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Lee R. Epstein
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Application of American Land Use and Environmental Planning Techniques to Environmental Recovery in Emerging Economies: Fundamental Foundations from the New World to the Old

By Lee R. Epstein* and Larry A. Gordon**†

I. INTRODUCTION

In this final decade of the twentieth century, the sophistication and efficiency of different means of mass communications has given rise to a truly global community. Similarly, economic and environmental policies and practices of individual nations now have international implications and repercussions. Science is providing ample evidence that the environmental impacts of many region-specific activities or urban point source pollutant inputs reach across political boundaries, affecting many nations and, in some instances, the natural resources and ecological systems of the world commons.¹

Worldwide examples illustrate the adverse effects of nonexistent or inadequate planning on local environmental and economic conditions. A review of the history and development of land and environmental planning techniques in the United States indicates that the implementation of

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** Partner, Land Use and Administrative Law, Linowes and Blocher, Silver Spring, Maryland; B.S. 1973, Pennsylvania State University; M.C.P. 1976, University of Pennsylvania; J.D. 1982, The Catholic University of America; Professorial Lecturer in Land Use Law, National Law Center, The George Washington University, 1987-present.

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similar techniques in other countries can play an important proactive and preventive role. Such techniques are particularly effective in addressing problems on a regional and local level. While many international environmental problems are not as readily engaged by land or environmental planning frameworks, the application of appropriate land planning techniques still can have a positive impact.

II. INTERNATIONAL URBAN AND ENVIRONMENTAL CONDITIONS

Environmental problems have achieved a significant level of international attention and concern. The world community has finally reached the sobering conclusion that continued degradation of natural resources seriously endangers our immediate health and well-being. Additionally, scientific analysis of the effects of environmental insults on the world commons is, with increasing and disheartening frequency, confirming one of the fundamental laws of ecology: That seemingly unrelated perturbations on what purports to be a local or regional scale can and do have far-reaching implications on greater ecological systems.

The dangers of global warming and climate change that arise from the release of carbon and other gases are now almost universally acknowledged. Transboundary migration of sulphur dioxide and acid deposition; international shipment and disposal of hazardous waste; drastic losses of biodiversity from over-fishing in both Atlantic and tropical seas; tremendous annual losses of tropical rain forests, with the ensuing atmospheric and species loss implications; and huge flood control and irrigation water projects leading to "desertification," wetlands and fishery losses, and waterborne disease problems are examples of problems that are all international in scale and relationship.

2. See generally supra note 1.
A. Regional Environmental Problems

...[W]ere we truly people of judgment of the future as well as the past—of our own mistakes as well as the mistakes of others—with enough wisdom to know what we did not know...?

—John F. Kennedy

Inadequate or nonexistent planning has an immediate adverse impact on local environmental and economic health. The most pervasive examples of this were seen as the Iron Curtain parted in the late 1980s and the enormity of environmental damage suffered throughout Eastern Europe from decades of neglect became apparent. The litany of such environmental destruction is not only appalling, but virtually impossible to completely enumerate.

In addition to natural resources, cultural artifacts are also succumbing to environmental pollution. Acid deposition on architectural wonders is greatly accelerating the previously slow decay of many of the world’s manmade treasures. Examples range from the Greek Acropolis to the temples and art of native cultures of the Mexican Yucatan Peninsula. The epidemic is of global proportion.

1. Regional Examples

In 1990 the U.S. Environmental Protection Agency reported that more than half of Poland’s surface waters were so toxic that they were unusable as a water supply for recreational resources or fishery. Furthermore, even industry could no longer utilize many surface waters for fear of destroying capital equipment. Poland’s severe air pollution is also legion. In the Crakow region, approximately sixty percent of the food grown is considered unfit for human consumption due to high levels of heavy metals found in the soil. Over half of Poland’s cities, including Warsaw, and more than one third of its industries, have little or no waste water treatment. In the heavily industrialized Polish region of

8. French, Clearing the Air, supra note 3, at 71. See also Leigh Dayton, Mayan Ruins Succumb to Attack from the Age of Oil, 724 New Scientist 32 (1989).
9. Id.
11. Id.
12. See B. Molholt et al., Risks from Environmental Pollution in Eastern Europe (paper presented at Society for Environmental Toxicology and Chemistry Annual Meeting, Nov. 13, 1990) [hereinafter Molholt].
14. See Hilary F. French, Green Revolutions: Environmental Reconstruction in Eastern

...
Upper Silesia, lead levels in the soil of the region exceed acceptable standards by 150 to 1,900 percent.\textsuperscript{15} Circulatory, acute respiratory, and mental illnesses as well as various cancers pervade the overall population. Epidemiological analysis strongly points to environmental pollution as the chief culprit.\textsuperscript{16}

In the former Czechoslovakia, presently the Czech and Slovak Republics, nearly sixty percent of all forests appear burned-over and lifeless.\textsuperscript{17} Dead or dying trees largely characterize the Fichtelberg, a once-majestic mountain situated at the German and Czechoslovakian border that served as a recreation destination.\textsuperscript{18} Such widespread tree loss has been attributed to Czechoslovakia's extensive use of high-sulphur, high-ash, soft lignite coal for heat and power generation.\textsuperscript{19} Presently, Czechoslovakia relies on brown coal for forty-one percent of its energy consumption.\textsuperscript{20} The use of this brown coal results in average sulphur dioxide concentrations of 155 micrograms per cubic meter in Czech population centers such as Prague. In Most, a Czech city in northern Bohemia, peak sulfur dioxide levels reach 1,000 micrograms per cubic meter.\textsuperscript{21} These concentrations are more than three times the World Health Organization (WHO) standard.\textsuperscript{22} Furthermore, at least one third of Bohemia's rivers, and one half of those in Slovakia, cannot support aquatic life.\textsuperscript{23} Indeed, half of Czechoslovakia's drinking water fails to meet health standards.\textsuperscript{24} Hazardous wastes are now found in areas such as the pristine Karlovy Vary, a famous mineral water and hot springs spa.\textsuperscript{25}

The air is virtually unbreathable in some other Eastern European urban and industrial centers such as Copsa Mica, Romania.\textsuperscript{26} This condition is reminiscent of the soot-blackened British industrial cities during the early stages of the industrial revolution in the nineteenth century, and the German Ruhr Valley and Pittsburgh, Pennsylvania at the turn of the

\textit{Europe and the Soviet Union, 99 WORLDWATCH PAPER 17 (1990) [hereinafter French, Green Revolutions].}

\textsuperscript{15} \textit{Id.} at 23-24.
\textsuperscript{16} \textit{See id.}
\textsuperscript{17} French, \textit{Clearing the Air, supra note 3, at 64.}
\textsuperscript{18} \textit{Id.}
\textsuperscript{19} \textit{See Rich, supra note 13, at 9.}
\textsuperscript{20} \textit{See French, Green Revolutions, supra note 14, at 11.}
\textsuperscript{21} \textit{Id.} at 13.
\textsuperscript{22} \textit{Id.}
\textsuperscript{23} \textit{Id.} at 17.
\textsuperscript{24} \textit{Id.} at 18.
\textsuperscript{25} \textit{Id.} at 19-20.
\textsuperscript{26} Rich, \textit{supra note 13, at 9.}
twentieth century. As the New York Times reported in early 1990,Copşa Mica and fifteen miles of surrounding area "looks as if it has been dipped in ink . . . . Even the sheep on the hillsides are a dingy gray." Hungary is also smothering in its own air pollution. In Budapest, lead levels are nearly thirty times the acceptable standard. Bulgaria, many areas in former East Germany, and the various former Soviet Republics all exhibit advanced environmental degradation. These areas are beset by pollution and its byproducts such as toxics in the air, ground and water, radio-nuclides, drastically reduced agricultural yields and productivity, vast failures in basic sanitary systems, and diminished supplies of potable water. These environmental maladies have a devastating impact on health and economic conditions. Unfortunately, the immediate environmental concerns facing Eastern Europe are a mere sampling of the great number of environmental concerns worldwide. Asian examples of environmental degradation are similarly distressing. Hong Kong has a population approaching six million people and a land area of approximately one thousand square kilometers. A highly charged and laissez faire-governed economy has led to massive environmental deterioration, characteristic of that found in other major Asian and Latin American urban centers. Such dense urban populations are exposed to common and toxic air pollutants, waters invaded by untreated human and industrial wastes, and degradation of natural resources and recreational areas. In addition, these populations are subjected to significant noise levels exacerbated by high densities and incompatible mixtures of land use.

