

# LEGAL REMEDIES FOR ONE-TIME, IRREVERSIBLE, GLOBAL HARM

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Historically law has evolved consequent to accumulated human experience. However, singular phenomena capable of creating a one-time irreversible global devastation do not allow for any repeat direct experience and thus challenge the existing legal framework to adopt a futuristic, anticipatory posture despite the absence of a historical database. The potential for global harm in the near future due to "global warming" because of today's human actions is used as an example to delineate the framework and parametric factors that must be taken into account for constructive evolution of an anticipatory legal practice.

## I. INTRODUCTION

Many corporations are already spending more than 25 percent of their legal resources on environmental matters and expect such workload to increase substantially in the future.<sup>1</sup> Despite significant allocation of legal resources to environmental problems, there is an aura of uncertainty as to the framework within which a corporation can prudently meet the intensifying environmental challenge. The uncertainty persists even though the legal profession remains at the forefront of evaluating environmental implications for the corporate world.

The environmental challenge is disconcertingly arriving within the context of a business world that continually seeks improvements in competitive production of goods and services and repeatedly blames the laws and legal profession for hindering profitability, growth, and innovation. The product liability laws, the medical malpractice suits and the worker compensation cases are examples of activities that exacerbate the perception that the legal profession enriches itself at the expense of others, es-

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1. Marianne Lavelle, *Survey: General Counsel Face Environmental Toll*, 14 NATIONAL LAW JOURNAL S2-S10 (March 16, 1992).

pecially the corporations.<sup>2</sup>

The environmental problems are multidimensional. They are intrinsic aspects of every economy. Within legally defined frameworks, every society on earth seeks economic growth. Alongside the economic growth lies the dilemma of a myriad of environmental wastes. Enigmatically, the environmental changes already set in motion may not affect today's humans but adversely impact the lives of future generations.<sup>3</sup> Can the legal profession wait until a form of damage is ascertained before it seeks remedies, or should it venture beyond its experiential tradition to enact legal preventives for unwanted environmental events of decades from now?

The purpose of this paper is to delineate the challenges of *anticipatory legal practice*. The anticipatory legal practice evolves around environmental problems that are persistently moving toward near-term maturity and, once in place, could cause irreversible global destruction. The existing laws have never had to deal with potential global damage of one-time, irreversible phenomena. The closest that the legal profession has come to experience one-time, globally destructive, irreversible phenomena is the specter of *nuclear winter*.<sup>4</sup> It is created by explosions of a large number of nuclear weapons. There are currently no anticipatory legal practices seeking to eliminate or minimize the damage of nuclear winter or to gain a measure of current compensation for potential damage in the near future.

The anticipatory legal practice has not focused on nuclear winter because "government" is its creator. Government claims full control of the event. Furthermore, government is the maker of laws based on which the legal profession does its practice. Such is not the case for other newly evolving, globally destructive, irreversible phenomena. For example, global warming, a phenomenon that can introduce extreme measures of famine into the world and totally disrupt the fabric of civilization, is a business-made phenomenon, thus totally exposing the business world to the lawful wrath of government.<sup>5</sup> Unlike governments which may claim control over nuclear arsenals, the business world has little control over

2. John T. Hartley, *Fighting on Two Fronts: The Battle for Competitiveness* (Washington Legal Foundation, Washington, DC, 1992).

3. Harry Jonesburg, *The Waste Streams of Ignorance* (Les Livres, Dayton, Ohio 1992).

4. H. Jack Geiger, "The Meaning of 'Nuclear Winter,'" in *Environmental Sciences*, ed. F. S. Sterrett (New York Academy of Sciences, NY, 1987). For a different perspective also see M. Anjaliasastry, J. J. Romm and K. Tsipis, *Can the U.S. Economy Survive a Few Nuclear Weapons?* 92 TECHNOLOGY REVIEW 23-29 (April 1989).

