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Climate Change in Cities of the Developing World

Robert Samuelson, a business and economics journalist, cautions: "[W]e don't know enough to relieve global warming, and . . . we can't do much about it."[1] He cites the International Energy Agency for the notion that unless we freeze everyone's consumption, including that of the global poor, greenhouse emissions will double by 2050.[2] James Fleming adds that the pursuit of technological or Rube Goldberg quick fixes to global warming by American and other experts raises doubts about the prospect of achieving the international cooperation and lifestyle changes required by more conventional approaches, such as carbon taxes, alternative energy sources, and other measures aimed at increasing energy efficiency.[3] One well-financed quick fix, nuclear power, threatens disasters that would

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1 Robert J. Samuelson, Editorial, *Global Warming's Real Inconvenient Truth*, WASH. POST, July 5, 2006, at A13.

2 *Id.*

3 James R. Fleming, *The Climate Engineers*, WILSON Q., Spring 2007, at 46, 48.

overwhelm even the risks of global warming. Having been rudely awakened to the demonstrable realities of climate change,[4] many policymakers are pessimistic about the ability of human civilization to cope. This is sad news for the poorest and most powerless citizens of developing countries and cities, including those of the rather underdeveloped New Orleans after hurricane Katrina, who will bear the brunt of the disasters and diminished opportunities associated with climate change.

The Intergovernmental Panel on Climate Change (IPCC) describes an "increasing . . . risk of storms, flooding, landslides, heatwaves and drought and [an] overloading [of] water, drainage and energy supply systems."[5] Up to 160,000 deaths per year are attributed to the effects

4 *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], *Summary for Policymakers*, *in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 1 *passim* (Susan Solomon et al. eds., 2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf. The Intergovernmental Panel on Climate Change, *Summary for Policymakers* is definitive in its support for the global warming/climate change paradigm, observing: "The understanding of anthropogenic warming and cooling influences on climate has improved since the [Third Assessment Report], leading to [ninety percent] confidence that the global average net effect of human activities since 1750 has been one of warming." *Id.* at 3 (citation omitted) (emphasis omitted). Further, "[w]arming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." *Id.* at 5 (citation omitted). *See* Naomi Oreskes, *The Scientific Consensus on Climate Change*, 306 SCI. 1686, 1686 (2004). Oreskes' meta-analysis surveyed 928 papers on climate change and found that "none of the papers disagreed with the consensus position" that human activity is the major cause of global warming. *Id.*; *see also* U.S. EPA, Climate Change, http://www.epa.gov/climatechange/index.html (last visited Apr. 12, 2010) (compiling data, statistics, reports, and other information concerning global warming). *But see* Jim Hansen, *The Threat to the Planet*, N.Y. REV. OF BOOKS, July 13, 2006, at 12, 14 ("The press and television, despite an overwhelming scientific consensus concerning global warming, give equal time to fringe 'contrarians' supported by the fossil fuel industry. Special interest groups mount effective disinformation campaigns to sow doubt about the reality of global warming. . . . The public is understandably confused or uninterested. I used to spread the blame uniformly until, when I was about to appear on public television, the producer informed me that the program 'must' also include a 'contrarian' who would take issue with claims of global warming. Presenting such a view, he told me, was a common practice in commercial television as well as radio and newspapers. Supporters of public TV or advertisers, with their own special interests, require 'balance' as a price for their continued financial support.").

5 IPCC, *Industry, Settlement and Society*, *in* CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 357, 382 (Martin Parry et al. eds., 2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter7.pdf. Heat waves are exacerbated by "heat islands"—the most built-up, centralized locations of a city. Saleemul Huq et al., Editorial, *Reducing Risks to Cities from Disasters and Climate Change*, 19 ENV'T & URBANIZATION 3, 5 (2007).

of global warming, and most of these impacts are felt in the developing world.[6] Common increases in diseases due to climate change include diarrhea, from floods that overload poor sanitary arrangements; cardio-respiratory ailments, from pollutants interacting with hotter temperatures in a low-level ozone; and increases in tropical diseases like malaria and dengue fever, which are now invading areas that were previously too cool to incubate them.[7] Effects are the greatest on vulnerable populations in urban areas.[8] De Sherbinin et al. give us a model of "multiple, synergistic stresses and perturbations" combining with "multiple, interacting physical and social characteristics of the exposed human-environment system."[9] In other words, there are "few easy prescriptions,"[10] although the poor and powerless typically prove to be remarkably resilient when their local governance and community organizations are competent.[11] Competence turns out to be a demanding criterion, however, as illustrated by the unnecessary deaths from the Chicago heat wave in 1995, the European heat waves in 2003, and Hurricane Katrina in 2005.[12]

I
A POLICY AGENDA

Author Brietzke is familiar with some cities in the developing world, including two cities from each of the continents of the South: Caracas, Venezuela and Rio de Janeiro (Rio), Brazil; Cairo, Egypt

6 Shaoni Bhattacharya, *Global Warming 'Kills 160,000 a Year,'* NEW SCIENTIST, Oct. 1, 2003, http://www.newscientist.com/article/dn4223-global-warming-kills-160000-a-year.html.

7 DAVID SATTERTHWAITE ET AL., ADAPTING TO CLIMATE CHANGE IN URBAN AREAS: THE POSSIBILITIES AND CONSTRAINTS IN LOW- AND MIDDLE-INCOME NATIONS 3, 28–29 (2007), *available at* http://www.iied.org/pubs/pdfs/10549IIED.pdf.

8 Sari Kovats & Andrew Haines, *The Potential Health Impacts of Climate Change: An Overview*, 11 MED. & WAR 168, 169 (1995).

9 Alex de Sherbinin et al., *The Vulnerability of Global Cities to Climate Hazards*, 19 ENV'T & URBANIZATION 39, 61 (2007).

10 *Id.*

11 *See id.*; SATTERTHWAITE ET AL., *supra* note 7, at 50–68; Huq et al., *supra* note 5, at 3–4.

12 *See* Bettina Menne, *Extreme Weather Events: What Can We Do to Prevent Health Impacts?*, *in* EXTREME WEATHER EVENTS AND PUBLIC HEALTH RESPONSES 265, 265 (Wilhelm Kirch et al. eds., 2005); Jan C. Semenza et al., *Heat-Related Deaths During the July 1995 Heat Wave in Chicago*, 335 NEW ENG. J. MED. 84, 84 (1996); Editorial, *Saga of Incompetence*, WASH. POST, Dec. 26, 2005, at A38.

and Nairobi, Kenya; and Jakarta, Indonesia and Kuala Lumpur, Malaysia. In 1999, flooding and landslides killed 30,000 and affected 600,000 in Caracas. Serious flooding also occurred in Jakarta in 2007.[13] Caracas, Rio, and Jakarta are all coastal cities and are thus vulnerable to rising sea levels.[14]

Before 1999, Caracas began using an innovative, risk-based means of land settlement and resettlement.[15] Rio is relatively fortunate to have federal revenues guaranteed by the Constitution; the other cities make do with a small part of the four to five percent of national revenues that are apportioned to urban areas.[16] Studies of other cities are often instructive and transplantable if they are carefully modified: balancing growth, equity, and sustainability in a Cape Town "ecovillage";[17] achieving a sustainable infrastructure planning in Cape Town;[18] improving the slums of Phnom Penh, Cambodia;[19] public participation in environmental management projects within a low-income settlement in Chiang Mai, Thailand;[20] and phasing the transfer of health services from an international nongovernmental organization (NGO) to a partnership between a local government and a local NGO in Nepal.[21] All of these studies emphasize the political and administrative obstacles that will figure prominently in this analysis.

Climate hazards combine in ways that are unique for each city, but similarities are often stressed here as more amenable to overall policy

13 Huq et al., *supra* note 5, at 6.

14 Alex de Sherbinin et al., *supra* note 9, at 60–61.

15 Virginia Jimenez Diaz, *Landslides in the Squatter Settlements of Caracas; Towards a Better Understanding of Causative Factors*, ENV'T & URBANIZATION, Oct. 1992, at 80, 84; *see* SATTERTHWAITE ET AL., *supra* note 7, at 65.

16 SATTERTHWAITE ET AL., *supra* note 7, at 75.

17 Mark Swilling, *Sustainability and Infrastructure Planning in South Africa: A Cape Town Case Study*, 18 ENV'T & URBANIZATION 23, 40 (2006).

18 Mark Swilling & Eve Annecke, *Building Sustainable Neighbourhoods in South Africa: Learning from the Lynedoch Case*, 18 ENV'T & URBANIZATION 315, 316 (2006).

19 Geoffrey Payne, *Getting Ahead of the Game: A Twin-Track Approach to Improving Existing Slums and Reducing the Need for Future Slums*, ENV'T & URBANIZATION, Apr. 2005, at 135, 139–44.

20 Gustavo Ribeiro & Angunthip Srisuwan, *Urban Development Discourses, Environmental Management and Public Participation: The Case of the Mae Kha Canal in Chiang Mai, Thailand*, ENV'T & URBANIZATION, Apr. 2005, at 171, 171–82.

21 Martin Allaby & Christine Preston, *Transferring Responsibility from an International NGO to Local Government: Experience from the Yala Urban Health Programme, Nepal*, ENV'T & URBANIZATION, Apr. 2005, at 249, 252.

analyses and conclusions.[22] Each city has a gleaming, high-rise commercial center—a heat island—which, except in Cairo and perhaps Rio, is smaller in relation to the city's total surface area compared to those in the West. Each city also has spacious, elite residential areas where the success of residents who are foreigners or ethnic minorities stirs resentment among the poor, thus creating occasional disorders. With the partial exception of Kuala Lumpur, these cities have huge residential areas occupied by poor and powerless people, many of whom are recent migrants from rural areas seeking work, as well as an emerging, better-educated middle class that cannot afford elite residences. This group lives in barrios, favellas, townships, alleys, or kampongs. Each of these are lacking in urban infrastructures such as roads; electricity and power plants; sewage; water plants; schools; medical care and hospitals; transport and communications; culturally and religiously important structures; responses to emergencies; financial services; supplementary care for the very young and elderly; social safety nets; and bureaucratic competence and, often, honesty. Such infrastructures range from grossly overstretched (e.g., decaying colonial-era facilities and administrative structures) to virtually nonexistent. All of this exacerbates extreme-weather events, such as sewage-laden flooding during increasingly common monsoons.[23]

Many opponents of projects aimed at mitigation of, or adaptation to, climate change argue that such projects take attention and resources away from immediate development needs. This line of thought is debunked by Lecocq and Shalizi, who examine theoretical and empirical studies of economic growth, rather than development, from the standpoint of climate change, mitigation evaluation, adaptation before and after a disaster, and the ultimate damage caused.[24] They found significant reductions in both short-term and

22 *See* Alex de Sherbinin et al., *supra* note 9, at 61.

