EVALUATION IN ENVIRONMENTAL PLANNING

Assessing Environmental, Social, Economic, and Political Trade-offs

Donald M. McAllister

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Truth is our element of life, yet if a man fasten his attention on a single aspect of truth and apply himself to that alone for a long time, the truth becomes distorted and not itself but falsehood. . . .

Is it any better if the student, to avoid this offence and to liberalize himself, aims to make a mechanical whole of history, or science, or philosophy, by a numerical addition of all the facts that fall within his vision? The world refuses to be analyzed by addition and subtraction.

Ralph Waldo Emerson
"Intellect," *First Essays*

PREFACE

After teaching a graduate course on evaluation in environmental planning for several years at UCLA's School of Architecture and Urban Planning, I felt that a book on the subject might be useful. Evaluation is a central function of planning and a variety of methodologies have been developed over the years that seem to vie for the planner's attention. However, no single method is generally superior; each has its limits. Yet among the books, monographs, and articles on the topic, widely scattered across the disciplines, each tends to describe and advocate a single method. By collecting together in one volume information on a variety of methods, their strengths and weaknesses can be better understood. Furthermore, common weaknesses can be spotted that help identify directions for improvement.

The common strength of existing methodologies is at the same time the source of a major weakness. The evaluation of plans should be systematic and scientifically sound. Toward this goal the methods deserve substantial commendation for advancing the field in both thought and practice. But in focusing attention on technical rigor, the methods have placed evaluation on too narrow a base, ignoring important broader considerations.

Part I of this book attempts a beginning, at least, to redress the problem of narrowness by including chapters on human values, democratic philosophy, and environmental values. The discussions of these subjects, going well beyond the immediate bounds of evaluation, focus attention on those aspects I feel are most relevant to our topic. Some readers will be well versed in these subjects and therefore may prefer simply to skim the chapters or read the concluding sections. The selective nature of these chapters and the implications that are derived for the conduct of evaluations are necessarily personal. Other people surveying the same subjects might emphasize other aspects and reach different conclusions. To readers new to the field of evaluation, the relevance of these chapters may not be fully apparent on first reading, but review should substantiate their usefulness.

The intended audience for this book is broad, including citizens actively engaged in planning issues as well as the academic and professional communities. I have made a special effort to minimize the use of technical jargon so that readers do not have to be mathematicians and economists to understand the material.

Following the tradition in the evaluation literature, a fundamental premise

here is that public planning is not simply an instrument of preferential politics for serving only the interests of the select group in power. It assumes that the planning function seeks to give due consideration to all interests in designing and evaluating plans. Of course neither view is an adequate description of reality. Most planning contains some mixture of the two. To the degree that a particular planning effort seeks to be representative and systematic, the underlying philosophy and approaches presented here should be applicable.

Although there are many similarities and overlaps in the approaches to evaluation among different planning fields, this book does not attempt a general overview. It focuses attention on before-the-fact (or "ex-ante") evaluations of plans. Therefore many of the issues it examines are quite different from those addressed in the growing literature on evaluative research, which is primarily concerned with after-the-fact (or "ex-post") evaluations of social action programs. Moreover, it is directed at plans that have important environmental implications, in which evaluations must deal with the thorny problems of trading off environmental factors against economic and other considerations. Some of the issues in preparing environmental impact statements and similar documents are not addressed here, because they are receiving due attention elsewhere.

No new evaluation method is proposed in this volume, nor are detailed directions offered on "how to do it" in practice. Instead, the conclusions might be seen as containing suggested guidelines for conducting evaluations. This approach springs from the view that plan assessment is more an art than a science, an art requiring planners to design each evaluation process to fit the characteristics and requirements of the particular situation. Accordingly, excellent evaluations will result from the exercise of sound personal judgment more than from following a rigid set of standardized procedures. Planners should have a solid understanding of the strengths and weaknesses of various evaluation methods, and use them as a mechanic uses his tool kit, selecting that set of techniques most suitable to the problem at hand.

In developing my thinking on the topic and preparing this manuscript, I owe many thanks. First I wish to extend my thanks to the students who have taken my evaluation course for the many provocative ideas that have come out of our discussions.

