

sibility. Environmental policy is a highly complex and dynamic area, and we can all benefit from the thoughts of one another. I welcome your comments and reactions to the book.

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Chapter 1

The Environment as a Public Policy Issue

Environmental policy is set apart from other policy areas by a simple but very important fact. Environmental policy has to do with sustaining the ecological basis of life. Other policy areas have to do with the quality of life and are certainly important for that reason. For example, transportation policy is concerned with how to move people effectively and efficiently from one place to another. The environment, however, is the milieu within which we survive as biological creatures. Only health policy approximates environmental policy in terms of relating to the basis for human life itself. In many ways, environmental policy and health policy are inextricably intertwined.

Many policy analysts view public policies as paradoxes (Stone 1988:1). Environmental issues certainly contain elements that are seemingly contradictory. The effects of environmental problems are simultaneously direct and indirect, immediate and long term, personal and impersonal. For example, ingesting a toxic chemical residual affects the individual directly while a change in a production process toward more clean technology may have an indirect effect. In regard to immediate versus long term effects, the ingestion of toxic chemical residuals may abruptly cause nausea or it may cause cancer after many years. In terms of personal and impersonal, it is hard to imagine a more personal effect than nausea resulting from drinking contaminated water, but many of the forces that produce that contaminated water are out of the control of individuals. In addition, all these

impacts may paradoxically be perceived or unperceived, catastrophic or minor, measurable or unmeasurable.

Since environmental policy contains contradictory elements, how do we talk civilly and think effectively about it? For example, many people believe that the statement that environmental policy has to do with sustaining the ecological basis of life is alarmist or sensationalist. In public discussions about environmental policy worldwide there are references to "environmental rhetoric" and "environmental hype." But the accusation of hype is itself a form of hype (creating another paradox). Certainly the statement that "the impulse of many environmentalists is to vilify and simplify" (Samuelson 1992) is rhetorical, if we mean by rhetorical the modern implication of super grandiose language. But the need is not for balance in our language. The need is for civility in language and for accurate description. The most important issue is not who is guilty of hype and rhetoric, but rather how the environment should be viewed. In Deborah Stone's (1988:4) words, "How can we make sense of a world where paradoxes occur?" Through what conceptual lens should we look? What perspective best allows us to see the world as it really is and to ensure that conditions in the world become what we want them to be?

The basic argument of this book is that the conceptual lenses through which we look determine to a large extent what we see and what we do. Conceptual lenses differ in their power to illuminate reality. In some perspectives on the environment, individuals are "looking through a glass darkly." While our purpose is not to attack the views of others, observing through a truncated and limited set of concepts yields a truncated and limited portion of reality. On the other hand, as all scientists know, no set of conceptual lenses allows us to see all of reality. What is needed, then, is continual development of the conceptual underpinnings of the way we look at the environment. Through continuous refinement of our concepts, we can see more and more of the environment and understand better the dynamics that take place within it.

The conceptual lenses through which we look also determine to a large extent what we will do. Different well-meaning individuals can hold very different views as to what should or should not be done. It is important in an area filled with so many conflicting views to be respectful and tolerant of others. But sincerity and a desire for furthering the common good, as important as these virtues are, are not enough. There must be effective prescription, based in concepts powerful enough to inform us what ought to be and then illuminate for policy how to bring that condition into being. Among other things, this means that the conceptual lenses through which we look must include an ethical component. A perspective that would blind us to the ethical implications of our actions or that would vilify those with a sense of moral urgency is an inadequate basis for public

policy. There must be concepts powerful enough to illuminate the "oughts" of environmental action and to identify alternative ways of realizing those ethical imperatives.

CONCEPTS FOR UNDERSTANDING THE ENVIRONMENT

The themes in this book are based on analysis from a specific conceptual perspective. While we do not claim that this perspective allows the observer to see fully and to prescribe perfectly, we do believe that it provides the observer a more powerful descriptive and prescriptive tool than is found elsewhere.

The first proposition in our conceptual perspective is that human beings are biological creatures living in a single, complex, and interrelated environment. Since the system is a single one, what happens in any given part of it affects the whole. Changes in the tropical rain forest, for example, cannot be approached in isolation from the rest of the ecosystem. This feature of the ecosystem has resulted in what many refer to as the "globalization of the environment." It is no longer possible to think of environmental contamination as a local phenomenon. It has global implications wherever it occurs. Thus it is not possible to think of local solutions either. Solutions also must have global aspects.