23 *See* PIYA ABEYGUNAWARDENA ET AL., POVERTY AND CLIMATE CHANGE: REDUCING THE VULNERABILITY OF THE POOR THROUGH ADAPTATION 4–6 (Frank Sperling & Heather Budge-Reid eds., 2003), *available at* http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=1033.

24 Franck Lecocq & Zmarak Shalizi, *How Might Climate Change Affect Economic Growth in Developing Countries?: A Review of the Growth Literature with a Climate Lens* 3 (World Bank Dev. Research Group Sustainable Rural & Urban Dev. Team, Working Paper No. 4315, 2007), *available at* http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2007/08/13/000158349_20070813145822/Rendered/PDF/wps4315.pdf.

long-term resources due to the destruction or reduced productivity of production factors, including human labor and other resources to the introduction of economic rigidities.[25] Other reductions in growth occur due to forced technological changes, national and local poverty traps, and "lock-ins."[26] Lecocq and Shalizi also found that preemptive or preventive mitigations and adaptations are cheaper and less concentrated than adaptations after the fact, especially given the possibility of good lock-ins.[27] The difference between growth and development, increasingly called sustainable development, is the varying degrees of attention paid to improving the lot of the poor and powerless through development. A rising tide does not lift all boats in developing countries any more than it does or did in the United States, for example. Changes in climate thus reduce development rates to a greater extent than they reduce growth rates.

A committee of the IPCC found a "high correlation" between development and adaptive capacities, a correlation resulting, only in part, from markets.[28] The net costs of climate change, some of which are not yet monetized, will grow over time and vary widely across sectors and localities. Others found correlations among an interrelated development and resilience, reduced vulnerability, and increased opportunities—qualities also associated with actions against climate change.[29] The first item on the climate change policy agenda is: "Start with what you have, build on what you know."[30] It is not too cynical to label the same project either developmental or climate change mitigating, or both, depending on an aid donor's preferences. This is a superior alternative to the moral hazard of waiting until after a climate change disaster for the international relief community to bail

25 *Id.* at 37–38.

26 *Id.*

27 *Id.* Lecocq and Shalizi go on to argue that "lock-ins"—strong commitments to doing certain things in certain ways—and other channels by which climate change affects growth are poorly understood. *Id.* at 38. In contrast to practices in most of contemporary economics, growth must be evaluated in the presence of climate change as "path dependant with multiple equilibria." *Id.* at 41 (emphasis omitted). Existing economic models can be significantly improved by focusing on the indirect effects of the energy and climate-sensitive sectors on the rest of the economy. *Id.*

28 IPCC, *Perspectives on Climate Change and Sustainability*, *in* CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 811, 827 (Martin Parry et al. eds., 2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter20.pdf.

29 *See, e.g.*, SATTERTHWAITE ET AL., *supra* note 7, at 9–11.

30 *Id.* at 50.

nations out. Indeed, new literature on risk accumulation processes shows the need to shift attention away from disasters. The urban poor spend their lives adapting to often meager economic opportunities, political circumstances, risks to their homes such as crime, and a paucity of community organizations to act as buffers.[31] In order to understand constraints on autonomous adaptations by the poor, it is necessary to first try to understand their segregation by adopting a pro-poor-and-powerless attitude; this is the second policy agenda item, which is perhaps implicit in the first. The segregation of such people involves a lack of information that is not intensely local, a lack of public participation, and a lack of authority to organize. Poverty is difficult to understand because data on household income and the cost of non-food necessities in the informal (i.e., unlicensed or black market) sector is usually unavailable. Instead, proxies are used: malnutrition; infant mortality; housing quality; personal security, which is a particularly vexing problem in Caracas, Rio, and Nairobi; and the life chances of women and the elderly.[32]

Each vulnerability, such as poverty (ten percent of which the World Bank ascribes to climate change) and powerlessness, reinforces other natural and man-made vulnerabilities. These include: unequal access to resources, including information and technology; food insecurity; poor disaster management; poor land cover and use; incompetent governance and administration; malnutrition; insecure residential status; weak civil society supports; and deteriorating public safety.[33] Traditional coping techniques, such as trade, migration, the storage of food during productive years, and temporarily laboring for someone else, are often unworkable in urban areas where both houses and the economic resources necessary to replace them are equally flimsy following extreme-weather events.[34] Thus, the third policy agenda item is to recognize the value of the analyst's struggle to understand such a complex interrelatedness, so as to generate viable policy alternatives.

As in the slums of the United States, the poor and powerless are segregated from mainstream markets and the better economic opportunities they offer, as well as the decent education and health

31 *Id.* at 47.

32 *See id.* at 42.

33 *See, e.g.*, ABEYGUNAWARDENA ET AL., *supra* note 23, at IX–XII.

34 *See id.* at 6.

care that improve productivity and quality of life over time.[35] This comparison, however, is relative. For example, there is currently a debate over whether poverty should be measured in developing countries as living on two dollars per day or one dollar per day, a level of poverty no Westerner can imagine. Even under conservative assumptions regarding trends in population growth, land use, and industrial production in developing countries, computer models that combine environmental and epidemiological factors predict horrid health consequences in a warmer world,[36] especially in underresourced megacities like the six surveyed here, with partial exceptions for Rio and Kuala Lumpur. The fourth policy agenda item, then, is to promote the political and socioeconomic integration of the one billion (two billion by 2030) urban poor and powerless at the international level, as well as within developing countries.[37]

In all of the cities under discussion, the reasons for their original formation in a particular location no longer apply.[38] This is due to what economists call a collective action problem: moving to a particular city was and is a rational individual response to changing opportunities, even as it creates an overcrowded mess in the aggregate. Various national government efforts to curb this urbanization have proved futile because they contradict a private economic logic. A city will rarely depopulate much or disappear after a disaster—in the modern, post–Sodom and Gomorrah world—for economic reasons. Corporations and wealthy groups can adjust to disaster with relative ease, and the poor who are de facto bound to them are stuck and forced to learn to live with the risk of disaster.[39] In the crisis-prone Mumbai slums, for example, young workers often eat and sleep near their sewing machines in workhouse fashion, while earning four times what they would earn in the rural areas.[40] The fifth agenda item is calling attention to such collective action problems, since they can either reinforce or all but negate policy proposals.

35 Paul H. Brietzke, *Urban Development and Human Development*, 25 IND. L. REV. 741, 741 (1992).

36 Sid Perkins, *Dead Heat: The Health Consequences of Global Warming Could be Many*, 166 SCI. NEWS 10, 10 (2004).

37 *See* PATRICIA L. MCCARNEY, UN-HABITAT, OUR FUTURE: SUSTAINABLE CITIES—TURNING IDEAS INTO ACTION 34 (2006), *available at* http://www.unhabitat.org/downloads/docs/3040_94379_background-final.pdf.

38 *Cf.* Huq et al., *supra* note 5, at 9–12 (discussing why cities develop on risky sites).

39 *Id.* at 4; *see also* SATTERTHWAITE ET AL., *supra* note 7, at 94–96.

40 *Poverty in India: A Flourishing Slum*, ECONOMIST, Dec. 22, 2007, at 57, 59.

High levels of air and water pollution, already endemic in the cities under discussion, will exacerbate climate change events for the overwhelming majority who cannot afford ameliorations like air conditioning or bottled drinking water. While air breathability varies in the six cities being discussed, it is estimated that breathing the air in Jakarta, which currently has some fourteen million residents, is the health equivalent of smoking two packs of cigarettes a day.[41] Since many Jakartans also smoke two or more packs of strong but cheap *kretek* clove cigarettes daily, the fight for breath is often audible on the streets on a hot day.

"[D]oubling atmospheric concentrations of carbon dioxide boost[s] ragweed . . . pollen production by [sixty] percent" in the United States.[42] Developing countries have their own asthma-inducing plants and conditions, which are exacerbated in similar ways. Pollen and mold spores easily attach to diesel exhaust, which is then inhaled by children, the elderly, and others at risk.[43] Such statistics are "'a real wake-up call for people who mistakenly think global warming is only going to be a problem way off in the future or that it has no impact on their lives in any meaningful way.'"[44] Though we have not seen relevant studies, asthma is undoubtedly a more serious problem in our six (and many other developing) cities compared to those in the United States. Other air pollutants like ground-level ozone and airborne particulates are associated with increased numbers of emergency room visits, hospital admissions, and deaths from lung diseases in the United States.[45]

In the poor and powerless neighborhoods of these developing cities, the absence of interconnected sewer drains, much less actual treatment of the sewage, means that flooding increases water pollution that is already potentially deadly, especially since the water table is typically quite high. This is echoed in the findings of the city ombudsperson of Buenos Aires, Argentina, after an NGO filed a

41 *Cf.* LESTER R. BROWN, PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION 192–212 (2008) (discussing the air quality problems of several large Asian cities).

42 Perkins, *supra* note 36, at 12.

43 *Id.*

44 Press Release, Harvard Med. Sch. Ctr. for Health and the Global Env't, Experts: Childhood Asthma "Epidemic" Among Inner-City Youths Seen in Absence of Steps to Curb Global Warming, Fossil Fuel Use (Apr. 29, 2004), *available at* http://chge.med.harvard.edu/media/releases/urbanpress.html (quoting senior research scientist, Christine Rogers).

