the relative nature of value judgments. It is also at this point that one must draw an important distinction between assessment, which requires more or less analytic objectivity; and evaluation, which incorporates a variety of value assumptions or subjective judgments.

The planner and/or team involved in impact assessment, understanding the implications of multiple frames of reference, can no longer ask the question, "What are the adverse and beneficial effects of a Corps' project?" -- now the phrase from "whose point of view" has to be added. If everyone can be sensitized (the leadership of the Corps, the Division and District leadership, the personnel responsible for impact assessment) to the phrase "from whose point of view" a level of awareness of cultural diversity will have been achieved which should add immeasurably to the process of impact assessment.

(b) Publics' frames of reference

Just as within the Corps there are multiple frames of reference to consider, the same is true of the impacted area. The individuals in an impact area by virtue of being members of different racial and cultural groups, different social classes, different age, economic, religious, and political groups, see uniqueness in the world they live in and a shared consensus with other individuals who make up their world.

In assessing social impacts, it is especially important, in the light of socio-political realities, to determine whether the publics' frames of reference do or do not fit with those of the Corps. In maintaining this sensitivity, the planner can be alert to issues which may present difficulties to the Corps or publics. He can use his knowledge of the diversity of viewpoints and the sources of actual or potential community conflict, to develop and promote discussions of issues which can encompass the wide spectrum of these world views.

### 1.3 Socio-Political Realities

Assessing the multiple impacts of Corps projects is a complex and complicated process at best. A major aspect of this complexity is the fact that impacts, be they environmental, economic or social, are not in controlled laboratory settings but in the everyday world of people. People with a variety of frames of reference, points of view, values, expectations, etc., about what is the best possible life for them. Given this plurality one can see how disagreements might emerge over the appropriateness or inappropriateness of any given Corps project.

A lot of different people participate in raising issues, asking questions, and providing tentative solutions to the vexing problems of water resource planning. How are the varied value judgments of these different publics incorporated in impact assessment.

Socio-political considerations are a major reality that confronts any evaluator, regardless of the area of evaluation or the nature of the individual project itself. Socio-political considerations, i.e., those forces which enable an individual or group to influence or be influenced by others, take on added importance in impact assessment because of the potentially profound effects of Corps projects. Engaging in the evaluation of projects for the public interest necessitates studying the diverse commitments the various groups or publics have vis-a-vis the project and the impacted area. In short, since there are likely differential, if not conflicting, interests on the part of the multiple publics to any given Corps project, methods of impact assessment that can capture this diversity have to be utilized.

Throughout this document, the word public(s) or public interest or community interest is repeatedly used. By public interest we simply mean interests of all affected parties that ought to be taken into account in weighing the potentially adverse or beneficial effects of a Corps project.

Given the importance of identifying, understanding, and responding to the multiple frames of reference used by individuals to comprehend their social worlds, a consideration of socio-political realities makes us keenly aware of the need to clearly specify to the public the standards and criteria by which important policy decisions are reached. Impact assessment or evaluation always have explicit political overtones. They are designed and implemented with the clear intention of yielding conclusions about the worth or value of a project vis-a-vis the framework in which the project is conceived. The rationale for conducting impact assessment is that it provides a foundation of evidence upon which judgment, policy decisions, and actions can be made about either implementing, constructing, maintaining and expanding current or proposed projects, or postponing, re-evaluating, modifying or abandoning current or proposed projects. This process inevitably leads to decisions which are unavoidably partisan. For, regardless of the evaluative criteria or social indicators used, the public may have a different priority. Any set of social indicators is also partisan in what is left out and as a result, the unintended consequences of any

Corps project may be far more important to certain parties than the few (often vague) intentions of its sponsors (for example, the new benefits accrued to duck hunters from a new body of water, as contrasted to the primary purpose of augmenting the municipal supplies of a nearby community).

Thus, in social impact assessments there is a lot that is threatening to everyone involved -- the Corps, politicians, federal agencies, interest groups, planners, publics, and the community. The more everyone understands the better they can cooperate in their respective roles in impact assessment. But are there potential problems that can alert these parties to sensitive areas? Again, the following examples are not meant to be definitive but are only indicative of the potential problems outlined above.

1. The role of the evaluator(s) is vitally important to impact assessment. Is the evaluator(s) an advocate or a protagonist or a neutral party to the impact assessment? Is the evaluator(s) a member of an "in house" or "out of house" team? How is the role of the evaluator(s) seen by the Corps, the various publics, and by the evaluator(s) himself? What circumstances, e.g., size of project, type of project, etc., play a part in shaping the role the evaluator(s) plays?
2. Too many times agencies and organizations state their goals in broad, general terms that really cannot be evaluated. Therefore, one of the most pressing tasks is to state goals in measurable terms. Often it may be up to the evaluator to help translate the goals, objectives, and basic questions into something that can be measured. Also it is important for the Corps to be aware of the need to assess the goals and objectives as perceived by the parties affected by the project. Then expectations can be put together for some collectively shared goals.

Planning projects involve people with their expectations and values. Projects that involve people have a fluid quality to them. Because of this dynamic character, a flexible approach to impact assessment has to be pursued in light of changing priorities placed on project goals and objectives.

3. The literature on organizational theory suggests that organizations are rarely what they pretend to be. That is, there seems to be a distinction made between the formal and informal or the stated and the real objectives of an organization. It is important to realize that how organizations are built, what they do, and the consequences of this structure and process are frequently quite different from the formal or public statements about such matters.

This suggests that the Corps needs to be aware of the influence of these processes on Corps projects. What promotes this dichotomy in perspective and what consequences does it have on public opinion about projects? This literature should make us cognizant of the socio-political ramifications of the "public" and "private" side of projects.

As mentioned earlier other interests could have political consequences on Corps projects. Attaining the project goals, avoiding outside political pressures and litigation, demonstrating fiscal responsibility, making one's ideological or technical point, etc., all mean different things to different people. It is important to Corps projects to understand what these meanings are.

Finally, what needs to be understood is that impact assessment implies public(s) participation, and participation implies both political pluralism and new uncertainty, namely, that impact assessments are continually subject to renegotiation and change.

#### 1.4 The Social Scientist

Social scientists have theory, concepts, methods, data and interpreted findings to offer to the water resources planner. Occasionally, the transfer is easy and straightforward. Usually, there is difficulty because the social scientist and the planner operate in somewhat different worlds. The language is different, and the categories and approaches are different.

##### Theory

Social scientists are usually quick to say their theories are in early and tentative state of development. This is certainly true in comparison with theories about the physical world. Yet, there is a large body of theoretical work in the social sciences which is useful to the water resources planner in several ways: a) it can sensitize the planner to conditions and relationships he might otherwise not recognize; b) it can give the planner a better understanding of how social systems function; and c) it provides a framework which can assist in direct assessment of social impacts.

##### Concepts

Many of the concepts of social scientists have, to some extent, passed into the general vocabulary, and as a result often now appear obvious at least in their general meaning. Yet, for this very reason it is often possible to forget that these concepts did not seem so obvious until they were empirically developed and tested. The rejection of these concepts can weaken a planning effort. The concept of opinion leadership, for example, seems trivial in retrospect. Yet, communication programs were and are designed as though there were no such concept.

## Data

Much of the data of the social scientist is "soft" and subject to some diversity in interpretation, particularly when compared with engineering data. As a result, in the recent past use of social data has often been limited to population and other demographic data. Many more data are available, however, and in doing social impact assessment it is necessary to gather and utilize these data as will be discussed in the third section of this report.

## Who Are Social Scientists?

Like engineers, there are many kinds of social scientists. This topic is discussed more fully in the fifth section of this report, but at least six broad groupings of social scientists should be recognized: a) anthropologists, b) economists, c) political scientists, d) sociologists, e) social psychologists, and f) geographers.

## What Do Social Scientists Do?

Work by social scientists can be divided into two categories: descriptive and analytical. In doing descriptive work, the social scientists collect data. His special expertise is in deciding what kind of data is relevant, how it can be collected, and how it can be organized and presented in a useful fashion. In doing analytical work, the social scientist seeks relationships among social variables. These relationships may allow for understanding social systems, making projections, or inferring causal or probabilistic relationships.

The final statement made by a social scientist may not appear dissimilar on the surface from those made by laymen. The difference is the reliance by the social scientists on science, rigor, and professional judgment. As a result, the social scientist has a foundation for his statement and is prepared to support it.

## What Don't Social Scientists Do?

The images of social scientists held by non-scientists vary from the sublime to the ridiculous. They are sometimes thought to be able to completely comprehend and control society in an optimal manner. They plan parties and make people happy. They are advocates of Social Security, social outcasts, the poor, and racial or other minorities.

The first image is false. The other two images are also false, though individuals may be especially adept at planning parties and individuals may be advocates for one or more of the positions or groups mentioned above. Individual engineers, musicians, and businessmen do likewise. It would not be surprising, however, to find a somewhat higher percentage of social

scientists becoming advocates for particular groups or positions because their work often leads to an understanding of the problems of some group. Thus, just as a biologist might raise an alarm upon discovering an animal species was in danger of extinction, so the social scientist might speak out on behalf of some social group suffering an injustice or encountering special problems.

The social scientist is sometimes thought to be able to make statements and judgments with very little effort and money. This is also a false impression. When data must be acquired and detailed studies made of a situation, the social scientist requires resources of people, time, and money just as does the surveyor, the geologist, the hydrologist, and the engineer/planner.

#### When Should The Social Scientist Be Used?

This question is addressed more fully towards the end of the document. The general answer is that there are roles for social scientists throughout the planning process leading to the final assessment of social impacts. The roles change through time, of course, ordinarily, more time would be spent in sensitizing the planner and collecting data in the early stages. In later stages, the emphasis would shift to organization and analysis of data, and interpreting the findings in light of proposed alternatives.

There should be a close relationship between social impact assessment and public involvement in planning. To some extent, the same persons would be working in both roles. The social scientist should himself assist in deciding where, when, and how he should participate in the planning process. Assigning the social scientist to perform a particular set of tasks is likely to lead to underutilization of his skills, and knowledge. While this is true of all planning team participants, it is especially important with social scientists because the planner is less likely to appreciate fully the potential roles of the social scientist. By contrast, the roles of the hydrologist, geologist, and civil engineer are usually much better understood.

#### 1.5 The Integration of Social Sciences in the Planning Field

A few remarks may conclude the introduction and general understanding of social impact assessment and its actual or potential practitioners. We do not really need to enter into an extensive argument in order to justify the professional credentials and the necessity for social sciences input in interdisciplinary research. What we should emphasize, since recent environmental legislation much more explicitly requires the presence of social scientists, are the roles that they might be called upon to play in the context of environmental studies, public project assessment, or in the general planning process. Such roles may include:

1. Competent consultant, by providing proper advice as to how to maintain or alter existing social arrangements to make collective life more harmonious and satisfying.
2. Policy planner, not only by using in a systematic way relevant sociological data and by formulating and elaborating coherent systems of social indicators; but also by clarifying values, assessing needs, or formulating appropriate criteria and standards.
3. Evaluator, by analyzing effects of perturbations, assessing long-range consequences, and considering new solutions to a variety of problems.
4. Practitioner by facilitating the transition to "new states," implementing social change through established organizations, and articulating public issues.

The social scientist is also a researcher studying not only the overall structure of society, institutions and social relationships, but also providing explanations which may help predict trends or events. This role as a researcher is an extension of the broader role of scientist who considers how new knowledge is acquired and used for the betterment of society. Thus, the acquisition of new knowledge (researcher) should complement the marshalling of existing knowledge (consultant and practitioner).

Three key questions seem to characterize the interest, preoccupation, and imagery of social sciences. The first has to do with the units of interaction. What kinds of entities participate in social interaction? Are we talking about individuals, groups, gangs, families, communities, or nations? The second has to do with the process of interaction. What are the components or phases of this process and how do various units or entities go about organizing their activities? The third has to do with what has been broadly defined as the matrix of interaction, i.e., the physical or social space in which interaction takes place. Around these key topics essentially related to the social process, major subject areas in social sciences have developed. Important are, among others, theory and methods (i.e., the logic, strategy and techniques for analysis of societies), social organization and institutions (the specialized groups or social aggregates that make up society), population and ecology (both the composition and changes in the relationship between people and their environment), and social psychology (the preoccupation with the individual as a social unit and problems of personality and attitudes toward the surrounding world).

Needless to say, this is a rather perfunctory way of describing the vast realm of a science, its areas of interest, its units of analysis, its epistemological premises, and the quest for an application of resulting knowledge to the pursuit of certain social policies. The social sciences enterprise seeks to understand and explain regularities or variations and interdependencies throughout all categories of social life. Social scientists follow patterns of organized social life diachronically. They

also study how social change may destroy old social forms and create new ones.

A final remark needs to be made on a question which divides quite a number of social scientists, namely whether they should work for practical ends. Beyond the use of accumulated scientific knowledge for an understanding of major social processes and an explanation of basic social problems, what is the role of "applied" social science and the perennial doubts as to how one can accommodate scientific objectivity with field implementation. This is particularly pertinent for environmental studies where a high degree of application seems appropriate. In recent debates, there appears to be agreement, at least among a significant portion of social scientists, that with proper safeguards there is no reason why professionals cannot directly participate in the application of their special knowledge. On the other hand, many social scientists would argue that the possession of basic knowledge alone is not a sufficient preparation for engaging in "social engineering." Yet, it should be recognized that as social scientists become more and more involved not only in new analytical studies, but also in a more direct way in the affairs of society, they will inevitably have to answer some very sensitive questions as to whether their proper relationships to the people are with "clients" whom they are supposed to serve.

At the same time, it should not be forgotten that there is definitely a danger of overselling the potentiality of help in practical affairs by believing that social scientists can come to the rescue of a society beset by social problems, conflicting goals, or contending power groups. The scientists in the discipline themselves are aware of the limitations of the field as well as of the great opportunities. It seems indeed appropriate that the field of environmental studies and the legal requirements for an immediate involvement in social cost estimation offer one of the keenest challenges both for advancing the field and for offering fresh perspectives to the social and behavioral sciences in contributing together with other disciplines to the understanding and solution of emerging environmental problems.

## 2.0

The title of this chapter is intentionally all-encompassing and general. By using the broad term "human community" as a catalyst for the following exposition, we want to underscore the circular argument of social impact assessment. It should be recalled that a distinction was made between inductive and deductive approaches. While the thrust and continuity of the argument remains the same as outlined in Figure 1 (profiling-projecting-assessing-evaluating), here we want to recast the concern of social sciences in other categories. Thus, after some general remarks on modeling, we can outline critical variables, elaborate the basis for assessment, and return through an analysis of interrelationships to the original question of a required framework for viewing systematically human community. In Chapter 3 and in the general presentation of methodological issues, we return to the question of assessment, keeping in mind the role of forecasting techniques.

A model implies the conceptualization of a group of phenomena constructed by a rationale. This rationale can be constructed either through analogy, or in an iconic manner (constructed for scale to directly resemble a set of properties), or, finally, in a symbolic manner through the meaningful interconnection of concepts. A model, then, although less than the reality it depicts, is a map that may be simple enough to be grasped at a glance, a simple representation of more complex forms, processes and functions.

Thus, ideally, we want to incorporate in social impact assessment a model-building capability to idealize reality in order to demonstrate certain of its properties, facilitate understanding, and enhance prediction. As models move from the real world (observation) to the highest level of elaboration (symbolic), information is lost and the model becomes more general. The ultimate purpose is to furnish the terms, components, relations, and propositions of a formal system, which, if validated, becomes a theory.

Models (rationales), theories (axiomatized propositions), and paradigms (inductive visions about the world around us) are all part of the scientific enterprise of describing, analyzing, and predicting phenomena. Models, as maps organizing our understanding of social conditions, are important for starting a systematic assessment of technological actions upon social systems. Desirable as this may be, modeling in social sciences is plagued, among others, with such difficulties as:

- a. inadequacies in the knowledge of the state of the system, such as initial conditions, critical variables, external inputs, etc.;

- b. simplifying assumptions about the social system which may lead to quite erroneous values or parameters, or misinterpretation of interdependencies;
- c. lack of, inadequate, or difficult to obtain data for model validation;
- d. problems of large systems (especially social systems) which so far -- and perhaps forever -- seem to transcend our ability to translate into complete and accurate description, especially in symbolic form;
- e. confusing causal links with interconnections sometimes spurious and other times difficult to separate, with a high degree of uncertain predictions;
- f. the decomposing of complex systems into smaller, more manageable elements, so that resulting models can be interconnected and aggregated;
- g. time and physical scales which may differ widely over the many hierarchical levels of large systems.

Finally, one of the many efforts of modeling in social sciences involves the use of systems analysis. Systems theory is a vehicle for making meaning out of chaos and a means for showing the significance of various subsystems to the whole. Since systems analysis tends to concentrate on modeling and problem solving with less emphasis to problems of conceptualization and verification, one of the most important tasks is a statement of the assumptions characterizing aspects of social life and the limitations inherent in the qualitative dimensions of social phenomena. This is why in using a systems approach or analysis we should also be aware of certain inherent limitations, namely:

- a. the problem of reification, or treating theoretical constructs as real;
- b. the restricted determinancy of social systems models, in that they do not completely account for social behavior (i.e., the need for understanding the interaction with individual and physical systems);
- c. the emphasis on stability, since prevailing social systems models have built-in tendencies towards equilibrium (i.e., interpreting social systems in terms of status quo, rather than defining change and conflict).

## 2.1 Human Community

### General

A key organizing concept for the description of ambient conditions and profiling in social impact assessment is that of "Human Community." The term human community in a broad sense covers groups with some degree of interrelatedness and interdependence that can be defined along a multi-dimensional continuum from the small, homogeneous and cohesive groups living and working together in the same territory to the metropolitan, state, regional or even world human community. As a rough approximation to such a continuum, it might be helpful for our present purposes to distinguish three broad levels of "community":

1. The (human) ecological community. The impact area of water project may encompass, for example, adjoining parts of two states, a large metropolitan complex, and a dozen rural towns. All of these may constitute an "ecological community" in that they depend on the same water sources, the same industrial base, the same food distribution network, the same mass communication media, etc.

2. The (social) structural community. A metropolitan area, or a county or state, for example, may be composed of a number of spatially and culturally distinct "communities," which are interrelated primarily by the more formal political, economic, and communication structures defined for the area.

3. The cultural-phenomenological community. This term usually points to small groups interacting together informally as well as formally on the basis of common cultural (or subcultural) characteristics, such as in group identity, religion, race, region, or the like. Most political entities of any size, such as cities, counties, states, and the like, are made up of a number of such communities. This meaning is significant to impact assessment because important differences in public reaction to a project may derive from such community differences.

Thus, terms such as "community," "social structure," "social system," "society," and "social organization" are part of diversified definitions as to how men organize their activities in some systematic fashion. Perhaps it would be appropriate to adopt another term, "social environment," as a more relevant definition in environmental studies whereby we recognize three key variables: the territorial variable (physical environment), the sociological variable (social interaction and organizational and institutional networks), and the cultural variable (common ties and the normative system).

Given terminological variations (and underlying theoretical differences), there is no widespread agreement as to how to describe community as a specific entity because the character of social phenomena is itself elusive. This makes it difficult to study communities as a distinct form of social organization. We may avoid further semantic confusion, by identifying these elements of community:

People: a demographic base

Place: a given geographic area

Identify: feeling of belongingness

Common culture: sharing of knowledge, beliefs, customs, laws, etc.

A major definition of a community is a "combination of social units and systems which perform the major social functions having locality relevance," with the emphasis placed on a firm territorial base. Above all, communities are organizational patterns through which persons meet their daily needs in a local area. Thus, although there are disagreements concerning the description of "community" as a unit of social organization, there seems to be an underlying consensus that one of the best ways of presenting community is in terms of a social system, or as a network of social interaction. This emphasis on the social system makes possible the explanation of many environmental affects of projects on social life, through a systems analysis that encompasses:

- a. Delineation of objectives and goals as well as of alternatives.
- b. Description of the system (boundaries).
- c. Techniques for systems analysis.
- d. Time constraints (short- versus long-range consequences).
- e. Constraints of the system (inputs).
- f. Evaluation of the performance of the social system.

In adopting such an approach, we recognize a large scheme of impact assessment wherein certain prerequisites (inputs) as transformed through a given community organization (thruput) contribute to goals or objectives (outputs). Thus, a systems model is a model of a social unit involving the systematic exploration, analysis and evaluation of all the possible consequences of proposed alternatives to an on-going system. We can use this notion to organize our data and model a social system by trying to answer the following questions.

- a. What are the major variables involved?
- b. Can these variables be classified in any meaningful clusters?
- c. What are the major types of relationships that ought to be investigated?
- d. Against what criteria can the range, intensity, or severity of impacts be judged?

If the human community is the focal concern, we need to recapitulate the context of social impact assessment and the continuity of interrelated steps in environmental analysis. So far, however, discussion of an assessment process has been based on the obvious premise that any public project would have effects on the surrounding environment. We need a larger policy approach that is problem-oriented with an extended time horizon to accommodate unanticipated circumstances and future environments. Such a policy and framework of analysis emanates from the following five questions:

1. What goal values are to be sought?
2. What are the trends in the realization of water resources values?
3. What broad physical and non-physical factors condition such trends?
4. What projections characterize probable and possible course of future developments?
5. What policy alternatives may bring the greatest net realization of water resources values? (Adapted from Lasswell, Politics: Who Gets What, When, How?)

Thus, a proposed water resource project has impacts not only on the area within which social life takes place, but also on the people and organizational structures of the community. Such activities are related to, coincide, or may even conflict with values, goals, and objectives of the local as well as the larger society. In practical terms, these goals and objectives may be translated to norms and standards of a more technical level. Norms, standards, or criteria may, then, be incorporated in specific plans or programs, providing the basis for the execution, alteration or even abandonment of a proposed water project. At the same time, the water project is also affected from outside by state and federal policies; the availability of resources and the policies for their allocation and use; the state of resources; the state of technology (and the ability to meet stated objectives); and, finally, by political factors.

