1

The Shape of Sustainable Environmental Policy

Public policy regulates a variety of activities affecting our everyday lives, but we often take it for granted. Only when some event draws our attention to policy are we aware of its importance. The necessity of some types of policies is immediately apparent—for example, policies regulating traffic flow, product safety, and the substances permitted in foods. The need for other types—such as environmental policies—is far less obvious. Many people refer to environmental policy advocates as "tree huggers," "bunny lovers," and "radicals." Many believe that environmental policies negatively affect business.

So what is the necessity of environmental policies? Environmental policy is necessary for three critical reasons: to acknowledge ecological principles, to recognize the link between economic activities and environmental stability, and to enact democratic principles of fairness. In this chapter, I elaborate on these important societal requirements to identify significant criteria for defining sustainability and assessing the effectiveness of environmental policies.

The Acknowledgment of Ecological Principles

A number of analysts describe ecological principles. For example, the ecologist Garrett Hardin (1993) describes three ecological laws: we can never do merely one thing because everything is intermingled with everything else; we can never throw anything away because there is no *away*; and a nation's environmental impact is represented qualitatively by the relation I = P + A + T, where "P" is population size, "A" is per capita consumption rate (affluence), and "T" is a measure of damage done by technology.

The environmental scientist G. Tyler Miller (2008) describes the principles of ecosystem operations. For his first ecological principle, he applies the first law of thermodynamics—that energy can be neither created nor destroyed—to the one-way flow of energy through ecosystems. Solar energy entering an ecosystem undergoes sequential transformations. Photosynthesis processes convert solar to stored chemical energy; organisms transform chemical to kinetic energy to do their work; and the remainder exits the ecosystem as heat. Miller's second

ecological principle is that functioning biological communities produce no wastes because wastes and dead bodies of one life form provide the nutrients required by other life forms. Another Miller axiom is that substances produced by humans should not interfere with any natural biological, physical, geological, or chemical cycles in ways that degrade the Earth's life-support systems for all species. The final principle is that we can never do just one thing in nature. Everything we do creates effects that are often unpredictable.

Perhaps the clearest description of ecological principles is offered in Barry Commoner's highly accessible delineation of four basic ecosystem laws (Commoner 1992).

Everything is connected to everything else.
The biosphere consists of all life forms and all the ecosystems that sustain them. It is an elaborate network of intrinsically linked component parts. In aquatic ecosystems, a fish is the following: consumer of oxygen produced by aquatic plants through solar-powered photosynthetic processes, producer of organic wastes that nourish microorganisms that support aquatic plants, the prey of birds, and a habitat for parasites. The fish is one element in a complex and coordinated network in which everything is connected to everything else in a balanced, stable equilibrium. Change in one element inevitably affects others, causing disequilibrium.

Everything has to go somewhere.
This ecological principle combines with the first to express the fundamental importance of cycles in ecosystems. Plants use solar energy to transform carbon dioxide from the air and nitrates from the soil in the production of biomass. Consumers—animals—eat plants and transform their stored chemical energy to kinetic energy for metabolism; other animals eat plant-eating animals. Animals excrete carbon dioxide and organic compounds. Microorganisms convert organic compounds into nutrients such as nitrates. Then the cycle begins again as plants use solar energy with the excreted carbon dioxide and nutrients to produce more biomass. In closed, cyclical systems, everything produced in one phase is used in a later phase. Ecosystems are the epitome of recycling systems: the identical *atoms* are recycled over and over.

Nature knows best.
Ecosystems' inner consistency and compatibility are the outcome of years of evolution. Ecosystems are conservative: the rate of evolution is slow, and the variety of surviving organisms limited. Temporary changes in an ecosystem generate a response that restores equilibrium: an overpopulation of rabbits is followed by an increase in the wolf population. "Nature knows best" represents the fact that, over several billion years, evolution has created a limited, self-consistent array of substances that are essential to life.

There is no such thing as a free lunch.
It appears to many people that few costs are associated with our exploitation of the environment. In actuality, the costs of disrupted ecological systems are

> unavoidable but not immediately obvious. All interventions stress an ecological system, but responses to stress do not occur evenly and predictably in a linear fashion. Initial adjustments may be minimal—hardly noticeable—for some time. As stress increases, though, ecological responses may suddenly become huge, even catastrophic. We deceive ourselves about no-cost environmental exploitation because of the lag time between stress and response. But we cannot afford such deception. What looks like a free lunch is actually a deferred debt—the bill will inevitably arrive.

Humans' violations of ecological principles inevitably degrade the environment, and the consequences for us are more severe than the aesthetic loss of a salamander species or high gasoline prices—threats to human fertility, morbidity, and mortality and destruction of the material basis for human survival. Yet many people believe that humans are exempt from ecological principles. These beliefs are based on a socially constructed duality between the biosphere and society. The biosphere, created by physical, chemical, geological, and biological processes over the planet's 4-billion-year history, is the land, air, and water that sustain all living creatures. Society, created by humans in a mere 2 million years, consists of cities, farms, wars, languages, music, landfills, televisions, poetry, factories, and philosophies.

