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An Overview of Comparative Environmental Law

Keywords

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An Overview of Comparative Environmental Law

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I. INTRODUCTION

The recognition of environmental disruption as an issue demanding political action has become a worldwide phenomenon.¹ There is growing recognition that the continued use of watersheds, land resources and the atmosphere as sinks for the disposal of human residuals results in unacceptable social costs, such as increased illness, crop losses, ecosystem disruption and the creation of low-level, long-term health risks such as cancer. Moreover, there is a growing societal preference, especially in the developed nations, for increased amenity levels.² This preference has led to demands for greater governmental protection of the natural landscape from developmental "insults," for the maintenance of a "human scale" in urban planning and for a greater role for social and aesthetic considerations in developmental planning of all kinds.³

Public health protection and amenity enhancement are often achieved by either the reduction of residual discharge levels or the promotion of less polluting activities. Environmental problems are present to some degree in all nations, independent of the political, economic, and social organization of the country. Pollution and the demand for amenity enhancement are largely functions of the levels of industrial development and education, and of the distribution of population within a country. For example, one can trace the evolution of air and water pollution laws in

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1. For a comparative survey of environmental issues in four industrialized countries—Great Britain, Japan, the Soviet Union, and the United States—which stresses the differences and similarities in environmental constituencies within and without government, see, C. ENLOE, *THE POLITICS OF POLLUTION IN A COMPARATIVE PERSPECTIVE: ECOLOGY AND POWER IN FOUR NATIONS* (1975).

2. The increased desire for cleaner, more aesthetically pleasing environments has been noted by all major studies concerned with global resource needs. See, e.g., W. HÄFELE, J. ANDERER, A. McDONALD & N. NACKICENOVIC, *ENERGY IN A FINITE WORLD: A GLOBAL SYSTEMS ANALYSIS* (1981).

3. In this article, the standard three-part classification of environmental planning and management objectives has been collapsed into two parts. The three traditional environmental planning objectives are (1) the protection of physical and mental health, (2) the enhancement of economic value and (3) the preservation of sensory pleasure. See T. O'RIORDAN, *ENVIRONMENTALISM* 202 (1976).

the United States as well as in both Eastern and Western Europe from general prohibitions against harmful discharges to technology-forcing licensing laws that specify the parameters of lawful air and water emissions.⁴

Despite common environmental problems and similarities among the institutional responses to environmental degradation and threats to human health, environmental protection is still primarily the responsibility of individual sovereign nations. This is true even though regional organizations, such as the European Economic Community (EEC), are playing an increasingly active role in policy formulation and coordination.⁵ In the foreseeable future, however, the persistence of differing economic and political goals suggests that there will be great variations among nations in the balances struck between the costs of maintaining environmental quality and the opportunity costs of achieving this objective.⁶ Some countries accord greater weight to the benefits of industrial development and wealth redistribution while others emphasize the benefits of a stable and healthy environment. These differences manifest themselves in the institutional structures and legal regimes devised to govern environmental quality.

This article attempts a brief comparative analysis of the different institutional responses to the various types of environmental degradation. The common types of environmental insult which have been the subject of legislation are initially classified and a model of the evolution of environmental strategies is proposed. The general schemes of environmental regulation utilized in various countries are identified by an examination of the different institutional arrangements which have been created to enforce such schemes. The different methods of pollution reduction and public health protection are compared in order to identify common approaches and to point out unique features of the methods employed by the countries surveyed. For the sake of brevity, selected examples from

4. An illustration of this general development can be seen in the evolution of Poland's water pollution control law from the Water Act of 30 May 1962, Dz V (Pol.), No. 34, at 158, to the Water Act of 24 October 1974, Dz V (Pol.), No. 74, at 430 (Trybuna Ludu), described in S. ERCMAN, EUROPEAN ENVIRONMENTAL LAW: LEGAL AND ECONOMIC APPRAISAL 89-93 (1977) [hereinafter cited as EUROPEAN ENVIRONMENTAL LAW]. For a more extended discussion of environmental protection planning in socialist systems, see Somer, *Legal Ways and Means of Environmental Protection in the Legal System of Industrial Investments in Socialist Countries*, 3 EARTH L.J. 7 (1979).

5. See note 94 *infra*.

6. Considerable debate exists about the priority to be given to environmental issues in developing countries. Many of these nations view stringent environmental protection policies as luxuries they cannot afford or, worse yet, as a plot by the developed nations to perpetuate the present unequal distribution of wealth throughout the world. For an early exposition of this theme, see Castro, *The Case of the Developing Countries*, in WORLD ECOCRISIS: INTERNATIONAL ORGANIZATIONS IN RESPONSE 237 (D. Kay & E. Skolnikoff eds. 1972). There is some evidence that the attitudes of the developing nations are changing. See Bassow, *The Third World: Changing Attitudes Toward Environmental Protection*, 444 ANNALS 112 (1979).

the three major legal systems of the Americas and Europe—the common law, civil law, and socialist law—will be used to illustrate such approaches and the impact of differing economic and social priorities on environmental law. To a lesser extent, the institutional responses to environmental degradation in countries on the road to development will be explored and, at the risk of emphasizing common aspects of environmental protection against the particular circumstances which influence the institutional responses to demands for environmental quality in a specific country, a generally applicable model of legal and environmental protection will be sketched.

II. CATEGORIZATION OF ENVIRONMENTAL INSULTS AND THEIR LEGAL CONSEQUENCES

Environmental insults which threaten public health may usefully be categorized as either episodic or persistent in nature. Different institutional responses are required depending on whether the problem is one of redressing past harm by compensating victims of isolated incidents or preventing future risks arising from persistent discharges.

Episodic insults are discrete pollution events occurring on a large or small scale. An accidental discharge of toxic effluents into a stream that kills fish and closes recreation areas or an air inversion which traps pollutants over a city for several days or perhaps weeks are typical episodic insults. The harm done by these discrete insults is measured by short-term exposure to the pollution. In contrast, persistent insults are more diffuse and more difficult to measure. They result from continuing, potentially harmful emissions produced by economically valuable activities and are exemplified by untreated sewage discharges, sulphur dioxide emissions from coal burning facilities, automobile exhausts, low level radiation emissions, and acid rain. Further complications arise from the potential irreversibility of such pollution phenomena as acid rain.⁷

Discrete environmental insults may be further classified into three types, and legal systems often respond differently to each of these. Harm from an environmental result may be past, imminent, or long-term and merely possible. All legal systems permit individuals injured by a discrete episode of pollution to seek a remedy in damages and, in some instances, an injunction against an activity which threatens immediate harm.⁸ Collective responses, however, are generally required to prevent persistent pollution since it is this type which often does not go unredressed by individuals' private actions. As a result, persistent pollution has increasingly become the subject of administrative regulation, although the regulations tend to focus on the prevention of measurable, known harms as opposed

7. See G. WETSTONE & A. ROSENCRAZ, *ACID RAIN IN EUROPE AND NORTH AMERICA: NATIONAL RESPONSES TO AN INTERNATIONAL PROBLEM* (1983) and I. VAN LIER, *ACID RAIN AND INTERNATIONAL LAW* (1981).

8. See, e.g., *BÜRGERLICHES GESETZBUCH [BGB]* arts. 906 & 1004 (W. Ger.).

to the minimization of serious, persistent, but unquantifiable public health threats.⁹

An increasingly accepted justification for the regulation of persistent pollution sources derives from the notion that often no one individual will suffer sufficient damage to make a threshold showing of injury under applicable private law doctrines. Even if a number of persons suffering legally cognizable harm were to aggregate their claims so as to give each more incentive to litigate,¹⁰ such incentive would more than likely be insufficient, given the paucity of each individual's potential share of any recovery.