Social impact assessment generally involves a contrast between present ambient conditions and probable or desirable future states. From the above discussion, three interlocking dimensions are used as part of the effort to describe the human community and provide the framework for an eventual assessment of impacts:

1. Profile of the ambient conditions of the human environment.
2. Criteria, exemplified in a variety of descriptive dependent variables under the general cover of Quality of Life/Social Well-Being.
3. Impacts, or the effects and consequences from alteration to an on-going system, leading to a consideration of a range of alternatives.

The descriptive categories of Figure 4 supplement the approach of this document by emphasizing the sequence of how variables can establish profile features with relationships of variables permitting data structure within profile. The purpose of the profile is to establish a relevant planning setting and a framework for analysis. It provides a collection of relevant data about the social, economic, and environmental conditions within the area affected by or relevant to a given project. Criteria can be applied to evaluate impact as registered by indicator performance. Results of such an evaluation lead to formulation of alternatives and to the establishment of a basis for decision-making.

We would like to concentrate in this discussion on an issue which is a part of the definition of the problem and also a key concern in developing methods to assess and evaluate social impacts. This has to do with the inclusion of all important variables (re: ambient conditions) which may be affected by any kind of large-scale project. In a number of agency guidelines (e.g., 122 Guidelines of the Corps of Engineers, Water Resources Council, Federal Highway Administration, etc.), lists of important variables are offered. No study can include all the variables, since a selectivity always operates as to which ones are considered as important in any given project or at any given time. Thus we need to develop at least a list of priorities and a larger map as to those which we may want to consider important or central variables in any social analysis. Again it should be recognized that the selection of pertinent variables is part of the vision we have about society, the assumptions we make about individuals and nature, and, hence, of a model of reality that we may construct.

The critical variables and their dimensions for the construction of a profile (the topic of the remaining pages in Chapter 2) have been clustered around four major categories: structural, cultural, interrelationships, and phenomenological. Each of these will be developed in some detail, but the point to be remembered is that, as also mentioned in many similar documents, the lists are indicative of wide array of variables. Such variables will vary of course from situation to situation, from time to time, and will necessarily differ with the scope of the study authority and nature of a proposed plan. At the same time, the combination of variables and their dimensions, collectively represented in a profile, both describe environments and indicate impacts.

Thus, profile and impact categories relate to the evaluation phase through the use of appropriate criteria. In its simplest form social impact assessment can be summarized in the categories of Figure 5 (upper portion). At the same time, the lower part of this figure expands on the argument of profiling existing conditions against which future changes and alternatives can be assessed.

We can now examine a little bit closer some of the proposed key variables and indicators in the human community with some examples from water resources planning.

FIGURE 4 -- Background of Social Impact Assessment

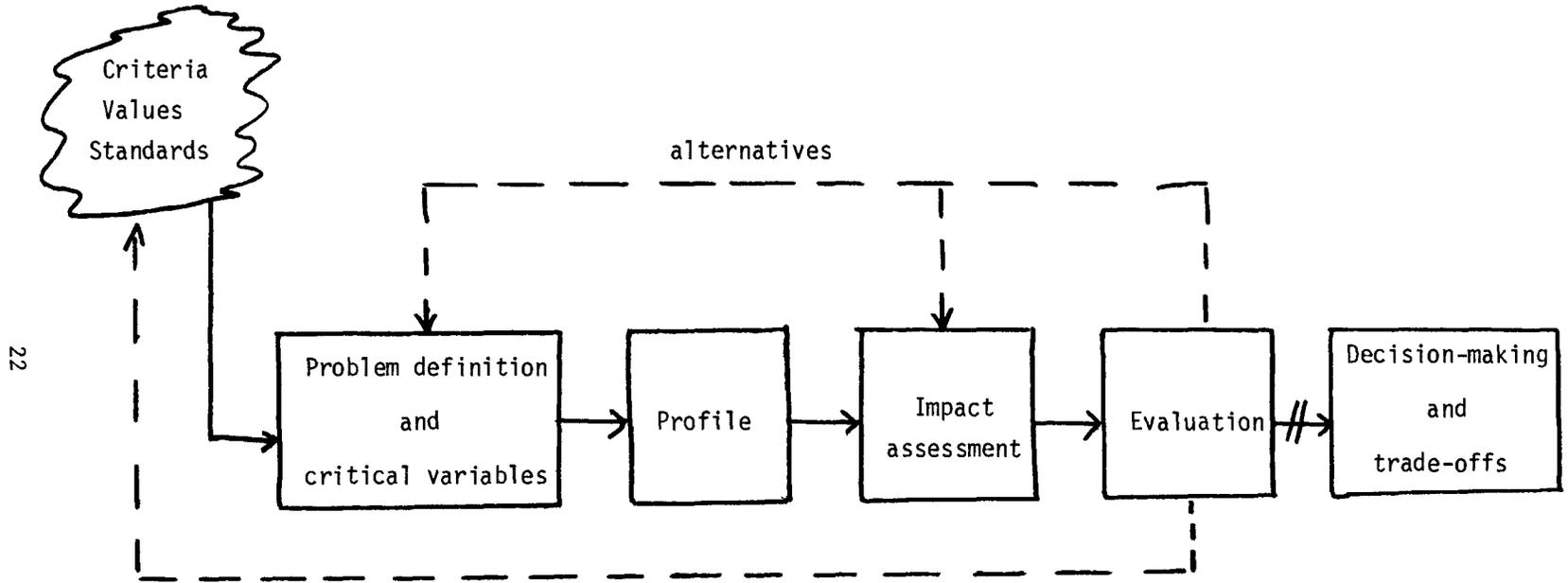
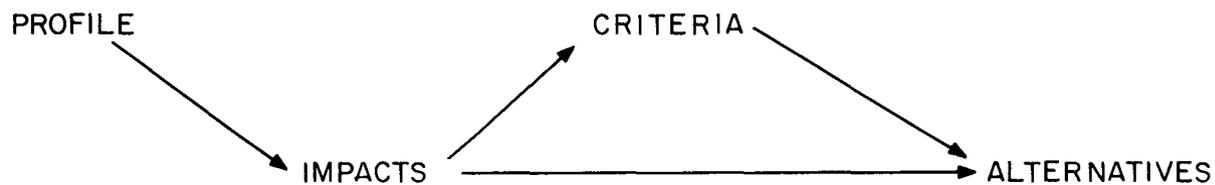
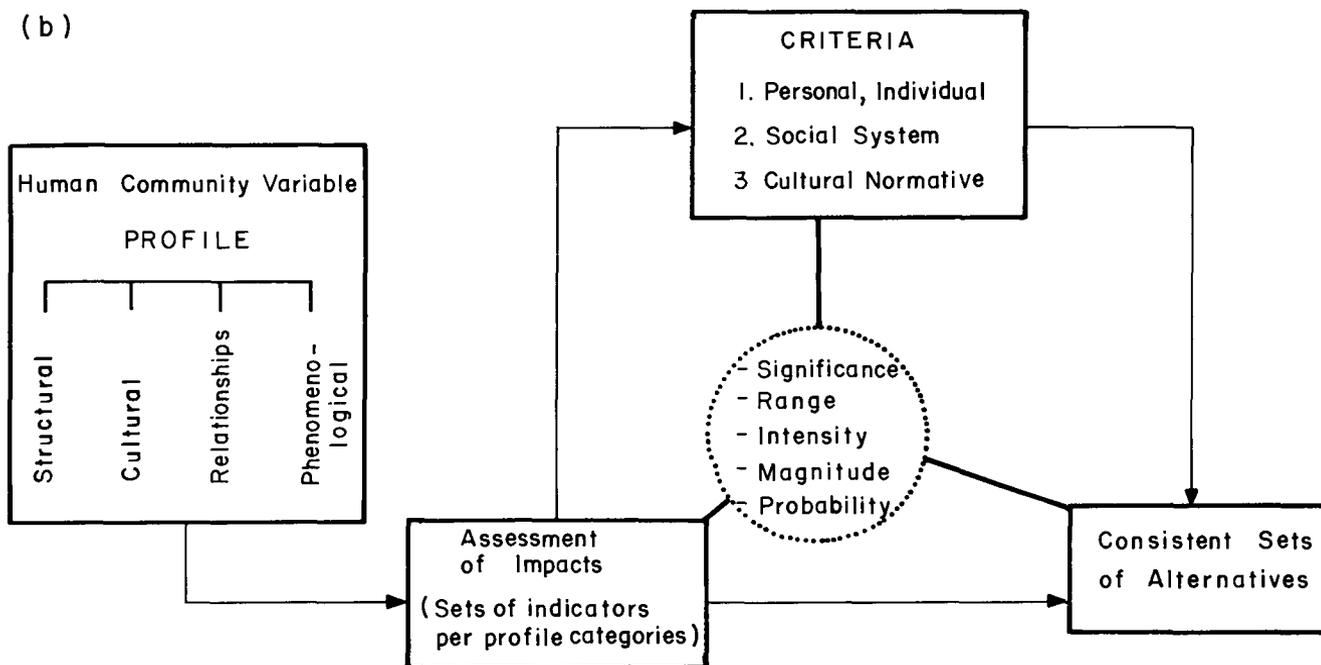


FIGURE 5 -- Community Profile, Assessment and Evaluation

(a)



(b)



## 2.2 Structural

Structural parameters in human community have to do with the basic variables within a spatial/temporal location and indicate the essential arena within which social interaction takes place. Table 1 summarizes the most important structural variables in social impact assessment.

The "check list" of Table 1 can be used as a starting point for establishing the framework of analysis and initial data, and the categories of effects on the human community. It is important, therefore, to describe briefly the meaning and range of effects of these categories:

### (1) Human Ecology

Two major clusters of variables are delineated here: population variables and spatial arrangements.

- a. The demographic characteristics are the obvious factors that must be taken into account, since they provide the immediate elements in the structuring of any community. The total number of people involved, the component characteristics (biological, ethnic, and cultural), vital rates, trends of urbanization, and types of mobility must be taken into account. From the demographic structure one may be able to infer the ability of communities to absorb or accommodate to changes caused by a project. Types of effects to be particularly watched for are:
  - i. Population density (number of people living in a given area), as it affects quality of life, range of economic opportunities, social activities, or forms of social disorganization.
  - ii. Population mobility (the movement from one place to another) can be an advantage or a disadvantage. On the one hand, a project may attract more people because of increased opportunities. On the other hand, displacement of people, business and farms can adversely affect community life, social stability, and even community survival.
  - iii. Population size and composition. This has rather obvious consequences. The size of a community may generate opportunities, but also dire consequences may result from rapid growth or altered population composition. For example, in a typical "boomtown" there is a dangerous lag between the ever-expanding needs of the community (result of population influx) and the proper development of a viable social and economic base. In the context of a highly mobile, heterogeneous population a split between old residents and new ones may cause increasing bitterness of local issues.

TABLE 1 -- Key Structural Variables in Human Community

Human Ecology	Characteristic Institutions	Social Collectivities
<p>a. demographic</p> <ul style="list-style-type: none"> <li>- size (community growth)</li> <li>- composition</li> <li>- vital rates</li> <li>- mobility (including displacement of people, businesses and farms)</li> </ul> <p>b. spatial</p> <ul style="list-style-type: none"> <li>- land use</li> <li>- housing</li> <li>- land ownership</li> <li>- rural-urban</li> <li>- core-suburban</li> <li>- "neighborhoods"</li> <li>- transportation patterns (accessibility)</li> </ul>	<p>a. family</p> <p>b. education</p> <p>c. religion</p> <p>d. political</p> <ul style="list-style-type: none"> <li>- interest groups</li> <li>- community services</li> <li>- citizen participation</li> <li>- governmental administration</li> </ul> <p>e. economic</p> <ul style="list-style-type: none"> <li>- occupation</li> <li>- wage structure</li> <li>- income levels</li> </ul> <p>f. health (physical and mental)</p> <ul style="list-style-type: none"> <li>- noise</li> </ul> <p>g. leisure and recreation</p>	<p>a. formal</p> <ul style="list-style-type: none"> <li>- association</li> </ul> <p>b. informal</p> <ul style="list-style-type: none"> <li>- power groups</li> <li>- ethnic groups</li> <li>- class, stratification</li> </ul>

- b. The spatial distribution reflects the concern that not all population and social uses are evenly distributed over the geographic area where a project is taking place. Severe disruption of the physical framework may create hardship for either an entire community or different groups within the community. The categories of concern in this cluster of variables are self-explanatory in the listing of Table 1. Let us highlight some key areas:
- i. Land use changes not only may change the economic character of a community, but have also far-reaching consequences for the social life of a community. The alteration in land use, as e.g., in suburban or industrial developments, promotes not only removal of crop production areas, but also encourages land speculation that results in land prices soaring and private lands passing into corporate hands.
  - ii. Housing concerns not only the economics of availability and choice, but also safety, environment, neighborhood character, and social cohesion.
  - iii. Transportation patterns, especially the accessibility of community functions to all segments of population affect the quality of community life and to other problems resulting from a highly mobile population over a large community area.

## (2) Characteristic Institutions

This large category of variables may be subdivided into two groups, socio-economic characteristics and community organization and institutional networks.

The first category exemplifies the importance of background characteristics of any impacted community or population. Communities and parts of a community are characterized by populations which have certain social, educational, occupational, religious, or economic backgrounds. The impacts of a public project on various communities, as for example among a predominantly elderly retired community and a more or less youthful university town, differ not only in the severity of economic dislocation or the opportunities for future growth, but also by the ability of the affected population to absorb the resultant shock.

Community organization and institutional networks are concerned with organizational arrangements, the structuring of social relationships, and ways of doing things. Some communities have better organized institutions that permit a better handling of the effects of a project; others lack both the organizational preparedness or the institutional structure (be it financial, educational, or political) to be able to deal with the consequences of a project.

Both these major categories of institutions are producing a vast array of specific variables and dimensions according to various studies. Most often the types of social effects include:

- i. Community cohesion (the most repeated dimension) as an expression of both unifying forces of people, groups, or subgroups and a major expression of social well-being. As will be discussed under cultural aspects of community, a project affects community cohesion by disrupting or impairing social proximity and by constraining or facilitating physical structures.
- ii. Political networks and administrative structures denote the mechanisms of support and coordination which make possible effective organization and handling of expected project effects.
- iii. Citizen participation as a means for project input and as a critical variable in estimating severity of impacts. The degree of public awareness, participation and involvement, the degree of consensus as to the utility of a project, and overall community cooperation produce different effects on the entire community and on segments of it. At the same time, however, public participation should not be equated with the broad spectrum of public opinion.
- iv. Noise, especially as it affects the physical and mental health of surrounding populations. Noise creates physiological discomfort, restlessness, and stress, and disrupts the serenity and quiet of pleasing environments.
- v. Leisure and recreation opportunities. In water resources planning there is special concern for project effects on leisure and recreation due to demands for more facilities, changing uses, access to hinterland, and social activities conducive to the pursuit of "the good life" or social well-being.

### (3) Social Collectivities

Human community also has a variety of informal social aggregates. Voluntary organizations, fraternal societies, informal power groups, elites, social classes, or ethnic groups are each affected differently by a project. There are invisible costs resulting from the social dislocation of identifiable collectivities and from the destruction of viable groupings. Weighing the presence of special groups and recognizing power structures and interest coalitions are needed to understand differential project effects. At the same time, the possible interventions of official and unofficial groups in the unfolding of the impact process is an important variable, which though difficult to describe or predict, should be assessed where possible.

Communities as a whole, or parts of a community, have different social, spatial and institutional characteristics. Hence, a project has different effects and different chances of success given the diversified background and composition of the surrounding community.

### 2.3 Cultural [Features of Culture Within Human Communities]

"Cultural" pertains to philosophies and patterns of life shared by a number of interacting individuals. The group of interacting individuals who share the same philosophy and the same pattern of life may be an ethnic group, a professional group, a religious group, etc. There may be overlappings between groups in terms of some aspects of philosophy or life-style. There may be individuals who are able to shift between different philosophies or patterns of life. There may be individuals who belong to one culture according to one criterion, and to another culture according to another. In all cases, cultural considerations are considerations of different philosophies and patterns of life.

When social scientists refer to the culture of a people, they do not mean the "fine arts" or "cultural opportunities," in the sense that many people say a community (or individual) is "cultured" or exposed to "the finer things in life." When people refer to "culture" in this fashion considering that certain qualities (such as an "appreciation of opera or classical music," a particular set of table manners, "stylish clothes," and "refined speech") indicate that people are "cultured," they are expressing an ethnocentric bias. That is to say, what some individuals consider to be the ideal qualities for the "good life" for themselves are not necessarily shared and enjoyed by others. Thus, in the mid-1930's, in a hamlet in the Southwest, contiguous to villages where Native Americans and people of Spanish and Mexican descent have lived for over 400 years, an Euro-American woman developed a "civic center" so that the Indians and Hispanos of the area could acquire "culture." What this woman failed to understand, and what many who make judgments about quality of life for others fail to comprehend, is that all people have their own unique lifestyles, their own beliefs, their own ways of coping with things, their own traditions, their own music and dance, their own language, etc., that is, their own unique culture. It is in this latter sense that the social scientist uses the expression the culture of a people.

Social scientists diverse cultural and social enclaves to understand potential impacts on a community origin. Even though it may not be possible to mitigate all undesirable or adverse social impacts, it is still the responsibility of the impact assessment team to fully and completely investigate the possible impacts on all cultures of an area. The biologist considers diversity of life an important aspect of the environment and any action which reduces the number of life forms is considered a negative environmental impact. Likewise, the social scientist views cultural diversity as an important aspect of the social environment and any action which reduces the number of cultures in an area is a negative social impact.

To be a more specific discussion of culture, let us define culture. Culture is the system of knowledge, beliefs, practices and artifacts shared by a people and passed on from generation to generation. It is understood that the description of a given society's culture(s) is based not only on observation of contemporary social behavior, but on an analysis of the historical studies of this same society, thus providing a picture of social life, cultural beliefs and expression which have been passed on from generation to generation.

The culture of a people includes the following traits which can be used as indicators for impact assessment:

1. Lifestyles

The way people live and act out their lives and the beliefs which, in part, govern their actions. Among these features of living we find the following:

- a. Subsistence -- forms of employment, occupation.
- b. Communications -- all those things used by humans to convey messages including:
  - i. Language(s) (spoken)
  - ii. Expressive media other than spoken languages (includes art forms, non-verbal languages on media, signs, newspapers and other forms of written languages, artifacts, and may include visual media such as television or other electronic communication facilities or media). What we are interested in here is the ways information is transmitted to and between members of society. While expressive media may be the most obvious in U.S. society, especially in the form of television, newspapers, posters, etc., we want to call attention to the fact that there are other expressive forms. For example, a street "celebration" or a native American ceremonial dance may contain messages that will be understood only to local people unless the outsider is willing to look beyond the gaiety of performance for the event's deeper meaning.
  - iii. Transportation -- routes along which individuals travel to visit friends and relatives, to conduct business or trade, or take a "vacation," are important communication routes.
  - iv. Proximity and other spatial variables -- these include not only the "proper" distances one is expected to maintain in face-to-face interaction, but also the size, dimensions and placements of rooms and furniture within a single household, as well as the placement or location of housing and other physical structures in a community, village, or town.

- c. Religion -- belief in and worship of God(s).
  - i. Beliefs.
  - ii. Practices.
  - iii. Sacred places, events and objects.
  - iv. Places of worship.
- d. Housing
  - i. Styles of shelter (includes preferences for design, etc.).
  - ii. Clusterings (i.e., spatial relationships).
  - iii. Relationship to kin-networks, work or occupational needs, traditions.
- e. Geographic location of people, businesses and farms, and other physical structures of the community -- we are interested in the demographic features of the community, as well as with the relationship of people and places (this fits with the requirement that social impact assessment must take into account the possible displacement of people, businesses and farms).
- f. Institutional characteristics and relationships (includes beliefs in and practices of kinship and other features listed in 2.2(2) -- structural institutional characteristics).
- g. Health
  - i. Culture-specific definitions of health (including physical, psychological and social health or well-being as defined by people in the society).
  - ii. Local health practices.
  - iii. Local health facilities (this includes, as does 2. above, culture-specific practitioners and their places of practice, as well as other practitioners). In some communities then we will find cuaranderos, faith healers, medicine men or shamans, as well as medical doctors, nurses, osteopaths, etc. The former, as well as the latter, may practice medicine in their homes, but they may not be so conspicuous to people from outside the community. A development plan that called for the relocation of such a practitioner could result in extreme adverse reaction of the community people -- for example, they might become demoralized (or even hostile), community cohesion might break down, and the outsider who did not understand the high position of

the practitioner who was forced to leave would no doubt attribute the reaction to things, events, or characteristics of the community beyond his/her understanding. An accurate cultural analysis of the community can prevent this type of thing from happening.

h. Education

i. Formal -- that which is offered, given, received in a structured learning situation; there is usually a formally recognized teacher or other types of educators. Some examples: In a synagogue, there are often classes in Hebrew, history, social science, and other "subject-areas" taught by lay-people or the Rabbi or other temple people; in a Kiva in the Southwest, young adults may be instructed in specific tribal traditions; in a medicine woman's home, young people may be taught traditional medicine; in an Amish home in Pennsylvania or Iowa, girls may be formally taught women's work and women's total responsibilities to society; all of the above are examples of formal education in society. In U.S. society most communities also have head start, elementary schools, junior and senior high schools, and in many there are colleges of various sorts. People who are obtaining formal education in one of the former institutions are also obtaining education in these latter.

ii. Informal -- that which is offered, given, received in a non-structured learning situation. Informal education includes "learning by example or participation."

i. Leisure, cultural and recreational opportunities -- those things in which people participate, or which people attend, which do not have a specific subsistence purpose (although it may be indirectly related to subsistence).

j. Politics -- systems of activities which result in government of the community (includes local governmental forms, such as village council, mayoral system, traditional Native American or Indian government, as well as district, state, and federal governmental controls in local areas).

2. Historical (legacy) features

a. Artifacts -- those features or items found to have historical significance to the population.

i. Contemporary.

ii. Archaeological.