Lawrence Susskind at MIT and Dennis Ducsik at Clark University made

penetrating critiques of the manuscript as reviewers for MIT Press, which helped me greatly in making improvements.

For their valuble comments on various drafts, I owe a special debt to my colleagues in the Urban Planning Program at UCLA, including W. David Conn, John Friedmann, J. Eugene Grigsby, Peter Marris, Harvey Perloff, and Donald Shoup. To Martin Wachs I owe a heavy debt for his invaluable comments on the first draft.

Ets Otomo typed the many drafts of this manuscript in her usual proficient and pleasant manner for which I am very grateful.

Finally, I want to thank Martin Wachs and Harvey Perloff for enabling me to reorganize my teaching responsibilities the past two years so that I could have large blocks of uninterrupted writing time.

Of course the help of these people should not be interpreted as a general agreement with the ideas presented in this book. Important differences of opinion were expressed, but naturally the choice of positions taken here was mine and I am solely responsible for whatever shortcomings remain.

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INTRODUCTION AND BACKGROUND CONSIDERATIONS

1
INTRODUCTION

Local governments each week make thousands of decisions affecting the quality of the natural environment and the use of rapidly depleting natural resources. Should a wildlife habitat be developed as a residential neighborhood? Should a rapid transit system be built at great expense in order to improve a congested city's transportation services and cut auto-related air pollution and energy consumption? Should a polluting manufacturer be permitted to locate in an area plagued with chronic unemployment? Should a community adopt a slow-growth policy to protect its rural character and public finance position, while restricting the freedom of people who would like to move to the area? Decisions on such issues are significant to local residents, and all local decisions, taken together, have major implications for our future living environment.

State governments and the federal government, too, make many decisions having far-reaching environmental implications. Should severe safety controls be adopted for establishing and operating nuclear power plants, controls so strict that all plans for new plants could be sidelined? Should a new land-use control be adopted that protects all prime agricultural land from being converted to urban uses? Should a statewide plan be adopted that regulates development in the coastal zone at substantial expense and reduction in private property rights in order to protect and preserve the unique environmental resources of the coast for the enjoyment of all people? Should a wild river be dammed to provide additional water and electricity to a growing metropolitan population hundreds of miles away? Clearly the wisdom of our decisions on these and similar issues will profoundly affect our future welfare.

The wisdom of our decisions will be determined by the care and methods we use to evaluate our alternatives. Evaluation—obtaining, organizing and weighing information on the consequences, or impacts, of alternatives—is the subject of this book. More specifically the focus is on concepts and systematic methods for evaluating public actions having important consequences for our natural environment: air, water, land, and life. The interest in these actions is not limited, however, to their environmental impacts; the full spectrum of environmental, social, economic, and political consequences must be considered in reaching wise decisions.

All types of public actions having environmental repercussions are relevant to the discussion. Projects entailing major construction are perhaps the most common source of environmental impacts and are the most frequent subject

of systematic evaluation methods. But many programs and policies have major implications for the quality of the environment and the use of rapidly dwindling natural resources. All should be subjected to systematic scrutiny.

1.1 EVALUATION IN PRACTICE

Evaluations of public actions today range the spectrum from nonexistent or haphazard to systematic and technically competent. A disappointingly small proportion of the decisions by local governments is made on the basis of systematic evaluations of the alternatives. Evaluations are often ad hoc, quick, and impressionistic. A sense of urgency tends to prevail over a sense of caution, usually fostered by a growing backlog of issues that decision-makers must address. The situation at the state level, in general, is only slightly better.

A much greater proportion of decisions at the federal level, having important environmental consequences, is preceded by systematic evaluations. This is due in large part to the adoption of certain legislative requirements. For example, the Flood Control Act of 1936 required that an evaluation be made of the benefits and costs of each proposed water project, eventually leading to the development and standardized use of cost-benefit analysis. The National Environmental Policy Act of 1969 required that environmental impact statements be prepared for all federal actions expected to significantly affect the environment. Although the impact statement is not a formal evaluation like cost-benefit analysis, it is a useful source of evaluative information.