5. For a general review of global warming see Bette Hileman, "Web of Interactions Makes It Difficult to Untangle Global Warming Data," 70 *Chemical & Engineering News* 7-19 (April 27, 1992); John Douglas, *Sharper Focus on Greenhouse Science*, 15 EPRI JOURNAL 4-13 (June 1990); and John Firor, *The Changing Atmosphere* (Yale University Press, New Haven, 1990), chap. 4. For a more topical treatment of global warming implications see *Greenhouse Warming: Abatement and Adaptation*, N. J. Rosenberg, W. E. Easterling III, P. R. Crosson, J. Darmstadter, eds. (Resources for the Future, Washington, DC, 1989).

global warming. As a result, anticipatory legal practice has to evolve as a measure of preventing the events such as global warming that the business world simply cannot afford to experience.

## II. A GLANCE AT GLOBAL WARMING

In search of modes of legal restructuring to suit future needs, the use of a specific example aids in identification of critical aspects. To demonstrate our points, we will utilize "global warming," a byproduct of the prevailing patterns and technologies of production and consumption, as exemplary vehicle of this paper.

Humans all over the world are converting substantial amounts of earthly materials called "fuel" into energy to produce goods and services. The conversion also produces "waste" in the form of carbon dioxide (CO<sub>2</sub>), which continually flows into the atmosphere as though it were an inexhaustible disposal site for gaseous waste. The blanket of atmospheric gases gradually grows "thicker" with such inflows and in the process traps more of the sun's heat. As earth cannot get rid of the excess heat trapped in its atmosphere, there is a strong possibility that a few decades from now the average temperature of earth's surface will rise sufficiently to produce a global change in the weather pattern.<sup>6</sup> It could adversely "affect agriculture, forestry, and water resources, and could lead to rising sea levels and inundation of vulnerable coastal regions."<sup>7</sup>

Until the 1950s, the concern with atmospheric CO<sub>2</sub> concentration remained the theoretical specialty of a few scientists. But since then, the scientific database has expanded and validated a 13 percent increase in CO<sub>2</sub> concentration of the atmosphere.<sup>8</sup> Is this something of commercial concern? What kind of an increase in earth's average temperature would a 13 percent increase in CO<sub>2</sub> concentration cause? We know that for doubling the CO<sub>2</sub> concentration, *i.e.*, 100 percent increase, the scientific models predict a 2° F to 9° F rise in earth's average temperature.<sup>9</sup> Why should such a small temperature variation produce a significant debate on the need for drastic commercial, legal or political action?

Within each locality on earth, the human societies are accustomed to large daily or seasonal variations in temperature. Yet, the temperature

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6. William E. Easterling III, Martin L. Parry and Pierre R. Crosson, "Adapting Future Agriculture to Changes in Climate," in *Greenhouse Warming: Abatement and Adaptation*, N. J. Rosenberg, W. E. Easterling III, P. R. Crosson, J. Darmstadter, eds. (Resources for the Future, Washington, DC, 1989), at 91-104. Kenneth D. Frederick and Peter H. Gleick, "Water Resources and Climate Change," in *Greenhouse Warming: Abatement and Adaptation*, N. J. Rosenberg, William E. Easterling III, P. R. Crosson, J. Darmstadter, eds. (Resources for the Future, Washington, DC, 1989), at 134-143.

7. Robert E. Morrison, *Global Climate Change* (Congressional Service Issue Brief, Report No. IB89005, March 2, 1989).

8. Robert M. White, "The Great Climate Debate," 263 *Scientific American* 36-43 (July 1990).

9. Bette Hileman, "Web of Interactions Makes It Difficult to Untangle Global Warming Data," 70 *Chemical & Engineering News* 7-19 (April 27, 1992).

question of global warming is not just one of a few degrees higher than common experience. If that were the case, global warming would be of little concern. Few humans could have distinguished a 2° F to 9° F component in the local temperatures that normally vary by tens of degrees from day to night or season to season. The global warming danger arises from the fact that with a few degrees' increase in the average temperature of earth's surface, *earth's weather pattern* would change.<sup>10</sup>

The 2° F change in earth's average temperature would be similar to the change in temperature from the little ice age of the 14-18th centuries to today's conditions. The 9° F change in average earth temperature would correspond to a change from today's conditions to the great ice age of 12,000 years ago, when large portions of the earth were covered with glaciers or turned into deserts.<sup>11</sup> A similar order of change could take place with "doubling" of the CO<sub>2</sub> concentration within the next couple of decades. With a new weather pattern, all of today's farms and agricultural methodologies could be in jeopardy, as they are designed for *today's* pattern of weather. Thus, global warming looms potentially capable of producing immense global disruptions in the food supply of the earthly societies. Few societies if any could survive for long under such circumstances.

