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SUSTAINABLE SKEPTICISM AND SUSTAINABLE DEVELOPMENT

Terry L. Anderson[†] and Lea-Rachel Kosnik[‡]

Bjørn Lomborg's skepticism of gloom and doom environmental predictions emanate from his careful analysis of the data. He is a statistician-political scientist interested in empirical verification or rejection of hypotheses. As a statistician, he believes his job is to analyze the data of others, and not necessarily to collect new data. Unlike most social scientists, Lomborg really is willing to reject a hypothesis. As he explains in the introduction to his book, he set out to show that the late Julian Simon's belief that we have not been running out of natural resources was wrong, and that those professing an "environmental litany" are correct. When Lomborg found all the data on Simon's side, he was willing to conclude, "children born today – in both the industrialized world and developing countries – will live longer and be healthier, they will get more food, a better education, a higher standard of living, more leisure time and far more possibilities – without the global environment being destroyed. And that is a beautiful world."¹

For the most part, Lomborg does not go beyond the data to explain why the environmental sky is not falling. The one case where he does consider cause and effect is with the relationship between income and environmental quality. Lomborg correlates the World Bank's environmental sustainability index with gross domestic product per capita across 117 nations concluding that "higher income in general is correlated with *higher* environmental sustainability."²

Even this discussion, however, begs two questions: what is driving economic growth, and can that growth be stimulated and sustained, especially for less developed countries without harming the environment? Put in the vernacular of the day, are the improvements Lomborg finds sustainable?

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¹ BJØRN LOMBORG, *THE SKEPTICAL ENVIRONMENTALIST: MEASURING THE REAL STATE OF THE WORLD* 352 (Cambridge University Press 2001) (1998).

² *Id.* at 33.

This paper will focus on our understanding of the growth process and its relationship to environmental quality. We will survey the evidence regarding the relationship between economic growth and institutions and between environmental quality and institutions. These data suggest that secure property rights and the rule of law are what lie behind Lomborg's findings, and that they are necessary conditions for sustainable development.

I. IT'S THE INSTITUTIONS

When the eastern bloc countries were freed of the shackles of communism, Milton Friedman said, "Privatize, privatize, privatize."³ The assumption was that in order for an economy to grow and develop, free market discipline was all that was required for growth to take off. Less developed countries like those in the eastern bloc, where both growth and environmental quality were at levels well below those in the developed western nations, just needed to institute free market reforms (privatization, fiscal and monetary discipline, and open markets) and the breakneck growth of these newly freed countries would take our breath away.

After more than a decade of experiments and a growing amount of data on what it takes to stimulate economic growth, Friedman has modified his position. Now he says that: "It turns out that the rule of law is probably more basic than privatization. Privatization is meaningless if you don't have the rule of law. What does it mean to privatize if you do not have security of property, if you can't use property as you want to?"⁴ Failure to account for the lack of such basic institutions as the rule of law and secure property rights is the sort of criticism frequently directed at failed IMF and World Bank reforms in countries like Argentina, Brazil, South Africa, and Turkey. In all of these countries, as with the eastern bloc countries, sound free market policies such as exchange-rate reform, privatization, and fiscal discipline were pushed, but before the more basic free market foundations of the rule of law and property rights were secured. Free market discipline is good, even necessary, for ultimate economic growth, but there is a growing realization that certain institutional reforms need to be in place before the magic that these policies perform can be realized. Before a country can privatize and grow, it needs the foundational institutions of secure rights to property, the rule of law, and the democratic process for managing reform.

³ Milton Friedman, *Preface* to JAMES GWARTNEY & ROBERT LAWSON, *ECONOMIC FREEDOM OF THE WORLD: 2002 ANNUAL REPORT* at xvii (2002), available at <http://www.cato.org/economicfreedom/2002/efw02-intro.pdf>.

⁴ *Id.* at xviii.

Indices that measure these institutions have been gathered for the last twenty years. Gastil and Gwartney, Lawson and Block both developed comprehensive property rights indices.⁵ Knack and Keefer created an International Country Risk Guide to measure the rule of law.⁶ Holmes, Johnson, and Kirkpatrick developed a comprehensive cross-national "index of freedom" for the Heritage Foundation and the *Wall Street Journal* that can be used as a measure of the democratic process.⁷

Based on these indices, economists have begun to quantify the relationships between institutions and economic growth building on traditional neoclassical growth models. Kormendi and Meguire, for example, find that civil liberties encourage investment and economic growth.⁸ Scully compares polities that exhibit economic freedom and constitutional guarantees on private property with those that do not and finds that growth is more rapid in the first instance.⁹ Barro and Barro and Sala-I-Martin confirm a whole host of institutional variables that affect growth,¹⁰ and Knack and Keefer, Knack, Keefer and Knack, and Pejovich find that institutional variables described as "the rule of law," "freedom of contract," and "economic freedom" are all significant factors catalyzing economic growth.¹¹ All of these support Friedman's contention that private property, the rules of law, and democratic processes are necessary for economic growth.

This strong empirical evidence helps us operationalize the notion of sustainable development. While still an ambiguous concept, sustainable development implies resource use today that leaves future generations at least as well off as current generations. A viable criterion to measure sustainability, developed by Hartwick, implies that resource use is sustainable if the total value of the capital stock is not

⁵ RAYMOND D. GASTIL, *FREEDOM IN THE WORLD: POLITICAL RIGHTS & CIVIL LIBERTIES: 1986-1987* (1987); JAMES GWARTNEY ET AL., *ECONOMIC FREEDOM OF THE WORLD: 1975-1995* (1996).

⁶ Stephen Knack & Philip Keefer, *Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures*, 7 *ECON. & POL.* 207 (1995).

⁷ 1997 INDEX OF ECONOMIC FREEDOM (Kim R. Holmes et al. eds., 1997).

⁸ Roger C. Kormendi & Philip C. Meguire, *Macroeconomic Determinants of Growth*, 16 *J. MONETARY ECON.* 141 (1985).

⁹ GERALD W. SCULLY, *CONSTITUTIONAL ENVIRONMENTS AND ECONOMIC GROWTH* (1992); Gerald W. Scully, *The Institutional Framework and Economic Development*, 96 *J. POL. ECON.* 652 (1988).

¹⁰ Robert J. Barro, *Economic Growth in a Cross Section of Countries*, 106 *Q. J. ECON.* 407 (1991); ROBERT J. BARRO & XAVIER SALA-I-MARTIN, *ECONOMIC GROWTH* (1995).

¹¹ Knack & Keefer, *supra* note 6; Steven Knack, *Institutions and the Convergence Hypothesis: The Cross-National Evidence*, 87 *PUB. CHOICE* 207 (1996); Philip Keefer & Stephen Knack, *Why Don't Poor Countries Catch Up? A Cross-National Test of an Institutional Explanation*, 35 *ECON. INQUIRY* 590 (1997); Svetozar Pejovich, *Property Rights and Technological Innovation*, in *THE ECONOMIC FOUNDATIONS OF PROPERTY RIGHTS* 193, 193-205 (Svetozar Pejovich ed., 1997).

declining.¹² Most proponents of sustainable development mean that the net resource base of the environment should not be depleted as a result of economic growth. An important issue is whether or not our institutional foundations support such an outcome.

Lomborg's analysis gives strong evidence that this is the case: not only are resource stocks not declining, in many instances they are growing. Agricultural yields on rice, corn, and wheat, despite Malthusian predictions to the contrary, have been increasing for decades. Reserves of oil, natural gas, and coal continue to increase. Stocks of aluminum, zinc, iron, and copper, even with maintained use in society, have been steadily increasing for decades as technology develops more conservative production techniques, and the price mechanism encourages exploration and new discoveries of underground reserves. "All indicators seem to suggest that we are not likely to experience any significant scarcity of raw materials in the future."¹³ This conclusion is consistent with any definition of sustainable development that includes leaving future generations with a non-declining capital or resource stock where the quantification is in terms of economic value and not simply quantities of resources.

Sustainability is possible in this context because of the underlying institutional structures (including secure property rights, the rule of law, and the democratic process) that encourage development, innovation, conservation, and discovery of new resources. Growth and increasing wealth, through these mechanisms, leads to environmental sustainability by raising the demand for environmental quality overall and by allowing supply to match demand by making the resources available for achieving environmental quality. Growing wealth may not be a sufficient condition for maintaining environmental quality, but it is a necessary one.

II. IT'S INSTITUTIONS FOR THE ENVIRONMENT TOO

The link between economic well-being and environmental quality is unequivocal. Paralleling Simon Kuznets' insight regarding the relationship between wealth and income distribution,¹⁴ political economists have developed the notion of an "Environmental Kuznets Curve (EKC)." Represented as an inverted U, the data suggest that, just as inequality initially increases but then turns around as an economy grows, environmental degradation initially increases as per cap-

¹² John M. Hartwick, *Intergenerational Equity and the Investing of Rents from Exhaustible Resources*, 67 AM. ECON. REV. 972 (1977).

¹³ LOMBORG, *supra* note 1, at 147-48.

¹⁴ Simon Kuznets, *Economic Growth and Income Inequality*, 45 AM. ECON. REV. 1 (1955).

ita income increases, but after a turning point, decreases monotonically.¹⁵ In other words, environmental quality is an income elastic good, meaning that people demand proportionally more environmental quality as their incomes rise.

Yandle, Vijayaraghavan, and Bhattarai have surveyed the literature documenting this relationship between wealth and environmental quality.¹⁶ As they report, Grossman and Krueger were the first to test the wealth-environmental quality relationship empirically in the context of the North American Free Trade Agreement.¹⁷ Their study found that rising incomes, as a result of trade, led to stricter environmental control. Soon after, Shafik and Bandopadhyay also found a consistently significant relationship between income and environmental quality indicators.¹⁸ They found that quantities of sulfur dioxide, suspended particulate matter, and fecal coliform initially increase as income levels improve, but then decrease as the economy reaches a certain minimum level of income. The income turning points for these pollutants, in 2002 U.S. dollars, are \$6,193.00, \$5,524.00 and \$2,343.00 respectively.¹⁹

Other studies measure the EKC relationship for various air, water, and deforestation quality indicators. Selden and Song examined various air pollutants and found that the EKC relationship held in all cases.²⁰ Shafik found that the EKC relationship held for sulfur dioxide and suspended particulate concentrations, yet she could not confirm the EKC relationship for carbon emissions, dissolved oxygen in rivers, or for deforestation.²¹ Cropper and Griffiths found that as income increases, the rate of deforestation levels off,²² and Panayotou confirmed the EKC relationship for deforestation, sulfur dioxide, ni-

¹⁵ See, e.g., INDUR M. GOKLANY, *CLEARING THE AIR: THE REAL STORY OF THE WAR ON AIR POLLUTION* (1999); John M. Antle & Greg Heidebrink, *Environment and Development: Theory and International Evidence*, 43 *ECON. DEV. & CULTURAL CHANGE* 603 (1995).

¹⁶ See BRUCE YANDLE ET AL., *THE ENVIRONMENTAL KUZNETS CURVE: A PRIMER* (Political Economy Research Center, PERC Research Studies No. 02-1, 2002), available at http://www.perc.org/pdf/rs02_1.pdf.

¹⁷ Gene Grossman & Alan B. Krueger, *ENVIRONMENTAL IMPACTS OF A NORTH AMERICAN FREE TRADE AGREEMENT* (Nat'l Bureau of Econ. Research, Working Paper No. 3914, 1991).

¹⁸ Nemat Shafik & Sushenjit Bandyopadhyay, *Economic Growth and Environmental Quality: Time Series and Cross-Country Evidence*, (1992) (working paper for WORLD DEVELOPMENT REPORT 1992).