45 Perkins, *supra* note 36, at 11.

complaint against the city government for sewage "discrimination" against the poor and powerless who live in the southern districts.[46] Children there, and the elderly to a lesser extent, thus face the risks of hepatitis, gastroenteritis, cholera, meningitis, typhoid, and even polio.[47] The study found that the existing sewage arrangements were "incomplete and deficient."[48] They were created by the residents themselves, another collective action problem, rather than planned for interconnection by the local government; the consortium hired to improve things in Buenos Aires did little, and its contract has been revoked as a result.[49] This tale is typical of infrastructures in the developing world because, by definition, the poor and powerless cannot help themselves or compel the authorities to help them; indeed, if they could, they would not be poor and powerless.

Cairo and the agricultural productivity of rural Egypt offer a contrary example because they are vulnerable to upstream rainfall variations, rainfall which is markedly decreasing overall, in Ethiopia and South Sudan.[50] This rain then flows to Egypt through the Blue and White Nile respectively. Such decreased rainfall, then, impoverishes three connected countries. A similar story can be told about the Ganges and Indus rivers flowing through India and many of its major cities.

The availability of cooling centers is limited in developing cities because the main venues, such as government offices and elite hotels, are unlikely to welcome temporary occupation by poor people. One might wonder whether tax incentives could encourage corporations to open their offices to the poor temporarily, but, in these six cities and others, most corporations have already bribed their way into paying little to no taxes. A clever NGO, however, might convince a multinational corporation of the public relations benefit that would

46 Marcela Valente, *Argentina: Open Sewers a Health and Environmental Risk*, INTER PRESS SERVICE, Apr. 25, 2006, http://ipsnews.net/news.asp?idnews=33012.

47 *Id.*

48 *Id.*

49 *Id.*

50 C. FUNK ET AL., U.S. GEOLOGICAL SURVEY, ESTIMATING MEHER CROP PRODUCTION USING RAINFALL IN THE 'LONG CYCLE' REGION OF ETHIOPIA 3 (2003), *available at* http://earlywarning.usgs.gov/adds/pubs/EthProductionOutlook.pdf (noting that "the long cycle growing region in Ethiopia has been experiencing a strong and consistent drying trend"); SUMAYA AHMED ZAKIELDEEN, ADAPTATION TO CLIMATE CHANGE: A VULNERABILITY ASSESSMENT FOR SUDAN 4 (2009), *available at* http://www.iied.org/pubs/pdfs/14856IIED.pdf (noting that average rainfall in Sudan declined between 1941 and 2000).

result from serving as a cooling center. Otherwise, the poor may feel lucky to cool off in badly polluted underground car parks. Rural residents are often out of luck altogether. The sixth agenda item is perhaps obvious: tailor infrastructure projects, including those in health and education, to match local conditions and knowledge.

A major reason why slum housing is overcrowded and of poor quality is the fact that, with partial exceptions in Caracas and Kuala Lumpur, such housing is ostensibly illegal, and is thus occupied by squatters who often connect to electricity lines illegally. These squatters are treated as illegals by local governments, police, and the military. Owners, frequently as landlords, thus have no incentive to invest in housing improvements when the municipality could bulldoze the housing at any time. Hernando De Soto has done excellent work on the design of private property rights of "identified encroachers" in Mumbai, who are guaranteed compensation if their house is bulldozed,[51] and the design of administrative laws. The solution, basically, is to decrease the number and complexity of bureaucratic procedures to reduce their cost and the opportunities for corruption.[52] An audit of existing planning regulations would show the points where access to land is most impeded. The cure is to create a measure of security in unauthorized settlements, while also reducing the growth of future slums through improved access to land and basic services. There are promising experiments with communal urban tenures and, under U.N. Human Settlements Programme (UN-HABITAT), shared private-public ownership;[53] in fact, thirty percent of costs concern roads and needed public spaces anyway.[54] The seventh agenda item is establishing private property and land administration rules consistent with the nation's legal system, influenced as it is by colonial experiences and by subsequent ruling ideologies, which would increase tenure security and access to land and basic services at a price the poor can afford. Such an improved stake likely gives the poor more incentive to participate, and to thus reduce their powerlessness.

Community-based adaptation (CBA) and microplanning within a developmental framework, rather than the narrower one offered by,

51 *See Poverty in India: A Flourishing Slum*, *supra* note 40, at 59.

52 HERNANDO DE SOTO, THE OTHER PATH: THE INVISIBLE REVOLUTION IN THE THIRD WORLD 246–52 (June Abbott trans., Harper & Row Publishers 1989) (1986).

53 *See* MCCARNEY, *supra* note 37, at 38.

54 *See* SATTERTHWAITE ET AL., *supra* note 7, at 82 tbl.11.

for example, the U.N. Framework Convention on Climate Change,[55] are so important that they provide our eighth agenda item. This is because CBAs can, and sometimes actually do, provide not only things that poor individuals cannot afford, but that the various levels of government, aid donors, and international agencies cannot or will not fund.[56] The problem is that local NGOs frequently cannot reach consensus because, as in the typical law faculty meeting, little or nothing is at stake. However, seed money, or sponsorship by international or national NGOs, can often help form a compelling consensus. Human rights and the environment are areas where so-called civil society has made great strides. Amnesty International and Greenpeace, for example, are international NGOs that offer compelling agendas and small amounts of money to their national and local affiliates. International NGOs sometimes deflect criticisms from their affiliates, many of which operate underground. Those interested in climate change have yet to organize in this fashion, but such a step could be promoted by policy analysts qua analysts. In the many countries where the right to organize is not robust, operating underground makes sense because the police and military treat those who seem to oppose even local government policies as terrorists, currently the favored buzzword, or radicals who must be opposed coercively like the illegal residents they are. The ninth agenda item is to give the typically underemployed, yet expensive, police and military tasks to perform, such as disaster relief and other useful efforts related to climate change. Uniformed officers and poor people getting to know each other in uncoerced ways creates good public relations.

The political and administrative complexities surrounding our topic are enormous. There are similarities at a relatively high level of generality: a political and administrative elitism that makes participation by, and assistance to, the poor and powerless remote and difficult; an imperfect democratic accountability; the difficulty of designing political and administrative incentives for elites who, as a consequence, frequently turn climate threats into man-made disasters; and the tendency to pass the buck to a different level of government or to a foreign or multilateral aid donor. The sensible planning and implementation of climate change policies are handicapped by the distinct limits on bureaucratic competence, professionalism, and

55 *See id.* at 62–63.

56 *See id.*; Alex de Sherbinin et al., *supra* note 9, at 61–62.

altruism that promote corruption and a public mistrust of bureaucrats admittedly pulled in many directions at once. There are also many differences between and among countries rich and poor—differences in culture, levels of development, political and bureaucratic styles, and laws and legal systems due to different types of colonialism and post-independence ideologies and experiences. What, if anything, can be usefully modified and transplanted from richer countries? Can experts from these rich countries or from other poorer countries help create effective participation by the poor and powerless, as well as planning and implementation strategies? These are the topics analyzed in Part II.

II
POLITICS AND ADMINISTRATION

Kwame Nkrumah, the Black Star and first leader of post-colonial Ghana, famously said: "Seek ye first the political kingdom and all things shall be added unto you."[57] Nkrumah was arguably being more honest than his counterparts elsewhere, and we will examine the domestic political and administrative backdrop to climate change from this perspective, sometimes using Chicago's Mayors Daley, the elder and the younger, as our guides. Author Brietzke worked in Jakarta during a period when Suharto and his cronies' grip on power began to loosen. What transpired was called the "first e-mail revolution": security forces were never able to puzzle out the hit-and-run tactics of large numbers of students and others that were coordinated over the internet and by e-mail. Jakarta friends and colleagues thought Brietzke psychic because he could almost always predict the cronies' short-term responses. His technique can now be revealed: he would think of what Chicago's former Mayor Daley, the elder, would do in like circumstances. This analogy predicted so well because Chicago politics was, and still is, highly centralized in a one-party state—or municipality, for non-Chicagoans—run through patron-client relations, and blended with some democratic aspects. These democratic elements serve partly to disarm would-be domestic reformers and, in many developing countries, soothe international and bilateral donors.[58] We see such regimes in many developing

57 KWAME NKRUMAH, GHANA: THE AUTOBIOGRAPHY OF KWAME NKRUMAH 164 (4th prtg. 1961).

58 *See infra* Part II.A.

countries; Indonesia's Sukarno called it "guided democracy," and its hallmark is a political elitism.[59]

A. Politics

As always, the political complexity of climate change events continues to outrun their scientific complexity. We should not merely project elitism onto a Chicago political system known to be kleptocratic and patronage-ridden, or project it into some analytically safe foreign city. There are, however, some countervailing powers and pressures on elitism in the United States, so that it does not always determine political outcomes. But such powers and pressures have yet to emerge in many developing countries.

The six developing cities under discussion and their respective countries have slightly varying degrees and types of democracy while sharing the common element of governance through elitism.[60] Keen to insulate themselves from extreme-weather events, they, like Mayor Daley, the younger, will deal with such events only if forced to do so. Unfortunately, the poor and powerless by definition lack a politically effective way to express their needs and desires, or to organize effective NGOs to pursue their needs and desires as they define them, rather than relying on some elite politician who purports to represent them.

To have an effective and permanent democracy, it is a necessary but not sufficient condition, as the mathematicians say, that the ranks of the elites be fragmented. President Luiz Inácio Lula da Silva and President Hugo Chavez have divided the elites in Brazil and Venezuela, respectively, for example, with their populist rhetoric and some populist, occasionally undemocratic actions. Populism is at once the antithesis of, and an outgrowth from, elitism. Consider

59 Paul H. Brietzke, *The Politics of Legal Reform*, 3 WASH. U. GLOBAL STUD. L. REV. 1, 4–12, 60 (2004). "Elitism" is rule by an autonomous and self-perpetuating group, especially as unreconstructed from a previous, undemocratic regime. *Id.* at 4–12. Elites dominate politics, business, higher education, the media, and most other axes of power. *Id.* Analyses can profitably be based on the century-old Italianate elitism model of Gaetano Mosca, Wilfredo Pareto, Antonio Gramsci, and Robert Michels—perhaps as given an American twist by C. Wright Mills. *Id.* at 4–5. It speaks to the *chaebol* of South Korea, *apparatchiks* and the *nomenklatura* of Russia and Eastern Europe, the kleptocrats of Indonesia, and various family-based groups in Latin America. *Id.* at 5–8. Some find a façade democracy in an elitism: democratic procedures, but little that is democratic in substance, leaving a regime vulnerable to an undemocratic backsliding, into Depression-era Louisiana politics under Huey Long, for example. *Id.* at 4–5, 11–12.

