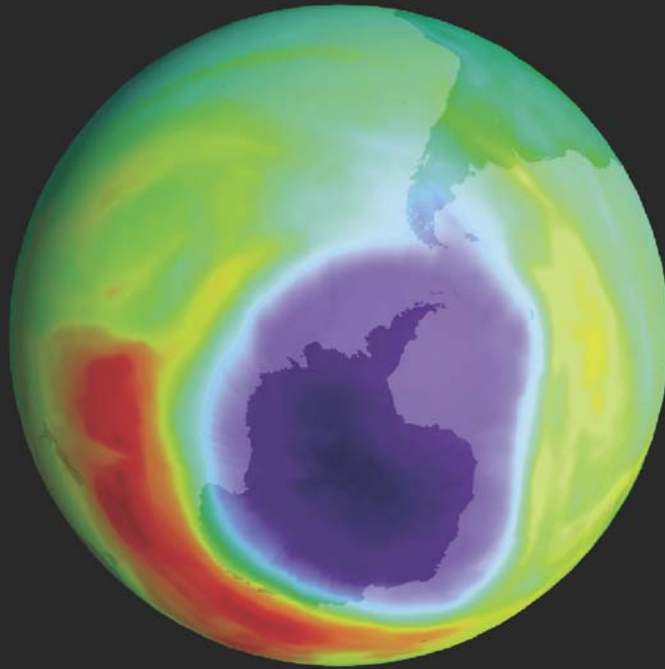


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## GLOBALIZATION AND THE ENVIRONMENT

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## GLOBALIZATION AND THE ENVIRONMENT

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Human societies have long experienced the increasingly rapid expansion of the modern world-economy, an economy that has existed since at least the middle 1400s, meeting crisis after crisis in accumulation (e.g. Abu-Lughod 1989; Arrighi 1994; Chase-Dunn 1998; Chase-Dunn and Hall 1997; Chew 2001; Frank 1978, 1998; Frank and Gills 1993; Kentor 2000; Moore 2003; Pomeranz 2000; Wallerstein 1974, 1979). Rapid technological growth has been part and parcel of this expansion that has tightened the global division of labor and importance of distant events for all humans. This division of labor permits further expansion in rationalized production, and it reaches everywhere to expand markets and offer up cheap labor and material resources to increase surplus value (e.g. Marx 1906; see also Foster 1999, 2002; Harvey 1999).

In recent decades, global capitalist economics, technology (including communication), and global military reach have worked together to remove a major political-military, economic and ideological challenge to capitalism, that is, Eastern bloc-style socialism (it could be argued that we now are working on the next challenge, Islam). While these dynamics have stunted any nascent challenges to market expansion, the latter has created other contradictions. One of these is that "globalization" now threatens the human race with environmental disasters (e.g. Broswimmer 2002; Foster 2002; Grimes 1999).

Generally lacking in the environmental literature, as well as the globalization literature, is a mature long-term historical approach that explains the emergence

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of such dynamics. Fortunately, this is provided in a world-systems approach. Indeed, the last two decades have witnessed a burgeoning area of inquiry in the social sciences that blends environmental sociology with the world-systems perspective. This is quite evident in the vast array of relevant conferences and related publications.<sup>1</sup> Recent conferences include the twenty-first annual conference of the Political Economy of the World-System section (PEWS) of the American Sociological Association (ASA), titled “Ecology and the World-System” (1997, University of California, Santa Cruz); the PEWS and Environment and Technology ASA sections (co-sponsors) 2001 conference titled “Globalization and the Environment: Prospect and Perils” (Anaheim, California); and the international symposium on “World-System History and Global Environmental Change” (2003, University of Lund, Sweden).

There is a general consensus in this blossoming, multidisciplinary literature that the capitalist world-economy is in crisis because it cannot find solutions to key dilemmas including the inability to contain ecological destruction<sup>2</sup> (e.g. Broswimmer 2002; Bunker 1985; Foster 1999, 2002; Grimes 1999; Hornborg 2001; Jorgenson 2003; Jorgenson and Burns 2003; Wallerstein 1999). Global modes of production and accumulation are intimately linked to environmental degradation (e.g. extraction of natural resources and multiple forms of pollution via commodity production). Furthermore, the core-periphery model of exploitation provides useful, historically grounded explanations of different environmental and ecological outcomes (e.g. Bergesen and Parisi 1997; Kick et al. 1996; Moore 2003; Roberts and Grimes 2002; Smith 1994), and degradation can be seen as both a cause and consequence of underdevelopment in non-core regions (Boswell and Chase-Dunn 2000:143–144; Bunker 1985; Burns, Kentor, and Jorgenson 2003; Chase-Dunn and Hall 1997; Evans 1979; Jorgenson and Burns 2003).