- b. Physical representations.
    - i. Contemporary physical structures
    - ii. Structures of antiquity (not reconstructed, or to be reconstructed, sacred grounds, etc.).
  - c. History of the area.
    - i. In some cases requires analysis of prehistory.
    - ii. In others, requires close historical analysis of relatively recent times
3. Worldviews, Beliefs, Perceptions and Definitions of Reality
- a. Cognitive and religious systems.
  - b. Value systems.
    - i. Historic values.
    - ii. Aesthetic values -- what individuals in a community consider to be "beautiful," "pretty," attractive, pleasing, etc.
  - c. Belief systems (may or may not overlap with religious system; for example: belief in supernatural beings that are not deified or worshipped, such as "witches").
  - d. Perceptions of own group (community identify), or of others.
4. Intercultural Perceptions and Relations  
 This includes "recognition" of cultural diversity, cultural conflicts, ways of handling differences between groups, etc.

The preceding outline is an overview of some of the essential features of culture. To provide a good analysis and description of a culture(s), within an impact area, one would need to look for the basic traits in each category before one could understand what might happen if a project should be carried out of a given area.

But even before we could understand potential effects, it is necessary to understand the interrelationships between aspects of the community(ies) in question. In the next section we look at some of these interrelationships; in the final section of this chapter we examine, in greater detail, the original question -- the perception of reality by human communities.

## 2.4 Interrelationships

A few introductory remarks are needed on prevailing logics and the different paradigms and frames of reference affecting social impact assessment.

A current term used for the analysis of cultural, social and psychological considerations is "impact analysis." This is based on the paradigm of unidirectional causality, which has been until recently considered as the "scientific" way of thinking. However, recent advances in science have produced a newer paradigm of multilateral mutual causality. This paradigm is applicable to many physical, biological and social processes, and is indispensable to their analysis.

In public work planning, the notion of "impact analysis" is based on a wrong paradigm because social processes involve mutual causality. The notion of "impact analysis" must be replaced with the notion of causal loop analysis. For example, the construction of a highway or dam may become a part of a self-perpetuating or self-amplifying loop: e.g., the construction of a highway through a corn field may cause residential areas or factories to grow along the highway, and such developments make the highway more necessary than before. Or the construction of a recreational lake may draw a large population to the lake area; soon the lake becomes overcrowded and more lakes must be constructed. These are examples of two-element loops (construction and population). There are also many-element loops, in which the causal effect comes back to the same element via a chain of several elements.

In almost all cases the person who wants to perform an "impact analysis" begins with a list of categories. A typical list being used now consists of three large categories of "economic," "environmental" and "social," which are further divided into smaller categories or items. While we also have provided such lists above, we would like to place them in perspective by recognizing loop analysis.

The preceding structural and cultural categories is intended to suggest, for most water projects, important social variables that might provide the basis of an impact community profile. However, a community is never adequately characterized by any list of variables, but is a dynamic system of on-going processes and transactions between individuals, subgroups and environmental objects and events. This may involve, not merely simple causal chains, but networks of interactions, and sometimes cycles of mutually reinforcing or mutually cancelling processes (i.e., positive or negative feedbacks). In general terms, we often find self-regulating processes that may lead to the development of new structures on the one hand, or resistive stabilizing processes on the other (morphogenesis or morphostasis, to use cybernetic terms). (See Figures 6-8.) Hence, any projections of possible impacts must keep such interactions in mind even though we now lack them.

FIGURE 6 -- Possible Impact of Planning Process Itself

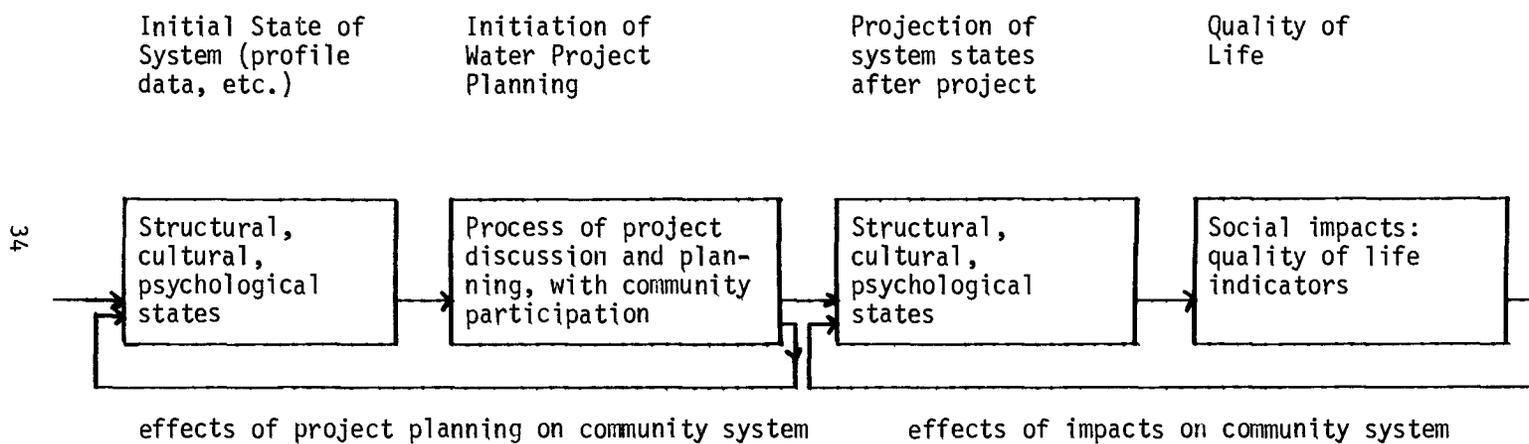
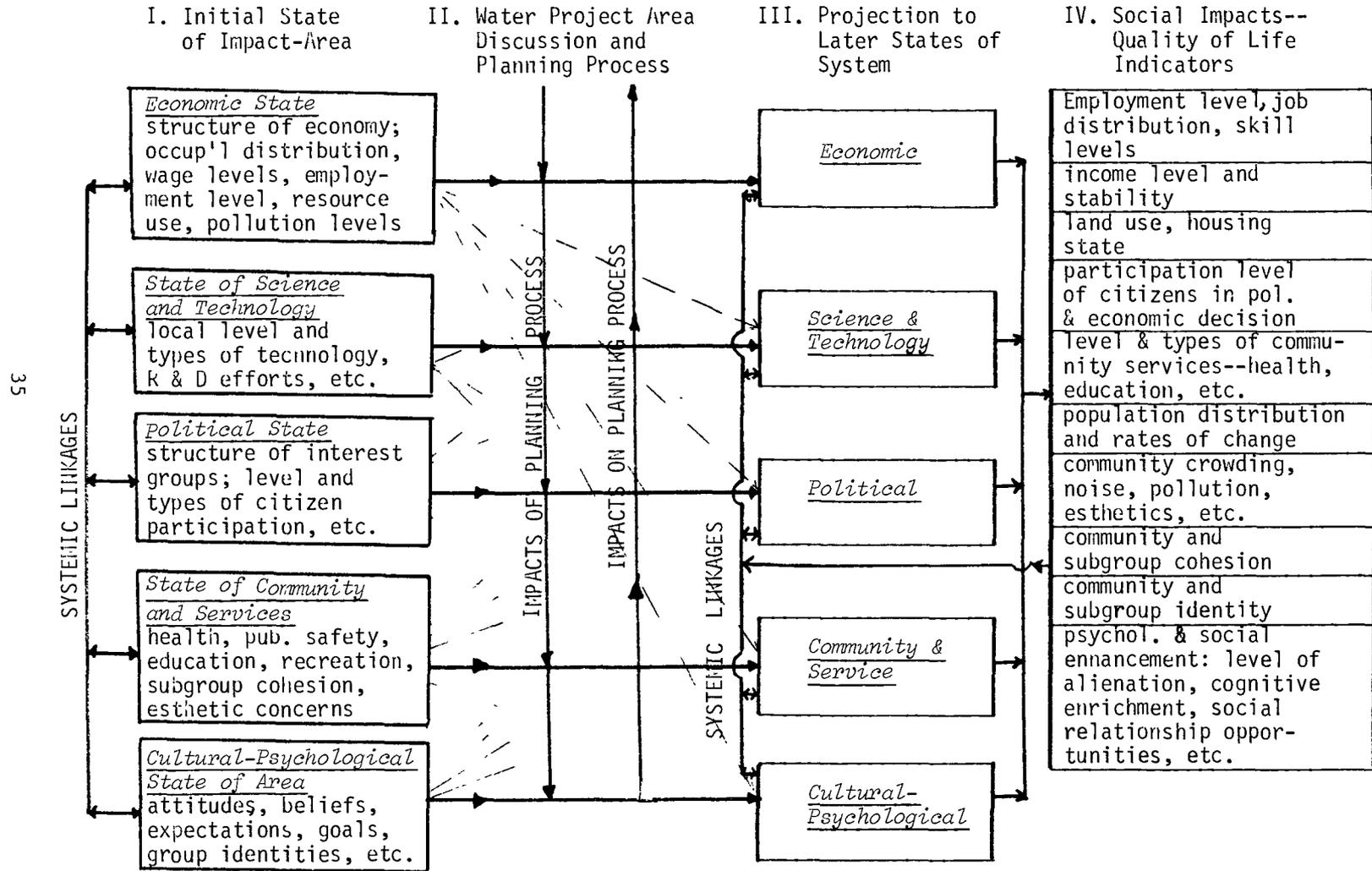


FIGURE 7 -- Possible Routes of Impact Flow (Much Simplified)





Many of our profile variables or categories are not related in any necessary or obvious way to quality of life indicators that an impact assessment must be ultimately concerned with. And many variables in the list are, at best, potential intervening variables. Thus, it is crucial to attempt to trace the interrelationships of variables in order to follow the causal flow from project implementation, through intermediate impact variables, to indicators of important social needs and values. (Figures 7 and 8).

But more than this, the impact assessment process must make an attempt (incomplete as it must be) to go beyond a billiard ball causal model to capture the possible dynamics underlying a static profile describing the state of a community system at some point in time.

Given the above conception of the complexities involved in carrying out a reasonable social impact assessment, a number of further suggestions may be made to those involved in the assessment.

a. Because a community represents a cumulative process of development, it is important that the history of the area be studied. Although it is dangerous to assume that the future of a social system will result from a simple extrapolation of state variables of the past, the historical context often provides the best foundation on which to assess the future. In the absence of other reasons, past rates of change of variables may provide the best guess as to future performance.

b. Though hazardous, an attempt must be made to relate the categories or variable listed in the structural and cultural categories. An initial technique is the matrix method of listing sets of variables along the two dimensions of a matrix and assessing the interactions of each possible pair. This may be helpful, but cannot do justice to the much more complex interactions that sometimes occur.

If the direct consequences of a project involve substantial economic changes in an area, such as large shifts in occupational distribution, income opportunities, and the like, these in turn may generate significant changes, positive or negative, in cultural lifestyles, patterns of poverty, life attitudes and values, birth rates, structural features such as political organization and participation, educational organization, family patterns, and community cohesion. Similar ramifications may flow from initial impacts on political organization, or some other significant institutional area. Thus it might be helpful as a checklist guide to develop flow charts similar to Figures 7 and 8 listing initial potential impact areas of a broad nature and following their possible interactions with major institutional areas of the community through to the ultimate quality of life impacts.

An important principle is that any category of potential impact, such as economic consequences, is not an end point of assessment but an intermediate point through which a project ultimately has a significant social impact. It is assumed that the endpoint of the assessment process is,

ideally, the most direct quality of life variables or indicators such as health, work satisfaction, pride in self and group identity, development of cognitive, moral and aesthetic potential, participation in social, political, and economic decision-making, etc.

c. In dealing with social variables and quality of life indicators, where quantitative measures and analytic techniques are rather difficult, the assessment of the possible interrelations of variables and their net social impact can best be undertaken by experts in the fields involved, e.g., sociologists, anthropologists, social psychologists, etc. It would appear desirable that such social scientists become permanently related to the field offices, either to undertake such assessments themselves, or to define needs for outside contracting to such experts.

d. It has often been pointed out that, in contrast to the passive or inert elements that make up the systems dealt with by physicists and engineers, the social scientist works with systems whose elements are active, deciding, interpretive individuals, and whose behavior -- though usually quite orderly and generally predictable -- can often defy any logic. Thus, besides the complexity in their own right of the interactions of structural and cultural variables, social impact projection and assessment is made even more difficult by the often unpredictable interventions of groups, formal and informal, in the causal matrix. That is, as the impacts of a water project unfold, individuals or subgroups may at any point take notice and intervene before the impact has gone any further. Thus, what may be reasonable assessment forecasts may not actually occur, or occur in a way not anticipated. Of course, the planner may make the community aware of possible impacts so that they may react appropriately to them when they occur, and thus the projection takes specifically into account the reactions of groups. But very often it can be expected that individuals or groups may react to impacts, more or less unconsciously, at points in the causal net earlier than anticipated. It is this kind of transactional dynamics that makes impact projection especially difficult.

e. Consideration should be given to the possible social impacts resulting from even the initial discussion of a project or a problem. Any such discussion may lead to the development or shift in interest groups, subgroup involvement, changes in political and economic plans and structures, and in general generate conflict or other changes in community cohesion whether or not the project is eventually implemented. Consequently, the initial phase of project discussion should be carefully organized so as to minimize unnecessary confusion and disruption.

## 2.5 Phenomenological [Constructing Social Reality]

We use the term phenomenology to mean the social actor's perceptions of reality. That is how an agent defines and identifies the experiences that make up his social world. Thus, in doing social impact assessment it is important to have some understanding of the diversity of peoples and groups in society. How else is any kind of collective social order

possible? And if we can identify the processes that promote a semi-balance of order in society, can we better understand the mechanisms that produce social change?

These questions are at the heart of the social science enterprise, and still remain largely unanswerable today, although there are some schemes of thinking which have tried to grapple with these complex questions. It is not our purpose to provide any definitive answers to these questions in this document, but to simply introduce a scheme of thinking which may be helpful in conceptualizing these issues when doing impact assessment.

It is a sociological truism that the greater part of social life takes place more or less in accord with certain expectations regarding our own behavior as well as the behavior of those with whom we interact. At its most elementary level, social life can be thought of as people doing things together. In doing things together, individual people do what they do with an eye on what others have done, are doing now, and will likely do in the future. Furthermore, people ordinarily take into account what is going on around them and what is likely to go on when they decide what they will be doing. In effect, then, social life is a shared action of individuals. It is this sharedness and predictability of events which produces a reality perceived to be objective, and knowable to all participants. And it is this shared collective reality which is shaped by and shapes the culture and social structure. However, it is of utmost importance to comprehend the significance of the following statement. This shared world is not fixed or static but rather is shifting and dynamic.

This statement helps us also understand the significance of the normality of change. In a broader context we can argue that since frequent dislocation is a normal part of Americans' experience, adjustive strain can be absorbed on the social psychological level. For example, there is a concern that some people (perhaps many) will be displaced or have adverse effects on their lives because of improper social impact assessment, that they will not be able to recover. But, humans are, on the whole, remarkably resilient creatures. We have managed to adjust to extreme climatological and sociological conditions with a rapidly increasing population. We are also relatively reasonable creatures and when we know that we are being taken into account, even in unpleasant situations, we are more likely to accommodate rather than dramatic forced-change.

Social meanings emerge from and are constituted by the interpretive processes of social actors. In making this statement, we are claiming that nothing is known to human beings except in the form of something that they can indicate or refer to. To indicate anything human beings must see it from their perspective; they must depict it as it appears to them. Given this assumption about the nature of social life, the charge to those responsible for doing social impact assessment is to describe how social meanings emerge, become shared, and form the foundation of collective reality.

In doing social impact assessments, the macro concepts of society, social structure, culture, institutions, social systems, etc., take on a new meaning if viewed from the perspective of the social construction of reality. Rather than conceiving of society as being relatively fixed and stable, this scheme emphasizes its fluid characteristics, showing the tremendous significance of the interactive and reciprocal characteristics of social life. In doing impact assessments, we have to realize that social structures and social systems work through human beings and human beings act and interact within these structural constraints.

The ground has been set in Chapter 2 for profiling and modeling. Critical variables and impact categories can be identified, as well as relationships among elements of the "human community." Variables or impact dimensions can be seen as the backdrop of the assessment phase.

To formalize the assessment and prepare for the evaluative phase we need the linkages of appropriate strategies and specific techniques. Chapter 3 discusses some general methodological issues relevant to the conduct of social impact assessment. This methodological framework is necessary for explicating challenging problems in the search for reliable social data.

While impact assessment is introduced in Chapter 2, the argument continues in the context of evaluation and with relation to criteria or standards against which the significance of effects can be measured (Chapter 4). Some researchers would argue that evaluative criteria should be discussed as a beginning step of the assessment process, since they comprise the initial considerations or standards against which other steps can be compared and judged. Others would equally as well argue that criteria can be seen as "goals" towards which project activities are directed and whose fulfillment or approximation can provide guidance as to the significance of anticipated impacts. In either case, criteria are seen as the ultimate yardstick for judging the range and significance of anticipated project effects. In the present document, as indicated earlier, the assessment process is seen as circular with criteria or values operating both as initial points of departure and as ultimate objectives of project efforts. To put it in simpler terms: criteria/standards are both an expression of the goals of project activities and a basis for indicators of project effects.

## METHODS - ANALYSIS

### 3.0

In the introductory chapter impact assessment was broadly understood as an appraisal of the effects of technological actions on the environment. Operationally, impact assessment can be described as compliance with the law; conceptually, however, it becomes a beginning point for an integrated, long-range planning process.

As has been observed by many writers, no federal legislation of recent years bears greater potential significance for the management of the environment in the United States than the National Environmental Policy Act of 1969. The purpose of NEPA is to "encourage productive and enjoyable harmony between man and his environment and stimulate the health and welfare of man." NEPA recognizes throughout the profound impact of man's activity on the interrelations of all components of the natural environment and prescribes the use of all practicable means and measures to create and maintain conditions of productive harmony with the environment and fulfillment of social, economic and other requirements of present and future generations.

Yet, this concern with the assessment of the effects of public projects' activity or program implementation did not start in 1969. It can be traced to a variety of interests, concerns, and legislative actions that tried to find out the effects of proposed interventions. The first substantial effort to promote a statement of environmental impacts in the area of water resources was in 1936. In response to a report from the Subcommittee on Drainage Problems and Program of the Natural Resources Committee, President Roosevelt required all federal agencies involved in land drainage and water storage projects to report impending projects to the Committee. A series of executive memoranda and executive orders (such as Executive Order 9384 of 1940) attempted to resolve conflicts involved in the preparation of such comments. A series of authorizing acts made provisions for actual survey and circulation of reports. The Water Resource Council created under the Water Planning Act of 1965 enforced and extended these procedures.

These efforts resulted in the succinct imperatives of NEPA and similar documents which made more urgent than ever the need to account for environmental changes. At the same time, distinctively social impacts have tended to be implicit, indirect, and qualitative. It is only recent administrative regulations, legal interpretations, and public pressures that have broadened and deepened the social content implicit in many of the acts and the concern with higher order, unanticipated consequences of technological actions.

In its broadest terms, impact assessment becomes a procedure for anticipating effects of purposive action and, thereby, forestalling or upsetting adverse consequences to which a particular project may give rise. In this sense, impact assessment is a hedge against uncertainty in the planning process.

### 3.1 The General Model of Social Science Research

As was emphasized throughout the preceding text, social science research and social impact assessment depend on inferences that can be drawn from valid, reliable, and relevant data. In the general literature of assessment criteria have been prepared and in some instances certain refined indicators have been developed measuring the effects of a given project on various systems (ecological, economic, etc.). For example, in the construction of a dam repeated measurements have been made concerning the effects of the new water source on the aquatic life, the displacement of other animal populations, ecological perturbations, and the economic consequences for surrounding communities. Much less is known about the effects of a project on the social, cultural, and even aesthetic dimensions of a human community. The difficulties come from both disagreement as to what are the component parts (and overall structure) of a social system, and the elusive and subjective character of many of the scales used in measuring and interpreting social phenomena. For example, there is a temptation to equate cardinal with ordinal or metric scales without presenting or elaborating the assumptions underlying a particular technique. The literature of social sciences abounds in serious reservations and methodological cautions as to the very validity of various survey instruments, the transference and adoption of physical science models to social phenomena, and the counterintuitive character of social systems.

A distinction can be drawn here between pre-methodological, methodological, and meta-methodological considerations. The pre-methodological considerations have to do with the assumptions and "models" characterizing a given social science approach, the visions about the world around us, and interpretations about the relationship of individual and society. Methodological considerations concern strategies and specific tactics involved in obtaining, utilizing and interpreting data. The meta-methodological involves teleology and ethical questions as to the ultimate use of data in the planning process.

The general model of social science research does not differ significantly from other disciplines. They essentially have three major phases:

1. The conceptual phase, or the definition of the problem and the development of a general "model" incorporating the essential questions of our inquiry, key concepts, and the array of crucial variables.
2. The empirical or field phase which incorporates all of the efforts for finding the proper population, the strategies and techniques for collecting valid data.

3. The interpretative phase or the inferences that can be drawn from the data collected and the evaluation of the findings.

There are many questions about how social scientists make inferences, ranging all the way from ambiguities in theoretical conceptualization to specific inadequacies in data collection, evaluation and interpretation. The following, however, seem to to be central concerns:

- A. General problems of measurement for both quantitative and qualitative aspects of data. Two specific problems are particularly acute, namely, the question of validity (how do we develop appropriate criteria free of systematic error), and the question of reliability (random error control, or how successive measures produce the same results). While there is a continual striving towards finding better techniques for collecting data plus sets of rules for using these data, the success of such an effort will depend on the development of criteria that will be characterized by:
  - a. validity -- criteria free of systematic error, or criteria that measure what is supposed to be measured.
  - b. reliability -- successive measures produce the same results (random error control).
  - c. "refinability" -- the criteria used as a sensitive one that is able to make fine distinctions among categories (precision).
  - d. comparability -- the definition of the criterion remains the same over time and space.
  - e. permissibility -- the range of error to be tolerated.

Of the above, the most important is validity since the main methodological problem remains the presence of constant errors. Here, more than any other field, the research is particularly concerned with the extent to which one is measuring and testing what is supposed to be measured, rather than some other variable or dimension.