¹⁹ *Id.* at 8-11.

²⁰ Thomas M. Selden & Daqing Song, *Environmental Quality and Development: Is There a Kuznets Curve for Air Pollution Emissions?*, 27 *J. ENVTL ECON. & MGMT.* 147 (1994).

²¹ Nemat Shafik, *Economic Development and Environmental Quality: An Econometric Analysis*, 46 *OXFORD ECON. PAPERS* 757 (1994).

²² Maureen Cropper & Charles Griffiths, *The Interaction of Population Growth and Environmental Quality*, 84 *AM. ECON. REV.* 250 (1994).

trogen oxides, and suspended particulate matter.²³ Grossman and Krueger repeated and extended their earlier seminal work, reconfirming that the EKC relationship held for various measures of air, and now water quality.²⁴ Cole, Rayner, and Bates confirmed the EKC relationship for a myriad of environmental quality indicators, including carbon dioxide levels, CFCs, suspended particulates, nitrates, municipal waste, energy consumption, and even traffic volumes.²⁵ Finally, Utt, Hunter, and McCormick have found that net carbon emissions decrease as incomes increase.²⁶

The impact of economic growth on environmental quality is amplified over time as developing countries are able to attain a higher level of environmental preservation for any given level of income. A study by Hettige, Lucas, and Wheeler investigated the global concern that environmental quality improvements in rich countries translated to a shift in environmental degradation to low-income countries.²⁷ Their analysis finds that the EKC relationship for toxic intensity per unit of GDP holds on a global scale. The study suggests that toxic intensity in poor countries may be influenced more by protectionism than by manufacturing shifts from rich countries. In other words, increasing toxic intensity does not necessarily characterize manufacturing in less developed countries; it only parallels those that are relatively closed to international trade.

Goklany finds that developing nations are better off than developed countries were at equivalent levels of income.²⁸ By taking advantage of the knowledge and technology generated in developed countries, developing countries can leapfrog some of the worst initial instances of environmental degradation as growth takes off, essentially flattening the EKC so that the turning point for environmental improvement occurs much sooner.

Delving further into the link between economic development and environmental quality, others have documented the importance of

²³ Theodore Panayotou, *Environmental Degradation at Different Stages of Economic Development*, in *BEYOND RIO: THE ENVIRONMENTAL CRISIS AND SUSTAINABLE LIVELIHOODS IN THE THIRD WORLD* 13 (Ifikhar Ahmed & Jacobus A Doeleman eds., 1995).

²⁴ Gene M. Grossman & Alan B. Krueger, *Economic Growth and the Environment*, 110 Q. J. ECON. 353 (1995).

²⁵ M.A. Cole et al., *The Environmental Kuznets Curve: An Empirical Analysis*, 2 ENV. & DEV. ECON. 401 (1997).

²⁶ JOSHUA A. UTT ET AL., ON THE RELATION BETWEEN NET CARBON EMISSIONS AND INCOME – CARBON SINKS GLOBAL WARMING: ARE RICH PEOPLE COOL? (Working Paper 2001), available at <http://sixmile.clemson.edu/topics/sequestration/team%20sequestration.pdf>.

²⁷ Hemamala Hettige et al., *The Toxic Intensity of Industrial Production: Global Patterns, Trends and Trade Policy*, 82 AM. ECON. REV. 478 (1992).

²⁸ INDUR M. GOKLANY, ECONOMIC GROWTH AND THE STATE OF HUMANITY 20 (Political Economy Research Center, PERC Policy Series No. PS-21, 2001), available at <http://www.perc.org/pdf/ps21.pdf>.

institutional considerations underlying the EKC relationship. Some form of secure property rights is necessary to preserve environmental quality improvements.²⁹ Panayotou tested five indicators of general institutional quality including “respect/enforcement of contracts,” “efficiency of the bureaucracy,” “efficacy of the rule of law,” “extent of government corruption,” and “the risk of appropriation.”³⁰ He found that higher indexes for the institutional variables led to significant environmental quality improvements.³¹ Qin, in modeling two measures of environmental quality, sulfur dioxide emissions and dissolved oxygen in rivers, found that property rights were significant in flattening the EKC curve.³² More secure property rights led to an earlier turning point in the EKC relationship and less pollution overall. Meiners and Yandle documented the importance of the rule of law, particularly common law, as environmental defender.³³ They show that nuisance and trespass laws give judges the legal ammunition to emphasize outcomes and damages of individual actions, and thereby, environmental protection. Bhattarai found that civil and political liberties, the rule of law, the quality and corruption levels of government, and the security of property rights were relatively more important in explaining deforestation rates in sixty-six countries across Latin America, Asia, and Africa than traditionally assumed culpable factors such as population and agriculture growth.³⁴ Norton found that in countries where property rights are relatively strongly enforced, environmental quality, measured in terms of access to safe water, sanitation, life expectancy, deforestation, and population growth, is better.³⁵

III. SUSTAINABLE SKEPTICISM

Neo-Malthusian arguments that we will run out of resources depend on the assumption that increasing demands on our finite re-

²⁹ See TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* (2001) (arguing that a free market approach to environmental preservation is more effective than a regulatory approach).

³⁰ Theodore Panayotou, *Demistifying the Environmental Kuznets Curve: Turning a Black Box into a Policy Tool*, 2 ENV. & DEV. ECON. 474 (1997).

³¹ *Id.* at 483.

³² See XIAN DONG QIN, *ECONOMIC DEVELOPMENT AND ENVIRONMENTAL QUALITY: A LOOK AT THE ENVIRONMENTAL KUZNETS CURVE* (1998).

³³ Roger Meiners & Bruce Yandle, *Common Law and the Conceit of Modern Environmental Policy*, 7 GEO. MASON L. REV. 923 (1999).

³⁴ MADHUSUDAN BHATTARAI, *THE ENVIRONMENTAL KUZNETS CURVE FOR DEFORESTATION IN LATIN AMERICA, AFRICA AND ASIA: MACROECONOMIC AND INSTITUTIONAL PERSPECTIVES* (2000).

³⁵ SETH NORTON, *POPULATION GROWTH, ECONOMIC FREEDOM, AND THE RULE OF LAW* (Political Economy Research Center, PERC Policy Series No. PS-24, 2001), available at <http://www.perc.org/pdf/ps24.pdf>.

sources ultimately will constrain our ability to improve or sustain environmental quality. This conclusion rests on the assumption that resources are fixed or non-renewable so that it is only a matter of time before they will be exhausted unless use of them is constrained. Paul Ehrlich was so confident that exhaustion would occur he was willing to put his money where his mouth was in a now famous bet with Julian Simon. Noting that increasing scarcity would drive up prices, Simon bet Ehrlich that the prices of any five metals he wanted to pick (and he chose chrome, copper, nickel, tin, and tungsten) would fall, not rise, over a ten-year period. When Simon won the bet after both the nominal and real (inflation corrected) prices fell, he proposed to increase the stakes from \$1000 to \$20,000 and repeat the bet. Ehrlich declined, saying, "The bet doesn't mean anything. Julian Simon is like the guy who jumps off the Empire State Building and says how great things are going so far as he passes the tenth floor. I think the price of those metals will go up eventually"³⁶ As Lomborg notes, however, this has yet to happen.

In essence, Paul Ehrlich was arguing that falling resource prices indicating declining scarcity could not continue indefinitely or, put differently, was not sustainable. The notion of sustainability received its credibility in the environmental literature with publication of the *Blueprint for a Green Economy*.³⁷ Pearce, et al. held that sustainability meant "that real incomes rise, that educational standards increase, that the health of the nation improves, that the general quality of life is advanced."³⁸ By these standards, Lomborg's data certainly show that most nations have achieved sustainability.

But the word sustainability implies more of a process or time-series rather than an end state. That is to say, achieving a specific standard of living, level of health, or level of education does not necessarily mean that they will be available in the future. To incorporate a time dimension to the concept, Pearce, et al. add that sustainability "places emphasis on providing for the needs of the least advantaged in society (intragenerational equity), and a fair treatment of future generations (intergenerational equity)."³⁹

This addition makes the tasks of measuring sustainability and of demonstrating that it is attainable more difficult. Measuring equity aside, having the wherewithal to provide for the least advantaged and to provide future generations with equal access to wealth, however measured, immediately confronts the data which Lomborg confronts.

³⁶ John Tierney, *Betting the Planet*, N. Y. TIMES, Dec. 2, 1990, § 6 (Magazine), at 78, 81.

³⁷ DAVID PEARCE ET AL., *BLUEPRINT FOR A GREEN ECONOMY* (1989).

³⁸ *Id.* at 2.

³⁹ *Id.*

If natural endowments are fixed and demands are growing, how can either type of equity be attained?

Professor Robert Solow is one of the few economists to try to provide a conceptual context for considering this problem. Trying to make sustainability more than a slogan, Solow argues that "it must amount to an injunction to preserve productive capacity for the indefinite future."⁴⁰ This requires creating and maintaining "a generalized capacity to produce economic well being."⁴¹ He goes on:

[A] sustainable path for the economy is thus not necessarily one that conserves every single thing or any single thing. It is one that replaces whatever it takes from its inherited natural and produced environment, its material and intellectual endowment. What matters is not the particular form that the replacement takes, but only its capacity to produce the things that posterity will enjoy. Those depletions and investment decisions are proper focus.⁴²

In other words, focusing on conservation of finite resources is not necessarily the path to sustainability, for two reasons. First, focusing on finite resources ignores the fact that our knowledge of how much of the finite resource is available is limited by our willingness to invest other resources that could be doing other things to improve well being into finding those resources. There is a finite quantity of oil at any point in time because we are not willing to invest in finding new reserves until scarcity of existing reserves make it worth finding new inventories. Just as a supermarket only has a finite quantity of flour at a point in time because there is a cost of maintaining the inventory (storage, spoilage, etc.), so too there is a cost of finding oil reserves and maintaining ownership of those reserves until they are pumped. Seen in this light, it is not surprising that known oil reserves are continually rising despite the fact that we consume more of them all of the time.⁴³ Second, finite resources can be converted to other types of capital that have a greater ability to foster intra- and intergenerational equity. For example, converting finite reserves of oil into plastic for medical treatment has the potential to provide services for posterity and is certainly the type of "replacement" that Solow had in mind.

Solow says that the proper focus for understanding sustainability is on "decisions" not finite resource stocks. Lomborg's focus is more on the stocks because he is refuting the environmental litany that we

⁴⁰ ROBERT SOLOW, AN ALMOST PRACTICAL STEP TOWARD SUSTAINABILITY 7 (1992).

⁴¹ *Id.* at 14.

⁴² *Id.* at 15.

⁴³ LOMBORG, *supra* note 1, at 124.

are running out of these stocks. His conclusion that we are not running out of them suggests that someone must be making the correct decisions.

Those someones are the entrepreneurs whose insights and perceptions are switched on by market signals and by the security provided by the institutions of private property and rule of law. Entrepreneurs make depletion and investment decisions based on their predictions of what will happen to scarcity. Prices in the marketplace for natural resources signal what traders expect the future to look like. If they expect more oil to be available in the future, prices today will be low, and vice versa. If entrepreneurs have secure property rights to the resources in question, they have an incentive to gather information about the future and to deplete or conserve based on that information. If their expectations comport with reality, they will profit. If they are wrong, they will lose, creating a self-enforcing system that weeds out bad decision makers. Lomborg's data and the work of others suggest that decisions made in an institutional framework of secure property rights and the rule of law provide a sustainable path.

