

# *Political Geography*

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*Third Edition*

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## *The Politics of Ecology, Energy, and Land Use*

We have discussed *cultural landscape* as a concept describing how people modify the physical landscape to create an environment more conducive to their needs. Such modifications have spanned mankind's presence on Earth. The scale and scope of contemporary human-environment interactions, however, make this a time of unparalleled change. We are essentially conducting an experiment on our home world with little certainty as to the outcome. The resulting degradation of the environment is the product of four factors we have already discussed: rapid population growth, increasing wealth leading to increased per capita consumption, ever more sophisticated technology, and accelerating urbanization. These trends are all interdependent in varying degrees. They are all, furthermore, influenced and shaped in some degree by politics—by positions, policies, and decisions based on political considerations.

Concern with the environment and its relation to politics is not new. We have discussed, for example, concepts of *environmental determinism*, whose origins go back at least to Hippocrates and Aristotle. Ibn Khaldun, as we pointed out in Chapter 1, theorized about the effect of the environment on the political units of his time and the life cycle of the State. Montesquieu, Ratzel, Kjellén, and Huntington are only a few others who have followed in this tradi-

tion. Toynbee, Wittfogel, and the Sprouts have more recently developed less deterministic concepts of "the impress of the environment on politics," as pointed out by Kasperson and Minghi.\* Study of "the impress of politics upon the environment" does not reach back nearly so far, but Ratzel and Huntington both recognized that it was important, and over half a century ago Whittlesey examined it in some detail. Kasperson and Minghi suggest that a study of this kind of relationship might be organized into four major components: "political goals, agents of impress, processes and effects." They also consider a third type of environment-politics relationship, "the public management of the environment." Here they review some of the work on this subject by Barrows, Colby, White, Burton, and themselves, all during the twentieth century. They organize their discussion under three main headings—environmental policy and planning, resource allocations, and spatial linkages and area repercussion. These are most useful concepts and can help us understand the three types of relationships as we examine three aspects of the environment-politics linkage.

\* Roger E. Kasperson and Julian V. Minghi, eds. *The Structure of Political Geography*. Chicago: Aldine, 1969, pp. 423–435.

## Ecology

Before the mid-1960s, **ecology**\* was a word used commonly by geographers, biologists, and other scientists, but seldom heard or seen by the general public. Since then it has been adopted by a new generation concerned about rapid worldwide destruction of our planet's environment. They have broadened and fortified the conservation movement and impressed the public with both the urgency and the practicality of protecting our physical environment from further destruction and actually reversing the trend and restoring the environment if possible to its original state. The euphoria and élan of the early days have largely disappeared, however, and the ecology movement has settled down into a persistent, dogged, and frequently successful battle against entrenched interests, rigid thinking, and obsolete laws. Heartening also has been the spread of the ecology movement from the United States to other countries.

In less than a century, Americans have lived through an economy of scarcity during the Great Depression, an economy of abundance in the post-World War II period, and an economy of waste at present. Through it all, they have never lost faith in the eternal bounty of nature and the virtue of exploiting it enthusiastically. Now we must shift gears and focus on sustainable development, but every stage, every step involves a political struggle. In less than half a century we have experienced titanic battles in Congress and the press over the Glen Canyon Dam (Arizona), the Dickey-Lincoln project (Maine), the Cross-Florida Barge Canal, the Central Arizona Project, the Alaska Pipeline, and dozens of other proposals, large and small, for modifying our physical environment, allegedly in order to improve our economic and perhaps social environment. We have come to expect gov-

ernment at all levels, especially the federal, to subsidize projects of this nature, but we are still unwilling to accept their regulation and control. Worse, we have yet to develop a national consensus on environmental matters that can be expressed in a national plan or at least guidelines.

The Environmental Policy Act of 1970 was a landmark, a giant step in the right direction. It spelled out goals and policies to guide all federal actions that would have an impact on the quality of our environment. It made concern for environmental amenities and values a part of the mandate of every federal agency. It established the Council on Environmental Quality to identify the policy issues and alternatives for environmental administration. Finally, it required an annual report on the quality of the environment. This act was followed by more specialized legislation such as the Clean Water Act and the Clean Air Act, all the products of diligent and persistent efforts of citizens individually and collectively working with—and on—legislators.

These have helped rectify two of the three basic problems that had prevented the federal government from playing an effective role in long-term environmental planning. Long-range planning has generally aimed at dealing with problems posed by projected trends rather than achieving desirable goals, and public policies too often have been defined and carried out in fragmented, narrow programs by mission-oriented agencies. Now there is somewhat more order in both setting and reaching goals, but there is still considerable scope for improvement, both in the planning and the execution of plans. Both are made more difficult than necessary, however, by the failure so far to deal with a third basic problem: the fact that public administration in general is geared to annual appropriations favoring short-term considerations. Furthermore, most elected officials serve terms of two to six years, thus giving them less incentive to deal effectively with long-term problems.

It would be difficult indeed to find someone who would speak forcefully in favor of deliberately destroying our environment. Yet

\* We prefer the term *ecology* to *environment* because ecology is the study of the mutual relations between organisms and their environment. When it becomes a public issue, however, or when linked with human activity, environment serves just as well, and we therefore use the terms more or less interchangeably.

many argue in favor of postponing decisions on ecological problems, insisting that they are not really so serious or that other problems should be attended to first or that we really cannot afford to protect wildlife, clean up streams, restore land eroded by careless farming practices, or reduce noise pollution. In fact, all these arguments have some merit and it is unwise to ignore them. Because we cannot do everything first or well or at all, we must make choices. These choices are, in part, moral ones—but they are largely political. Decision making in these cases is always difficult.

The types of decisions to be made fall into three categories.

**1. Priorities of resource allocation.**

There is so much to be done. As abundant as our resources are, they are limited and must be allocated to accomplish a variety of tasks. Money, energy, talent, and time must be allocated on some basis other than simply greasing the squeaky wheels, yet we have not yet devised such a system.

**2. Distribution of costs.** We all recognize by now that nothing is free; everything costs, even clean water and air. But who is to pay for achieving and maintaining a livable environment? Ultimately, of course, we all pay for everything, but the real questions are whether we pay now or later; through higher taxes or higher prices; in cash or in kind, or by foregoing luxuries and reducing our consumption; and who is to bear the costs? Does the polluter pay, or the victims? And what of environmental justice for minorities and other politically disadvantaged groups? Must they bear an equal share of the costs if they lack equal access to the policymaking process?

**3. Distribution of benefits.** Should the benefits of an improved environment be distributed evenly throughout the entire country, through all socioeconomic levels, and among all ethnic groups? That would seem to be very democratic, but we may question whether it is practical or desirable. Should not special attention

be given to the physically and mentally handicapped, to deprived minorities, to low-paid workers, to the unemployed? Should the wealthy get subsidized marinas and rural people beautiful parks?

Clearly, there are no easy answers to any of these questions. Two contemporary but long-standing problems may serve to illustrate these points.

### *Strip Mining*

There are at present more than 3,000 surface mines in the United States, spread widely across the midsection of the country from the Appalachians to the Rockies, most of them coal mines and most of them relatively small. Until adoption of the federal Strip Mining Control Act of 1977, regulation of strip mining was largely left to the states. Long after the severe ecological damage of strip mining had been amply documented, its control was spotty and inadequate. Although some states, such as Kentucky, enacted their own legislation, many states did nothing. Even states that passed new laws frequently allowed enforcement to lapse, thus allowing mining companies to do as they pleased.

Congress finally passed federal legislation after decades of effort by ecologists and others. The 1977 Strip Mining Control Act authorized the Department of the Interior to establish the Office of Surface Mining (OSM) to set minimum standards and ensure compliance among the states. Although states may supersede federal authority by establishing their own regulatory agencies, their standards must meet or exceed federal standards. The OSM budget was drastically cut during the Clinton administration, however, thus limiting its ability to provide federal oversight. Additionally, adoption of "Directive 8" by the OSM essentially makes the agency a partner of the states rather than an enforcer.

Citizen and environmental groups responded to lax enforcement by filing suit in federal courts to compel states to enforce federal regulations, particularly in cases of mountaintop removal where mining debris

and hazardous chemicals are typically dumped into adjacent valleys. Beginning in the late 1990s, a series of rulings in federal appeals courts virtually eliminated the ability of citizens' groups to seek redress in federal courts. Because safety issues regarding nuclear power and geopolitical issues involving petroleum and natural gas combine to make coal all the more important to the U.S. economy, the problems are likely to increase, not decrease. Meanwhile, mining companies continue to ignore the laws, states look the other way, OSM pretends nothing is wrong, federal courts refuse to act, and ordinary Americans watching the destruction of their communities feel powerless to stop the process.\*

### *Water Projects*

One of the traditions of American politics since the founding of the republic has been the regular congressional appropriations to support what were once termed "internal improvements," more recently referred to as "rivers and harbors projects" and informally known as "pork-barrel" legislation. In April 1977, President Carter, less than three months in office, decided to break with tradition and slashed more than \$7 billion worth of water projects from the budget. Despite ample justification for most of these cuts on grounds of both economy and ecology, congressmen and senators around the country raised a storm of protest. Their pet projects, those designed to benefit their constituents and win votes, were threatened, and they fought to protect them. In the end there was a compromise, and the president signed a bill that still provided over \$10 billion for public works, including some big and expensive projects he had opposed. The president and the public learned how hard it is to overcome local demands for federally financed "improvements."

\* The material in this section was drawn from Ken Ward Jr.'s series on mountaintop removal at <http://wvgazette.com/static/series/mining>. The series has won a number of awards for excellence in journalism and continues to be updated.

### *A Brief Catalogue of Ecopolitical Woes*

We do not have the space here to discuss in detail the manifold ecological problems of the planet, or even of the United States, that are caused or aggravated by politics. The problems are so numerous, complex, widespread, and intertwined that volumes would be necessary even to outline them properly. So here is a brief sample of some current issues that are not particularly well publicized.

1. **Irrigation:** Irrigation agriculture has sustained civilization for thousands of years and is still vitally important for the subsistence of millions of people around the world. Yet in the United States, it is not a matter of civilization or even of subsistence; it is a matter of luxury. We discussed some elements of this issue under the heading of public lands in Chapter 14, but the point warrants expansion here. Irrigation of rice fields in California and sugarcane fields in Florida is destroying the natural environment in order to provide crops heavily subsidized by the taxpayers that could be more cheaply imported to meet domestic needs. But Florida and California have large and growing congressional delegations that seem more interested in protecting the huge agribusiness complexes in their states than in protecting the consumer, the small farmer, the taxpayer, or the environment.
2. **Ocean fisheries:** During the 1970s, some American commercial fishermen, chiefly those in New England and to a lesser extent in the Pacific Northwest, lobbied hard for a 200-mile exclusive fishing zone in order to exclude foreign fishing fleets they claimed were seriously depleting fish stocks. They won the legal battle but are losing the ecological and economic ones. Only 15 years after the president's 1976 proclamation of a 200-mile exclusive fisheries zone, several fish stocks were seriously depleted, in part because American fishermen increased their harvest once foreign fleets were excluded. Since then,

the United States has signed agreements with a number of countries allowing their fishermen to return to harvest stocks that American fishermen now consider too uneconomic to pursue.

