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CLIMATE CHANGE AND GLOBALIZATION: AN EMERGING PERSPECTIVE

Dr. Kaiser Manzoor*

Abstract

Climate change and globalization are weaving together the fates of households, communities, and people across all regions of the globe. Both processes are enhancing connections across space and time, such that actions taken in one location have increasingly visible effects on other locations, often in ways that are hard to predict. Both processes are seen as creating not only new opportunities but also growing risks and increasing uncertainty. Whereas geographic research has paid much attention to climate change and globalization as separate and distinct processes, only limited attention has been directed to the interactions between the processes.

* **Teaching in the Dept. of Environmental Science, University of Kashmir**

Introduction

Climate change and globalization are weaving together the fates of households, communities, and people across all regions of the globe. Both processes are enhancing connections across space and time, such that actions taken in one location have increasingly visible effects on other locations, often in ways that are hard to predict. Both processes are seen as creating not only new opportunities but also growing risks and increasing uncertainty. Whereas geographic research has paid much attention to climate change and globalization as separate and distinct processes, only limited attention has been directed to the interactions between the processes. A thread of studies has explored exposure to multiple stressors, winners and losers from both processes, dynamic and teleconnected vulnerabilities, and relationships between neoliberal policies and the capacity to adapt to climate change (e.g.,O'Brien and Leichenko 2003; O'Brien et al. 2004; Eakin 2006; Liverman and Vilas 2006; Keskitalo 2008; Adger, Eakin, and Winkels 2009; Silva, Eriksen, and Ombe 2009). Yet many questions remain regarding potential feedbacks between processes of globalization and climate change, adaptation to climate change under conditions of rapid socioeconomic change, and resilience to the risks and uncertainties associated with both processes. The linkages between climate change and globalization are readily evident when we consider the connections between the current global financial crisis and new initiatives in the areas of environmental and climate policy. There is, in fact, widespread public recognition, articulated by U.S. President Barack Obama, United Nations Environment Programme Executive Director Achim Steiner, journalist Thomas Friedman, and others, that the solution to the financial crisis and climate crisis go hand in hand: Efforts to transform energy systems and dramatically reduce greenhouse gas emissions can create new jobs and a better environment (Friedman 2008; Administration of Barack H. Obama 2009; Barbier 2009). Despite considerable public and media discussion of these issues, there have been few formal analyses of the interactions between climate change and the financial crisis. In particular, there has been little attention to how the mechanisms associated with global financial markets mediate climate change outcomes across spatial and temporal scales or how joint responses to both processes might influence adaptation efforts.

Despite widespread and growing public recognition of the linkages between environmental change and economic activities, geographic research efforts to date have paid only limited

attention to the connections and interactions between climate change and globalization. As a consequence, critical linkages, feedbacks, and synergies between these two processes often go unnoticed (Leichenko, O'Brien, 2010). Globalization theorists invoke climate change as part of a vague and black-boxed globalized environment, and climate change analysts both blame globalization for environmental problems and attempt to mobilize support for environmental causes through appeals to global citizenship and responsibility. Although globalization has enabled climate change to become a point of debate and climate change has contributed to the definition of globalization, neither contains the other. Climate change has strong ties to the cultural aspects and issues of globalization (especially in the domain of science), but more local economic and political issues play large roles in the debates about the sources, consequences, and possible policies of climate change. The concepts relevant to globalization often gain definition from the ways they are revealed in more concrete problem spaces, and climate change, as a global problem par excellence, reveals the shape and mechanisms of globalization as well as defining potential responses (Malone, 2002).

Approaches to Theorizing Climate Change

Global climate change, or "global warming," as it is sometimes termed, is simultaneously an exemplar of globalization and a type of universalization that transcends globalization. It may be the result of capitalism/consumerism (an economic dimension), modernity (a political/governance dimension), or science itself (a cultural dimension). The scientific narrative about climate change usually begins with Svante Arrhenius, a Swedish chemist who at the turn of the twentieth century hypothesized that increasing levels of carbon dioxide in the atmosphere would cause Earth's climate to become warmer. But it was not until after World War II that general and specific factors enabled scientists to investigate the link between carbon dioxide (and other radiatively active gases) and changes in Earth's climate. The scientific factors include improved and expanded measurements, and advances in computational power.