Perhaps a more powerful justification for regulating activities such as pesticide use or the discharge of toxic substances into the air, water, or earth is the fact that those who are involuntarily exposed to the risk of future ill health often have little or no idea of the dangers of such exposure. While intervention by a government to protect the citizenry from unwitting exposure to subtle health risks is increasingly accepted, it remains controversial because of the opportunity costs of risk minimization. Attempts to reduce substantially societal exposure to certain risks will increase the costs of bringing new products to market and may thus serve to deprive society of those products' benefits. For this reason, some countries, such as Japan, emphasize after-the-fact compensation for environmental disasters,¹¹ rather than the prevention of future harm.

In the public mind, the impairment of public health and welfare is associated with discharges of residuals, commonly described as "pollution." This appellation gives rise to the normative inference that government intervention is justified to reduce or eliminate such discharges. While there is some basis for using the term "pollution" to refer loosely to any undesirable concentration of chemicals or particulates, the term is not truly self-defining. Two reduction goals exist which have sharply dif-

9. One commentator has written of acid rain:

[air pollution] standards are especially ineffective in addressing long range transport because concern for compliance focuses on ground level concentrations, not on higher altitudes more relevant to the transportation process [T]he laxity of present standards is largely due to poor documentation of the health effects associated with exposure to low levels of the pollutants.

Weston, *Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow*, 10 ENVTL. L. REP., Mar. 1980, at 50001, 50005.

In comparison, U.S. regulation of pesticide use focuses both on the problems of acute and chronic toxicity in evaluating the safety of various chemical compounds. The primary focus is on screening out those compounds that present a substantial, but highly probabilistic, risk of producing cancer in persons exposed to pesticide residues. See NATIONAL ACADEMY OF SCIENCES, *REGULATING PESTICIDES* (1980).

10. See Krier, *Environmental Watchdogs: Some Lessons from a "Study" Council*, 23 STAN. L. REV. 623 (1971).

11. *The 1973 Japanese Law for the Compensation of Pollution-Related Damage: An Introductory Assessment*, 5 ENVTL. L. REP., Dec., 1975, at 50229. See also J. GRESSER, K. FUGIKURA & A. MORISHIMA, *ENVIRONMENTAL LAW IN JAPAN* (1981) (discussing the development and current status of Japan's environmental law).

ferent consequences, and the goal chosen by a government controls the operative definition of "pollution."¹² A *conservative goal* defines pollution as any concentration of a substance that degrades the air or a watershed below its natural background level; in short, the term is defined as any artificial change. A *rational goal*, by contrast, defines pollution in terms of the measurable or assumed costs of degradation. A rational strategy does not define changes in natural background levels as pollution *per se*. Rather, it requires that beyond proof of degradation, there must be some level of aggregate damage beyond proof(?) of degradation, the reduction of which will yield benefits in excess of the costs of reducing emissions. The pursuit of a conservative goal, in sum, is equivalent to the imposition of ambient air standards to eliminate or reduce substantially all known and unknown risks, whereas the pursuit of a rational goal is tantamount to following control strategies based on a social cost accounting approach that stops short of eliminating all discharges.

Since the laws of most countries reflect a tension between conservative and rational goals, the term "pollution" can only be defined in the context of specific regulatory programs. Unfortunately, legislatures, courts and commentators generally do not use the term to describe precise emission reduction goals. Instead, it is used to refer to any degradation generally considered intolerable, a usage that obscures the hard choices involved in formulating any emission reduction strategy. In this article, however, the term will refer to receiving media content levels that are in excess of emission levels deemed safe or reasonable by a court or legislature with respect to the public health or other interests.

Pollution is said to result from historic assumptions that watersheds, the air and many land resources are, in economic terms, free goods.¹³ Thus, water, air and land have historically been used without cost as sinks for the disposal of wastes. In many cases, however, the use of these resources in such a manner has imposed costs on both present and future generations.¹⁴ Because their ownership has never been clearly defined, no person or entity could charge for their use for waste disposal purposes. Disposal costs were not, therefore, internalized by the disposer. As a matter of economic theory, the costs of waste disposal are no different from those using other factors of production, such as labor and raw materials, but these costs have been ignored because there has been no market to discipline producers' waste production levels.¹⁵ As a consequence, the

12. Hardin, *The Tragedy of the Commons*, 162 *SCIENCE*, Dec. 13, 1968, at 1243.

13. W. BAUMOL & W. OATES, *ECONOMICS, ENVIRONMENTAL POLICY, AND THE QUALITY OF LIFE* 209-16 (1979).

14. Some costs, such as those to human health, are obvious—see L. LAVE & E. SESKIN, *AIR POLLUTION AND HUMAN HEALTH* (1975)—but others are more subtle and longterm. See, e.g., Georgescu-Roegen, *The Entropy Law and the Economic Problem*, in *ECONOMICS, ECOLOGY, ETHICS: ESSAYS TOWARDS A STEADY-STATE ECONOMY* 49, 57 (H. Daly ed. 1980).

15. For a readable introduction to this literature, see A. KNEESE & C. SCHULTZE, *POLLUTION, PRICES, AND PUBLIC POLICY* (1975).

One conspicuous example of a country's decision to allow the continued free use of

price system which forced the efficient use of labor and raw materials did not have the same effect on disposal sinks. The inevitable result of the free use of natural resources as sinks has been overuse. Such overuse becomes a problem for the following reason: whenever an activity (e.g. pollution), free to the market actor, imposes costs (e.g. health problems), the market or market substitute will not guarantee the proper allocation of resources, with the consequent risk that resources will be inefficiently allocated. This is the standard explanation of the cause of the "pollution problem," and it has provided a universally powerful rationale for public intervention to protect public health. As a reformist rather than a radical theory, however, such an explanation does not challenge the prevailing assumption throughout the world that economic development (along with the provision for national defense) should be given the highest priority by a country. While this theory suggests only that gross abuses of development should be curbed, other more radical theories based on the "lessons" of ecology argue that the world must squarely face the fact of limited resources and decrease its overall consumption levels to ensure environmental quality and human survival.¹⁶

What follows from the welfare economics approach is a *rational* pollution strategy, and the laws of many countries, as will be discussed below, are premised on the goal of allocating resources efficiently. Achieving this goal requires balancing the costs and benefits of pollution reduction. The notion that the control of pollution is a simple cost-benefit problem, however, is being increasingly rejected. It is often argued that certain discharges are potentially so harmful that the public should be protected from them regardless of the opportunity costs of the regulation.¹⁷ Simply put, rationales for pollution reduction to achieve a *conservative* goal exist, apart from improved efficiency.

III. FACTORS INFLUENCING ENVIRONMENTAL PROTECTION LEVELS

The desired level of environmental protection and the method of seeking public health protection and environmental quality enhancement vary from country to country. Ultimately, a detailed knowledge of each country's culture, history, and political organization is necessary to understand fully its environmental laws and policies, but common variables exist which can be used to predict both the level of environmental protection and the means chosen to reach it. These variables can initially be

airsheds as sinks was Brazil's environmental policy in the 1970s. The city of Cubat-Wao was at one point described as the "valley of death" because of high discharges of carbon monoxide, sulfur dioxide, nitrogen oxides, and hydrocarbons from a petrochemical complex, but the country seemed nonetheless to have accepted the argument that pollution control is a luxury affordable only by developed countries. See N.Y. Times, Sept. 23, 1980, at 3, col. 2.

16. This literature is summarized in Duvall, *The Deep Ecology Movement*, 20 NAT. RESOURCES J. 299 (1980).

17. See Rodgers, *Benefits, Costs, and Risks: Oversight of Health and Environmental Decisionmaking*, 4 HARV. ENVTL. L. REV. 191 (1980).

allocated among four categories: industrialization; political organization; cultural and ideological values; and public awareness, demand and organization for governmental action to solve environmental problems, a category which cuts across the first three categories but is sufficiently important to merit separate discussion.

A. *Industrialization*

Of necessity, all countries desire economic growth and consequently pursue or have pursued aggressive industrialization programs. In a few countries, such as Norway and Sweden, the optimal degree of growth has been debated politically, but in most countries the need for industrialization is assumed as an article of faith. Since pollution is caused by, among other things, the discharge of residuals from industrial and associated activities, it is found in all developing as well as developed countries, regardless of political organization or ideology.