3. **Waste disposal:** The disposal of waste produced by an economy based on consumption has emerged as a major environmental, political, and social problem. We now have the spectacle of household garbage being trucked across the country or barged to Europe and Africa in search of cheap, legal, and perhaps secret dump sites. Ocean dumping has been restricted for sound ecological reasons, and shooting garbage into outer space is not yet feasible, so we must find some terrestrial repositories. Toxic and radioactive wastes are even more difficult to manage. The most logical and the ecologically soundest method of dealing with the problem—produce less waste by reducing consumption—has been considered un-American but is slowly gaining support. Recycling is helped by federal programs that encourage municipalities to establish and promote it and some firms are developing increasingly innovative uses for recycled materials, but these efforts are clearly inadequate.
4. **Wetlands:** The biologically richest and most essential physical environments in the world are coastal wetlands, followed closely by inland wetlands. Yet the American propensity for living, working, and playing on or near water has drastically depleted the wetlands, perhaps past the point of no return. State and federal legislation to protect these fragile areas from the ravages of “developers” is hard won and easily lost. President Bush’s 1991 solution to the problem was to redefine “wetlands” so as to remove huge areas from potential federal protection and make them available for “development.”
5. **Wildlife:** The Alaska Native Claims Settlement Act of 1971 allocated to new native corporations large portions of the state. One of them, Old Harbor Native Corporation, now faces destitution unless it can sell or lease its land to commercial interests to develop for logging camps, sawmills, hunting lodges, canneries, fishing camps, airstrips, and other activities. The people would like to sell their land, or most of it, back to the federal government, which does not want it. The problem is that their land is within the Kodiak National Wildlife Refuge, established in 1941 to protect the Kodiak bear, the largest land predator on Earth, of which there are currently 2,500 to 3,000, as well as bald eagles and many other wild animals. This is a classic case of conflict between preservation of the environment and its destruction through commercial development, only here the Aleuts are caught in the middle. Similar problems are faced by indigenous peoples throughout North America and elsewhere.
6. **Feral animals:** In the western United States, especially in the Great Basin, large herds of wild horses and donkeys roam freely, protected since 1971 as “living symbols of the historic and pioneer spirit of the West.” The legislation resulted from an outcry by conservation and animal-rights groups as well as the general public, protesting the slaughter of these feral animals whose numbers far exceeded the carrying capacity of their environment. The result of the protection is that the number of horses alone has grown from about 35,000 to between 50,000 and 75,000. The “adopt-a-horse” and “adopt-a-donkey” programs haven’t worked, zoos don’t want the animals, the law protects them from the pet-food producers, and the Bureau of Land Management does not have the funds to manage them properly. So the feral animals drive away the native wildlife in the competition for scarce water and forage; even water just below the surface is being depleted, and erosion is being accelerated.
7. **Water:** Not only is improper and wasteful irrigation causing waterlogging and salinization of good agricultural land, but the runoff water is contaminated

with chemical fertilizers, pesticides, and fungicides. The per capita consumption of water in the United States is among the highest in the world, and consumption is increasing with increasing population, wealth, and water-using technology, at the same time that we are losing potable water to pollution from many sources. Again, the politically acceptable approach to the problem has been to spend more money on water treatment, recycling of wastewater, and other palliatives rather than to reduce per capita consumption of water in the first place. Logical, of course, but politically unacceptable at present.

The overall problem of managing the environment wisely is compounded in the United States by its federal system. Since the early 1980s, the federal government has abdicated its leadership role in this area, and some states are beginning to step in as understudies. States, counties, and municipalities are regulating the emission of toxic chemicals into the air, requiring and regulating recycling programs, regulating the use of cancer-causing substances, strengthening liability rules for oil spills, controlling automobile emissions, modifying allocations of irrigation water, and assuming a leading role in many other environmental issues. Some of these programs are innovative, and some are effective locally. Because the problems are

regional, national, even global, however, even the best local programs cannot do enough in the long run. Political geographers can contribute substantially to efforts at all levels of government and among the general population as well. Although some have begun to do so, more such effort is needed.

### *Ecology in Other Countries*

Concern with environmental matters has been manifested mostly among the educated and well-to-do. Poor people often have other and higher priorities. The same is true of States. As we pointed out in our discussion of marine pollution, the poorer countries of the world have only recently begun to realize that their environments are also in danger and that ecological damage may well cost more than industrial development will earn. All over the world, major development projects are being reexamined in light of new understanding of ecological principles. The Jonglei Canal project in Sudan and the Trans-Amazonian Highway in Brazil are examples. Even Egypt's pride, the Aswan High Dam, completed only in 1970, has already caused so much ecological damage in the Nile Valley and the eastern Mediterranean that some suggest it should be dismantled. But the destruction goes on: The large wild animals of East and Central Africa are in danger of being exterminated, the forests of Southeast Asia are disappearing at a frightening rate,



**Ecology consciousness spreads to China.** Even China is now ignoring Marxist doctrine to some extent and making some efforts to reduce environmental degradation. This billboard in a public park in Zhengzhou, Henan, reads: "Theme of World Environment Day 5 June 1989—Warning: The Globe Is Getting Warmer." It was erected by the Zhengzhou Environmental Protection Bureau. (Martin Glassner)



overirrigation continues to destroy cropland through salinization and waterlogging in North Africa and Southwest Asia, and soil erosion continues almost unchecked in the highlands of Latin America. It will be difficult to overcome the suspicion born of colonialism and foreign exploitation and convince the people in these regions that conservation is in their interest.

In the Soviet Union, Marxist ideologues typically blamed capitalism for environmental degradation and were thus prevented by their own rhetoric from admitting Soviet environmental ills. Ironically, the USSR had stringent environmental regulations, but chose to ignore them in favor of greater production. By the late 1970s, however, growing concern caused the government to take action. In early 1979, the main governmental agency on the environment was upgraded to the status of a State committee and a six-year-old program of cooperation with the United States in 11 major environmental areas, including air and water pollution as well as earthquake prediction, was intensified. They issued a *Red Data Book* listing endangered species of plants and animals, began reducing chemical pollution, relocated some factories out of urban areas, sought to reduce sulfur emissions from hydroelectric plants, and in general displayed a more serious commitment to ecology. In 1985, Mikhail Gorbachev came to power. His policy of *glasnost*, coupled with the April 1986 disaster at the Chernobyl nuclear power plant, prompted a first-ever Soviet report on environmental problems throughout the USSR. It highlighted approximately 20 catastrophes, including Chernobyl and the Aral Sea. Although we have no detailed information, we might suppose that the political infighting that led to this commitment was at least as brisk as in the United States.

The frightful devastation of the environment throughout Central and Eastern Europe and the Soviet Union became clear, however, only as their communist governments were crumbling. Newly organized non-governmental organizations (NGOs), newly liberated mass media, and newly unshackled scientists and other intellectuals began voic-

ing loudly and documenting what hitherto they had only been able to conjecture and grumble about *solto voce*. One of the worst areas is the Black Triangle region of Poland, the Czech Republic, and former East Germany, but equally devastated environmental landscapes appear throughout the former communist bloc. Now all of them are faced with daunting problems of restoring the environment while continuing to restructure their economic, social, and political institutions. We can hope that they will be successful—with considerable outside help—but there is danger that some could revert to dictatorship, despair, and decay.

Canada's Green Plan for a Healthy Environment was unveiled in December 1990. It contains more than 100 new proposals, policies, programs, and standards to clean up, protect, and enhance Canada's land, water, air, renewable resources, the Arctic, parks, and wildlife, and to reduce waste generation and energy use. This may be the world's most comprehensive national environmental plan. Much of it is based on the United Nations concept of sustainable development. Since the plan is the product of democratic give-and-take, however, it is full of compromises and really pleases no one. As we pointed out in Chapter 13, powers not specifically delegated to the Canadian government remain with the provinces. Consequently, the Canadian government has less power to enforce its will on its provinces than the United States has in regard to the states. The plan is, however, far more progressive than anything produced south of the border and has few determined opponents. We will see how vigorously and effectively it is implemented.

One hopeful sign may be the fate of the projected Grande Baleine (Great Whale) Complex, phase II of the massive James Bay Project (Fig. 38-1). This scheme to dam the La Grande and other rivers flowing through northern Québec into southeastern Hudson Bay, including James Bay, was initiated by Hydro-Québec, one of Canada's largest corporations. In 1971, the Québec government created the Société d'Énergie de la Baie James, and construction began with

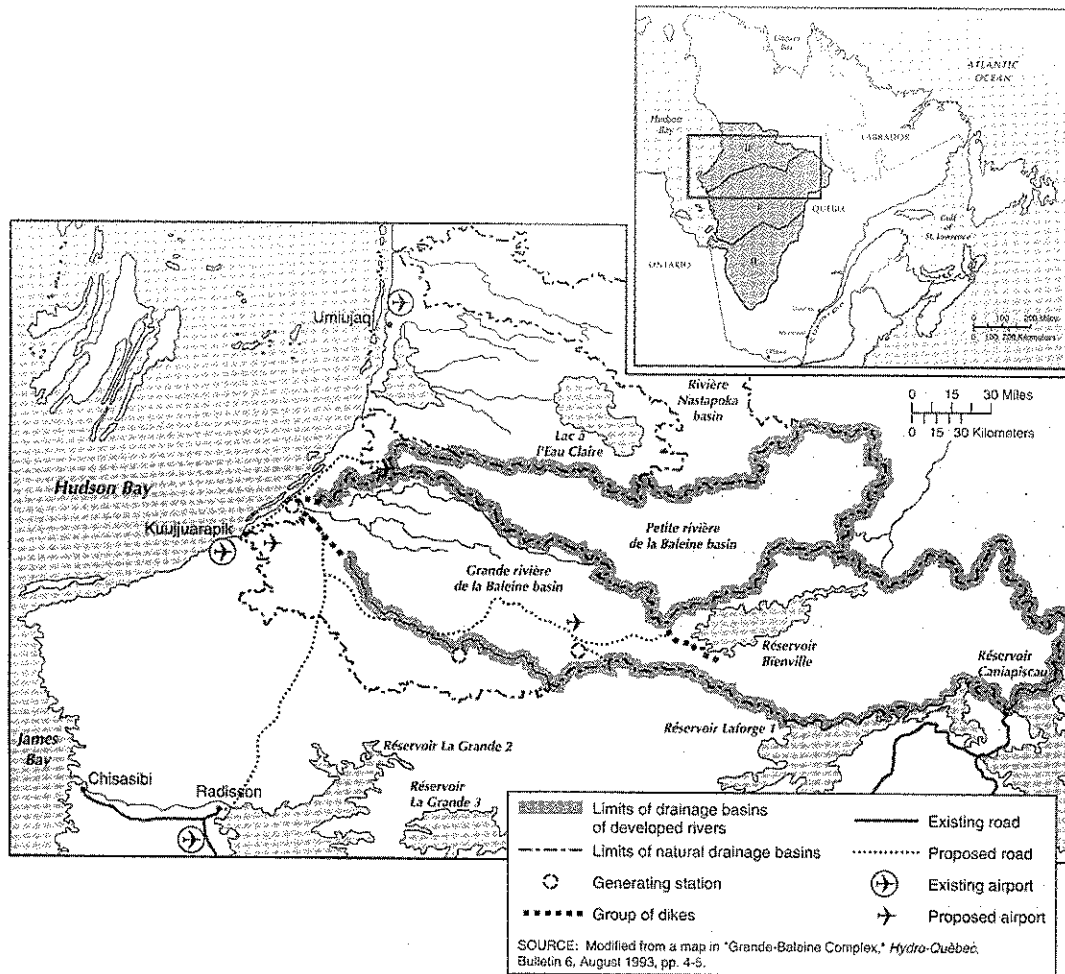


Figure 38-1: Canada's proposed Grande Baleine Complex.