The traditional legal approach to the CO<sub>2</sub> waste stream would be to wait until "sea levels would rise . . . with inundation of low-lying cities and highways, agricultural regions, and coastal properties, and the shift of large populations away from some coastal areas."<sup>12</sup> Such a nightmarish scenario of a possible future only a few decades from now would also barbarously glitter as the golden boom of legal services as millions would lose jobs, houses and property and have to be compensated for damages and for relocation from coastlines to inland locations. But the golden lining evaporates quickly with the recognition that the sinking of Florida below ocean or having the western United States rival Saudi deserts would also decimate most of the paying clients and might even lead to such drastic change in the social structure that little of the traditional compensation schemes would have any relevance to the situation at hand. Rather than being in demand, the legal profession might find itself totally out of business as the U.S. government might declare a state of "war" in order to get hold of the conditions created by the environmental disaster.<sup>13</sup>

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10. *Id.* G. P. Hekstra, "Sea-Level Rise: Regional Consequences and Responses," in *Greenhouse Warming: Abatement and Adaptation*, N. J. Rosenberg, W. E. Easterling III, P. R. Crosson, and J. Darmstadter, eds. (Resources for the Future, Washington, DC, 1991), at 53-67. Joel D. Scheraga, "Combating Global Warming," 33 *Challenge* 28-32 (July/August 1990).

11. *Supra*, note 8.

12. *Supra* note 7.

13. William D. Ruckelshaus, "Toward a Sustainable World," 261 *Scientific American* 166-174 (September 1989).

### III. CHALLENGES FACED BY THE LEGAL PROFESSION

Carbon dioxide (CO<sub>2</sub>) emissions are just one part of the global warming gases regularly dumped into the atmosphere.<sup>14</sup> To get a feel for the extent of the CO<sub>2</sub> problem alone, it suffices to say that at the current rate of production and consumption of goods and services, about 22 billion tons of CO<sub>2</sub> are dumped into the atmosphere every year.<sup>15</sup> In the United States, this corresponds to annual dumping of 20 tons of CO<sub>2</sub> on behalf of every American. Assuming that the huge CO<sub>2</sub> inflow is deemed threatening, what is the role to be played by the legal profession? Does it need to adopt a proactive posture?

There are a number of issues that the legal profession can entertain today on the subject of global warming:<sup>16</sup>

1. Legal requirements to ensure *intergenerational* fairness and justice.
2. Legal duty for *early warning* systems.
3. Legal requirements for societal adaptation to uncertainty as *scientific knowledge* advances on damage potential of the phenomenon.
4. Design of the legal framework for *compensation* in case of large-scale global damage.
5. Legal *incentives* for international agreements and effective institutional counters to the potential threat.
6. Delineation of the mechanisms for *implementation* and *enforcement* of long-range environmental laws.

The intergenerational justice is significant because in the current societal zeal to maximize the production and consumption of goods and services, humans could destructively exploit earth's resources leaving only substantial costs, depleted resources and an abundance of damaging wastes for future generations. The current economic analysis, however, continues to portray global warming as merely another variation in the existing economic structure, to be addressed through cost-benefit analyses and more research and development.<sup>17</sup>

Due to the immense political or legal problems of any program that attempts to reduce environmental emissions, government action has been mostly directed at programs that would ideally *levelize* tomorrow's envi-

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14. We have purposely avoided the use of the word "add" in place of "dump." "Adding CO<sub>2</sub> to the atmosphere" fails to convey the primitive character of the way the gaseous wastes are entering the atmosphere today. "Dumping" provides a clearer signal of the potential legal liabilities.