The Planet Earth

The earth is an irregularly shaped sphere with a diameter of about 8,000 miles and a circumference of about 25,000 miles, resulting in a surface area of about 200 million square miles. Not all this surface is habitable by humans in the ordinary sense of that word. About 70 percent of the earth's surface is covered with water. In addition, considerable portions of the ground surface are either so dry or so frosty that they are inhospitable to human habitation.

While the great natural systems of the world are divided into categories for geographical studies, the most important fact about the planet is its essential global unity. For example, the oceans are divided into the Atlantic, Pacific, and so forth, but in point of fact, these great bodies are uninterrupted and consist of one ocean. Unfortunately, the interrelationships of the earth's natural systems are not well-known. We are only beginning to scratch the surface in our understanding of the ocean as the great regulator of the earth's climate system. Now that the artificial categories of the earth's natural system have been mapped and studied in detail, attention should be turned to a study of global unity and the dynamics of Planet Earth.

The second proposition is that an understanding of environmental problems and policy requires a cross-national mode of analysis, largely because the environment is a single, interrelated phenomenon. Environmental problems are not encapsulated within national borders, and so what happens in one nation affects the environment of us all. The need for multinational cooperation is clear. Additionally, nations can learn from each other. Each nation should examine and evaluate the experience of other nations. It is a strange anomaly that in the United States we argue that different approaches should be tried while at the same time neglect to take the experiences of other countries seriously as the basis for our decision making. Whether we like it or not, environmental degradation does not honor our borders and environmental isolationism is too limited a view.

The third proposition in our theoretical perspective involves the time horizon. Our argument is that effective environmental policy requires an intergenerational mode of thinking. Intergenerational sensitivity is not a new concept. An important body of law written several millennia ago expressed the concept this way: "For I the Lord thy God am a jealous God, visiting the iniquity of the fathers upon the children to the third and the fourth generation of those who hate me" (Exodus 20:5). Thus the concern for the intergenerational consequences of action is quite old indeed. But something very important happened to this concern on the way to the twenty-first century. One line of thought led to the belief in individual accountability for individual actions. The prophet Jeremiah voiced this view: "In those days they shall no longer say: The fathers have eaten sour grapes and the children's teeth are set on edge. But everyone shall die for his own sin. Each man who eats sour grapes, his teeth shall be set on edge" (Jeremiah 31:29-30). Coupled with the extreme individualism of Western civilization and of American society in particular, this view meant that modern Western man virtually lost sensitivity to intergenerational issues. Among the most obvious (bleak?) lessons to be learned from observations of the environment is that decisions and actions have significant intergenerational consequences. Indeed, with the halflife of most carcinogens, particularly nuclear wastes, the time frame associated with the "third and fourth generation" seems short and seriously in error.

Our fourth proposition is that environmental policy is inherently intergovernmental. Humans live in different nations with different cultures, laws, and policies relative to the environment, so the relationships between governments is an important component of environmental policy (Porter and Brown 1991).

The intergovernmental nature of environmental policy must be considered on two levels. The first is the national level, involving the relationships between nations. Some of these are direct, one-on-one relations, such as the *acid rain agreement* between the United States and Canada. Others

are within the framework of the institutions of the global community or of regional organizations such as the European Community. In most instances, the actions of individual governments are understandable only in the context of these intergovernmental relationships.

The second intergovernmental level is that of the national policy system, involving actions at all levels of government. This is particularly true of federal systems, in which the relationships between the national government and the states are critical to all policy areas (Hamilton and Wells 1990:2). But it is also true of unitary systems with more centralized governments; here relationships between the central government and regional or local agencies are often critical for policy outcomes. To look at the actions of one level of government in any country, then, distorts what actually is happening in the policy system.

These four themes—a single, interrelated environment; the cross-national mode of analysis; intergenerational sensitivity; and an intergovernmental mode of analysis—are the skeletal elements of our theoretical perspective. We believe that they allow us to see the environment relatively fully and clearly, and, it is hoped, will allow us to prescribe policy actions that achieve a sustainable future.