2. Resource Stress and Depletion

Resource stress and depletion are intimate partners with the type and intensity of air, water, and land pollution that are now globally extensive. These conditions are particularly acute in developing nations

27. See French, Clearing the Air, supra note 3, at 64.
29. Id. at 16.
30. Id. at 14.
31. Id.
32. See id. at 21-22.
34. Id.
35. Id. at 17-18.
36. Id.
with emerging, dynamic economies.\textsuperscript{38} Systemic ecological decline is present in many reaches of the vast but fragile Mediterranean Sea, in the Chesapeake Bay, in the coral reefs of the Philippines, and in the ghostly acidified forests of portions of Europe.\textsuperscript{39} The "crash" of certain fishery stocks in the Chesapeake region of the mid-Atlantic United States has been attributed, \textit{inter alia}, to acid deposition, loss of bay grasses, sedimentation, and siltation due to urbanization and agriculture.\textsuperscript{40} Other related causes include the loading of nutrient and toxic pollutants from non-point and point sources and the deposition of airborne nitrates.\textsuperscript{41} Less subtle stresses on marine ecosystems are occurring in tropical waters. For example, extraordinarily destructive chemical "fishing" techniques have been used to the detriment of fragile coral reef biological communities in various parts of the world.\textsuperscript{42}

The damage resulting from excessive withdrawal of groundwater is also evidence of environmental problems caused by direct natural resource depletion or stress. "Waterlogged and salted lands, declining and contaminated aquifers, shrinking lakes and inland areas, and the destruction of aquatic habitats" are a partial list of such groundwater withdrawal-induced damage.\textsuperscript{43} One investigator has estimated that salinization is reducing crop yields on twenty-four percent of irrigated land worldwide.\textsuperscript{44} The concentration of toxics that leach into the soil is a related problem. For example, the volume of Russia's Aral Sea, the source of fresh water for a majority of that region's agricultural production, has shrunk by two-thirds, and it has been reported that all of its native fish species have disappeared.\textsuperscript{45} Dusty winds deposit particles from the dry, salty seabed on surrounding cropland, substantially damaging and reducing harvests.\textsuperscript{46} Dams and reservoirs also create substantial environmental costs, including the flooding of arable land, reduction of downstream fisheries,\textsuperscript{47} and the introduction of waterborne diseases.\textsuperscript{48}

\begin{itemize}
  \item \textsuperscript{38} Id.
  \item \textsuperscript{39} See generally French, \textit{Green Revolutions}, supra note 14.
  \item \textsuperscript{40} U.S. ENVTL. PROTECTION AGENCY, \textit{CHESAPEAKE BAY PROGRAM: FINDINGS AND RECOMMENDATIONS} (1983); DIANE FISHER ET AL., \textit{POLLUTED COASTAL WATER: THE ROLE OF ACID RAIN} (1988).
  \item \textsuperscript{41} Id.
  \item \textsuperscript{42} Mark Derr, \textit{Raiders of the Reef}, \textsc{Audubon}, Mar.-Apr. 1992, at 48 ff.
  \item \textsuperscript{43} Sandra Postel, \textit{Water for Agriculture: Facing the Limits}, 93 \textsc{Worldwatch Paper} 15 (1990).
  \item \textsuperscript{44} Id. at 16.
  \item \textsuperscript{45} Kotlyakov, supra note 7, at 4.
  \item \textsuperscript{46} See id. at 20-21.
  \item \textsuperscript{47} Id. at 23.
\end{itemize}
Severe water scarcity, competition, and conflict are additional stresses that must be addressed.

Resource stress and depletion is exacerbated by significant threats to systemic ecological health caused by direct loss or alteration of habitat. The cutting or burning of tropical forests and the drainage and plowing of wetlands are prominent examples. One observer has noted that decisions about land use management typically made on a small spatial scale may not be sufficient to help develop the kinds of large-scale solutions necessary to ameliorate the problems of habitat loss and fragmentation. However, a solution may be reached by joining these local decisions in a regional planning scheme.

B. Examples of Urban Problems

_Cities are the conscience of a nation._

—Victor Hugo, _Les Misérables_

The decay of urban centers is a keystone environmental concern. In no particular order, some of the world’s most polluted cities include: Calcutta, Bangkok, Taipei, Santiago, Shanghai, Beijing, Dacca, Kuala Lumpur, Sao Paulo, Jakarta, New Delhi, Mexico City and Hong Kong. The list is ever-growing and western urban centers such as Greater London, Los Angeles, and Metropolitan New York City must surely be included. Substantial population shifts are endemic when resource-based cultures face increasing competition for lands and waters from diversifying industries. Expanding in-migration to already overwhelmed cities has caused tremendous problems in Africa, Latin America, and the Asian subcontinents. Cities with a “design capacity” of three hundred thousand residents have metamorphosed into sprawling megalopolis of five to ten million people. These “center cities” are surrounded by “squatter cities” with little or no running water, open sewers, no solid waste management, no electric power or other city services, and minimal business regulation. The provision of fundamental sewer, water, waste

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50. __Id.__


52. _Pollution in Asia, supra note 37._

53. For example, the infrastructure in the inner urban core of Mexico City, Mexico may be able to support 500,000 people, while the existing population has surpassed 15,000,000.

54. _Pollution in Asia, supra note 37._
management, and road infrastructure becomes a priority second only to basic housing.

The combination of teeming populations and a lack of environmental controls and planning in Eastern European and Asian cities is potentially lethal. The Asian urban example is particularly instructive. Although environmental damage from industrial development is greater in Eastern Europe and Russia, more people are likely to be injured by such damage in Asia where "industrial waste and agricultural degradation have an immediate effect on almost half of mankind." The population in Asia is growing at nearly twice the rate of Europe's, and so are its cities.

... [by] 2000 the urban population [in Asia] will probably be around 1.3 billion. Forty years ago Asia had five cities with more than four million residents . . . . Today there are at least 18 such 'mega-cities' in Asia, out of a world total of 30. By the end of the 1990s there will probably be ten more . . . At least a third of the people in Dacca, Manila . . . and Jakarta live in what sociologists call 'informal settlements'—in plain English, slums, with little or no access to clean water, sewerage system, roads, health care or education.

Manila exemplifies the unhealthy juxtaposition of heavy industry and dense population. In Manila, seventy percent of the Philippines' fifteen thousand industrial firms regularly empty untreated waste into the rivers and sea. Another example is seen in Taiwan, home to twenty million people, which serves a mere six hundred thousand people with sewer services. Frequently, the very reason for the economic growth of emerging countries and cities is the foreign or native investment in industrial and agricultural production. Investors utilize the inexpensive labor and accompanying low or non-existent health and environmental controls of the developing country. Such characteristics are found in the electronics industry of Malaysia, metal fabrication on Macao and the sugar mills of the Philippines.

Urban environmental conditions in many of the world's leading cities are deteriorating. Even in the comparatively prosperous city-state of Hong Kong, economic advance has yielded extensive environmental decline. Hong Kong's environment is tainted by severe noise pollution,
air pollution, industrial effluents, and a burgeoning solid waste volume that may soon overwhelm landfill capacity. In addition, until recently, virtually untreated sewage and other organic wastes flowed freely into coastal waters. All of these conditions are exacerbated by areas of extraordinary population density accompanied by an uncontrolled mix of land uses and overlays of twenty-first century transportation demands on a city and territory of ancient lineage. Combined with a subtropical climate which intensifies certain environmental problems, these factors result in urban environmental degradation of a substantial magnitude.

The nations of Eastern and Central Europe face many of the same problems, albeit in a slightly different context. These nations rely upon transportation systems largely dependent upon heavily polluting vehicles and fuels, jerry-rigged into ancient cities. Their urban centers are characterized by heavy industry in close proximity to residential populations. Moreover, decrepit, rudimentary, or non-existent sewage treatment, inefficient or unreliable water supplies, and emissions of virtually untreated industrial air and water wastes complete the unfortunate picture.

III. HISTORY AND STRUCTURE OF U.S. PLANNING AND ITS ENVIRONMENTAL ANTECEDENTS

When asked what he thought of Western civilization, Mahatma Gandhi replied, “I think it would be a very good idea.”

Before exploring ways of applying appropriate land planning techniques to international environmental problems, it is important to review the nature, art, and science of planning. Planning, including land use and environmental planning, involves an analysis of current conditions and a prediction of future trends as a means of determining a positive future course of action. Within the context of land use and environmental management, the plans that emerge from this process guide the

61. See generally Hong Kong, supra note 33.
62. In some urban areas of the territory, density averages more than 5,000 persons per square kilometer. See Hong Kong, supra note 33, at 20. In squatter and refugee “villages” in the urban core, this figure is much higher. See id.
63. See generally id.
64. See generally Molholt, supra note 12, at 3.
65. Id.
66. See generally French, Clearing the Air, supra note 3.
67. Donald G. Hagman & Julian Conrad Juergensmeyer, Urban Planning and Land Development Control Law 11 (2nd ed. 1986) [hereinafter Hagman]; Int’l City Mgmt. Ass’n, The Practice of State and Regional Planning, 3, 7 (Frank S. So et al. eds., 1986) [hereinafter State and Regional Planning].
community through political, economic, and technological change. These plans are intended to serve as guideposts rather than hitching posts. They are neither sacrosanct nor inviolate and are intended to be written on an erasable slate, rather than etched in stone.

The act of planning is an iterative process. Plans must be periodically reassessed, modified, and, where appropriate, rewritten as underlying objectives, assumptions, and projections change with the passage of time. Thus, just as a sailboat's centerboard requires regular removal of barnacles, stripping, and reapplication of varnish to enhance the smoothness of the ride, so too must a plan be maintained and occasionally overhauled. As Albert Mayer noted, however, "trend is not destiny,"[68] so caution must be observed when revising plans to prevent temporary economic or social aberrations from unduly influencing status quo and long range goals.

