1

Policy Analysis: An Overview

This chapter addresses five questions:

1. What is public policy?
2. What is policy analysis?
3. What is good policy analysis and what should be its objective?
4. How is doing policy analysis different from doing science?
5. What role does analysis play in making and implementing policy?

The questions are deceptively simple. My objective in writing this book is to help you develop your own answers to these and similar questions. Too many people who work in performing, assessing, and using policy analysis do so with little or no critical reflection on the assumptions that underlie the analysis they are doing or the methods they are using. Just as when people use powerful computer-based statistical packages without really knowing any statistics, performing and using policy analysis without a deep understanding of the ideas and assumptions that underlie the methods being used can often lead to results that are muddled, incomplete, or sometimes even dangerously misleading.

1.1 WHAT IS PUBLIC POLICY?

Bauer (1968) has observed that:

> Various labels are applied to decisions and actions we take, depending in general on the breadth of their implications. If they are trivial and repetitive, and demand little cognition, they may be called routine actions. If they are somewhat more complex, we may refer to them as tactical decisions. For those that have the widest ramifications, and the longest time perspective, and which generally require the most information and contemplation, we tend to reserve the word *policy* …

> It is true that one man's policy may be another man's tactics inasmuch as the level of organization is critical. The superintendent of a factory may pass along a directive to his foremen, which then becomes policy for them, that is, it forms the general framework of principles within which the foremen make their own "tactical" decisions, which in turn become policy for their subordinates …

The process of policy formation, especially when it occurs in the public sector, is typically highly complex, involving large numbers of actors, interacting over extended periods of time, and often involving several different levels and parts of government. Today, much policy formation also involves complex technical issues about which different parties hold different views, sometimes because of genuine disagreement about the underlying science and technology, sometimes because the parties hold or represent very different values and interests (Sabatier, 2007).

Much intellectual effort by academics has gone into trying to develop theories of the policy process. Sabatier (2007) has invested significant effort in organizing and publishing summaries of the current state of theorizing about policy processes. He identifies five different theoretical traditions:

1. The *stages heuristic* that consists of agenda setting, policy formulation and legitimation, implementation, and evaluation. This is less a theoretical framework than a simple descriptive ordering.
2. *Institutional rational choice* that explores how participants motivated by material self-interest operate within a set of institutional rules and constraints (see the discussion of Graham Allison's models in Chapter 15).
3. *Multiple-streams* in which a set of different actors and processes operate largely independently until they occasionally come together through "policy windows" (see the discussion of the Kingdon model in Chapter 16).
4. *Punctuated-Equilibrium*, which adopts the perspective that policy processes are "characterized by long periods of incremental change punctuated by brief periods of major policy change … when opponents manage to fashion new 'policy images' and exploit the multiple policy venues characteristic of the United States."
5. *Advocacy Coalition Framework*, which, as the name implies, "focuses on the interaction of advocacy coalitions – each consisting of actors from a variety of institutions who share a set of policy beliefs – within a political subsystem."

Sabatier (2007) provides a bibliography of the literature on each of these and also summarizes several other theoretical traditions whose formulation and application have largely been limited to the United States. Readers interested in learning more about these different theoretical strands can find details in the individual chapters of Sabatier's edited collection, which summarize and discuss each one.

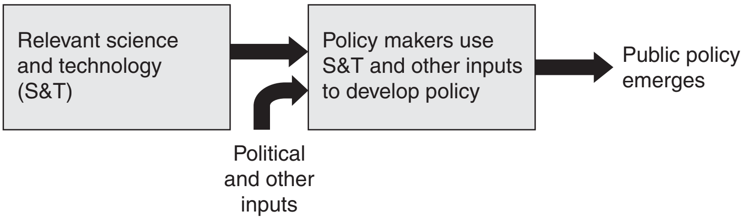

FIGURE 1.1. A classic "technocratic" vision of the way in which scientific and technological knowledge contribute to the development of public policy.

