

Population and Environment: Methods of Analysis

Wolfgang Lutz, Alexia Prskawetz, & Warren C. Sanderson (Eds.)

New York: Population Council, 2002. 251 pages.

Reviewed by **Frederick A.B. Meyerson**

Demographic and environmental change are inextricably related at many scales—that much can be said with relative ease. In *Population and Environment: Methods of Analysis*, Wolfgang Lutz, Alexia Prskawetz, and Warren C. Sanderson propose that research into these linkages is now sufficiently advanced to constitute a new and distinct interdisciplinary field called “Population-Environment (P-E) Analysis.” To both support this theory and fulfill it, Lutz, Prskawetz, and Sanderson have assembled eight chapters on aspects of P-E research, ranging from literature surveys to synthetic critiques to case studies. This sample is too narrow to do the sprawling field justice; but *Population and Environment*, with its excellent and concluding introductory chapters, is a critical contribution to the growing P-E literature.

The tangle of relationships among environmental and demographic variables has created virtually infinite opportunities for scientific research and speculation over the three decades since Paul Ehrlich, Donella Meadows, and others revived the hypotheses and apocalyptic warnings of Robert Malthus. Lutz, Prskawetz, and Sanderson correctly assert here that P-E research and thought has thus far produced a “somewhat disappointing lack of consistent and generalizable findings” (page 1), which they attribute to the complexity of the issues and the lack of accepted methods and standards. While *Population and Environment* pointedly does not attempt to standardize P-E research or even delineate its fuzzy boundaries, it does identify and begin to address some of the considerable challenges facing a field whose broad scope potentially encompasses most human and non-human processes on the planet.

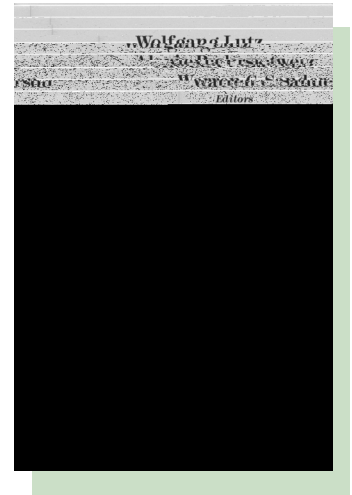
The editors begin by characterizing P-E analysis as a “chair with four legs” (page 5): population dynamics, environmental dynamics, and the influences of each on the other. Lutz, Prskawetz, and Sanderson note that the overwhelming majority of P-E studies have focused primarily on the impact of

changes in the human population on the environment. Many of the studies included in this volume follow or support that pattern, including “Demographic Determinants of Household Energy Use in the United States” (written by Brian C. O’Neill and Belinda S. Chen), “Population Dynamics and the Decline in Biodiversity” (by C.Y.C. Chu and R.-R. Yu), and “Spatial Integration of Social and Biophysical Factors Related to Landcover Change” (by Tom P. Evans and Emilio F. Moran).

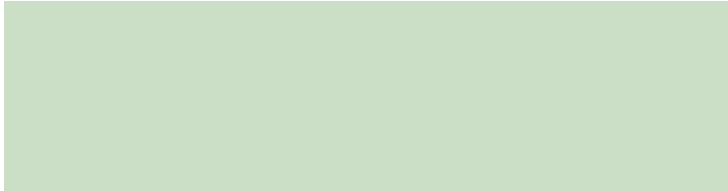
Lutz, Prskawetz, and Sanderson suggest that a full P-E study should ideally cover all four aspects jointly. The goal is laudable in theory but may be a tall order in practice, perhaps even encouraging shallow breadth over depth for all but the extravagantly funded. Some of the field’s most celebrated studies to date have absorbed millions of dollars and years or even decades of research without venturing much beyond the effect of population on the environment (and not always effectively capturing even that relationship).