During the postwar period, countries were actively seeking international scientific cooperation, which resulted in a global network of atmospheric observing and measurement stations under the newly formed World Meteorological Organization (WMO). In 1958, the International Geophysical Year, David Keeling began measuring the level of carbon dioxide in the atmosphere

over Mauna Loa; this record clearly showed rising levels. Meanwhile, computer models of the climate system were being developed, first of the atmosphere, and then about the ocean. By the 1970s the US Department of Energy and other agencies were sponsoring climate model runs of increased atmospheric carbon dioxide. The 1980s and 1990s showed increasing levels of research, at both national and international scales. The central scientific organization in this area, the Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 under the auspices of the United Nations Environment Programme and the WMO. But these scientific activities unfolded in a historical context of globalization. After World War II, the United Nations was organized and the Bretton Woods system of international finance came into being. After the beginning of the Cold War, the United States sought national security through international scientific and political cooperation. The stage was thus set for political, economic, and cultural globalization (led, in the "free world," by the United States) and for scientific investigations of climate change (and other "global" problems). Most discussions of globalization that include the environment as a topic include climate change in a list of global environmental changes, such as the ozone layer, biodiversity, sustainable development, pollution and overfishing in the oceans, and acid rain. Although he acknowledges and maps the diversity of environmental organizational types, Castells (1997) treats these problems and their associated groups together as "the Environmental Movement" and points to its influence on governance, corporations, and individual identities as environmentalists. Further, the environmental movement is a prime example of the network society, with "a direct correspondence between the themes put forward by the environmental movement and the fundamental dimensions of the new social structure, the network society" (Castells 1997:122). These themes include a love hate attitude toward science and technology, which are simultaneously the source of many environmental problems and the source of information about them; control over space and an emphasis on locality; control over time in a "glacial time"perspective; and a view of the global unity of species and matter as a whole. However, Miller and Edwards (2001:3) argue that climate change "can no longer be viewed as simply another in a laundry list of environmental issues; rather, it has become a key site in the global transformation of world order." The new regimes and institutions constructed around the issue of climate change are extensive, reaching from science to policy to grassroots movements and raising hotly debated questions about whose knowledge is used and who speaks for Nature.

Economic Globalization and Climate Change

In the economic dimension, climate change and other environmental issues raise questions about the values of the capitalist production system and its tendency to favor here-and now benefits over delayed but more uncertain benefits (the so called high discount rate). The capitalist system is global, and the logic and operating principles of this global system swamp any local, traditional economies it may come in contact with. Free trade, universal access to markets, and economic efficiency are the explicit pathways to Western/Northern-style prosperity and wellbeing. Furthermore, capitalist enterprises produce both goods and environmental degradation. The world cannot have the good life without the bad environment. Finally, the production of environmental bads is a direct function of the capitalist need to use "free" resources in order to accumulate capital (Saurin 1996,Wallerstein 1999). Efforts to "value" the environment (e.g., the "polluter pays principle") are steadfastly resisted or, when resistance is futile, such costs are passed on to consumers. Wallerstein (1999) opines that the need of capitalist enterprises for free natural resources is so great that environmental economics is contributing to the fall of capitalism. Governments can and are buying time by such strategies as shipping wastes to a politically weaker South and constraining growth in newly industrializing countries. But eventually there are only three options: (1) force businesses to pay all costs, resulting in drastically reduced profits;

(2) make governments pay, resulting in large tax increases and probably a profit squeeze from reduced consumption; or (3) nothing and face various ecocatastrophes.

Tied to issues of economic globalization is the concept of sustainable development, which includes climate as one feature of the world that should not be degraded for future generations. Redclift (2000) articulates three views of the links between economic growth and sustainability.