1.2 WHAT IS POLICY ANALYSIS?

While this is a book about the tools and practice of policy analysis, my more specific focus is on policy problems in which scientific and technical details are of central importance – that is, on problems where ignoring those details is likely to lead to dumb or silly answers. For many years, and indeed in some circles even today, the model adopted of how science and technology contributes to the development of public policy has been the "technocratic model" shown in Figure 1.1. In this model, insights from science and technology feed directly into the policy processes where they are combined with political and other considerations to shape public policy.

Beginning in the late 1960s, Arthur Kantrowitz (1913–2008), who was then president and CEO of Avco-Everett Research Lab (AERL), began to promote the idea of science courts (Kantrowitz, 1976, 1995). His idea was to convene a jury of accomplished scientific experts in an area that was of importance to a pending policy decision. This group would take testimony, deliberate, assess the present state of science, and then pass the results along for use by the policy community.[1] Kantrowitz (1976) argued that such a science court should "be concerned solely with questions of scientific fact. It … [should] leave social value questions – the ultimate policy decisions – to the normal decision-making apparatus of our society, namely, the executive, legislative, and judicial branches of government as well as popular referenda."

I believe that Kantrowitz had two objectives in promoting the use of science courts. He was clearly interested in devising a mechanism to get the best available science into the hands of the policy community. I may be doing him an injustice, but in conversations I had with him in the 1970s it seemed clear to me that his second objective was to protect and isolate the clean and objective

[1] While somewhat different, the IPCC process for assessing climate change, its likely impacts, and strategies that might be used for mitigation and adaptation, has some similarities to the process Kantrowitz envisioned, although some aspects of the work of Working Group III have probably gone further than a strict interpretation of the science court model. Note, too, that while Kantrowitz was only concerned with natural science, the same model could be applied to empirical social science, as Working Group III has also done in a limited way.

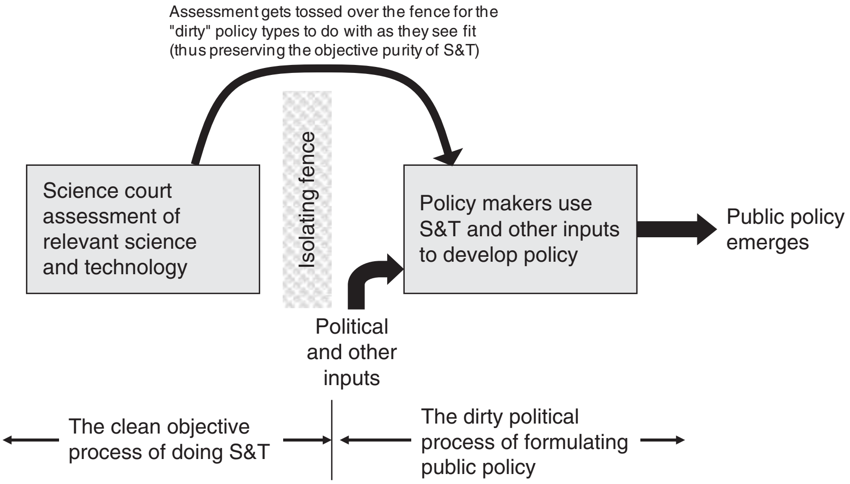

FIGURE 1.2. A "science court" strategy in which the science and technology are assessed by a jury of technical experts in a clean and objective way and then that assessment is tossed over the fence to be used by the "dirty" political policy process. This figure may be an exaggeration of what some of the proponents of science courts had in mind, but it is clear that a motivation of at least some of them was to isolate science from the policy process.

work of science and technology from the "dirty" and inherently political work of policy development and implementation. To the extent that this reading is correct, the model is shown in Figure 1.2.