In general, there has been a strong trend in the United States, beginning in the 1950s, toward a more thorough assessment of public actions. In recent decades several evaluation methodologies have been developed, cost-benefit analysis being the most notable, that help clarify and summarize for decision-makers the complex considerations of proposed actions. Some of these methods have become elaborate technical procedures that themselves are difficult to understand for all but the trained analyst.

The technical style of evaluation that is prevalent in many fields today contrasts sharply with the various styles of discussion and debate that predominated in earlier decades. The wisdom contained in the U.S. Constitution continues to amaze us, yet the many complex and interrelated decisions that were made during the Constitutional Convention were made without the aid of modern analytical tools. The men who framed this political masterpiece

were well read in philosophy, extremely knowledgeable in the history of political systems, and rich with first-hand experience in governing people during the colonial and confederate periods. With this background they debated each issue and decided by majority rule. The style of this period can be characterized as utilizing broad, integrated, shared knowledge, implemented by the process of discussion, debate, and compromise. By contrast the technical style that many advocate today can be characterized as utilizing deep, fractionated, unshared knowledge, implemented by written reports.

Clearly many of the problems faced today are quite different from those experienced in past decades and centuries. Many of our problems are more complex, requiring careful analysis by trained technical experts. Increasing specialization and the "knowledge explosion" seem to have put the average decision-maker and the average adult out of touch with the evolving body of scientific knowledge. These factors, and others, have contributed to the changing style of evaluation. Whether they have necessitated the change, however, is a different matter. There is no question that systematic evaluations are desirable, but there is evidence of growing discontent over the highly technical approach taken by most of the currently used methods.

1.2 THE ROLE OF EVALUATION IN PLANNING

Evaluation pervades the planning process, which in a highly simplified form can be characterized as encompassing the following five steps: (1) identify the problem to be addressed, (2) design alternative solutions to the problem, (3) evaluate the alternatives, (4) decide on the action to be taken through the appropriate political process and implement it, and (5) monitor the results.

Although evaluation is the explicit function of step 3, it also plays an important role in three other steps. Identifying the problem to be addressed (step 1) involves important value judgments, because it determines the particular interests that will be served by planning. The number of societal problems is huge by comparison to the limited number that available resources permit us to act upon. By some screening procedure we must scan the list of possibilities and select the few that are most important and amenable to solution. Although a formal evaluation is seldom conducted in this step, evaluation clearly is involved.

Designing alternatives (step 2) also involves major value-laden decisions:

deciding to explore some alternative solutions and not others, deciding to develop only one plan or several alternatives, selecting certain design elements in preference to others, pursuing large-scale solutions versus small-scale versions. Sometimes the most important planning decisions are made in this step. Evaluation also plays an important role in monitoring the results (step 5). In this step measurements and judgments must be made regarding the degree of success of an action and the occurrence of unwanted side effects, so that corrective feedback can be supplied when necessary to improve results.

The main focus of this book is assessments in steps 2 and 3, which I will refer to as "in-design" and "post-design" evaluation. However, the general principles and many of the tools discussed here also have applications in the other steps.

1.3 THE TWO PHASES OF EVALUATION: ANALYSIS AND SYNTHESIS

Evaluating a proposed action can be divided into two phases: analysis, in which the whole is divided into parts, and synthesis, in which the parts are formed into a whole. These are portrayed graphically in figure 1.1. In more specific terms the analysis phase defines and estimates the various impacts of the action. This is necessary in order to gain a detailed understanding of the many consequences of an action, but at the same time it poses a dilemma of achieving coherence from the many diverse parts. The synthesis phase attempts to solve this dilemma by bringing together the impacts into an integrated view so that a judgment can be formed on whether the action should or should not be supported.

Analysis tends to be objective, whereas synthesis is subjective. Estimating impacts is objective, because the correctness of the results, in principle, can be verified and agreed upon by all rational people.[1] Forming an integrated view is subjective, because in the process one must assess the relative importance of the impacts to the whole. The preference, which follows, of accepting or rejecting the action is a value judgment; its correctness cannot be verified. People will reach different conclusions from the same set of facts about impacts because their values differ.