B. *Political Organization*

For environmental policy-making purposes, it may be easier for interests without formal governmental representation to elevate environmental issues to the level of important political questions in democratic nations than it is in totalitarian regimes. Even though environmental problems are no less serious in the latter, they are less likely to engage the attention of the ruling elites, who are usually concerned primarily with economic, military and internal security matters.¹⁸ The recognition of environmental interests is often seen as a generally destabilizing force.¹⁹

In countries organized on the basis of a federal administrative system, a national government with specifically delimited powers governs, with states or provinces possessing semi-autonomous authority.²⁰ In these countries, control over natural resources is often considered a state or provincial, as opposed to a national, function²¹ and thus states have considerable discretion to define environmental priorities on self-interest grounds alone unless the national government intervenes. In the United States, states competed for industry by allowing lax pollution standards, but this problem has been dealt with by uniform national standards which set maximum levels for discharges into the water and air.²² In contrast, Canada's federal system allows the ten provinces to enjoy greater

18. C. ENLOE, *supra* note 1, at 150.

19. *Id.*

20. In unitary systems, by contrast, as exemplified by the United Kingdom and France, subunits of government exist as well, but only as administrative arms of the national government, which has complete authority to dictate policy to them. See G. LEFEOE, *LAND DEVELOPMENT IN CROWDED PLACES* (1979).

21. See Streibl, *Environmental Policy in a Federal State*, 1 ENVTL. POL'Y & L. 13 (1975).

22. See, e.g., The Clean Air Act, 42 U.S.C. §§ 7401-7642 (Supp. I 1977).

freedom to set nonuniform standards.²³

C. Political Ideology

A country's political ideology influences 1) the effective allocation of environmental regulatory authority among different units of government, 2) the impetus with which environmental objectives are sought to be achieved, 3) the division of power between formal institutions and the public, and 4) the general receptivity of the government to popular pressure for increased environmental protection. Both the Judeo-Christian foundations of Western liberal democracy and the Marxist-Leninist theory of socialism place man above nature.²⁴ Additionally, both the Western tradition of individualism and mainstream Marxist ideology and practice stress the need for man to struggle against nature in order to better himself.²⁵ However, two important minority currents in Western thinking—the theory of man's stewardship responsibility for preserving the natural environment, and the theory stemming from the eighteenth-century German transcendental idealist, Fichte, that one can only perfect nature by cooperating with it—have proved to be important justifications for environmental legislation in many Western countries.²⁶ In contrast, it is argued that in socialist countries with highly centralized bureaucracies, such as the U.S.S.R., the economic, political, and military benefits derived from traditional (socialist) patterns of production far outweigh environmental concerns, given that increased production constitutes the only acceptable measure of bureaucratic success.²⁷ It has also been suggested that Far Eastern values, which emphasize reverence for nature, animals and inner self-fulfillment, are more compatible with environmental protection; however, the Japanese, with their tradition of respect for authority, have allowed post-war governments to establish "industrial growth as the formula for National happiness"²⁸ and to deflect the rising concern over the costs of unrestrained industrial development. Still, the anti-materialistic, spiritual values of grace and restraint in Japanese culture

23. See Weston, note 9 *supra*. See also Lutz II, *The Laws of Environmental Management: A Comparative Study*, 24 AM. J. COMP. L. 447, 458-59 (1974).

24. See J. PASSMORE, *MAN'S RESPONSIBILITY FOR NATURE* 28-40 (1974).

25. A recent summary of the Western and other views of nature can be found in Callcott, *Traditional American Indian and Western European Attitudes Toward Nature: An Overview*, 4 ENVTL. ETHICS 293 (1982).

26. See E. FEDOROV, *MAN AND NATURE: THE ECOLOGICAL CRISIS AND SOCIAL PROGRESS* 146-47 (1980). What Marx has to say about environmental problems is debated in Lee, *Toward A Marxian Ecological Ethic: A Response to Two Critics*, 4 ENVTL. ETHICS 339 (1982); Lee, *On the Marxian View of the Relationship Between Man and Nature*, 2 ENVTL. ETHICS 3 (1980); Routley, *On Marx as an Environmental Hero*, 3 ENVTL. ETHICS 237 (1981); and Tolman, *Karl Marx, Alienation, and the Mastery of Nature*, 3 ENVTL. ETHICS 63 (1981).

27. See Paper presented by Robert W. Clawson at the Conference on Soviet Resource Management and the Environment at the University of Washington (June 7, 1974) (entitled *Soviet Resource Management: Political Aspects of Water Pollution Control*).

28. C. ENLOE, *supra* note 1, at 178. See also M. REICH, N. HUDDLE & N. STIDSKIN, *ISLAND OF DREAMS, ENVIRONMENTAL CRISIS IN JAPAN* (1975).

played some role in the elevation of environmental concerns to a central political issue in the early 1970s.²⁹

D. Opportunities for Public Influence

In many countries, organized public action has influenced the political process by generating debate about environmental problems and their solutions. The extent to which a political system allows interest groups to organize and participate in the political process influences responses to environmental questions. For example, in the United States, the relative openness of the political system facilitated the quick rise of influential "public action" groups calling for new regulatory initiatives and allowed these same groups to secure a prominent place for environmental issues on the national agenda. In contrast, the relatively closed nature of the political process in Japan has led to violence in popular expressions of concern about environmental issues.³⁰

IV. LEGAL STRATEGIES TO CONTROL ENVIRONMENTAL INSULTS

Any pollution control program designed to protect public health must choose from among limited emission reduction or minimization strategies. Any country's pollution control program will likely combine elements from all of these strategies, but it is useful to analyze them separately due to the different costs and benefits associated with each.

A. Private Actions

Every legal system allows those who suffer injury by living in close proximity to a pollution source to seek redress. In civil law systems, private actions against activities which cause damage to health and property are based on the theory of abuse of established rights. An abuse occurs whenever a right is "exercised in a manner contrary to the societal interest,"³¹ and the standard is an objective one. This same concept, i.e., that law is for the benefit of the community, is expressed by the common law maxim *sic utere ut alienum non laedes* (every person should use his own property so as not to injure that of another), which allows courts to define the correlative rights of landowners to use their property.³² The potential for private actions to eliminate many environmental harms is limited, however, because any system of private rights must decide which activities causing discomfort to others are legal and which are not. Were it otherwise, every activity carried on in connection with land could be potentially tortious. In both the civil law and common law systems, the

29. J. GRESSER, K. FUJIKURA & A. MORISHIMA, *ENVIRONMENTAL LAW IN JAPAN* 45 (1981).

30. C. ENLOE, *supra* note 1, at 180.

31. L. JOSSEMAND, *DE L'ESPIRIT DES DROITS ET DE LEUR RELATIVITÉ: THÉORIE DITE DE L'ABUS DES DROITS*, cited in F. LAWSON, A. ANTON & N. BROWN, *AMOS & WALTON'S INTRODUCTION TO FRENCH LAW* (3rd ed. 1967).

32. See R. ELLICKSON & A. TARLOCK, *LAND USE CONTROLS* 564-70 (1982).

granting of damages and specific relief is confined to "abnormal activities."³³ All systems of landowner rights and remedies are based on the idea that normal levels of background activities for an area can be determined and that liability should only attach to those activities which exceed such levels. However, this standard for landowners' rights has given courts considerable discretion to balance the costs and benefits of any given activity. Because only those acts which exceed the normal background activity of a neighborhood constitute a nuisance, many environmental harms go unredressed—especially those which first manifest themselves to the sensitive person and those which are only considered harmful once their cumulative impact is understood.