A key problem with either of these two models is that the raw results that come out of research in science and technology are rarely in a form in which they can be directly applied to the development of public policy. The key role of policy analysis and policy-focused research is to determine the needs of the policy-making process and then frame, interpret, and, as needed, extend available scientific and technological knowledge to place it into a form that is relevant to, and addresses the questions faced by, the policy community.[2] This model is displayed in Figure 1.3.

Most of the players in government policy processes are generalists, often lawyers or liberal arts graduates. The best ones are quick studies, able to master a wide range of new issues. However, analysts who are performing policy

[2] While I often use the phrase "policy analysis" in this book to refer *both* to policy analysis and to policy-focused research, the two concepts are different. In its narrow sense, policy analysis is undertaken in direct support of decision makers who face a specific policy choice. Policy-focused research is a more general concept involving analysis that is informed by, and intended to inform, the present or likely future needs of the policy community. For an elaboration of these ideas, see pp. 16–18 in Morgan and Henrion (1990).

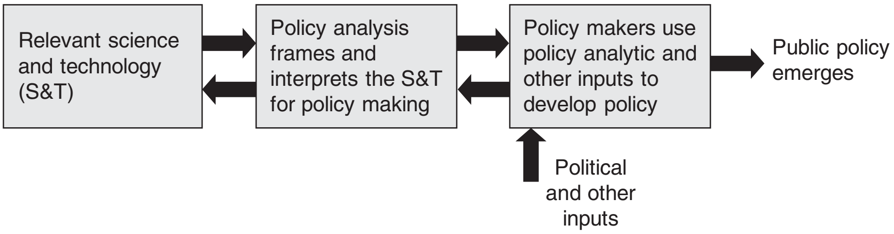

FIGURE 1.3. Policy analysis plays an essential role by framing, interpreting, and, as needed, extending available scientific and technological knowledge to place it into a form that is relevant to, and addresses the questions faced by, the policy community.

analysis on scientifically and technically substantive issues need to have a strong domain expertise.

1.3 WHAT IS GOOD POLICY ANALYSIS AND WHAT SHOULD BE ITS OBJECTIVE?

The word "good" implies a normative (i.e., value) judgment. People commission policy analysis for a variety of reasons, so what is a "good" piece of analysis might be expected to depend on the motivation of those who commission it. Morgan and Henrion (1990) list a variety of motivations that people have for engaging in analysis. While these include "substance-focused" analysis that is designed to develop insight or understanding about a specific or general class of problems, they also include: "position-focused" analysis that is designed to produce results to substantiate and provide support for the preferences and views of a participant in an adversarial setting; "process-focused" motivations that result from institutional or legal mandates that require analysis; and "analyst-focused" motivations related to the professional and personal interests of those performing that analysis.

Given this wide range of motivations, it might be tempting to conclude that producing a general set of attributes of "good" policy analysis is a hopeless task. However, Morgan and Henrion (1990) argue that while:

> people and organizations undertake research and analysis with a wide range of motivations, if it is to serve its purpose, analysis must be able to pass, at least to a minimal extent, as having been undertaken with a substance-focused motivation. For example, for a piece of analysis with a position-focused motivation to be effective, others must be prepared to treat it as substance-focused. If one can readily demonstrate that the inputs for the analysis were artfully chosen to get the desired answer, the effectiveness of the analysis as an adversarial tool is greatly diminished.

Morgan and Henrion (1990) conclude that while one can "identify a wide variety of motivations for commissioning or performing policy research and

TABLE 1.1. *"Ten commandments" of good policy analysis from Morgan and Henrion (1990).*[3]

1.	Do your homework with literature, experts, and users
2.	Let the problem drive the analysis
3.	Make the analysis as simple as possible, but no simpler
4.	Identify all significant assumptions
5.	Be explicit about decision criteria and policy strategies
6.	Be explicit about uncertainties
7.	Perform systematic sensitivity and uncertainty analysis
8.	Iteratively refine the problem statement and the analysis
9.	Document clearly and completely
10.	Expose the work to peer review

analysis … if it is to be effective all such work must meet some minimal standards as successful substance-focused work." Table 1.1 summarizes the attributes they argue such work should display. An elaboration of each attribute can be found on pp. 36–43 of Morgan and Henrion (1990).