Impacts can be quite diverse. A general classification of impacts is according to environmental, social, economic, or political characteristics. Examples of environmental impacts are air pollution, water pollution, wildlife,

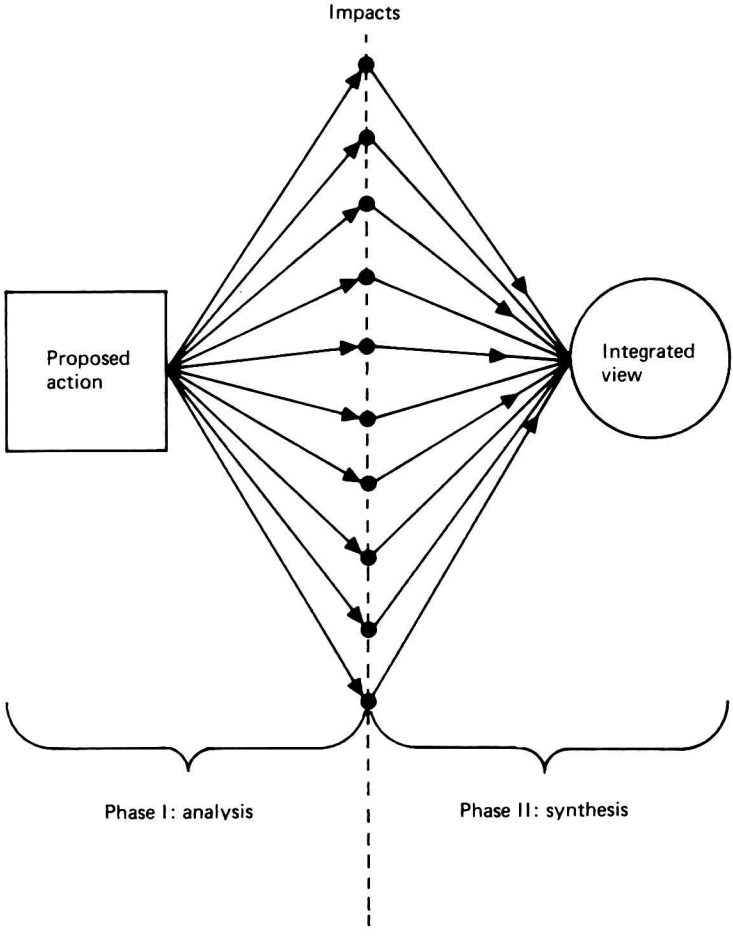

Figure 1.1
The two phases of evaluation

noise, soil erosion, landscape aesthetics, outdoor recreation resources, and the like. Social impacts include health, education, unemployment, disability, crime, discrimination, community cohesion, and many others. Economic impacts are those that can be measured directly in monetary units, such as income, taxes, property values, and the prices of goods and services. Political impacts include public access to decision-makers, the concentration of power, opportunities for citizen participation and inequalities in election and selection processes.

To accurately estimate impacts often requires the skills of technical experts in many different fields familiar with the systems in which the impacts occur and through which they are transmitted. Chemists, meteorologists, geologists, ecologists, and landscape designers are needed to estimate environmental impacts; psychologists, sociologists, anthropologists, and medical scientists, for social impacts; economists, engineers, and accountants, for economic impacts; and political scientists and public administrators, for political impacts. Thus the kinds of knowledge that are necessary for estimating impacts are diverse and quite technical. It is not the purpose of this book to discuss the technical aspects of impact estimation; no single book could contain the knowledge necessary for this task. However, the issues of scientific versus judgmental estimation and expert versus citizen roles are addressed.

The synthesis of impacts to form an opinion can be accomplished in either of two ways: informally, by personal review of the impacts, taking as much time as required for them to create a distinct impression in the mind; or formally, by applying a rating procedure that calculates a composite score of impacts. The informal approach can be characterized as judgmental and holistic; the formal as mathematical and additive.

The informal approach can be time consuming and frustrating. The impacts of alternatives are numerous and diverse, some are desirable and others undesirable; some can affect an individual directly while others only indirectly (by affecting other people in society); some occur immediately and others in the distant future; some can be predicted with certainty, but others are uncertain. All of these factors should be weighed in reaching a conclusion. Rarely is one alternative clearly superior. Each well-designed alternative typically has disadvantages as well as advantages.

Decision-makers, such as elected representatives and appointed officials,