B. Public Actions

Private actions have been rejected as the sole means of controlling pollution in many countries because of the technical difficulties of proving harm and cause in fact, and because of disincentives to organizing suits to reduce many serious but diffuse sources of pollution.³⁴ Still, in some countries private actions remain an important means of obtaining relief³⁵ and of bringing regulatory gaps to public attention.³⁶ In fact, many public regulatory programs actually rely on private actions for their effectiveness. For example, the Clean Air Act and Clean Water Act in the United States allow citizens' suits against public officials who fail to carry out their clearly defined statutory duties or against polluters who violate air and water quality standards.³⁷

In 1972, the U.S. Supreme Court recognized a federal common law of water pollution that allowed direct actions against sources of pollution that were alleged to cause injury despite compliance with applicable regulations,³⁸ but subsequently the Court held that comprehensive water pollution control legislation preempted common law actions.³⁹ Similarly, the Court has also refused to recognize any implied private rights of action under the pollution statutes.⁴⁰ In civil law systems, the ability of private plaintiffs to bring a public action is alien to the more rigid theory that

33. See, e.g., Greek Civil Code arts. 1003-05, reprinted in A. Mastorogamvraki, *Environmental Protection in Greece*, in *EUROPEAN ENVIRONMENTAL LAW*, supra note 4, at 351.

34. See, e.g., T. Fleiner, *Swiss Environmental Law-The Position at April 1976*, in *EUROPEAN ENVIRONMENTAL LAW*, supra note 4, at 431-32.

35. E.g., Spain's fragmentary law of air and water pollution control is basically a codification of the civil law prohibitions against the maintenance of nuisances. *Id.* at 98-103, 165-67.

36. A famous articulation of this position worldwide is J. SAX, *DEFENDING THE ENVIRONMENT: A STRATEGY FOR CITIZEN ACTION* (1971).

37. 42 U.S.C. § 7604 (Supp. IV 1980); and 33 U.S.C. § 1365 (1976).

38. *Illinois v. City of Milwaukee*, 406 U.S. 91 (1972).

39. *City of Milwaukee v. Illinois*, 599 F.2d 151 (7th Cir. 1979), cert. granted 445 U.S. 896 (1980), mem. 449 U.S. 813 (1980).

40. *Middlesex County Sewerage Auth. v. Nat'l Sea Clammers Ass'n*, 453 U.S. 1 (1981).

rights must be either public or private.⁴¹ By way of exception, however, such actions brought by recognized nature protection associations have been allowed by statute in two states in the Federal Republic of Germany.⁴²

V. PUBLIC REGULATION

A. *Environmental Policy Formulation and Expression*

As noted above, significant variations exist among countries regarding environmental goals and the means of accomplishing them. Sometimes these goals are expressed directly through substantive legislative standards that state the weight given to environmental values relative to other societal values. In other instances, the formal substantive standards are less important than the means chosen to implement the goals. In general, environmental goals and substantive standards are related to the level of industrial and technological development of a country, while the regulatory strategies chosen to implement the goals reflect the political, economic and social organization obtaining there. Prior to the passage of the National Environmental Policy Act of 1969⁴³ (NEPA) in the United States, countries had often devised natural resources use goals in terms of the optimal level of development of a single resource, with environmental values being relegated to a position of secondary concern. The early forerunners of modern comprehensive pollution control enactments were various acts of public health legislation dealing with nuisance-like substances such as sewage and smoke. A country's environmental policy, if one existed, was often directed against specific problems, for example, the killer fog of 1952 in England.⁴⁴

In 1963, a general model of the evolution of environmental policy was proposed by Lynton K. Caldwell.⁴⁵ It was argued that environmental policy is "an outgrowth of the conservation movement, and often still appears under the names of conservation or natural resources administration in many countries."⁴⁶ This evolution was generally thought to have three distinct stages: (1) a public awareness of values, as occurred in the United States between the years 1890-1908; (2) the conservation of specific resources such as the water, air, soil, or forests;⁴⁷ and (3) concern

41. See Reh binder, *Controlling the Environmental Enforcement Deficit: West Germany*, 24 AM. J. COMP. L. 373 (1976). Citizens in the Federal Republic of Germany do, however, have considerable rights to participate in administrative proceedings.

42. Act for the Protection of Nature and Landscape § 44, 1979 [BGBl] 345 (W. Ger.) and Act for the Protection of Nature and Landscape § 36, [1980] I [GVBl] 309 (W. Ger.). See generally P. STORM, UNWELTRECHT (1980).

43. 42 U.S.C. §§ 4321-4327 (1970).

44. L. BATTEN, THE UNCLEAN SKY 14 (1966).

45. Caldwell, *Environment: A New Focus For Public Policy?*, 23 PUB. AD. REV. 132 (1963).

46. L. CALDWELL, MAN AND HIS ENVIRONMENT: POLICY AND ADMINISTRATION 35 (1976).

47. In the United States, environmental policy was confined to conservation and the preservation of nature until the late 1950s and early 1960s. See J. PETULLA, AMERICAN ENVI-

with the totality of man's environmental relationships.⁴⁸

The method of formulating an environmental policy, as the Caldwell model indicates, is inevitably piecemeal and leaves many gaps. Generally, if an agency has no express authority to deal with the environmental aspects of a problem, it will not do so until specific legislation forces it to act.⁴⁹ Although some countries continue to address specific gaps with specific legislation, others have tried to "short circuit" the process by adopting general policy statements. While policy statements do not, of course, serve to commit the resources and political will necessary to cope with environmental problems, they are nonetheless important because they stimulate new efforts and reinforce existing ones. NEPA was adopted as U.S. national policy with little debate, but it produced far-reaching, if ambiguous, changes in federal decision-making processes.⁵⁰

To effectuate a policy of giving environmental concerns equal weight with developmental ones, NEPA declares "a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment . . . and stimulate the health and welfare of man"⁵¹ While this statute has influenced other countries, many European nations have been more cautious in according environmental protection equal status with the goals of economic development, because of the problems inherent in their integration with the former.⁵² The economic

ENVIRONMENTAL HISTORY: THE EXPLOITATION AND CONSERVATION OF NATURAL RESOURCES (1977).

48. This third stage, symbolized in the United States by the enactment of NEPA, is "concerned with the so-called artificial environment of the cities and buildings as well as with the natural world. It differs from the narrower interpretations of natural resources policy in that its criteria are ecological rather than economic." Caldwell, *supra* note 45, at 85.

49. *E.g.*, the former U.S. Atomic Energy Commission took the position prior to the enactment of NEPA that it lacked the necessary jurisdiction to consider the impact on water quality of the nuclear plants it was licensing. See Tarlock, *Balancing Environmental Considerations and Energy Demands: A Comment on Calvert Cliff's Coordinating Committee, Inc. v. AEC*, 47 IND. L.J. 645, 648-52 (1972).

50. NEPA forced agencies to consider factors that had not previously been considered and to reassess procedural and substantive decisions. Institutional responses vary among and within agencies, of course, but the impact on many agencies was substantial. See R. LIROFF, *A NATIONAL POLICY FOR THE ENVIRONMENT: NEPA AND ITS AFTERMATH*. (1976).

51. 42 U.S.C. § 321.

52. For a comparative analysis of environmental versus developmental goals, see L.J. Lundquist, *Clean Air Policies in the USA and Sweden: What Matters Most, Technology, Economics or Politics?* (Paper presented at American Political Science Association, Seattle, Wash., 1979).