Item 8 in Table 1.1 deserves special notice. Figure 1.4 contrasts the sort of linear approach to policy analysis that is adopted by many, especially inexperienced analysts, with the approach of iteratively refining both the problem statement and the analysis.

I first produced my own answer to the question "What is good policy analysis and what should be its objective?" in an editorial I wrote in the journal *Science* in 1978. I believe it is still a pretty good answer:

> Good policy analysis recognizes that physical truth may be poorly or incompletely known. Its objective is to evaluate, order, and structure incomplete knowledge so as to allow decisions to be made with as complete an understanding as possible of the current state of knowledge, its limitations, and its implications. Like good science, good policy analysis does not draw hard conclusions unless they are warranted by unambiguous data or well-founded theoretical insight. Unlike good science, good policy analysis must deal with opinions, preferences, and values, but it does so in ways that are open and explicit and that allow different people, with different opinions and values, to use the same analysis as an aid in making their own decisions. (Morgan, 1978)

[3] In using the phrase "ten commandments" Morgan and Henrion (1990) write: "We know of no analysis, including any of our own, that satisfactorily meets all of these commandments. Some may object that if the commandments are unachievable, they should be abandoned. We disagree. Most Christians consider a life without sin unachievable. Nevertheless they have found it to be a useful guiding objective. The point is to try to get as close to the ideal as possible." Morgan and Henrion argue that the commandments they list should play a similar role.