DESCRIBING THE BEAST: WHAT IS MEANT BY POLLUTION

Analysis and decision makers seem to have the greatest difficulty defining those things that are most fundamental to our well-being. For example, in 1974 the United Nations convened a Special Committee on the Question of Defining Aggression. The Committee issued a report identifying objective criteria for aggression, but the world community has not adopted that report. Aggression remains basically undefined for public policy purposes. The same is true for environmental degradation or pollution. While various domestic laws and regulations and international conventions set criteria for specific forms of pollution, no general agreement has been reached on a comprehensive and unifying definition.

The absence of a definition is a critical problem. A definition is the meaning that is assigned to a situation and thus the mold through which all decisions are cast. The definition also partially defines what an individual will believe about reality. It is really a value statement about the nature of the problem and, by implication at least, a prescription for the solution. The struggle over definition, then, is really the struggle over ideas and values. The definition process in this sense is the most political of all policy processes.

Like other problems, the environmental problem has many definitions, each one producing its particular set of policy prescriptions. It is not our intention here to review and critique the various definitions. Rather,

we offer a view of the environment from a particular perspective in the belief that it offers a more complete understanding of the environmental problem and a more effective basis for policy.

We define environmental policy as actions governments take with the objective of protecting the ecological basis of life in all its forms. The first thrust of environmental policy would be toward maintaining what is referred to as environmental quality. The second thrust of environmental policy would be toward preventing or ameliorating environmental degradation. An effective environmental policy must do both: It must seek to maintain environmental quality and it must clean up or neutralize contamination that has already occurred.

The issue of what constitutes pollution is the most controversial aspect of definition. Following our definition of environmental policy, we define pollution as any addition to the environment that damages the ecological basis of life. The damage usually results from a contaminant from either natural or human sources. Contaminants from natural sources are such things as volcano activity, forest fires caused by lightning, or background radiation. Human sources can be either inadvertent or willful.

A major source of contaminants are an inadvertent result of human activity. The environment is a complex, interrelated system that people do not totally understand. Modern societies have developed high levels of technology and sophisticated economic, social, and cultural systems whose impact on the environment cannot be fully determined. Recent years have seen a number of reversals of actions or withdrawal of products thought to be environmentally benign and later found to have adverse effects. DDT was hailed as the basis for an agricultural revolution, before its full toxicity became evident. Even when dramatic reversals do not occur, there are limits to technology. Accidents too are inadvertent causes of contamination. Accidents do happen, of course, but the problem is to determine what is accident and what is negligence. Was Union Carbide's release of toxic gas in Bhopal, India, accidental or negligent? In most instances this question is difficult or impossible to answer.

Contamination can occur also as a result of the willful actions of individuals and groups. There are two important theories to explain why and how willful pollution occurs. The first is the conspiracy theory and the second involves the tragedy of the commons enunciated by Garrett Hardin.

Conspiracy theories refer to the pursuit of maximum personal economic gain. In street language, there are "fat-cat" polluters who dump contaminants into the environment for the single purpose of maximizing profits. A Milwaukee *Journal* cartoon once portrayed fat-cat polluters standing in toxic waste covering the United States, singing "Oh beautiful for spacious waste, For ample savings gained." While this is a caricature, all nations have abundant anecdotal evidence of decisions resulting in envi-

ronmental degradation. Thus conspiracy theories do partially explain willful contamination.

If anything, conspiracy theories are not general enough. Perhaps what is needed is an NDG or "no-damn-good" theory. That is, it may be that most individuals do not have sufficient moral capacity to act responsibly relative to the environment. The effort to get people in the United States to take recycling seriously is an illustration of this phenomenon. Some members of environmental organizations (Environmental Clubs on college campuses, for example) nevertheless stubbornly refuse to recycle aluminum cans. They know recycling is the right thing to do but lack the moral capacity to carry through on this principle.

Garrett Hardin's *tragedy of the commons* explains willful pollution as a result of the rational pursuit of self-interest. *Tragedy* means the remorseless working of things, and a *commons* is an asset or value that is open to all individuals. Hardin asks that we picture a pasture that is open to anyone who wishes to graze cattle. Each herdsman will seek to maximize his gain and will thus want to keep as many cattle on the commons as possible. By adding an additional animal to his herd, the herdsman will gain—in the value of the additional animal—and lose—in the effects of overgrazing on his herd. Hardin demonstrates that the gain will be larger than the loss. Thus the sensible course for each is to continue to add animals to his herd. But when all herdsmen follow that rational action, the commons is overgrazed and ruin comes upon all. Hardin concludes: "Each man is locked into a system that compels him to increase his herd without limit in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons" (Hardin 1968:1244). The individual can continue to justify the gain by denying the ultimate truth of the effects of his or her action on society.