In his book, *The Ultimate Resource*,⁴⁴ the late Julian Simon built the coffin in which such neo-Malthusian ideas should be buried. For him the ultimate resource was human ingenuity. As he was fond of saying, "With every mouth comes two hands and a mind." Or alternatively in the words of Aaron Wildavsky, "scarcity has yet to win a race with creativity."⁴⁵ Both of these scholars understood that institutions that get the incentives right and prices that signal the extent of scarcity are the reason that scarcity always loses the race. The growing empirical work linking economic growth and environmental quality to the institutions of free societies should drive the final nail into that coffin.

⁴⁴ JULIAN L. SIMON, *THE ULTIMATE RESOURCE* (1996).

⁴⁵ AARON WILDAVSKY, *CULTURE AND SOCIAL THEORY* 91 (1998).

SUSTAINABLE VERSUS UNSUSTAINABLE PROPOSITIONS

John C. Dernbach[†]

In *The Skeptical Environmentalist: Measuring the Real State of the World*,¹ Bjørn Lomborg often uses the language of sustainable development to describe his position. But the book would turn sustainability on its head. While some things are getting better, other things are getting worse. Improvements in human quality of life, moreover, are not going to happen automatically. The legal and policy choices we make now can have a profound and positive effect on the world that future generations will experience.

Since the end of World War II, if not earlier, we have measured progress around the world by the extent to which we have seen improvements in peace and security, economic growth, and social development or human rights. For these objectives, a great deal of progress has been made. But protecting the environment has not, until recently, been a major objective; indeed, environmental degradation was considered a necessary price of progress. It has become increasingly clear that the ability of the environment and natural resources to support human activities is subject to multiple and growing stresses. These stresses hinder and even threaten economic growth, social development, and peace and security. They also make national governance on behalf of these objectives much more challenging and difficult. Moreover, these stresses are going to increase significantly over the next half century, as both the global population and economy grow. These stresses exist because humans have made, and continue to make, decisions as if the environment could be separated from everything else they care about.

Sustainable development offers an alternative path, though it is certainly not an easy one.² Sustainable development is based on, and requires, economic growth, social development, and security,

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¹ BJØRN LOMBERG, *THE SKEPTICAL ENVIRONMENTALIST: MEASURING THE REAL STATE OF THE WORLD* (Cambridge University Press 2001) (1998).

but it also requires environmental protection and restoration. Protecting the environment is part of what progress means; it is not the price of progress. The idea that we need to seek environmental protection *at the same time* as we seek to advance other goals is a guiding principle of sustainable development. Sustainable development provides a powerful and realistic basis to be hopeful about the future. This is particularly true because we have a very good idea of the legal and policy tools that we need to put in place to navigate a transition to sustainability.³ The intellectual foundations of sustainable development are contained in the 1980 World Conservation Strategy⁴ and the 1987 report of the World Commission on Environment and Development, entitled *Our Common Future*.⁵ Sustainable development, first endorsed by the nations of the world at the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro, and recently reaffirmed at the World Summit on Sustainable Development in Johannesburg, also represents an international consensus on how to reconcile the environment with traditional development.

Sustainable development does not easily fit the left-right, liberal-conservative political spectrum on which people's environmental perspectives are usually judged. It is not primarily about economic growth, social well-being, environmental protection, or security; it is not about one objective at the expense of others; it is about achieving all of them. Among other things, sustainable development is premised on the importance of fostering human freedom, opportunity, and quality of life; on the importance of private efforts; and on the need for removal of subsidies – points that are consistently emphasized by the right. But it is also premised on an ambitious and broad set of environmental goals and a desire to eradicate large-scale poverty – points that are consistently emphasized by the left. It shares with both left and right a sense that governments bear a significant share of responsibility for existing environmental problems. As a consequence, it requires that governance be part of the solution. This is middle ground in the cur-

³ See, e.g., STUMBLING TOWARD SUSTAINABILITY (John C. Dernbach ed., 2002) (setting forth detailed recommendations for moving toward sustainability in the United States over the next decade).

⁴ INTERNATIONAL UNION FOR CONSERVATION AND NATURAL RESOURCES, WORLD CONSERVATION STRATEGY: LIVING RESOURCE CONSERVATION FOR SUSTAINABLE DEVELOPMENT (1980).

⁵ WORLD COMMISSION ON ENV'T AND DEV., OUR COMMON FUTURE (1987) [hereinafter OUR COMMON FUTURE].

rent debate,⁶ but it is more than that; in my view, sustainable development is also higher ground.⁷

A number of international and intergovernmental organizations are providing data and analysis to support this effort. The best single-volume assessment of the world's environmental and social conditions is the United Nations Environment Programme's *Global Environmental Outlook*, the most current version of which was published in 2002.⁸ Reliable reports on human development, including poverty, are regularly published by the United Nations Development Programme (UNDP).⁹ The World Bank annually publishes a World Development Report that focuses on economic and social development.¹⁰ Other authoritative reports providing broad data on environmental, social, and economic conditions are published by the Organization for Economic Cooperation and Development¹¹ and other institutions.¹² In addition to these big-picture reports, there are an increasing number of reports on specific global issues, such as energy,¹³ water,¹⁴ and climate change,¹⁵ as well as a growing number of periodic reports on environment or

⁶ See, e.g., J.B. Ruhl, *A Manifesto for the Radical Middle*, 38 IDAHO L. REV. 385 (2002).

⁷ I am indebted to Jim Wallis for this way of describing middle ground.

⁸ UNITED NATIONS ENV'T PROGRAMME, GLOBAL ENVIRONMENTAL OUTLOOK 3: PAST, PRESENT, AND FUTURE PERSPECTIVES (2002) [hereinafter GLOBAL ENVIRONMENTAL OUTLOOK 3]; see also, UNITED NATIONS ENV'T PROGRAMME, GLOBAL ENVIRONMENTAL OUTLOOK 2000 (1999).

⁹ See, e.g., UNITED NATIONS DEV. PROGRAMME, HUMAN DEVELOPMENT REPORT 2002: DEEPENING DEMOCRACY IN A FRAGMENTED WORLD (2002), available at <http://www.undp.org/hdr2002> [hereinafter HUMAN DEVELOPMENT REPORT 2002].

¹⁰ See, e.g., THE WORLD BANK, WORLD DEVELOPMENT REPORT 2003: SUSTAINABLE DEVELOPMENT IN A DYNAMIC WORLD: TRANSFORMING INSTITUTIONS, GROWTH, AND QUALITY OF LIFE (2003) ("This . . . [r]eport . . . is about the growth in income and productivity required in developing countries to eliminate poverty in a way that is environmentally and socially sustainable."). *Id.* at ix.

¹¹ See, e.g., ORG. FOR ECON. CO-OPERATION AND DEV., ENVIRONMENTAL OUTLOOK (2001) (providing "an analysis of the forces driving environmental change, the recent and projected pressures on the environment, and the resulting changes in the state of the environment to 2020"). *Id.* at 17.

¹² See, e.g., UNITED NATIONS DEV. PROGRAMME, ET AL., WORLD RESOURCES 2000-2001: PEOPLE AND ECOSYSTEMS: THE FRAYING WEB OF LIFE (2000) (arguing that "the well-being of people and ecosystems is interwoven and that the fabric is fraying," that "[w]e need to repair it, and we have the tools at hand to do so"). *Id.* at ix.

¹³ See, e.g., UNITED NATIONS DEVELOPMENT PROGRAMME, ET AL., WORLD ENERGY ASSESSMENT: ENERGY AND THE CHALLENGE SUSTAINABILITY (2000) ("describ[ing] energy's fundamental relationship to sustainable development and [analyzing] how energy can serve as an instrument to reach that goal."). *Id.* at 2.

¹⁴ See, e.g., THE WORLD'S WATER: THE BIENNIAL REPORT ON FRESHWATER RESOURCES (Peter Gleick ed., 2002) ("provid[ing] critical new insights into new solutions to both old and new water problems"). *Id.* at xiv.

¹⁵ See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2001, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY (James T. McCarthy et al. eds. 2001); INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2001, CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS (J.T. Houghton et al. eds. 2001) [hereinafter CLIMATE CHANGE 2001].

sustainable development that are published by countries,¹⁶ multinational regions,¹⁷ and states or provinces within countries.¹⁸ The Heinz Center recently produced an excellent report on the condition of U.S. ecosystems.¹⁹ In 1999, the National Research Council published an impressive synthesis of the scientific information relating to sustainability, entitled *Our Common Journey*.²⁰ These reporting efforts tend to be collaborative, multidisciplinary, peer-reviewed, and iterative. They reflect current thinking and knowledge, and thus are generally regarded as authoritative by people working in the field.

Although Lomborg often refers to sustainability,²¹ his list of references does not even include the basic literature on sustainable development.²² If he refers to the other sources described above, it is almost always with approval. But the book ignores many of the intellectual developments of the past several decades as well as the analysis that underlies them. The book adds very little to what most environmental professionals already know, and says a great many things that are oversimplified or wrong. He argues that science counts, that environmental groups need to get the science right (and sometimes don't), that rigorous analysis is important, that some environmental problems are more important than others,

¹⁶ Denmark, where Lomborg is from, publishes such reports. See THE DANISH GOV'T, DENMARK'S NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT: A SHARED FUTURE-BALANCED DEVELOPMENT (2002), available at <http://www.mst.dk/homepage>. Other countries have also recently published such reports. See BRAZILIAN INST. FOR THE ENV'T AND NAT. RENEWABLE RESOURCES ET AL., GEO BRAZIL 2002: ENVIRONMENTAL OUTLOOK IN BRAZIL (2002); ECON. PLANNING UNIT, PRIME MINISTER'S DEP'T, MALAY., MALAYSIAN QUALITY OF LIFE (2002), available at <http://www.epu.jpm.my/bi/publi/mqli2002/mqli02.html>; THE FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION AND NUCLEAR SAFETY, GERMAN ENVIRONMENTAL REPORT (2002), available at <http://www.bmu.de/english.fset800.php>.

¹⁷ See, e.g., EUR. ENV'T AGENCY, ENVIRONMENTAL SIGNALS 2002: BENCHMARKING THE MILLENNIUM (2002), available at http://reports.eea.eu.int/environmental_assessment_report_2002_9/en.

¹⁸ See, e.g., ENVIRONMENTAL SIGNALS IN TUSCANY 2001: ENVIRONMENTAL INDICATORS AND PUBLIC POLICIES (Elena Calistri, Dep't for Territorial and Env'tl. Policies ed., 2001), available at <http://www.rete.toscana.it/sett/ambiente/segnali-ambientali-2001/english>; INTERAGENCY SUSTAINABILITY WORKING GROUP, LIVING WITH THE FUTURE IN MIND: GOALS AND INDICATORS FOR NEW JERSEY'S QUALITY OF LIFE (2000), available at <http://www.state.nj.us/dep/dst/sustainable-state>; OREGON PROGRESS BOARD, ACHIEVING THE OREGON SHINES VISION: THE 2001 BENCHMARK PERFORMANCE REPORT (2001), available at <http://www.econ.state.or.us/opb/2001report/2001new.html>.

¹⁹ THE STATE OF THE NATION'S ECOSYSTEMS: MEASURING THE LANDS, WATERS, AND LIVING RESOURCES OF THE UNITED STATES (H. John Heinz III Center for Science, Economics and the Environment ed., 2002) [hereinafter STATE OF THE NATION'S ECOSYSTEMS].

²⁰ BOARD ON SUSTAINABLE DEV., NAT'L RESEARCH COUNCIL, OUR COMMON JOURNEY: A TRANSITION TOWARD SUSTAINABILITY (1999) [hereinafter OUR COMMON JOURNEY].