- B. Questions of evaluation and trade-offs. It is not enough to describe or analyze the surrounding world through adequate, valid, and reliable data, it is also imperative to provide for some form of decision-making and trade-offs between various alternatives. This requires a clear specification of program goals, the measurement of program outcomes and unanticipated consequences, and some way of describing new states of affairs. Such questions focus attention on: (1) larger problems of evaluative research in the analysis of who benefits and who pays, (2) the need for adequate data both before the project begins (baseline data) as well as

longitudinal data that would permit diachronic "over-time" perspective, and (3) evidence supporting any attribution of cause since many programs aim at multiple effects rather than at a unitary objective.

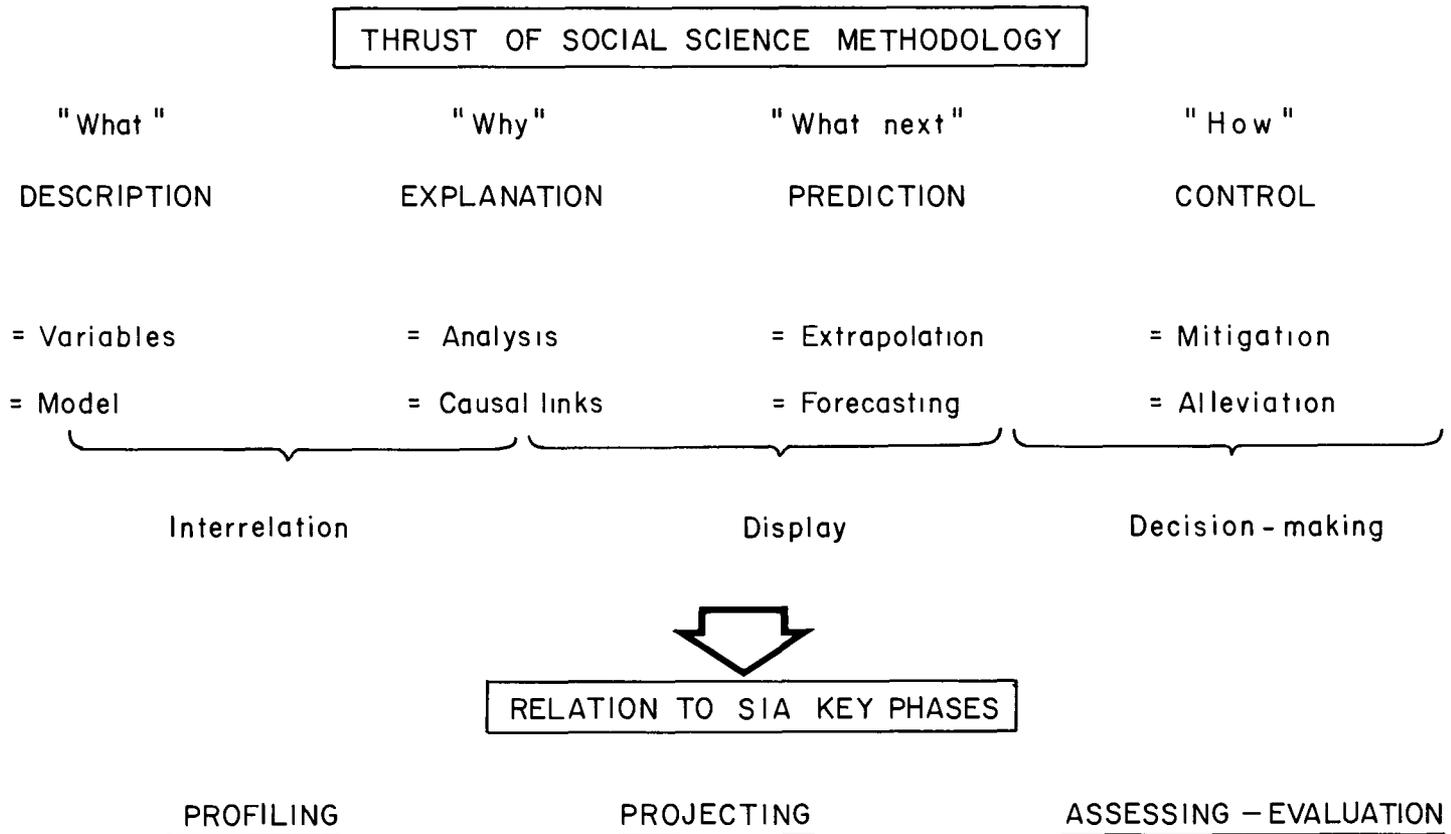
- C. Social indicators. This refers to the increasing attempt to measure the diverse effects of a public project, with an emphasis on Quality of Life dimensions and an evaluation of intangibles relating to human welfare. Quite a number of studies have tried to develop intricate systems for arranging values in various social indicators. However, such efforts are plagued by doubts as to their use having to do not only with validity, but also with perception, time preferences, lack of value consensus, etc. Furthermore, the state-of-the-art in social indicators is characterized by a highly demanding task of "instrumentation." Other than demographic and socio-structural variables, current literature has little on "attitudinal" or "behavioral" social indicator models (see, e.g., the repeated discussions on this concern in Land and Spilerman, 1975). In particular, the problem of calculating "social costs" is taxing the ingenuity of authors. It is not only that social costs are difficult to assess directly; often, they reflect larger questions of social policy transcending the immediate project and affecting wider segments of population beyond the immediate area of a given water project.

At the same time, there is a wide variety of methodological efforts essentially in two directions. The first has to do with the extent, quality, and scope of the information available and the level of data; the second involves an improved capability of a reciprocal relationship between the researcher and the public and our responsiveness to public needs and perception of the surrounding world. The last implies also that various "publics" are to be brought forward not only as passive providers of data but also as key components in the decision-making process.

We may accentuate some salient points of social science research and analysis by relating in Figure 9 the general thrust of the social science methodology paradigm to key steps of the SIA process outlined in the preface (Figure 1). The general argument of Figure 9 and the broad concerns of social inquiry can be further elaborated in a general model of social science research (Figure 10). The categories of Figure 10 are more or less explanatory and correspond to an unfolding sequence of logically related questions, namely, delineating the problem, obtaining appropriate data, and analyzing results.

Simplified diagrams, such as Figure 10, must not detract attention from serious methodological questions haunting social sciences. Physical impacts may be more obvious, but social, cultural and psychological impacts will require a great deal of professional judgment that is not amenable to formal operational procedures. At the same time, attention must also be paid to the shifting levels of analysis employed in social impact assessment -- from micro to macro -- and the implications for data collection,

FIGURE 9 -- Social Science Methodological Emphases and the SIA Process



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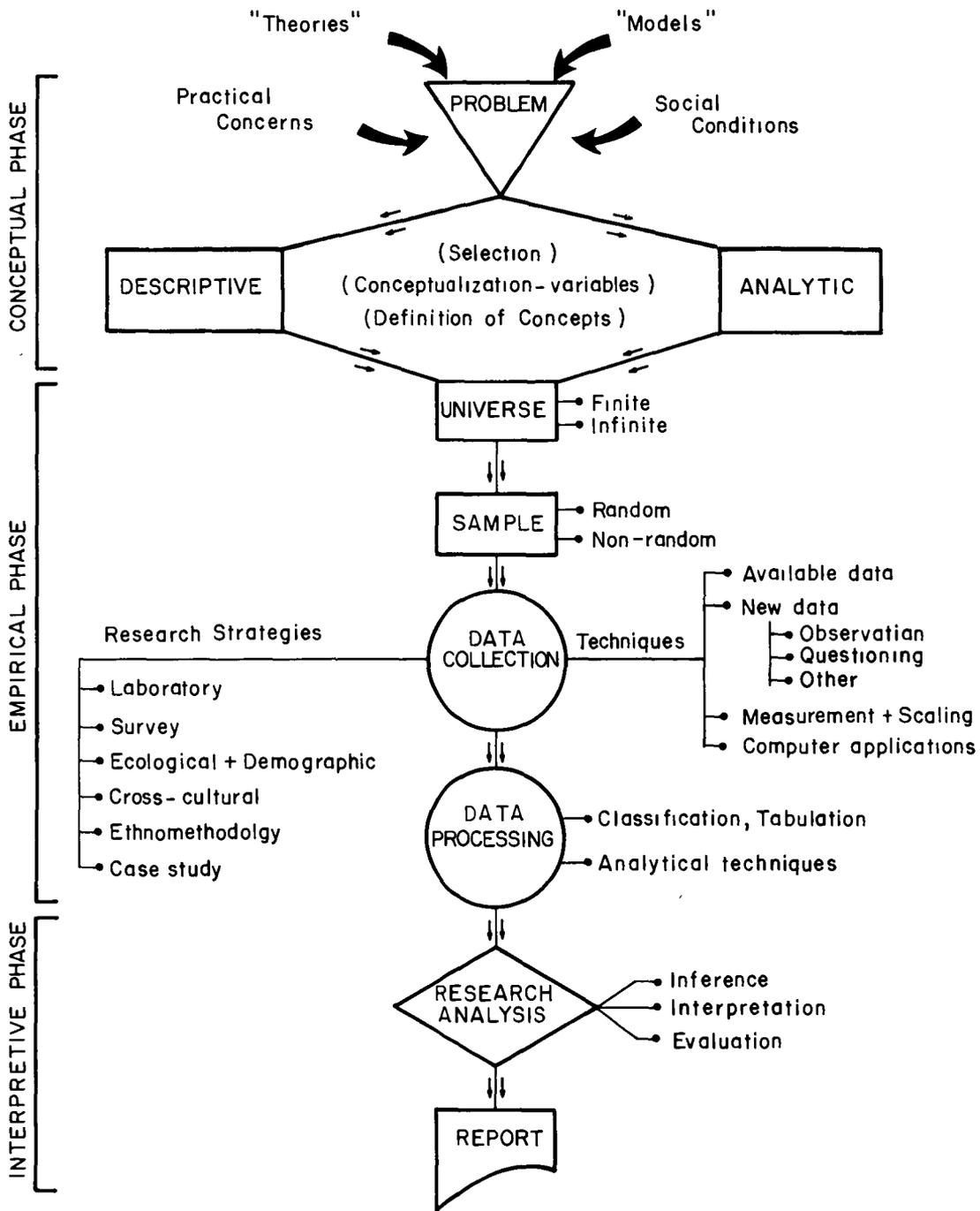


FIGURE 10 -- General Model of Social Science Research

analysis, interpretation and evaluation. Finally, although the larger cultural and social structures are over long time periods largely independent of the particular individuals playing their roles in them at any one time, such structures work through and have their impacts on human beings. Both levels, and their mutual interrelationships, must be taken into account.

What needs to be underlined at the end is the complexity of social impact assessment and the fact that judgment about effects will be based upon data that range from purely objective to highly subjective. Objective evaluations can be based on commonly accepted standards, or be expressions of simple arithmetical calculations (as, e.g., number of people, rates of population influx, income levels, etc.). Subjective evaluation, on the other hand, and the use of more qualitative criteria, seem to be the order and in many instances the only desirable method, for such phenomena as community preferences, values, aesthetic considerations, and similarly indirectly arrived at dimensions of collective life. In some cases objective and subjective evaluations may be also appropriate as, e.g., the density of population as an objective index of growth and at the same time as a subjective evaluation of indirect effects of crowding, social discomfort, loss of community character, or emotional stress.

A concluding remark: even good data may be of little use unless they are also timely and relevant.

### 3.2 Data Gathering

The basic assumption in assessing the potential social impact of a proposed Corps of Engineers project is that any major change in an ecosystem (which includes humans) will have long-term, as well as short-term, effects on the socio-cultural systems of the area. Thus, social impact assessment attempts to predict what specific effects can be expected and to recommend means for mitigating potentially adverse (including stress-producing) changes. To accomplish these ambitious goals, the essential attributes of the human environment can be divided into basic social science categories which will allow the social impact assessor (or assessment team) to collect, analyze, evaluate, and organize for display data which depict baseline community characteristics. Baseline community characteristics help the planner/social impact assessor speak to the effect that a Corps project is likely to have on the noise, population mobility, population density, displacement of people, aesthetic values, housing, archeologic remains, historic structures, transportation, education opportunities, leisure opportunities, cultural opportunities, community cohesion, community growth, institutional relationships and health of a given community (as on Section 122 (PL 91-611), ER 1105-2-105 and ER 1105-60-105).

In Chapter 2 we discussed some of the essential features of human communities and attempted to provide a background for the assessor(s) to understand the procedures for community analysis that we have. Although the last chapter discusses the desirable job specifications of social impact assessors, we want to restate at this point that the people of

the community should be actively involved from the outset in the data collection, analysis, evaluation and display. This would be in cooperation with the social scientist who leads a team for social impact assessment.

a. Identifying, Locating and Plotting Impact Population or Communities

Defining the potentially impacted human populations is a difficult problem facing the assessment team. At the outset, when a site has been chosen for construction of a dam, or other engineering project, it is usually fairly easy to determine who will be the obviously affected people. They are the people along the waterway which currently exists or will exist after construction. But, because it is impossible to accurately predict the exact reaction which will occur when a project is completed, it is necessary to consider the "outside" impacts most likely to occur. Thus, we begin by attempting to delimit primary, and secondary areas of impact.

The terms "primary" and "secondary" refer here to the obviousness of impact, not the order or magnitude. For example, primary impacts can be ascertained, in part, by looking at a map, or remote sensing imagery, or other visual display of the area. Secondary areas can be discerned when the investigator begins to follow networks of trade, transportation and interpersonal relationships, by talking with and tracing linkages of the people in the zones affected. The social scientist also depends a good deal on the expertise of the physical scientist who is simultaneously trying to determine how the water will behave when construction has been completed. The identification of impacted populations is not a one-time process, but must continue throughout all stages of a project. In fact it is also necessary to conduct impact study of projects after they have been completed.

b. Sources and Types of Data

Social scientists try to understand future responses to planned (directed) and unplanned (natural or evolutionary) change. But human nature is so unpredictable that social scientists usually study post facto or sometimes current circumstance of sociocultural adaptation and change. In many instances, one can only speculate as to the cause of a particular social or cultural shift. Social scientists have to rely on people's accounts and expressions of "the way things used to be," "the way they are (perceived to be) now," "the way things ought to be," and on what people believe is likely to occur in the future, as well as on statistical data collected in the process of counting human activities (e.g., births, deaths, enrollments in schools, tax reports, etc.). This data may be obtained from previous researchers, from published statistical and other written reports, from specific types of interactions with community people and from various professional experiences that gives the social scientist a trained perspective on human behavior.

There are essentially two sources of data for constructing a community profile: primary and secondary data. Primary data are obtained directly from contact with people in the community; secondary data are obtained from published reports, or other documents which have been compiled by conducting direct contact research. While data is to be collected prior to project construction to obtain a "before project" community profile, it is necessary to keep collecting sociocultural data throughout the planning, evaluation and implementation stages so that social and cultural change may be recorded and analyzed. This helps in project evaluation, and in finding ways to mitigate adverse (predicted and unanticipated) effects. It should also provide useful data for predicting effects of other projects.

Some means of obtaining primary data include: participant observation; in-depth interviews (face-to-face) with samples or total population; surveys (face-to-face, telephone, mail, etc.) with samples or total population; remote sensing and other aerial data.

Participant observation is the research technique used most frequently by anthropologists and sociologists who believe that a knowledge of other people can be gained only by living with and participating in the everyday activities or life of the people who are the object of study. While the social scientist participates in community life, he/she also makes a detailed record of all that he/she observes during his/her stay in the community. The latter includes not only details of all activities in the cultural and structural categories, but also the researcher's reactions to and thoughts about those activities. This is important so that the biases of the researcher (which influence data collection, selection and analysis) can be understood. In this holistic approach a total view of the community may emerge. Further, it is relatively easy to have community members involved in the assessment process when the social science team actually participates in the life of the community.

In-depth interviews may be used in conjunction with participant observation. In a small community, it may be possible to interview everybody, while in a larger community it is necessary to use a sample. The interviews may be "subject/topic-oriented" or broad-based. That is, the researcher may have a specific interest and wish to query the total population as regards this or he/she may wish to know as much as possible about life-ways and perceptions of life as these are defined by informants. An in-depth interview requires that the person interviewed have more than one opportunity to discuss the issues.

Sampling procedures vary according to research topic, size of population, interview schedule, time and funds, and the confidence level desired. It is important to stress that, if sampling is done, it must include representation or samples from the varieties of people within a given community, not just those in particular sociocultural "classes."

Surveys are most often used independently of other research techniques. They are usually single purpose and require only a single contact with informants. There is usually a questionnaire or "survey schedule" that has been pretested on a sample of the population, and it may be administered by direct face-to-face contact, telephone, or mail. A survey is usually a superficial scan of opinion, but whether given to a selected sample or a total population, the same procedure for administering it and the same process for its analysis must be used to control or minimize interviewer error or bias. As with the method for in-depth interviewing, it is possible for the social scientist to train community people in the assessment process. This becomes especially important in writing up a community profile, and in public presentations of findings.

Remote sensing and aerial imagery depend on the use of photographs for plotting demographic, physiographic, geographic, and physical structural characteristics of an area. Observations and knowledge of the physical elements of the depicted study are essential in attempting to describe human activity. Through the use of maps and aerial images, the macro-scale relationship and balance of man to his environment can be better understood. The technique of remote sensing can be useful in the identification of human networks and establishments and a population's spatial structure in a study area. This medium serves as a composite indicator of current status and changes occurring in an area. Thus, it provides the researcher with clues as to where informants are likely to be aggregated and where population shifts and other mobility trends are occurring.

Other means of obtaining primary data include walks through a community, windshield surveys, on-the-ground photography. These activities are merely intended to give a sense of place and spatial orientation to the outsider researcher suggesting areas for more intensive research.

Secondary data have many sources some of which are summarized in Table 2. This list is self-explanatory. We wish to record as much information as is germane to finding the questions we want to ask in our search for primary data. We can also get evidence on historical conditions and activities of a community from using secondary sources, and following our collection of primary data, begin to understand (by diachronic or historical present comparative analysis) some of the dynamic features of the community.

The above sources and types of data can help us answer questions that we must ask in order to construct community profiles. Given the outline of cultural and structural characteristics presented in Chapter 2, we would ask questions relating to each "category" in those outlines, and those that would be discovered in the field. Two examples are offered for clarification of this point:

TABLE 2 -- Selected Sources of Secondary Data

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United States Bureau of the Census

Census of Governments  
Census of Transportation  
Directory of Federal Statistics for States  
Directory of Non-Federal Statistics for States and Local Areas  
Fourth Count--Minnesota Analysis and Planning System (or other)  
General Housing Characteristics  
General Population Characteristics  
General Social and Economic Characteristics  
Other

State Sources

Governor's Office of Human Resources  
State Offices of Planning and Analysis  
Superintendent of Public Instruction  
State Department of Agriculture  
State Department of Business and Economic Development  
State Departments of Conservation  
State Departments of Finance  
State Department of Public Health  
State Department of Employment  
State Department of Public Works, Buildings and Highways  
State Department of Highway  
State Departments of Environmental Quality  
State Library  
Historical and Archaeological Commissions

Regional Planning Commissions  
City (or Municipal) Planning Commissions  
Departments of Public Health  
Social Service Agencies  
Boards of Education (or School Districts)  
Social Science Research Laboratories (private and public)  
University and College Libraries (theses and honors papers, as well as  
archives, journals and books, etc.)  
Public Libraries  
Local or Regional Water Resource Councils  
Computer Centers  
Agricultural Extension Centers (or Farm Labor Bureaus)  
Others  
    State Highway Maps  
    U.S.G.S. Maps  
    U.S. Department of Commerce  
    etc.

---

Example 1: We ask, "What is subsistence/economic base of the areas?" We want to know, not only the principal subsistence base, but all subsistence practices. The categories we elicit might fall into the following major groupings:

Subsistence/Economic Bases

-- Agricultural

Tenant farming/non-tenant farming  
Types of products  
Other

-- Ranching

Cattle  
Chicken  
Other

-- Labor-Industrial, plus Agricultural or Ranching

Cotton Mills  
Soybean Products Plants  
Canneries  
Slaughterhouses/other animal processing  
Other

-- Labor-Industrial, Small Businesses

Plants: Assembly; Manufacturing Types  
Small Businesses (essentially "service" or  
principal economic base)

-- Labor-Industrial, Large or Big Business

Manufacturing  
Assembly  
Other

-- Natural Resource Exploitation

Mining and Export of Raw Materials -- includes  
Processing Plants if associated  
Oil, Gas Drilling and Export  
Timber  
Fish  
Human (e.g., artist "colonies" such as Taos, N.M.;  
University "towns")  
Other

-- Military (e.g., Norfolk, Va.)

-- Tourist (e.g., Orlando, Fla.)

While we can obtain some detail on subsistence/economic practices by using secondary sources (such as state departments of agriculture, business and economic development), we will still need to obtain first-hand information from community inhabitants in order to learn exactly how these systems of subsistence work, and how they interrelate with other sociocultural systems in the community.

Example 2: We ask, "What are the basic institutions in the area?" We might find categories like the following:

Social Organizing Institutions

-- Ethnicity (language and cultural heritage)

Homogeneity (e.g., principally Native American or U.S. Indian; principally Spanish-speaking; English-speaking European-American; etc.) -- indicators of common heritage  
Heterogeneous (ethnic-mix)

(Note: details can be described by display of statistics, as well as by narratives which give historical and present characteristics of intra-group activities and interrelationships).

-- Social Organization

Familial (nuclear, simple extended, large extended, clans, moieties, tribal, etc.) -- described both as kinship relationships that are recognized locally and as constitution of households  
Religious systems and structures  
Political systems and structures  
Educational systems and structures (all socialization mechanisms used, both formal and informal)

As with the subsistence/economic data, we can obtain some information from secondary data. However, we must obtain first-hand information from people in the community. Even if there are rather descriptive publications for a given community, still the impact assessor should obtain current information from the inhabitants themselves. Further, such publications may not have had a Corps project in mind and so may lack a helpful perspective.

Even "grass-roots" people can be trained to assist in research, present findings, and evaluate research reports about their communities. Further, planners profit from working actively with people in the community. Finally, methods for data collection and analysis have to be tailored to the situation,

since each project and community has its own requirements. Thus research for social impact assessment must be flexible.