See also Wimmer, *Environmental Law in Austria—the Position of April 1976*, in EUROPEAN ENVIRONMENTAL LAW, *supra* note 4, at 289-90, where it is argued:

The unsatisfactory situation of environmental protection in Austria results not so much from the lack of law but from the fact that the existing laws are only partially applied in practice. The reason for this . . . stems from the fundamental problems of the structure of environmental law as a whole. This consists primarily in the fact that the provisions concerning the environmental embodied in the various administrative texts are not exclusively and entirely

consequences of such a policy were quickly perceived by these nations and thus, when they enacted their own comprehensive acts, a more explicit balance was struck. For example, the Swedish Environmental Protection Act of 1969, drafted so as not to handicap the international competitive position of Swedish industry, simply does not state general future goals.⁵³ The German Program for the Protection of the Human Environment of 1971 was drafted after extensive deliberations by ten project groups, including different economic groups.⁵⁴ The Program, although influenced by the American model, merely states ten general goals, leaving it to the several German states (Länder) to choose between economic and environmental priorities. The most explicit legislative decision to pit environmental enhancement against industrial development was found prior to 1970 in the Japanese Basic Act for Environmental Pollution Control of 1967. The listed goals of the Act were to be harmonized with "sound economic development."⁵⁵ In the U.S.S.R., environmental goals are recognized by supplemental economic planning. GOSPLAN, the State Planning Committee, was directed in 1974 to include conservation indices and plans in its long-term and annual plans, especially in the 25th Five Year Plan (1976-80).⁵⁶

B. Institutional Arrangements For Environmental Regulation

Legislative declarations of environmental policies are meaningless without the creation of institutions to implement them. Such policies generally require industries and public entities to invest considerable sums of money in pollution abatement technologies or in the development of less harmful products, or to modify their behavior otherwise in costly ways. Prior to the last decade, government institutions in almost all countries had only fragmented authority to deal with problems now called environmental. Moreover, these institutions often lacked sufficient geographical authority to deal with the scope of pollution spillovers or administrative authority to attempt any kind of comprehensive management approach to the problem posed by even one source of pollution. Thus, countries desiring to respond to environmental problems were then

devoted to environmental protection, but also must satisfy other interests for which the administration is responsible, whether of a technical, financial or economic nature.

53. S. Westerlund, *The Legal Control of Land Use and Environmental Quality in Sweden*, in *EUROPEAN ENVIRONMENTAL LAW*, *supra* note 4, at 401.

54. W. MANGUN, *THE PUBLIC ADMINISTRATION OF ENVIRONMENTAL POLICY: A COMPARATIVE ANALYSIS OF THE UNITED STATES AND WEST GERMANY* (1977).

55. This phrase was stricken in the December 1970 amendments to this legislation. For a brief but useful discussion of the background of the 1970 legislation, see generally *AIR POLLUTION CONTROL IN JAPAN 22-24* (1972), prepared for the U.N. Conference on the Human Environment.

56. See W.E. Butler, *Environmental Law and Water Legislation in the Soviet Union* (Paper presented at the Conference on International Environmental Law, arranged by the British Institute of International and Comparative Law, London, Sept. 1-3, 1973).

and are today confronted with two sets of potential problems. First, a choice must be made among modes of institutional reform. The available choices are (1) expansion of existing regulatory jurisdictions, (2) coordination of existing jurisdictions through a central coordinating body, and (3) creation of new management institutions. Second, the choice of institutional design is further complicated by the physical nature of environmental problems, which often calls for action from progressively higher levels of government, generally at the national level. The increased centralization of regulatory functions, however, may well create stresses in federal systems; even in unitary forms of government, such a trend may be controversial. Notwithstanding these problems, the move from the second to third stages of the Caldwell model is often signalled by the expansion of existing regulatory authorities or the creation of new, national regulatory institutions.

When strong, centralized institutions already exist at the national level, a country may be able to respond to the need for increased regulation of public health-threatening activities by the jurisdictional expansion of existing agencies. Sweden's experience exemplifies this manner of regulation.⁵⁷ Jurisdictional expansion is especially successful when a regulatory authority with jurisdiction coterminous with a physical problem is already in place. This situation exists in France, where six extant river basin authorities (*agences du bassin*) were given the power to control pollution. The *agence* concept has also been used as a model for bilateral institutions to deal with the related environmental problems of impacted areas such as river corridors.⁵⁸

Often, there is an interim step between the expansion of the jurisdiction of existing regulatory bodies and the creation of a new, often centralized body: that is, the coordination of existing jurisdictions. The policies of the various governmental agencies in most countries have environmental consequences of one kind or another and some mechanism is needed to harmonize the nation's environmental and non-environmental goals. While diverse functions should naturally be coordinated, any coordination without the prior resolution of underlying value conflicts is meaning-

57. A Natural Conservancy Act (*Naturvardslag*) was enacted in 1964 primarily to protect the scientific and amenity value of the country's parks and coastline—an atypical late conservation era policy. In 1969, Sweden initiated a technology-forcing pollution control program. A licensing system was enacted and the executive functions were given to the Nature Conservancy Agency, which was renamed the Environment Protection Board. The Environment Protection Act (*Miljoskyddslag*) created a new, quasi-judicial body, the Franchise Board (*Koncessionamnd*), to issue licenses, but the real power to implement the purpose of the act, i.e., to exempt and vary the terms of licenses (*dispens*), remained with the Environmental Protection Board. Sand, *Sweden: Basic Laws and Institutions*, FAO LEGIS. STUD. No. 4 (1974). See also S. Westerlund, *supra* note 53, at 392.

A similar expansion of regulatory jurisdiction occurred in the Soviet Union. See W. E. Butler, note 56 *supra*.

58. See A. Kiss & C. Lambrechts, *Legal Protection of the Environment in France—The Position at April 1976*, in *EUROPEAN ENVIRONMENTAL LAW*, *supra* note 4, at 324-27.

less. A classic coordination scheme is illustrated by the powers given to the federal Minister of the Interior in the Federal Republic of Germany.⁵⁹

The United States and Japan illustrate the third option, the creation of new regulatory institutions. In 1971, the two countries more or less simultaneously decided to create new environmental protection agencies. At the federal level in the United States, responsibility for environmental functions had previously been scattered among many government agencies. For example, responsibility for air and water pollution was split between two Cabinet departments: Interior; and Health, Education and Welfare (HEW). Allegations were made that some departments (such as HEW) with jurisdiction over air pollution, but not over water pollution, ranked air pollution abatement low on their list of priorities. In other cases, the fundamental mission of the agency was simply inconsistent with environmental regulation.⁶⁰ As a consequence of the foregoing, a new executive agency, the Environmental Protection Agency (EPA), was established, which was neither a part of the Cabinet nor an independent regulatory commission. Following the recommendations that agencies with direct control over business conduct be administered by single administrators with significantly reduced judicial authority, the EPA is directed by a single administrator appointed by the President and directly responsible to him.⁶¹ The hope was that the agency would be the vehicle by which a clear and consistent executive environmental policy could be executed.⁶²

C. *General Forms of Environmental And Public Health Regulation*

In most industrialized countries, regulation is the preferred method of pollution control and public health protection. From an administrative perspective, as opposed to an economic efficiency perspective, regulation is often the least costly means of emission reduction and of behavior and product modification strategy. Regulation allows uniform standards to be formulated at relatively high levels of governmental decision-making. It has also been suggested that regulation is popular with governments because the creation of new entities and the enactment of new standards of conduct constitute the fastest ways of convincing an electorate that the

59. See H. STEIGER & O. KIMMINICH, *THE LAW AND PRACTICE RELATING TO POLLUTION IN THE FEDERAL REPUBLIC OF GERMANY* (1976).

60. Environmentalists argued that the Department of Agriculture could not evaluate the safety of chemical pesticides having substantial production benefits because of its mission to promote food production. See Rodgers, *The Persistent Problem of the Persistent Pesticides: A Lesson in Environmental Law*, 70 COLUM. L. REV. 567 (1970).

61. President's Advisory Council on Executive Reorganization, *A New Regulatory Framework: Report on Selected Independent Regulatory Agencies* (1971).