Social scientists and others commonly label processes of social change in the modern world-economy as falling under the rubric of globalization. Moreover, “globalization” continues to be a buzzword in political discourses that employ ideas about global integration and competition to justify actions and inter-

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<sup>1</sup> For a review of recent publications in this area, see Jorgenson (2003), Jorgenson and Burns (2003), Bergesen and Bartley (2000), or the literature review sections for the articles appearing in this special issue.

<sup>2</sup> Ecological modernization theory represents an alternative perspective that foresees the twenty-first century as a time of ecological modernization and the re-rationalization of societies into more ecologically sustainable forms (Humphry, Lewis, and Buttel 2002:166–171; see also Mol and Sonnenfeld 2000a, 2000b).

related policies (e.g. McMichael 2000; Shiva 2002; Stiglitz 2002), while social scientists working in the world-systems tradition have scientifically defined (and empirically charted) structural globalization as being composed of different inter-related dimensions of broadening and deepening interaction networks—especially political, economic and cultural globalization (e.g. Chase-Dunn and Hall 1997; Chase-Dunn 1999; Chase-Dunn, Kawano, and Brewer 2000; Chase-Dunn, Jorgenson, Reifer et al. 2002; see also Kick 1987; Kick et al. 1995; Snyder and Kick 1979). We reject the notion that these dimensions constitute different aspects of social reality that should be studied separately by various theoretical perspectives or academic disciplines. Instead we contend that it is useful to distinguish between them in order to understand how they have affected one another. Furthermore, they reflect structural factors and political-economic processes in the world-economy that impact the well being of human and non-human populations in different zones of the world-system as well as regional ecologies and the global biosphere.

Globalization is not new analytically or empirically. Those working in the world-systems tradition have addressed analogous long-term historical cycles, trends, transformations, and other factors in the capitalist world-economy since the perspective’s inception decades ago. The articles appearing in this issue reflect recent empirical and theoretical developments of the structural world-systems approach to globalization and how the increasing scale and intensity of systemic processes in the capitalist world-economy impact the natural environment and living conditions of human populations.

This special issue begins with the article “Cornucopia or Zero-Sum Game? The Epistemology of Sustainability.” Author Alf Hornborg systematically contrasts opposing general perspectives on economic development and concomitant ecological degradation. The first perspective is the traditional neoclassical model in economics, which has been employed in dominant areas of discourse regarding further economic development as the long-term solution to environmental problems. The second perspective is the zero-sum world-systems approach that models environmental destruction in more peripheral regions as an outcome of economic developments in core areas of the world-economy. Hornborg provides a heavy-handed critique of the faulty logic and unrealistic view of the former perspective and its inability to adequately explain the unequal impact of core-based production and consumption on the natural environment in different regions of the world-system. His critical discussion and positive emphasis on the latter perspective sets the stage for the empirical analyses in subsequent articles.

In the second article, “Matter, Space, Energy, and Political-Economy: The Amazon in the World-System,” Stephen Bunker argues that it is absolutely necessary to analyze the material processes of production in space as differentiated

by hydrology, climate, topography, and distance between relevant places. This approach would significantly increase our understanding of the expansion and intensification of the social and material relations of capitalism that have created and sustain the dynamic growth of the world-system from the local to the global. Drawing from his extensive research of the Amazon Basin, Bunker discusses the spatio-material configurations that structured local impacts on global formations from within this region. In so doing, he offers critiques of the tendencies in the globalization and world-systems literature to apply spatial metaphors without investigating how space affects the material processes around which social actors organize the political-economy. More importantly, through this analysis Bunker shows that the 400 year-long sequence of extractive economies in the Amazon has reflected the shifting demands of industrial production headquartered in core regions. This thorough study illustrates how such processes can be more accurately understood by focusing on spatio-material configurations of local extraction, transport, and production.

The third article, "Exporting the Greenhouse: Foreign Capital Penetration and CO<sub>2</sub> Emissions 1980–1996," consists of a quantitative cross-national analysis of less-developed countries in which Peter Grimes and Jeffrey Kentor examine the impacts of foreign investment dependence on carbon dioxide emissions. Their most striking finding is the significant positive effect of foreign capital penetration, coupled with the weak and non-significant effect of domestic investment on CO<sub>2</sub> emissions. Grimes and Kentor suggest that transnational corporations relocate more environmentally unfriendly production to countries with relatively less environmental controls. This claim is further supported by the previous research of Timmons Roberts (1996), which indicates that semiperipheral and peripheral countries are less likely to participate in international environmental treaties. Moreover, according to Grimes and Kentor foreign investment in less-developed countries is more likely to be concentrated in industries that use relatively higher levels of energy consumption; power generation techniques employed in foreign capital dependent countries are likely to be less energy efficient; and with the ever increasing expansion of global production, the transport of inputs and outputs is relatively more energy intensive in non-core countries with poorer infrastructures.