little fanfare or opposition. Gradually, however, opposition arose, led by environmentalists and Cree Indians. From the beginning, however, the project had the single-minded support of Robert Bourassa, Premier of Québec, and it became a major political issue in several elections. The opposition focused on the serious environmental damage done by the project and on the disruption of the traditional way of life of the Crees, Naskapis, and Inuit in the area. Supporters focused on the jobs created (mostly for Caucasians coming in from outside the area) and on the revenue from the sale of electricity (mostly to New York and New England). Politics won and James Bay I was completed by 1995.

In contrast, planning for James Bay II, the Grand Baleine Complex to the north of the original project, ran into formidable opposition from Crees and environmentalists, bolstered by increasing support from Canadians in general and Québécois in particular. Furthermore, the Parti Québécois government of Premier Jacques Parizeau was not nearly as committed to James Bay as the Liberal government of Bourassa had been. On 18 November 1994, Premier Parizeau announced that the \$13-billion project was not a priority for his government and that it would not be constructed in the foreseeable future.

India has been building huge dams almost since independence, and generally they have been sources of pride. They have made

available immense quantities of electric power and irrigation water, and have helped India's economic development keep pace with its rapidly growing population. Only recently have the environmental costs of these economic benefits been considered. In 1989, there were popular protests against the Narmada Basin Plan to build 30 large, 135 medium, and more than 3,000 small dams on the Narmada River and its tributaries. One of the outcomes of this project would be the world's largest man-made lake behind the planned Sardar Sarovar Dam. The lake would displace some 300,000 people in all, including many tribal people. The project, in Madhya Pradesh, is designed to benefit many people in Gujarat, Rajasthan, and Maharashtra as well. But a grassroots opposition, with women providing critical leadership, prompted some American and German investors to withdraw funding. Resistance arose because villagers were not consulted about the project and the possibility of major environmental hazards, the greatest of which could be from reservoir-induced seismic activity whereby the weight of the water triggers earthquakes. Nevertheless, construction continues and many villages were flooded without warning during the 2002 monsoon season.

China's Three Gorges Dam on the Chang Jiang (Yangzi Jiang further downstream; Jiang means river) is another controversial project. The Chang/Yangzi River is the third longest in the world after the Nile and the Amazon. The project, which should be completed by 2009, is expected to provide almost 10 percent of China's energy needs through hydroelectric power, spur development by allowing oceangoing freighters to reach the Sichuan Basin, and diminish the danger of flooding along the Chang/Yangzi River. In the process, 400 square miles of China's most fertile farmland will be lost, silt will accumulate behind the dam, close to two million people face resettlement, over a thousand archaeological sites will be inundated, and toxic chemicals from flooded factory sites may concentrate in the reservoir. Corruption charges and concerns over poor construction methods prompted Chinese

leaders to take the rare measure of inviting foreign engineers to provide oversight. Although some experts contend that a series of smaller dams would provide the same benefits with fewer environmental risks, China's leaders are unlikely to reverse themselves if for no other reason than not wishing to "lose face" in China and the world by admitting the project was flawed. One can only hope that "reservoir-induced seismic activity" does not appear in this densely populated region as well.

In Chile, the military dictatorship (1973–1989) headed by General Augusto Pinochet essentially ignored environmental issues. After the democratic government of Patricio Aylwin took over in 1990, a national debate began over environmental policy. As in most of Latin America, the debate swirled around two competing conceptualizations of **sustainable development**, the concept formulated in 1987 by the Brundtland Commission (discussed later in this chapter) and now underpinning all development efforts of the United Nations and many other intergovernmental organizations, governments, and voluntary groups. Sustainable development requires programs designed to meet three goals: stimulate economic growth, promote social equity, and protect the environment. One view holds that rapid economic growth based on free market economic restructuring eventually results in improved quality of living for people who, with more income, can afford to devote more effort to protecting the environment. The alternative approach considers that market-based growth historically has not, especially in developing countries, led to the other goals and that it is therefore necessary for government to assist the process through grassroots development projects and local control over resources. It is a more holistic approach to development and emphasizes the linkages among all aspects of all three goals.

The debate in Chile was about how to achieve these three goals. It was strongly influenced by a variety of internal and external factors, including the return to democracy, the entrenched power of the traditional elites, pressure from the United States and

the World Bank to adopt environmental protection policies, the nature and role of the opposition during Chile's gradual transition to democracy (1983–1989), the strengths and weaknesses of the responsible technocrats in the government, changing world market conditions, and the need to attract investors. In the end, the comprehensive environmental law enacted in March 1994 facilitates the market-oriented approach to sustainable development.

This does not mean that Chile is totally committed to international capitalism or that it is headed for ecological disaster. It means that Chile has chosen, for the present at least, to build its development strategy on traditional foundations with less government involvement in the development process than the supporters of the alternative view had wanted. In addition, because Chile is a democracy, the alternative concept will still be expounded and will be able to influence decisions in many individual cases. The first effect of the legislation, however, was to cool the enthusiasm of the United States to have Chile join the North American Free Trade Area as the next step in creating a hemisphere-wide free trade area.

### **Energy**

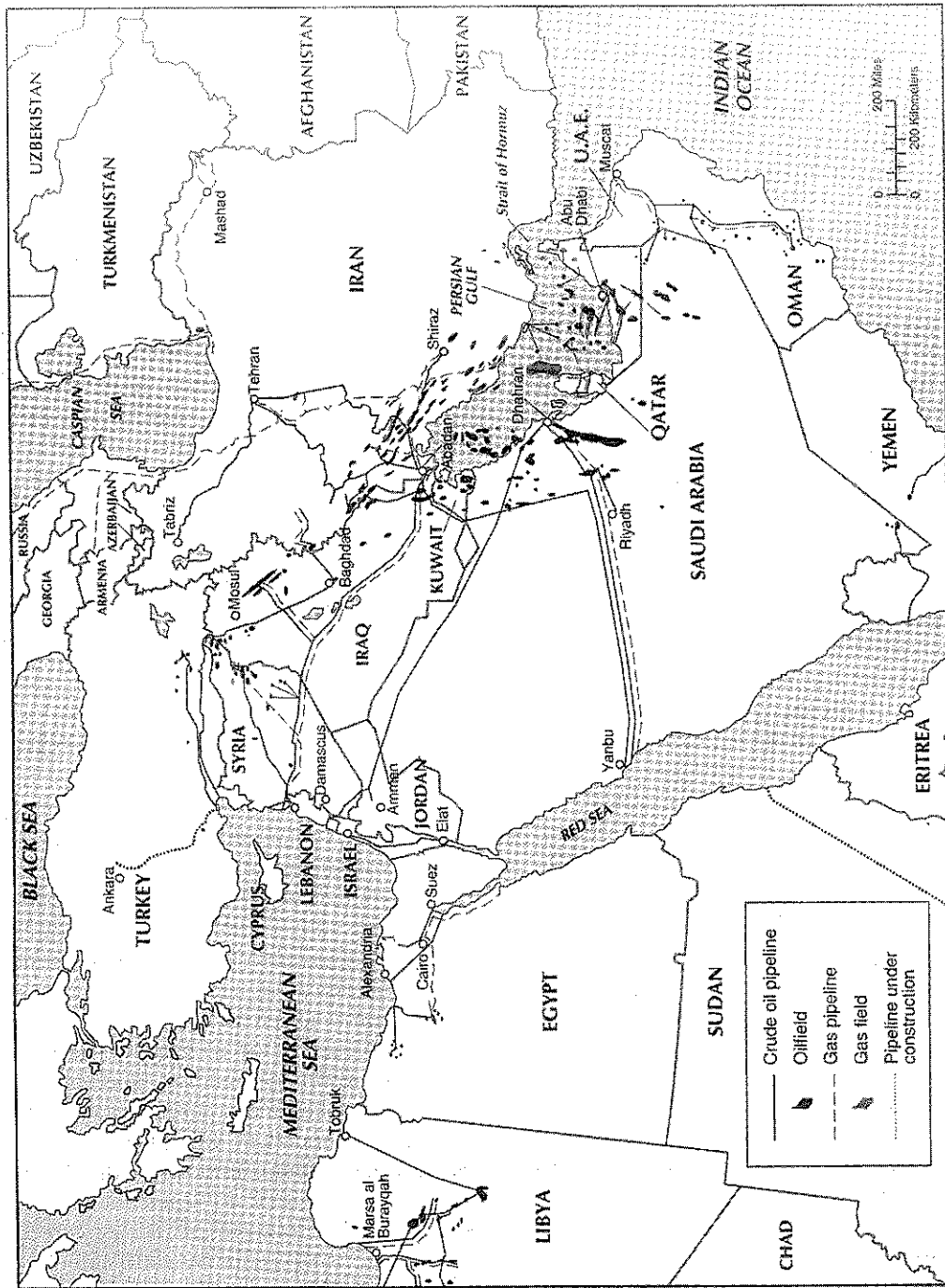
The "oil crisis" of 1973–1974 (discussed in Chapter 27) suddenly and painfully brought to the attention of the American public what scholars, government officials, ecologists, and others had been saying for many years: that the supply of hydrocarbon fuels, although very large and still unknown, is limited, whereas demand is generally rising geometrically; that the United States and other countries have become too dependent on such fuels; and that petroleum can be used as a political weapon (Fig. 38-2). For the first time, Americans (and others) began thinking seriously about the total energy picture instead of isolated portions of it, about the folly of building a society based on the expectation of unlimited supplies of cheap energy, about the ease with which mighty States can be held hostage by a few coun-