A. History of Planning

The best test of an idea is its ability to get itself accepted in the marketplace.

—Oliver Wendell Holmes

The art and science of land use and environmental planning certainly are not new. One commentator traces the evolution of city planning to the city-kingdoms developed by the Sumerians of Assyria around 4000 B.C. and further anoints Hippodamus, a Greek architect practicing in the fifth century B.C., as the first city planner.[69] Indeed, Hippodamus has been credited with developing the grid street patterns and central market place concept that are found in many modern Western cities.[70] Moreover, the widening of streets into highways and the expansion of the central marketplace were among the more notable achievements of the Mayan and Incan civilizations.[71] On a regional planning scale, it was the Romans who, from 500 B.C. to 300 A. D., first developed a regional road and transportation network to promote communications, commerce, and military transport.[72] The concept of regional planning is fundamental to

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68. See Albert Mayer, The Urgent Future: People, Housing, City, Region (1967).
70. See id. at 6-8.
72. Catanese, supra note 69, at 9.
modern-day environmental planning since, as previously suggested, environmental issues frequently cross geopolitical boundaries, thereby engendering the need for interjurisdictional cooperation and effort.

From the fifteenth century through the eighteenth century, the invention of gunpowder, the evolution of arts and humanities during the Renaissance, the development of the steam engine, and the occurrence of the industrial revolution shaped the evolution of land use planning. In particular, the industrial revolution gave rise to significant changes in transportation systems which then set the stage for the suburban movement of the late nineteenth and early twentieth centuries. Moreover, the industrial revolution resulted in the segregation of land uses whereby intensive labor and concomitant congestion, health problems, and pollution arose in centralized urban factories and surrounding tenements, while housing for the affluent spread beyond the cities to the suburbs. This evolutionary process is consistent with the thesis that it was the division of class, not the division of work, that separated the city from the village and, in modern times, the city from the suburb. Finally, the byproducts of the industrial revolution led such forward thinking planners as the British/American Ebenezer Howard and the Scottish-born Patrick Geddes to develop the concepts of garden city new towns and the merger of physical planning with social, economic, and environmental concerns, respectively. These notions fostered the concept of comprehensive planning that has evolved during the twentieth century.

Just as the art and science of land use planning have ancient roots, their natural adjunct—environmental planning—branches from the same trunk. As practiced in many early Western and Eastern classical civilizations, as well as in certain indigenous cultures in Africa and the Americas, land use planning actually utilized environmental principles to the extent they were then understood. Witness, for example, the relative sophistication of planning for water supply and sewage segregation in early Greek and Central American urban cultures, or the attempted conservation of certain valuable natural resource lands and commons in na-
tive North American societies. A more pointed example of early environmental planning in colonial America is found in a 1739-40 statute of the Province of Massachusetts Bay which provided, in pertinent part,

Whereas . . . there is a great and valuable estate, consisting of salt meadow, lying on the Island at the bottom of Ipswich Bay . . . which is exposed and liable to be destroyed by horses, cattle and other creatures . . . feeding down the beach grass and treading down the sea walls . . . whereby the shrubs and grass are destroyed and open a course to the sea . . . which if not prevented may . . . destroy said estate to the great loss of . . . the public; for remedy whereof—Be it enacted . . . That . . . no person shall . . . turn or drive any Neat cattle, horses, sheep or swine upon said island . . . .

The evolution of land use planning and its environmental context affirms an effort to prevent urban and environmental problems by design. Plans for ancient cities were intended to foster communication, commerce, ready transport, security and—to the extent then known—cleaner living conditions than those found in the unincorporated countryside. Today's planning in new and redeveloping areas can and should address no less noble causes.

B. Planning in the United States

Some luck lies in not getting what you thought you wanted but getting what you have, which once you have it may you be smart enough to see is what you would have wanted had you known.

—Garrison Keillor, Lake Wobegone Days

Although planning has occurred in the United States since colonial times, modern planning began proximate to the First World War. This era of modern American planning followed a century of rapid industrialization and urbanization throughout the Western world. While late seventeenth and eighteenth century colonial town planning, as exemplified by William Penn's design for the City of Philadelphia, emphasized the

81. "An Act for the effectual Prevention of Horses, Neat Cattle, Sheep and Swine from running at large or feeding upon a certain Island . . . in the County of Essex." Acts and Resolves of the Province of Massachusetts Bay 1739-40, ch. 8.
82. Int'l City Mgmt. Ass'n, Principles and Practice of Urban Planning 16 (Goodman & Freund eds., 1968) [hereinafter Urban Planning].
gridiron-street and subdivision design, it was not until the early 1900s that comprehensive planning and zoning came into being. In the interim period, such technological advancements as railroad expansion and invention of the telegraph, elevator, typewriter, electric lamp, water-carriage sanitary sewer, automobile, and skyscraper frame construction led to unprecedented industrialization and centralized urban expansion. During that time, the centralized state government practice of laissez faire regulation of land use resulted in uncontrolled and often unsanitary and environmentally destructive development.

The acknowledged "precursor to modern urban American planning" was the "City Beautiful Movement" initiated at the Columbian Exposition of the 1893 Chicago World's Fair. This Movement followed an era of ardent protectionism of private property rights and interests. The City Beautiful Movement sought to remedy urban blight and disease through physical design improvements and gave rise to the advent of comprehensive planning and concomitant consideration of a wide range of municipal issues in the planning process, including overall plans for land use, streets and transit, parks and recreation, and water and sewer.

The "City Efficient" or "City Functional Era" arose during the ensuing decade, followed by the "Age of Business" in the 1920s. In sum, the principal events of the American planning process during the four decades spanning from 1890 to 1930 included: (i) the Columbian Exposition of 1893; (ii) the 1911 adoption by the City of Chicago of Daniel Burnham's comprehensive plan; (iii) the 1916 enactment by the City of New York of the first comprehensive zoning ordinance; (iv) the 1924 publication of the Standard State Zoning Enabling Act; (v) the 1926 United States Supreme Court ruling approving use of the "police power" in the zoning process in Village of Euclid v. Ambler Realty Co.; (vi) the 1928 publication of the Standard City Enabling Act; (vii) the 1929 Regional Plan of New York and its Environ; and (viii) the 1929 completion of the "new town" of Radburn, New Jersey.

Certainly the most far-reaching of these events was the evolution and interconnection of comprehensive planning and zoning. Simply

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85. See generally Urban Planning, supra note 82.
86. Id. at 16.
87. HAGMAN, supra note 67, at 16.
88. Id. at 17.
89. Id.
90. See generally id.
92. See HAGMAN, supra note 67, at 22-23; Urban Planning, supra note 82, at 25.
stated, it is zoning that has given the force and effect of law to the rec-
com-
mendations of advisory plans. Indeed, it has been suggested that “zoning
became to planning what the sacraments are to the Bible—a visible sign
of grace.”

Having become firmly entrenched in the American political frame-
work by the late 1920s, planning, from the Great Depression of 1929
through the end of World War II, was characterized by expansion of
national, state, and regional planning, with particular emphasis on social
and economic factors in conjunction with traditional physical planning
issues. Thereafter, from the post-war years of the mid-1940s to the
present, local and regional planning have continued to evolve while na-
tional planning has entered a period of substantial decline. Most re-
cently, statewide planning has emerged, particularly with regard to
environmental issues.

Classical American planning theory “incorporates scientific method,
decision theory, and simple logic.” Most American jurisdictions have
traditionally subscribed to this “rational” and technical view of the plan-
ing process. The process begins by identifying and defining a prob-
lem, and proceeds by taking deliberate analytical steps to resolve the
problem. These steps include: (i) identification of the problem, (ii) goal
setting, (iii) collection and analysis of data, (iv) refinement of goals, (v)
preparation of alternatives, (vi) evaluation of alternatives, (vii) adoption
of the preferred plan and/or policies, (viii) implementation, (ix) monitor-
ing and evaluation, and (x) feedback and redefinition of the problem.
This traditional planning approach is underscored by the premise that
planning issues can be resolved by the application of science and logic to
create a comprehensive plan which, at a given point in time, properly
considers all necessary variables. Creation of a regular feedback loop
prevents the plan from becoming stale.

Environmental planning also utilizes the traditional rational plan-
ning model. As such, it involves a future-oriented, continuous process,
based upon an analysis first of environmental resources and present con-
ditions. Air, water and land issues may all be involved. The problems

93. URBAN PLANNING, supra note 82, at 25.
94. STATE AND REGIONAL PLANNING, supra note 67, at 41.
95. Id.
96. Id. at 42.
97. Id.
98. Id. at 3-4.
99. Id.
100. Id.
101. Id.
studied can include such diverse matters as generalized urban air pollution, surface and groundwater pollution or depletion, sanitary sewer and water supply, solid waste management, slide-prone soils, noise, and basic resource conflicts. One of the most important tools utilized in the environmental decision making process is the environmental impact assessment (EIA), which analyzes and reveals the potential adverse environmental impacts of a proposed action or project.

