

The ecological dimensions of population growth, migration, and urbanization

Symposium - Integrating Ecology and Poverty Alleviation

Alex de Sherbinin, Susana B. Adamo, and Sandra R. Baptista (CIESIN, The Earth Institute at Columbia University)

Jason Bremner (Population Reference Bureau)

Jason Davis and David Carr (Department of Geography, UC Santa Barbara)

Sara R. Curran (Henry M. Jackson School of International Studies and Daniel P. Evans School of Public Affairs, University of Washington)

Peter J. Marcotullio (Department of Geography, Hunter College, CUNY)

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http://en.wikipedia.org/wiki/Albuquerque,_New_Mexico



Introduction

The role of human population dynamics in the ecology-poverty nexus

- Chapters address the **complexity** of the linkages between population, poverty and ecology
- Recognize the **context-specific** nature of these linkages
- **Dispel some of the fallacies and myths** surrounding population-environment interactions
- Argue in favor of a more balanced understanding of both the **positive and negative aspects of human-environment interactions** and their implications for poverty alleviation

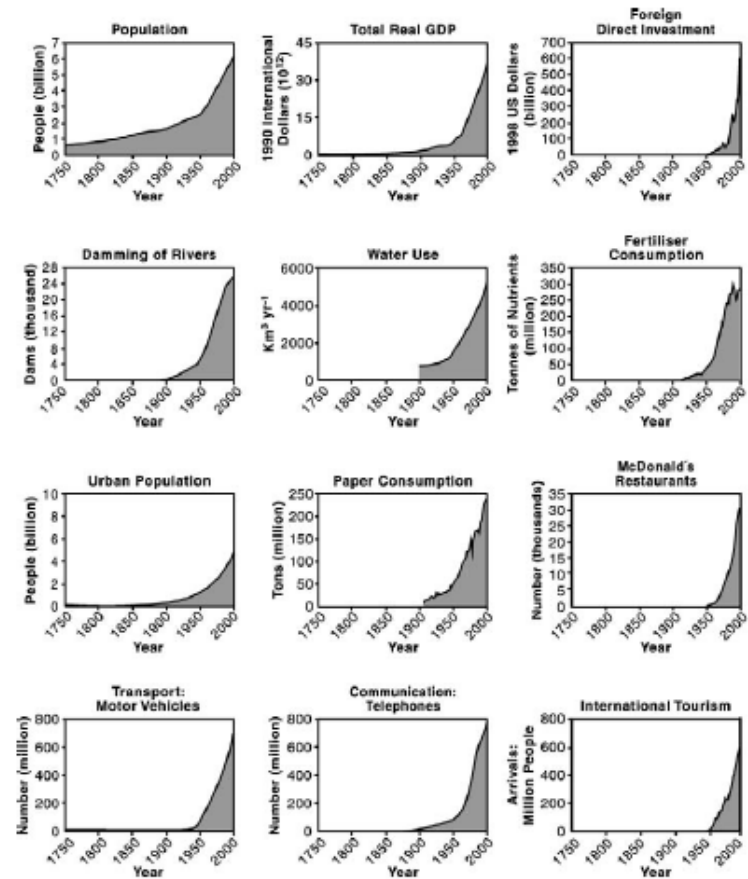
The Global Context

The Anthropocene: the age of human domination of the Earth's systems

Table 1. Atmospheric CO₂ concentration during the existence of fully modern humans on Earth. References given in notes below.

Year/Period	Atmospheric CO ₂ concentration (ppmv) ¹
250 000–12 000 years BP ² :	
Range during interglacial periods:	262–287
Minimum during glacial periods:	182
12 000–2 000 years BP:	260–285
Holocene (current interglacial)	
1000	279
1500	282
1600	276
1700	277
1750	277
1775	279
1800 (Anthropocene Stage I begins)	283
1825	284
1850	285
1875	289
1900	296
1925	305
1950 (Anthropocene Stage II begins)	311
1975	331
2000	369
2005	379