60 *Id.* at 4, 6–9.

Peronism in Argentina and Huey Long's politics in Depression-era Louisiana.[61] Lula and Chavez may prove responsive to extreme-weather planning, but, in the other four cities and countries under discussion, elitism correlates with an increasing inequality and a resistance to reform through business as usual.[62] Regardless of whether elites are fragmented, the only recourse of the poor and powerless is usually to demonstrate or riot—a major reason why elites, and *their* police and military, treat extreme-weather events first and foremost as law-and-order problems. Consider, for example, New Orleans after Hurricane Katrina.

Adaptations to climate changes require long time horizons, while political time horizons are short. This discrepancy makes the design of political incentives difficult.[63] The Chicago heat wave of 1995 can be understood on the basis of political underdevelopment. An actual climate disaster is almost always a necessary precondition to effective action in the future, given the many more immediate and serious issues that compete for the attention of politicians of limited imagination, and the necessarily limited agenda-setting capacity of the poor in most developing areas.[64] Daley's initial reluctance to innovate stemmed from (self-) satisfaction with the status quo and from fears that the necessary changes would diminish his power, based as it is on patron-client networks. Fundamental to change under political elitism is the reasonable certainty that the electorate will hold incumbent elites responsible, an accountability[65] that, in turn, requires a vibrant media and a civil society that discovers and publicizes the consequences of politicians' inaction.[66] Daley was either smarter or less arrogant than other autocratic leaders in Chicago and recognized a regime-threatening event when he saw one. He was

61 *Id.* at 38; *see also* ALLAN P. SINDLER, HUEY LONG'S LOUISIANA 16 (1956).

62 *Id.* at 9.

63 Alex de Sherbinin et al., *supra* note 9, at 61.

64 *See* SATTERTHWAITE ET AL., *supra* note 7, at viii–ix, 38–40. Indeed, handled carefully, a climate disaster can, sad to say, be the basis for pretty fundamental reforms. *See also* ROGER W. COBB & CHARLES D. ELDER, PARTICIPATION IN AMERICAN POLITICS: THE DYNAMICS OF AGENDA-BUILDING 160–90 (2d ed. 1983) (observing that not just the poor but most of the rest of a populace will often disregard most facets of governmental decision-making processes except those regarding voting, which rarely has the effect on public policies that interest group pressures do).

65 *See* Brietzke, *supra* note 59, at 5.

66 *See* SATTERTHWAITE ET AL., *supra* note 7, at 71. In our six cities, there are few such political channels that the vulnerable can use to reduce their risks.

eventually seen to act appropriately and spurred the development of a heat wave response plan that ultimately proved effective.[67]

As with the effects of Hurricane Katrina in New Orleans in 2005, it is generally agreed that many massive natural disasters often have human folly as their precipitating ingredient.[68] Famines, for example, often occur following revolutions or government aggression against civilian populations, as they did in Ethiopia, Sudan, Uganda, and too many more countries in recent decades. Indeed, since the 1980s, Oxfam and other voluntary disaster relief organizations have seen famines and malnutrition as man-made disasters, rather than as the result of purely natural phenomena.[69] The burden of relief falls on these organizations and those of the United Nations, enabling the elite politicians, who need not fear accountability and subsequent electoral loss, to practice what economists call a moral hazard:[70] do nothing to mitigate or adapt to a climate change disaster before the fact, secure in the knowledge that disaster relief agencies will bail out their poor and powerless after a fashion. The same kind of moral hazard applies to risky behavior by banks that are "too big to fail," which expect a government bailout when they create disasters, as well as to education and health care expenditures in poor countries. The money saved by not incurring such expenses, because international and bilateral donors will fill the gaps somehow, leaves elites free to spend on the weapons that reinforce their elite power.

67 Carl Adrianopoli et al., *Extreme Heat Events*, *in* KOENIG & SCHULTZ'S DISASTER MEDICINE: COMPREHENSIVE PRINCIPLES AND PRACTICES 609, 616–17, 622 (Kristi L. Koenig & Carl H. Schultz eds., 2010).

68 *See* Paul H. Brietzke, *Hurricane Katrina: Nine Tales of Injustice from New Orleans* (forthcoming).

69 SHELDON WATTS, EPIDEMICS AND HISTORY: DISEASE, POWER AND IMPERIALISM 202 (1999); *see also* JOHN ABRAHAM, FOOD AND DEVELOPMENT: THE POLITICAL ECONOMY OF HUNGER AND THE MODERN DIET 90–104 (1991); NIGEL TWOSE, BEHIND THE WEATHER: WHY THE POOR SUFFER MOST: DROUGHT AND THE SAHEL 1, 12 (1984); AMARTYA SEN, POVERTY AND FAMINES: AN ESSAY ON ENTITLEMENT AND DEPRIVATION 1–48 (1981).

70 Paul H. Brietzke, *Law and Economics After the Great Recession* (forthcoming); Robert J. Samuelson, *Greenspan Strikes Back*, NEWSWEEK, Mar. 29, 2010, at 21 ("The problem of 'moral hazard'—meaning that if people think they're insulated from risk, they'll take more risks—applied not to individual banks but to all of society: bankers, regulators, economists, ordinary borrowers, and consumers.").

B. Administration

The accuracy of Kwame Nkrumah's assertion above[71] is borne out when we explore a comparative public administration. In the West, effective heat wave response plans, for example, are produced by appropriately trained and motivated professionals, some of whom belong to advocacy coalitions.[72] Such bureaucrats think and behave in ways that neoconservative public choice economists do not understand and thus cannot explain. They cannot explain such behavior on the basis of the altruistic inner checks associated with a bureaucratic professionalism, grounded in a long-term, agency-socialized view of the public interest—the very existence of which is denied by such economists who consider nearly all bureaucratic acts as inherently selfish and budget, power, or wealth maximizing.[73] Whichever way the reader comes out on this issue with regard to Western administrators, it seems clear that there is very little bureaucratic altruism in most developing countries. Why? Because there is very little of the professionalism through which it can take root. The net effect in these cities and countries is that little will happen unless Nkrumah's political lash is applied liberally, inevitably by elites whose motives are usually far removed from responding to extreme-weather events.

Low levels of administrative competence in many developing countries, especially at the municipal level, along with a well-deserved public mistrust due to the few benefits conferred by the bureaucracy, in the absence of bribes the poor cannot afford, perhaps, would bedevil any serious attempt to implement extreme-climate policies. Migdal finds that complex organizations, including states, have a tendency to disintegrate over time because of the various forces pulling them in so many directions; it is his contention that

71 *See* NKRUMAH, *supra* note 57.

72 *See* Susan M. Bernard & Michael A. McGeehin, *Municipal Heat Wave Response Plans*, 94 AM. J. PUB. HEALTH 1520, 1520 (2004).

73 *Compare* MARISSA MARTINO GOLDEN, WHAT MOTIVATES BUREAUCRATS? POLITICS AND ADMINISTRATION DURING THE REAGAN YEARS 11–12 (2000), *and* Paul A. Sabatier, *The Need for Better Theories*, *in* THEORIES OF THE POLICY PROCESS 1, 3 (Paul A. Sabatier ed., 1999), *and* Jane J. Mansbridge, *The Rise and Fall of Self-Interest in the Explanation of Political Life*, *in* BEYOND SELF INTEREST 3, 16 (Jane J. Mansbridge ed., 1990), *with* LAWRENCE B. MOHR, THE CAUSES OF HUMAN BEHAVIOR: IMPLICATIONS FOR THEORY AND METHODS IN THE SOCIAL SCIENCES 5, 151 (1999), *and* WILLIAM A. NISKANEN, JR., BUREAUCRACY AND REPRESENTATIVE GOVERNMENT 5 (1971), *and* ANTHONY DOWNS, AN ECONOMIC THEORY OF DEMOCRACY 36–38 (1957).

national cultures can provide stability and continuity to these institutions,[74] and that this self-regulating mechanism is mostly lacking in failed or failing states. Local administrators and politicians in these six cities are typically placed in office by national politicians as a reward for services they provided through patron-client networks, rather than because of a level of competence determined by competitive exams. Low incomes and meager tax collection capacities at the local level generate few local revenues, which are, in any event, dissipated through political maneuvers.[75] Robin Craig makes the important point that regulatory fragmentation, resulting in multiple assertions of authority and use-right claims, wastes scarce water (and many other resources, we would argue); provokes irreconcilable conflicts;[76] and, we would add, creates collective action problems, namely, ensuring enough for yourself creates waste and hoarding, and thus leaves too little for others in the aggregate. For example, as it passes through central Jordan, the once-mighty Jordan River flows only six feet wide and two feet deep; countries upstream, Syria and Israel, take too much from the river and its underground aquifers for irrigation purposes.[77] Elites and their special interest groups, rather than some politically or administratively defined public interest, will likely win such games.[78] More neutral and expert international determinations are really no solution, and leaving such determinations to the economists' disembodied market makes them no less vulnerable to subordination by elites and their special interest groups. Craig's recommendations of a public debate, one that weighs cross-jurisdictional tradeoffs and pays more attention to the "end of the line"—for example, the shrinking and otherwise dying Dead Sea, into which the River Jordan empties—could be adapted to suit other resources as well.[79]

Capable planning resources are scarce, stretched, and stressed by elites ignoring or bribing their way out of inconvenient strictures that

74 *See* Joel S. Migdal, *Researching the State*, *in* COMPARATIVE POLITICS: RATIONALITY, CULTURE AND STRUCTURE 162, 162 (Mark Irving Lichbach & Alan S. Zuckerman eds., 2d ed. 2009).

75 Alex de Sherbinin et al., *supra* note 9, at 61.

76 Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 825 (2008).