Today, however, planning in America no longer relies solely on the classical planning process. Because of the tremendous plurality permitted by American government, reliance on the traditional rational planning process alone has been criticized as being too rigid. Numerous individual and governmental agency decisions now fragment the planning process. The planning process is thus seen as incremental at best, rather than comprehensive. Moreover, it involves both analytical and political dimensions. The fundamental planning issue has become whether to develop firm plans with an eye toward faithful implementation, or whether to construct plans which enunciate general principles to be used as guides for particularized instances occurring later.

The manner in which land use and environment are planned and managed in the United States is a microcosm of the country’s governmental system of separation of powers. Under this system of federalism, government occurs at three levels, federal, state, and local, with the states serving as the sovereign. The fifty states, in turn, have delegated certain powers and authority to the federal government through the United States Constitution, while retaining full authority for creating and structuring local government. Any power not expressly delegated or, in certain instances, necessarily implied by such delegation, is reserved by the individual states under the Tenth Amendment to the U.S. Constitution. For the most part, however, land use planning and regulatory authority have been delegated to local governments, which then implement their authority through enactment of local ordinances.

The specific authority by which government regulates both private and public property is the “police power.” Defined as “the legislative
or policy-making power that resides in each state to establish laws and ordinances to preserve public order and tranquility and to promote the public health, safety and morals and other aspects of the general welfare;” the police power includes zoning and the exercise of land use and, in many instances, environmental controls.

Significant federal and state constitutional guarantees to individual land owners that affect the regulation of private property include “due process,” “just compensation,” and “equal protection.” Within its “procedural” context, due process assures a property owner of fundamental fairness, including adequate notice, an opportunity to be heard and to cross-examine others, a written decision based upon evidence of record, and a procedure for appeal. A second form of due process, known as “substantive” due process, requires that land use regulations be applied in a manner that is neither arbitrary nor capricious. Such determinations are made by assessing whether the regulation is substantially related to the public health, safety, welfare, or morals.

The Fifth Amendment to the U.S. Constitution, as extended to the individual states through the Fourteenth Amendment “due process clause” and to municipalities via delegation, guarantees that no person will be deprived of property without due process of law and that private property will not be taken for public use without payment of just compensation. Additionally, the Fourteenth Amendment assures that states will afford their citizens equal protection under the law.

Equal protection in the land use context means that there must be a legitimate governmental purpose for the classifications and use restrictions that are applied to properties. Properties which are similarly situated must be treated similarly, unless there is a rational justification for their disparate treatment. In sum, equal protection means equal treatment.

An unconstitutional “taking” of private property can arise through

109. Id.
110. Id.
111. Id. at 10.
112. Id. at 13-14.
113. Id. at 12-13.
114. Id.
115. Id. at 10.
116. Id. at 12.
117. See id. at 10-13.
118. Id. at 59. This is extended to the individual states through the 14th Amendment “due process clause” and, via delegation, to municipalities.
119. Id. at 13.
direct governmental action or by the impact of government regulation on the individual's use and enjoyment of private property. Where government physically acquires private property for public use, it engages in the process of "eminent domain" and must pay fair market value "just compensation" as determined through the consent of the parties or, if necessary, through a condemnation proceeding in a court of law. Should government fail to abide by its eminent domain requirements, the private property owner may pursue payment of just compensation through an "inverse condemnation" suit. More recently, the concept of compensable "regulatory takings" has been endorsed by the United States Supreme Court in its "1987 takings trilogy" cases. Under this theory, a governmental regulation, an action short of a complete physical invasion or confiscation, may be so impactive as to require payment of compensation to the private property owner for the period during which the regulation was in effect.

While these are the primary constitutional guarantees afforded private property owners in America, there are a vast array of other legal assurances, rights, restrictions, and procedures made available to both private landowners and government entities by contract, statute and case law. Vested rights, nuisance theory, exactions and nexus, adverse possession, uniformity, and easements and covenants are but a few examples. The American land use lexicon is lengthy and complex.

The American system of planning is neither flawless nor without its detractors. The multi-tiered format can lead to excessive delay, over-regulation, and, in more extreme instances, a level of indecision that has sometimes been referred to as "paralysis by analysis." At times, it may be more responsive to the desires of a vocal minority asserting their due process rights than to the best planning interests of the non-communicative majority. Its inextricable link with local political processes may also give rise to planning solutions that are more expedient than curative. And, as one planning practitioner has noted, care must be taken so that

120. Hawaii Housing Authority v. Midkiff, 467 U.S. 229, 244 (1984).
122. Id. at 520.
126. Id.
127. A phrase frequently used by Royce Hansen, former Planning Board Chairman, Montgomery County, Maryland.
plans themselves do not become exercises in "artful ambiguity." Regardless, it is a system that accommodates and encourages innovation and participation. These characteristics have resulted in the creation of planning tools and techniques that have addressed a plethora of land use and environmental maladies.

In some American jurisdictions, the traditional planning process has evolved into a complex array of sub-plans and administrative review processes addressing matters as widely divergent as urban design and wetland conservation. In its most sophisticated iteration, the land use plans of an American locality may now consist of an overall comprehensive plan, a series of subdistrict master plans, a collection of sector plans covering even more minuscule sub-areas, and a set of functional plans addressing jurisdiction-wide issues such as transportation, parks and recreation, or historic preservation. With regard to zoning itself, a variety of techniques now exist to help achieve but one of the underlying purposes of land planning, the regulation of density and the distribution of population through the separation of uses and creation of development standards. Such contemporary progeny as transferable development rights, cluster design, and floating zones all promote the zoning objective.

Lastly, the traditional local government administrative techniques of land subdivision and permitting have, in some American municipalities, evolved into a labyrinth of detailed site plan review, environmental impact analysis, adequate public facilities ordinances, exactions, impact fees, and developer agreements. One commentator, von Lichtenberg, has chastised the complexity of such procedures by noting that, "The planning laws in most American neighborhoods would not permit the

128. Richard Tustian, former Director of Planning, Montgomery County, Maryland.
129. Examples of such jurisdictions include Bucks County, Pennsylvania, Prince George's County, Maryland, and San Francisco, California.
130. See e.g., Montgomery County, Maryland General Plan for the Maryland-Washington Regional District, "On Wedges and Corridors," 1964 and subsequent Master, Sector and Functional Plans.
131. Transferable development rights involve the conveyance of the right to develop from a "sending" property, which is to be preserved for a public benefit, to a "receiving" property, which has been predetermined to be suited for increased density of development. Clustering entails a reduction in minimum lot sizes without an ensuing increase in total lot yield as a means of enhancing site design flexibility and environmental preservation. Lastly, floating zones are designated zoning categories, similar in nature to special exceptions, that permit increased density of development and a broader range of permitted uses in exchange for provision of public amenities as determined at site plan review. See SCHNIDMAN, supra note 121, at 17-18, 529-30.
132. See Montgomery County, Maryland legislative and administrative land use controls.
construction of a Parthenon." Nonetheless, certain of these devices are not unique to American planning and have been implemented in other nations. For example, England has allowed developer agreements since 1947 and regulates them under section 106 of the Town and Country Planning Act. France has employed a formal system of environmental impact analysis since the mid-1970s; the Netherlands has regulated land use and environmental matters so extensively and for so long that it has been dubbed "the most planned country in Europe." However, what is unique about contemporary American planning is the amalgamation of a multitude of planning-related procedures and tiers of ministerial review.

Despite the aforementioned criticisms, the American system of public and private land ownership and land use regulation merits consideration by existing and emerging political and economic systems. At a minimum, it provides for some rational study of, and application of local solutions to, a variety of urban problems, including those related to environmental issues. It also encourages public participation in defining issues and objectives and in applying adopted regulations through the administrative review and approval process. Thus, while the end result may take a seemingly inordinate length of time to achieve, it may receive the benefit of diverse inputs ranging from those of the property owners themselves to comments from adjoining neighbors, affected organizations and interest groups, political leaders and coalitions, and private and public sector planners. It is this accumulation of collective wisdom that, perhaps, best personifies and commends the American planning system as one important element in the environmental management programs of emerging economies.

IV. ENVIRONMENTAL PLANNING: PREVENTION, REMEDIATION, AND ECONOMIC DEVELOPMENT AND REVITALIZATION

*Do not pray for tasks equal to your powers, pray for powers equal to your tasks.*

—Proverb


135. Davies, supra note 134, at 437.

136. Id. at 339.
While future planning may not be able to correct or even reverse certain preexisting environmental problems or trends, it can still play an important proactive and preventative role. Through the application of American land use and environmental planning procedures ranging from traditional land use planning, zoning, subdivision, site planning, and permitting, to the use of environmental impact assessments or air quality modelling, environmental recovery goals and objectives may be served.