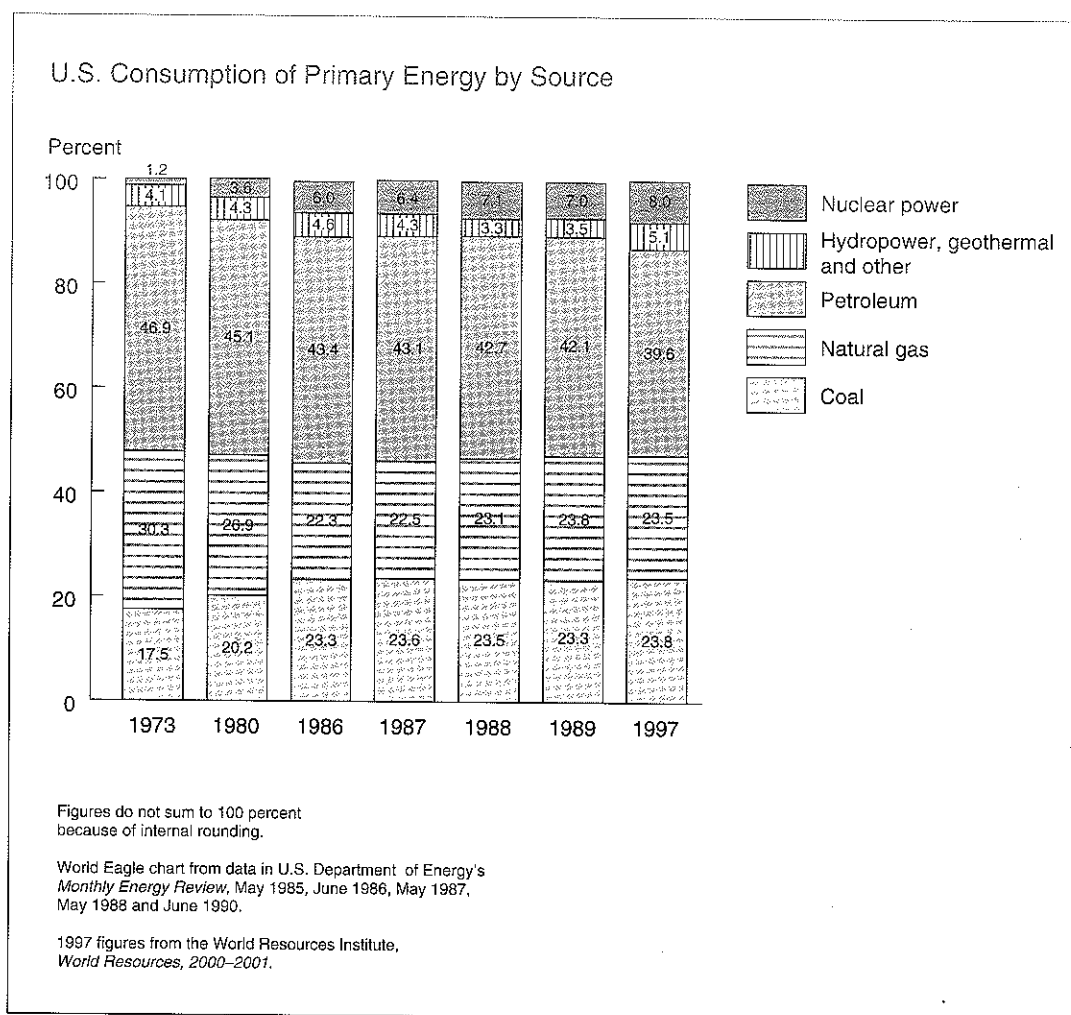
tries poor in technology but rich in fuel. The fall of the Shah of Iran early in 1979 generated another "oil shock" of falling stocks and rising prices. Whereas the first crisis generated greater concern, the second crisis prompted the U.S. government and even private industry to take action. They began preaching energy conservation, investing heavily in alternative energy research, building up strategic petroleum reserves, and intensifying the search for new sources of petroleum within the United States, including the continental shelf—all in the name of "energy independence."

But in the mid-1980s, the price of oil plunged on the world market due to two trends. First, the 1970s rise in oil prices spurred oil companies to increase their productive capacity. In 1973, oil companies had to draw on 90 percent of their cumulative productive capacity to meet world demand. By the mid-1980s, that demand could be met with just 70 percent of cumulative productive capacity. Second, consumers began looking for ways to save money by conserving energy, notably by purchasing more fuel-efficient automobiles. These two trends coalesced in the mid-1980s to drive oil prices down. Market forces sometimes take on a life of their own, and the price of oil declined more than one might have expected in what the Meadows team described as "overshoot."\*

Almost immediately, research on alternative energy sources diminished, the search for new oil reserves slowed almost to a halt, offshore oil rigs were laid up, promotion of conservation was left to the NGOs and to private firms that stood to gain from it, and Americans resumed building and buying larger automobiles and other motor vehicles. "Project Independence" went a-glimmering. American petroleum imports, which had fallen from a high of 46.5 percent of total supplies in 1977 to a low of 28.1 percent in 1982, began rising again. By 2001, imported petroleum accounted for 57 percent of what

\* Donella H. Meadows, Dennis L. Meadows, and Jürgen Randers. *Beyond the Limits: Global Collapse or a Sustainable Future*. London: Earthscan Publications, 1992.





**Figure 38-3: U.S. consumption of primary energy by source.**

Americans consumed. In percentage terms, the majority of those imports come from four major suppliers: Canada (15.4), Saudi Arabia (14.3), Venezuela (13.2), and México (12.3). Other important suppliers include Nigeria (7.4), Iraq (6.7), Norway (2.8), the United Kingdom (2.6), and Colombia (2.4). Overall, the Persian Gulf accounts for 23.5

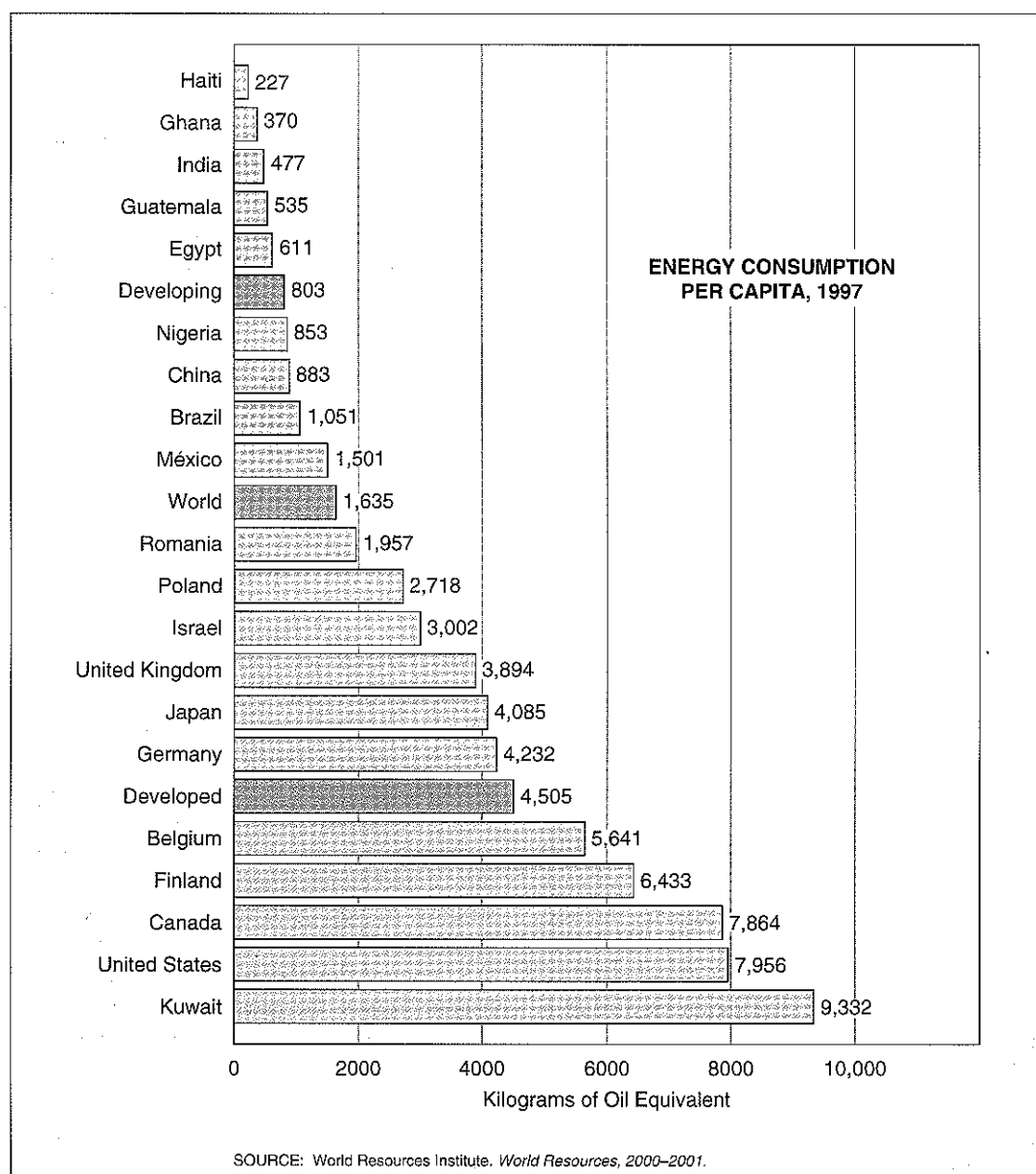
percent of imports or roughly one-eighth of U.S. consumption.

Figure 38-3 shows the energy picture for the United States since the 1970s. The most striking change from the 1973 picture is the considerable rise in the proportion of total U.S. energy derived from coal and nuclear fission versus the decline in hydroelectric

**Figure 38-2: Petroleum and natural gas in the Middle East.** The world's largest reserves of oil and natural gas are shown on this map. Their political and economic importance in the contemporary world can hardly be exaggerated. The Arab oil embargo and the quadrupling of oil prices in 1973-1974, a second "oil crisis" following the 1979 Iranian Revolution, the Iran-Iraq War (1980-1988), and the first and second Gulf Wars of 1991 and 2003 between Iraq and U.S.-led coalitions are only the most dramatic illustrations of the reserves' geopolitical importance, and of their vulnerability to political instability.

power. Since 1990, however, the proportions of energy derived from various sources has remained relatively constant. But geothermal energy, tidal power, wind power, wave power, ocean thermal energy conversion (OTEC), and solar power: Where are they? So much for the American commitment to clean, renewable energy.

In the United States, 56 percent of the natural gas produced domestically comes from Texas and Louisiana. Those two states, plus Alaska, California, and Oklahoma, jointly account for 58 percent of domestic crude oil production. Despite the undoubted wealth and vaunted political power of the "oil lobby," the fact remains that Americans still enjoy huge amounts of relatively cheap



**Figure 38-4: Per capita energy consumption for selected countries, 1997.** (Source: World Resources Institute. *World Resources, 2000-2001*)



energy. Even when the second Gulf War pushed prices higher, they remained far below those paid by consumers in Europe. It is clear, however, that this situation cannot continue much longer; it is much too fragile. Difficult energy situations may well recur with increasing frequency and severity until the country adopts and maintains a policy based on conservation of energy. We need an appropriate mix of fossil fuels, nuclear power, and such renewable sources of energy as the sun, wind, tides, geothermal steam, alcohol, and thermal layers in the sea, and we must have a rational means of paying for energy.