²¹ See, e.g., LOMBORG, *supra* note 1, at 160 (discussing the World Bank's definition of sustainable development).

²² Lomborg's bibliography does not include OUR COMMON FUTURE, WORLD CONSERVATION STRATEGY, or OUR COMMON JOURNEY.

and that predictions of doom are almost certainly wrong. No one who expects to be taken seriously on environmental issues would dispute these propositions. But his sweeping claims that “things are getting better” and that the environmental problems we face are all “manageable” or nonexistent are not accurate.

The book has been given importance by conservative groups that agree with its mistaken tendency to conflate environmental protection with government regulation and loss of freedom and, ironically, by the media that he attacks. The author, an assistant professor of statistics at the University of Aarhus in Denmark, appears to be a disciple of the late Julian Simon, whose own skepticism about environmental claims made him popular with conservatives.²³ But the book is not, in my view, a serious contribution to understanding or solving the problems we face. For that reason, I contribute this essay with some reluctance. It is the possibility of sustainable development, not blind faith in the virtues of economic growth or underestimation of our environmental problems, that provides humanity’s real hope in the years ahead. This isn’t about whether we should be hopeful; this is about the basis for our hope. Put differently, it is possible to be hopeful even if we accept the existence of serious problems. In fact, there is no *realistic* basis for hope unless we do. My essay first addresses his assessment of the problem, and then addresses what we need to do about the future. My object is to be thematic, not exhaustive.

²³ Lomborg explains in the preface how he was converted to his current position by examining Simon’s data. LOMBORG, *supra* note 1, at xix. The frontpiece in the book is a quotation from Simon. The biodiversity chapter is “to a large degree based” on a book Simon coauthored. *Id.* at 408 n.2011. A substantial number of footnotes are from Simon’s books. Stuart Pimm & Jeff Harvey, *No Need to Worry About the Future*, 414 NATURE 149 (2001) (book review). Moreover, the subtitle of the book echoes the title of other right-of-center tracts on the environment. See EARTH REPORT 2000: REVISITING THE TRUE STATE OF PLANET (Ronald Bailey ed., 2000) (published under the auspices of Competitive Enterprise Institute); THE TRUE STATE OF THE PLANET (Ronald Bailey ed., 1995) (published under the auspices of Competitive Enterprise Institute). Not surprisingly, Bailey is enthusiastic about Lomborg’s book. Ronald Bailey, *Debunking Green Myths*, at http://www.restoringamerica.org/archive/environment/debunking_green_myths.html (Feb. 6, 2002).

Finally, in Lomborg’s world, the dominant public voice on the environment is provided by environmentalists. See LOMBORG, *supra* note 1, at xx. If we rely on the evidence analyzed in this book, there are no corporations, trade associations, conservative organizations, or libertarians denying the existence of environmental problems or minimizing those problems. No one with an economic interest in unsustainable or environmentally damaging practices is being heard, Lomborg implies. See *id.* One has good reason to be suspicious of those who claim to be providing the “truth” when they ignore a large part of reality.

I. SOME THINGS ARE GETTING BETTER AND SOME ARE GETTING WORSE

This book, according to the subtitle, is an effort to measure “the *real* state of the world.”²⁴ The “whole purpose of this book,” Lomborg says, is to provide “access to the best possible and least myth-based knowledge.”²⁵ There is no explanation for how the reports described above fall short of that mark; if they are discussed at all, they are cited with approval or referred to in positive terms.²⁶ But then his primary adversaries here are not the most authoritative reports on the environment or the human condition; they are, rather, a handful of voices that have predicted some version of environmental doom. They are wrong, he says; everything that matters is getting better, and will continue to get better.

It is generally true, as Lomborg says, that many social and economic measures of human well-being have improved, including life expectancy, human health, and education.²⁷ These are not small things; they are emphasized in the UNDP’s Human Development Reports and other assessments, and he rightfully emphasizes them. Lomborg also, and properly, identifies hunger and poverty as major problems.²⁸ But it is inaccurate to state broadly that “[t]hings are getting better,”²⁹ or that “mankind’s lot has vastly improved in every significant measurable field.”³⁰ The book systematically underestimates environmentally-related risks, it ignores the problem of unsustainable patterns of production and consumption, and it does not seriously address the moral and even religious issues raised by global environmental degradation.

A. *The Book Systematically Underestimates Environmentally-Related Risks*

Whenever we face a challenge, we need to understand that challenge as precisely as we can. If it is serious, we need to know that, and we need to know as much about it as we can. If the challenge is not serious, we also need to know that. In addition, we need to know what the uncertainties are. That is, if we take Lomborg seriously, we need to follow the science wherever it takes us. But we also need to take appropriate precautions in the absence of

²⁴ LOMBORG, *supra* note 1, at 3.

²⁵ *Id.* at 33.

²⁶ The reports of the Intergovernmental Panel on Climate Change are the only such reports to which he devotes significant criticism.

²⁷ *Id.* at 50-59, 81-82.

²⁸ *Id.* at 328.

²⁹ *Id.* at 3.

³⁰ *Id.* at 351.

perfect information. If we can agree that Chicken Little is a bad role model, we should also agree that Neville Chamberlain and his appeasement policy are bad role models. No one would want to underestimate the seriousness of a problem, like the intentions and capability of Hitler's Germany in the 1930s, and then bear responsibility for the consequences. In fact, Winston Churchill is widely admired because he endured harsh criticism for warning the English people of a problem about which they did not want to hear, and which eventually brought them into a terrible war. So a basic task is to understand the environmental science as best we can, the positive, the negative, and the uncertain, and to recognize that the consequences of underestimating risks are at least as serious as those of overestimating risks. Unfortunately, Lomborg doesn't strike that balance.

As already indicated, the doom-sayers are only a part of the many different voices calling for environmental protection. When the environmental movement became publicly prominent in the early 1970s, there were many such voices; indeed, many of the statements that Lomborg criticizes come from that era, and were answered long ago.³¹ While the apocalyptic voice is still heard occasionally, the environmental protection debate has moved on. Other voices recognize the necessity of clean air and water for life, the economic value of the services that nature provides, the importance of livable communities, the aesthetic appeal of the environment, the economic necessity for natural resources, economic and competitive advantages that come from more efficient and less polluting operations, the environment's educational value, the need for intergenerational equity, or the importance of religious stewardship of creation.³²

³¹ See Michael Grubb, *Relying on Manna From Heaven?*, 294 SCI. 1285, 1285 (2001) (book review) (noting that the point about the claims was made a decade ago); see also John P. Holdren, *Energy: Asking the Wrong Question*, 286 SCI. AM., Jan. 2002, at 65 (stating that Lomborg's energy chapter attacks a view "that few if any environmentalists actually hold. What environmentalists mainly say on this topic is not that we are running out of energy but that we are running out . . . of the capacity of air, water, soil and biota to absorb, without intolerable consequences for human well-being, the effects of energy extraction, transport, transformation and use.").

³² See, e.g., RICHARD N.L. ANDREWS, *MANAGING THE ENVIRONMENT, MANAGING OURSELVES: A HISTORY OF AMERICAN ENVIRONMENTAL POLICY* 270 (1999) (discussing the regulatory reform advocates' proposal of market-based incentives to augment or replace the EPA's command-and-control regulations); Dieter T. Hessel, *Sustainability as a Religious and Ethical Concern*, in *STUMBLING TOWARD SUSTAINABILITY*, supra note 3, at 594 (noting that Judaism, Christianity, and Islam emphasize the human role as steward or guardian of creation); STEPHEN R. KELLERT, *THE VALUE OF LIFE: BIOLOGICAL DIVERSITY AND HUMAN SOCIETY* 211 (1996) (noting the need to learn about the connection between human life and the natural world, not just cognitively, but in value terms as well); Daniel A. Mazmanian, *The Three Epics of the Environmental Movement*, in *TOWARD SUSTAINABLE COMMUNITIES: TRANSITION TRANSFOR-*

Moreover, there is a large difference between those who categorically predict that a certain bad thing will happen, and those who describe environmental problems and the risks of certain negative outcomes. Climate change presents, for instance, a real but unquantifiable risk of outcomes that would be catastrophic to humans;³³ this is not a prediction—it is a statement of the risk. Except when something is scientifically certain to happen, most people and organizations now use projections and scenarios of possible or likely futures, not predictions.³⁴ In that respect, too, the environmental debate has moved on.

Lomborg's analysis is based to a great degree on one-sided presentations of available information,³⁵ citations to nonscientific sources,³⁶ and citations to sources that don't support the stated proposition.³⁷ The scientific community's harsh criticism of this book, including leading journals such as *Nature*,³⁸ *Science*,³⁹ and

MATIONS IN ENVIRONMENTAL POLICY 3 (Daniel A. Mazmanian & Michael E. Kraft eds., 1991) (noting the amount learned about the government's ability to direct economic activity, affect human values and behavior, and create livable and sustainable communities).

³³ The West Antarctic ice sheet, for instance, contains enough ice so that sea level would rise six meters around the world if it melted. J.A.CHURCH ET AL., *Changes in Sea Level*, in CLIMATE CHANGE 2001, *supra* note 15, at 639, 678. A panel of experts recently concluded "that there is a 98% chance that [the West Antarctic ice sheet] will not collapse in the next 100 years." *Id.* at 679. By contrast, sea levels rose during the past century, and "[i]t is very likely that 20th century warming has contributed significantly to the observed sea level rise." *Id.* at 641. It is also very likely that sea levels will continue to rise by about half a meter over the next century. *Id.* at 641-42.

³⁴ Even companies use scenarios to plan their future. See SHELL INT'L LTD., PEOPLE AND CONNECTIONS: GLOBAL SCENARIOS TO 2020—PUBLIC SUMMARY 1 (2002) (using scenarios to look at how the business environment may change over a twenty year period).

³⁵ See John Bongaarts, *Population: Ignoring Its Impact*, 286 SCI. AM., Jan. 2002, at 67, 69 (stating that the population chapter's "selective use of statistics gives the reader the impression that the population problem is largely behind us," and that Lomborg "neglects the contribution of population growth to poverty"); Grubb, *supra* note 31, at 1286 (describing the climate change chapter, which is the longest in the book, as "inconsequential," as offering "nothing new or insightful," and suggesting that "readers would do far better to read" the reports of the Intergovernmental Panel on Climate Change); Thomas Lovejoy, *Biodiversity: Dismissing Scientific Process*, 286 SCI. AM., Jan. 2002, at 69, 71 (stating that the biodiversity chapter is biased and that "Lomborg seems quite ignorant of how environmental science proceeds."); Stephen Schneider, *Global Warming: Neglecting the Complexities*, 286 SCI. AM., Jan. 2002, at 62, 63 (stating that Lomborg's climate chapter tends to cite only "those studies that support his rosy view that only the low end of the uncertainty ranges will be plausible. IPCC authors, in contrast, [are] subjected to three rounds of review by hundreds of outside experts. They [don't] have the luxury of reporting primarily from the part of the community that agrees with their individual views.").

³⁶ See, e.g., Pimm & Harvey, *supra* note 23, at 150 (stating that Lomborg "disagrees with the broad scientific consensus, using arguments too often supported by news sources rather than by peer-reviewed publications").

³⁷ See, e.g., Lovejoy, *supra* note 35, at 71 (stating that Lomborg's biodiversity chapter frequently cites to sources that do not support the stated proposition); Pimm & Harvey, *supra* note 23, at 150 (stating that footnotes often do not support the propositions for which they are cited, that Lomborg often "misses the critical literature in exactly the same ways as did Simon").