The tragedy of the commons works slightly differently in the environment. Instead of taking something out of the commons, pollution puts something into it. However, the calculation of gains and losses is similar. The polluting firm finds that its cost of releasing wastes into the environment is less than the cost of purifying or controlling the waste. At the individual level, the cost to the individual in terms of inconvenience is higher than the benefit from recycling.

Because of the problems associated with defining pollution and identifying sources, environmental policy faces what is known as an uncertain production function. That is, no general agreement exists as to what we are trying to accomplish in the policy arena. Cross-national analysis should be helpful in this regard. In considering the experiences of other countries, we should attempt to identify both what they are trying to accomplish and how they are attempting to do so. In this way, we can give operational meaning to the definition of environmental policy as those actions

THE LOGIC OF AND NEED FOR COLLECTIVE ACTION

For much of human history, individuals could go about without concern for the effect of their actions on the ecosystem. Human actions seemed to be in "harmony with nature" and humans were comfortable with being an inherent part of nature. But as societies became more complex and science and technology advanced, humans encountered the need for ever greater controls on the environment. As Lynton Caldwell pointed out, to be civilized, humans had to modify and control the natural environment (Caldwell 1963:100). So the problem is not inherently in the control and manipulation of the natural environment, but rather in those actions that alter the environment in a way that endangers the ecological basis of life. Which of those harmful actions should government address? How is government action justified in a society with a market economy full of individuals with an entrepreneurial spirit?



Key Components of the UN Declaration on the Human Environment

Man is both creature and molder of his environment which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth... [A] stage has been reached when through science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale....

The protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world; it is the urgent desire of the peoples of the whole world and the duty of all governments....

Man has the fundamental right to freedom, equality, and adequate conditions of life, in an environment of a quality which permits a life of dignity and well-being, and bears a solemn responsibility to protect and improve the environment for present and future generations.

The natural resources of the earth including the air, water, land, flora and fauna and especially representative samples of natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning and management as appropriate.

Source: UN Conference on the Human Environment, Stockholm, June 16, 1972.

In many ways, one of the oldest justifications for collective action through government is one of the best for environmental policy. Aristotle argued that politics is largely about how individuals live together in community. In a world consisting of isolated individuals living in harmony

that people do not and cannot live that way. Humans live in community. Government to Aristotle was a legitimate instrument for the accomplishment of collective purposes, among which was the control of individual behavior required for community well-being. If self-interest or the feeling of moral obligation were not strong enough to elicit the desired behavior, then the coercive power of government through rules and sanctions was justified.

In modern policy terminology, Aristotle's view would be called the *command-and-control* strategy. It has resulted in a large body of rules and regulations enforced through complex institutional structures. Sanctions vary from mild reprimands (notices) to fines and imprisonment to punishment by death. As we shall see, levels of enforcement vary substantially in nations where such strategies are in effect, particularly in the United States. But whatever their level of enforcement, rules and regulations are designed to maintain those conditions required for persons to live together in community. This does not mean that all rules and regulations are wise or effective. It simply means that regulations can be justified on the basis of Aristotle's arguments.

Modern public finance offers two additional justifications for governmental action in the environment. The first involves the concept of *pure collective goods*, those goods whose supply is indivisible and whose demand is not individual. Pure collective goods cannot be sold to some and withheld from others, and conversely, if they are provided for one they are provided for all. National defense is the usual example. If a nation is made secure for one, it is made secure for all. Traditional public finance has assumed that government provides or delivers pure collective goods in much the same way that the market provides private goods. The purest of all collective goods is the ecosystem, our environmental commons. In this view, government action in the environment would produce a pure public good called *environmental quality*. In the American constitutional system, no other kind of action is as clearly directed toward providing for the general welfare.

The second justification for collective action inherent in traditional public finance is the phenomenon of externalities. *Externalities* are those actions that affect someone who is not a part of the decision to act. A negative externality imposes a cost on others and a positive externality results in a benefit to others. In the environmental area, a negative externality would be found in a municipality that dumps its inadequately treated sewage into a stream, imposing the cost of the polluted water on individuals downstream. A positive externality would be an individual's retrofitting an automobile with emission controls. Negative externalities exist because individuals or firms do not bear the full cost of their operation; rather, it is transferred to others, who subsidize the operations of the polluter. Positive externalities occur much less frequently. Individuals responsible for positive externalities do not reap the full and exclusive benefit of

their action. So the motive for positive externalities is found in something other than a self-interest calculus.