### 3.3 Data Organization

Essentially, how data are organized depends on the frame of reference used. Though there are many such frames we may point out two which provide a clear contrast. If we label them Frame A and Frame B, we may contrast them as follows:

<u>Frame A</u>	<u>Frame B</u>
Categorical (Classifications)	Rational (patterns)
Enumerative	Gestaltist
Exhaustive	Relevance-selective
Immanent	Contextual
Universal	Situational
Objective	Trans-spective
Hierarchical (ranking)	Interactive (network)

Confusing as this terminology may look, it points out some essential differences. In Frame A data are divided and coded into mutually exclusive categories, which are as exhaustive as possible. These categories are also considered to be universally valid and objectively measurable and this framework is closely akin to analytical techniques of the physical sciences. Frame B patterns are allowed to emerge from the data without preconceived categorization. This approach makes the researcher perceive the whole first, recognizing at the same time that there are infinite ways of categorizing data, with categories depending on the situation, "meaning" derived from the context, and variables seen to be interactive rather than causally hierarchical.

The first approach is closely related with the scheme of analysis proposed in Chapter 2. If we assume at this point that social data tend to favor the second approach we may suggest some alternatives for data organization.

- a. Identify the cultural composition and components of the community.  
Examples: Irish, Italian, Polish, Mormon, American Indians.
- b. Learn their philosophy, religion, world views, beliefs, lifestyles, tastes and other intangible background elements before studying the more material, tangible types of data: i: If such information is available, learn as much of it as possible; ii: regardless of whether it is available the indispensable next step is to talk to some members of the cultural group(s) person-to-person, in order to learn further about these intangibles. (Caution: Observe and follow the modes of communication used in the cultural group. Do not rely on the so-called "leaders" recommended by outsiders. Go into the community yourself, and meet ordinary people whom you

find there, not pre-selected or pre-arranged people); iii: If sociological or anthropological books and articles on the cultural group are available, read them.

- c. After obtaining a background as above, look through the entire data first before sorting them out. It is important to spend as much time as needed in this step. Look at the data back and forth several times to see overall connections and patterns. Formulate a tentative pattern and several alternative patterns if possible. Go back to the data again to see if any pattern fits the data. If not, change it.
- d. Go to the community again, and talk with people under b.ii. Find out what categories are meaningful from their point of view. This is the endogenous relevance.
- e. Choose what seem to be relevant considerations from the point of view of the relationship between the outside community (including the entire nation) and the project community. This is the exogenous relevance.
- f. Organize the data around the endogenous relevance. This should be done in cooperation with someone from the community.
- g. Interpret each item in the data in terms of the cultural context. If the data do not make sense, suspect that you are not sufficiently aware of the cultural context. Even if the data make sense, still suspect that the "making sense" may be an illusion due to consistent misinterpretation on your part. Always check the interpretations with people in the community.
- h. Check whether the data and their interpretations depend on situational factors, and whether the "answer" may change if the situation changes.
- i. Try to enter into the thinking of the people in the community: use their logic, and frames of reference in describing and explaining the data.
- j. Study the interrelations between the variables in the data. Study mutual causal relations, and identify mutually reinforcing causal loops as well as mutually counteracting causal loops.
- k. Return to the exogenous relevance.
- l. Interpret the data in terms of the context external to the community.
- m. Check whether the "answer" may change if the situational factors external to the community change.

- n. Study the interrelations between the variables in the community and the variables outside the community.

To sum up: a flexible framework combining inductive and deductive approaches, continuous iteration, and sensitivity to all parties involved must be established. Such an iterative scheme of increased detail with continuous feedback and anticipatory steps is outlined in the approximate stages of SIA of Figure 11. Implicit in this figure is the notion that despite emphasis on any particular stage there is a constant interplay between data collection and interpretation.

### 3.4 Display and Analysis

As each phase of data collection proceeds, data is to be presented to the public. Raw data with a minimum of processing might be prepared after the very first stage (windshield surveys, aerials, etc.). These presentations can be used by public and Corps planners to decide what other data and question should follow in the next stage. As each stage is reached, the data are presented in a form appropriate to that stage.

In organizing social data, two principles can be used:

- a. It should be most useful in impact assessment.
- b. It should be sufficiently standardized or indexed so the reader can easily extract what he needs or wants.

Because the social impacts may vary so widely among different segments, proper attention to the first principle may imply the second principle.

Data are organized and analyzed for two sets of people: a) planners and other professionals, and b) the lay public. Ordinarily, the former group can more readily use sophisticated approaches than can the latter. Numerical summaries, mathematical models, indices, matrixes, and complicated graphs may be used for the former group.

For the lay public, while sophisticated approaches may be used, the planner should attempt to present implications in narrative language. For the past this is a history. For the present it is a snapshot of today, a tour-guide. For the future it is a set of scenarios and projections.

Normally, the amount of detail increases in the course of planning, though some social data is analyzed in detail even in early stages.

Qualification: if there is a large number of details, some ranking of importance should be established so the reader does not spend most of his time on the less important factors. Profile displays that facilitate value judgments by public segments, planners, and decision-makers seem to be favored by many planners today. Yet, when the planner does the weighing or when too much use is made of numerical rating, the significance of the numbers is lost.

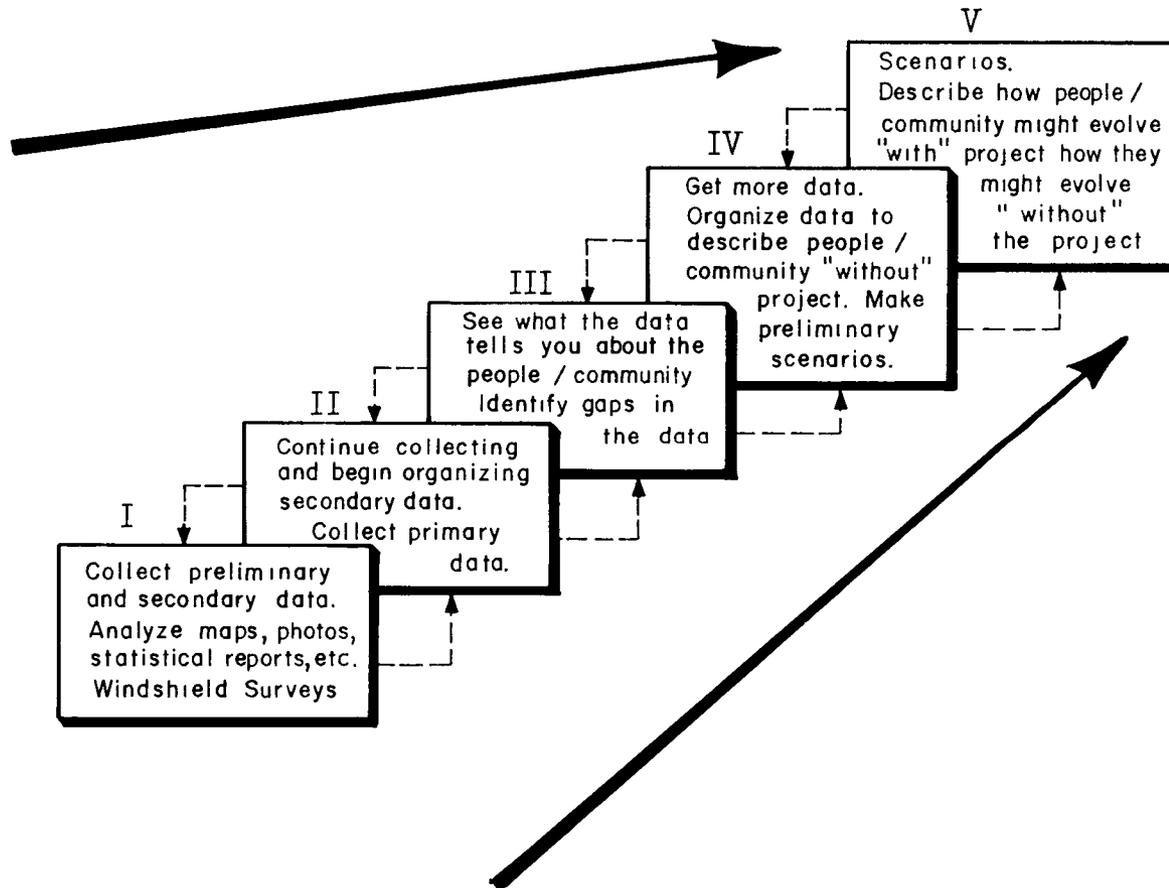


FIGURE 11 -- Approximate Stages in Pre-Project Social Impact Assessment

The last remark emphasizes again all the methodological pitfalls involved in the handling of the social science data (sometimes scornfully referred to as "soft" data). Incidentally, in trying to adopt a general scientific posture, many practitioners develop a passion for "objective" (re: "quantifiable") data and suspicion of "subjective" data. The pre-occupation may yield a lot of objective but not particularly relevant data, (irrelevant objectivity). Some critical problems in finding indices are:

- a. Perception. The perception of the environment varies not only from person to person, but it is also subject to change in the person himself in accordance with changing situations. Even more, a person's perception and attitude towards an environment is influenced by broad socio-cultural processes as well as by specific situations.
- b. Reversibility. Another factor which affects the construction of indices refers to those circumstances where evaluation is based on the possibility of action, i.e., certain situations which have the same effect may be evaluated differently according to different degrees of reversibility or retrievability. The above implies that the higher the degree of reversibility, such as for example the invention of new, cheaper, and/or more efficient techniques, the higher the degree of acceptance of a legitimate risk in the introduction of a given public project.
- c. Time preferences, or those environmental situations in which improvements of present comfort can be obtained only at the price of giving up future comfort and vice versa. Various societies and communities have different "discount-factors" for evaluating future situations which depend on their time horizon, the acceptability of risk, and their commitment to long-range planning.
- d. Value consensus. Here the difficulty exists in that in order to construct an index we have to ask ourselves whose values are we taking as a basis. Indeed, there is limited agreement on preferences, standards, taste, and other abstractly conceived community values. Conditions which are perceived as "good" or "bad" depend very much on a consensus and are often not even fully compatible.
- e. Incompatible conceptual systems. Indices and aggregate measures relate to concepts and models about the individual and society and to some theories about the structure and functioning of social systems. But there still exist incompatible conceptual models and contending theories of society and a bewildering number of key concepts regarded by various social scientists as essential in the discussion of society.

In many respects the above reiterate reservations expressed in the first part of this chapter. Flaws in aggregation and indexing contribute to errors in data organization and inference by reinforcing "tabloid

thinking" or preferences for the familiar (stereotyping), contribute to "halo" prestige through false authority, and lead to incorrect analogies through inappropriate models and relationships.

Extremely important are also fallacies committed when inferences made at one level of aggregation or on any subset of observations are applied to other levels or sets. Social scientists have long been aware of the difficulty in moving from a consideration of total communities to an examination of individual behavior (cross-level fallacies). We cannot easily infer individual behavior from a knowledge of how men act or what characterizes them in the aggregate (the so-called ecological fallacy).

Finally, the researchers' views should not deter them from presenting an unbiased and objective analysis. This implies that they must resist the temptation of providing only marginal data because they fit a special model or their intellectual bias. At the same time, one should estimate carefully the degree of sophistication of audiences and be aware how -- even with good intentions -- data can be used inappropriately as a means of influencing other colleagues or the community at large.

More specifically, as far as the presentation of data are concerned, the display of data must perform several functions:

1. Show clearly what has been found;
2. Facilitate interpretation and evaluation;
3. Facilitate verification; and
4. Serve as basis for discussion among segments of public.

Consider the second and third points first. Unlike physical data, such as astopography and streamflow, the accuracy of certain kinds of social data is not always verifiable from internal evidence or from scrutiny of the process used to obtain it (though both these approaches are useful). For such data as social profiles, it is good practice to give the social segment being described the opportunity to comment on its accuracy. People may and usually will find out things about themselves they never knew before but, on the other hand, they may improve the profile after it has been presented to them.

Collecting social data presents certain problems that do not accompany collecting physical data. The data collector himself affects the accuracy of the data. His/her personality and the way he/she approaches data collection in some ways distort the data he/she receives. There are several reasons a person may not give accurate data to the interviewer. They may be "talking different languages," he may feel exploited and give phony information, or he may think that he will be harmed in some way if he gives accurate information.

By presenting the collected and partially compiled data to members of the social segment being described, the data collector can overcome at least some of the difficulties. People can see how their statements were decoded, compiled and stated, thus verifying the accuracy of data transmission.

The data collector can also show how the data fits into the study and thus, perhaps, benefit the interviewees. Finally, threatening data can be excised (and usually should be excised) before it gets widely disseminated. In some cases, the interviewees may come to see that data they originally considered threatening actually is not because of the way it is compiled and used and, thus, may be willing to give more information to the data collector.

To be explicit: Sensitive social data compilations should be discussed with members of the social segment before widespread dissemination. This is both an ethical principle and a practical point. The ethical principle is that the data collector should not violate the confidence of an interviewee. The practical point is that if members of the social segment feel their confidence has been violated, they will refuse to give more information and may influence members of other segments to do likewise.

We return now to the first function, "showing clearly what has been found." In most respects, this is a technical matter of choosing the proper communication channels, using clear language, comprehensive graphs, and following-up to find out whether one has been understood. For messages other than those transmitted in face-to-face dialogue, it is very desirable to pretest them on persons similar to those in the target audience.

Because information flows to the members of a social group in stages, with intermediaries performing much of the communication, the planner should attempt to facilitate message transmission through the intermediaries, perhaps by supplying extra copies of graphic and printed materials.

Social impacts are likely to have a substantial amount of emotional content. Such content can partly be displayed and communicated by printed and graphic materials but it is generally desirable to have a direct, face-to-face talk between planner and affected group. Dialogue can enhance understanding of the main issues, plus such side issues as may be relevant. It also reduces the image of impersonality in the planning organization.

A second dimension of showing what has been found is that of display by the social scientist to the engineer/planner. The task here is to show relevance of the information to the study and how it can be used in planning. Because the terminologies of the social scientist and engineer/planner are somewhat different, a gap in understanding may develop. The means of bridging such a gap are discussed in Chapter 5, under mutual education of social scientists and planners.

The fourth function of data display, serving as a basis for discussion among segments of the public, is somewhat different. In evaluating alternatives, the effects of each must be compared. These comparisons cannot be well done by the planner alone. Tradeoffs, compromises, and alternative modifications may come in part from the public segments themselves. In order for this to happen the various groups need to know something about other groups and how they are affected. Such comparisons are especially important when an alternative presents major effects, either negative or positive, on some group, and relatively minor effects in the opposite direction for other groups. In displaying data to perform this function, the planner should point out such instances and stimulate discussion among those groups.

### 3.5 Forecasting, or Using Assessment as a Predictive Process

This presentation centered about present-oriented accounting of a project's effects. Given, however, the explicit legal imperative that any project assessment study other alternatives as well as long-range consequences of a proposed project, it is equally important to consider assessment as a predictive process. A new multi-dimensional, multi-objective, multi-disciplinary, long-range model of impact analysis has brought about additional considerations concerning technological changes, a necessary ingredient of a more complex strategy of assessment and evaluation.

Increasingly, water resources project assessments look to the future. First, in terms of scope, the time horizon has been extended from the present to not only the near, but also to the more remote future. At the same time, the range of effects has increased to include higher-order, unanticipated and indirect consequences. On top of these, the space affected has been enlarged (result of the preoccupation with "ripple effects"). Finally, environments other than the physical are considered.

We are asked to assess the project's significance for some future environment. Even more difficult, and the legal requirements here have been increasing, we are also being asked to imagine how communities will fare without our intervention or to account for unanticipated and higher-order consequences on the social system from the decision not to proceed with a proposed project. Here forecasting alternative futures could respond to the present charge that there is only an interest in historical growth and in technical fixes, and that planned use of water resources should be directed by considerations of future states that emanate from articulated, shared goals.

In trying to mold a new planning ethos, there is a fruitful new combination of traditional project considerations with "futuristic" methods. This is the natural culmination of trying to assess long-range effects on future environments within which projects will be operating.

New planning principles may be developed based on heterogeneity and symbiosis as well as new methods particularly suited to non-linear thinking about such items as quality of life, aesthetic integration, solidarity, and other intangible or incommensurable dimensions of collective life.

In this context one examines the whole field of forecasting. Two basic approaches to the study of the future are: The exploratory or extrapolative approach in which through a historical, predictive model we ask ourselves what trend or event forecast can be made with regard to existing social, political, economic, and technological situations that may lead to future states. The second approach called normative or teleological involves a delineation of desired goals and future objectives. In other words, in exploratory forecasting, one moves from the present (with knowledge of the past) towards the future, while normative forecasting implies a "backward" move from idealized or desired future states to the present. In exploratory forecasting we emphasize trajectories and extrapolations, in normative we strive to achieve desired states.

Increasing research has been concentrating on the utility of technology assessment and social forecasting, not only about the impact of a public project but also about future consequences of technological changes. Key impact questions that have been raised in the context of technology assessment involve such characteristics as:

- Affected groups
- How they are affected
- The likelihood of effects
- The timing of impact
- The magnitude of effects
- The duration of the impact
- The breadth and depth of impact, or the diffusion of effects
- The source of impact, or the origination
- The controllability of the impact generated by given technologies.

Since we are adopting a futuristic posture in our assessment methodology, we need to raise a question that has tormented mankind from time immemorial: "How can one foresee the future?" We all realize that in what appears an erratic and chaotic world there are some threads of continuity and stability. Throughout history, what has been considered the "logical" planning or the traditional approach was one that proceeded from the past and the present towards the future through prediction, projection and extrapolation in trying to develop a model of the "probable" future. "Teleological" planning, on the other hand, starts from desired goals of future states and moves backward towards improving the basis of knowledge.

There is a tremendous number of continuously improving and expanding methods for forecasting and extrapolation and the planner must become aware of its jargon and techniques. A descriptive table summarizes some of the types of forecasting currently being used under the titles of exploratory and normative (Table 3). This classificatory scheme of Table 3 is at least somewhat relevant, since a particular technique may belong to either approach, depending on purpose or emphasis. In our discussion we need only to indicate some that may be useful for water resources planning.

#### A. Exploratory forecasting

##### a. Intuitive forecasting, especially Delphi studies

The Delphi technique is a method of seeking group consensus which avoids some of the problems of face-to-face confrontation. This technique is directed toward the systematic solicitation of expert opinion whether rather than achieving a consensus by open discussion. It uses a carefully planned program of sequential individual interrogations interspersed with information and opinion feedback derived from consensuses from earlier parts of the process.

##### b. Trend extrapolation and correlation

These are forecasts based on the assumption that factors contributing to trend in the past are more likely to remain constant than to change in the time period of future consideration. There are quite a number of trend extrapolations such as simple extrapolation, curve fitting with judgment modifications, trend curves, "envelope curves," and other means of monitoring changes in the surrounding environment.

##### c. Metaphors and analogies, especially simulation

These involve all techniques that assume that a new technology or situation may emerge in a manner, pattern and/or rate of change analogous to some preceding event, or existing natural or social phenomena. Simulation, on the other hand, is the approximation of complex systems by dynamic models, such as mechanical analogs, mathematical analogs, metaphorical analogs, and game analogs. Today one of the more outstanding technology forecasting attempts by modeling is the culmination of the systems dynamic approach used by J. Forrester and his students to study world problems. The Corps has been using successfully KSIM in a number of studies and training efforts.

##### d. Scenarios

Scenarios are a projection of the future from present conditions, taking account of stated assumptions. Such assumptions include economic, political, social, and technical possibilities. Scenarios, or "future histories," are narrative descriptions of potential courses of developments. Scenario writing can be effectively used for generating some

Table 3 -- Types of Forecasting

EXPLORATORY [predictive]	NORMATIVE [teleological]
<ul style="list-style-type: none"> <li>-Intuitive Forecasting</li> <li>  =Conjecture</li> <li>  =Brainstorming</li> <li>  =Heuristic programming</li> <li>  =Consensus (Delphi)</li> </ul>	<ul style="list-style-type: none"> <li>-Morphological Analysis</li> <li>  =Socio-technological planes</li> <li>-Network Techniques (network logic)</li> <li>-Technology Scanning</li> </ul>
<ul style="list-style-type: none"> <li>-Trend Extrapolations</li> <li>  =Trends</li> <li>  =Monitoring</li> <li>  =Breakthroughs</li> </ul>	<ul style="list-style-type: none"> <li>-Contextual mapping</li> <li>  =Functional array</li> <li>  =Graphic models</li> </ul>
<ul style="list-style-type: none"> <li>-Trend Correlation</li> <li>  =Precursor events</li> <li>  =Correlation and regression</li> </ul>	<ul style="list-style-type: none"> <li>-Mission networks and functional arrays</li> <li>  =Mission flow analysis</li> <li>-Decision theory</li> <li>  =Decision trees</li> <li>  =Relevance trees</li> </ul>
<ul style="list-style-type: none"> <li>-Metaphors and Analogies</li> <li>  =Growth</li> <li>  =Historical</li> <li>  =Simulation</li> </ul>	<ul style="list-style-type: none"> <li>-Cross Impact Matrix Methods</li> <li>  =Cross-impact gaming</li> </ul>
<ul style="list-style-type: none"> <li>-Scenarios</li> <li>  =Surprise-free</li> <li>  =Canonical variations</li> </ul>	
<ul style="list-style-type: none"> <li>-Dynamic Modeling</li> <li>  =Gaming</li> </ul>	
<p>Supporting Efforts</p> <ul style="list-style-type: none"> <li>Input-output analysis</li> <li>System analysis</li> <li>Operations research</li> <li>Learning models</li> <li>Structural models</li> <li>Iterative system projection</li> </ul>	

major assumptions for many water resources projects and proceeding to explore various options.

## B. Normative forecasting

In the normative forecast, goals, needs, objectives, or desires are specified and the forecast works backward to the present in order to examine what capabilities now exist or could be extrapolated to meet future goals. Of the many new techniques of normative forecasting, we indicate a few that seem to be prevalent.

### a. Decision trees

Decision trees are graphic devices which display the potential results of alternative approaches to crucial decisions.