³⁸ See, e.g., Pimm & Harvey, *supra* note 23.

Scientific American,⁴⁰ has been consistent on these points. On January 7, 2003, the Danish Committees on Scientific Dishonesty found that Lomborg, "in light of his systematic one-sidedness in the choice of data and line of argument, has clearly acted at variance with good scientific practice."⁴¹ The Committees, which operate under the auspices of the Danish Ministry of Science, Technology, and Innovation, were created to investigate and rule on complaints of scientific dishonesty.⁴² Evaluating the book as a work of science, the Committees ruled that its "systematically biased representation" of information constitutes scientific dishonesty. Because of the "extraordinarily wide-ranging scientific topics dealt with" in the book, and Lomborg's lack of "any special scientific expertise," however, the Committees concluded that there were no grounds "to deem that the defendant has misled his readers deliberately or with gross negligence."⁴³

The claim that he gets some of the science right – that some environmental problems are not that severe – does not mitigate the problem because we already know that some problems are more severe than others. The U.S. Environmental Protection Agency's Science Advisory Board made that point in 1990 when it used available data to rank the seriousness of various environmental problems.⁴⁴ Nor does a claim for partial accuracy rescue his

³⁹ See, e.g., Grubb, *supra* note 28.

⁴⁰ See Bongaarts, *supra* note 35, at 69; Lovejoy, *supra* note 35, at 71; Holdren, *supra* note 31, at 65; Schneider, *supra* note 35, at 61-62 (discussing the fact that most of Lomborg's citations come from popular sources). *But see* Bjørn Lomborg, *The Skeptical Environmentalist Replies*, 290 SCI. AM., May 2002, at 14 (Lomborg's reply to these four reviews); John Ronnie, *Editor-in-Chief of Scientific American Replies*, 290 SCI. AM., May 2002, at 15 (discussing many of the criticisms of Lomborg's book). In addition, see also SKEPTICAL QUESTIONS AND SUSTAINABLE ANSWERS (Christian Ege & Jeanne Lind Christiansen eds. 2002) (critique of Lomborg's book by Danish environmental professionals), available at <http://www.ecocouncil.dk/download/sceptical.pdf>.

⁴¹ Udvalgene Vedrorende Videnskabelig Uredelighed Udtalelser, debatindlæg m.v. (Decision regarding complaints against Bjørn Lomborg), available at http://www.forsk.dk/uvvu/nyt/udtaldebat/bl_decision.htm.

⁴² THE DANISH COMMITTEES ON SCIENTIFIC DISHONESTY, 2001 ANNUAL REPORT 44-46 (2002) (reproducing Danish Executive Order 933 of Dec. 15, 1998, by the Danish Ministry of Science, Technology, and Innovation, which created the Committees), available at <http://www.forsk.dk/eng/uvvu/publ/annreport.pdf>. The report describes cases that were considered in 2001. *Id.* at 23-42. It also describes cases involving scientific dishonesty in the United States, including the work of the Federal Office of Research Integrity. *Id.* at 7-9.

⁴³ *Id.* (decision against Lomborg).

⁴⁴ It concluded that habitat destruction, loss of biodiversity, stratospheric ozone depletion, and global climate change posed relatively high risks; that pesticides, toxics, and acid deposition posed medium risks; and that oil spills and ground water pollution posed relatively low risks. RELATIVE RISK REDUCTION STRATEGIES COMMITTEE, SCI. ADVISORY BOARD, REDUCING RISK: SETTING PRIORITIES AND STRATEGIES FOR ENVIRONMENTAL PROTECTION 13 (1990). Lomborg applies no such ranking system.

statement that this book provides the “best” and “least myth-based” information.

But the problems with his assessment of environmentally-based risk are much deeper than fact versus claimed fact. Internal contradictions, omissions, and unfounded assumptions in his analysis are at least as damaging to the book’s credibility. Lomborg’s own evidence contradicts his claims. His claim that “things are getting better” is not just a rhetorical ploy for him; he really means it. The “only place where we have not seen a significant improvement,” he says, “is the level of international debt” borne by developing countries.⁴⁵ In all remaining ways, in other words, things are getting better. What he often seems to mean by “better,” though, is “not as bad as some think,” “getting worse at a slower pace,” or “better in developed countries.” In some cases, he frankly acknowledges that things are getting worse, but then quickly adds that they are not as bad as some people think they are. Yes, we’re losing tropical forests, but the rate is lower than some people would have you believe.⁴⁶ Yes, species are becoming extinct at a rate that is “about 1,500 times higher than the natural background extinction” rate, but this is not as high as the extinction rate that others suggest.⁴⁷ Such statements are hardly consistent with claims that everything is getting better. In addition, he often describes things as “getting better” when they are actually getting worse, albeit at a slower rate than before or a slower rate than expected. The population growth rate is slowing down, he emphasizes, noting, but not emphasizing, that the world’s current population of just over six billion is projected to grow to 9.3 billion by 2050 and stabilize at about 11 billion by 2100.⁴⁸ But he never fully deals with the variety of stresses that such considerable and continuing population growth will have on human society or the environment. Lomborg acknowledges that growing population will “increase water demands and put extra water stress on almost 20 percent of humanity,”⁴⁹ and that the fertilizer required for a doubled population will probably lead to “more, and more pervasive eutrophication” of coastal waters.⁵⁰ But he does not even begin to address the myriad of other environmental pressures posed

⁴⁵ LOMBORG, *supra* note 1, at 13.

⁴⁶ *Id.* at 117.

⁴⁷ *Id.* at 255-56.

⁴⁸ *Id.* at 46-47; *see also* OUR COMMON JOURNEY, *supra* note 20, at 12 (“While growth rates are declining, because the current growth rate (still higher than replacement level) is applied to a fast increasing population base, absolute population growth will continue to have tremendous momentum over the next two decades.”).

⁴⁹ LOMBORG, *supra* note 1, at 156.

⁵⁰ *Id.* at 201.

by this increased population or the considerable challenges involved with feeding, housing, clothing, and educating them. None of this appears to matter to him because the population growth rate is slowing down. He also argues that things are getting better for everyone simply because there have been environmental improvements in developed countries. For instance, Lomborg correctly concludes that air pollution has been reduced in the United States and western Europe,⁵¹ which is consistent with his thesis. But he admits “[a]ir pollution has got worse in the developing world,” and that some of the worst air pollution in the world exists in large cities in developing countries.⁵²

He also underestimates environmentally-related risks by treating part of a problem as if it were the entire problem. Environmental professionals understand biodiversity as constituting diversity in the number of different species, genetic diversity within species (which generally is greater if the species exists in larger numbers), and diversity of different ecosystems. Indeed, that three-part definition is used in the Convention on Biological Diversity.⁵³ Lomborg, instead, defines biodiversity only in terms of species extinction, as if having small numbers of remnant species and massively declining habitat are not issues that are even worth discussing.⁵⁴

He also says there is plenty of room for landfills and thus dismisses waste disposal as a problem.⁵⁵ He doesn't address environmental degradation or nuisance-type conditions at landfills, even at the best-run landfills. Nor does he seriously address the sustainability issues with municipal solid waste. Marian Chertow has suggested that three indicators or goals provide a useful way of measuring a move toward sustainable waste management: (1) decreasing per capita generation; (2) decoupling of waste generation from GDP; and (3) even if waste generation rises, decreasing per capita waste disposal through increased recycling, composting, and resource recovery.⁵⁶ Each of these indicators represents a movement toward greater conservation of materials and energy, and thus

⁵¹ *Id.* at 163-75 (citing a number of graphs showing reduced levels of pollution).

⁵² *Id.* at 210.

⁵³ Convention on Biological Diversity, June 5, 1992, art. 2, *reprinted in* 31 I.L.M. 818 (1992).

⁵⁴ LOMBORG, *supra* note 1, at 408 n.2004 (“In this section I use the number of species as a definition of biodiversity, although the word naturally has other, partially overlapping, meanings.”).

⁵⁵ *Id.* at 206-08.

⁵⁶ Marian Chertow, *Municipal Solid Waste*, in *STUMBLING TOWARD SUSTAINABILITY*, *supra* note 3, at 467.

reduced environmental impact.⁵⁷ Lomborg acknowledges that per capita waste generation seems to be growing in most developed countries, but says there is no point to recycling because landfills don't take up much space.⁵⁸

The book also underestimates risk by arguing, in effect, that we shouldn't worry at all about environmental issues for which scientific uncertainty exists. A meta-message of the book is that pretty much everything is either "certainly so" or "certainly not so." This is an attitude we would not recognize in any other area of life, where uncertainty is common. As environmental scientists know, there are often significant gaps in our knowledge of particular problems and particular ecosystems. We know some things to be true or not true. However, a great many other things are true or not true, but we don't yet know.⁵⁹ As a result, scientists often describe environmental effects in terms of a range of outcomes, reflecting this uncertainty. Lomborg repeatedly deals with such ranges by arguing that the "true" outcome is on the low end of the environmental impact range.⁶⁰ This type of analysis essentially reduces risks from uncertain outcomes to zero, but it is necessarily based on limited information. Again, authoritative analyses of the range of outcomes are available, and more severe potential outcomes are not so easily dismissed.⁶¹ One example is the possibility of abrupt climate change induced by human activities. Lomborg's analysis assumes gradual warming over a long period of time in response to gradual increases in atmospheric concentrations of greenhouse gases. But another possibility is large changes – average temperature changes of 10 to 20 degrees Fahrenheit, or doubling or halving of average annual precipitation – that manifest themselves in a short time (within years or decades) and then persist for centuries. Such changes have occurred before,⁶² and human activity appears to make such changes more likely to occur in

⁵⁷ *Id.* at 469 (discussing how Agenda 21 of the U.N. Conference on Environment and Development and the EPA's solid waste policy have focused on these indicators and set recycling goals to reduce landfill dependence).

⁵⁸ LOMBORG, *supra* note 1, at 208-09 (arguing additionally that landfills today are safe for groundwater and that recycling may not be the best use of resources).

⁵⁹ See, e.g., STATE OF THE NATION'S ECOSYSTEMS, *supra* note 19 (which is replete with references to inadequate or insufficient data).

⁶⁰ See, e.g., LOMBORG, *supra* note 1, at 259 (summarizing his approach to the reports of the Intergovernmental Panel on Climate Change).

⁶¹ See, e.g., Grubb, *supra* note 31, at 1286 (stating that the Intergovernmental Panel on Climate Change reports are more helpful in understanding the problem than Lomborg's presentation).

⁶² COMMITTEE ON ABRUPT CLIMATE CHANGE, NATIONAL RESEARCH COUNCIL, ABRUPT CLIMATE CHANGE: INEVITABLE SURPRISES 10 (2002).

the future.⁶³ Abrupt changes would significantly reduce the ability of humans to adapt. Although few environmental or economic studies of the impact of abrupt climate change have been conducted, the negative impacts are likely to be much greater than would occur if climate change were gradual.⁶⁴

Moreover, the issue-by-issue analysis that Lomborg conducts is likely to underestimate or ignore major categories of risks. His analysis addresses problems one at a time, which is understandable in some ways. But it is not likely to be the way environmental problems unfold or are experienced. In the more immediate future, the National Research Council says, the most difficult challenges are not from any one problem but rather are “environmental threats arising from multiple, cumulative, and interactive stresses, driven by a variety of human activit[y].”⁶⁵ Lomborg’s discussion of potential increases in hurricane damage from climate change is a case in point. If weather-related damage increases, he says, it isn’t because of global warming; it is the result of more development along coastlines, the destruction of wetlands that would reduce flooding, and other environmental degradation.⁶⁶ So yes, weather-related damage has increased, but there are multiple reasons for this other than climate change. If climate change contributes to rising sea levels and coastal flooding, as it is likely to do,⁶⁷ will we even recognize the role that it plays (during hurricanes and at other times) when we consider all the other contributing factors? As insurance companies get more concerned about climate change, it is not climate change by itself they are worried about; it is the cumulative effect of climate change and these other factors.⁶⁸ Lomborg has nothing to say about cumulative effects.