The justification for collective action, then, is found in the need to protect the ecosystem within which communities exist, to safeguard the purest of all collective goods, the ecosystem, and to prevent some individuals or firms from imposing involuntary costs on others. Once agreement is reached on the need for collective action, decisions must be made relative to its scope and strategies.

One caveat is in order. Government action is also a part of the environmental problem, in two ways. First, governments themselves are both inadvertent and deliberate polluters. Like individuals and private firms, they inadvertently pollute because of technology and through accidents. In many respects, the materials that governments handle and the operations in which they engage have the potential for higher—even catastrophic—levels of contamination. Governments are also deliberate polluters. In fact, if all levels of U.S. government are put into the equation, government may be the nation's largest polluter. For example, the Rocky Mountain Arsenal near Denver was called "the most contaminated square mile on earth" by the Army Corps of Engineers (Turner 1991:10). Many dramatic instances of deliberate pollution by government have come to light as a result of the dissolution of the Soviet Union. What would be unthinkable in most advanced societies, such as the excavation of the basin for lakes by nuclear devices, were a part of Soviet practice.

A second way that government is a part of the problem involves its economic growth policies. One of the consequences of economic growth in the past has been high levels of environmental contamination. Economically advanced nations consume a disproportionate share of the world's resources and energy, and as a result, they enjoy a disproportionate standard of living. In the process, they also contribute disproportionately to the pollution problem. For Third World countries, public policy must address the twin problems of providing subsistence for an ever-increasing population while devoting resources to economic growth that will increase the standard of living. Policy makers in Third World countries are sometimes resentful of the policies of economically advanced nations, whom they see as enjoying a high standard of living at the expense of the environment. Is not what is good for the goose also good for the gander?

Environmental policy needs to face squarely the question of whether environmentally responsible action retards economic growth. Is there an environmental quality/economic growth tradeoff? We address that question in the discussions on policy subsets (Chapters 3–9), with a synthesis of the argument in the concluding chapter. It is helpful in following this theme to remember something that is often forgotten in such discussions: the proposition that humans are changeable elements in their own environment.

most traditional proposition of what constitutes economic growth

from images of the belching smokestacks of traditional industry to the trend toward the small cottage production process. Perceptions of what constitutes the good life vary substantially as well. It is in this context that the concern for a changing consciousness in the environmental movement takes on particular importance. There is a common position to which all must come in regard to economic growth and its attendant good life: that a clean and esthetically attractive environment that protects the ecological basis of life is the most fundamental element in an ethically defensible concept of sustainable growth and the good life.

Once the need for governmental action is recognized, policy makers must determine the most appropriate level for action, at whatever scope and using whatever strategies. This is the problem of service boundaries—within what area will policy be implemented? Environmental policies involve some complex service boundary problems.

Since the natural environment is involved, it is tempting to think only in terms of naturally defined service boundaries—areas based in the identification of natural regions such as a river basin or an air shed—and to implement policy on the basis of conditions within that region. In the United States, air quality policy relative to emission controls on automobiles varies substantially on the basis of conditions existing in the various air sheds. This approach, however, presents many problems. First, it is difficult to establish the boundaries of the natural regions. Hazardous waste policy, for example, does not involve natural regions since there is no natural dump zone for commercially produced chemicals. In emission control policy, the air sheds involved are usually the boundaries of metropolitan areas, which are commercial or governmental institutional arrangements rather than natural regions.

Some analysts downplay the importance of natural regions and emphasize institutional regions instead. One group of authors concluded that "it is less important that the boundaries of the region include all of the residuals dischargers and all those affected by changes in ambient environmental quality than that the boundaries represent some region or area for which there is an institutional arrangement which can be made responsible" for policy management (Basta and Bower 1982:7). They recognize that factors such as tax policy and price of factor inputs are frequently more important than regional institutions in the effectiveness of environmental policies.