¹The CO₂ concentration data were obtained from: (a) <http://cdiac.ornl.gov/trends/trends.htm> for the 250 000–12 000 BP period and for the 1000 AD–2005 AD period. More specifically, data were obtained from (34; 250 000–12 000 BP), (35; 1000–1950 AD), and (42; 1975–2000 AD). (b) CO₂ concentrations for the 12 000–2000 BP period (the Holocene) were obtained from (36). ²The period 250 000–12 000 years BP encompasses two interglacial periods prior to the current interglacial (the Holocene) and two glacial periods. The values listed in the table are the maximum and minimum CO₂ concentrations recorded during the two interglacial periods and the minimum CO₂ concentration recorded over the two glacial periods. According to mtDNA evidence, the first appearance of fully modern humans was approximately 250 000 years BP.



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Figure 2. The change in the human enterprise from 1750 to 2000 (28). The Great Acceleration is clearly shown in every component of the human enterprise included in the figure. Either the component was not present before 1950 (e.g., foreign direct investment) or its rate of change increased sharply after 1950 (e.g., population).

Steffen *et al.*, 2007

Overview of Chapters

Three aspects of **human population dynamics** considered:

- **Population Growth**
- **Migration/Mobility**
- **Urbanization**

Overarching questions:

How are these three aspects related to ecology, environmental impacts, and poverty?

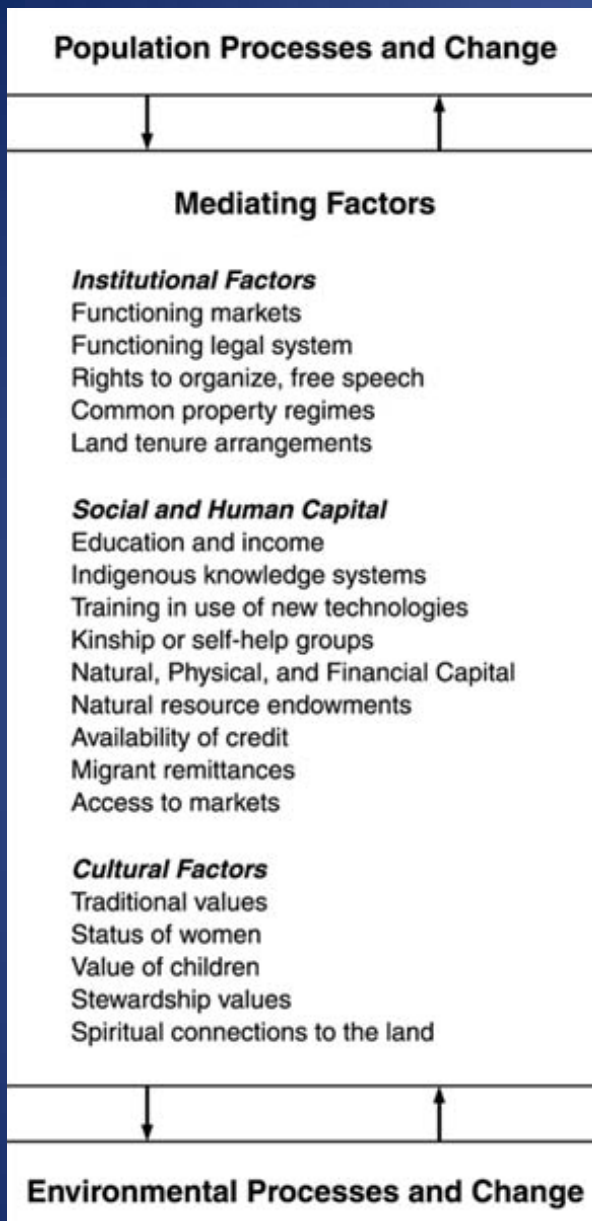
Under what circumstances can they be detrimental or beneficial to human well-being and ecosystems?

What are the possibilities for ecological stewardship and poverty alleviation?