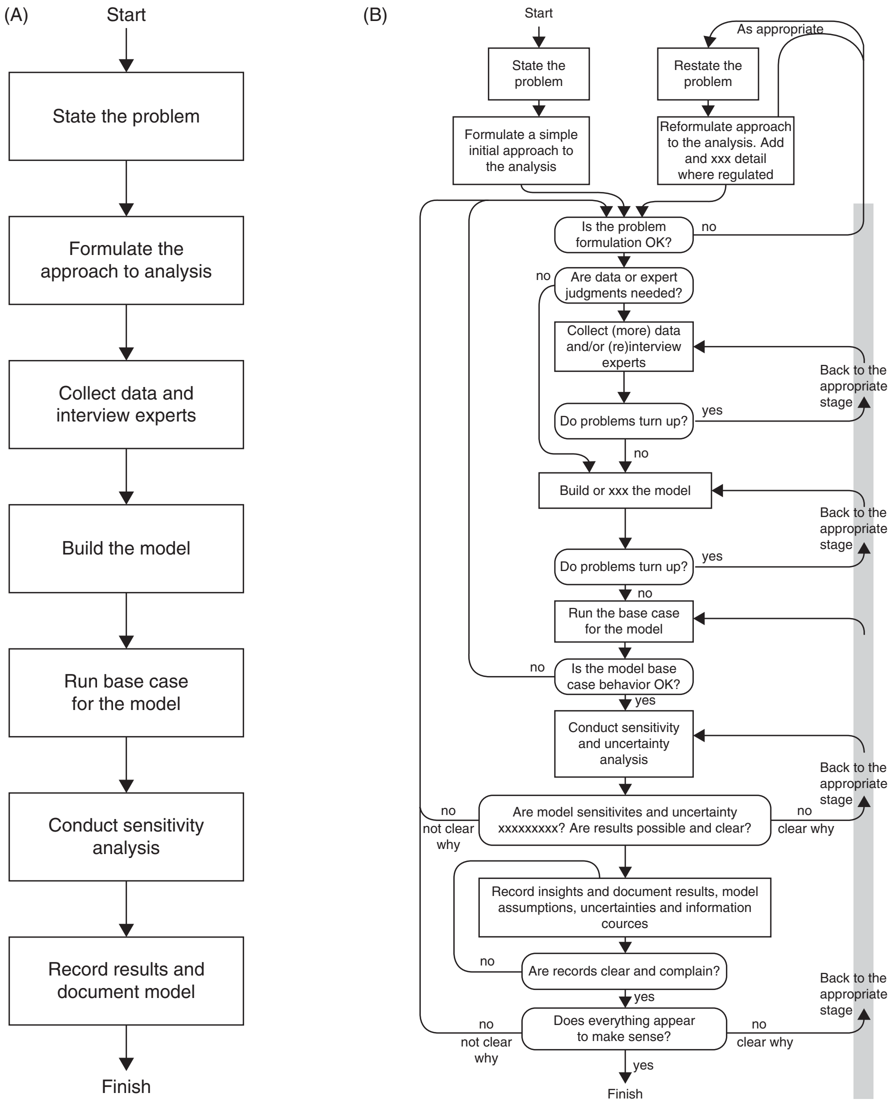

FIGURE 1.4. **A.** Example of the linear approach to analysis adopted by many, especially inexperienced analysts, as contrasted with **B.** the approach of iteratively refining both the problem statement in the analysis that characterizes good policy analysis. Figure modified from Morgan and Henrion (1990).

READING 1.1

Sections 3.3–3.7 (pp. 23–36) of "Chapter 3: An Overview of Quantitative Policy Analysis," in M. Granger Morgan and Max Henrion, *Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis*, Cambridge University Press, 332pp., 1990.

DISCUSSION QUESTIONS FOR READING 1.1

- Why does James March argue that goal development and choice are *not* independent? In doing policy analysis, when might that matter and when does it probably not matter?
- Table 3.2 in Morgan and Henrion lists a number of different decision criteria for policy analysis for risk management. Are they all equally feasible? Can you describe situations in which one might choose to use: cost effectiveness; approval/compensation; best available technology?
- Are you persuaded by the argument that, whatever the analyst's motivation for performing an analysis, to serve its purpose, policy analysis must be able to pass, at least to some extent, as having been undertaken with a substance-focused motivation? Why or why not?

1.4 HOW IS DOING POLICY ANALYSIS DIFFERENT FROM DOING SCIENCE?

Section 3.2 in Morgan and Henrion (1990) addresses the difference between how policy-focused research and analysis is typically performed and the process of doing science. An updated summary is reproduced in Table 1.2.

We argued that empirical testing was typically far more feasible in many branches of science than it is in the domain of policy. That remains the case, although small-scale policy experiments are sometimes possible. Unfortunately, such experiments are too rarely tried.[4]

Both policy analysis and empirical science should document work with care so that others can understand what assumptions were made and reproduce the results obtained. This is standard practice in science, aided by the fact that in many fields standard laboratory and analytic procedures have been adopted that can be referenced in a way that all readers in that field can

[4] The fact that the United States has 50 states offers an opportunity to use the policy initiatives of one or a few states as a "laboratory" to assess new policy ideas. Of course, that requires that these "experiments" be well instrumented, which too rarely happens. It is also possible to simulate or "red team" policies before they are put into practice – again a strategy that is too rarely adopted. For example, if some of the policies that were put into place in the restructuring of the U.S. electric power system had been subjected to such assessments, a number of problems might have been anticipated and avoided.

TABLE 1.2. *A comparison of the process of doing science with the process of doing policy analysis as made by Morgan and Henrion c.1990 and updated 25 years later.*

Features of science	**Common practice in policy analysis *c*.1990**	**Common practice in policy analysis *c*.2016**
Empirical testing	Testing often impractical	Testing often impractical
Full documentation	Documentation typically inadequate	Documentation slightly better but still often inadequate
Reporting of uncertainty	Uncertainty usually incomplete or missing	Uncertainty frequently addressed but with uneven quality
Peer review	Review not standard and in some cases arduous	Review much more common especially in some agencies like EPA and in peer-review publications
Open debate	Debate hindered by above problems	Debate still hindered by some of the above problems

understand what was done. While progress has been made in recent decades, adequate documentation is still insufficiently practiced in policy analysis.