Service boundaries for environmental policy, then, are associated with political and commercial institutions. The essential question is: At what level of political institutions? Should environmental policy be exclusively internal to each nation? Is there a role for transnational and international policy? In practical terms, environmental policy presently is both domestic and transnational.

uncertain service boundaries. Since it is difficult to define "natural regions," various nations reflect different models for the implementation of their internal policy. Service boundaries reflect political or sometimes commercial institutional arrangements, which are often the result of political decisions made long ago and have little relevance for a rational implementation of environmental policy. At the same time, the international community has institutional arrangements for dealing with global problems. The instruments of cross-national cooperation vary between policy subsets and often lack the apparatus necessary for effective implementation. One of the areas for fruitful cross national cooperation would be a search for a more rationalized service delivery mode.

THE IMPORTANCE OF THE TIME HORIZON

Environmental policy makers function in a state of constant tension between the present and the future. Some policy makers are future oriented and are willing to give up present consumption for a quality environment in the future. Others are present oriented and are unwilling to forgo present consumption. How individuals and societies posture themselves relative to the present and the future is extremely important.

In the Western tradition, both the future orientation and the present orientation have long histories and effective advocates. The generational sensitivity cited earlier is certainly an illustration of the future orientation in the religious heritage of the West. The present orientation is equally old with equally effective advocates. The Epicurean motto of "Eat, drink, and be merry" is well-known. It is probably not as well-known that the ultimate in present enjoyment to the Epicureans was quietness apart in the garden, not raucous celebrating on the order of a fraternity party. The present orientation gained its greatest philosophical support in recent times in the form of existentialism.

So how are the competing appeals of the two orientations to be evaluated relative to environmental policy? The best device yet found for converting future value to present value is the discount rate. Finding the proper discount rate can be one of the most important choices an analyst can make.

What is needed in the environmental area is a similar concept that we call the *cultural discount rate* (CDR). The CDR, as we define it, is the implicit interest rate a society uses to determine value in the future. A society with a low CDR places high value on future activity. In essence, such a society would value resources for present consumption at low levels in favor of the value created by alternate use of those resources to realize future objectives. A society with a high CDR, in contrast, is more present oriented. Such a

sumption and a relatively low value on future conditions. So viewed, the CDR is a measure of the time horizon a society uses in making its decisions.

Two characteristics of the CDR are especially important. The first is that the CDR is society specific; that is, it differs from society to society in the same time period. On a global scale, it could be argued that Third World countries are forced by necessity to a high CDR. The need to provide basic essentials such as food, housing, and medical care are so pressing that these nations have to commit their energy and resources to present needs. This fact explains in significant part the posture of the Third World leadership on environmental questions. It was certainly given forceful articulation at the Rio Conference in June 1992.

A second characteristic of the CDR is that it is time specific; that is, it varies over time in the same society. The United States illustrates this principle clearly. Thomas Jefferson's decision to purchase the Louisiana Territory hardly solved immediate problems facing the fledgling United States. Rather it was aimed at the expected future requirements of a more developed country. By contrast, the 1980s reflected a very high CDR. The suggestion that the government sell off natural resource assets to minimize the federal deficit represented a very short-range view. Doing so would deprive future generations of the public use of the country's natural resources. More fundamentally, target dates for the accomplishment of key environmental objectives were pushed into the future or ignored, all under the guise of "preserving jobs in the present." In essence, there was a fundamental shift to a high cultural discount rate in the 1980s as a result of a distinctly present orientation.

The cultural discount rate can guide and inform discussion of environmental problems in at least three important ways. First, it can assist in a more realistic determination of the overall hazards resulting from environmental contamination. For example, research in other countries, particularly Great Britain, has established rather definitively that certain types of contaminants in the air affect the genetic structure of plants and "higher animals." Can these findings be extrapolated to man?

There is mounting evidence that they can but we do not know. With a high CDR we are unlikely to make the investment necessary to find out.

Second, a low CDR would almost certainly lead to the investigation of the possible effects of environmental degradation on lifestyle. The U.S. lifestyle tends to include a heavy dosage of outdoor activities. What will be the effect of continued ozone depletion on that lifestyle? A high-ranking member of the Reagan administration suggested that Americans could simply wear hats and put on extra thick sunscreen as adaptation behavior. But is this an acceptable alternative to Americans? How else will lifestyles have to change in adapting to other forms of environmental degradation? Again, with a high CDR, it is unlikely that this type of question will receive serious consideration.