Background

The relation of human population dynamics to the environment is mediated by:

- institutional factors
- governance systems
- social and human capital
- cultural factors

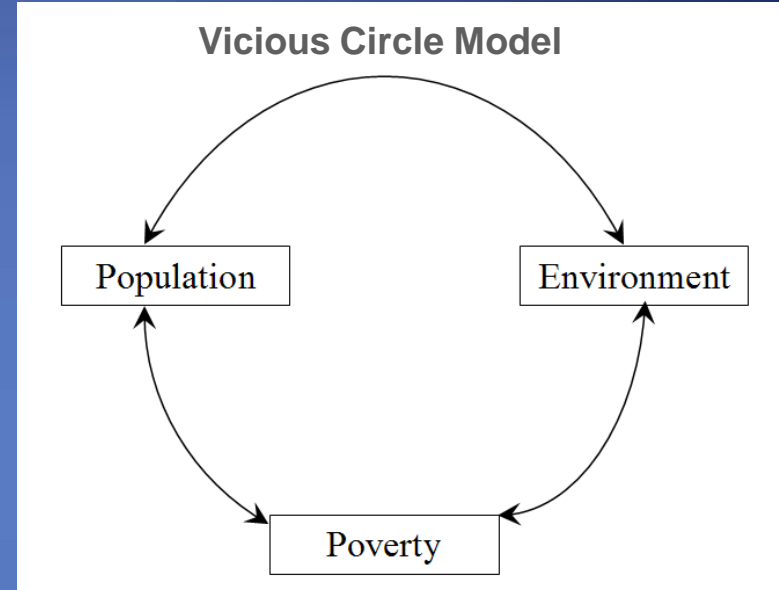
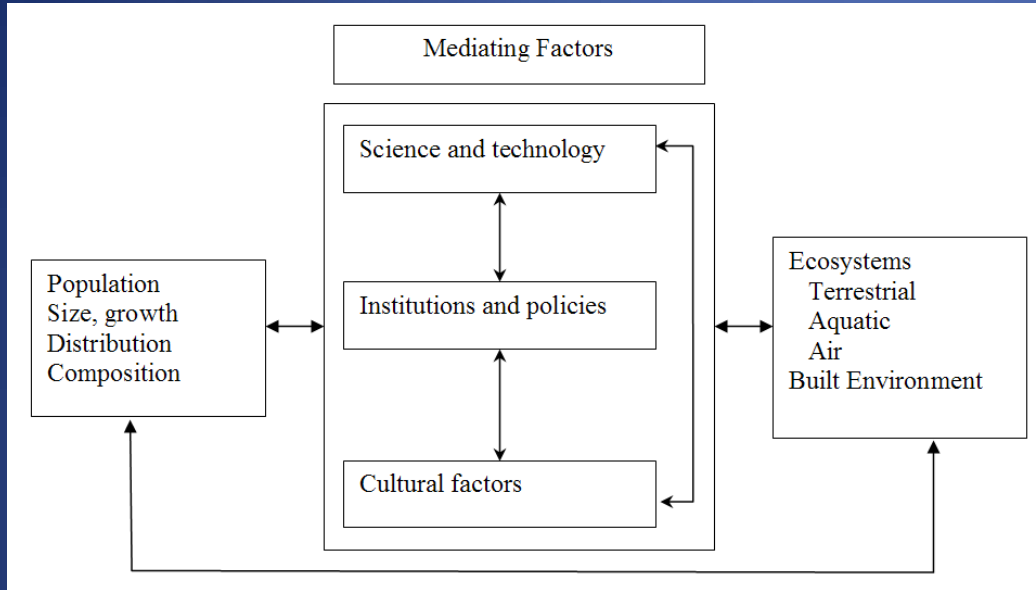


Adapted from Mishra, 1995.

Source: de Sherbinin, 2000 [online] <http://www.gechs.org/aviso/07/#Anchor-Populatio-52746>

Population Growth

By Jason Bremner, Jason Davis and David Carr



Theory: Population Growth, Ecosystems & Poverty

- Malthus (1798) and neo-Malthusian arguments
- Boserup (1965) on agricultural intensification
- **Multiphasic response** of agrarian households and communities to maintain/improve standard of living (Davis, 1963; Bilsborrow & Ogendo, 1992)
- **Livelihoods framework**; household decision-making (what limits responses)
- **“Vicious circle” model** (downward spiral into poverty); multiple feedbacks; poverty as both contributing factor to and a consequence of population growth and environmental change

Population Growth (cont.)