62. Japan undertook a similar consolidation of specialized environmental programs to create the National Environmental Agency in 1971. Unlike the American system, the agency head is a ministerial appointment—the Minister of State for Environmental Affairs. See Y. NOMURA, *THE CREATION AND DEVELOPMENT OF JAPAN'S ANTI-POLLUTION LAWS* (1976).

government is responding to a "crisis."⁶³

At the outset, two fundamental choices must be made with respect to any regulatory program. First, it must be decided whether emission standards will be based on the desired quality of the individual receiving medium, such as an airshed or river basin, or whether the standards will be based on the source of the emission. The first generation of pollution control programs often relied on receiving media standards, because emission reduction was seen as a rational resource allocation problem similar to the conservation of renewable and non-renewable resources. Second generation programs, as the widely studied and copied U.S. experience illustrates, often shift their basis to emission source standards.⁶⁴ It has proved very difficult, as a practical matter, to work backwards from general media quality standards to individual emissions in order to enforce source standards against polluters. Governments have found it far easier to specify the allowable chemical contents of drainage pipe, smokestack, and industrial process effluents and the technologies which must be used to achieve these results, and then to require that identifiable sources of emission apply for some type of permit.⁶⁵

After the issue of receiving-media quality versus source-of-emission standards is resolved, a choice between performance and specification standards must be made.⁶⁶ In practice, many pollution abatement and control programs apply performance and specification standards simultaneously.⁶⁷ Countries which desire significant pollution reduction often seek performance goals through technology-forcing standards which specify increasingly sophisticated emission control technology by legislatively or administratively-set deadlines. This is a popular method of controlling automobile pollution inasmuch as the concentrated nature of the industry facilitates the establishment of uniform engine-design standards to meet a performance goal.⁶⁸

Pollution reduction standards are generally set to achieve one of three goals: immediate public health protection, general welfare enhance-

63. J. KRIER & E. URSIN, *POLLUTION AND POLICY* 263-77 (1977).

64. The Federal Republic of Germany requires the use of emission limitation equipment reflecting the state of the art. BundesImmissionsschutzgesetz [BIMSchG] 5 § 2. The statute is described in Currie, *Air Pollution in West Germany*, 49 U. CHI. L. REV. 355 (1982).

65. Currie, *supra* note 64, at 356-58.

66. Performance standards allow polluters to act as they wish, so long as their emissions do not exceed specified limits for particular pollutants . . . and specification standards decree not what goal must be accomplished but how it must be accomplished. Most commonly they require pollution control equipment which meets certain design requirements

Krier, *The Pollution Problem and Legal Institutions: A Conceptual Overview*, 18 U.C.L.A. L. REV. 429, 463-64 (1971).

67. *E.g.*, The Belgian Act of March 26, 1971 on the Protection of Surface Waters, reprinted in EUROPEAN ENVIRONMENTAL LAW, *supra* note 4, at 29.

68. See Currie, *The Mobile Source Provisions of the Clean Air Act*, 46 U. CHI. L. REV. 811 (1979).

ment, or public health and safety risk minimization. Standards often attempt to promote these goals simultaneously, but it is useful to distinguish among them because the distribution of costs and benefits associated with attaining each may be radically different. Each goal either takes the form of a statement of general objectives or precise numerical limitations on the amount of pollutants that can be discharged over time. Whatever the goal, standards must initially rest on a foundation of scientific data, the first step of which is the development of common scientific criteria and methodologies for measuring pollution damage and setting emission reduction regulations.⁶⁹ However, environmental standards cannot ultimately rest on scientific criteria alone; the uncertainties surrounding the effects of various discharges on receiving media and those persons exposed to such media remain too great. As a result, any standard adopted ultimately reflects a value judgment about the degree of risk minimization to be afforded society.

Public health protection standards are designed to protect the public from known, immediate health and crop threats. Administrators are generally directed to base the standards on existing scientific knowledge of cause and effect relationships between exposure to a particular pollutant and resulting damage to health or crops. Because of the uncertainty of scientific knowledge in many countries, the standards are conservative in that "margins of safety" are included to protect the public from potential underestimates of the harmful effects of pollutants. Nonetheless, public health standards are still limited to the protection from serious harm of people and the flora and fauna useful to them. Pollution which causes aesthetic damage in the form of visibility impairment or historic building decay, for example, is often excluded from this calculus.

However, the United States and other countries have adopted secondary standards to address this problem. Whereas under the Clean Air Act primary standards are aimed at public health protection, secondary standards, which in some cases may be more stringent, are aimed at broader "general welfare" effects such as visibility impairment.⁷⁰ These latter standards are especially controversial because the causal link between emission and harm is more speculative and thus the ratio of quantifiable benefits gained compared to the costs of achievement may be small.⁷¹

The third goal of standards is to protect the public from long-term, low probability, yet high-cost risks of health impairment. Unfortunately, the kinds of controls that are effective for smoke reduction do not necessarily work for substances such as pesticides, toxic chemicals, and hazard-

69. See S. JOHNSON, *THE POLLUTION CONTROL POLICY OF THE EUROPEAN COMMUNITIES* (1979).

70. W. RODGERS, *HANDBOOK ON ENVIRONMENTAL LAW* 227 (1977).

71. See B. ACKERMAN & W. HASSLER, *CLEAN COAL/DIRTY AIR OR HOW THE CLEAN AIR ACT BECAME A MULTIBILLION DOLLAR BAILOUT FOR HIGH SULPHUR COAL PRODUCERS AND WHAT SHOULD BE DONE ABOUT IT* (1981).

ous wastes. These latter are diffused into the environment in ways that make it impossible to trace causal relationships between exposure and harm. As such, science can only demonstrate that various risk levels of future harm are thereby created.⁷² These risk levels are intensely controversial because of the regulatory consequences of standards designed to minimize long-term, low probability risks.⁷³ There is increasing recognition that because toxic pollutants are inorganic and tend to concentrate in food chains, such chemicals differ from conventional organic pollutants. To protect the public from the health hazards associated with toxic pollutants, the burden is increasingly being placed on those who seek the benefits of a chemical to prove its safety.⁷⁴ Further, discharge and use limitations need not be restricted by the current findings of scientific research; rather, regulators may deal with uncertainty by establishing standards with wide margins of safety.⁷⁵

As noted above, any pollution control strategy must make an initial choice between reliance on the assimilative capacity of the receiving media and the application of technology to eliminate the alleged harmful effects of the discharges. Prior to the worldwide recognition of the harmful consequences of pollution, use of the assimilative capacities of air-, water- and landsheds was the primary means of waste disposal, and this strategy is still often followed in developing nations, if only by default. Reaction against the social costs of the overuse of free goods has led to the adoption of the "polluter pays" principle, based on the ambiguous notion that the discharger is responsible for all costs of his activity,⁷⁶ and consequently to a rejection of the assimilative capacity of receiving media as the primary pollution control strategy. However, such capacity is still a factor to be considered in setting technology-based standards for individual discharges (which generally are used to force the internalization of external costs by the polluters). The quality of the receiving media is also considered in designing laws to influence the location of industrial processes and other polluting activities. Where an activity is located may not only determine the degree of pollution hazard that it poses but may influence the cost of emissions-reduction as well.⁷⁷

72. The problem of agency ability to do more than specify potential risks within a wide range of probability is discussed in Latin, *The "Significance" of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty*, 10 *ECOLOGY L.J.* 339 (1982).

73. See W. LOWRANCE, *ON ACCEPTABLE RISK* (1976).

74. The shift of the burden of proof is the result of many statutory changes and more subtle changes in administrative attitudes. The idea has received formal legal recognition in the United States in a series of cases holding that the EPA need not prove that a substance is harmful in order to limit substantially its use and discharge; the agency's decisions need only rest on respectable, even though disputed, scientific evidence. See, e.g., *Env'tl. Defense Fund v. EPA*, 598 F.2d 62, 82-83 (D.C. Cir. 1978).

75. An important U.S. judicial decision establishing this principle is *Ethyl Corp. v. EPA*, 541 F.2d 1, 24 (D.C. Cir. 1976), cert. denied 426 U.S. 941 (1976).