77 Chris McGreal, *Once Mighty Jordan Reduced to a Trickle*, GUARDIAN (London), Mar. 9, 2009, at 15.

78 *See* Craig, *supra* note 76, at 825.

79 *Id.* at 826.

are embodied in some plan. It is risky to specialize in, for example, health care planning, since bureaucrats are regularly transferred for reasons unrelated to need or individual performance. They might be transferred to forestall the emergence of rival patron-client networks, real or imagined, for example. Planning is almost certainly a sketchy, top-down imposition, where the undifferentiated top has often been wrong in the past. Such planning and regulation as it exists only serves those in power, as colonial relics perhaps, and is expensive and therefore corruptible. Emergency responses are uniformly directed toward maintaining regime stability, and involve the military and police rather than civil servants. Very low bureaucratic salaries and, often, a culture of corruption—the "tradition of gift-giving," or the "way we do things here," as it is sometimes described—mean that the bureaucratic decisions that are ultimately made often run contrary to policies based on reasoned elaborations of the public interest.[80]

People imbued with professionalism would do almost anything except join the dispirited, ill-trained, and poorly paid bureaucracy in most developing countries. Author Brietzke has concluded that rather strict, discretion-minimizing administrative laws, with clear criteria for evaluating and promoting or demoting the bureaucrat, and her evaluator, are what works in most developing countries.[81] This is simply because few will use their bureaucratic discretion to innovate in ways that advance the public interest. In sum, the frequent absence of suitable political and bureaucratic incentives is a significant constraint on transplanting useful experiences from elsewhere to deal with extreme-climate events in the developing world.

Explanations are needed for the paucity of climate change studies and plans in developing cities and countries. Is it caused by a lack of awareness, or by a lack of interest, given the seemingly more pressing developmental needs? Is it caused by inattention among elites, or overstretched scientific and planning capacities? Is it caused by all of these reasons? What, if anything, should be transplanted from Western countries, if it could be transplanted? For example, after the 2003 heat waves in Europe, the European Ministries of Health and Environment, at the Fourth Ministerial Conference for Environment and Health in Budapest in 2004, recognized the increasing hazards

80 Paul H. Brietzke, *Democratization and . . . Administrative Law*, 52 OKLA. L. REV. 1 *passim* (1999).

81 *Id.*

posed to human health by global warming. It was thus decided that it would:

> [(1)] develop[] . . . guidelines for estimating the burden of disease due to weather . . . ; [(2)] develop indicators for intercountry and intracountry comparison and monitoring of progress; [(3)] . . . coordinate the development of new methods, including sentinel monitoring and surveillance systems, to provide timely information on the health impacts of weather and climate extremes at the European level; [and] . . . develop and evaluate more effective and efficient interventions, such as early warning systems . . . ; and . . . [(4)] harmonize interventions across regions and countries to facilitate the sharing of data and lessons learnt.[82]

The World Health Organization (WHO) recommended and then participated in this harmonization. For Europeans, "[i]t is the combination of sciences, skills, and beliefs that is directed to the maintenance and improvement of the health of all the people through collective or social actions."[83]

Could this kind of approach be transplanted into the six cities being surveyed? Arguably, yes, into Caracas, Rio, and Jakarta, where ideological leanings coincide with a colonial background and legal system influences of the Spanish, Portuguese, and Dutch respectively. But the European emphasis on uniformity assumes this is both possible and desirable. This kind of collective social action is very un-British, especially after Blair's so-called reform of the Labour Party, and incompatible with the subsequent laws and ideological orientations evident in Nairobi, Kuala Lumpur, and Cairo. While Islam might be thought of as supportive of such an approach, it is merely given lip service in Egypt and Malaysia, and does not form much of the political formula in either country. More important, should this approach be transplanted? Europeans often punt issues like climate change to the European Union, a step typically thought inappropriate by the British, to say nothing of ostensibly individualistic Americans. Jurisdiction over climate change disasters in the United States usually falls to local governments by default because state and federal governments try to duck responsibility, despite the fact that climate change occurs in "interstate commerce," the major constitutional source of unenumerated federal powers in the United States. Consider, for example, the chaos surrounding the responses to Hurricane Katrina. Accountability here, discharging

82 Menne, *supra* note 12, at 270.

83 A DICTIONARY OF EPIDEMIOLOGY 145 (4th ed. 2001).

responsibility in visibly effective ways, is as vital to achieving administrative goals as it is in politics. In the Chicago example, the public and the media fixed responsibility on the office of the Mayor.[84] In Europe, responsibility is fixed on a national ministry or even on the national chief executive; the European Union lacks reality for many Europeans and their media. It makes sense to apply a European approach to accountability in the six cities discussed here, where local politicians and administrators are seen as incompetent time-servers, lacking an independent power base like that of Chicago's Mayors Daley. It remains to be seen whether bilateral aid donors or international agencies can perform EU-like functions for these six cities.[85]

Some functions, like weather prediction, are easy to integrate. The U.S. National Oceanic and Atmospheric Administration (NOAA) has global satellite and computer modeling coverage far superior to its European counterpart. NOAA gives about two weeks warning compared to three to seven days for European systems,[86] to say nothing of the World Meteorological Organization's system. NOAA already has a significant number of subscriber countries, funded by small sums from Congress to deliver the kinds of models and information that local experts need.[87] Some, Venezuela's Chavez for example, might mistrust NOAA's information, which is admittedly cleansed of sensitive national security information before being shared, but other users find it reliable. There is a great deal of research on risk assessment, which is the implications of vulnerability to the event rather than the potential seriousness of the event itself; rapid detection;[88] the costs and effects of house design; the means of organizing churches, synagogues, mosques, and other community organizations for local observations and disaster relief; and otherwise fixing many other gaps in our knowledge.[89]

84 *See supra* notes 59–67 and accompanying text.

85 *See supra* pp. 96–97.

86 T. Michelon et al., *Lessons of the 2003 Heat Wave in France and Action Taken to Limit the Effects of Future Heat Waves*, *in* EXTREME WEATHER EVENTS AND PUBLIC HEALTH RESPONSES, *supra* note 12, at 131, 132.

87 *Id.*

88 For example, during the 2003 heat wave in France, the effects in any given location were small, but 3000 died throughout the country.

89 R. Sari Kovats et al., *Heat Waves and Human Health*, *in* CLIMATE CHANGE AND ADAPTATION STRATEGIES FOR HUMAN HEALTH 63, 79–80 (Bettina Menne & Kristie L. Ebi eds., 2006); Menne, *supra* note 12, at 265, 268.

Such information can be, and to a large extent already is, shared with the developing world. Financial adaptations and innovations are also important. Cheap credit for small sums can be used to upgrade housing, to reduce both its impact on climate change and its vulnerability to weather events; create modest infrastructures; or start a business. An attenuation of risk, and a more accurate pricing of it, could result through a widespread and affordable, privately or publicly underwritten insurance, which spreads risk without creating moral hazards.[90] The World Bank is experimenting with underwriting such insurance.[91] But the problem remains that overlapping international, national, and local structures will spawn incoherent and uncoordinated funding systems that are damaging to the continuity that longer-term projects require. Private sector investment and private-public or NGO-public partnerships all have their welcome place, but, like insurance, their potential role has long been overestimated. In these and many other areas, local participation can be used to get the projects right, and to reduce their cost.[92]

What should administrators or politicians do about climate change in developing countries? Experiences in the United States provide a long list for developing countries to ponder concerning the relevance of topics and the workability of local adaptations. These include creating warning systems around weather predictions;[93] effective education and communication, for and with various publics and by various means; public registries of the elderly and other at-risk groups who need special attention during a disaster; experimenting with higher-tech solutions, such as a network of remote sensors that are particularly valuable for monitoring heat and earthquake events; public health measures, as executed by agencies that are underfunded and overstretched in all countries; identifying how medical practices and emergency systems for people who fall ill from extreme weather events differ from ordinary practices and systems; disaster response, perhaps by training the police and military, which would build the more positive image discussed above,[94] and create a more expert urban and regional planning structure that will generate public benefits beyond responses to climate change; awareness of cultural,

90 SATTERTHWAITE ET AL., *supra* note 7, at 53.

91 *See infra* pp. 119–20.

92 SATTERTHWAITE ET AL., *supra* note 7, at 53–54.

93 *See supra* notes 75–76 and accompanying text.

94 *See infra* pp. 110–11.

behavioral, and sociological factors that can make relief easier or more difficult; determining which additional resources are needed and where these can be obtained or perhaps borrowed; and how greater accountability, for example, will make politicians more deserving of local political, NGO, and media support over time.

European efforts, on the other hand, tend to be broader and more integrated. Contrasts with shorter-term, municipal-level plans of the United States are striking: changes in European building codes and wetland and shoreline protections; other land use provisions and planning permissions; controls over the rates of urbanization and deforestation; curbing air and water pollution by certain industries located close to cities; and other longer-term, risk-reducing concerns. These matters are all regulated to some extent in the United States, but Europeans will try to link these factors more coherently with concerns about climate change. Still, disasters like extreme-heat events are so new in Europe that the tailoring of responses to a specific event leaves much to be desired, including: the tailoring of local care and outreach; the communication of information to various publics; providing some basic responses, such as ice or untainted water and food; and the air conditioning of hospitals, cooling centers, and other facilities where at-risk people congregate. But developing countries are lucky in that they can select among what they may see as adaptable U.S. and European approaches to help develop a coherent package for meeting local needs. In the end, administrative success turns on local accountability,[95] capacity, and competence.[96]

III
DONORS AND POTENTIAL GLOBAL SOLUTIONS

It is too easy to paint ourselves into a gloomy policy corner. As is the case with Chicago and the French, underdevelopment problems in the politics, administration, and scientific capacities of most developing countries—and certainly in the six cities being surveyed, as well as elsewhere in the West—show how problematic the political-planning-implementation-enforcement interface can be for

95 *See* Brietzke, *supra* note 59, at 5.

96 SATTERTHWAITE ET AL., *supra* note 7, at 54–57.

dealing with climate change.[97] Can bilateral donors and U.N. agencies remedy these weaknesses?