In the traditional land use planning context, comprehensive plans might identify special natural resources for protection or particular environmental problems for resolution. As previously suggested, these planning goals may be the product of input from public and private sector planners, citizens, and politicians alike. Similarly, zoning classifications and accompanying use, density, and development standards may be established which, among other things, will enhance or maintain environmental stability. Through the subdivision process, a jurisdiction may impose restrictions on the timing of development and coordination of new growth with the provision of adequate public facilities to accommodate expansion. Site plan review requirements afford an opportunity to assess and regulate environmental impacts and preservation efforts on a property-by-property microscale. Finally, issuance of permits for construction and ultimate occupancy afford an opportunity to assure that design and use measures have been put in place to compel compliance with environmental objectives initially espoused in community plans.

Similarly, detailed environmental recovery plans might pinpoint a few immediately pressing problems for attention, isolate the particular causes, and recommend an implementation schedule for technical issues, process/political issues, funding, and other components of problem resolution. A discussion of various environmental media, related pollution sources, and specific potential planning remedies for local, urban, regional, and transboundary/international settings follows.

A. Prevention

Quality is always cost effective.

—Unattributed

137. Examples of natural resources to protect include wetlands, shorelines, and groundwater recharge areas. Examples of environmental problems include surface and groundwater pollution from non-existent or failing sewage systems, as well as air pollution from motor vehicles.

138. Planning-type solutions are likely most effective when combined with other remedies including implementation of "end-of-the-pipe" controls, fuel changes, possible permit systems, and the introduction of economic and market-based incentives and disincentives.
1. Air Quality

Air pollution is largely the direct result of industrial processes, motor vehicle transportation, and residential uses of various fuels.\textsuperscript{139} While natural sources like geothermal gases, forest fires, and wind-borne particulates in arid regions may also contribute to air pollution, they are usually not primary contributors and are not considered here. Since human health effects are magnified by the proximity of high density populations to industrial sources,\textsuperscript{140} one effective planning solution is the geographic separation of significant stationary pollution sources and residential areas, taking into account local micro-climatic effects. Concomitantly, the systematic analysis and management of area-wide transportation efficiency, integration of public transit and pedestrian systems, and development and application of locational and site design criteria that create less energy consumptive and more efficient land use patterns, and help coordinate new development served by public transportation, are all pure planning approaches aimed at regulating mobile source pollution by reducing vehicle miles travelled and transportation system inefficiency. (See Figure 1)

\begin{figure}[h]
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\begin{tabular}{|l|}
\hline
\textbf{Problem:} Air Pollution \\
\textbf{Causes:} \\
\hspace{1cm} • Industrial, Utility Sources \\
\hspace{1cm} • Mobile Sources (Vehicles) \\
\hspace{1cm} • Residential Heating, Cooling, Cooking \\
\textbf{Planning/Related Solutions:} Land Planning: \\
\hspace{1cm} Appropriate Siting for Industrial Sources; \\
\hspace{1cm} Direct Controls on Vehicles and Stationary Sources \\
\hspace{1cm} Taxes/Economic Incentives; \\
\hspace{1cm} Planning for Efficient Development by Public Transit \\
\hspace{1cm} and Pedestrian Circulation Systems; \\
\hspace{1cm} Transportation System Efficiency Increases such as \\
\hspace{1cm} Signalization; \\
\hspace{1cm} Car-Free Days; \\
\hspace{1cm} Fuel Changes; \\
\hspace{1cm} Vehicle Inspection/Maintenance ("I/M") Programs. \\
\hline
\end{tabular}
\caption{Problem: Air Pollution}
\end{figure}

\textsuperscript{139} French, \textit{Clearing the Air}, supra note 3.
\textsuperscript{140} See generally, French, \textit{Green Revolutions}, supra note 14.
2. Water Quality

Industrial discharges, urban and agricultural non-point source runoff and sewage inputs are the primary causes of surface water degradation.\textsuperscript{141} Groundwater pollution results from some of the same inputs, as well as direct injection of industrial waste and saltwater intrusion due to significant drawdown and aquifer depletion.\textsuperscript{142} Both process and "end-of-the-pipe" controls are an important, albeit burdensome, part of any strategy for surface water clean-up. Moreover, while economic and market-based tools might also be applied, there are environmental planning approaches that can serve as useful adjuncts.

Upgrading sewage treatment capabilities need not imply capital-intensive technologies. For example, an environmental planning approach would analyze the actual localized problem and develop appropriate alternative solutions. In that instance, small "low tech," innovative on-site systems may provide substantial quality enhancement at low cost. Similarly, for non-point source pollution, the application of sound land planning techniques for new development such as avoiding steep and highly erodible soils, and the use of so-called "best management practices" such as the institution of vegetated buffers for capturing and filtering runoff from both agriculture and redeveloped lands, need not be costly solutions. Finally, for groundwater problems, advance planning can at least identify aquifer recharge and water conservation areas to be avoided by future housing and industrial facilities. (See Figure 2)

3. Fishery, Wildlife, and Special Natural Resource and Cultural Losses

Without adequate planning, a nation's or a region's most economically, aesthetically, culturally, and ecologically valuable natural resources can be irrevocably harmed. Preeminent lands and waters can receive protection through the implementation of creative land and environmental planning tools. Once these areas are identified by survey and analysis, land and water management programs can be implemented. Programs may include clearly articulated conservation policies, protected zones, and criteria and mitigation requirements and techniques to be met prior to and during development and use, as well as the application of economic incentives and disincentives.

Planning programs can also identify alternative areas for resource

\textsuperscript{141} See Global 2000, supra note 48, at 340-41.

FIGURE 2

Problems: Surface and Groundwater Pollution; Groundwater Depletion/Land Subsidence.

Causes:

- Industrial Discharges: toxics, metals, nutrients.
- Urban/other Non-point Source Runoff: agriculture, nutrients toxics, sediment
- Sewage: treatment plant discharge, non-treated wastes, septic systems
- Direct Injection
- Saltwater Intrusion
- Over-Withdrawal: residential, industrial, agricultural uses

Planning/Related Solutions:

Point Sources: Formal and enforceable agreements to undertake specific process changes to reduce discharges to specified levels, command and control-type permit systems for same, economic and market incentives/disincentives.

Non-Point Sources: Stormwater system retrofits; implementation of "best management practices" as part of urban development or redevelopment, agriculture, and site planning both during and after construction.

Sewage: Upgraded, programmed systems, including innovative on-site.

Groundwater: Possible standards, classification, permitting program; advance planning to identify and protect recharge areas; reduce withdrawals in certain areas.

Groundwater Depletion: Use of alternative sources where feasible. Develop cost-effective upland storage capability, additional treatment of surface water, or different aquifer.

development or utilization, specify acceptable extraction or harvesting methods, and help create alternate economic uses within protection areas. Zoning controls such as transferable development or exploitation rights, critical area overlay districts, and performance standards and restrictions can all be adapted to local and regional economies and political systems. Examples of special areas that can be protected by these techniques include: wetlands, aquifers, and stream valleys; endangered and
threatened species habitats; rainforests, temperate forests, and wood-
lands; coastal zones, estuaries, and inland seas; sensitive mountain or gla-
cial regions; rural areas, cultural and historic artifacts, and aboriginal
lands; prime agricultural areas; grasslands, steppes, and deserts; islands;
mineral and extractive resource areas; fisheries and aquatic sites; and
fault lines and volcanic areas. (See Figure 3)

4. Urban Environmental Noise

While perhaps less significant in the scheme of environmental con-
cerns, in some congested urban centers motor vehicle and industrial
noise is much more than a mere nuisance. High and sustained noise
levels may present health risks to heavily exposed populations, and even
structural damage to buildings.\textsuperscript{143} Source controls such as mufflers on all
vehicles and heavy construction equipment are a readily apparent solu-
tion, although such requirements can be costly to impose and enforce.
An alternative or additional solution is based largely in effective land
planning. Through site and building design regulations including
mandatory setbacks, building orientation, berms, barriers, and landscap-
ing controls, noise impacts can be significantly attenuated.\textsuperscript{144} (See Figure
4)

5. Flooding, Coastal Hazards, Landslides and Soil Loss

Inappropriate location of structures and human habitation is the
single major cause of the terrible loss of human life and property that
results from natural disasters. Witness, for example, the devastation vis-
ited upon Bangladesh in May 1991.\textsuperscript{145} Unfortunately, while the chief
solution is the practice and follow-through of good land planning, it is
not simple to implement given the extent of historical and existing

\textsuperscript{143} The U.S. Environmental Protection Agency has determined that sustained noise levels
above 70 dBA (about the level of a busy U.S. highway) can adversely affect public health. \textit{See}
that are frequently reached in third world urban centers, where the mix of noise sources in-
cludes motorcycles by the thousands, diesel-fueled trucks, buses and automobiles, and con-
struction equipment such as hydraulic jackhammers and pile-drivers—few of which are fitted
with mufflers.

\textsuperscript{144} \textit{See generally} A. Magan, \textit{Quiet Communities} (1979); Lee R. Epstein, \textit{Quiet
Communities} II (1980).