15. Harry Jonesburg, *supra* note 3, at 50.

16. Edith Brown Weiss, "Legal Dimensions of Global Change," 41 *International Social Science Journal* 399-412. (1989).

17. As example see Alan S. Manne and Richard G. Richels, *CO<sub>2</sub> Emission Limits: An Economic Cost Analysis for the USA*, 11 (#2) *THE ENERGY JOURNAL* 51-74 (1990); and William W. Hogan, "Comments on Manne and Richels: *CO<sub>2</sub> Emission Limits: An Economic Analysis for the USA*," 11 (#2) *THE ENERGY JOURNAL* 75-85 (1990).

ronmental emissions at today's levels. Even levelizing will require "price increases for coal and oil; lots of solar power devices; more use of nuclear and biomass energy; new forests all around the planet; a sharp cutback in the manufacture of chlorofluorocarbons and related products; a lower per capita demand for cement; new ways of producing rice, meat, and milk; gas capture systems in landfills, including those in the developing world; and an unusual degree of cooperation among the developed and the developing nations." The legal requirements for handling all of the above are mindboggling. And "[i]f all of these things begin happening in the early 1990s, the rate of gas buildup may level off in the 22nd century."<sup>18</sup>

The negative reaction to the initial cost of environmental regulation in the United States embodies a measure of the challenge to be faced by the legal profession. Even though environmental problems, especially global problems, are at infancy, the cost of partial remedial action is already perceived to be too high. Why should today's society spend enormous sums on reduction of the CO<sub>2</sub> emissions to affect global climate 50 years from now? "[S]pending large amounts of resources today to curtail CO<sub>2</sub> growth is likely to confer benefits that have a very low present value."<sup>19</sup>

The key words in opposition to CO<sub>2</sub> reduction are "present value"—the mathematical exercise of *discounting* a "future" event to a "present" occurrence. It can readily make the future seem immaterial. For example, if fifty years from now to counter the global warming would cost \$1 trillion per year, discounting it at 10 percent would give a present value of \$8.5 billion. Those who today suggest a fossil fuel carbon tax of \$8 per ton<sup>20</sup> already impose a cost of \$8 billion per year on the coal industry alone. Why should today's society accept a cost of \$8 billion per year in just one of its energy industries so that it will eliminate a future cost that has a present value of \$8.5 billion?

In a fundamental sense, the question simply becomes one of the *legality* of the present-value formula:<sup>21</sup>

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{Discount Rate})^{\text{Years to Future}}} \quad (1)$$

18. Barbara J. Culliton, "EPA's Plan for Cooling the Global Greenhouse," 243 *Science* 1544-1545 (March 24, 1989).

19. Robert Crandall, *Why Is the Cost of Environmental Regulation So High?* Policy Study #110 (Center for the Study of American Business, Washington University, St. Louis, February 1992), at 18.

20. William D. Nordhaus, *To Slow or Not to Slow: The Economics of the Greenhouse Effect*, 101 *ECONOMIC JOURNAL* 920-937 (July 1991).

21. For a generic review of the traditional applications of the present-value formula see Lawrence J. Gitman, *Principles of Managerial Finance*, 2nd ed. (Harper & Row, NY, 1979), chap. 13; Fred Weston and Thomas E. Copeland, *Managerial Finance*, 8th ed. (Dryden Press, Chicago, 1986), at 73-79.



How "legal" is the use of this formula? How legal is it to accept the annual trillion-dollar costs of 50 years from now as merely a few-billion-dollar, present-valued cost, today? In such a seemingly simple question lies the very complex field of *anticipatory legal practice*. Under what circumstances and within what kind of legal framework would the present actions be deemed "legally unacceptable" because of detrimental future effects?

Some of today's existing legal structures can be applied to circumstances that could potentially lead to global warming. For example, the legal profession is keen on many warning systems covering emergencies such as nuclear power plant accidents, floods, earthquakes, fires, release of poisonous substances and many other potential hazards to human health and well-being. From such a perspective, the legal profession's initial response to global warming and similar threats could include the delineation of the following:

1. *Legal measures to prevent global warming*

A global warming disaster is of such an extent that it would be *irreversible*. Once the weather pattern reconfigures, there is no way to get it back to its historical pattern. Similarly, once the coastal areas get buried under the ocean, recovering that land becomes next to impossible.