Another standard practice in science is the routine reporting of uncertainty in all results. To quote Carl Sagan (1995), "Every time a scientific paper presents a bit of data, it's accompanied by an error bar – a quiet but instant reminder that no knowledge is complete or perfect." At the time Morgan and Henrion was published, the treatment of uncertainty in policy analysis was relatively rare. Today, in part because of that book as well as the work of many others, most analyses, especially for agencies such as EPA, include a discussion and treatment of uncertainty, although quality remains uneven.

Peer review is the norm in science, but is still too rarely practiced in policy analysis. However, here too, in recent decades, the emergence of outlets for peer-reviewed publication of policy-focused research has begun to change the situation.[5]

Debate is the norm in science. It occurs in policy analysis as well, but to the extent that the four previous problems remain unresolved, informed debate can be difficult.

In 1972, the nuclear physicist Alvin Weinberg (1915–2006), who had long served as director of Oak Ridge National Laboratory, addressed the role

[5] One of the first leading journals to introduce a separate peer-reviewed section for policy analysis was *Environmental Science and Technology*, under the editorial leadership William H. Glaze. Mitchell J. Small of Carnegie Mellon served as the first area editor, and was instrumental in establishing the high standards that continue to characterize that section.

of science in the public policy process in a thoughtful essay titled "Science and Trans-Science" (Weinberg, 1972). Weinberg observed that, with increasing frequency, questions in public policy "hang on the answers to questions which can be asked of science and yet *can not be answered by science.*" He proposed the term "trans-scientific" for these questions since "though they are epistemologically speaking, questions of fact and can be stated in the language of science, they are unanswerable by science; they transcend science."

As examples of such questions, Weinberg identifies the biological effects of exposure to very low levels of ionizing radiation and the probability that an extremely improbable event will occur, such as a catastrophic accident in a new reactor design. The first is trans-scientific because one simply cannot design a large enough case-control experiment to obtain meaningful answers; the second is trans-scientific because, even employing all the modern tools of failure mode and effect analysis (see Chapter 10), there is still no way to be confident that one has captured all accident paths, or assigned appropriate probabilities to the various event trees.

Weinberg noted too that many activities in engineering, especially in fields that are developing rapidly, have the attributes of trans-science:

> The engineer works against rigid time schedules and with a well-defined budget. He can not afford the luxury of examining every question to the degree to which scientific rigor would demand. Indeed "engineering judgment" connotes this ability, as well as necessity, to come to good decisions with whatever scientific data are at hand …
>
> Uncertainty is in a sense inherent in engineering: unless one is willing to build a full-scale prototype, and test it under the precise conditions which will be encountered in practice, there is always the uncertainty of extrapolating to new and untried circumstances.

Clearly, trans-scientific questions are not limited to natural science and engineering. While Weinberg's treatment displays the perspective of a twentieth-century physicist when he discusses the social sciences,[6] he provides several relevant examples.

The one topic on which I think Weinberg was misguided is his inclusion of questions about establishing priorities in science and about criteria for scientific choice. Since such questions are inherently normative (i.e., requiring value judgments), unlike his other examples, they do not have a unique, value-free answer. If by "questions that can be posed to science" one means questions that could be answered experimentally if one had a large enough sample size, an appropriate observing platform, and a long enough observing time, I would not call this final set of questions trans-scientific.

[6] While Weinberg was much better in this respect than most of his generation, and some physicists have become much more broad-minded, it is still the case that too many physicists believe there is nothing in the social sciences that a good physicist couldn't invent during a weekend cocktail party. For those of you who (like me) have backgrounds in physics, I hope that this book, especially Part III, will disabuse you of this view.