One solution is to drastically reduce our overall per capita consumption of energy. On a per capita basis, the developed countries consume more than five times the energy as the developing world and almost three times the world average (Fig. 38-4). Barring extreme measures, it is unlikely that any developed country will succeed in reducing per capita energy consumption to the world average. The United States, however, could certainly work toward lowering its per capita expenditures to the average for all developed countries. Promoting greater energy efficiency is the logical first step toward that goal. U.S. agriculture, manufacturing, transportation, and ordinary household activities all account for frightful waste of energy resources, but that represents a substantial opportunity for energy conservation. As for "energy independence," it is a chimera. Autarky in energy is as foolish and impractical as it is in automobiles, textiles, consumer electronics, or nearly anything else. Real energy security may well lie in international cooperation rather than competition. But other countries' energy pictures are not the same as ours, and both their goals and their policies will differ accordingly.

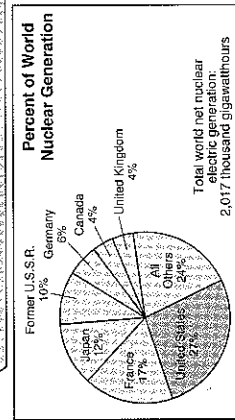
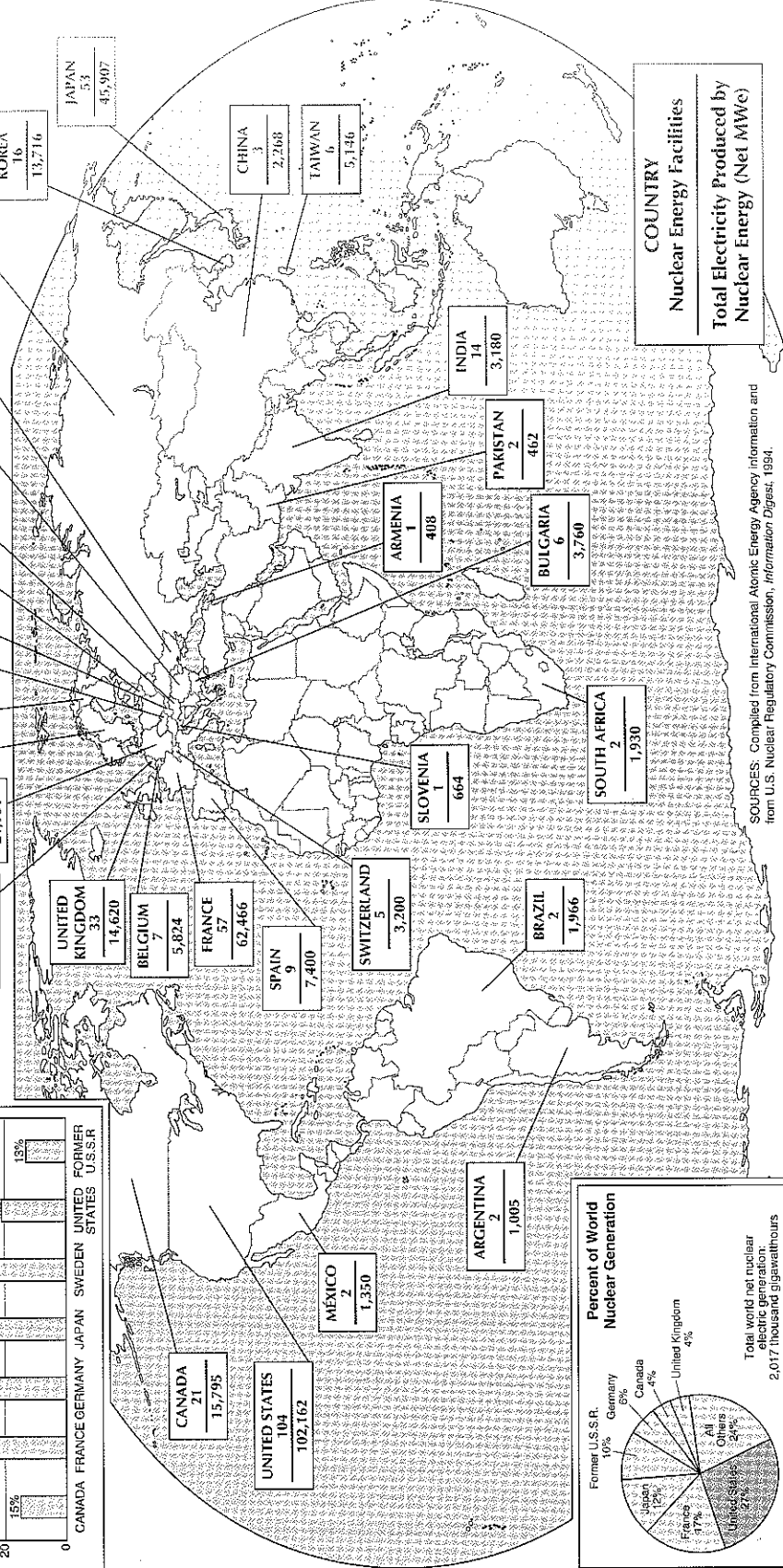
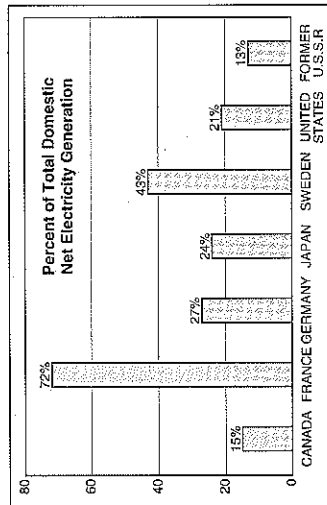
Western Europe, where the Industrial Revolution began, using first water power and then coal, is today much more dependent on external sources for its energy than the United States. Petroleum and natural gas under and around the North Sea have relieved this situation somewhat, and still

newer reserves in the form of tar sands in France and heavy crude under the Adriatic Sea may in the future be important, but the basic energy dependence of Western Europe remains unchanged. Consequently, nuclear energy is proportionately more important there, especially in France, than anywhere else in the world. (Fig. 38-5) Nearly all the hydroelectric potential has been developed, and the world's only large-scale tidal power project functions in the estuary of the Rance River in France. Nevertheless, Western Europe is still dependent on Middle East oil, and the 1973-1974 oil embargo by Saudi Arabia and other Arab States did influence the policies of most States in the region (except the Netherlands) toward the Arab-Israeli dispute, though not necessarily to the extent hoped for by the Arabs. The second oil crisis, sparked by the 1979 Iranian Revolution, led to even greater efforts among Western European governments to decrease energy consumption.

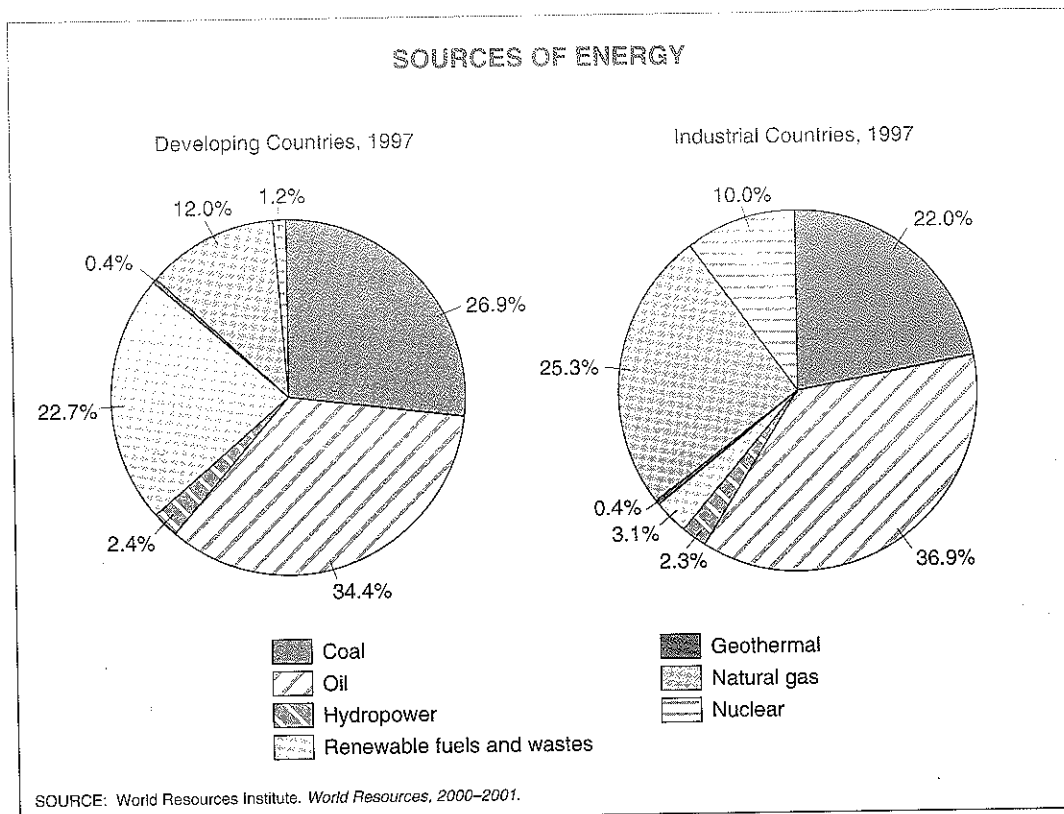
Japan is even more vulnerable, having a much smaller domestic energy stock. As an island State, it cannot draw on an electricity intertie system such as that which binds most of continental Western Europe. With most of its oil supply originating in the Middle East, it is vulnerable both to Middle East turmoil and potential interdiction at a number of chokepoints. On the other hand, Japan stands to gain from increased Russian production given its relative proximity to Siberian oil fields.

The developing countries present a more complex picture (Fig. 38-6). Some are exporters of petroleum and perhaps members of OPEC. Therefore, they have fewer worries regarding energy, at least in the short term. But as they invest their oil revenues in industrialization and modernization in general, they become more dependent on all manner of imported consumer and capital goods, technology, and skills obtainable primarily in the developed countries. At the same time, their domestic energy needs grow, leaving less for export (barring a sharp increase in production, which is unlikely because of the desire to conserve finite reserves). The result is likely to be





SOURCES: Compiled from International Atomic Energy Agency information and from U.S. Nuclear Regulatory Commission, *Information Digest*, 1994.