\textsuperscript{145} The Bangladesh disaster of May 1991 occurred on the Bay of Bengal, "the worst place
in the world for typhoons to hit," explained Robert Beard of the U. S. Joint Typhoon warning
center located in Guam. Bangladesh is largely low lying flood plains and deltas, and the sea
floor slopes very gradually away from the shore. The combination of these factors funnels vast
amounts of sea water inland during cyclones. R. Monastersky, \textit{Geography Conspires Against
FIGURE 3


Causes:

Fishery:
- Water Pollution
- Overfishing

Wildlife:
- Uncontrolled Hunting, Poaching
- Loss/Fragmentation of Habitat

Natural and Cultural Resources, Biodiversity:
- Fishery and habitat loss due to over-fishing, pollution stresses, resource extraction
- Forestry, agricultural, development practices
- Uncontrolled land uses
- Lack of official protection policy or program

Planning/Related Solutions:

- Enforcement of Water Pollution Laws;
- Habitat/Fishery Management;
- Restrictions and Enforcement;
- Economic Incentives and Disincentives;
- Effective Land Use Planning and Control to Protect;
- Sensitive Habitat;
- Identification of Alternative Land for Domestic and Economic Uses;
- Pollution Control;
- Resource Extraction Controls;
- Coastal Zone Management;
- Development of Alternative Sustainable Resource Uses.

human settlement in flood-prone and other hazard areas worldwide, and the vast need for shelter in and around world urban centers. Nevertheless, advance identification of hazard areas such as floodplains, coastal zones, and unstable soils and slopes can eventually lead to enforced avoidance. Additionally, retention of effective vegetative and other natural buffers, including natural dune and tidal wetland systems,

146. In many countries, cities historically were built on major rivers, at the confluence of several major rivers, or on an estuary. Note, for example, Cairo, Egypt, which is near the mouth of the Nile; Lisbon, Portugal, which is on an estuary at the mouth of the Tagus River; and Buenos Aires, which is on the Rio de la Plata, at the mouth of the Uruguay and Paran Rivers.

147. Pollution in Asia, supra note 37.
and effective setbacks will become increasingly important in coastal areas as the world and its island states confront a rising sea level expected to accompany the global warming phenomenon.\textsuperscript{148}

Soil loss from agricultural and construction activities is largely a function of exposure to stormwater and winds.\textsuperscript{149} Implementation of so-called "best management practices" need not be inordinately expensive but does require training and effort. For agriculture, these practices include terracing and contour plowing, windbreaks and vegetated swales, crop and field rotation, and low tillage methods.\textsuperscript{150} For construction, best management may entail the use of berms and barriers, sedimentation ponds, and maintaining naturally buffered streams.\textsuperscript{151} (See Figure 5)

6. Transboundary/International Environmental Problems

Climate change, acid deposition, global warming and rising sea levels are all transboundary environmental problems of international concern. The common wisdom would not ordinarily include these intransigent global problems within a discussion of planning-type solutions. While many root causes of these problems are not treatable through traditional planning, certain land/environmental planning and

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\textbf{FIGURE 4} \\
\hline
\textbf{Problem:} Urban Environmental Noise. \\
\hline
\textbf{Causes:} & \begin{itemize}
\item Construction and Industrial Sources
\item Motor Vehicles
\item Siting of Land Uses
\end{itemize} \\
\hline
\textbf{Planning/Related Solutions:} & \begin{itemize}
\item Muffler Laws;
\item Noise Ordinances and Police Enforcement;
\item Land Use Planning and Control Techniques for Attenuation.
\end{itemize} \\
\hline
\end{tabular}
\caption{Urban Environmental Noise Causes and Solutions.}
\end{figure}

\textsuperscript{148} See generally Global Warming, supra note 1.


\textsuperscript{151} See Managing Nonpoint Source Pollution, supra note 149; Proposed Guidance Specifying Management Measures, supra note 149.
FIGURE 5

*Problems*: Flooding, Coastal Hazards, Landslides, Soil Loss.

*Causes*:

Flooding, Coastal Hazards:
- Location in flood-prone, coastal areas
- Destruction of natural buffers

Landslides:
- Location on slide-prone soils, slopes
- Proximity to water

Soil Loss:
- Agricultural and construction methods

*Planning/Related Solutions*:

- Advance Identification, Land Use Planning and Regulation to Avoid;
- Implementation of Structural Measures where Unavoidable;
- Require that Buffer Areas be Retained;

related approaches can be used to attack some of these large scale issues. (See Figures 6 and 7.) Planning is largely a preventative activity and has been described by one commentator as “anticipatory decisionmaking.”

By effectively analyzing urban topography and regional natural constraints, and merging this analysis with expressed public policy goals, one can theoretically arrive at land use development and redevelopment solutions that, at a minimum, will avoid the mistakes of the past. Such “proactive” planning techniques are but a part of the land use and environmental planning approach to remediation of existing environmental problems.

B. Remediation

*Success is never final, failure is never fatal.*

—Winston Churchill

The direct discharge of heavy metals, solvents and organic wastes by an industrial source into a local river is not a problem ordinarily solvable through the land use/environmental planning interface. Direct controls, permit systems, requirements for engineering process changes and waste...
FIGURE 6
Transboundary Problems: Climate Change, Global Warming, Sea Level Rise

Causes:
- Burning of Fossil Fuels
- Methane Sources
- Chlorofluorocarbons (CFCs)
- Forest Losses

Planning/Related Solutions:
Protect forests and open lands through effective land planning and control, identification and/or provision of alternate lands for domestic and economic uses; Pollution controls, taxes, and economic incentives/disincentives; Product bans; Encouragement/mandates for different fuels, conservation, etc.; Land use related mandates for afforestation and reforestation in development and resource utilization context.

FIGURE 7
Transboundary Problems: Acid Deposition; Hazardous Waste

Causes: Acid Deposition:
- Industrial Production
- International Shipment for Disposal
- Little Prevention or Re-Use
- Lack of Siting Controls, other Regulations

Planning/Related Solutions:

Acid Deposition: Pollution controls; alternative fuels; conservation to reduce utility demand; efficient land use planning for energy conservation.

Hazardous Waste: Coordinate in-country recycling and extra-territorial marketing of by-products; encourage process changes to minimize; tracking regime; standards for disposal; land planning for siting of facilities.
minimization, and the application of market-based economic tools are all important public policy mechanisms for fostering environmental improvement, as discussed above. The application of comprehensive and environmental planning techniques and, in some instances, the implementation of stringent land use controls, can also play a substantial role in the environmental remediation process.

Among the most readily apparent areas where such techniques might usefully be focused are the planning, scheduling, and capitalizing of infrastructure. For example, capital planning, programming, and financing techniques can borrow from several models in order to analyze long-term sewer and water needs, choose realistic systems and geography-based provision plans, and develop reliable funding mechanisms. Moreover, funding mechanisms can include utilizing bond markets, public-private joint ventures, tax/fee revenues, local/state or province/federal cost-sharing formulas, and special districts and multi-jurisdictional authorities. The use of planning techniques may also be helpful in the selection of appropriate on-site solutions to sewer and water supply problems.

Land and environmental planning techniques are also applicable to the daunting problem of regional water supplies. A number of factors constrain efficient management of regional water supplies, including: insufficient funding and technology for water transport, overdrawn surface or groundwater supplies, polluted raw water, and insufficient storage capacity or land/environmental conflicts for reservoirs. Land use planning and controls can help protect aquifers and reservoir water quality and environmental planning can assist the decisionmaking for upland storage sites and facilities. Effective analysis of existing systems and modern capital programming techniques for new and planned systems can be of great benefit.

Removing/relocating and amortizing incompatible adjoining land uses and facilities and siting new, potentially impactive land uses like landfills is another area of remediation in which environmental planning should play a leading role. In selecting appropriate areas for environ-

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153. See generally Prevention, supra § IV A.
154. Note, by way of illustration, the Washington Suburban Sanitary Commission, a bi-county water and sewer authority serving Montgomery and Prince George's Counties, Maryland, and its region-wide taxing authority and revenue raising mechanisms.
155. See generally STATE AND REGIONAL PLANNING, supra note 67.
156. See GLOBAL 2000, supra note 48, at 139-59.
157. See id. at 333, 340. For example, area-wide natural resources and sensitive lands could be surveyed and avoided, and upland storage sites chosen, according to the land's natural qualities, capabilities, and cultural and social values.
mentally impactive land uses, public policy, land use planning and enforceable land use controls are first developed. These relate directly to prioritizing types of uses and activities in given locations. Inappropriate uses become "non-conforming" and, over time, must relocate to more compatible areas or districts. For instance, heavy industry with air discharges, currently located proximate to residential areas, may eventually be directed to relocate downwind from dense population centers into areas proximate to other heavy industry. Thus, while zoning itself is rarely the answer to environmental problems, it can be a useful tool in dealing with direct adverse environmental impacts upon adjacent populations.

Similarly, the facility siting process will not, by itself, resolve solid or hazardous waste problems. On the other hand, if one goal is to reduce direct human exposure to toxins or disease vectors associated with such facilities, the land use planning process is a vital part of finding appropriate secure and environmentally safe locations in which to put landfills and recycling centers, scrap yards, treatment plants, and incinerators.