2. *Legal measures to minimize damage*

The damage must be minimized even if politically it cannot be prevented. The political system can readily behave like a runaway car that will not stop until it explodes at the valley floor below. Given such political dysfunction, how can the legal devices minimize the damage?

3. *"Thinking legally" about the extent of damage*

Assessing the extent of damage and attempting to identify the possible schemes of compensation would be salutary even if no compensation would be possible for the globally disrupted human societies. Although "compensation" would be least effective in preventing a global disaster, quantification of the order of magnitude of the damage could show the futility of the situation and encourage adoption of effective preventive measures.

The key lies in fundamental adjustment of the legal profession's view of its role in prevention of unwanted future events.

#### IV. SEEKING FUTURISTIC LEGAL STRUCTURES

The legal profession is an effective agent for influencing society's behavior. With its presence, it has essentially told the corporate world that "profit" alone is not the measure of corporate benefit to the society. Law is a form of intervention in business activities. At times it drastically modifies the corporate scheme of allocating resources for production of goods and services. Like any other manmade structure, law also has many drawbacks. When the legal intervention in corporate affairs be-

comes ineffective or dysfunctional, it can give rise to widespread societal harm.

The traditional legal structure suffers from a well-known intrinsic dilemma: the existing legal remedies cannot holistically guide healthy corporate or societal action.<sup>22</sup> For example, only if corporate action remains *visible* and *local* can law adequately keep business activities within socially desirable bounds. Furthermore, the legal controls would remain effective so long as injuries and damages either are reversible or can be reasonably compensated. As Figure 1 demonstrates, as soon as the injury becomes “irreversible” and there are no avenues of compensation, the legal framework collapses by its own intrinsic deficiencies.

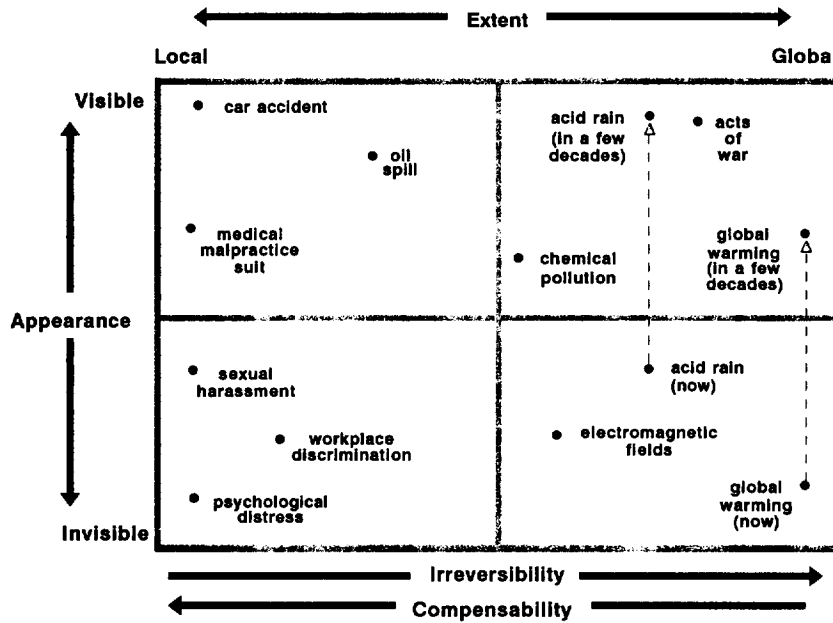


Figure 1 - The spectrum of existing and evolving challenges to the legal profession.

When it comes to irreversible global problems, not only would the legal profession have serious difficulties in finding remedies, but the historical inadequacies of the traditional patterns are glaring. For example:<sup>23</sup>

1. Law as practiced today is primarily a *reactive* device. In its current

22. Christopher D. Stone, *Where the Law Ends* (Harper Torchbooks, NY, 1975), chap. 11.

23. Christopher D. Stone, *id.*, at 93-110.





mode it is incapable of anticipating an *irreversible, invisible* source of injury such as global warming that could manifest itself within the next few decades in many unforeseen forms.