Cairo, Egypt; Nairobi, Kenya; and Jakarta, Indonesia, are acutely dependent on aid from multilateral and bilateral donors. Without this aid, it is unlikely that their unstable governments would remain in power, and the International Monetary Fund (IMF), the World Bank, and the U.S. Agency for International Development (USAID) could thus demand implementation of effective climate change policies as one among many conditions on their receiving regime-saving aid. But this is unlikely to happen because donor funds are small compared to developing country needs, and the donors are, at present, unlikely to even consider extreme weather.[98] The hope is that "logical, justifiable, fundable" climate change projects "driven by good science" will get funded,[99] but this hope usually recedes into the future. Composed of elites at the upper reaches, the donors only know how to deal with fellow elites living in developing cities and countries.[100] These people are unlikely to consider extreme-weather events because they offer little profit and can often be ameliorated for wealthy families by, for example, allowing them to vacation in Paris during such an event. Consider the World Bank's passion for huge dam projects, which provide cheap power for large corporations, but misery and eviction from their dam-flooded lands for the rural poor, thereby swelling the ranks of the urban poor. Perhaps it was the late John Kenneth Galbraith that called a fondness for such things as dams an edifice complex. Even if aid donors mandated good climate change policies, their unwillingness to monitor the subsequent implementation of these mandates leaves the countries and cities in question free to do little more than give lip service to such policies and appoint several bureaucrats who will busily do nothing to implement the mandate.[101]

Funds are more likely to be available for disaster relief than for alleviating the effects of climate change. People and governments are moved to contribute to relief NGOs and U.N. agencies by media

97 *See generally* Paul H. Brietzke, *Playing Poker at the U.N.*, 26 PENN ST. INT'L L. REV. 317 (2007); Paul H. Brietzke, *Globalization, Nationalism, & Human Rights*, 17 FLA. J. INT'L L. 633 (2005) (critiquing the modern international legal arena).

98 *But see* ABEYGUNAWARDENA ET AL., *supra* note 23, at 22–23.

99 SATTERTHWAITE ET AL., *supra* note 7, at 2.

100 *See id.* at 3, 43.

101 Brietzke, *supra* note 59, at 13–19.

depictions of manifest suffering; consider, for example, Haiti in early 2010. Even so, and admitting how awful climate change disasters are for the participants, U.N. and charitable donations are often grossly inadequate, and seldom meet the needs of the poor and powerless who are most affected. After the December 2004 tsunami in South Asia, though not a climate change-related disaster, the Red Cross distributed thick blankets in Sri Lanka, a place far too warm to need them.[102] Relatively abundant disaster relief funds are being used in Sri Lanka to build "world-class tourist centers," rather than to resettle the half million displaced people or rebuild the two hundred schools and four universities that were destroyed.[103] Can we imagine a regional, or better yet, global equivalent of the new tsunami warning system, which failed South Java, Indonesia, in July 2006, for extreme-weather events generally, along with more effective and customized planning for each city? Further, can we imagine such a system without the climate change equivalent of the 2004 tsunami having to occur before meaningful global action begins? How would resources be provided for such systems?

According to Huq et al., "[t]here is a profound unfairness globally between those who cause climate change and those who are most at risk from its effects," through CO_2 emissions and the high consumption lifestyles of wealthy people and nations.[104] High-income nations maintain their own greenhouse gas and other harmful emissions by importing many energy-intensive goods from, for example, China, which has now replaced the United States as the world's largest polluter of greenhouse gases.[105] After all, analyses of

102 *Cf.* Eilene Guy, *Red Cross Kits Help Survivors Reconstruct Lives*, Jan. 19, 2005, http://www.greaterlongbeachrc.org/article.aspx?&a=454.

103 Bikash Sangraula, *Tsunami-Hit Countries: Disaster as Business*, INTER PRESS SERVICE, Mar. 28 2006, http://www.ipsterraviva.net/tv/karachi/viewstory.asp?idnews=599.

104 Huq et al., *supra* note 5, at 12.

105 SATTERHWAITE ET AL., *supra* note 7, at 28; Evan Ratliff, *Top 100 Science Stories: 1. China's Syndrome*, DISCOVER, Jan. 2008, at 16, *available at* http://discovermagazine.com/2008/jan/china2019s-syndrome. *But see* Eric A. Posner & Cass R. Sunstein, *Climate Change Justice* (Univ. of Chi. Law & Econ., Olin Working Paper No. 354, Univ. of Chi., Public Law Working Paper No. 177, 2007), *available at* http://ssrn.com/abstract=1008958; Richard Black, *'Major Melt' for Alpine Glaciers*, BBC NEWS, Apr. 4, 2006, http://news.bbc.co.uk/2/hi/science/nature/4874224.stm. One much-touted reform that is no reform at all is the United States "saving" 1711 million tons of carbon dioxide by importing goods from China—something Americans were going to do anyway, given cheaper Chinese prices. These American imports accounted for fourteen percent of China's carbon dioxide emissions, a savings in the United States of only three

sustainable development tend to stress equity in the distribution of resources. Such equity is going global to incorporate climate change factors as well.[106] These facts and arguments have led many to call for a distributive, or, as some have called it, corrective, justice: wealthy polluting countries should pay for amelioration of the climate change effects they have caused in more lightly polluting developing countries, which include the six cities surveyed here.[107] It takes little imagination to understand why wealthy countries contribute so little money to U.N. climate change programs under a "not until China, India, and Brazil do" refrain, since they believe that funding from such countries is unlikely. Doyle describes an excellent but very different approach from ours; it could be consulted as an antidote, perhaps.[108]

This Article treats significant parts of what UN-HABITAT's head, Anna Tibaijuka, calls "the biggest problem confronting humanity in the [twenty-first] century."[109] According to the background paper for the Third World Urban Forum (WUF), the "very existence [of cities] is threatened by . . . climate change," a prospect meriting interventions from the very highest to the lowest levels.[110] The WUF recommends that cities form a new web of relations and partnerships with and among multilateral institutions, bilateral donors, national and state or provincial governments, the private sector, and the urban poor.[111] Such relations could help realize upfront resource commitments for plan preparation and implementation, and for the upgrading of slums, which is part of the WUF's broader Cities

percent. *See also* Andrew Yeh, *Toxic Chinese Mercury Pollution Travelling to US*, FIN. TIMES, Apr. 12, 2006, http://www.ft.com/ (search "Toxic Chinese Mercury"; then follow first "Toxic Chinese Mercury Pollution Travelling to US" hyperlink). The American touting of this process ignores the essentially global flow of carbon dioxide, as illustrated by the fact that airborne mercury from coal-fired plants in China (and India), and dioxin and furan from Chinese cement kilns, also find their way into the U.S. atmosphere. *Id.*

106 IPCC, *supra* note 28, at 813.

107 *See* SATTERTHWAITE ET AL., *supra* note 7, at 88–93.

108 Alister Doyle, *China, India, Brazil Could Slash Energy Use—Report*, ALERTNET, May 29, 2006, http://3countryee.org/Cached/Reuters_ChinaIndiaBrazilCouldSlashEnergyUse.htm.

109 Jare Ajayi, *Development: From Slums to Sustainability*, INTER PRESS SERVICE, June 16, 2006, http://ipsnews.net/news.asp?idnews=33650.

110 MCCARNEY, *supra* note 37, at 8.

111 *Id.* at 4.

Without Slums campaign.[112] This is good global policy advice because, as the Hyogo Framework for Action, 2005–2015 notes:

> Disaster loss is on the rise with grave consequences for the survival, dignity and livelihood of individuals, particularly the poor, . . . [since this loss interacts with] changing demographic, technological and socio-economic conditions, unplanned urbanization, . . . environmental degradation, climate variability, climate change, . . . competition for scarce resources, and the impact of epidemics such as HIV/AIDS . . . .
>
> . . . .
>
> Events of hydrometeorological origin constitute the large majority of disasters.
>
> . . . .
>
> [T]he Yokohama Strategy [of 1994 addressed] . . . disaster risks in the context of sustainable development . . . [and identified gaps and challenges that still remain unfilled and unmet] in the following five main areas: (a) Governance: organizational, legal and policy frame-works; (b) Risk identification, assessment, monitoring and early warning; (c) Knowledge management and education; (d) Reducing underlying risk factors; (e) Preparedness for effective response and recovery.[113]

These are the kinds of weaknesses and shortcomings identified in this Article, and we see them replicated at the international level, usually for different reasons.

This Article has so far identified many best practices, as well as some of the ways in which these can be adapted to become more palatable and thus more effective in developing countries. There are many ways in which the integration and implementation of these practices are stymied: failures of imagination; political inattention; and falling between overly rigid layers of government, planning, and administrative incompetence. Yet, after some eighteen years since international efforts began, they have not gotten much further than identifying many best practices, including a few we neglect, by a bewildering variety[114] of international agencies and NGOs that are

112 *Id.* at 34–36.

113 World Conference on Disaster Reduction, Jan. 18–22, 2005, *Report of the World Conference on Disaster Reduction*, 6–8, U.N. Doc A/CONF.157/23 (Mar. 16, 2005), *available at* http://www.unisdr.org/eng/hfa/docs/Final-report-conference.pdf.

114 The International Strategy for Disaster Reduction (ISDR) was created in 1999, at the end of the International Decade for Natural Disaster Reduction promulgated by the General Assembly. *See* G.A. Res. 44/236, U.N. Doc. A/Res/44/236 (Dec. 22, 1989). The ISDR reports to and takes instruction from the Economic and Social Committee

sometimes preoccupied with reinventing the wheel.[115] Each of the authors has differing expertise in overcoming coordination and integration problems within and among complex organizations, but we have not yet obtained enough information to make concrete recommendations at the international level, a good future topic.