**Figure 38-6: Comparison of energy sources between developed and developing countries, 1997.** Notice the contrasts between the higher use of nuclear energy in the developed countries and more dependence on renewable fuels and biomass waste in the developing countries. Reliance on hydro, geothermal, wind, and solar power remains low throughout the world.

decreased bargaining power and a restoration of something approaching a community of interests.

Those developing countries that are not oil exporters present a varied picture. Some, such as Bhutan and Malawi—the least developed countries—consume so little inanimate energy that for the present, at least, local supplies of wood, cow dung, agricultural wastes, coal, peat, and other traditional organic fuels are adequate to meet present needs. But these materials could also be used for fertilizers, chemicals, and industrial raw materials if other fuels were reliably

available at reasonable prices, and cutting trees for firewood and charcoal contributes to the deforestation causing so much damage to the planet's environment.

Some countries are well along the road to industrialization and thus more energy-dependent than the poorest countries. Others have attained middle-class status, largely on the basis of the export of agricultural and nonfuel mineral commodities. Both groups of countries are hard-hit when oil prices rise steeply, but can get along because they have more financial resources of their own, better credit ratings, and more bargaining power

**Figure 38-5: Worldwide nuclear generation of electricity.** Despite the accidents at Three Mile Island and Chernobyl, the world is not likely to abandon the use of nuclear fission to produce electricity until a more satisfactory method is developed, probably not until well into the twenty-first century. In 2001, there were 441 nuclear energy plants in use around the world. The United States generated about 27 percent of the world's total nuclear energy, France about 17 percent, and Japan about 12 percent.

than the poorest countries. Those most seriously affected are generally those with infant industries, budding transport systems, nascent urbanization, and heavy dependence on foreign energy sources, but whose economies cannot yet bear the new costs. These are the countries receiving the most aid from the United Nations, the OECD, and even some of the OPEC countries.\*

As discussed in regard to "overshoot," the rising oil prices of the 1970s spurred increased exploration throughout the world. Consequently, OPEC has steadily lost market share to non-OPEC countries including Angola, Brazil, Canada, Colombia, Egypt, Gabon, México, Norway, Russia, and Viet Nam. Increasingly sophisticated technologies are locating ever greater deposits of oil and natural gas. México, for instance, is already self-sufficient, has become a major exporter, and may have one of the world's largest oil reserves. Since the breakup of the Soviet Union, new deposits in and around the Caspian Sea suggest that region may one day rival the Persian Gulf. While former Soviet officials probably lose sleep at night thinking of this turn of events, they can be consoled by news that Siberia's oil deposits are also substantially larger than previously thought. It remains to be seen how these new deposits will affect the oil market and worldwide energy conservation, but there will inevitably be unpredictable political consequences.

We emphasize petroleum here because worldwide it is, and is likely to remain for a long time, the world's most important internationally traded fuel. Coal and natural gas seem unlikely to increase substantially in international trade, although of course locally they may well become more important. Nuclear energy could conceivably play a larger role in the future, but safety concerns stemming from the Chernobyl and Three Mile Island incidents, coupled with the threat

of terrorism, make this a less likely avenue. Another reason why nuclear power may not reach the levels predicted in the 1970s arises from the enormous increase in the capital costs of building nuclear facilities. Caution is also warranted by the uncertainties of nuclear power. Neither commercial-grade uranium nor advanced nuclear technology is as abundant or widespread as fossil fuels and the technology necessary to utilize them. The possibilities of nuclear blackmail are therefore at least as great for the suppliers of either the fuel or the technology. Here is still another example of the intricate interdependence of all the States and peoples of the world and of the need for worldwide cooperation rather than competition.

### **Land Use**

Increasing population is putting severe pressure on another finite resource: land. **Land tenure**, the system of land control, management, and/or ownership, has been a matter of concern and study in many parts of the world for decades, but it is especially important now as population growth leads to increased competition for land. In Chapter 4 we described how territory and population are key requirements for all States. Consequently, the manner in which a State divides its territory among its people is an issue of special importance to political geographers. At all levels, from the individual house lot to whole countries and regions, they present problems so difficult that at times one despairs of trying to solve them. They can be solved eventually, but not very soon and certainly not to everyone's satisfaction.

### **Zoning**

One of the most interesting examples of conflicts over land use, and one attracting the attention of some geographers, is that of local zoning. Systematic land zoning within urban areas of the United States dates only from 1916, and even today many urbanizing areas have only rudimentary zoning systems or none at all. In some areas where urban sprawl has become a serious problem, the old zoning

\* Consumer countries have formed organizations to counterbalance OPEC. The International Energy Agency, composed of 20 major consumers, mostly OECD countries, and the Latin American Energy Organization are trying to work out programs to conserve petroleum, use petroleum more efficiently, and develop alternative energy sources. Their prospects for success are still uncertain.

regulations have proven inadequate to cope with new situations. Suburbanization has tended to rob central cities of their centrality, thus undercutting the fundamental premise on which zoning was originally based. Now suburbs are themselves becoming central cities, surrounded not by other suburbs but by other central cities. The long-term implications of the suburbanization of the hinterland and the urbanization of suburbia are unforeseeable, though we have already referred to some of them in our chapters on civil divisions and special purpose districts. Here we can only introduce some specific problems relating to zoning in urban and suburban areas.

The concept of zoning is based on the notion that society in general and most individuals benefit from the separation of various types of land use, generally divided into industrial, business, and residential, and subdivided further according to local perceptions. Those who have lived in countries where zoning is unknown or rare, however, and have been able to live in quiet, charming neighborhoods within easy walking distance of employment, shopping, and services, all of which are sprinkled throughout the city rather than confined to particular zones, may question the validity of this basic concept.

More serious from a political standpoint are the social effects of zoning. One of the popular ideas of the 1920s, when zoning spread rapidly across the country, was that cities should be surrounded by "garden cities," spacious, quiet, neighborhoods, green with vegetation surrounding single-family homes on large lots facing broad and sometimes deliberately curved streets. This "ideal" suburban community has had distinct advantages for those who live in them and has provided some needed relief from the "asphalt jungle" of the city. But it has created some problems as well. For one thing, as whites became more affluent and moved into these suburbs, they tended to be replaced by blacks, Chicanos, Puerto Ricans, and other minorities, leading to patterns of white suburbs surrounding minority-dominated inner cities. Zoning that includes minimum lot sizes, prohibits multifamily dwellings, severely restricts the location of businesses providing goods and services, and provides

other benefits for the well-to-do family with more automobiles than children has the effect of keeping the minorities bottled up in the cities with little opportunity to follow the whites out to the suburbs, even when they acquire the inclination and means to do so. Environmental zoning can become, by design or chance, exclusionary zoning.

Another effect of the insistence on low-density suburbs has been the acceleration of urban sprawl, with huge areas of often productive farmland given over to subdivisions. The ecological effects of urban sprawl are at least as serious as the social and political ones. Most states by now have adopted some laws protecting open spaces around cities from the ravages of the "developers," but such laws drive up the price of developable land, deprive municipalities of additional revenue-producing land, intensify traffic congestion in the urban areas, and have other undesirable side effects. This is not to say that it is wrong to insist on green belts around cities, only that better planning is necessary to permit them to perform effectively the tasks for which they are designed.

Another type of zoning that is beginning to be taken more seriously is hazard zoning, that is, prohibition or regulation of land use in areas subject to frequent natural hazards. So far this has been used mainly to exclude residences, businesses, and most industries from floodplains (clearly a public good), but there are still many problems with such zoning even where it is in force. We still have, moreover, virtually no zoning for areas subjected to other natural hazards. An example of the need for such zoning is provided by the Los Angeles area with its Mediterranean climate. It became fashionable after World War II to build homes on the slopes of the canyons in the Santa Monica Mountains and the Hollywood Hills in the northern part of the city and in other nearby areas. Nearly every summer and fall the grass and brush cover dry out during the dry season. It then catches fire from natural or human action. Powerful winds spread the fires through the canyons, endangering and even destroying houses. Then, with the vegetative cover removed, the winter and spring rains cause massive floods and mudslides, endangering and even destroying



**The politics of land use.** This dramatic satellite photograph of the border area of Alberta (top) and Montana clearly shows the effects of an international boundary on land use in an environmentally homogeneous region. Because of different governmental agricultural policies, grazing is the dominant economic activity on the Canadian side and wheat farming on the American side of the 49th parallel. (Courtesy Geometrics Canada)

still more houses. The dangers are well known, yet the taxpayers are annually called upon to provide emergency services for people who insist on living in these hazardous areas. Similar examples abound in various physical environments around the country.

A still larger problem is one that has only recently received serious consideration. It can be bluntly summarized in a single question: How long will it be before we begin to restrict the occupation of desert areas that require enormous expenditures of public funds for water, roads, power, and other facilities to make them habitable, to say nothing of the effects of large-scale human habitation and public works on fragile desert ecosystems? Zoning of this type on a national scale might seem unthinkable now, but in fact there is ample precedent for it.

### *Land Reform*

Contrary to the situation in the United States, it is private, not public, land owner-

ship that is controversial in many other countries. During the eighteenth and nineteenth centuries and well into the twentieth, the dominant form of land tenure throughout Latin America, North Africa, Southern and Eastern Europe, and most of Asia was the *latifundio*, the large family-owned estate known by a variety of local names, of which the most common is *hacienda*. Under the *latifundia* system, a large proportion of the land is owned by a very small percentage of the people. Before the 1789 revolution in France, for example, 40 percent of the land was owned by only three percent of the people. In Bolivia, 10 percent of the farmers owned nearly 95 percent of the land in 1950. In industrial, urbanized societies, these figures might not be alarming, but in a traditional society in which land plays such a great role in the lives of people, they are serious indeed.

Land reform has been an essential prelude to, or component of, every important eco-

nomic and social revolution in recent history. Land reform in Japan, before industrialization began, generated a doubling of agricultural production between 1870 and 1914. Similar increases in both agricultural production and farmers' incomes have followed (after an interval of disorganization and uncertainty) the revolutions of 1910 in México and 1952 in Bolivia. Land reform has been fundamental in the programs of all communist governments and of many democratic governments as well. In fact, it has been amply demonstrated that *latifundismo* retards economic and social progress, while more equitable distribution of land encourages them.

Maldistribution of land also inhibits political democracy. Quite commonly, the large landowners are aligned with the local and national military and religious authorities to form a triumvirate that controls the State. Each reinforces and protects the other two, as we discussed in Chapter 20. This is the major reason why meaningful land reform is so difficult to initiate and sustain without a violent or at least radical revolution. Where it has been attempted peacefully, as in Venezuela, the process does not seem to be so effective. In Venezuela, from the initiation of serious land reform in 1960 to 1973, 75 percent of the land redistributed came from the public domain; only about 12 percent of the country's private estate land had been affected. But land reform began in Venezuela when economic development, fueled by oil money, had already started and only a third of the labor force was in agriculture. Expropriated lands were paid for generously, again out of oil revenues, and after a brief early period of expropriation of private land, the reform evolved into what is essentially a colonization program. These three factors—redistribution of public lands, small agricultural space, and the colonization program—together permitted an increase in agricultural production as part of overall economic development under a stable democratic system, but these three factors are seldom present together. Furthermore, there are still grave imbalances and inequities in the country's socioeconomic picture. The coun-

try's rate of economic development slowed considerably after the drop in oil prices, and its former political stability has been seriously disrupted. Perhaps real land reform could have mitigated the damage of falling oil prices and helped to maintain political stability.