Empirical examples (dynamics related to land cover change, water, energy, climate):

- **Terrestrial** ecosystems (e.g., deforestation and land use in the Amazon)
- **Coastal and marine** ecosystems (e.g., Galapagos)
- **Freshwater** ecosystems (e.g., water scarcity in the Sahel region of sub-Saharan Africa)

Limitations of current knowledge:

- Few generalizations can be made given the complexity of empirical cases
- Across multiple scales, pop-env-pov dynamics tend to be non-linear, ecosystem specific, and involve multiple pathways
- Poverty as a result of and as a contributing factor to pop-env relationships has only recently been systematically addressed in the literature

Implications for future research and policy:

- **Livelihoods framework** provides a useful approach
- Need long-term interdisciplinary research on **integrated population, health and environment (PHE)** projects
- **Research imbalance** -- tropical forest settings studied much more than dryland, coastal and freshwater ecosystems
- Need strengthened **communication of research findings** to policymakers and the public

Alliances, conflicts and mediations: the role of population mobility in the integration of ecology into poverty reduction

By Susana B. Adamo and Sara R. Curran

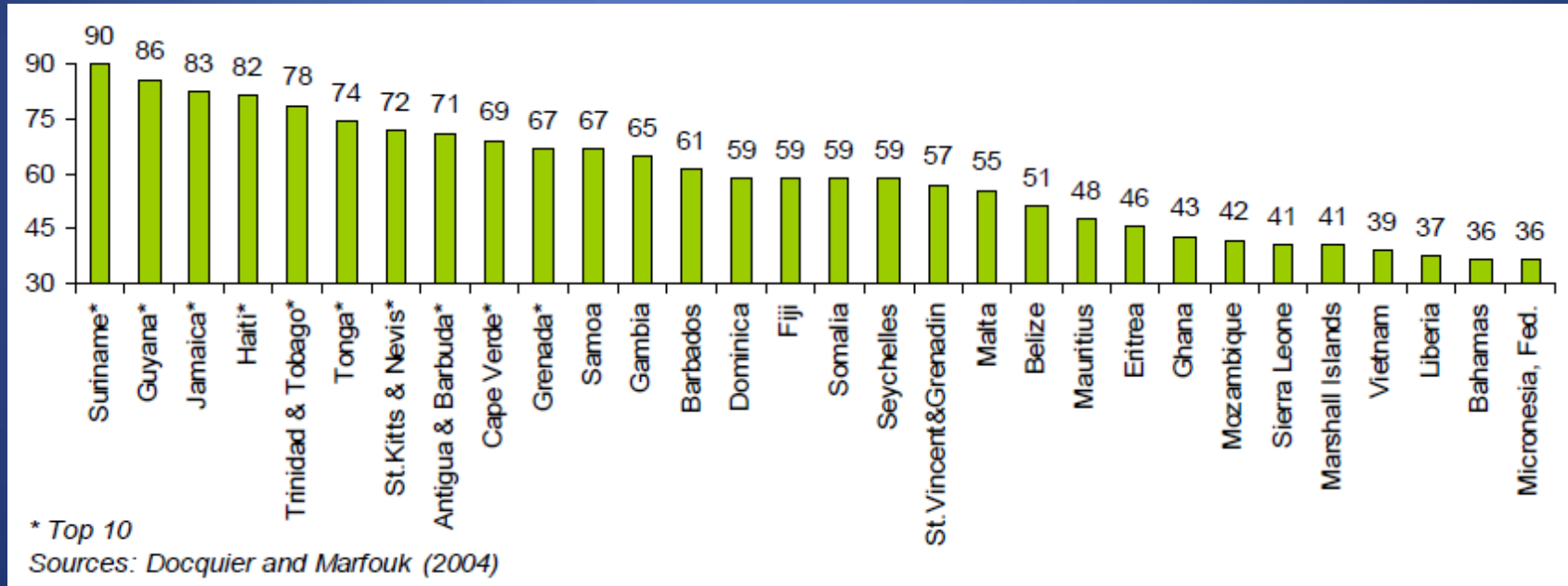
Migration systems perspective

- Settlements, flows, contexts and regulation mechanisms viewed holistically
- Migration/mobility as a mediating factor facilitating or constraining the effectiveness of ecology for poverty alleviation
- Environmental changes may instigate out-migration from some regions while in-migration in other regions results in larger settlements and altered environments

Migration systems (cont.)