But Lutz, et al. are correct that P-E research is rarely convincing unless the research team includes and fully utilizes both demographic and environmental or ecological expertise. For ecologists, the temptation has been to take off-the-shelf human population data and plug it into their models. Demographers have been equally guilty of “dumbing down” or “black-boxing” environmental and ecological data. And economists who troll in the P-E waters have sometimes even managed to over-simplify both demographic and environmental data. The garbage-in, garbage-out results and conclusions of this kind of shortcut have not served the P-E field or its reputation well. *Population and Environment: Methods of Analysis* seeks to avoid or reduce those pitfalls by suggesting a path to standards for the field.

The editors also make the important observation that many P-E researchers begin with a “predefined normative goal” and then employ science to buttress it rather than fully



exploring its validity. Julian Simon and the early work of Paul Ehrlich come to mind as archetypal examples of this trap, but there are many instances of the rush to policy conclusions prior to (or ignoring) scientific results and analysis. The melding of population and environment and/or economics, particularly in making projections, has often been ruled by passion and politics rather than statistics.



There are many other landmines (or more optimistically, challenges) for P-E research, and the introductory chapter of *Population and Environment* does a good job of briefly reviewing them. For example, spatial and temporal scale of both human activities and environmental causes and consequences vary widely across P-E studies. Linking these scales within single studies (even well-funded ones) has not been easy, and synthesizing studies conducted at different scales has been even more problematic. In addition, the disparate disciplines that are part-time residents under the P-E umbrella often use vastly different research, analytical, and statistical methodologies.

Varying approaches to uncertainty—a critical element of P-E analysis—are also a major challenge to those envisioning a unified, coherent field. The editors of *Population and Environment*

Environment is a valuable and important first step towards getting this fascinating field.

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Population and Climate Change

By Brian C. O'Neill, E. Landis MacKeller, & Wolfgang Lutz
Cambridge, UK: Cambridge University Press, 2001. 266 pages.

Reviewed by **Gayl D. Ness**

The environment has always presented difficult problems for demographers. In contrast to the easily conceptualized and measured categories of fertility, mortality, and age-sex distributions, the “environment” seems boundless, vague, and not easily quantified.

But in 1994 the Austrian demographer Wolfgang Lutz of the International Institute for Applied Systems Analysis (IIASA) led a team that produced a seminal work on population, environment, and development (Lutz, 1994). Lutz and his team modeled the country of Mauritius to show how one would attack that country’s population-environment-development issues in a systematic manner. Lutz drew on the work of the 6th century BC Greek philosopher Anaximander in conceptualizing the environment as composed of earth, air, water, and fire (energy). When construed as modules in a dynamic systems model, these four modes permitted that model to provide extensive and insightful examination of their interactions.

For example, Lutz and his team showed how reductions in fertility furthered economic development by freeing women for the labor force and reducing costs of child rearing. The study also demonstrated how production of commodities such as sugar and textiles could obstruct the future development of Mauritius by destroying the marine environment on which its new tourism industry depends.

Now Lutz has teamed up with an IIASA economist (Brian O’Neill) and a climatologist from Brown University (E. Landis MacKeller) to produce in the book under review what I consider the best single work to date on the relationships between population and climate

change. Indeed, I would argue that if one could read only one work in this area, this would be the book.

Population and Climate Change is a slim volume, with six chapters of dense arguments and extensive summaries of the most critical findings on population, climate change, and how the two are linked. The references cite more than 700 works. The best way to present *Population and Climate Change* is to summarize each of book’s six chapters.

Chapter 1 provides a brief primer on climate change—including the “greenhouse effect,” the rise of greenhouse gases (GHGs), and long-term increases in world temperature. Demographers are all too often unfamiliar with biogeochemical cycles. This chapter provides an efficient and useful lesson.

Chapter 2 is a primer on human population change. It notes the growth of world population, the demographic transition, and the recent shift of world population toward less developed countries. The chapter also summarizes recent population projections (which maintain that world population will rise by 2100 to between 8 and 12 billion) and discusses how policies (such as economic development, investment in education and health, and promotion of women’s empowerment) can help speed fertility decline and reduce population growth. The authors end the section with an examination of how populations are aging and what are the consequences of this trend. The more developed countries all show slow or even negative population growth rates and aging populations. This dynamic increases the demand for labor (implying a need for immigration) and results in rapidly increasing health costs for the aged.

downward. There have been more positive demographic changes than most demographers have anticipated.