In a related selection titled "Social Roots of Environmental Change: A World-Systems Analysis of Carbon Dioxide Emissions," Timmons Roberts, Peter Grimes, and Jodie Manale employ cross-sectional and lagged OLS regression techniques to a sample of 154 countries and examine the impacts of a country's world-system position, domestic class, and political factors on a nation's carbon dioxide intensity. This outcome variable is related to that of Grimes and Kentor's study, but rather than studying absolute levels of emissions, Roberts, Grimes,

and Manale examine the amount of carbon dioxide released per unit of economic output. Their findings indicate a Kuznets distribution of carbon dioxide intensity in relation to world-economy position. More specifically, the relatively least efficient consumers of fossil fuels appear to be countries falling within the upper periphery and semiperiphery. Moreover, semiperipheral and peripheral countries with relatively higher levels of debt, higher levels of military expenditures, more repressive political infrastructures, and larger export-oriented economies tend to be the least efficient consumers of fossil fuels. Even with a differently measured indicator of emissions, these findings coincide rather well with those of Grimes and Kentor. Countries in the semiperiphery and upper periphery also tend to be those experiencing relatively higher levels of foreign capital dependence.

R. Scott Frey then offers an in-depth case study of the Maquiladoras located on the Mexican side of the US-Mexico border. In his article, "The Transfer of Core-Based Hazardous Production to the Export Processing Zones of the Periphery: the Maquiladora Centers of Northern Mexico," Frey systematically describes how core-based transnational corporations externalize environmental and ecological degradation resulting from production processes to peripheral regions, a process which has continually increased through the broadening and deepening of material production in the world-economy. Moreover, Frey provides evidence that illustrates how these environmental outcomes adversely impact the quality of life for the already exploited human populations living in regions surrounding the Maquiladora centers. Like the preceding articles, Frey provides strong evidence of the impacts of structural globalization on the environment and well-being of communities located outside of core regions in the world-economy.

Following Frey, Thomas Burns, Edward Kick, and Byron Davis use multivariate regression analysis to test the effects of social and demographic causes of deforestation across different zones of the world-system. A rather noteworthy contribution of their article "Theorizing and Rethinking Linkages between the Natural Environment and the Modern World-System: Deforestation in the Late 20<sup>th</sup> Century" is the application of a methodology (slope-dummies) that allows for a more thorough empirical analysis of how social factors and environmental outcomes operate differently across zones of the world-economy. This method is a more sophisticated and useful approach to modeling non-linear relationships in cross-national studies that test world-systems propositions. Unlike previous studies that focus on earlier decades, Burns, Kick, and Davis find that deforestation has become more pronounced in peripheral regions of the world during 1990–2000 as opposed to the semiperiphery. In addition to differences in social factors between the periphery and semiperiphery, Burns, Kick, and Davis suggest that this increase in deforestation in the periphery is also a function of

“recursive exploitation” in which a nation in the semiperiphery is at a disadvantage to one in the core, yet is able to work exchanges in its favor when they involve peripheral countries.

Lastly, in a review essay titled “Lateral Pressure and Deforestation,” Andrew Jorgenson provides a thorough critique of Corey Lofdahl’s recently published book *Environmental Impacts of Globalization and Trade: A Systems Study*. Jorgenson points out some striking weaknesses in the book, especially its literature review and under-specified empirical models. However, he applauds Lofdahl for his application of geo-modeling to cross-national and global analyses of environmental outcomes and his development of a new quantitative measure of trade connectivity as a predictor of deforestation in less-developed countries. Jorgenson emphatically suggests that other social scientists should follow Lofdahl’s lead with the use of GIS in analogous empirical studies and the incorporation of his newly constructed indicator into more specified models of deforestation and other environmental outcomes.

We would like to thank all contributing authors and the entire editorial staff of the *Journal of World-Systems Research* for helping to make this special issue possible. We hope that these articles—both individually and collectively—will lead to a better understanding of how the capitalist world-economy impacts the global ecological system, and assist in the development and implementation of more informed international policies and practices that will reduce the negative impacts of production and accumulation on the biosphere and human populations living throughout the world, particularly in non-core regions.

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