While international efforts properly seek to integrate disaster plans into overall development efforts, they then ignore these plans, perhaps in order to build political coalitions. A basic chicken-and-egg dilemma emerges: climate change mitigation and adaptation efforts are more similar than is often realized, and both are stymied by various political and administrative underdevelopments that exist, by definition, in the developing world. The Hyogo Framework calls for

("ECOSOC"), which in turn reports to the General Assembly. The ISDR operates through a small independent secretariat, the Global Platform for Risk Reduction, the Hyogo Framework, *see supra* note 113 and accompanying text, the Inter-Agency Task Force on Disaster Reduction (which also includes academics and scientists), and the following divisions: Africa, Asia and the Pacific; Latin America and the Caribbean; the Early Warning Platform; the Programme Advisory Committee; and the Management Oversight Board. A representative international NGO that coordinates its activities with the ISDR is the Global Alliance for Disaster Reduction (more than 1000 experts, based in North Carolina). Other agencies with an interest in the area are the U.N. Development Group and Development Assistance Framework, the Commission on Sustainable Development, the World Bank, the Inter-Agency Standing Committee (on humanitarian action), the U.N. Office for the Coordination of Humanitarian Affairs (OCHA), the Red Cross/Crescent/Flame, the World Meteorological Organization, and UNESCO (on disaster education in the schools; a special program was in effect for 2006–2007). We have no idea whether this list is complete, since we know that the World Health Organization (WHO), UN-HABITAT, the U.N. Environmental Programme, and the U.N. World Food Programme play significant roles concerning disasters. This is the basis for the "bewildering variety" characterization in the text; the likelihood that this jumble can be coordinated and integrated, along with regional, national, state/provincial, and city governments, approaches the vanishing point.

115 *See Report of the World Conference on Disaster Reduction*, *supra* note 113, at 6. The Hyogo Framework, lists objectives for the next 10 years, which arguably have already been refined in the Western best practices we identify: "identify specific activities . . . on vulnerability, risk assessment and disaster management; . . . share good practices . . . increase awareness . . . [; and] . . . increase the reliability and availability of appropriate disaster-related information . . . ." *Id.* at 8. *See also* OCHA, Protection of Civilians in Armed Conflict, http://ochaonline.un.org/HumanitarianIssues/ProtectionofCiviliansinArmedConflict/Introduction/tabid/1115/language/en-US/Default.aspx (last visited Apr. 13, 2010). The OCHA wisely calls for the development of a "culture of protection," and speaks of increased vulnerability: 200 million were affected by natural disasters in 2003, and 45 million needed life-saving assistance during "complex emergencies"—which include disasters plus armed conflict or human rights abuses. *Id.*; IRIN, U.N. OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, DISASTER REDUCTION AND THE HUMAN COST OF DISASTER 8 (2005), *available at* http://www.irinnews.org/pdf/in-depth/Disaster-Reduction-IRIN-In-Depth.pdf.

enhancing "governance for disaster risk reduction . . . and for capacity-development measures," through, for example, a strong institutional basis for implementation.[116] The Hyogo Framework ignores the fact that only a modestly improved disaster governance can occur independent of improved governance in general. Also, and again, presumably for political reasons, international efforts typically ignore the need for collaboration among foreign and domestic experts, perhaps within international and local NGOs. Such a need is ignored precisely because such collaborations can circumvent or help change conventional national politics and, to a lesser extent, national administration—factors we identify as significant stumbling blocks.

Why do international agencies do so little to help poor city dwellers in their struggle against climate change? According to Dreher and Ramada-Sarasola, many of these agencies are part of the problem rather than the solution.[117] The World Trade Organization indirectly, and projects financed by the IMF, World Bank, the African and Asian Development Banks, and the U.N. Development Programme, increase carbon dioxide emissions; projects of the U.N. Environmental Program and the European Bank for Reconstruction and Development are emissions-neutral; and only Inter-American Development Bank projects decrease emissions on balance.[118] David Satterthwaite identifies four reasons for this state of affairs.[119] First, international agencies are in "antagonistic relationship[s] between . . . [the] low-income groups" regarded as inessential and as holding back progress presumably defined in terms of growth rather than development.[120] Second, and given a tendency to exaggerate the relative problems of rural people in developing countries, carbon reduction initiatives are "deliberately" ignored.[121] Third, the links between the disaster and development departments of an international agency, and links among agencies, are weak.[122] Each department or agency has its own programs, criteria, and project cycles, and each prefers simple, discrete projects ill-suited for dealing with climate

116 *Report of the World Conference on Disaster Reduction*, *supra* note 113, at 10.

117 Axel Dreher & Magdalena Ramada-Sarasola, *The Impact of International Organizations on the Environment: An Empirical Analysis* 21 (Swiss Inst. for Bus. Cycle Research, Working Paper No. 131, 2006), *available at* http://ssrn.com/abstract=892566.

118 *Id.*

119 SATTERTHWAITE ET AL., *supra* note 7, at 50.

120 *Id.* at 3.

121 *Id.* at 50.

122 *Id.*

change.[123] Fourth, international agencies work through national governments, while climate change solutions are often fundamentally local.[124]

If formal international agencies are of little help, what about international NGOs? As we discussed, they have yet to form over climate change, but there is at least one nascent possibility: a loose advocacy coalition formed in the United States to lobby and share expertise with regard to extreme heat events. With members of the Global Alliance for Disaster Reduction and experts from Europe, international organizations, and developing countries, the coalition's members could serve as secular climate change missionaries. As economist Jeffrey Sachs asks: "The question is, do you sit back and watch [climate change] as a tragic spectator sport or do you roll up your sleeves and try to do [something] about it?"[125] A rather loose structure could and should be retained, but modest funding from a source that would not compromise the group's independence is required. Expertise in a variety of local cultures and languages, as well as in educational and media matters, with special reference to how the mistrust common among the poor can be overcome, would also be needed. Overall, this is an expertise of comparisons and contrasts, since one-size-fits-all policies will not work.

With a legitimacy based on not-for-profit voluntarism, advocates could initially try to deal with interested municipalities and NGOs. To begin with, advocates could target local chapters of the Red Cross/Crescent/Flame, and other first responders to disasters, as well as organizations of the elderly and medical professionals. In its democracy-through-civil-society efforts, the USAID tries to create or strengthen many NGOs. The Agency's track record with purpose-built NGOs is quite poor, however, with funds too often winding up in the pockets of elites who try to use their NGO as a political power base. The better course is for advocates to extensively publicize climate change preparedness and hope that supportive NGOs will then grow or organize themselves.

While advocates should not rudely neglect national governments, conveying a willingness to proceed regardless of national patronage,

123 *Id.*

124 *Id.*

125 Mica Rosenberg, *Economist Pushes Insurance as Answer to Disasters*, ALERTNET, Apr. 11, 2006, at 1, http://65.181.175.195/component/content/article/211-development/45069.pdf.

and to seek funding directly for municipalities from an international organization, might enhance opportunities for useful collaborations at the national level. At the very least, national politicians could increase the incomes and status of bureaucrats in climate change-related fields, and markedly reduce the rate of their transfer to other departments to give their group expertise a chance to grow.

While altruism has its limitations among a city's residents, the probability that one's family will lose life, health, residence, or livelihood due to a climate change event should create quite an effective negative incentive. But studies show that many people discount similar probabilities too heavily, and that, in any event, positive incentives are more effective. Chief among these is the opportunity for participation in the planning and implementation of climate change mitigations and adaptations.[126] Elite politicians might oppose this, thinking that it will lead to demands for public participation in other areas as well, or result in the loss of politicians' moral hazard opportunities to do nothing because international organizations will bail citizens out after a fashion if disaster strikes.

Empowerment through participation is a powerful incentive, which can lead to the growth of a valuable "culture of disaster resilience."[127] The International Strategy for Disaster Reduction, on the other hand, speaks of "a true culture of prevention"[128] taking root, adapted to local contexts and stressing cooperation and coordination. Such cultures rely on education, beginning in primary school, as "an interactive process of mutual learning among people and institutions."[129] For example, lessons are learned locally and from other countries concerning "the sustainable use and management of ecosystems."[130] While on the subject of incentives, it is just as important to determine what motivates cooperation within, between, and among the varied agencies at international, national, and local levels, and different ethnic and religious groups at the local level. There is some research that can be carefully adapted to be made more culturally relevant: the

126 *See Report of the World Conference on Disaster Reduction*, *supra* note 113.

127 *Id.* at 12.

128 U.N. Econ. Comm'n for Eur., Food and Agric. Org. of the U.N., *International Forest Fire News*, 102, No. 22 (Apr. 2000), *available at* http://www.fire.uni-freiburg.de/iffn/iffn_22/iffn22.pdf.

129 U.N. International Strategy for Disaster Reduction, Education, http://www.unisdr.org/eng/risk-reduction/education/education.htm (last visited Apr. 24, 2010).

130 *Report of the World Conference on Disaster Reduction*, *supra* note 113, at 15.

effects of information on participants and on their problem-solving,[131] consensus building and using it for planning purposes,[132] local knowledge and the discussion process,[133] and dealing with ethnic or religious dissensus.[134]

Food security prior to the disaster, the subsequent availability of emergency funds, and the means of forestalling epidemics and criminal activity after the fact, are fundamental to ensuring resilience, as is the protection and the strengthening of infrastructures discussed earlier. The Hyogo Framework also calls for strengthening social safety nets,[135] ignoring the fact that these have been dismantled in many developing countries because of conditions previously attached to loans from the IMF and the World Bank. Also, the diversification of income-earning opportunities to decrease the disaster vulnerability of the poor, recommended in Hyogo,[136] is useful in theory but unrealistic: the poor are lucky to find one such opportunity, which can then be wiped out by a disaster like the fishermen who lost their boats and fishing grounds because of the December 2004 tsunami. But funds spent duplicating income opportunities can better be used to create primary opportunities for those who do not yet have them.

Above all, much of the otherwise-valuable disaster planning done by international organizations only amounts to wish lists because they do not describe where and how the resources necessary for policy implementation are to be found. Perhaps to atone for past policy mistakes, and like the G8 at its 2005 Gleneagles Summit, the World Bank seems to have both the inclination and the money to deal with climate change and disasters in a developmental context.[137] Unfortunately, however, the climate change issue evaporated from the 2006 G8 Summit. The World Bank is trustee and an implementing

131 *See, e.g.*, Kevin S. Hanna, *The Paradox of Participation and the Hidden Role of Information: A Case Study*, 66 J. AM. PLAN. ASS'N 398 (2000).