1. They may be more or less compatible, recognizing the need for international regulations protecting endangered species and ecosystems.
2. They may be totally incompatible; as Daly (1992:200) says, "sustainable growth is an oxymoron."
3. Their compatibility may depend on how we define such crucial variables as "wealth," "the needs of future generations," and "economic efficiency"; certainly we need to switch priorities and put sustainability first. All three views recognize that unchecked economic globalization will

continue to exacerbate (if it does not cause) problems such as climate change, indoor pollution, household and industrial wastes, water availability, air quality, and extinction of species. However, only the second view holds that economic growth is the cause of many global problems. According to this view, we cannot manage our way out of climate change (and other global environmental problems); we must dismantle the capitalist system and re-become just another of Nature's species in a world of multiple mutual dependencies. The first and third views retain capitalist institutions and processes. The first view leaves economic change in the driver's seat; either climate change regulations are add-ons or – in the view of economists such as Ausabel (1990) – the fact that people are accumulating wealth and techno-scientific knowledge will allow them to mitigate or adapt to whatever climatic changes may come. The third view is more aggressive about tinkering with the present system, putting sustainability ahead of profit as the primary criterion for making choices. This reorientation may be accomplished through ecological economic principles, which are based on the writings of Mancur Olson, Kenneth Boulding, and others; environmental goods such as clean air, water supplies, forests, scenery, and biodiversity must enter the market system and be valued so they are not degraded. Alternatives to the calculation of gross domestic products include the net national product (NNP), which subtracts depreciation costs from non-renewable resources (Solow 1991); the new economic welfare (NEW) approach, which subtracts items such as the unmet cost of pollution and the disamenities of urbanization (Tobin and Nordhaus1972); and the Genuine Progress Report, which discounts the cost of products that result from environmental degradation (Cobb, Halstead and Rowe 1995).

Political Globalization and Climate Change

Global political issues under the label of "modernity" have been held up as the all-purpose cause of climate change. In the political dimension, the global and national are almost conflated. Indeed, the global modern has also created the nation-state; nation-states are constituted and organized according to a global template (Meyer 1999), which includes an environmental ministry or agency. Modernity substitutes centralized technocrative governance and institutional engineering for traditional systems of all kinds.

Specific governing principles accompany this replacement: utilitarianism, free markets as productive of the highest human welfare, and rational actors. This is the political system that reinforces globalization and allows unchecked greenhouse gas emissions, especially from energy production and land-use change, two primary mechanisms of both modernizations. The governance accompaniment to "sustainable development," which focuses on changing the present system, is ecological modernization. In this view, a great mistake of modernity was to define the environment (Nature) as external to human societies and their production/consumption systems. The "human exemptionalist paradigm" (HEP), which expresses the assumption of most social theorists up to the 1980s that humans are exempt from natural constraints, needed to be replaced with a "new environmental paradigm" (NEP) that encompasses humans and their natural environment together (see Catton and Dunlap 1978, 1980). One reaction to this insight is "de-modernization theory" (Spaargaren 2000), an aspiration to a green society of small communities that live in harmony with nature and the natural climate. Another is ecological modernization, which seeks to update modernization by including the environment (for example, clean air and water) along with other factors of production and the costs of environmental damage along with other costs of production. This is ecological economics, but it has strong implications for modern governance. In essence, we can repair this mistake of modernity by enlarging modernity to including the management of environmental resources as well as societies. Ecological modernization posits the potential for controlled, sustainable growth that can yield both economic prosperity and no environmental damage (as expressed in the slogans "win-wins," win-win-wins" [the "triple bottom line"], and "pollution prevention pays"). In climate change, ecological modernization is the theory that underpins proposed policies like emissions trading schemes and tax breaks for renewable energy industries and technologies. The formation and organization of the modern nation-state have overturned the culture and customs of native peoples, many of whom had lived sustainably on their land. That is, modernization upsets the balance of natural and social systems, and causes environmental degradation of all kinds, including greenhouse gas emissions. Scott (1998) details the modernist horrors of villagization in Tanzania and Russia as well as modernist cities such as Brasilia. Davis (2001) provides a recent example of this view, with the added force of colonialism. He analyzes the devastating results of bringing India and China into world markets; the forcible breakdown of various traditional systems resulted in massive starvation and death when severe droughts