C. Economic Development and Revitalization

We have but one explicit model of the world and that is built upon economics.... Money is our measure, convenience is its cohort, the short term is its span, and the devil may take the hindmost is the morality.

—Ian McHarg, DESIGN WITH NATURE

Planning is not inherently antithetical to economic growth and revitalization. Indeed, effective planning efforts may, over time, enhance a community’s economic welfare as well as its environmental well-being. Thus, it is not untoward for a profit-oriented, emerging, or revitalizing economy to design and impose land use and environmental regulations.

The programming of infrastructure offers a good forum for examining the environmental context of effective land use planning. The location, types, and timing of selected infrastructure systems will inevitably impact future populations. Thus, for example, it is important to avoid the tendency to over-build sewer systems. Lower-cost, "intermediate" systems can be deployed more rapidly and can be readily modified geographically. Shallow sewer designs and other innovative systems with both low capital and low maintenance costs are preferred.158 Good capital facility planning will recognize these environmental tenets.

Similarly, in choosing types and locations of new housing, obser-

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158. For example, Benton, Louisiana has gained international recognition for its groundbreaking, innovative sewer system.
vance of basic environmental objectives will help minimize future problems. By providing buffers to natural streams and avoiding certain floodplains, steep lands, and highly erodible soils, environmental benefits will accrue in just a few years. Additionally, without much added expense, construction practices can be readily modified to reduce pollutant loadings to surface waters.

Older industrial cities and urban centers face other problems. As previously suggested, the substantial increase in motorized vehicles frequently causes significant mobile source air pollution. While effective pollution control at the source would go a long way toward improving the worsening situation, transportation system management and other environmental planning techniques can also have an ameliorative impact. Even point source industrial and water pollution problems in some older cities can be approached through the planning context to influence conditions in the immediate future. Reducing exposures to proximate human populations and choosing favorable micro-climate conditions are among several industrial siting/re-siting criteria that merit consideration.

Moreover, in light of technological change and, in particular, advances in communications, computerization and transportation, and land use and environmental regulations need not be draconian nor unduly burdensome to achieve substantial results. Indeed, as high technology activities and service-based industries generate fewer and cleaner waste byproducts than do industrial and manufacturing-based activities, the need for and extent of environmental controls required eventually will diminish.

For example, many information or service-based industries do not generate the levels of sewage, chemical, and industrial waste that their manufacturing industry counterparts do and, therefore, will likely have less potential impact on surface and ground water. Accordingly, such post-industrial uses may not engender a need for substantial water pollution controls. Conversely, high technology, computer based industries are notorious for generating waste paper and paper byproducts which, in

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159. For example, in December of 1991, the Maryland-National Capital Park and Planning Commission adopted the Guidelines for Environmental Management in Montgomery County, Maryland, to establish procedures for the identification and protection of natural resources adversely affected by construction activities.

160. See supra notes 145-46.

161. See supra note 135.


turn, will create the need for air pollution regulations to address incinera-
tion, land use controls for land fill and dumping activities and possible
recycling mandates to avoid natural resource depletion.

This is not to suggest, however, that emerging economies can or will
immediately take advantage of such technological advances. Where such
economies are more traditional, i.e., engaged in industrial and manufac-
turing endeavors, enactment and enforcement of a cogent system of land
use and basic environmental regulations will prove beneficial and, ulti-
mately, economically and socially profitable. As one noted futurist has
opined, "pollution is a metabolic disease of industrial society."\textsuperscript{164} The
direct and residual community costs of having to "cure" such "disease"
can be staggering.\textsuperscript{165} And, although it can be difficult to measure the
cost savings accrued by implementing land use and environmental regu-
lations to curb the incidents of the disease at the outset, one need merely
look at the enormous efforts employed by some relatively wealthy nations
to clean up air, land, and water systems in order to appreciate the poten-
tial value of such start-up investments.\textsuperscript{166} An alternative way of viewing
this issue is as follows: "arguing that planning imposes values on the
future, the anti-planners overlook the fact that non-planning does so too—often with far worse consequence."\textsuperscript{167} Regardless of the rationale
employed, without question extensive environmental disease is not self-
healing. Rather, when left unattended, the prognosis is additional and
accelerated decline.

Thus, whether the environmental concern is preexisting, prospec-
tive, or a combination of the two, planning for remediation or prevention
is a desirable objective. To encourage acceptance of land use and envi-
ronmental controls in the marketplace, especially where there is a desire
and need for continued economic development, incentives, rather than
disincentives and penalties, should be employed whenever possible. For
example, in urban centers, permission for increased development density,
tax credits, or abatements may encourage property developers or indus-
try to implement pollution controls. Such controls may be as complex as
specific engineering systems to regulate pollutant outputs or as simple as
a commitment to promote or financially support employee ride-sharing
and use of mass transit to help curb transportation-related pollution.\textsuperscript{168}

\textsuperscript{164} NIGEL CALDER, TECHNOPOLIS 180 (1970).
\textsuperscript{165} G. TYLER MILLER, LIVING IN THE ENVIRONMENT (2d ed., 1979).
\textsuperscript{166} Id.
\textsuperscript{167} Id. at 399.
\textsuperscript{168} The efforts of public/private groups such as the Transportation Action partnership of
North Bethesda, Inc. may be good models for fostering such long term efforts.
From a land use perspective, regulations that maximize development densities around mass transit centers and that, where reasonably compatible, place residential and nonresidential uses in proximity to one another in order to reduce vehicle trip distances, are but two of many techniques that may help reduce vehicle emission pollution. Moreover, basic recycling techniques and waste sorting may be employed in residences and the workplace to diminish adverse environmental impacts.

At a more complex level, zoning tools such as cluster development to consolidate housing and preserve open space without increasing density, and transferable development rights to accomplish similar objectives on a community-wide basis, can be implemented by local governments to curb environmental degradation and conserve important natural resources. Additionally, mandatory site plan review of development proposals that would affect sensitive areas containing valuable or fragile natural resources or historic structures or settings, with the application of fair protective criteria, could also assist in striking a reasonable balance between economic gain and environmental protection. Exemptions from certain steps in the land use review and approval process or expedited permit reviews in exchange for a commitment of future self-imposed environmental controls by a prospective property user could also prove effective and nonthreatening to the business community.

Finally, fee and tax set-asides for future large scale environmental protection and cleanup efforts should be programmed into the community's growth plans. Such long-range funding efforts should be coordinated with short-term capital programming to address more immediate needs related to the need for and timing of infrastructure (roads, public water and sewer) to serve future as well as current populations. In this manner, the sometimes divergent issues of existing community revitalization and long-term environmental planning objectives can be simultaneously addressed.

In sum, the regulatory methodologies available to state/regional and local governments are limitless. What matters most is that programs be thoughtfully developed, implemented and monitored to ensure that they produce desirable environmental results while minimizing adverse residual effects on the community's economic growth and well-being. Economic development—the development of new jobs, business and industry—need not eschew a rational approach to conserving natural resources and protecting the environment.
V. BALANCING ECONOMIC DEVELOPMENT WITH ENVIRONMENTAL PROTECTION

To waste, to destroy our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining in the days of our children the very prosperity which we ought by right to hand down to them amplified and developed.

—Theodore Roosevelt, Message to United States Congress

In the late 1950s and early 1960s, Professor Walter W. Rostow developed a conceptual model of industrial and post-industrial economic revolutions.\textsuperscript{169} Under Professor Rostow’s classical historical model, the economic evolutionary process consists of five distinct phases: a traditional society; pre-take-off transformations; take-off; a drive to maturity; and an age of mass-consumption.\textsuperscript{170} Beyond these stages lies the amorphous post-industrial society.\textsuperscript{171}

In at least two Western economies, nineteenth century Great Britain and nineteenth and twentieth century United States, Rostow’s framework accurately describes the structured economic changes that occurred. The concomitant British and American historical adjunct to phases three and four was laissez faire government.\textsuperscript{172} Arising from the lack of governmental intervention were such miscreants as the stench and palpably blackened air of Dickensian Birmingham and London, the 24-hour-a-day, soot-belching blast furnaces and coke ovens of the Pennsylvania steel towns, and the sludge and waste-filled waterways produced by the packing plants of Upton Sinclair’s Chicago. These, now universally decried, beginnings formed the foundations of two significant Western industrial economies.

Given these beginnings, questions naturally arise as to whether it is equitable for newly emerging economies to forego the distinct “advantages” that England, Germany, the United States, and other nations enjoyed during the seminal stages of their economic development, and quickly implement land use and environmental controls. On the other hand, is it possible to leapfrog Professor Rostow’s early industrial phases and enter a twenty-first century world economy without the baggage of additional decades of health and environmental abuse? Indeed, might some “emerging economies” already have “emerged” past these early stages? Finally, is the phrase “environmental recovery” at all compatible

\textsuperscript{169} WALTER W. ROSTOW, THE STAGES OF ECONOMIC GROWTH (1960).
\textsuperscript{170} Id. at 4.
\textsuperscript{171} Id. at 11.
\textsuperscript{172} See URBAN PLANNING, supra note 82, at 17.
with the economic development and revitalization of nations, regions, and cities?