The authors might also have given more consideration to how temperature increases will affect the natural reservoirs of fresh water in the form of mountain snowpack. Adapting to this problem by replacing snowfields with man-made reservoirs would entail immense and probably prohibitive expenditures. Not adapting would imply massive disruptions in seasonal water flows, with serious impacts on food production. But these are all minor points that do not in the least distract from this excellent summary and analysis.

The IIASA group has always excelled in putting together interdisciplinary teams to deal with fundamental issues. *Population and Climate Change* strengthens this record. Readers can now hope for another interdisciplinary approach that explores effective policy and program approaches to the links between population and climate change.¹

We know much about the social, economic, and political conditions that have led to low population-growth rates. (The revolution in population policies, for example, has certainly been one of the most dramatic in improving human welfare.) But what accounts for the dramatic variance in GHG emission rates among the low population-

growth countries? It would be most useful for IIASA and its associates to tackle this question, which would seem to have practical implications for the future of population and climate change.

Regarding climate change, O'Neill, MacKeller, and Lutz note that popular and elite concern for GHG emissions and climate change potential has only emerged in the past two or three decades, and that some useful policies have in fact emerged. Since the 1960s, there has also been extensive political support for policies and programs to address poverty and promote economic development. While resistance has been relatively slight to these policies (especially in comparison with population or GHG emission policies), the failure of both these policies and programs has been legion and has attracted a great deal of attention. It would be most useful now for someone to write a systematic assessment of population, development, and climate-change policies that parallels this fine volume—to give us a better sense of what is needed and what is possible in moving us toward a more sustainable future.



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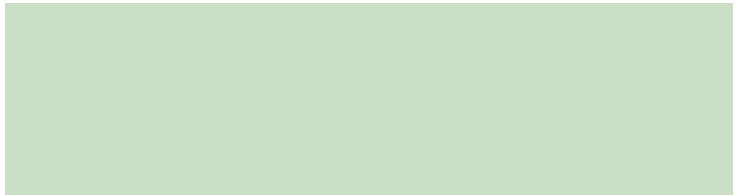
Notes

¹ Such an approach might investigate, for example, the consequences of the radical difference between population and climate-change dynamics of the world's 25 richest and 25 poorest countries. The 25 poorest countries show a narrow range of relatively high population growth rates (2-3 percent per year) and exceptionally low GHG emission rates (100 to 800 kilograms per capita)—neither of which is difficult to explain. The 25 richest countries show a narrow range of population growth rates (1 percent or less) but high and *highly variable* GHG emission rates, running from 5 tons for Sweden and Hong Kong to 24 tons for Singapore. High emissions are found in large land-mass countries (20 tons for the United States, 15 for Canada, and 18 for Australia) as well as tiny countries (18 for Luxembourg and 24 for Singapore, for example). This poses a challenge for researchers. We need (a) to understand what policies are responsible for the highly efficient and the highly inefficient consumption processes of wealthy nations, and (b) target those policies for change.

References

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amounts of supporting evidence. His synopsis
of the international negotiations leading up



oppose their efforts and to use any common ground to advance their own agendas. This is excellent advice, since much anti-environmentalist sentiment is grounded in either religion or economics, both of which are often seen as absolutes. But the advice is again very general. For example, Firor recommends the removal of natural-resource extraction subsidies in an effort to make the U.S. economy account fully for the cost of using them. However, he does not specify which ones should be removed or how this might be achieved in the face of almost certain industry opposition.

Finally, the bilateral structure of the book effectively and unhelpfully segregates the two issues of population and climate change, and the final chapter fails to bring them together

sufficiently. By simply prescribing two revolutions that Western society must undertake, Firor and Jacobsen do no more