76. For a concise discussion of the ambiguities in cost assessment, see S. Ercman, *supra* note 4, at 489.

77. See D. MANDELKER, *ENVIRONMENTAL AND LAND USE CONTROLS LEGISLATION* 169-221

Pollution reduction planning throughout the world often consists of the designation of pristine or relatively clean areas, where new industrial development and other polluting activities are discouraged, and the designation of relatively dirty areas, where stringent, technology-forcing standards or other pollution reduction strategies, such as fuel substitution, apply.⁷⁸

Some types of pollution which threaten public health may be minimized simply by locating the polluting activity in a place where the assimilative capacity of an air-, water- or landshed can deal effectively with the pollution, thus consuming rather than conserving clean media. This theory, however, "has no validity at all for synthetics like petrochemicals, to say nothing of radionucleides . . . [T]here is little or no safe assimilative capacity for such unnatural compounds."⁷⁹ Land use planning programs are the primary means of implementing such a consumption strategy: basically, industry is steered to geographic areas of the country where the receiving media are able to minimize the impacts of pollution, so that already overloaded media elsewhere will not be further stressed. Of course, such planning often conflicts with other environmental goals which seek to preserve environmentally sensitive areas from degradation.⁸⁰

Environmental planning encompasses a number of functions, which include the making of background assessments, the measurement of existing pollution levels and the likely impact of regulatory measures. There

(1976).

78. In the United States, regulations have been enacted to preserve the air quality of relatively pristine areas such as national parks and Indian reservations. Excessively dirty areas are designated as non-attainment areas, i.e., areas where the primary and secondary standards cannot be met, and stringent limitations are placed on the construction of new pollutant-emitting facilities. See Currie, *Nondegradation and Visibility Under the Clean Air Act*, 68 CALIF. L. REV. 48, 51 (1980).

Pursuant to EEC recommendations, Belgium has designated its heavy industrial concentrations as special protection areas for the purposes of imposing special controls. Royal Order of 26 July 1971, MB (Belg.), No. 150, at 9258 (5 Aug. 1974).

Bulgaria has established a special program for the capital city of Sofia and various industrial areas, which provides for air quality monitoring, the installation of filters and other purification devices, and the substitution of natural gas for oil. Decree on the Sanitary Classification of Industrial Activities and the Minimum Health Protection Areas of 13 Feb. 1970, Dz V (Bulgaria), at 3.

79. W. OPHULS, *ECOLOGY AND THE POLITICS OF SCARCITY* 81 (1977).

80. The problems of implementing such programs are illustrated by the Swedish experience. Since 1966, Sweden has undertaken "National Physical Planning" to determine the areas where major industrialization is likely to stress valuable ecological resources. While the government lacks the power to compel an industry to locate in a place which is consistent with national planning objectives, three coastal regions have nonetheless been withdrawn from development. Lundquist, *Sweden's National Physical Planning for Resources Management*, 2 ENVTL. AFF. 487, 496-98 (1972). While industrial growth is encouraged outside of existing major metropolitan areas to promote equal regional development, this goal conflicts with a concentration policy which dictates that, insofar as it is compatible with the regional dispersion policy, new polluting industries should be concentrated in already industrialized regions.

has been widespread dissatisfaction with single resource or single pollution source planning and consequently, in the past decade, there have been ambitious, though largely futile, attempts to mandate holistic, rational environmental planning. In 1970, the United States attempted to mandate formal national planning procedures for all federal activities which have a significant environmental impact. These procedures included consideration of all likely impacts of these activities and mitigation possibilities with respect thereto, and even study of a no action alternative.⁸¹ Because of the gap, under NEPA, between the costs of compliance and the environmental benefits received and the fact that mandatory planning leaves administrators no discretion to concentrate their resources on truly significant issues, among other reasons, most countries which have examined the U.S. experience have been reluctant to adopt the American model fully.⁸² However, environmental assessment exists in various countries by administrative decree, and in Japan a trial court has held that the civil tort law allows plaintiffs affected by the health hazards of a lake development project to require the government to prepare an environmental assessment of the project and consult with interested citizens.⁸³

Inorganic chemical products and wastes are often toxic, and all radioactive materials present possible health hazards if not carefully managed. Toxic substances are generally defined as wastes from chemical and other manufacturing processes, and products which present serious, often unascertainable health and other environmental hazards, even when used for their intended purposes. Increasingly, nations and international organizations subject toxic substances to special regulation. Regulatory regimes in industrialized countries share the following common features: (1) a regulatory authority with the power to screen products for health hazards before they reach the marketplace;⁸⁴ (2) governmental authority to re-

81. National Environmental Policy Act of 1969, 43 U.S.C. §§ 4331, 4335, 4341, 4342, & 4344. The duty to study no-action alternatives was first announced in *Nat. Defense Council, Inc. v. Morton*, 458 F.2d 827 (D.C. Cir. 1972).

Morton was trimmed in *Vermont Yankee Nuclear Power Corp. v. Nat. Resources Defense Council, Inc.*, 435 U.S. 519 (1978), but the duty to study no action alternatives remains quite strict. See *State of California v. Block*, 690 F.2d 753 (9th Cir. 1982).

82. See generally, 2 INT'L ENVTL. REP. 651 (1979).

83. Upham, *After Minamata: Current Prospects and Problems in Japanese Environmental Litigation*, 8 ECOLOGY L.Q. 213 (1979).

84. In Sweden, the government has been allowed since 1973 to control the manufacture, import, trade, and use of poisons and other dangerous products. See S. Westerlund, *supra* note 53, at 392.

In the United States, the authority to screen pesticides is conferred by the Environmental Pest Control Act of 1972, 7 U.S.C. § 135 (1970), as amended 7 U.S.C. § 136 (Supp. IV 1980). In 1976, the EPA was given the power to screen all potentially toxic products in advance of their manufacture. Toxic Substances Control Act, 15 U.S.C. §§ 2601-2629 (1976). For a discussion of pre-market screening of hazardous products, see COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY—10TH ANNUAL REPORT 215-21 (1979).

In June 1980, OECD nations reached agreement on pre-market data and testing requirements for toxic substances, which the EPA plans to integrate into its rules for pre-

quire testing protocols involving the use of laboratory animals, on which inferences that a substance is potentially harmful may be based in lieu of epidemiological evidence; (3) authority to base conclusions about substance safety on risk-benefit analyses;⁸⁵ (4) the shifting of the burden of proving a substance unsafe away from the governmental authority because of the often inconclusive nature of the evidence about public health hazards;⁸⁶ and (5) the requirement of stringent management practices for toxic and other hazardous wastes as the only way to balance the interests of industrial development and public safety in modern economies that require the use of many dangerous substances. Management options include recycling, storage, disposal, and treatment to alter the chemical content of the substance. Disposal practices are being tightened in many countries, more attention is being paid to the siting of hazardous waste management facilities⁸⁷ and incentives are being provided for recycling action.

D. Alternatives to Regulation

Two powerful charges have been directed at regulatory programs based on across-the-board standards. First, standards often require reductions in emissions which cannot be economically justified in terms of the emissions' social costs. Second, uniform standards are an inefficient means of achieving administratively-mandated pollution reduction levels because they do not encourage the least costly method of emission reduction.⁸⁸ In fact, such standards can work to lock industries into using inefficient technologies. Two alternative methods of emission reduction have been proposed to cure these deficiencies and at the same time protect the public from environmental harm: pricing mechanisms and subsidies. Pricing mechanisms take the form of charges or taxes on the amounts of waste disposed. The theory behind this strategy is that the more the polluter is charged, the greater his incentive to reduce the amount of his

market notification by American industries. See Note, *Control of Toxic Substances: The Attempt to Harmonize the Notification Requirements of the U.S. Toxic Substances Control Act and the European Community Sixth Amendment*, 20 VA. J. INT'L L. 417 (1980).

85. Such authority is required because of the great difficulties in determining whether and how a substance will actually cause harm to whom and at what time. A risk-benefit analysis substitutes state-of-the-art evidence about possible future harms for traditional concepts of cause-in-fact and immediate personal injury.

86. The Swedish hazardous products law expressly provides that public officials do not bear the burden of proving a product dangerous. See S. Westerland, *supra* note 53, at 411.