### b. Cross-impact matrix methods

The cross-impact matrix method is an experimental approach by which the probability of each item in a forecasted set can be adjusted in view of judgments relating to potential interactions of the forecasted items. Such an approach analyzes cross effects through an elaboration of potential interrelationships in terms of direction of the interaction, strength of the interaction, and time delay of the effect of one event or another.

The methodological issues and host of strategies and techniques relevant to the task of social impact assessment may be summarized in Figure 12. Figure 12 should be seen in conjunction with Figure 1, in that it not only extends the general argument introduced in the preface, but also emphasizes a future-oriented preoccupation. At the same time, Figure 12 attempts to indicate the methodological interconnection between the primacy of model generation and variable specification (referred to earlier as a difference between the deductive and the inductive approach).

The following Chapter attempts to provide an initial framework for assessment and evaluation, by stressing more the criteria against which the assessment of effects can be made and to a lesser degree the specific format that such an evaluative and decision-making scheme may take.

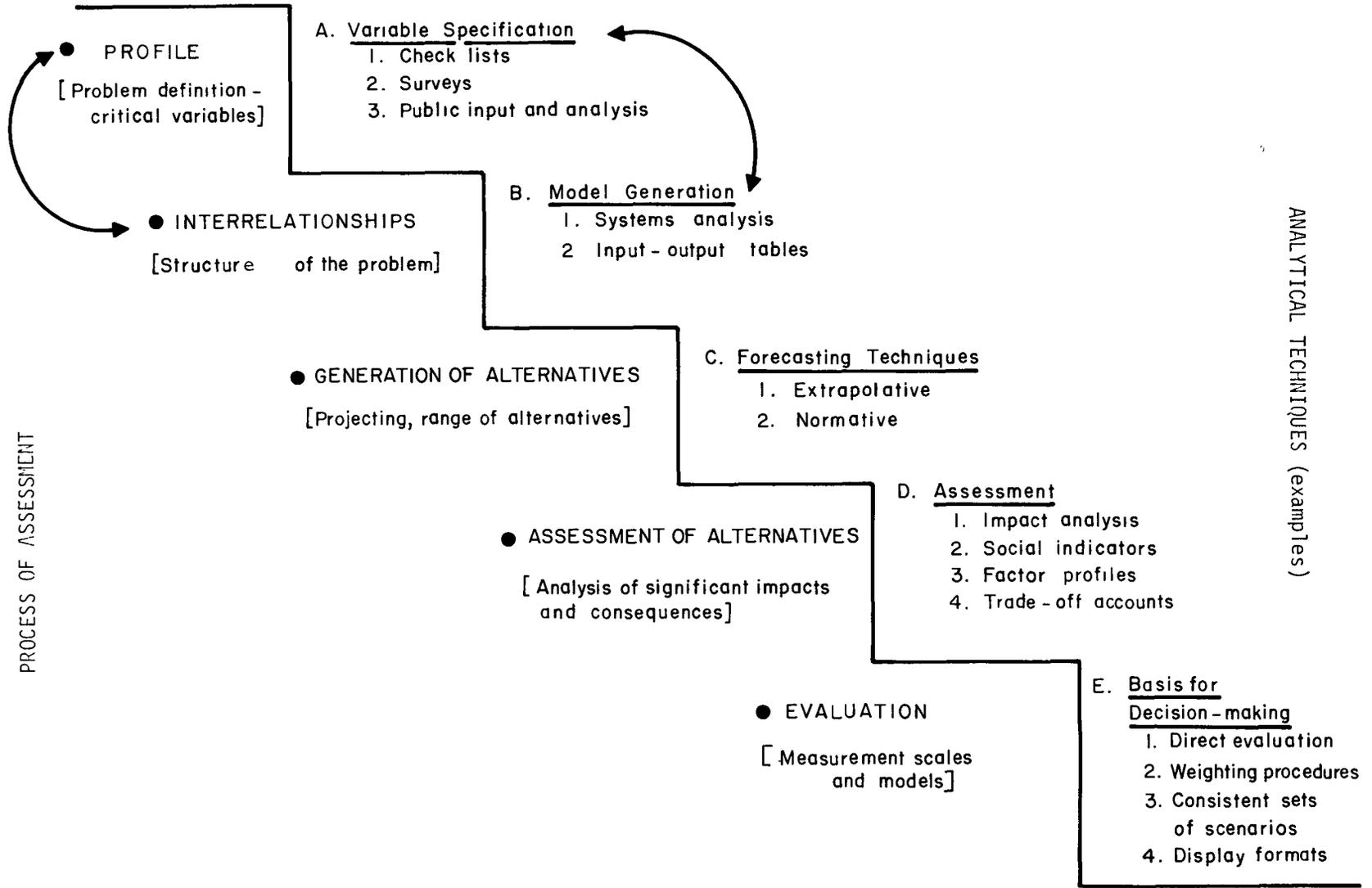


FIGURE 12 - Assessment Steps and Selected Analytical Techniques

## ASSESSMENT AND EVALUATION

### 4.0

When all is said and done, the final task of an impact assessment must include someone's evaluation of perceived effects, of alternative actions, and of options expressed in diversified scenarios. Similarly, a decision or recommendation must be made as to which of the above to adopt and under what circumstances. Such an evaluation is not necessarily performed by the impact analyst: quite often it is a matter of social choice, performed by politically responsible officials, or even by public referendum. Yet, the evaluative process must be discussed, since usually a selectivity process operates through the presentation of a few highly developed alternatives to politicians, authorities, or the public. Thus, a judgment is always made as to effects to be included, alternatives to be discarded, and major options to be considered.

There are a variety of methods in the general literature of natural resources research on evaluative schemes representing a combination of information organization, data management schemes, and specific evaluative techniques. These three elements are of vital importance for a cogent and meaningful evaluation that permits an understanding of the dimensions of the problem, the range and intensity of effects, and the desirability and feasibility of certain solutions.

Particularly pertinent for water resource projects are the following points on evaluative methods:

- a. An evaluation method should be able to deal with multiple objectives and assessment criteria which are both quantitative and qualitative in nature.
- b. The process should provide flexibility and monitoring mechanisms for considering new goals and criteria as improved insight is gained into the problem and as the values of assessors, decision-makers, or affected parties change.
- c. Evaluation should provide an objective framework for analyzing phenomena such that (although subjective in nature) their underlying logic and process of choice can be followed by third parties.
- d. The output of the evaluation should lead to visual displays of results so final judgment can be supported by evidence in a manner that delineates both the procedures and the end result of the information collection and analysis.
- e. The evaluative method selected should include both monetary and non-monetary aspects for each alternative and consideration of other costs beyond the benefit-cost analysis.

- f. In any evaluative effort, a balance must be struck between time, cost, and effort invested in reaching a decision and the potential gains (the "decision reward") in having this information in time for resolving problems.

Ideally, an evaluation presentation involves four major concerns: a) sources for making evaluation; b) evaluation criteria and procedures; c) relationship of social to other "environments"; and d) trade-offs, mitigating circumstances and feasible design. It is obvious that the last two transcend the present document, since they reflect concern with broader principles of environmental planning. Thus, selected remarks in the following pages are addressed to the variety of evaluation sources (notably public participation), and even more to the evaluation process itself, especially to its criteria.

#### 4.1 Sources of Evaluation

In any evaluation effort five different sources of judgment coalesce towards effects, assessment and decision as to alternatives:

- a. standards and criteria as developed in laws, guidelines, and similar documents;
- b. court interpretations and legal precedents;
- c. legal interpretations of elected officials;
- d. professional judgments and disciplinary input;
- e. public participation and involvement.

The above sequence is not hierarchical, since in an ideal evaluation process all are crucial components in arriving at decisions on alternatives, costs and environmental effects. Of particular importance here is public participation, since all other sources of judgment fall beyond the scope of the present document. (On the professional judgment of the social scientist, general methodological principles were presented in Chapter 2, with evaluation criteria further discussed in 4.2.)

In recent years, it has become quite fashionable to talk about the role of public participation in evaluating and making decisions on public projects. Ultimately one is led to ask, "which public?". If the answer is "well, let's go to the grass-roots," again we are led to ask "which grass-roots?" For, as certain as low-income people are the grass-roots to be affected by the construction of low-income housing plans, so are businessmen the grass-roots of a development scheme intended to revitalize a decaying inner city. So, for Corps projects who should be invited to participate and when?

We can (using scientific criteria) classify publics (to whom invitations should be extended) into discrete and non-discrete categories. If we use cultural models for these classifications, we might find that we are approaching a given area on the basis of ethnic groups. That is, we would expect to invite public participation from all people from the Chicano, Native American (or Indian), Black, Asian, or other (stratified) ethnic communities. If we use an economic model of these aggregations, we would expect to invite public participation from all people in the following categories: business people, professional people, low-income people, middle-income people, upper-income people, and so on. On the other hand, we may wish to use a social-geographic model, which may or may not allow a cross-cutting of ethnic and/or economic variations within a given area. The criteria for classification by economic/employment group or any other criteria will of course bias the cluster we ultimately confront.

The main point to be emphasized is that because of the intrinsic heterogeneity of the U.S., a project's impacted areas are more than likely going to have within them a diversity of people, and thus a diversity of vested (or non-vested) interest groups. None of the people should be ignored, or left out of the opportunity for participation in planning, implementing and evaluating a project. It is not expected that by including (representatives from) all people that none will be hurt. Rather, by confronting all people throughout the planning process those who may be hurt can more easily be identified and be, themselves, involved in the mitigation efforts. Their involvement should come at the beginning, for

. . . it has become increasingly clear that action agencies designing (major stream-control devices). . . and directing their construction . . . should become more aware of the wide range of potential effects on the local culture, in order to advise local residents how to anticipate such impact. In cases of Kentucky reservoirs recently filled, effects on many location institutions were not foreseen. Last minute, inefficient solutions were made to deal with situations. Stresses and tensions thus created could have been avoided if, at the public meetings held by the Corps to point out possible economic and recreational benefits from the dams, attention had been directed to such potential costs. By warning against such difficulties, and suggesting sources of assistance if needed in solving reservoir-created problems, the Corps and similar agencies could reduce tensions and improve their own relationship with the people whose ecosystem they so drastically alter (emphasis mine).

(Drucker in Smith 1973, p. ii).

There are those who will argue that it is impossible to have representative involvement from the diversity of communities that may exist in a given impact area. We argue that by involving people from the outset, it is possible to insure a representative involvement from various communities. How can this be accomplished? By several means. Before the research

begins, it is useful for the principal investigator to make personal contact with various community people. (In some locales, it is going to be necessary for the research team to obtain permission from, for example, the village council or leaders, before interviewing in the community can be conducted.) If the principal investigation is to use community residents in the research, running a descriptive ad in the classified section of the newspaper may encourage residents to seek more information on the project. General announcements about the research, and the project that is being contemplated, may also be run in local newspapers, discussed on local radio and television stations, placed in meeting halls, churches, schools, and other public areas. Job and project descriptions might also be placed on bulletin boards in employment offices, social service agency offices, grocery stores, libraries, department stores, etc. These measures also alert people to be at public hearings. Copies of research reports should also be made available to the general public for their scrutiny and criticism, and a mechanism for revision of reports to accommodate such input should also be incorporated. In addition to the use of "lay-publics," it will be valuable to have criticism and evaluation of the reports from "professional" researchers.

The discussion on sources of evaluation, especially public participation, could be expanded to incorporate remarks on the methodology of public involvement, critical inputs, feedback mechanisms, etc. It is imperative at this point, however, to turn attention to the evaluation process itself and, finally, discuss some of the criteria by which cogent judgments about a project's effects can be made.

#### 4.2 Evaluation Criteria and Procedures

Recall that in Figure 4 and 5 (Section 2.1) an overall scheme of social impact assessment was advanced. These figures and the discussion that followed involve two levels of abstraction at the same time. On the one hand, we have been deductively developing a model of a social system, its mechanisms and its interface with other subsystems. At the same time, we have been talking about inductively identifying particular variables (and their indicators), clusters of variables (and their indices), and producing a profile that depicts and displays significant social factors and their effects. Planners are then supposed to be able to begin assessing and evaluating this amalgam of information to decide the overall social impact of any given public project.

Criteria are needed here against which effects of a proposed project can be measured. The most widespread expression and summary of such an effort comes under the label Social Well-Being/Quality of Life (SWB/QOL). The variety of legislative enactments (particularly NEPA, Section 122 and 209 of the River and Harbor and Flood Control Act of 1970, as well as such interpretive schemes as the Principles and Standards of the Water Resources Council as revised on September 10, 1973) all point out broadening objectives in public water resources planning, especially as they refer to the so-called "fourth account", namely social well-being.

The quest for SWB/QOL is elusive since it involves many value judgments on the very purpose of a planning activity. Ideally, against a broad criterion of social worth and collective survival one can juxtapose present conditions and potential consequences, and, thus, arrive at a judgment as to the advisability of a proposed plan. The utility of this approach was briefly indicated in Chapter 2. There, impacts were discussed in the context of relevant social and cultural variables. These impacts provided also a first analysis of dimensions of social well-being. But still the question remains: against what ultimate criterion do we evaluate a project's short and long-term effects?

One way of proceeding toward such a criterion is the delineation of goals and objectives. Goal formulation is a long, painful process of getting people to state desired values and objectives in terms that are clear, specific, and ideally, measurable. However, goals are not formulated by clear, rational, logical debate involving all groups concerned, but rather evolve from a complex history of vaguely expressed public opinion, faulty interpretations, and political opportunism. Thus ambiguity in project goals is a common phenomenon. Its explanation lies in the practitioner's preoccupation with concrete matters of program operation and the general pragmatic mode of operation. Sometimes, however, this ambiguity may serve the purpose of masking underlying divergences or disagreements as to the very premises on which the entire project is based.

Whatever the above concerns and reservations, the overall purpose of formulating goals is to:

- a. provide a means to organize, compare and delineate sets of criteria in water resources projects;
- b. become part of the information necessary to evaluate the demands and requirements placed on water resources development and to resolve competing and sometimes conflicting demands;
- c. establish a basis for examining the relationships between sets of goals and to order priorities among various water uses;
- d. create a background for open discussion of the larger aims of society and for reconciling political decision-making with the desires of the public and professional analysis.

A starting point for the establishment of goals and criteria is the revised Principles and Standards which not only recognizes what the Water Resources Council refers to as the Four Plan Formulation test, namely:

- a. acceptability to the public and compatibility with institutional constraints;
- b. effectiveness in meeting component needs;
- c. efficiency in meeting component needs and least-cost needs;

elements through which values and goals are expressed in terms of direct outputs or expected results from the operation of specific water projects, but not necessarily in terms of ultimate effects and long-range consequences. Objectives concern specific accomplishments and purposes. Since they are limited in scope (and much more specific than goals), they can be looked at as sub-goals dealing with shorter time periods. They are generally quantitatively measurable, permitting -- because of their preoccupation with direct effects -- a better evaluative scheme of the performance of the system. At the same time, since they are not as general and as ambitious as the broad goals, they require less collective public agreement and they sometimes may represent interests of specific groups.

Standards and criteria are the means and screening mechanisms for making decisions concerning the relationship of goals, objectives and policy intentions in the context of immediate and long-range effects on environments. Thus, decisions on a program are guided and constrained by criteria provided by authorities, legal texts and interpretations, professional judgment, and, increasingly in recent years, public participation.

Some of these criteria are quantitative in nature, while others are highly subjective resulting from evaluative judgments and decisions concerning more intangible dimensions of life. At the same time, with continuously changing goals and objectives, as well as policies, new criteria continuously emerge. One should be highly alert to the demanding task of choosing explicit, systematic, and clearly stated standards and criteria that would permit monitoring and careful evaluation of originally stated goals.

Clear definitions of goals, objectives, policies, and criteria help one evaluate long-range consequences. Ideally, we may see the connection between values, goals, objectives, criteria, and indicators in a continuum representing an effort of reduction and of increased detail from the more general level to the specific, and from desired broad ends to specific means. This organization of a systematic hierarchy of levels may be seen in Figure 13, where two parallel ideas are explicated: the generation of specific variables from general values, and the process of goal reduction. However, it should be noted that the dividing line between various levels of specificity are highly arbitrary and are nothing more than part of a generalized effort of problem-solving relating ends to means.

Each level in Figure 13 represents a goal from a point of view of the level below it, but a means from the point of view of the level above. It is in this sense that goals and means (or ends and means) may be interchangeable depending upon how one views the hierarchy of values and when one intervenes. What may be a goal in one program may be simply a means to another. For example, the construction of a water reservoir may be the goal of a given community in expanding recreational facilities and, therefore, this particular project may be an end in itself. However, from a regional point of view (and from a total inter-basin exchange program) this may be only a means for a larger overall program of providing water supplies or flood control for a much larger area or region.

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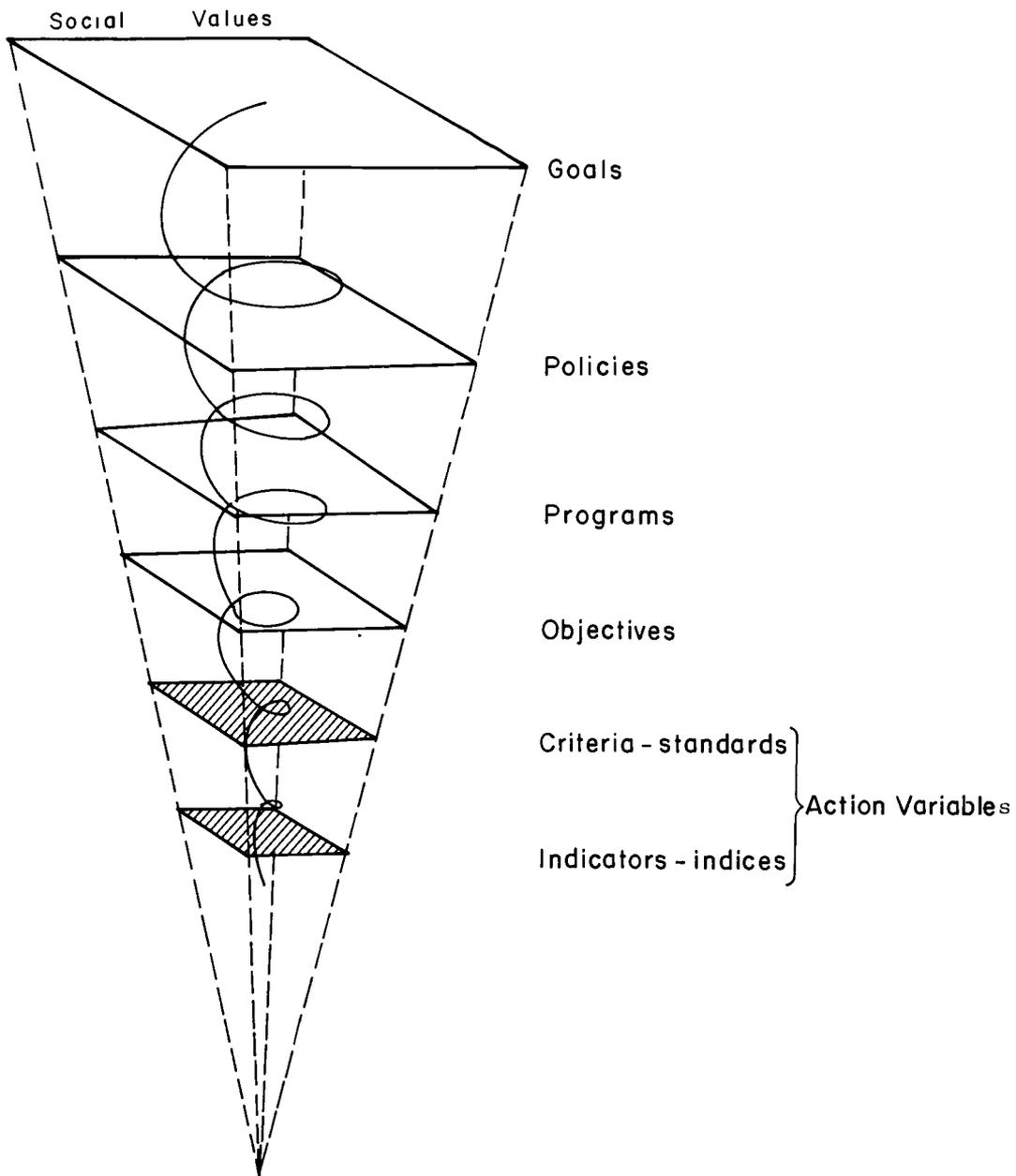
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FIGURE 13 -- The Process of Goal Reduction and Indicators' Development



Together with a variety of other documents and related literature, the Principles and Standards is one of the most widely used means for developing coherent goals and objectives in water planning, and permits planners, affected publics, Congressional members, and others the opportunity to evaluate a given project in terms of environmental quality (EQ), national economic development (NED), regional development (RD), and social well-being or quality of life considerations (SWB).

These principles are becoming the basis and vehicle for systematic water planning and evaluation. In addition, the principles and standards have strong policy overtones in that they: a) help assist in the allocation of scarce resources; b) delineate a system and criteria for displaying trade-offs in the form of alternative plans; c) recognize both quantifiable and non-quantifiable benefits and costs; d) demand public participation; e) require interdisciplinary input; and f) afford greater detail in the evaluation process and rational decision-making.

We still need to clarify the meaning and implications of Social Well-Being, which increasingly we are called upon to apply to water and other natural resources development. One way is to list from the Principles and Standards and from other documents components of this concept. In view, however, of conceptual vagueness and overlapping our approach for the establishment of "criteria" follows the scheme proposed in Figure 14.

In this figure, we recognize that the ultimate goal of any project, of any planning activity is survival and the enhancement of "fulfillment" understood as the "good life" ("man does not live by bread alone"). Assuming that the system of accounts can be used as a further elaboration, our effort should be concentrated primarily on the social well-being dimension, or QOL, recognizing at the same time overlapping with other areas (as, e.g., effects of increase in real income). The objectives indicated in Figure 14 (and they are only indicative of many similar objectives) can be separated into clusters of related specific variables and refined indicators.