We separate the biosphere and society and perceive that we live only in society, viewing the biosphere as an object. Our attitudes toward the biosphere are bifurcated. Sometimes we view it as beyond our influence: volcanic eruptions and hurricanes are considered "acts of God." Other times, we view the biosphere as subject to our manipulations. This erroneous perception leads us to believe that, because the human species is not bound by ecological laws, we need not limit our activities to comply with them. Yet our environmental problems derive directly and fundamentally from violations of basic ecological principles. Consequently, we require environmental policies that acknowledge ecological principles to ensure that our activities are consonant with them and that our life-support system is protected.

The Link between Economic Activities and the Environment

Despite our perception of dual worlds, there is only one—the biosphere. All human activities are carried out in the biosphere through social institutions. The economic institution is crucial in a consideration of environmental policy because it uses the very *substance* of the biosphere to provide humans' basic necessities of food, clothing, and shelter. Energy resources are humans' most fundamental requirement because we use them to extract materials from the biosphere for our necessities. Food is the stored chemical energy that we acquire from our consumption of plants and animals. The clothing and shelter that we require for protection from physical elements are made from resources withdrawn from the biosphere. We not only remove certain resources from the biosphere to

produce food, clothing, and shelter; we also add wastes to the biosphere via such production.

Both human and non-human organisms sustain themselves by extracting from and adding to the biosphere. But *every other species'* sustenance method—economic system—complies with ecological principles. Birds live in climates requiring nothing but their feathers for protection from physical elements. They use their own power to acquire the worms they eat and the sticks and grasses they use to build nests. Nature uses renewable solar energy to produce the nesting materials in the local environment. When the nest is no longer needed, it falls to the ground, where worms degrade it to build the soil that supports the plants that transform solar energy to the chemical energy that powers the birds.

In contrast, humans live in nearly all climates, seldom without clothing. We eat hamburgers and build skyscrapers. But our clothing, hamburgers, and skyscrapers are typically *not* produced entirely by nature in our local environments, and we rely on nonrenewable fossil fuels for many of our production processes. We wear clothing made from plants and animals grown and raised by farmers and sewn by factory workers outside our local environment. We produce hamburgers by razing rainforests for grazing and increasing the cattle population beyond nature's limit. We sustain cattle with synthetic growth hormones and grain grown from seeds manipulated in a laboratory to suit specific soil and weather conditions. Humans slaughter the cattle in one part of the world, process the meat, and transport it to other parts of the world to be cooked and presented to us in a Styrofoam box that we quickly discard as waste. We produce skyscrapers by removing resources from the earth, transporting them elsewhere to transform them into products, and transporting the products to a third site, where they are sold to contractors who transport them to a fourth site, where humans construct the skyscraper for the use of others. When the skyscraper is no longer wanted, humans knock it down and transport the disassembled materials to sites where the materials are sold for reuse or labeled "waste" that is either partially incinerated or buried in landfills.

Compared with the bird's worm-and-nest existence, humans' hamburger-and-skyscraper economy poses a much greater threat to our continued survival as a species. According to William Catton (1982), human survival depends on a carrying-capacity surplus, the excess of resource supply over human demand for resources. Carrying capacity is the population size that an environment can support. Catton declares that emphasis on increasing economic growth—increases in per capita consumption of resources—has turned us from *Homo sapiens* into *Homo colossus.* Technological innovation has temporarily expanded the available carrying capacity, but the finite planet inevitably imposes limits on our ability to fool ourselves with technological prowess. Humans are as dependent on the biosphere for survival as are birds. Economic activities are intrinsically linked to the biosphere. No alternative source exists. We *must* tread on the Earth to survive. Societies require environmental policies that reflect this crucial link, to guide our tread on the Earth in consonance with ecological principles.

The Enactment of Democratic Principles

A democracy is a political system in which supreme power is vested in the people and is exercised directly by them or their elected representatives. All citizens have an equal say in the decisions that affect their lives through their participation in the proposal, development, and passage of legislation into law. Participation is equated with citizens' power. Citizens require that political leaders respond to the general will and answer for their actions and inactions.

Democratic political systems adhere to democratic values. Three of the most characteristically democratic values are popular sovereignty, political inclusion, and equal opportunity (Olson 2006). Popular sovereignty holds that citizens themselves are the authors of the laws under which they live. The democratic value of political inclusion is the recognition that departures from popular sovereignty may occur, requiring extra measures to ensure that all citizens exercise sovereignty. The value of equal opportunity is rooted in principles of distributive justice and asserts that the state must maintain equal opportunities for political participation by counteracting social conditions, such as economic inequalities, that undermine participatory equality (Olson 2006).