In the United States, the courts have approved the use of sensitive evidentiary triggers to allow the government to ban a substance from the market and shift the burden of proving its safety to the manufacturer. See *Env'tl. Defense Fund, Inc. v. EPA*, 548 F.2d 998, 1004 (D.C. Cir. 1976) and *Hercules, Inc. v. EPA*, 598 F.2d 91, 106 (D.C. Cir. 1978).

87. See SITING NON-RADIOACTIVE HAZARDOUS WASTE MANAGEMENT FACILITIES: AN OVERVIEW, FINAL REPORT OF THE FIRST KEYSTONE WORKSHOP ON MANAGING NON-RADIOACTIVE HAZARDOUS WASTES (1980).

88. See Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 U.C.L.A. L. REV. 323 (1974).

waste discharges and to do so efficiently.⁸⁹ On the other hand, subsidies can take the form of either tax incentives or direct government payments for the construction of abatement facilities.

The United States has made use of these strategies only sparingly, preferring to try to correct the economic inefficiencies which allegedly result from its standards. This has been done through assorted variance procedures applied on a case-by-case basis and through flexibility devices such as "bubbles."⁹⁰ In France and the Federal Republic of Germany, however, where pollution control is more integrated with industrial development planning than in the United States, there has been much more widespread use of charges and subsidies.⁹¹

In deciding whether to adopt a pricing strategy, it is important for a country to distinguish between the two uses of charge systems. In the first instance, those polluters who fail to comply with applicable effluent or emissions standards may be subject to criminal fines. The payment of such fines, however, often costs less than implementing any serious program aimed at reducing the pollution. To prevent the creation of a low cost right to pollute, many countries have moved to set higher fines to encourage compliance.⁹² This theory of charges, though, still relegates such penalties to the role of backstop for emission level standards. In the second instance, many economists who have studied environmental problems urge that pollution charges be used as the primary rather than the secondary or tertiary method of reducing unwanted discharges.⁹³ It is posited that an entity with functional geographic boundaries and the capabilities of treating wastes and imposing charges on dischargers will force public entities and private industry alike to consider waste disposal costs and pollution control technology in choosing product mixes and plant locations. The expected result would be a reduction in emissions to more efficient levels. Various models based on the water management associations (*Genossenschaften*) operating in the Ruhr region of the Federal Republic of Germany have been proposed.⁹⁴

Many environmentalists are suspicious of effluent charges and taxes

89. A. KNEESE & C. SCHULTZ, *POLLUTION, PRICES AND PUBLIC POLICY* (1975).

90. The EPA allows operators of a single plant or plants in close proximity to one another to treat an entire complex, as opposed to its component parts, as a single source of emissions. All emission sources are thus put under a "bubble" for the purpose of allowing tradeoffs, i.e., a reduction in the emission levels of certain pollutants in exchange for higher allowable levels for others.

91. A. Kiss & C. Lambrechts, *supra* note 58, at 324.

92. *E.g.*, factory managers in the Soviet Union may be deprived of bonuses which represent fully half of their personal income. Louchs, *Water Quality Management in the Soviet Union*, 1977 *J. WATER POLLUTION CONTROL FED'N* 176-78.

93. *See, e.g.*, J. DALES, *POLLUTION, PROPERTY & PRICES* (1968) for an influential early statement of this position.

94. *See* F. ANDERSON, A. KNEESE, P. REED, R. STEVENSON & S. TAYLOR, *ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES* (1977) and A. KNEESE & B. BOWER, *MANAGING WATER QUALITY: ECONOMICS, TECHNOLOGY, INSTITUTIONS* (1968).

on the ground that such schemes will only legitimize generous rights to pollute. This argument has influenced the widespread governmental preference for licensing regulation⁹⁵ with the result that a different use has, in recent years, been made of the taxing power from that advocated by economists. Environmental disasters, such as oil spills and the abandoned hazardous chemical waste site at Love Canal in Niagara Falls, New York, often leave large property and health losses uncompensated. Liability standards are often unclear, though there is a general global trend toward the adoption of strict liability for environmental accidents,⁹⁶ and the problems of proving that a given entity caused the harm inflicted are formidable. One variant of the "polluter pays" principle requires the industry reaping the benefits of activities that pose high risks of environmental damage to bear the collective responsibility for those accidents which are seemingly inevitable. Industrywide responsibility is fixed by taxes imposed on the risk-causing activities—for example, the levy of a certain charge for each barrel of oil unloaded at a port. Such taxes inflate a fund upon which governments (and sometimes private individuals) may draw for cleanup and damage costs in the event of an accident.⁹⁷ Industry generally argues that since society as a whole benefits from its high-risk activities, responsibility ought thus to be borne by all citizens, or at least shared, and indeed, some funds are supported by activity taxes and general tax revenues.⁹⁸ In addition to their use in compensating victims of environmental disasters, such funds, especially those with strict liability rules, may have a beneficial deterrent effect against loose risk-management practices.

As environmental quality goals have increased in number and strictness, governments have had to cooperate with public and private entities to induce the construction and use of treatment facilities. Such cooperation of state and private enterprises has been facilitated through grants from various levels of government and resource management authorities.⁹⁹ Subsidies are usually granted through legislation, although the French water basin agencies grant them through private arrangements as well.¹⁰⁰ The United States has established a substantial, though chronically underfunded, federal grant system for the construction of municipal

95. See Latin, *Environmental Deregulation and Consumer Decisionmaking Under Uncertainty*, 6 HARV. ENVTL. L. REV. 187, 236 (1982).

96. S. Ercman, *supra* note 4, at 488.

97. Maine Oil Discharge Prevention and Pollution Control Act, ME. REV. STAT. ANN. tit. 38, §§ 541-57 (Supp. 1981).

98. See generally J. McLAUGHLIN, *THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE MEMBER STATES OF THE EUROPEAN COMMUNITY* 508 (1976).

99. A. Kiss & G. Lambrechts, note 58 *supra*.

100. An exception to the use of general legislation or subsidies granted by the central government is the Japanese concept of administrative contracts between local governments and private industry. See Sand, *Legal Systems for Environmental Protection: Japan, Sweden, United States*, FAO LEGIS. STUD. No. 4 (1974).

waste treatment facilities.¹⁰¹ Other countries provide special depreciation rules in their tax laws for the installation of pollution abatement equipment by private firms.¹⁰²

VI. CONCLUSIONS

At the risk of overgeneralization, a country's political structure and legal system should incorporate three essential features in order to promote effective protection against environmental hazards. First, an arm of the central government, whether in the context of a federal or unitary system, should have an exclusive mandate to promote environmental goals. At least for the foreseeable future, it will not be sufficient to merely decree that all governmental agencies shall consider environmental values in executing their missions. Second, this arm of government must have delegated to it the power to decide how pollution costs are to be allocated as between public and private entities. In most countries, this translates into the ability to license discharges or mandate what fuels, chemicals, and other necessary inputs to industrial processes may be used and under what conditions. While it might be argued that these "structural" solutions should be accompanied by strong mechanisms to allow the public and the courts to serve as watchdogs of the regulators, the problem of insufficient diligence in the promotion of environmental goals, as serious as it is, is less important than achieving the third feature of an effective system for environmental protection. Although an exclusive mandate to promote environmental values is necessary, at some point the protection of those values must become integrated into the country's general policy-making processes, which is the third essential feature. Otherwise, policies protective of the public health and the earth's fragile life support systems will remain too vulnerable to pressures that they be ignored or made less restrictive. The integration of such values requires that regulatory agencies have the flexibility to vary the degree of emission reduction and substance use they require, according to the severity of the situation. Where toxic chemicals and radioactive wastes are concerned, severe restrictions may be in order regardless of the costs of regulation. In some instances, however, it may be useful merely to create standards based on a state of the art cost-benefit analysis, while charges, taxes, or post-occurrence compensation may in other situations be the most effective remedy for public health protection.

101. *Id.*

102. See Thiem, *Environmental Law in the Federal Republic of Germany—The Position at April 1976*, in *EUROPEAN ENVIRONMENTAL LAW*, *supra* note 4, at 362.