occurred. Specific climate change examples focus on the inequalities of the world-system, now intensified by climate change. Industrialized countries are responsible for the historic emissions that are the cause of the steep rise in atmospheric greenhouse gases. But the resulting climate change impacts will largely be felt in the tropics, where most of the poor and non-industrialized countries lie (see, for example, Agarwal and Narain 1991). Here the global modern swamps the national/local, with negative results for the environmental and the already-poor. Boehmer-Christiansen (2003) shows that a proposed global transition to "green" fuels and technologies in order to mitigate climate change will similarly and disproportionately disadvantage poor groups and nations. Sachs (2000), in discussing the prospects for sustainability, notes that economic and political globalization, with an "openness" that few poor nations can exploit, fosters a new colonization of Nature; as poor countries fall into debt, they are forced to sell the products of "free" natural resources. O'Brien and Leichenko (2000) dub this situation the "double exposure" of the poor to economic globalization and to climate change. Another facet of the political dimension is that social and political theorists have taken the nation-state to be both the unit of analysis and the unit of governance in the nineteenth and twentieth centuries (Vogler and Imber 1996). "Realist" views of the anarchy in the international sphere assume that no global authority will gain legitimacy in governing environmental matters. International relations (IR) theory, having been dominated by (neo) realism, views all global environmental changes, including climate change, as items on the international agenda – and secondary items at best, after the perennial items of war, security and national self-interest

(Saurin 1996). International institutionalists, such as Paterson (1996) add extra-governmental institutions to the mix, while retaining the focus on political processes.With regard to the environment, countries have achieved international agreements codified in treaties and conventions, but implementation has fallen far short of what is envisioned in, for example, the UN Framework Convention on Climate Change

(1992). Redclift (2000) calls this a crisis of authority, since organizations such as the United Nations lack legitimacy necessary for implementation, monitoring, and enforcement. Furthermore, international agreements depend upon individual nation-states to implement the terms of the agreement. However, the nation-state may in fact be too small to effectively meet

global environmental challenges and too big to implement appropriate policies at local levels.3 Saurin (1996), among others, noting that global is not a synonym for international, calls for new institutions capable of dealing with the ordering processes involved in the scale, spread, complexity, and dynamics of global environmental changes.

Cultural (Scientific) Globalization and Climate Change

Science is the principal cultural element involved in climate change issues. Science is associated with larger issues of knowledge production and use. And, indeed, relegating science to the cultural realm, along with fashion, film, and fast food, runs the danger of minimizing its close interrelationships with both the capitalist system and modern governance.4 Beck (1992[1986]) uses the concept of the risk society to integrate the three dimensions I have separated into analytic categories. Risks are the "wholesale product of industrialization"; they are revealed by scientific investigation, which also promises their resolution; and they prompt a "reorganization of power and authority" in the attempted political management of both politicized nature and society (Beck 1992[1986]:21 and 24). Nevertheless, science plays a special role in global climate change related to the problem itself and to the nature of scientific knowledge and its uses. Science has constructed the problem and constructed it as a global problem with at least some human causes in the emissions of so-called greenhouse gases. As a scientific issue, climate change was "discovered" by advances in scientific understanding and methodology, and computational capacity, as outlined earlier. Of course, these scientific methods and conclusions are the subject of intense debate. Perhaps the measurement of greenhouse gases does not represent the global atmosphere; there is uncertainty about emissions of greenhouse gases, particularly from land-use changes; the models, because they are global models, cannot be verified and may neglect important processes; and the current warming trend may be unrelated to human activities and more dependent upon sunspot cycles, for example (see Edwards 2001, Norton and Suppe 2001). The issues of "globalizing science" relate to generalizing from localized experiments or data; Jasanoff and Wynne (1998) provide an account of the processes and issues involved in globalizing climate change science.