Even more fundamentally, environmental effects do not ordinarily occur to humans in a barefaced way. Rather, they interact with social and economic challenges and may thus manifest themselves in ways that hide their contributing environmental roots. For instance, the twenty-two Arab countries currently have a population of 280 million people; this number is expected to grow to

⁶³ *Id.* at 154.

⁶⁴ *Id.* at 121, 152.

⁶⁵ OUR COMMON JOURNEY, *supra* note 20, at 224.

⁶⁶ LOMBORG, *supra* note 1, at 292-97.

⁶⁷ Stewart Cohen & Kathleen Miller, in CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY: CONTRIBUTION OF WORKING GROUP II TO THE THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) § 15.2.5.3 (2001), available at <http://www.grida.no/climate/ipcc-tar/wg2/545.htm>. There is insufficient evidence to predict how hurricanes are likely to change in the future. *Id.* at § 15.2.4.1.2.3.

⁶⁸ *See id.* at § 15.2.7.

between 410 and 459 million by 2020.⁶⁹ Almost two-fifths of the population (thirty eight percent) is 14 years of age or younger; only six percent is 60 or older.⁷⁰ Among these countries, Saudi Arabia has one of the fastest growing populations.⁷¹ In its recently-issued Arab Human Development Report, the United Nations Development Programme and the Arab Fund for Economic and Social Development state that human development in these countries is being held back by the lack of democratic governance, lack of opportunities for women, and a weak educational system.⁷² Of course, much of the world, including the United States, depends on oil from these countries. And, of course, most of the 9/11 hijackers were from Saudi Arabia. No one thing – population growth, inadequate opportunities, the inability or unwillingness of developed countries to conserve energy or find alternative sources, poor governance, the presence of Israel, or a poor education system – makes the Arab region volatile and extremely challenging. It is all of these things taken together. In the real world, then, population growth, resource use, and environmental degradation contribute to the increased risk of social and economic destabilization and even conflict or terrorism in profound and unpredictable ways. On this point, Lomborg has little to say.⁷³ The book, quite simply, seriously underestimates environmentally-related risks.

B. The Book Ignores Unsustainable Patterns of Production and Consumption

Lomborg has nothing to say about the stresses caused by current and continuing patterns of production and consumption of materials, energy, and water. Agenda 21, the global plan of action for sustainable development adopted at the 1992 Earth Summit, describes unsustainable patterns of production and consumption as “the major cause of the continued deterioration of the global envi-

⁶⁹ UNITED NATIONS DEV. PROGRAMME & ARAB FUND FOR ECON. AND SOC. DEV., ARAB HUMAN DEVELOPMENT REPORT 2002: CREATING OPPORTUNITIES FOR FUTURE GENERATIONS 35, 37 (2002), available at <http://www.undp.org/rbas/ahdr/english.html>.

⁷⁰ *Id.* at 36.

⁷¹ *Id.* at 37.

⁷² *Id.* at 27-29. Those living under Israeli occupation, of course, also face daunting challenges. *Id.* at 1-2.

⁷³ He says only that it is “imperative for our future energy supply” that the Middle East “remains reasonably peaceful.” LOMBORG, *supra* note 1, at 121. The relationship between population growth and conflict is ignored in other contexts as well. For instance, he notes that India and Pakistan are two of the 12 countries with the greatest population growth, *id.* at 47, without noting that India and Pakistan have nuclear weapons as well as long-simmering tensions that frequently produce wars or threats of war.

ronment.”⁷⁴ Humans have significantly increased their use of the environment, as well as the pressure they put on it, over the past century. Between the 1890s and 1990s, world population grew by a factor of four, the world economy by a factor of 14, industrial output by a factor of 40, and energy use by a factor of 16.⁷⁵ Carbon dioxide emissions became 17 times greater, sulfur dioxide emissions 13 times greater, and atmospheric lead emissions eight times greater. In the same period water use grew by a factor of nine, marine fish catch grew by a factor of 35, irrigated area increased by a factor of five, and cropland doubled.⁷⁶ The pressures that humans put on the environment are likely to increase in the next half century. According to the National Research Council, it is likely that by 2050 global grain and energy use will roughly double and that global gross domestic product will grow by a factor of four.⁷⁷ The rate of these changes, and their global scale, are unprecedented. The idea here is not that resources are limited. The idea, rather, is that we are highly unlikely to be able to sustain increases of the kind we have seen in the past century into this century without either going past ecosystem or natural limits, going past the ability of human social and governance systems to manage these changes, or both.

Another way to view this issue is to look at the role of developed countries, and particularly the United States. With 5% of the world's population, the United States in 1993 was responsible for 24% of the world's energy consumption and almost 30% of the world's raw materials consumption.⁷⁸ That makes this country “the largest producer and consumer in all history.”⁷⁹ In the decade since the 1992 Earth Summit, materials and energy use in the United States increased significantly.⁸⁰ For many good reasons,

⁷⁴ U.N. CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, AGENDA 21, ¶ 4.3, U.N. DOC. A/CONF.151.26 (1992), available at <http://www.un.org/esa/sustdev/agenda21chapter4.htm>.

⁷⁵ J.R. McNEIL, SOMETHING NEW UNDER THE SUN: AN ENVIRONMENTAL HISTORY OF THE TWENTIETH CENTURY WORLD 360-61 (2000).

⁷⁶ *Id.* at 360-61 tbl.12.1.

⁷⁷ OUR COMMON JOURNEY, *supra* note 20, at 70 tbl.2.1.

⁷⁸ See PRESIDENT'S COUNCIL ON SUSTAINABLE DEV., SUSTAINABLE AMERICA: A NEW CONSENSUS FOR PROSPERITY, OPPORTUNITY, AND A HEALTHY ENVIRONMENT FOR THE FUTURE 142-43 (1996).

⁷⁹ PRESIDENT'S COUNCIL ON SUSTAINABLE DEV., TOWARDS A SUSTAINABLE AMERICA: ADVANCING PROSPERITY, OPPORTUNITY, AND A HEALTHY ENVIRONMENT FOR THE 21ST CENTURY 86 (1999).

⁸⁰ For instance, the quantity of materials used increased by ten percent, with increases in some environmental impacts. AMIT KAPUR & THOMAS E. GRAEDEL, *Production and Consumption of Materials*, in STUMBLING TOWARD SUSTAINABILITY, *supra* note 3, at 63, 63. Primary energy consumption increased by 21 percent between 1992 and 2000. LYNN PRICE & MARK D. LEVINE, *Production and Consumption of Energy*, in STUMBLING TOWARD SUSTAINABILITY,

much of the rest of the world is envious of the standard of living in the United States. But can the world's environment sustain a situation in which six or nine billion people consume materials and energy in the same manner and at the same level that Americans currently do? Lomborg ignores the serious risks raised by unsustainable patterns of production and consumption.

C. *The Book Virtually Ignores Ethical and Religious Consequences of Environmental Degradation*

Lomborg is not alone here, but that doesn't excuse the problem. Westerners in particular tend to see the environment as separate from themselves, and to see their moral or ethical responsibilities primarily in terms of their relationships with other people. Thus, the environment and sustainable development are not particularly relevant to their individual or social obligations.⁸¹ But that view is mistaken.

The idea that environmental degradation is connected to everything else we care about leads to an important moral insight: virtually everything that harms the environment also harms other people. Air pollution damages human health. Deforestation hurts people who use or depend on the forest, from indigenous people to hikers to people living downstream who experience greater flooding. Similarly, intergenerational equity is not just something we desire for our children and grandchildren; it is part of our moral obligation to others.⁸²

As a result, an assessment of environmental effects and risks should take into consideration the distributional consequences of those effects and risks. For climate change, for example, developed countries have contributed the largest fraction of greenhouse gases into the atmosphere over the past century, but developing

supra note 3, at 79, 87 (calculation from Table 2). Greenhouse gas emissions increased by 13.6 percent between 1990 and 1999. DONALD A. BROWN, *Climate Change, in STUMBLING TOWARD SUSTAINABILITY*, *supra* note 3, at 273, 285.

⁸¹ A recent exception would be the Evangelical Environmental Network and its effort to link morality and environmentalism, notably through its "What Would Jesus Drive?" campaign. See generally Danny Hakim, *A Group Links Fuel Economy to Religion*, N.Y. TIMES, Nov. 19, 2002, at C1.

⁸² The sacred texts and beliefs of the world's religions are also supportive of sustainable development, even if that has not always been true of their practices. Buddha taught respect for all life. Native American religious beliefs recognize the connectedness of all life. The Jewish and Christian traditions teach that God made the world, that God declared creation to be good, that the earth belongs to God, and that humans are to exercise stewardship or dominion (not domination) over creation. Of course, the texts and beliefs of each of the world's major religions also teach responsibility toward other humans. For the faithful, these teachings give religious significance to moral or ethical responsibilities to other people. See generally Hessel, *supra* note 32, at 593.

countries are likely to be much more negatively affected than developed countries.⁸³ It is one thing when developing countries more or less voluntarily assume the effects of greater pollution in order to develop their economies; it is quite another when developed countries impose those adverse effects on them. Surely such disparities are relevant to understanding whether things are getting better or worse, especially in a book on the “real state of the world.” Such disparities may also create animosities toward developed countries that could present political and even legal risks, particularly when the effects of climate change in developing countries are more clearly experienced.⁸⁴

II. OUR FUTURE MAY BE GENERALLY BETTER OR WORSE THAN IT IS NOW, DEPENDING IN LARGE PART ON THE CHOICES WE MAKE

Lomborg’s view of the future is both positive and certain: “children born today – in both the industrialized world and developing countries – *will* live longer and be healthier, they *will* get more food, a better education, a higher standard of living, more leisure time and far more possibilities—without the global environment being destroyed.”⁸⁵ It is likely that the problem of water scarcity “can be solved;”⁸⁶ climate change is “a limited and manageable problem;”⁸⁷ [t]here is . . . “good reason to believe that the developing world” will eventually reduce its air pollution.⁸⁸ I agree that this is one possible future, but it is not the only possible future. Our future could involve massive environmental degradation and an enormous divide between rich and poor, or it could be based on a decent environment in which resources and opportunities are available to all.⁸⁹ In addition, labeling a problem as solvable, manageable, or likely to be solved does not actually solve that problem in the real world. Indeed, Lomborg tends to assume away the question we most need to answer: how do we move from

⁸³ See *infra* notes 107-08, 119 and accompanying text. See generally DONALD A. BROWN, *AMERICAN HEAT: ETHICAL PROBLEMS WITH THE UNITED STATES’ RESPONSE TO GLOBAL WARMING* (2002) (“examin[ing] the positions that the United States has taken in global warming negotiations through an ethical lens,” and “conclud[ing] that many of the U.S. positions in global climate change negotiations are ethically bankrupt no matter what ethical theory is used to make an ethical analysis”). *Id.* at xiii.

⁸⁴ Distributional issues also exist for income. Large increases in gross domestic product, for instance, can easily conceal significant concentrations of poverty.

⁸⁵ LOMBORG, *supra* note 1, at 352 (emphases added).