Popular sovereignty in environmental matters means that citizens in a democracy have equal access to the natural resources that sustain life, are fully informed of potentially hazardous environmental exposures, and participate in laws and policies regulating resource use and hazardous exposures. Political inclusion in environmental matters demands that extra measures be taken to ensure that adequate and accessible information about resource use and potential hazardous exposures is available to all citizens so they can sustain themselves and choose the hazardous exposures that are acceptable to them. For equal opportunity participation, the state deliberately counteracts conditions inhibiting the participatory equality that allows citizens access to necessary resources and adequate information about hazardous exposures.

Because the biosphere is the basis for all human sustenance, we require environmental policies to enact democratic principles of fairness and justice in the production and distribution of life's necessities.

Sustainability: The Promise of Environmental Policy

The outcomes of environmental policy extend well beyond the purposes of other types of policy. Policy failures in the areas of traffic flow, product safety, and food additives harm people by disrupting the *flow of life.* But failures in environmental policy disrupt the essential *material fabric of life,* eroding the biospheric life-support system of all organisms.

The promise of environmental policy is the assurance that we operate to maintain the material fabric of life. Some refer to such a state as sustainable. But "sustainability" remains a buzzword—prominently used, yet poorly defined.

- The United Nations World Commission on Environment and Development (1987: 43) offers an ethical definition: sustainability involves "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
- The definition of sustainability by environmental scientists is parceled out among disciplines. Sustainable agriculture grows crops and raises livestock using organic fertilizers, soil and water conservation, biological pest management, and minimal fossil fuels. Conservation is resource management that does not waste resources and interferes with non-human species only to meet important human needs. A sustainable society is based on recycling and reusing discarded matter, conserving matter and energy resources by reducing unnecessary wastes and use, not degrading renewable resources, and by building things that are easy to recycle, reuse, and repair (Miller 1991).
- Many environmental activists advocate sustainable growth: economic growth that focuses on making social, economic, and political progress to satisfy human needs, desires, aspirations, and potential without damaging the environment (McKinney and Schoch 1996: 622).

Confusion over an adequate definition of sustainability conveniently allows us to evade the crucial task of creating environmental policies that restrict our activities to the boundaries of ecological laws. The proliferation of definitions suggests that some of our confusion derives from difficulties in communication across disciplines. Because the biosphere crosses disciplinary boundaries, environmental problems can be sufficiently addressed only in a discourse that crosses all boundaries.

I use the reasons cited earlier as underlying societal requirements for environmental policy to assess the status of current environmental policy and recommend the shape of sustainable environmental policy. To what extent does environmental policy acknowledge ecological principles? Does environmental policy reflect the link between economic activities and ecological stability? Does environmental policy enact democratic principles of fairness and justice?

Organization of the Book

In Chapters 2 and 3, I extend my discussion of the rationale for environmental policy with a historical overview of humans' methods for sustaining themselves, from hunting-and-gathering times until the present. I define modes of subsistence in Chapter 2, based on technology—the tools and techniques used to access resources, the primary energy source used to implement the technology, the environmental impacts of the technology and energy source, and the policies devised to mitigate the impacts. I distinguish between hunting and gathering and agriculture as the modes of subsistence used until 1945. Chapter 3 analyzes humans' post-1945 method of sustenance: petro-dependency. I argue that the petro-dependent mode of subsistence inflicts greater and more deadly ecological damage than earlier modes and that the damage is less adequately addressed by policy.

In Part II, I provide a detailed analysis of the world's prototype petro-dependent society, the United States. In Chapter 4, I describe U.S. petro-dependent policies of resource management and pollution abatement, presenting the policies in the context of their relevant portions of the Earth's life-support system: lithosphere, hydrosphere, atmosphere, and biological resources.

In Chapters 5–7, I gauge evidence for the success of U.S. petro-dependent environmental policies by using the criteria cited earlier. How emphatically do the policies acknowledge ecological principles (Chapter 5)? How explicitly drawn is the link between economic activities and the environment (Chapter 6)? How substantially are democratic principles enacted (Chapter 7)? In Chapter 8, I use that evidence to analyze the institutional and cultural forces that push petro-dependent societies toward unsustainability.

In Part III, I examine petro-dependency's reflection in international environmental policy. Chapter 9 examines the international process of environmental policymaking and the substance of international treaties, offering details of the process in two case studies. Chapter 10 focuses on major environmental problems that persist despite global treaties: population growth, approaching peak oil production, and global climate change. In Chapter 11, I analyze institutional tendencies that impede environmental progress and identify the single largest barrier to sustainable international environmental policies: the transnational corporate state.

In Part IV (Chapter 12), I describe humanity's unwavering march away from sustainability since adopting the agricultural mode of subsistence, where the petro-dependent path could take us, and how we might change our path to move toward sustainability.