Science is indispensable in discussions about global climate change. "The debate over environmental change is in large part a battle in the social construction of knowledge and

meaning with which it is fought in a global arena" (Saurin 1996:81). Indeed scientific research has made it possible for people to think of the globe as a symbol of a common humanity. The picture of the Earth from space (the "big blue marble") has evoked descriptions of its fragility, its limited resources, and human dependence. Associated images of Spaceship Earth and Gaia (the sense of the whole Earth as a living being) join earlier images of Mother Earth with powerful, global messages to "protect" the Earth and "Love your Mother." These are global images, cultural constructions that provide the appropriate settings for global climate change discussions. But global climate change has more localized and differentiated sources and impacts as well. Rich industrialized nations are largelyresponsible for increasing concentrations of greenhouse gases in the atmosphere, especially when historical contributions are accounted for; these same nations are likely to experience only mildly negative impacts from climate change, at least over the course of the next century. However, poorer but industrializing nations (such as India and China) are contributing an increasing share of global emissions; these nations, however, are likely to experience more severe consequences of climate change. Given this lumpiness, questions arise about whose knowledge counts and how any knowledge will be used. Prescriptions from industrialized nations, such as advice to less industrialized nations on "clean development" and technology-dependent "solutions," are likely to face skepticism. Calls for development assistance without the strings of capitalist institutions may well fall on deaf ears. The current state of negotiations on climate change exhibit many features that a neorealist would recognize, with self-interests dictating outcomes rather than a game-theoretic recognition and that cooperation may bring advantages for all.

Climate change, as the limit case of globalization gone wrong, provides a site where economic, political, and cultural/scientific issues can be debated. Climate change globalizes the environment by specifying the connections among what happens in specific places and the whole climate system. Nongovernmental organizations and institutions have gone a certain distance toward including multiple knowledge and North/South viewpoints. The Intergovernmental Panel on Climate Change, although dominated by industrialized-nation scientists, has come to conclusions not in the interests of their nations. The United Nations Environment Program and Development Program have had some modest success in providing assistance to poor nations who are not well adapted to current climate variability and who face further problems under

long-term climate change. Still, there is little indication that industrialized nations are preparing to overhaul their systems of producing energy and goods, and little indication of systematic planning for adaptations that will be necessary.

Conclusion

Economic, political, and cultural globalization are deeply implicated as the causes of climate change and our knowledge about it. In each dimension, analysts have suggested both "more" and "less" to meet the challenges of climate change. Milton (1996) suggests that "the global environmental debate encapsulates the tension between 'globaling' and 'deglobalizing' tendencies identified by Robertson" – that is, we should either promote globalization as the best way of protecting the environment or dismantle the global economy and allow localities to control their own resources. In the economic sphere, capitalism may either be expanded to account for the input costs of and damages to the environment, or be superseded by another economic system. In the political sphere, modernist governance needs to extend itself to manage the environment along with social systems or retreat to locally sustainable governments. In the cultural sphere, science needs to specify methods to mitigate and to adapt to more fully characterized climate changes, or to lose its hubris and make space for local knowledge and for moral and ethical approaches to the issues raised by global climate change.

Despite widespread and growing public recognition of the linkages between environmental change and economic activities, geographic research efforts to date have paid only limited attention to the connections and interactions between climate change and globalization. As a consequence, critical linkages, feedbacks, and synergies between these two processes often go unnoticed (Leichenko, O'Brien, 2010). Globalization theorists invoke climate change as part of a vague and black-boxed globalized environment, and climate change analysts both blame globalization for environmental problems and attempt to mobilize support for environmental causes through appeals to global citizenship and responsibility. Although globalization has enabled climate change to become a point of debate and climate change has contributed to the definition of globalization, neither contains the other. Climate change has strong ties to the cultural aspects and issues of globalization (especially in the domain of science), but more local

economic and political issues play large roles in the debates about the sources, consequences, and possible policies of climate change.

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