Generally, a measure of the QOL can be carried out in a number of ways. While a number of important variables affecting objectives of SWB/QOL were outlined in Chapter 2, the quest for social well-being can be summarized in the simplistic diagram of Figure 15.

This figure schematizes a methodology for arriving at social well-being dimensions. But what about indices of social well-being themselves? One point needs to be noted, namely the implicit and explicit emphasis of the literature and guidelines on schemata that emphasize progressive human growth from an "immature" or basic to more "mature" or higher level. In such schemes, social well-being and quality of life are understood as part of an attainment of increasingly higher needs through such stages as survival, security, belonging, esteem, knowledge, understanding, aesthetics, self-actualization. Indices in such an approach tend to emphasize psychological satisfaction and "cultural" fulfillment, as contrasted with many of the structural dimensions discussed in Section 2.2.

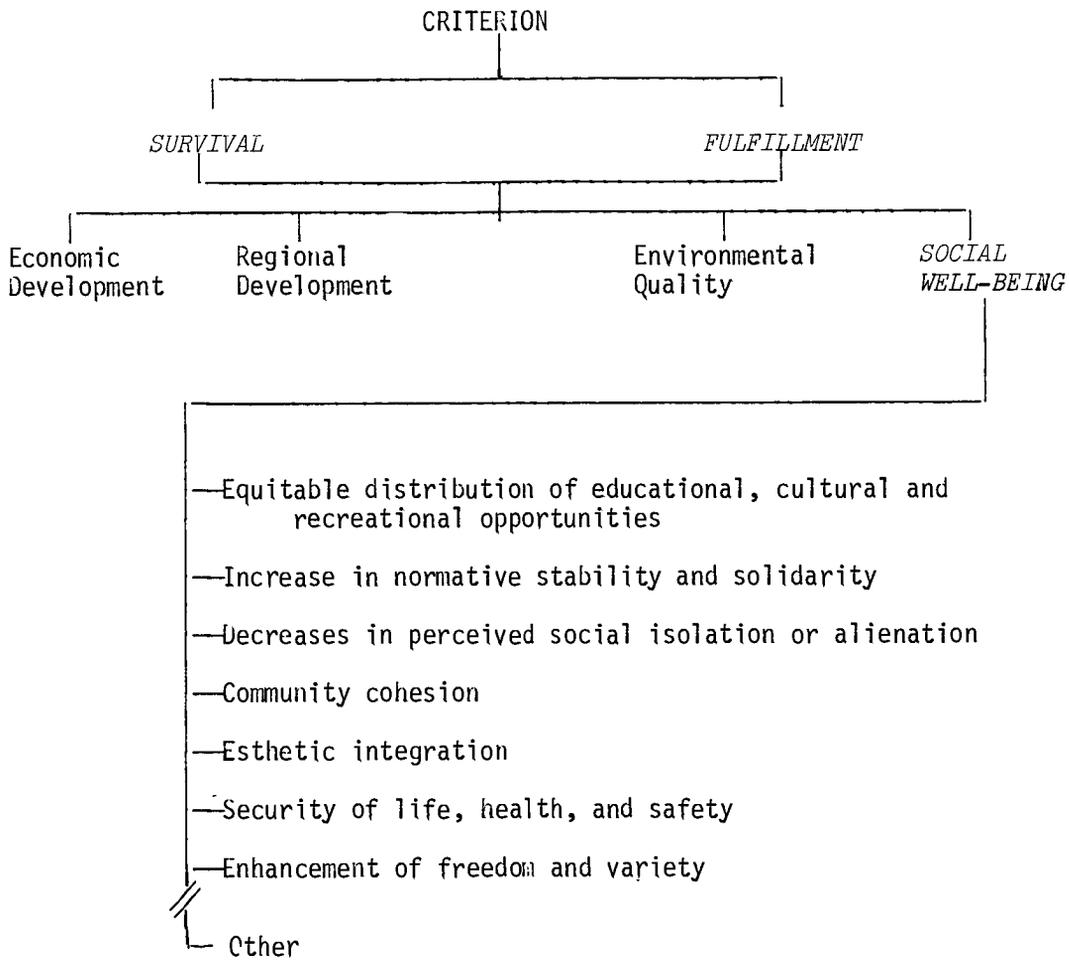
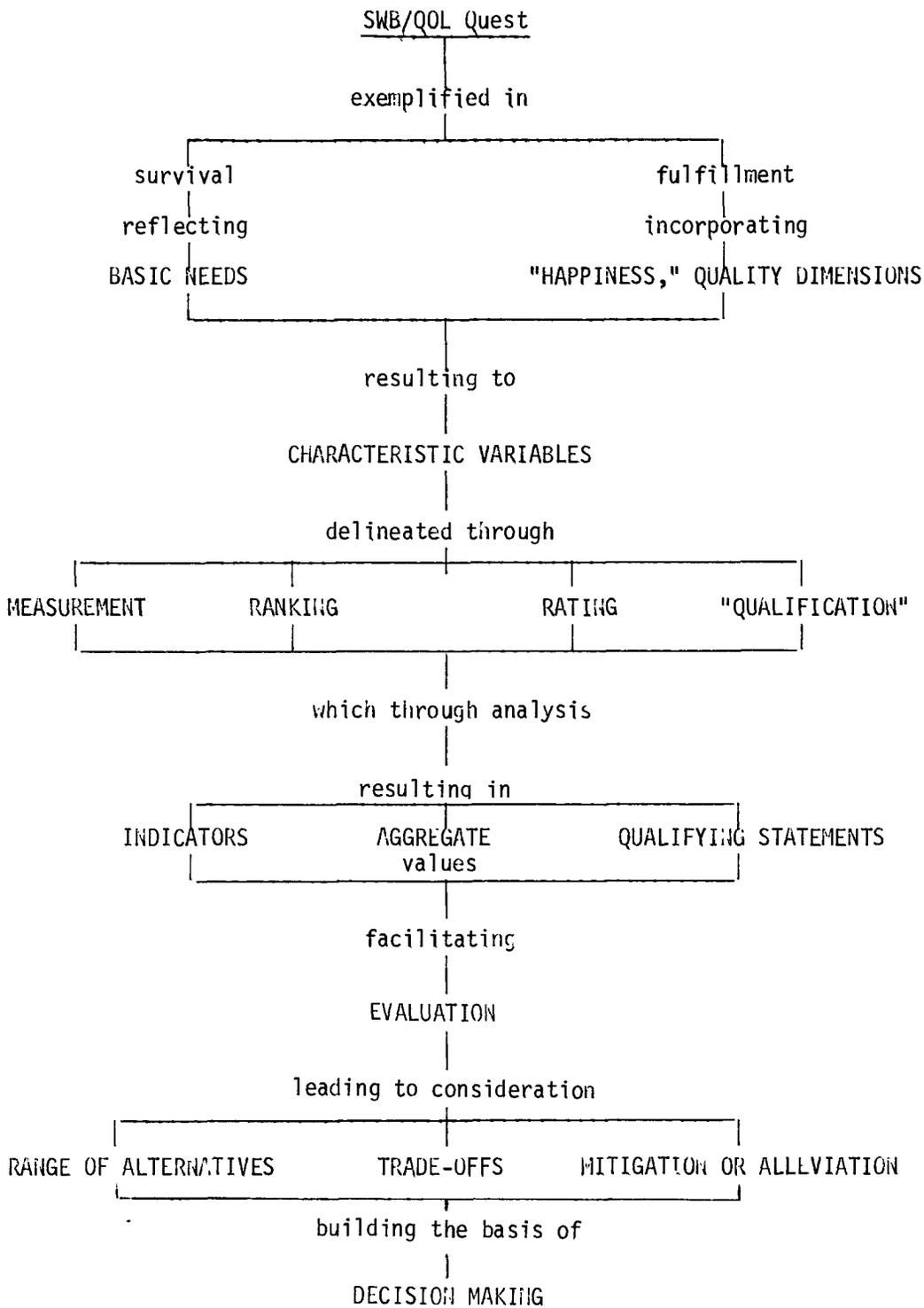


FIGURE 14-- Generation of evaluation criterion through social well-being goal emphasis

FIGURE 15 -- Determining Social Well-Being Dimensions



Thus, more important at this point is the question of social indicators themselves. Social indicators have been increasingly recognized as important forms of evidence for assessing goals, for evaluating specific programs, and for determining their short and long-range effects. Such important socio-economic indicators require selection of the unit of analysis; specification of the areas of concern and, collection of statistics relating to these sensitive indices.

Some studies have developed rather intricate systems for assigning values on various indicators. If we can quantify some of the dimensions involved, then we may be able to provide a value analysis which incorporates a benefit curve and a detriment curve and an optimum way of calculating the "total efficacy" of various combinations of parameters in the total design.

The process that generates indicators may be derived from a model of the particular study (which delineates critical variables) or from a breakdown of goals and objectives to such a level of specificity that they themselves become indicators. However, all current social indicators primarily express structural conditions and are not directly meaningful for consideration of broader social effects or unanticipated consequences. No good indicators exist dealing with net social benefits (benefits minus costs or losses in some sense). Similarly, rates of change require also additional indicators for assessing intensity or variations of given effects.

Studies have been made that try to breakdown goals into specific social indicators for monitoring and evaluating the effects of water resource projects on the environment. The most extensive study of this type is the so-called "Techcom Hierarchy" (formerly known as the "Strawman model") as it appears in the final report "Water Resources Planning, Social Goals and Indicators: Methodological Development and Empirical Test" (1975). There, a tremendous variety of social indicators, ranging all the way from internal security through environmental security to individual security, and from economic opportunity to aesthetic opportunity, exemplify the process of disaggregation and the question of developing sensitive indices to describe survival and fulfillment as the largest attainable goals.

The vast list generated in the above report as well as similar lists in other studies show concerted effort to develop social indicator models and systems of indices that can monitor the quality of life concept and the far-reaching effects of water resources projects. (See among others, Andrews, 1973; Fitzsimmons and Salamo, 1973).

Similarly, federal projects have been constantly subject to a systematic review in terms of relevant criteria. Beginning with the benefit-cost accounting of the "Green Book" of 1950, subsequent documents such as Bureau of the Budget Circular A-47 (1952), and Senate Document 97 (1962) have gradually increased the comprehensiveness and scope of water resources planning. Such efforts culminate in a variety of laws, regulations, administrative guidelines, and explanatory documents, and especially in the key provisions of the new Principles and Standards and their "four account" system. Yet, even in this document (although the broad concept of social

well-being is stated as an overall goal in federal water resources activities) no specific methodology is mentioned, nor are any specific indicators suggested.

Let us proceed, however, to develop a scheme of "measuring quality of life" with emphasis on appropriate social indicators. Figure 16 presents a truncated view of the process of separating out goals and generating social indicators with a few examples of characteristic sub-goals. Each particular sub-goal can be further broken down, analyzed, and disaggregated to such a level as to provide highly specific variables and indicators. For example, recreational opportunity may involve categories such as variety, quality, and ability to use facilities. The last may include available leisure time, access, income, and capacity of recreation activities each of which can serve as specific social indicators of the category "facilities."

It has been indicated previously that any social system (and for that matter any ecological system) is composed of sub-systems. It is important to note larger distinction between outputs of a water project or direct effects and total effects. The last reflect the effort for implementing an original decision (generated in the context of given social values and goals), and also indirect effects and unanticipated consequences.

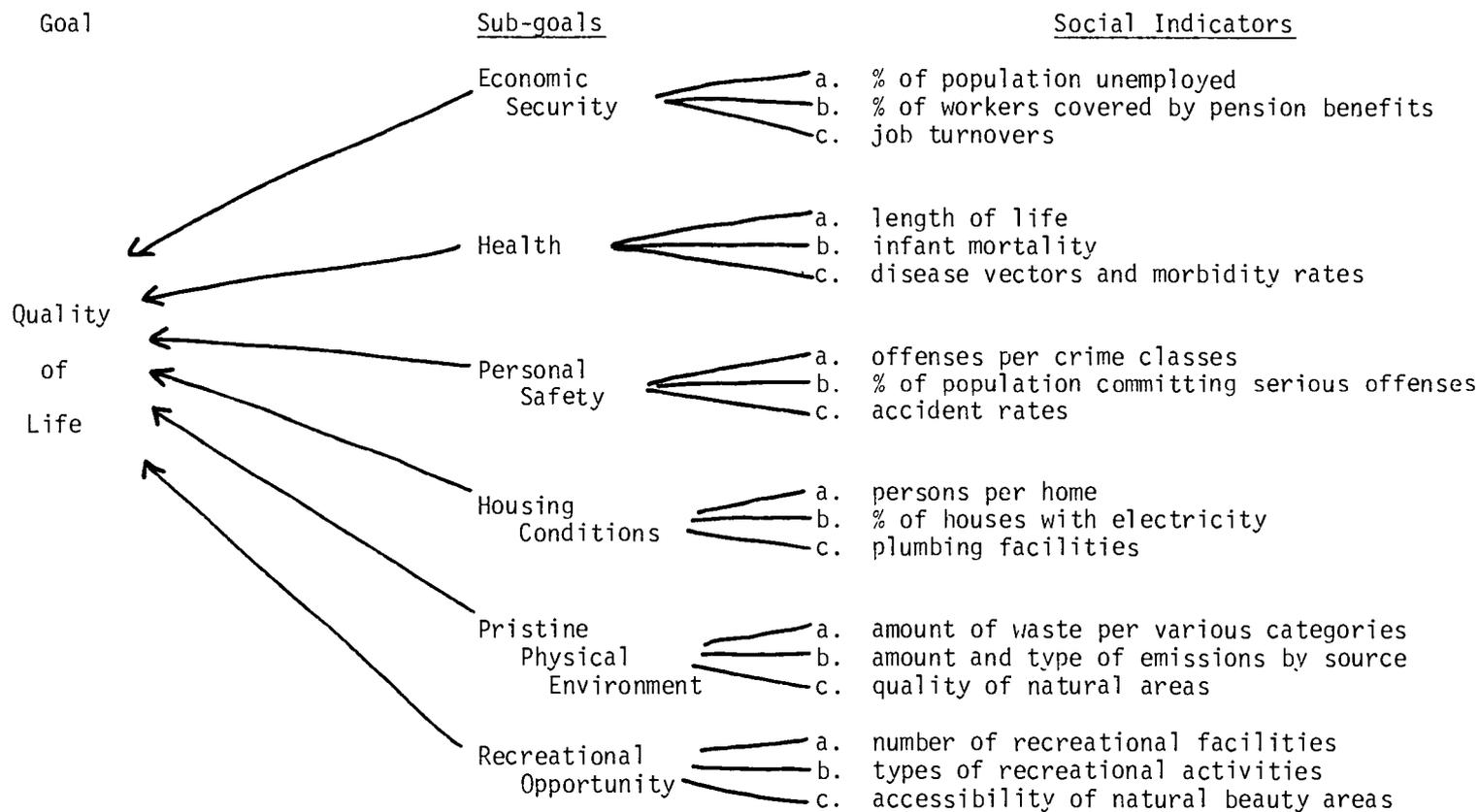
Let us articulate the difference between primary and secondary effects. "Primary" are usually defined as first in time, first in order of development, first in importance. In other words, as primary effects one may define those original factors that can be directly attributable to the project under consideration.

"Secondary" effects are of less than primary importance, second in time or in order. Secondary effects are derivative of primary ones, being either induced by or stemming from primary effects. Secondary consequences are related more to primary consequences than to the project itself; they are those impacts that are the indirect consequences triggered by the project but not in themselves "necessary" to the project. (This distinction often involves other similar terms such as direct-indirect, intended-unintended, first-higher, anticipated-unanticipated, tangible-intangible, etc.)

Needless to say, it is important to notice that there is really a fine line separating primary and secondary impacts and the placement of that line is mainly a value judgment and is quite often arbitrary. For example, we may know that activities related to the construction of a dam can be described as primary in terms of the loss of wilderness area, influx of construction workers, increased economic viability, etc. However, related land developments are difficult to determine as primary or secondary. The last case can be made as a result of the presence of the dam and the potential of a recreation area which stimulates further expansion.

To make such distinctions more precise, one may conceive of primary impacts as effects resulting from well-stated goals incorporated in the rationale of the project, in any supplemental guidelines, or in any other

FIGURE 16 -- Process of Developing Social Indicators



explicit manifestations of articulated objectives. The peripheral boundaries of secondary impacts are determined mainly as significance which is a function of the magnitude of the effects, the number of people affected, and the area affected by a water resource development. Finally, a further consideration should be the degree of irreversibility or irretrievability of the consequence.

It is interesting to notice that the distinction between primary and secondary consequences helps us also delineate an interactive scheme of "causes" and "effects" and of cross-relationships in the modeling of a given community system. Figure 17 outlines a paradigm of how social scientists can trace "causal sequences" and probable paths between direct impacts and indirect consequences. For each variable or category of effects a whole series of indicators can be developed that ideally can measure both the extent and rate of change.

Having delineated the criteria for assessing and evaluating impacts, our next concern is the process of evaluation itself. Evaluation is a derivative of "valuation," a term connoting not only a number of more or less objective considerations but also commitment to some normative purposes and definitive value orientation. In a simpler language, we are asking the following question: "To what extent does the project succeed in reaching its goals?" If we ignore for a minute methodological questions raised in Chapter 3, the evaluation process revolves around the following steps:

1. Find out a project's goals.
2. Translate the goals into measurable indicators of goal achievement.
3. Collect pertinent data.
4. Analyze and compare data on outcomes, participants, etc., with the goal criteria.

In practice, however, such a simple operation stumbles against several overt and covert considerations. To mention a few:

- a. Project goals are often ambiguous, elusive, or too broad to pin down. There are doubts as to what stated goals are. Are we, for example, interested in maximizing physical output in an efficient way, or providing a more equitable distribution among project beneficiaries?
- b. Projects do not accomplish only official goals. They also accomplish other things, sometimes in addition and sometimes instead. Serendipitous effects tend to confound the evaluative efforts. Time is an important factor since some projects may show immediate effects, while others create a "sleeper" effect that shows up at a later time.

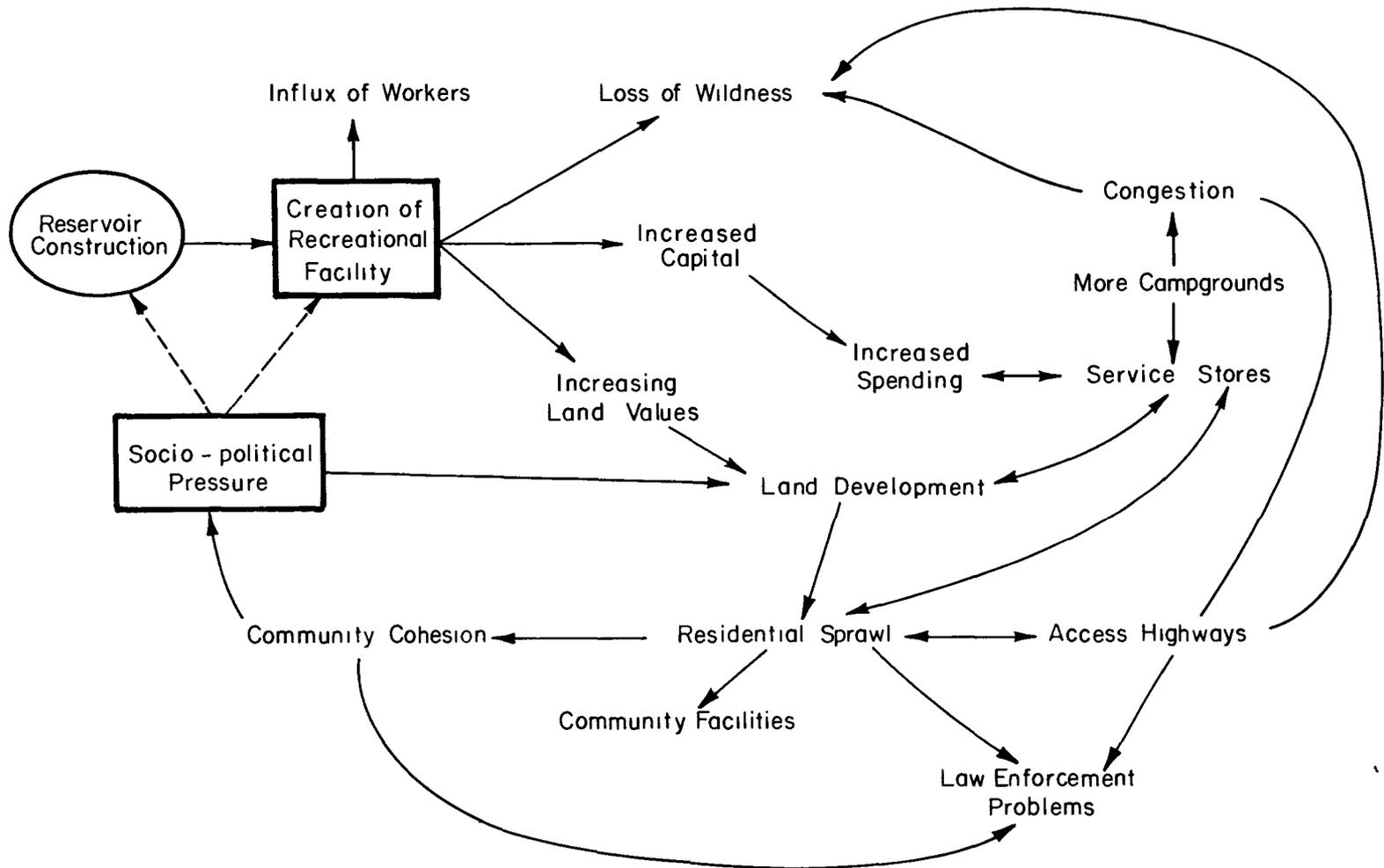


FIGURE 17 -- Selected Examples of Probable Cause-Effect Consequences in Reservoir Construction  
 (From Evan Vlachos and David W. Hendricks, *Technology Assessment for New Water Supplies*--Report, in press.)

- c. At whom is the project primarily aimed? Who are the potential "clients?" Are we seeking to influence or affect individuals, groups, or whole communities? How do we measure a series of changes and their differential effects among segments of the population?
- d. Many times projects aim at multiple effects. How do we measure and evaluate effects differing, among other things, in terms of type (direct, indirect), order (first, higher), magnitude (severe, light), importance (anticipated, unanticipated), timing (short-range, long-range), and reversibility (retrievable, irretrievable).