132 *See, e.g.*, Judith E. Innes, *Planning Through Consensus Building: A New View of the Comprehensive Planning Ideal*, 62 J. AM. PLAN. ASS'N 460 (1996); Nigel Taylor, *Mistaken Interests and the Discourse Model of Planning*, 64 J. AM. PLAN. ASS'N 64 (1998).

133 *See, e.g.*, Richard W. Wilson et al., *Does Discussion Enhance Rationality? A Report from Transportation Planning Practice*, 69 J. AM. PLAN. ASS'N 354 (2003).

134 *See, e.g.*, Scott A. Bollens, *Urban Planning and Intergroup Conflict: Confronting a Fractured Public Interest*, 68 J. AM. PLAN. ASS'N 22 (2002).

135 *Report of the World Conference on Disaster Reduction*, *supra* note 113.

136 *Id.*

137 *See* ABEYGUNAWARDENA ET AL., *supra* note 23; World Bank, *Seeking New Strategies on Climate Change*, Nov. 1, 2005, http://go.worldbank.org/19IB4BOJI0.

agency for the Global Environmental Facility established in 1991, which is the financial mechanism for administering the U.N. Framework Climate Change Convention (UNFCCC).[138] The World Bank may thus be able to coordinate and integrate some or many efforts at various levels through the power of its purse. Fortunately, the departure of Paul Wolfowitz has reduced World Bank ructions. Inevitably, money will be sought where it can be found, and other international organizations will fund different aspects of the problem, thereby dissipating the policy coordination and integration accordingly. This will perhaps include an IMF in desperate search of a new role, at least prior to the Great Recession of 2008–10, with the experience of coordinating its efforts with those of the World Bank. Two favored World Bank projects are described below.

We sometimes forget that the rather unsuccessful 1997 Kyoto Protocol,[139] which President Clinton weakened and President Bush tried to destroy, was appended to the UNFCCC that took effect in 1994.[140] This Protocol does not cover rapidly industrializing countries like China, India, Brazil, and Mexico; the rather optimistic hope at the time was that such countries would learn from Western experiences and develop in more sustainable ways.[141] It would be an exaggeration, but not by much, to say that except for bits and pieces, the UNFCCC, secretariat and all, disappeared without a trace. Its application is supposed to be coordinated with the Biological Diversity, Combating Desertification, and Telecommunications for Disaster Relief Conventions that are only slightly more prominent in their effects.[142] While the UNFCCC is broad enough to accommodate improved global policies and coordination, steps in that direction in Bali in late 2007 were not promising.

One of the World Bank's most favored projects, a strategy referred to above that is also recommended in the Hyogo Framework of 2005, is insurance against the effects of disaster, inevitably laid off on the

138 ABEYGUNAWARDENA ET AL., *supra* note 23, at 30, 35.

139 Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (1998).

140 United Nations Framework Convention on Climate Change, Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, 5th Sess., Annex, U.N. Doc. A/AC.237/18 (Part II)/Add.1 (1992), 31 I.L.M. 849, *available at* http://unfccc.int/resource/docs/a/18p2a01.pdf.

141 Sanjay Suri, *Looking to Life After Kyoto*, INTER PRESS SERVICE, Feb. 24, 2006, http://ipsnews.net/news.asp?idnews=32284.

142 *See id.*; ABEYGUNAWARDENA ET AL., *supra* note 23, at 10.

reinsurance market to free resources for other uses. The first such experiment in disaster insurance is already in place for Ethiopia against the effects of drought. On the other hand, Haiti was insured against hurricanes only to be struck by earthquakes. Nevertheless, globally visible economist Jeffrey Sachs recommends disaster insurance as an alternative to the overstretched U.N. World Food Program for flooding and mudslides in Guatemala, for example.[143] Sachs said: "This should be an insurable risk, but whether or not the premiums would be too high would have to be explored. It may have to be done with some co-financing from the World Bank."[144] Indeed, the insurance commissioners of the fifty U.S. states voted unanimously to establish a task force to consider the effects of climate change on the industry; the world's largest insurance broker, Marsh & McLennan, is advising its Fortune 500 clients on the same subject.[145] Discussing which premiums to charge and who can or must pay them, recognizing that the Ethiopian or Guatemalan governments, much less their peasants, are too poor to do so, arguably creates too much cooperative activity on both sides of the insurance market. The likely effect would be to manipulate premiums into a two-tier, sovereign and international organization versus corporate insurance market.

We could respond to Sachs by saying that all risks are insurable, including the World Trade Center on September 11, 2001, although the U.S. government chose to bail out the affected U.S. insurance companies, thereby creating a moral hazard for the companies over insurance for megarisks in the future. The conventional solution is for a reinsurer, Lloyds of London or Munich Re for example, to set a reinsurance premium on a particular risk, which insurers then use to calculate their own premiums. If the World Bank is known to be paying much or all of the premium, our old friend moral hazard re-enters the equation. It might, therefore, be more efficient and effective for the World Bank simply to self insure; that is, to cut out the insurance company middleman and simply pay the cost of disasters itself, rather than get beaten to death by insurance premiums set by uncompetitive means. There might also be a useful role for the IMF in such a scenario since the conditions it sets on subsidizing

143 Rosenberg, *supra* note 125.

144 *Id.*

145 Jim Lobe, *States Calculate Global Warming Pricetag*, INTER PRESS SERVICE, Mar. 14, 2006, http://ipsnews.net/news.asp?idnews=32500.

monetary disasters are no longer much observed after Argentina called what turned out to be the IMF's bluff.

Another favored World Bank project, and the second strategy referred to above, is to underwrite carbon dioxide emissions markets like Europe's, as stipulated in Article 12 of the Kyoto Protocol.[146] The idea is that relatively nonpolluting companies or countries can sell pollution credits (i.e., the right to pollute) to relatively polluting companies or countries at a market price. This is supposed to encourage the adoption of pollution abatement technologies, so as to sell more pollution credits or the need to buy fewer of them. The nonmarket alternative, to simply order pollution abatement, is not favored by conservative politicians and economists.

However, the relevant market is fragile and fickle. The European market is driven by an EU rule whereby each of twelve thousand firms, which are big users of fossil fuels, will have to pay a carbon tax of $50 per ton beginning in 2006 and $125 per ton beginning in 2008, to the extent that companies do not meet the targets set by the European Union. The so-called free-market price under the shadow of this tax stood at $25.80 per ton of carbon dioxide at the beginning of 2006, and rose to $37.75 by mid-April.[147] Then came the announcement from several European governments that carbon dioxide levels were lower than each government's quota level, and the market price quickly fell to $16.60 per ton.[148] Rational, cost-based investments in pollution abatement technology—investments that would allow an owner to sell pollution credits or buy fewer of them, which is the purpose of the whole scheme—cannot occur in such a volatile market. Germany, one of the biggest EU carbon dioxide emitters, decided, pending a challenge in the European Commission, to exclude its coal industry from its carbon-trading program.[149] If this decision sticks, it likely spells the end of the European emissions market. This market can otherwise be seen as an expensive flop: Kyoto leads to high carbon prices and a highly

146 ABEYGUNAWARDENA ET AL., *supra* note 23; *see* Jad Mouawad, *As Profits Surge, Oil Giants Find Hurdles Abroad*, N.Y. TIMES, May 6, 2006, at A1.

147 *Pollution Reports Hurt CO2 Emissions Market*, WASH. TIMES, May 2, 2006, http://www.washingtontimes.com/news/2006/may/02/20060502-122647-8250r/.

148 *Id.*

149 Judy Dempsey, *New German Rule Could Increase Greenhouse Gas Emissions*, N.Y. TIMES, June 29, 2006, at C6.

differentiated, and thus inefficient, allocation of emissions abatements.[150]

The United States is not a member of the Kyoto club and, as the largest emitter until recently,[151] its corporations do not participate in such a market. The European Union prohibits participation in this market by non-EU members, and in fact prohibits EU members from participating in any non-EU carbon market,[152] both of which are inefficient restraints of trade. The United States plans to institute its own EU-style carbon tax to perhaps fund environmental or disaster remediation. This seems unlikely given the Great Recession and political deadlock, California's plans notwithstanding, at least until after the 2012 elections. Partly as a result of U.S. government inattention, a study shows that European and some Asian companies are paying more attention to global warming than their American counterparts, and that chemical companies are paying more attention overall than are oil companies; Chevron and Texaco are partial American exceptions.[153] With respect to carbon emissions in the United States, DuPont did the best while United Airlines did the worst, and some investor groups say they will give effect to this study.[154]

IV
THE END AS THE BEGINNING

The pessimism voiced by Robert Samuelson and James Fleming, and discussed in the first paragraph of this Article, may prove warranted. A committee of the IPCC adds to this pessimism its "high confidence" that, by 2100, climate change will produce "significant impacts" despite "aggressive mitigation . . . [and] significantly enhanced adaptive capacity."[155] But our journey through the politics, administration, and economics of cities, countries, and regional and international organizations in their dealings with extreme-weather

150 William D. Nordhaus, *Life After Kyoto: Alternative Approaches to Global Warming Policies* 7 (Yale Univ. Dept. of Econ., Nat'l Bureau of Econ. Research, Working Paper No. 11889, 2005), *available at* http://www.nber.org/papers/w11889.pdf.

151 MEINHARD DOELLE, FROM HOT AIR TO ACTION? CLIMATE CHANGE, COMPLIANCE AND THE FUTURE OF INTERNATIONAL ENVIRONMENTAL LAW 253 (2005).

152 Nordhaus, *supra* note 150, at 12.

153 Claudia H. Deutsch, *Study Says U.S. Companies Lag on Global Warming*, N.Y. TIMES, Mar. 22, 2006, at C3.

154 *Id.*

155 IPCC, *supra* note 28, at 813.

events and climate change generates many useful insights that are arguably conducive to forming a guarded optimism. We wish we could offer simple resolutions tying up the many loose ends that remain, but this topic is as complex as it is essential to solve. Any such solving will likely be done in bits and pieces that are tied to an overall development scheme at various governmental levels both domestic and international. We have carried the discourse over climate change some way forward, but the global poor command that we and our readers persist.