Land reform is not enough, however. Agricultural production cannot be increased and social inequities redressed without comprehensive programs of *agrarian reform* and *rural development*. These include such things as access to, and better utilization of, land, water, forests, and other natural resources; the development of a rural infrastructure, including electric power, farm-to-market roads, storage and transport facilities, irrigation and drainage projects, pure water, schools, and medical facilities; provision of agricultural inputs (such as seeds, fertilizers, pesticides, and machinery), crop insurance, generous credit, and agricultural education and extension training; development of nonagricultural activities in rural areas; and greater participation of rural people, especially women, in rural development. All this costs money, takes time, and requires a reordering of political priorities. And it inevitably has profound and often unpredictable political consequences. Yet in the long run, it is not only desirable but essential to have such agrarian reform and rural development. Many of the world's estimated 1.2 billion people who live below the absolute poverty line (\$365 per year in purchasing power parity) reside in rural areas and would stand to gain the most from agrarian reform programs.

### ***International Environmental Problems***

The most important lesson to be learned from our experience with ecology, energy, and land use has yet to be learned by mankind as a whole: that Planet Earth and its atmosphere constitute one unified ecosystem and that damage to any part of it inevitably results in damage to the whole. Everything is connected to everything else, a



fact preached by geographers for decades. But statesmen have only recently begun to give much thought to the long-range environmental consequences of their decisions and actions, and many politicians are still hesitant to do so. But, as we pointed out earlier, an environmental consciousness has begun to spread around the world, and is gradually having an impact.

In the 1960s, many considered air pollution to be a local, albeit serious, problem. Cases such as London's killer smog and similar events in Europe, North America, and Japan prompted government officials to take action. One response was to build taller smokestacks, but this changed the geographic scale of pollution. It alleviated the severe local concentrations in urban areas, but allowed pollution from thousands of such smokestacks to rise higher in the atmosphere, mix together, and create new problems such as **acid precipitation**. This occurs when airborne industrial and automotive pollutants mix with moisture in the atmosphere, sometimes producing rain with the acidity of vinegar. Carried by the wind, "there are now air pollution problems that are clearly of international and even global scope."\* Acid precipitation from the United States and Western Europe is devastating lakes and forests there as well as in Canada and Scandinavia. It threatens farms, forests, buildings, and monuments in India, México, Indonesia, Zambia, Brazil, and other developing countries. Even the Arctic is not immune as pollutants from thousands of miles away create an "Arctic haze" for several months out of the year. Such transboundary issues have been a driving force leading to improved international legislation. For example, officials meeting in London (1990), Copenhagen (1992), and Vienna (1995) added substantial amendments to the 1985 Montréal Protocol on Substances that Deplete the Ozone Layer.

\* Marvin S. Soroos. *The Endangered Atmosphere: Preserving a Global Commons*. Columbia: University of South Carolina Press, 1997, p. 37. Although one often hears of "acid rain," acid precipitation is the more accurate term because it involves all forms of precipitation.

The nearest thing to a global environmental agency is the United Nations Environment Programme (UNEP), with headquarters in Nairobi. Its Oceans and Coastal Areas Programme has generated and coordinated environmental protection and cleanup activities in designated portions of the global sea. Its Mediterranean Action Plan has had considerable success in cleaning up the Mediterranean Sea, one of the most polluted large bodies of water in the world. Progress has also been made in the Baltic, where the problem is at least as serious. Other international and regional organizations are also increasingly active in environmental matters. The OECD and the United Nations Economic Commission for Europe (ECE) were early leaders in addressing problems caused by transboundary air pollution. Their actions led to the signing in Geneva of the 1979 Convention on Long-Range Transport of Air Pollutants (LRTAP Convention). Around the world, as the realization spreads that environmental issues concern everyone, other organizations such as the Asian Development Bank, the African Union, and the Organization of American States are becoming increasingly involved in the search for solutions. Even the World Bank has engaged in some strategic rethinking recently and is now promoting sustainable development projects around the world, much of it administered through the Global Environment Facility (GEF) to help developing countries meet their obligations under various global environmental treaties.

Increased international action comes none too soon. All over the world, scientists are discovering disturbing signs of the scope of environmental interlinkages. Agricultural pesticides applied in the rich countries of the Northern Hemisphere wash down rivers into the global sea and eventually end up in the bodies of penguins in Antarctica. Deforestation for firewood in Nepal contributes to much more damaging floods in Bangladesh. The shrinking Aral Sea leaves behind salt that blows on the wind to damage farmland hundreds of miles away. The release of carbon dioxide and other greenhouse gases in the Northern Hemisphere

raises the risk of small island States being inundated. Some links are deliberate. Tens of thousands of shipments of hazardous wastes generated in the developed world are frequently sent to Eastern Europe and the developing world. Although the 1989 Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal called for its ban by 1997, some unscrupulous companies continued the practice, albeit on a reduced scale.

The threat of major worldwide climate change due to **global warming** continues to rouse controversy. Although most *greenhouse gases* such as water vapor, carbon dioxide, and methane occur naturally in the environment, many scientists fear that human activity causes those levels to rise, thus leading to the **greenhouse effect** in which the Earth's atmosphere slowly warms. The ramifications include glacial melting, rising sea levels, inundation of coastal cities and many islands, prolonged drought, food shortages, refugee migrations, and the possibility of new conflicts. The depletion of the ozone layer in the upper atmosphere, which protects the planet from excessive ultraviolet radiation from the sun, is another global problem, although it is more forcefully addressed by the Montréal Protocol and amendments. Another global issue is **deforestation**, the rapid disappearance of the forests that once blanketed much of the Earth and that provide much of our atmospheric oxygen as well as wildlife habitat, watershed protection, sustenance for soil, and regenerative forest products. This is one of the factors contributing to **desertification**, the spreading of deserts, particularly in Africa, over land that had been at least steppe and even savanna.\*

All these issues intensify the pressure on finite supplies of fresh water, which are so scarce that some coastal desert States wish to

"import" icebergs from the Southern Ocean, as has already been done experimentally. Another result of both human and natural forces is the rapid extinction of species of plants and animals. Who can tell how many potential sources of food, medicine, pest control, beauty, and spiritual joy have been lost in this way?

The political and social consequences of this environmental degradation are incalculable. Despite improved agriculture, global per capita food production is virtually unchanged, over one billion people suffer from hunger and malnutrition, and we continue to see huge waves of environmental refugees fleeing drought, floods, famine, and other ecological problems. The possibility looms of resource wars, water wars, food wars, and even land wars once more becoming primary catalysts to armed conflicts.

All this, of course, both stems from and reinforces the maldistribution of wealth and power in the world, generated in part by the Industrial Revolution and in part by the staggering growth of the world's population that followed it. These points are discussed in greater detail elsewhere in this book, but here they are seen in a broader context. Another point bears repetition: Although at the present stage of world history populations are growing most rapidly in the poorest countries, it is likely that the greatest environmental damage is caused by the rich countries and their agents in the poor countries. Furthermore, industrial and urban pollution is greatest in the rich countries.

Western Europe, for example, rich, sophisticated, and proud, was caught completely off guard in November 1986 when a series of accidental spills of toxic chemicals in Switzerland flowed down the Rhine River, killing hundreds of thousands of fish, contaminating drinking water for millions of people, and otherwise damaging the environment of four countries. This calamity called to mind the words of the English Romantic poet Samuel Taylor Coleridge:

The river Rhine, it is well known,  
Doth wash your city of Cologne;  
But tell me, nymphs, what power divine  
Shall henceforth wash the river Rhine?

\* Although the nature, causes, and even existence of desertification are challenged by some scientists, most governments consider it a genuine problem. In 1977, the UN Conference on Desertification was held in Nairobi, and the UN Conference on Environment and Development (Rio de Janeiro, 1992) called for a UN Convention on Desertification which was negotiated subsequently and opened for signature in October 1994.



What power indeed? The Rhine River fiasco and countless other issues finally prompted many of the world's leaders to consider marshaling the necessary power. A global plan of action—backed by a worldwide consensus, determination, sustained effort, and plenty of cash—emerged as a result of the 1987 report of the World Commission on Environment and Development. This commission, composed of 23 people from all parts of the world and headed by Gro Harlem Brundtland, then Prime Minister of Norway, was created by the United Nations but was independent of it. It labored for three years before issuing the Brundtland report on a broad range of contemporary world problems. Two years later, world leaders meeting at the 1992 Earth Summit adopted *Agenda 21*, which provides a detailed plan of action for countries to promote and achieve sustainable growth.

There are other hopeful signs as well. One is the growing impact of environmental NGOs around the world. The moratorium on whaling, the ban on large-scale driftnet fishing, the ban on discharge of chlorofluorocarbons into the atmosphere, efforts to preserve biodiversity, and many other small victories can be credited at least in part to their efforts. NGOs also introduced "debt-for-nature-swaps" that forgive a portion of a developing country's foreign debt if it dedicates areas of the country as parks or biosphere reserves. This creative idea has great potential to accomplish numerous environmental and developmental objectives—if it is administered wisely, on a large enough scale, and over a long enough period of time. Similar arrangements involve debt relief in return for initiating sustainable development programs. Since 1987, several hundred million dollars in debts have been forgiven in dozens of countries in Latin America, Africa, Asia, and Eastern Europe.

Another sign of hope is the "greening" of politics at the local and national level, which may eventually spread to the international level. "Green" parties were organized in a number of European countries in the 1970s and 1980s to contest elections on environmentalist platforms. They have had some

success, especially in Germany where the Green Party is part of the governing coalition. But they have not yet had a substantial impact on political institutions in most other parts of the world. Single-issue parties such as this can only be successful in electoral systems based on proportional representation, and even there the system places limits on what they can accomplish. If they try to broaden their appeal and win more votes, either by incorporating other planks in their platform or forging alliances with other parties with different programs, then they automatically dilute both their message and their energy, possibly to the detriment of both the parties and the environmental movement. It is a classic dilemma in politics, and it has no simple solution. Nevertheless, formal, legal political activity has both publicized and legitimized the notion of environmental protection, and this has demonstrably influenced some national policies. Green parties' initial successes typically force traditional parties to give higher priority to environmental issues. Although this may draw voters away from the green parties and back to traditional parties, it does represent progress in promoting the environmentalists' message.