The authors contend that all of these queries may be answered in the affirmative. The development and implementation of advanced land use/environmental planning regulatory structures and processes is not antithetical to economic advance and, in fact, in their absence short-term economic gain may be converted into long-term loss.

A. Economies in Ascension

_Them that's going, get in the goddamn wagon._
_Them that ain't, get out of the goddamn way._

—William Faulkner, THE BEAR

Presently, several Eastern European\(^1\) (e.g., Poland, Hungary, and the Czech and Slovak Republics) and nascent Asian economies\(^2\) (e.g., Thailand, Malaysia) appear to be progressing through the middle phases of an industrial revolution. Their industrial sectors continue to be primarily dependent upon heavy capital, labor, and resource-intensive inputs.\(^3\) Concomitantly, they have historically lacked health, environmental, or land use regulations and their waste outputs into the environment have been substantial and direct. Additionally, while their sales markets have traditionally been local or regional, in the last decade their industrial sectors have begun supplying finished or partly finished goods to consumer economies worldwide.\(^4\)

There are, of course, distinct commercial and competitive advantages in operating manufacturing businesses, developing land for housing, business, or industrial use, or selling consumer goods in the near absence of environmental or land use controls. If a business can avoid the cost of pollution control equipment, the maintenance of strict labor health standards, or the need to submit itself to multiple levels of governmental review, significant up-front cost savings can accrue. This translates into lower production costs and higher profits than are otherwise available to manufacturers, developers, or natural resource industries subject to regulatory control. But lower costs and higher profits are not the sole byproducts of laissez faire environmental and land use control.

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2. _Pollution in Asia_, supra note 37.
3. _Id_. _See also_ French, _Green Revolutions_, supra note 14.
One problem presented in the unregulated scenario is that which has been referred to as the "tragedy of the commons." This theory suggests that if the use of the "commons"—air, water, land and natural resources—is a free and unregulated good, each user will seek to maximize his return by using as much of the commons as possible. At some level of use, however, returns per level of input begin declining, as the carrying capacity for the resource is approached and exceeded. Ultimately, the resource is so diminished or depleted as to provide for no one. Fisheries and grazing lands have proven to be good examples of "commons" abuse.

A second problem, also familiar to resource and environmental economists, concerns "externalities." An externality is either a cost or benefit indirectly accruing to a firm or a community as a result of action by others or events over which the firm or community has no control. A negative externality or "diseconomy" arises when market forces alone are insufficient to force an individual or firm to pay for the actual costs of its actions. Accordingly, while a manufacturing concern may derive significant economic benefit from operating with little or no pollution controls, it is imposing external costs upon the community and engendering something less than social optimality.

Whether the environmental harm is water pollution or toxic air emissions from an industrial plant; groundwater depletion through inappropriate withdrawals, salinity intrusions, or development over aquifer recharge zones; air pollution from mobile sources; or pathogenic water pollution due to the absence of sewage treatment facilities, the externality imposed comprises serious and oftentimes long-term environmental health consequences that must be borne by the society-at-large. These consequences inevitably have an economic component, for eventually the "toll" is collected in increased public health costs; dislocation of industry that has "used up" local labor, capital, and common natural resources; and an urban environment which literally becomes unlivable. Thus, the wholly unfettered market that may seem like the goose that laid the

178. *Id.* at 1244.
179. *Id.*
180. *Id.* at 1245.
182. *Id.*
183. *See id.* at 34-39.
184. MILLER, supra note 165.
golden egg turns out to be an ephemeral beast that continues to poison itself with heavy metals even as it produces more of the same.

B. Equity and Regulation

*The law is majestic in its equality; it prohibits kings and beggars alike from sleeping under bridges.*

—Anatole France

"Equity" in applying land use and environmental regulations to emerging economies is an even more difficult concept to describe empirically than the nature of "environmental rights" themselves. In a recent article, Professor Joseph Sax eloquently explored such "environmental rights." Sax suggests that "environmental rights" derive from the precepts of a welfare state wherein certain basic rights are guaranteed to all individuals. If this assertion is true, an affirmative governmental duty to assure relative freedom from environmental hazards is likely also invoked.

While "modern industrial society" may, from the developed, post-industrial, Western perspective, seem an already realized objective, the reality for many emerging economies is that they may not yet have reached the mature stages of phases three or four described in Professor Rostow's previously discussed model of industrial economic evolution. The financial or whole economy benefits have yet to fully accrue in emerging economies, and their standards of living may still be low. The fundamental fairness of potentially delaying the attainment of those standards through the interposition of environmental and land use controls is naturally called into question, particularly when compared with the free market economic growth that characterized the early development of the U.S. and other Western economies.

186. *Id.*
188. *Then, too, the true macroeconomic impacts of environmental and land use regulation are difficult to predict. Do these new mandates inhibit productive investment because capital expenditures for non-productive (pollution control) equipment are required? Alternatively, do increased efficiencies accomplished with process and product changes—i.e., "pollution prevention"—have positive impacts on various sectors and the economy as a whole? The likely answer is that such economic progress is gradual, with paybacks taking some period of time to accrue. The data on the phenomenon is not extensive, however, and is also dependent upon the type of "regulation" imposed (e.g., economic incentives/disincentives, command and control permit systems, etc.). See Paul R. Portnoy, *The Macroeconomic Impacts of Federal Environmental Regulation*, 21 NAT. RESOURCES J. 459 (1981); Robert H. Haveman & Gregory B. Christiansen, *Environmental Regulations and Productivity Growth*, 21 NAT. RESOURCES J. 489*
Perhaps a more salient inquiry, however, is whether it is equitable to impose upon a given economy the hidden, but certain, growing "debt" that environmental degradation will impose both in the immediate and distant future. An ancillary question is whether individuals or a society with little or no information, can voluntarily submit themselves and their natural resources to high levels of risk. While the Central and Eastern European examples of such "debt" discussed in Part II are not representative of nations that have gained substantial short-term economic benefit from intensely abusive environmental practices, they do provide useful paradigms for the physical results. Conversely, some of the Asian examples previously cited\(^8\) illustrate both significant economic development and growth gains against a backdrop of worsening environmental conditions.

Professor Sax's "environmental rights" theorem is of utmost relevance to the fundamental equity issue raised by applying land and environmental regulations in emerging economies.\(^9\) Assuming that some fundamental right or opportunity of all individuals to flourish exists, and that some basic, but as yet undetermined, level of freedom from environmental hazard is part of that construct, then any society that plunges ahead into wholly unplanned urban industrialism is virtually assuring the eventual eradication of those rights.

Professor Sax evokes the moral or ethical consideration of "patrimonial responsibility"\(^1\) as an imperative in all societies. Sax, citing C.S. Lewis on the ethical mandate not to impoverish the future, invokes the stewardship theory that is found in many societies and cultures:

> Each generation exercises power over its successors: and each, in so far as it modifies the environment bequeathed to it and rebels against tradition, resists and limits the power of its predecessors. This modifies the picture which is sometimes painted of a progressive emancipation from tradition and a progressive control of natural processes resulting in a continual increase of human power. In reality, of course, if any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may have put wonderful machines in their hands we have pre-ordained how they are to use them . . . . The last men, far from being the heirs of power . . . will themselves exercise least power upon the

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189. *Pollution in Asia*, supra note 37.


191. *Id.* at 102.
future.\textsuperscript{192}

If, indeed, there is a moral necessity to maintain the cultural and natural capital of a society for long-term gain, if there is a certain innate right in the natural order, \textit{i.e.}, a non-anthropocentric environmental ethic, and if there is consensus that unregulated resource use may lead to substantial and possibly irreversible environmental degradation, then the equity balance weighs decidedly in favor of fair, though possibly gradual, implementation of environmental and land use regulation.

\section{VI. CONCLUSION}

\textit{We are confronted by insurmountable opportunities.}

\textit{—Pogo}

International environmental problems and concerns are substantial and mounting. Application of American land and environmental planning processes and procedures to these maladies may afford an opportunity to achieve a desirable level of environmental recovery and future management without substantial sacrifice in economic growth. Moreover, the optimism inherent in American planning methodologies, premised upon the fundamental tenet of enhancing the future well-being and quality of life of the community at large, can serve as a soothing salve upon a scarred environmental psyche. While the specific planning procedures and degree of regulation applied by a given jurisdiction will be subject to the influences of political culture, process and power, current economic welfare, and, perhaps, community health, the implementation of environmental protection processes will help provide direction and purpose to future leaders and populations. The essential steps are the creation and implementation of a planning process that is sensitive and responsive to environmental needs, within the context of new political and social structures. The specifics are not as important as the process itself which, over time, can be adapted to best serve immediate exigencies and long term objectives. This planning process will bring into focus the "insurmountable opportunities" that await and deserve the benefit of our individual and collective energies.

\begin{footnote}{\textsuperscript{192} Id. at 102-03 (quoting from C.S. Lewis, \textit{The Abolition of Man} 36-37 (1947)).}\end{footnote}