2. Laws are *made* with active participation of the entities whose actions today would produce the projected *irreversible, invisible* injury of tomorrow. Promulgation of laws and safety rules is a cumbersome, bureaucratic process that does not reach a conclusion unless there is a demonstrable injury or damage. The corporations such as fuel companies or automakers who today benefit from acts that tomorrow may lead to global warming have historically manipulated public opinion to prevent or delay legal constraints on their current activities.
3. With irreversible global phenomena, there are no possibilities of *observing* the event, determining the *cause and effect*, and then deciding on remedies. The human societies get only one chance at irreversible global events. Therefore, the traditional legal focus of establishing the causality and effect will be futile for an irreversible injury for which no mode of compensation exists. Until the global warming does produce disastrous manifestations, today's "vagueness" of tomorrow's problems will continue to portray the corporations as victims of arbitrarily selected, imprecise laws.
4. In the event of an irreversible global phenomenon, even if some form of a law could be enacted for potential damages, *enforcement* would be impossible because of drastic societal disruptions that could readily place a much higher priority on providing for the immediate needs of the survivors than compensating those harmed. In a sense, such a situation would resemble an earth that is daily ravaged by hurricanes and earthquakes. Surviving the day's earthquakes and hurricanes and finding food, water and shelter for the night would outstrip any notion of attending months of court hearings to find out whose fault they were and whether there is a forum for enforcing a measure of compensation.

The traditional legal approach also suffers from many regular violations of the laws. It is possible to claim that "efforts to achieve compliance with environmental law fail because of a weak enforcement approach. Not enough violators are identified; when identified, not enough are sanctioned; and when they are sanctioned, penalties are too weak to communicate that violations will not be tolerated."<sup>24</sup> There is little doubt that "enforcement" as a tool of ensuring environmental quality would be effective if laws could spawn a higher degree of certainty on outcomes of human action. But laws are largely defective artifacts.<sup>25</sup> Any tightening of today's "defective" laws would reduce business and government efficiency in dealing with and responding to the society's current needs and future developments. The degree of uncertainty skyrockets when the problem is a projected global anomaly capable of adversely affecting the whole earth. The global, irreversible environmental problems cannot be

24. Joseph F. DiMento, *Can Social Science Explain Organizational Noncompliance with Environmental Law?* 45 JOURNAL OF SOCIAL ISSUES 109-132 (1989).

25. Harry Jonesburg, *supra* note 3, at 5 & 36. Harry Jonesburg, *Ways of Living and Dying* (Les Livres, Dayton, 1992), at 23 and 44-45.

remedied by “tougher laws” or by innovative compensatory schemes specifically designed for cases of extreme societal disruption. A new form of “anticipatory” legal practice has to evolve, radically different from the reactive practices of the past, focused on prevention of events that human societies cannot afford to experience.

In search of fundamental solutions, red herrings offer many short-term distractions. For example, in search of a new framework it is possible to forgo national, multinational or global solutions and instead seek legal remedies within “metropolitan regions” of the world. Assigning the “legal burden” to metropolitan areas promises to be effective. As centers of economic activity, they form the prime sources of future benefit or damage to human societies. If this step is taken, the legal profession of today will have to face the discomfort of accommodating a measure of the following unpopular remedies:<sup>26</sup>

1. Reduce the long-term rate of capital accumulation and slow down the metropolitan growth to achieve an optimal environment for economic activities.
2. Reduce the rate of economic growth by higher taxes on individual household expenditures.

As such, the legal profession’s pursuit of anticipatory practice would be challenged by today’s upwardly mobile segments of the society who are continually influencing the development of environmental laws to shift the bulk of environmental burden “such as foul air, excessive noise, toxic wastes, deteriorating social infrastructure, and arduous commutes to those parts of the population who, being poor, are least able to defend themselves.”<sup>27</sup> Such a pattern is also prevalent in interregional and international allocation of resources.