We need to recall all the above to emphasize the key role of goal specification in any evaluation effort and to indicate that even under the best conditions, good evaluation studies of projects are relatively rare. Furthermore, even if we come close to learning how well a project is reaching its goals, participants or members of a project may differ in expectations.

Any model of a social system must take into account that the latter is a system of complexly interrelated components or subsystems, such that changes in one of them may effect one or all others. These subsystems can be analyzed in terms of the main divisions of the society or community, i.e., the political, economic, educational, religious, kinship, military, etc. (as exemplified in Figures 6-8, Chapter 2).

A difficult problem may often arise in the evaluation of multiple impacts. Thus, a project may be assessed to have a positive impact on the economic sector but a negative impact on community cohesion and political integration (for example, through a disruption of neighborhood residential areas and a strong shift to suburbs, outlying towns or new political units). In addition, the educational system may be stressed by an influx of new workers' families and a demand for new types of job training.

Consequently, the evaluation of project impacts and goals cannot be confined narrowly. For example, a project's immediate goal may be to provide clean water, a deep enough river channel to permit navigation, and a family recreation area. But an evaluation of the project in terms of these health, economic, and social goals must also extend to a comparative evaluation against impacts in other subsystems of the community as well as in other environments outside that community.

The problem of making comparative assessments of values, goals, and preferences still plagues us. Where possible, of course, objective figures need to be given -- numbers of dollars, of persons, of acres, of students, of unemployed, etc. But there is no completely objective way to compare such units; the numbers do not speak for themselves in any way common to all groups of people. Although a benefit-cost type of comparative evaluation and balancing of trade-offs may provide some guidance under certain conditions, most social effects are inherently nonobjective and incommensurable. Thus, any benefit-cost analysis and balancing of trade-offs involving different subgroup values, goals and preferences reflects the biases of the analyst:

any final assessment and balancing can only be done through a fully participatory decision process involving the impact groups and institutional representatives, and a variety of both quantifiable and nonquantifiable measurements.

Although the Corps planners may weigh pro's and con's in terms of some particular well-defined criteria, any attempt by any group to force a value judgment on the whole community has no objective and defensible basis. Put in other terms, the Corps cannot be expected or allowed to be at once executor, advocate, judge and jury.

MANAGEMENT CONSIDERATIONS FOR OPERATIONALIZING  
SOCIAL IMPACT ASSESSMENT

5.0

This report so far has been directed primarily at those responsible for social impact assessment and secondarily those responsible for overall impact assessment. This section is directed more specifically at those personnel responsible for supervising the former.

As engineer/planners become involved directly or indirectly in assessing social impacts for Corps projects, they inevitably become involved in social science. This is bound to be somewhat frustrating initially for individuals trained to expect hard data and clearly delineated alternatives. Anyone who has read this far in the present document realizes that social science does not have methods of producing easily categorized hard data. Boundaries are never hard and fast, either in data and analysis within social science.

5.1 The World of Social Science

While there is an area of study called social science, all social scientists are trained in a specific social science discipline such as sociology, anthropology, social psychology, psychology, economics or cultural geography. There is a great deal of overlap between these fields, but each has different orientations to research and methods for data collection.

Social sciences can be best understood in terms of two dimensions: cross-institutional analysis and institutional analysis. Under institutional analysis can be classified those social sciences which focus on the study of a single major institutional area.

Social Science Sub-Field

criminology  
geography  
political science  
economics

Institutional Area

deviant behavior  
land ownership and use  
government  
economy

Note that while economics is usually classified as a social science, economic considerations are subject to separate analysis outside social impact analysis.

Additionally, there are social sciences which focus on a particular type of social phenomena in all institutional areas.

Social Science Sub-Field

Type of Phenomena Studied

psychology

sociopsychological  
(attitudes, perceptions)

sociology

social structure  
(social organization)

anthropology

sociocultural  
(shared values)

Each social science has developed its own conceptual frameworks and methods for analysis. But most social scientists are aware of methodologies in related social sciences. Thus a cultural geographer has special skills in social impacts related to changes in land use. But the anthropologist and the sociologist could also contribute in this area. However, because of the focus on attitudes and perceptions, the social psychologist could probably contribute little to the determination of changes in land use, but he would be particularly suited to determine how people might respond to these changes. Thus the selection of a particular type of social scientist for involvement in social impact assessment can be expected to vary somewhat depending on the nature of anticipated project impacts.

An increasing number of academic departments in the social sciences are recognizing the need for broadly trained applied social scientists to meet the need for social science expertise within a variety of agencies. Social scientists with such an applied focus are likely to be more broadly trained than the more traditional social scientist regardless of field of specialization. For this reason, in selecting individuals to participate in social impact assessment, breadth of training and experience are probably more important than the particular disciplines.

5.2 Levels of Competency in Social Science

Given that a social scientist from any of several disciplines could make a contribution to social impact assessment, there remains the question of varying qualifications of social scientists at the bachelors, masters or doctoral levels. The higher degree of training and resulting specialization may have equipped the Ph.D. more for a role of researcher, or specialized consultant, than for day-to-day work for the Corps, particularly at the District office level. At the same time, it must be acknowledged that not all persons with B.A. training in the social sciences have the breadth of expertise and methodological skills to assess the range of potential social impacts stemming from Corps projects as required for adequate multidisciplinary impact assessment.

5.3 The Social Scientists in the Multidisciplinary Impact Assessment

Existing legislation recognizes and encourages multidisciplinary coordination and interdisciplinary research. Further, legislation exemplifies an underlying planning ethos which incorporates not only integrated approaches,

but also a futuristic orientation and evaluation of a wide spectrum of alternatives to solutions.

In this context, the Corps may utilize social scientists capable of performing tasks such as:

1. Preparation of studies, particularly at the early formulation stage, by collecting and analyzing relevant data, identifying appropriate populations and communities, describing historical and cultural features of the surrounding social environment.
2. Presentation of perspectives on social issues involving a variety of populations, exchanges and balances between natural and social systems and difficulties involved in estimating nonmonetary factors.
3. Continuous review and monitoring of reports and project implementation, alerting planners of the potential social consequences of proposed activities.
4. Review of projects that have been activated, being constructed, or completed for better understanding of impacts.

#### 5.4 Integration of Social Science Expertise into the Corps

The diversity of the social sciences, the varying scale and circumstances of Corps projects and the scope of social science involvement in multi-disciplinary impact assessment seems to dictate a variety of alternatives for integration and utilization of social scientists.

The first alternative is for employment of social scientists on staff positions within the Corps. Ph.D. social scientists may be better utilized at Division level or higher, where they could provide technical assistance and support for the social impact assessment at the District office level. B.A. or M.A. level social scientists, particularly if they had solid training or experience in applied research, could be utilized at the District office and perhaps the Division office level.

A second alternative for utilization of social science personnel would be through contracts for social impact assessment as part of a general contract for project assessment. However, even if the contract is through a private firm, the Corps would be well advised to look beyond the qualifications of the firm to require actual experience of the social scientist to be employed under the contract.

Thirdly, the Corps might contract for base studies to provide background data on the basic population and social trends in an area to be affected by a project.

Finally, individual social scientists or a panel of social scientists might be utilized by the Corps to evaluate, review or advise as to the current status of social impact assessment for a project, or the overall operation of social impact assessment in a Corps office.

It is probable that a mix of the above alternatives would be required to meet the diversity of needs in any Corps office. A small project, with few alternatives, relatively short project life and limited impact would probably best be carried out by a single person with a B.A. or M.A. in social science employed in a staff position at the District office level. An alternate solution might well be to secure cross-training for an existing staff member with an interest in social science. Intermediate scale projects with a greater range of potential impacts would seem to dictate utilization of someone with specific training in social science and a demonstrated skill in organizing research. Lacking a qualified staff member, the Corps might choose to contract the total effort of impact assessment to a multidisciplinary team. Finally, there are large scale projects which have a multigeneration impact on an entire region. While social impact assessment for an intermediate scale project could probably be carried out by a single broadly trained individual, the large scale project would probably require a multidisciplinary team of social scientists in order to adequately carry out the social impact assessment. At this level, each social scientist would be working more nearly as an expert within his own subdiscipline in a coordinated research effort. The scope of expertise required for large projects is beyond the probable social staffing potential of Corps District offices for the foreseeable future, dictating contracting for base studies and quite possibly for the social impact assessment as well.

It is obvious that at each project level there are alternatives for social science input. Probably in the long run a balanced mix of types of inputs and level of integration will occur in each District office according to local needs. It should be noted that full social impact assessment cannot be implemented without a significant increase in staff time and funding. Thus, the fuller integration of social science in the Corps planning effort must be viewed as a developing effort.

#### 5.5 Mutual Education of Engineer/Planners and Social Scientists

Likewise, the mutual education of engineer/planners and social scientists must be viewed as a developing effort. Most social scientists are not fully aware of water resources planning and of the roles played by engineer/planners in that process. Not all engineer/planners are fully knowledgeable of the capabilities and best means of utilizing social scientists. The current professional literature of each discipline needs to be shared. The social scientist might well read such journals as "Engineering News-Record" and "Water Resources Bulletin," while the engineer/planner might examine "Human Organization" and "Society." Gilbert White's "Strategies of American Water Management" offers the social scientist a view of the history of water management, while Douglas James' "Man and Water" could introduce the engineer/

planner to the potential contributions of the diverse social science fields. The possibilities for developing specialized short courses or in-service training for existing personnel should be examined. In the long run, however, mutual education is most likely to take place through informal discussions that are part of everyday work. The utilization of outside social science consultants can be an important factor in introducing new ideas into such discussions. Finally, the ideal situation for mutual education lies in the formation of working teams in which the planner and the social scientist each makes his contribution to the planning process in an ongoing effort.

## SUMMARY - RECOMMENDATIONS

### A. Summary Remarks

As stated in the Preface, the consultant team did not intend to provide a field testable "manual" or social impact assessment. Instead, the emphasis of the writing above has been primarily on the establishment of a frame of mind and a discussion of methodological approaches of social scientists.

Looking back at what has been discussed, one may detect key themes and preoccupations, some of which can serve as highlights. Among these:

1. Social impact assessment is become part of the planning process of water resources projects. This implies:
  - a. identification of the types of social scientists needed for a project;
  - b. delineation of the kind of social information most appropriate for the project;
  - c. commitment to interdisciplinary communication and efforts;
2. Contending theories and assumptions about society and social systems result in sensitizing rather than in operational models of impacted areas or communities. This realization (and the complexity of multiple impacts) leads to a tentative character of proposed community analysis, and also to:
  - a. recognition of the role of contending frames of reference;
  - b. long and often conflicting lists of critical variables;
  - c. acknowledgement of sociopolitical realities and conflicting interests;
  - d. awareness of the dynamic, iterative character of the social system;
3. Increasingly, water resources project assessment is acquiring a future-oriented emphasis. This movement reinforces:
  - a. wider recognition and application of technology assessment and social forecasting techniques;
  - b. commitment to an extended time-horizon and appropriate methodologies for multidimensional, multiobjective, multidisciplinary long-range models of impact analysis.

4. Assessment and evaluation will require more sensitive social indicators and sources of evaluation ranging from legal standards and professional judgments to public participation and involvement. Desired characteristics of social assessment and evaluation include:

- a. clear, specific, and, ideally, measurable goals and objectives;
- b. coherent schemes and hierarchies of criteria and indicators;
- c. the demanding task of "instrumentation" and quantification;
- d. specification of the areas of concern for which indicators are to be developed;
- e. recognition of the important difference between primary impacts and secondary consequences;
- f. collection and aggregation of basic statistics for the construction of sensitive indices.

To conclude, some broad recommendations must be made as to how the viewpoints of social sciences can be integrated into the entire impact assessment process. These recommendations include overall suggestions concerning the general Corps of Engineers social impact assessment effort and a few specific remarks for potential further work to be sponsored by the Institute for Water Resources.

B. Overall Recommendations Concerning the Corps of Engineers Social Impact Assessment Effort

1. Implementation of social impact assessment within the total planning process of the Corps of Engineers will require a much greater allocation of planning funds and staff time.
  - a. In the short run, the most immediate improvement in social impact assessment can be made through expanded contracting by the Corps for both base studies and full social impact assessment, together with training courses for lower level personnel and orientation sessions for supervisory personnel.
  - b. In the long run, a wiser use of available funds for social impact assessment may call for increased employment of social scientists within the Corps and indepth cross-training of existing personnel.
2. Use of advisory or review boards of social scientists may provide an essential mechanism for evaluation of the social impact assessment carried out by Corps personnel and by outside contractors.

3. A few selected Districts and Divisions should form a Social Science Advisory Group to work with the District over a period of time to improve understanding of social sciences in Corps programs,

4. Effective utilization of social scientists by the Corps must be based on the professional needs of both social scientists and the needs of the Corps.

- a. Continued close contact between Corps social scientists and other social scientists is required to overcome the current limited state-of-the-art in long-range social impact assessment.
- b. Organizational structures must be evolved to facilitate the productiveness of social scientists within and outside the Corps, similar to those being developed in other fields.

5. At the District office level, there is a need to begin building a broad data base for social impact assessment reaching beyond the individual project.

6. Social impact assessment must be recognized as essential to all aspects of long-range planning by public agencies, and the efforts of the Corps and of social scientists working with the Corps must be directed toward improving the predictive quality of social impact assessment.

7. A conference of relatively high level Corps personnel (District or Division planning chiefs, OCE, BERH, District and Division Engineers) should be held to show how the social sciences fit into field level planning. In preparation for such a conference, trial field studies should be made in order to present a variety of actual situations and a realistic examination of the spectrum of problems encountered in social impact assessment.

C. Recommendations by the Team of Consultants to the Institute for Water Resources for Potential Further Work to be Sponsored by IWR

1. A series of pilot sites representative of the scale and variety of Corps projects should be selected for utilization of this background report under more or less controlled conditions, or at least monitored as "natural experiments." This might serve as a preliminary field check of the report and as a basis for revision in terms of the needs of the field.

2. Long-range social forecasting is a new area of study in social science. It would seem appropriate to carry out a state-of-the-art study of the use of social forecasting in concrete situations.

3. In light of 2 above, a long-range research plan could be formulated to try to provide standardized instrumentation for social forecasting and a series of social indicators particularly applicable to water resources projects.

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*This little volume is one of the definitive field guides for doing what is known as "natural sociology"--dealing with people in the context of their environment and letting them lead the researchers to the Data. The chapters on intensive interviewing, participant observation, and materials mechanics and analysis are quite detailed and excellent.*

Meehan, Eugene J., "Explanation in Social Science: A System Paradigm." Homewood, Illinois: Dorsey Press, 1968.

*Another paperback attempting to develop a general paradigm of the variety of explanatory schemes in social sciences, with emphasis on the system paradigm and value judgment.*

Mitchell, Arnold, et al., "An Approach to Measuring Quality of Life." (Report prepared for the Stanford Research Institute Research and Development Program). SRI Projects 90414 and 48953102AME. Stanford: SRI, September, 1971.

*One of the many studies and reports in the field having to do with the attempt to quantify dimensions of the quality of life.*

Moore, Frank W. (ed.), "Readings in Cross-Cultural Methodology." New Haven: HRAF Press, 1961.

*A wealth of material for sensitizing one in the varieties of cultural experiences.*

Morrison, Denton, et al (compilers), "Environment: A Bibliography of Social Sciences and Related Literature." Washington: EPA, Report 600/5-74-011, 1973.

*A voluminous collection of social sciences references on the environment. The bulkiness of the bibliography and the all-inclusiveness of the term "environment" make this bibliography difficult for immediate use.*

Motz, Annabelle B., "Social Science Data Banks and the Institute for Water Resources." US Army Engineers Institute for Water Resources, IWR Pamphlet No. 1, 1975.

*Author examines the potential use of social data banks for use by water resources planners. Contains interesting examples of data bank usage.*

Murdoch, William W. (ed.), "Environment: Resources, Pollution and Society." Stamford, Connecticut: Sinauer Publishers, 1971.

*Another good example of a useful collection of material relating to the larger problem of environmental studies and the relationship of ecology to society.*

Pelto, Pertti J., "Anthropological Research: The Structure of Inquiry." New York: Harper and Row, 1970.

*Probably still one of the most thorough research guides for conducting sociocultural research, covering major aspects of entering the field, selecting informants, deciding on specific research tools, and the quantification of qualitative data.*

Phillips, Derek L., "Knowledge from What: Theories and Methods in Social Research." Chicago, Illinois: Rand McNally and Company, 1971.

*Pitfalls involved in the blind acceptance of the physical sciences model in social research. The author challenges many of the sacred assumptions concerning the collection of sociological data in his later work, "Abandoning Method" (San Francisco: Jossey-Bass, 1973).*

Poetner, Herbert G. and the ASCE Committee on Research, "Impact of Civil Engineering Projects on People and Nature." New York: American Society of Civil Engineers, 1973.

*An attempt of a special committee of the American Society of Civil Engineering to determine the requirements for cogent analysis of the impact of public projects on society and the environment.*

Proshanksy, H. M., W. H. Ittelson and L. G. Rivlin, "Environmental Psychology: Man and His Physical Setting." New York: Holt, Rinehart, and Winston, 1970.

*One of a beginning series of textbooks (and readers) in the new field of environmental psychology with particular emphasis on theoretical conceptions, the organization of space, and basic psychological processes and the environment.*

Rokeach, Milton, "The Nature of Human Values." New York: The Free Press, 1973.

*This describes attitudes, values, and belief systems. Data from a national sample of American adults and from numerous special studies provide the basis for value profiles and a series of hypotheses on attitudes, behavior, and subsets of values.*

Rosenberg, Morris, "The Logic of Survey Analysis." New York: Basic Books, 1968.

*This remains the standard textbook on survey analysis with particularly useful discussions on the varieties of critical variables that one encounters in the research effort. A variety of examples enlighten theoretical principles and methodological particularities.*

Sharp, Virginia L., "On the Measurement of Social Impacts. A Social Indicator Approach." Department of Geography, The Pennsylvania State University (February 4), 1974.

*As the title indicates, another attempt to measure social impacts with particular focus on spatial distribution.*

Sheldon, Eleanor B. and W. E. Moore (eds.), "Indicators of Social Change: Concepts and Measurement." New York: Russell Sage Foundation, 1968.

*One of the first volumes in a series on social indicators. The emphasis is on large and national efforts for developing ways of measuring the performance of the social system. The original contributions of several social scientists are directed toward the analysis and control of major social change in the U.S.*

Smith, Charles R., "Social and Cultural Impact of a Proposed Reservoir on a Rural Kentucky School District." Lexington: University of Kentucky. Water Resources Institute, Research Report No. 60, 1973.

*One of the many reports coming out of Smith's work at the University of Kentucky which began even before the legislation which now requires assessments to be done. These reports are part of long-term studies and can be viewed as valuable guides for conducting social impact assessments in diverse settings.*

Stober, Gerhard J. and D. Schumacher (eds.), "Technology Assessment and the Quality of Life." Amsterdam: Elsevier Scientific Publishing Company, 1973.

*What could have been a useful work in bringing together technology assessment and considerations of social well-being turns out to be an uneven collection of writings. Yet, this book is useful in presenting the variety of examples of futuristic studies in the use of natural resources, the role of social technology, and of efforts measuring the quality of life concept.*

Suchman, Edward A., "Evaluative Research: Principles and Practice in Public Service and Social Action Programs." New York: Russell Sage Foundation, 1967.

*The standard book on evaluation. A rigorous analysis of the principles and problems involved in setting up schemes of evaluating public programs or actions.*

Sutherland, John W., "A General Systems Philosophy for the Social and Behavioral Sciences." New York: George Braziller, 1973.

*A very useful volume concerning the use of systems analysis in the social and behavioral sciences, with incisive criticisms on the failure to make appropriate use of the variety of scientific tools. The part on methodological and instrumental implications of general systems theory should be profitable reading.*

Technical Committee of the Water Resources Research centers of the Thirteen Western States, "Water Resources Planning, Social Goals, and Indicators: Methodological Development and Empirical Test." Logan, Utah: Utah Water Research Laboratory Publication PRWG-131-1, December 31, 1974.

*This is the final report of what earlier was known as the "Strawman" model (now known as Techcom). In addition to the principles of disaggregating social goals, objectives and indicators. This report also contains a series of studies on the practical applications of social indicators.*

Van Gigch, John P., "Applied General Systems Theory." New York: Harper and Row, 1974.

*A thoroughly useful introduction on the use of systems theory in formulating problems, in evaluating performance, and on developing the basis for decision-making and implementation. Of interest to both theoreticians and practitioners.*

Wagner, Richard, "Environment and Man." Second Edition. New York: W. W. Norton, 1974.

*The lucid writing and careful approach of this standard textbook enhances the even-handed argument about environmental problems, the effects of technology, and the overall relationship of man to his environment.*

Warren, Roland L., "Studying Your Community." New York: Free Press, 1965.

*This early methodological volume (which is out also in paperback) contains very practical information and guiding principles for studying human communities. Long lists of important variables in community analysis make it a useful working manual for laymen and serious researchers.*

Wilcox, Leslie D., et al., "Social Indicators and Societal Monitoring: An Annotated Bibliography." San Francisco: Jossey-Bass, Inc., 1972.

*Essentially a bibliography on social indicators and a handy reference for the researcher.*

Williams, Thomas R., "Field Methods in the Study of Culture." New York: Holt, Rinehart, and Winston, Inc., 1967.

*One of the first "field guides" that came out in the late sixties when there was a sudden emergence of concern for systematizing field procedures and approaches. It is still one of the best applicable to diverse situations.*

Wohlwill, Joachim, and D. H. Carson (eds.), "Environment and the Social Sciences: Perspectives and Applications." Washington, D.C.: The American Psychological Association, Inc., 1972.

*This is a rather traditional approach and discussion of the potential role of psychology in environmental studies. Yet, it remains one of the few statements from a psychologist concerning environmental studies, although heavily slanted towards problems of crowding, institutional settings, and behavioral responses to pollution.*