⁸⁶ *Id.* at 156.

⁸⁷ *Id.* at 323.

⁸⁸ *Id.* at 177.

⁸⁹ Kofi Annan, *Beyond the Horizon*, TIME, Aug. 26, 2002, at A18.

a global society based on unsustainable development to one based on sustainable development?

We should “focus primarily on the economy” and on “securing economic growth,” Lomborg says.⁹⁰ Essentially, he says, all other good things will automatically happen if we do that. Lomborg evidently means that economic growth based on “business as usual” will provide the means to achieve environmental protection at some future point. Without question, economic development is important. But it is not the complete answer, and not all forms of economic development will do. The challenge is to foster a situation in which economic, social, environmental, and security goals are advanced in mutually reinforcing ways.

The book doesn’t contain a program of action. Lomborg rarely gives unqualified support to any environmental protection measure. Instead, he repeatedly applies a set of assumptions or propositions as reasons for withholding support for environmental laws and policies. By teasing these propositions out of the text, it is possible to see how they differ from a sustainability-based approach, and how misguided they are. To achieve sustainable development, though, we need to recognize at least six things about appropriate laws and policies, five of which are contradicted by the text.

A. *Good Governance and Other Factors, Not Just Economic Growth, Contribute to Human Quality of Life*

A central theme of the book is the positive correlation between economic development and human quality of life.⁹¹ The book suggests but does not demonstrate that economic growth alone is responsible for these improvements. Nor could it make that demonstration. National governance, peace and security, and social development or human rights have also played a significant role. Ironically, Lomborg’s assessment of human progress over the past several centuries ignores entirely one of the greatest success stories of the period – the rise of democratic governance, individual liberties, and adherence to the rule of law.⁹² Even in the last several decades, the number of democratically governed coun-

⁹⁰ LOMBORG, *supra* note 1, at 324.

⁹¹ *Id.* at 70-86 (discussing the relationship between economic development and consumer goods, education, leisure time, and safety).

⁹² *See id.* at 506-15. According to the index, Al Gore, a favorite target for Lomborg, is discussed at least 13 separate times. *Id.* at 511. But there is not a single reference in the index to democracy, environmental law, environmental regulation, governance, liberty, law, regulation, or even subsidies. There are, however, two references to environmental taxation. *Id.* at 509.

tries has grown and the number of countries with authoritarian governments has declined.⁹³ The role of sound national governance in fostering human quality of life was emphasized in the recently completed World Summit on Sustainable Development in Johannesburg.⁹⁴ Civil liberties, the rule of law, and protection of private property all provide support and encouragement for individual and corporate effort, and thus facilitate economic development. At the same time, economic development requires a healthy, well-educated work force, adequate transportation, adequate resources, a clean environment, and other institutions and infrastructure; none of which is likely to occur or be maintained without the active support of national, regional, and local governments. And all of these things are put at risk when there is war or even terrorism. Economic growth alone, then, is an insufficient means of improving human quality of life.

B. Laws and Policies are Essential for Environmental Protection

Lomborg concedes only part of this point. He admits that air pollution laws in the United States and the United Kingdom should get some of the credit for reducing air pollution in those countries. Then he adds that technology also played a role,⁹⁵ without acknowledging that these laws forced the development of necessary technology. But he regularly explains environmental improvements as being based on domestic or international environmental laws.⁹⁶ This, of course, underscores the importance of law.⁹⁷

Lomborg also recognizes that the failure of regulators to require that the negative costs of fossil fuels be included in the price of these fuels puts renewable energy at a competitive disadvantage.⁹⁸ Thus, the book contains at least some recognition that government also can be part of the problem. In the United States, there appear to be many different kinds of laws, including but not limited to subsidies, that support or encourage unsustainable de-

⁹³ HUMAN DEVELOPMENT REPORT 2002, *supra* note 9, at 14-15.

⁹⁴ WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT, PLAN OF IMPLEMENTATION ¶ 4 (Sept. 5, 2002) (advance unedited text), at http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.pdf [hereinafter PLAN OF IMPLEMENTATION] ("Good governance within each country and at the international level is essential for sustainable development.") [hereinafter PLAN OF IMPLEMENTATION].

⁹⁵ LOMBORG, *supra* note 1, at 170; *see also id.* at 351.

⁹⁶ *See, e.g., id.* at 176, 189, 231.

⁹⁷ *Id.* at 32 ("This does not mean that I am a demonic little free-market individualist. I believe that there are many circumstances in which environmental intervention is necessary if we are to prevent unnecessary pollution and avoid people shunning their responsibilities.")

⁹⁸ *Id.* at 132.

velopment.⁹⁹ The repeal or modification of those laws would enable individuals and corporations to make choices on behalf of the environment or sustainable development that they are now discouraged from making. It would reduce barriers to market entry and level the economic playing field for companies competing with fossil fuels. In this important respect, sustainable development would enhance human freedom and economic opportunity.

C. Poverty and Environmental Degradation are Mutually Reinforcing

Lomborg assumes wrongly, and without analysis, that poverty and environment are unrelated problems. The “major problems remain with hunger and poverty,” he says, and “we must prioritize the environment as against better education, more health care, and better infrastructure as well as improving conditions in the Third World.”¹⁰⁰ The environment, in other words, has little if anything to do with poverty. In fact, poverty and environmental degradation are mutually reinforcing. As a consequence, economic development efforts supported or allowed by governments also require environmental protection to be effective.

Poverty contributes to environmental degradation, as the World Commission on Environment and Development concluded in 1987: “Those who are poor and hungry will often destroy their immediate environment in order to survive.”¹⁰¹ But it also works the other way: environmental degradation contributes to poverty. The poor tend to breathe the most polluted air, to drink the most contaminated water, and to live on the most degraded lands. About 1.3 billion people live on environmentally fragile or sensitive lands where agricultural opportunities are limited, and a great many of these people live on less than one dollar per day.¹⁰² The economic and human health consequences of inadequate or polluted resources are to deepen their poverty and to make it more difficult to escape poverty.

Moreover, environmental changes that impose costs on everyone will be more damaging to the poor because they lack the

⁹⁹ JOHN C. DERNBACH, *Synthesis*, in STUMBLING TOWARD SUSTAINABILITY, *supra* note 3, at 3; see also Doug Koplow & John Dernbach, *Federal Fossil Fuel Subsidies and Greenhouse Gas Emissions: A Case Study of Increasing Transparency for Fiscal Policy*, 26 ANN. REV. ENERGY & ENV'T 361 (2001) (reviewing literature on fossil fuel subsidies in the United States and identifying benefits that could accrue from their modification or repeal).

¹⁰⁰ LOMBORG, *supra* note 1, at 327.

¹⁰¹ OUR COMMON FUTURE, *supra* note 5, at 28 (“They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities.”). *Id.*

¹⁰² THE WORLD BANK, *supra* note 10, at 59.

means to adapt to change. Climate change is an example. As Lomborg acknowledges, "the developing world will experience by far the most damage from global warming,"¹⁰³ including damage to its food production systems.¹⁰⁴ Many people in these countries are vulnerable to the effects of climate change; as many as ten million people in Bangladesh may be displaced by rising sea levels.¹⁰⁵ In addition, people in developing countries lack the means to adapt; we can buy air conditioners, and they can't. Over and over, environmentally degrading economic development makes the poor worse off and reduces their economic opportunities. Many environmental controversies, moreover, are not conflicts between humans and the environment; they are controversies between humans over competing uses of the environment or natural resources, including forests, agricultural lands, and fisheries. The winners are made wealthier, and the losers, who tend to be less well off, are made poorer. Environmental degradation also offsets the benefits of economic growth. The World Bank estimates that the cost of air and water pollution in 1995 in China was equal to eight percent of that country's gross domestic product.¹⁰⁶

D. Economic Growth is Not an Essential Precondition to Environmental Protection

A great deal of environmental protection can be accomplished now, with good governance, even in developing countries, in ways that further both social well-being and economic growth. Lomborg's contrasting view on this issue is straightforward: "only when we get sufficiently rich can we afford the relative luxury of caring about the environment."¹⁰⁷ On this point, Lomborg cites the World Economic Forum's Environmental Sustainability Index (ESI), developed in collaboration with Yale and Columbia Universities.¹⁰⁸ The book shows a figure from the ESI in which, Lomborg says, "higher income in general is correlated with *higher en-*

¹⁰³ LOMBORG, *supra* note 1, at 322.

¹⁰⁴ *Id.* at 289.

¹⁰⁵ See JOHN HOUGHTON, GLOBAL WARMING: THE COMPLETE BRIEFING 111-15 (2d ed. 1997) (discussing the impact of a rise in sea level on inhabitants of coast zones, delta areas, and low-lying islands throughout the world).

¹⁰⁶ THE WORLD BANK, CLEAR WATER, BLUE SKIES: CHINA'S ENVIRONMENT IN THE NEW CENTURY, A SUMMARY OF THE ENVIRONMENT SECTION OF THE CHINA 2020 REPORT, available at <http://www.worldbank.org/nipr/china/clrwt-sum.htm> (last visited Oct. 17, 2002).

¹⁰⁷ LOMBORG, *supra* note 1, at 33; see GLOBAL LEADERS FOR TOMORROW ENVIRONMENT TASK FORCE, WORLD ECONOMIC FORUM, ENVIRONMENTAL SUSTAINABILITY INDEX (2002), available at <http://www.ciesin.org/indicators/ESI/downloads.html> (providing the Environmental Sustainability Index Report for 2002 in pdf format).

¹⁰⁸ LOMBORG, *supra* note 1, at 33.

vironmental sustainability.”¹⁰⁹ Thus, Lomborg’s formula is: economic growth now, environment later.¹¹⁰ That is not, however, an accurate reporting of the ESI. The first page of the ESI executive summary states:

Although the ESI is broadly correlated with per-capita income, the level of development does not alone determine environmental circumstances. For some indicators there is a strong negative relationship with per-capita income. Moreover, within income brackets, country results vary widely. Environmental sustainability is therefore *not* a phenomenon that will emerge on its own from the economic development process, but rather requires focused attention on the part of governments, the private sector, communities and individual citizens.¹¹¹

In fact, the variables that correlate most strongly with environmental sustainability are all associated primarily with governance—including civil and political liberties, reduced corruption, and democratic governance.¹¹² This conclusion is consistent with other works blaming governments in both developed and developing countries for failure to properly manage natural resources and the environment.¹¹³

Moreover, it is simply not true that developed countries with high incomes have the smallest ecological footprints. In fact, the opposite is more likely to be the case. “High pollution levels and rising greenhouse gas emissions are found in many strong economies,” the report adds later, “raising the specter of future negative quality of life impacts.”¹¹⁴ It is developed countries, not developing countries, that have made the largest historic contribution to greenhouse gas emissions.¹¹⁵ In addition, as already noted, the large ecological footprint of the United States grew even more over the past decade. While the United States has managed to reduce air and water pollution over the past several decades and

¹⁰⁹ *Id.* (footnote omitted).

¹¹⁰ This is not what sustainable development is about. The idea is to make progress on environmental protection, economic development, and social development at the same time, not to sequence environmental protection as a subsequent effort.

¹¹¹ GLOBAL LEADERS FOR TOMORROW ENVIRONMENT TASK FORCE, *supra* note 107, at 1.

¹¹² *Id.* at 22.

¹¹³ See, e.g., WILLIAM ASCHER, WHY GOVERNMENTS WASTE NATURAL RESOURCES: POLICY FAILURES IN DEVELOPING COUNTRIES (1999); GOVERNMENT VS. ENVIRONMENT (Donald R. Leal & Roger E. Meinert eds., 2002).