Perhaps the crucial test, not only of the concept of linking economic development and environmental protection but also of international action as a means to bring it about was the United Nations Conference on Environment and Development (Rio de Janeiro, 1–12 June 1992). This conference, scheduled just 20 years after the UN Conference on the Human Environment in Stockholm, was voted by the General Assembly in 1989 and preparations for it began almost immediately. Over 110 countries were represented by heads of State or government (as compared with two in Stockholm); it was the largest "summit" meeting held to date. Following a trend that began in the 1980s, numerous NGOs and private-sector interests also played an active role. It was certainly one of the most important conferences since UNCLOS III. Its true significance, however, will not be evident for years—perhaps even decades—for the real measure is not what was said or done in

Rio but how the resolutions, the Rio Declaration, plans such as *Agenda 21*, treaties such as the Framework Convention on Climate Change and the Convention on Preserving Biological Diversity, and other documents such as the Statement of Forest Principles that emanated from it are interpreted and implemented.

In 1997, representatives from over 170 countries met again, this time in Kyoto, Japan. The Kyoto Climate Change Summit specifically addressed issues of global warming and the greenhouse effect and resulted in a compromise between the developed and developing world. The European Union, United States, and Japan agreed to reduce their emission of greenhouse gases by eight, seven, and six percent, respectively, from 1990 levels, while developing countries agreed to take steps to curb deforestation. One innovation calls for countries that fail to meet their targets to "trade" emissions with countries that have exceeded their target. But the proposals only apply to individual governments that ratify the Protocol and the United States, the world's largest emitter of greenhouse gases, has yet to do so.

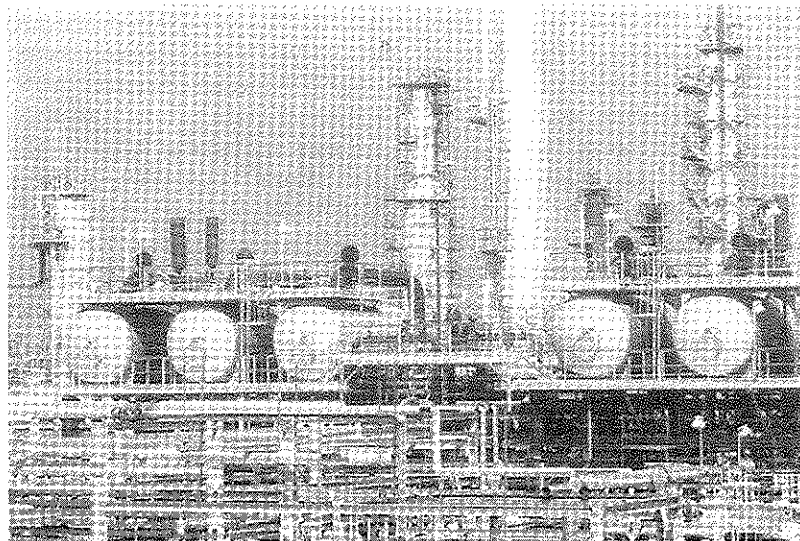
The conference in Kyoto fell halfway between the Rio summit and the 2002 World Summit on Sustainable Development in Johannesburg, South Africa. Unlike Rio, many observers concluded that the Johannesburg summit fell short of expectations. Participants did agree to a 2015 goal of a 50 percent reduction in the number of people without access to safe drinking water. Otherwise, it appeared to produce resolutions without deadlines. Important issues such as increasing the use of renewable energy and building stronger links connecting trade, development, and the environment yielded little more than "good intentions."

### ***Conflicts in Ecology, Energy, and Land Use***

In this chapter we have pointed out a number of problems relating to environmental politics from the local to the global scale. Each is difficult enough in itself, but their

interrelatedness compounds the complexity. Here we suggest a few interrelationships only to illustrate the point.

1. In the rush to "energy independence," we are considering a return to coal as a primary fuel because it is domestically abundant, but we forget the reasons that we converted from coal to oil and gas in the first place: Coal is bulky, dirty, inefficient (except for expensive anthracite), and produces more greenhouse gases. Moreover, underground mining is hazardous and unhealthy, while surface mining is ecologically ruinous.
2. Expansion of the land under cultivation to increase food production means in most of the world using marginal or sub-marginal land, which would require a great deal of energy and can have most unfortunate ecological consequences.
3. Dispersal of industry to improve the urban environment and provide rural employment can simply accelerate urban sprawl, increase transport costs and energy consumption, and transfer the less desirable features of industry to rural areas, making these areas less attractive than they are now.
4. An increase in energy consumption, especially from non-renewable sources, means additional pipelines through fragile environments, oil spills, and blowouts; unsightly and perhaps dangerous electricity transmission lines; more rail, road, and water transport, requiring more energy and raw materials to produce and operate; uncertainties about nuclear energy; and changes in the composition of the Earth's atmosphere.
5. Increased raising of livestock for food means increased competition with wildlife for forage, destruction of their habitats, and increased pollution from feedlots.
6. Landfills in urban areas or even for off-shore facilities, such as airports and oil terminals, can have adverse effects on the ecology of the coastal zone.
7. Economic development, considered a desirable political goal, is too often non-



**A small portion of a large petroleum refinery.** This is the desulfurization unit of the huge Texaco refinery in Convent, Louisiana. The immense complexity and capital cost of a large modern refinery preclude such installations in poor countries without external assistance in the form of capital, technology, equipment, management, or some combination of these elements provided by transnational corporations, international organizations, governments of rich countries or some combination of these sources. To be efficient and profitable, petroleum refineries generally employ relatively few workers, relying instead on greater automation. They pose serious environmental problems in the form of emission of noxious gases and toxic effluents, besides the ever-present dangers of oil spills and fires. They provide raw materials for a great variety of petrochemicals that have become important to both producers and consumers in modern industrial societies and in poor agricultural societies alike. They are therefore good candidates for vertical integration as the core of a modern sector of a traditional country. (Photo courtesy of Texaco and the American Petroleum Institute)

- sustainable, leading to intensified land use, ever-increasing energy demands, and ecological damage.
8. Hydroelectric dams, which generate nonpolluting energy at relatively low cost, can interfere with the migrations of anadromous and catadromous fish, cause siltation behind the dam, desiccate wetlands below it, and devastate the land and culture of nearby indigenous peoples and settlers.
9. The readily accessible fossil fuels have already been found; new deposits are likely to be found in environmentally fragile areas where the risks and costs are far greater than in the older ones.
10. Orderly economic growth today requires broad policies and plans for land use, energy, and ecology that can be developed and administered by governments only at the expense of some limitations on free enterprise, private ownership of land, and individual behavior.
11. Successes already achieved in environmental protection are threatened by reversal as economic interests organize to achieve "wise use" or "balanced use" or "multiple use" of land and resources, thereby damaging or destroying both inhabited and wilderness areas.

12. A growing population would require economic growth merely to maintain the present unsatisfactory levels of consumption of goods and services for the great majority of the people of the world, so that cutbacks in production can only make a bad situation worse.
13. An increasing, and wealthier, population also requires more recreational facilities on land and offshore in areas not yet urbanized, thereby placing even greater pressure on our remaining rural and wilderness areas and in the most biologically productive area of the sea.
14. Establishment of marine parks, sanctuaries, and reserves to protect rare, scenic, or scientifically important portions of the sea can conflict with marine transportation and fisheries needed by a growing population (Fig. 38-7).
15. Political democracy can best be achieved and maintained in a society that is reasonably prosperous and in

which wealth is equitably distributed, with a substantial middle class, but these conditions can only be developed over a period of time at some environmental cost.

In these 15 points alone, without even considering other summary points that could be made or our more elaborate discussion that led up to them, we can see all the components suggested by Kasperson and Minghi: "political goals, agents of impress, processes and effects." But using these components in a linear fashion to analyze environment-politics relationships could quickly lead to an analytical dead end. They themselves are interrelated in complex ways. The agents of impress, for example, may select the political goals they wish to reach but find that they have a very limited range of processes from which to choose, while the effects of their choices are felt by people who played no role in the selection of goals, agents, or processes and may object to all of them.

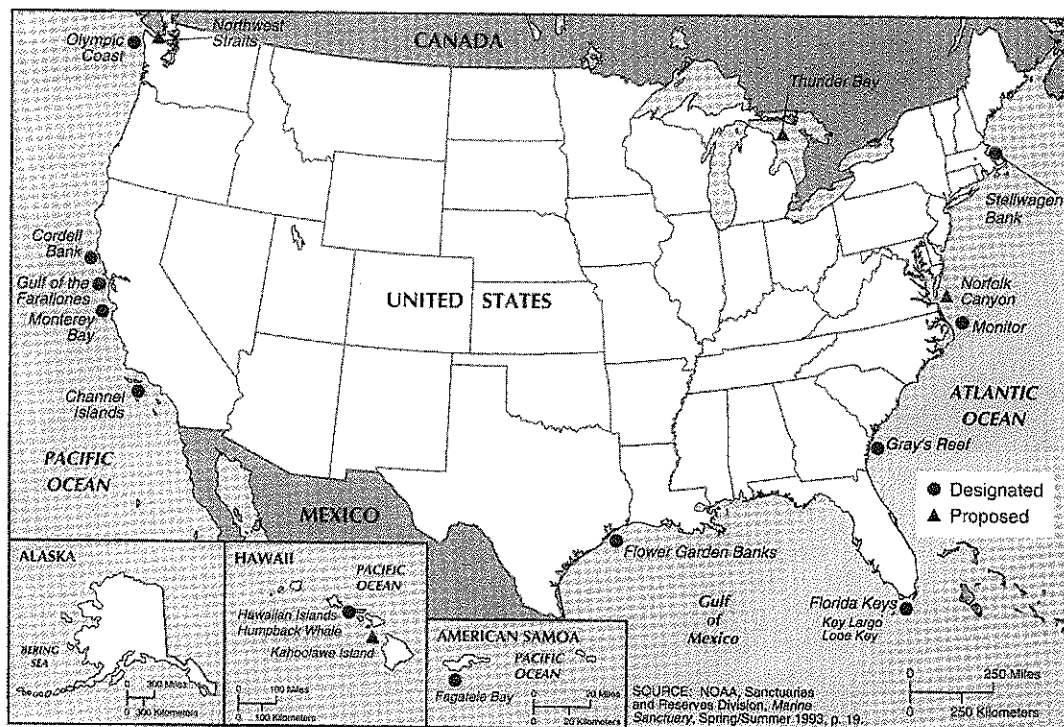


Figure 38-7: Marine sanctuaries of the United States.

The political geography of everyday life, as we have seen, affects every single individual on the planet, in multiple ways, everywhere one goes, awake or asleep. Students of the subject understand the factors we have discussed and others we have had to omit; they see the world through different eyes than other people, and that should enable them to make wiser decisions. They should be able to help make the world just a little bit better.

*Key Terms and Concepts*

Acid Precipitation  
Deforestation  
Desertification  
Ecology  
Global Warming  
Greenhouse Effect  
Land Tenure  
Sustainable Development