Third, a low CDR would facilitate informed discussion on the social disorientation that might result from prolonged environmental degradation. What about an environment so poisoned that entire societies have to live inside bubbles? What about population growth? The Club of Rome, in *The Limits of Growth*, predicted sudden and uncontrollable decline in well-being if the present trends in world population continue. Can our institutions and social structures withstand the effects of this kind of crisis? With a high CDR, we are not likely to make a serious effort to seek answers to these questions.

On a more immediate level, the cultural discount rate would be a valuable tool for understanding and assessing risk. A hazard is a danger that exists externally to the individual. Risk is the probability that harm will result from the hazard. The usual illustration of hazards and risks involves crossing the Atlantic Ocean. Whatever the mode of crossing, the hazard is the same, but the risk is quite different. The risk is much lower if the crossing is made on the *Queen Mary* than if it is made in a homemade sailboat. What level of risk is acceptable for public policy purposes?

Without guidance from a concept like the cultural discount rate, the levels of risk considered acceptable have varied widely over time. During a period with a high CDR (present orientation) policy makers will raise the level of risk, increasing the degree of exposure to the hazard. During a period with a low CDR (future orientation) they will lower the level of risk, decreasing the degree of exposure to the hazard. This phenomenon has produced rather marked policy cycles in the United States. Until political systems can develop and agree upon a cultural discount rate for environmental policy, there is likely to be a waxing and waning of commitment to environmental quality. An established cultural discount rate would not only help bring consistency to environmental policy over time, it would also result in a more realistic assessment of risk.

The social discount rate would also be an important element in the development of an ethics of the environment. How can an ethical system emerge in a society with a high CDR? The commitment to immediate consumption erodes the basis on which any meaningful ethics of the environment can emerge. In large part, we do not know what we ought to do in relation to the environment because we do not see over time the effects of our actions. One of the elements in an ethics of the environment is the imperative to avoid overvaluing the present and undervaluing the future. The social discount rate provides the tool through which we can convert that ethical imperative into practical policy.

The absence of a concept like the cultural discount rate, then, means that environmental policy has had to deal with a high degree of uncertainty relative to the time horizon. This uncertainty has permeated all policy, from the very definition of the hazard to the determination of specific threshold exposure levels to toxic materials (Brookfield 1992). Our basic

proposition is that environmental policy is inherently intergenerational. The social discount rate is the analytical device by which we can understand intergenerational effects and prescribe policy for future generations.

ENVIRONMENTAL POLICY IN A CONTEXT OF UNCERTAINTY

There are four basic themes that underlie the discussion throughout the book. The first is that environmental policy is global in scope. This is true because of the inherent unity of the ecosystem. Since there is a single inter-related ecosystem, the second theme is that environmental policy must be cross-national in nature. However, since policy must be implemented through national institutions, this proposition results in substantial uncertainty and inadequacies in service boundaries. The third theme is that environmental policy is inherently intergenerational in outcomes. With the difficulty of developing analytical concepts such as the cultural discount rate, this proposition means that there is substantial uncertainty relative to the time horizon of environmental policy. The fourth theme is that environmental policy is inherently intergovernmental, made and implemented through a dynamic and complex interrelationship between all levels of government. This too adds to the level of uncertainty relative to service boundaries. Within this complex intergovernmental system, both domestic and transnational decision makers have been unable to agree upon what constitutes environmental quality and environmental degradation. This inability to agree upon the nature of the problem creates an uncertain production function.

Perhaps a fifth theme of the book, therefore, is that environmental policy functions in a context of uncertainty: uncertain service boundaries, an uncertain time horizon, and an uncertain production function. As a result, all statements relative to the environment are subject to deniability. It is possible simply to deny that there is an "environmental problem" (*New American*, June 1, 1992).

We do not view this uncertainty as altogether negative, however. Uncertainty can be a powerful motivation to search for understanding; certainty can be the cloak for ignorance. Uncertainty can be an energizing force in the life of an individual or nation; certainty can be the mask for laziness. Uncertainty can result in a powerful thrust toward the development of moral consciousness; certainty can be the rationalization for outright evil. Our references to uncertainty therefore are not intended to produce despair. Rather they are realistic assessments of the situation with the hope that the recognition of these uncertainties will be a motivator to think seriously about the environment.

In the remaining chapters we will attempt to bring the best of policy analysis to an understanding of environmental problems and policy. That