Not everyone would agree with the array of the short-term, stereotyped solutions.<sup>28</sup> Although a reduction in capital accumulation and a slowdown in economic growth can evidently lead to milder environmental impacts, such requirements are viewed contrary to the goal of a “sustainable society.” Nevertheless, the legal balance of environmental quality and economic growth becomes a question that must be answered *today* if *tomorrow’s* society is to be sustained. Similarly, the stereotyping of “metropolitan regions” or theorizing on contradictions of the “poor and affluent” are ineffective planning tools for the future. The legal profession will increasingly face the challenge of equity of differentiated development strategies of human societies as it searches to fully address and resolve the potentially irreversible global problems.

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26. John Friedmann, *Planning, Politics, and the Environment*, 55 AMERICAN PLANNING ASSOCIATION JOURNAL 334-338 (Summer 1989).

27. *Id.*

28. Hilda Blanco and Michael Neuman, *The Environment as Common Ground*, 55 AMERICAN PLANNING ASSOCIATION JOURNAL 339-341 (Summer 1989).

## V. CONCLUDING OBSERVATIONS

The anticipatory legal remedies have to contend with the untraditional yet insightful view that economic growth comes not merely from production and consumption but also from improvements in human qualities and advances in technology. Such an approach to resolution of environmental problems would see the rapid growth in human population of the low-tech, illiterate societies as a major threat to global quality of life. Thus, Chinitz<sup>29</sup> concludes that "too many people and/or too much money generate too much congestion, too much pollution" and thus must be addressed explicitly in any plan to reduce environmental damage. The legal implications of dealing with poor, low-tech populations in the process of developing a sustainable society are most challenging. As a viable alternative, Jonesburg<sup>30</sup> offers the non-consumption societal focus of 1) seeking knowledge for life (everyone a student for life) and 2) sharing the society's work for life (everyone a part-time worker for life) instead of the traditional goals of profit maximization and growth through consumption. The legal foundation of a society of *work-sharing knowledge seekers* is totally unexplored. It may offer new insights for anticipatory legal designs to avoid global devastation.

Chinitz<sup>31</sup> offers another thought-provoking observation, namely distinguishing an individual's consumption from the total production of society when assessing environmental problems. The individual's consumption of goods and services sets the "standard of living," while the total production of the society would include things such as armed forces, war and exploitation, whose absence will reduce environmental problems without adversely affecting the individual's living standard. How can the anticipatory legal remedies balance the "individual's needs" with the "needs of societal organization for multinational destructive or exploitive encounters" when it comes to resolving environmental problems?

The legal profession also has to take into account the tendencies of human societies for apocalyptic claims, none of which have come true. Is a phenomenon such as "global warming" only a specious apocalyptic vision that will lead to hasty political and business decisions that in turn would waste society's scarce resources? Or is it real, in which case human societies must develop equitable legal designs to smoothly transform today's ways of production and consumption into a sustainable structure that would at least survive the 21st century? In short, 22 billion tons of CO<sub>2</sub> dumped annually into the atmosphere speak of the real-

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29. Benjamin Chinitz, *Growth Management from an Economist's Perspective*, 55 AMERICAN PLANNING ASSOCIATION JOURNAL 338-339 (Summer 1989).

30. Harry Jonesburg, *supra* notes 3 and 25.

31. *Supra*, note 29.

ity of the problem, as none of the proposed remedies is expected to make any significant reduction in CO<sub>2</sub> emissions.<sup>32</sup> The challenge of a constructive response definitely lies with the legal profession.

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32. As examples of typical CO<sub>2</sub> reduction programs see *Carbon Dioxide Reduction Through Electrification of the Industrial and Transportation Sectors*, Issues and Trends Briefing Paper # 54 (Edison Electric Institute, Washington, DC, 1989); and Clark W. Gellings and Thomas Morron, "Saving Energy with Electricity," 16 *Electric Perspectives* 42-50 (July-August 1992). For a more global review of proposed CO<sub>2</sub> reduction programs see *Cooling the Greenhouse* (Natural Resources Defense Council, Washington, DC, 1989).