¹¹⁴ GLOBAL LEADERS FOR TOMORROW ENVIRONMENT TASK FORCE, *supra* note 107, at 17.

¹¹⁵ Framework Convention on Climate Change, May 9, 1992, *reprinted in* 31 I.L.M. 849, 851 (1992) (“[n]oting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries”).

manage its waste better, it does not have a particularly good record of protecting biodiversity, protecting the environment from the adverse effects of agriculture, reducing greenhouse gases, controlling suburban sprawl, or protecting the ocean within its territorial waters.¹¹⁶

E. Precautionary Measures are Appropriate to Address Significant Environmental Risks

If we accept the existence of scientific uncertainty, as knowledgeable observers do, then the real world problem is how to proceed in the face of uncertainty. The precautionary approach or principle provides a navigating device, stating that we should not refrain from acting in the face of irreversible harm if there are cost-effective ways of proceeding.¹¹⁷ This is a common sense approach, not just to uncertainty regarding environmental effects, but also to many other kinds of uncertainty that we deal with in our lives. In the face of uncertainty, we daily see precaution used to protect the economy, national security, and other aspects of national and community life. When we use seat belts or lock our doors, or when we see the doctor because of a physical condition we don't understand, we are using precaution in the face of uncertainty. On the other hand, scientific uncertainty is the standard reason that the environment loses to economic development projects. The precautionary approach or principle is simply a way of attempting to ensure that environmental concerns get the same level of attention as economic concerns whose impacts are often more predictable and certain.

Lomborg seems to understand that the precautionary principle can be applied to environmental and nonenvironmental problems, but he attacks it for putting the environment *ahead* of all other concerns.¹¹⁸ This position turns the precautionary principle on its head, and utterly ignores large areas of scientific uncertainty where prudence would suggest greater care.

¹¹⁶ See DERNBACH, *supra* note 99, at 3.

¹¹⁷ The precautionary approach or principle is stated in somewhat varied ways in international agreements. See, e.g., Rio Declaration on Environment and Development, June 14, 1992, Principle 15, reprinted in 31 I.L.M. 874, 879 (1992); Framework Convention on Climate Change, *supra* note 115, art. 3.3, at 854.

¹¹⁸ See LOMBORG, *supra* note 1, at 348-50 ("It is imperative for us to see the environment as an important-but only *one* important-part of the many challenges we must handle."). *Id.* at 348. There are more extreme versions of the precautionary approach, as Lomborg acknowledges. *Id.* at 349-50. But Lomborg seems antagonistic to all forms of the precautionary approach.

F. *Laws and Policies are Increasingly Available for Sustainable Development*

Laws and policies can protect the environment, foster human well-being, and encourage economic growth at the same time. Contrary to Lomborg's repeated statements, every choice is not a tradeoff between environmental goals and other goals. Over and over, Lomborg says, we must prioritize; every dollar or rupee spent on the environment is a dollar or rupee not spent on something else.¹¹⁹ "If we want to improve one thing, such as Third World access to clean drinking water, we need to take the resources from other areas where we would also like to make things better."¹²⁰ Fair enough, but access to drinking water is not just about the environment; improving access to drinking water in developing countries would reduce the incidence of water-related disease and death as well as increase economic productivity.¹²¹ That's why the nations of the world agreed in Johannesburg to "halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water" and sanitation.¹²² The point of such measures is to improve environmental quality, social well-being, and economic growth at the same time.

A large and growing number of such measures are available, in both developing and developed countries. Many traditional practices already manifest "long-term sustainability in action."¹²³ Developed and developing countries can phase out subsidies for ocean fishing vessels, fossil fuels, and other examples of government spending for unsustainable development. China, a developing country, has reduced its greenhouse gas emissions while continuing its economic growth.¹²⁴ Many states in the United States have adopted measures that foster energy efficiency or renewable energy, create jobs, encourage technological development, and

¹¹⁹ *Id.* at 334 (stating the importance of "prioritizing between the environment and all other essential areas of society").

¹²⁰ *Id.* at 6.

¹²¹ GLOBAL ENVIRONMENTAL OUTLOOK 3, *supra* note 8, at 152 ("Lack of access to safe water supply and sanitation results in hundreds of millions of cases of water-related diseases, and more than 5 million deaths, every year.").

¹²² PLAN OF IMPLEMENTATION, *supra* note 94, at ¶ 7. With respect to access to drinking water, the Plan of Implementation mirrors the commitment by the U.N. General Assembly in 2000. *United Nations Millennium Declaration*, G.A. Res. 55/2, U.N. GAOR, 55th Sess. 8th plan. mtg. ¶ 19, U.N. Doc. A/55/L.2 (Sept. 8, 2000), available at <http://www.un.org/millennium/declaration/ares552e.htm>.

¹²³ Steven Sanderson, *The Future of Conservation*, FOREIGN AFFAIRS, Sept./Oct. 2002, at 162, 171 (identifying "the ancient rice terraces of Asia, Balinese water temples, and the traditional monsoon water-harvesting systems of Southern India" as examples).

¹²⁴ William K. Reilly, *A Climate Policy that Works*, N.Y. TIMES, April 1, 2001, § 4, at 17. Mr. Reilly is a former administrator of the U.S. Environmental Protection Agency.

provide economic opportunities for entrepreneurs that also have the effect of reducing greenhouse gas emissions.¹²⁵ According to the National Research Council, family planning, improvements in the status of women, and better attention to children, mostly in developing countries, could reduce the expected global population in 2050 by as many as one billion people; such activities over the past several decades have already reduced projected population levels.¹²⁶ Moreover, a well-established feature of international environmental law is the provision of money by developed countries to developing countries for the incremental additional costs of projects to address global warming, biodiversity protection, stratospheric ozone depletion, and other problems.

Throughout the developing world, there are many, many examples of practices that protect the environment and foster economic and social well-being at the same time. Indeed, one of the strongest impressions I got attending the World Summit on Sustainable Development in Johannesburg was how much learning has occurred over the past decade on this precise point. The Organization for Economic Cooperation and Development and others are using increasingly sophisticated analysis on how to decouple environmental impacts from economic activities; such analysis is likely to suggest additional means of protecting the environment while ensuring social and economic well-being.¹²⁷

A particularly helpful development is the increasing use of market-based tools and market-based thinking in environmental protection. There is a broad recognition that such tools, properly designed and implemented, can achieve far more environmental protection at a much lower economic cost than many other approaches. Thus, many of the legal tools used by U.S. states to address climate change allow trading, encourage competition where competition did not previously exist, and provide incentives to the private sector.¹²⁸ The emergence of subsidy reduction as an issue

¹²⁵ See John Dernbach & the Widener University Law School Seminar on Global Warming, *Moving the Climate Change Debate from Models to Proposed Legislation: Lessons from State Experience*, 30 ENVTL. L. REP. 10933 (2000). This experience contradicts Lomborg's argument that the ancillary benefits of reducing greenhouse gas emissions are minimal. LOMBORG, *supra* note 1, at 312-13 (asserting that attempts to reduce emissions are "much more limited than normally assumed" and that some "fell far short of real payoffs").

¹²⁶ OUR COMMON JOURNEY, *supra* note 20, at 12. Thus, population in 2050 could be 8.3 billion instead of 9.3 billion.

¹²⁷ ORG. FOR ECON. CO-OPERATION AND DEV., SUSTAINABLE DEVELOPMENT: INDICATORS TO MEASURE DECOUPLING OF ENVIRONMENTAL PRESSURE FROM ECONOMIC GROWTH 2 (2002) available at <http://www.oecd.org/olis/2002doc.nsf> (establishing a basis for formulating indicators to measure the decoupling of economic growth from environmental degradation).

¹²⁸ Dernbach & the Widener University Law School Seminar on Global Warming, *supra* note 125, at 10,933 (describing a variety of tools used in dealing with climate change).

in sustainable development is based on the same premise; subsidies for fossil fuels, as already noted, create a barrier to market entry for alternative energy sources and renewable energy. There is also increasing use of economic tools to establish a value for "nature's services." Such economic values make clear the economic losses incurred when the environment is destroyed in the name of economic growth.¹²⁹ They also suggest an increasingly important role for government: ensuring that a country's natural capital is maintained and protected so that it can be used by future generations as well as the present one. For everyone, but perhaps especially for the 1.3 billion drawing their living from ecologically fragile or marginal lands in developing countries,¹³⁰ environmental protection is a necessity that cannot – and need not – wait.

The good news, then, is not that these problems don't exist. The good news is that legal and policy tools are available to address them, and to put the world on a course for sustainable development. The good news, too, is that many of these tools are already being used, and with evident success, to at least some degree. That is precisely the conclusion that emerges from *Stumbling Toward Sustainability*, a 32-chapter assessment of U.S. sustainable development efforts over the past decade.¹³¹ For every single economic sector, natural resource, activity, or issue examined, the book's contributors recommended actions to put the country on a course for sustainability. In each economic sector, and at every level of government, some companies, individuals, and government entities are taking leadership positions in moving toward sustainability. This is true not just of the United States; it is also true around the world.¹³²

CONCLUSION

Much of the foundation for sustainable development, then, is good governance, and effective deployment of the right laws and policies. Law is at least as important to our future as economics. Of course, there are no guarantees, no magic formulas, for making sustainable development happen. It can be done, but only if we

¹²⁹ See, e.g., GRETCHEN C. DAILY & KATHERINE ELLISON, *THE NEW ECONOMY OF NATURE: THE QUEST TO MAKE CONSERVATION PROFITABLE* (2002) (describing the market for ecofriendly goods and encouraging government regulation to encourage the growth of the "nature services" industry); James Salzman et al., *Protecting Ecosystem Services: Science, Economics, and Law*, 20 STAN. ENVTL. L.J. 309 (2001) (describing ecosystem services and encouraging increased protection and valuation of ecosystem services through the development of rules and incentives).

¹³⁰ THE WORLD BANK, *supra* note 10, at 59-82.

¹³¹ STUMBLING TOWARD SUSTAINABILITY, *supra* note 3.

¹³² See OUR COMMON JOURNEY, *supra* note 20, at 1-2.

are willing to take seriously the real environmental risks we face, and not find excuses to ignore or underestimate them.¹³³

The good news is that risks are also opportunities. If we confront these problems directly, we can improve human quality of life by making our social, economic, environmental, and security goals more and more mutually reinforcing over time. We can also improve the effectiveness of national and global governance. It is the availability of these opportunities, and the legal and policy tools that are increasingly available to realize them, that provide our real basis for hope.

¹³³ Part of the appeal of *The Skeptical Environmentalist*, I expect, is that it makes denial easier. Denial has many forms. One can refuse to recognize facts, use euphemisms to minimize the significance of facts, deny that particular situations or events are morally wrong, or “not tak[e] active steps in response to knowledge.” STANLEY COHEN, *STATES OF DENIAL: KNOWING ABOUT ATROCITIES AND SUFFERING* 7-9 (2001). We deny things when we don’t want to know, when things are so much part of the background that we don’t even notice them, when it would threaten our sense of identity to recognize them, when we don’t care, or when we don’t think we can do anything about them. *See id.* at 23-24. Denial is not just something that individuals do; countries do it, and so do cultures. *See id.* at 10-11. Lomborg’s book exhibits most of these forms of denial. He denies environmental facts, minimizes their significance, and says, in effect, that the environmental degradation that occurs because of human activity is justified because of human progress. Besides, he says, environmental problems will go away eventually, and government action in the meantime will in all likelihood simply make things worse, so there is nothing much we can or should do anyway.