People move to improve their well-being, however, out-migration may weaken home communities as result of “brain drain” and the loss of the young and able-bodied

Graph 1: Top Emigration Countries of Tertiary Educated, 2000 (as % of total tertiary educated)

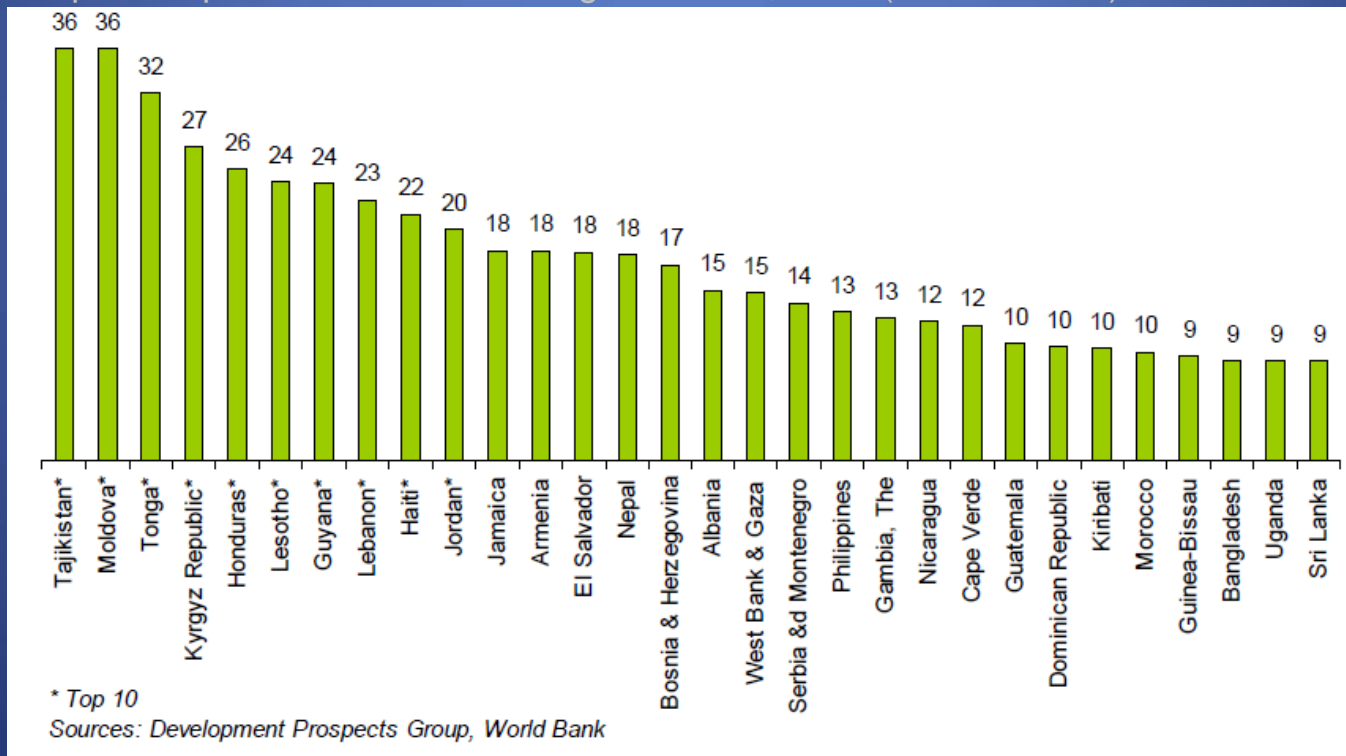


Source: Ratha and Xu, 2008

Migration systems (cont.)

- Changes in the availability of financial capital
- How remittances are spent can affect the environment
 - beneficial impacts
 - negative impacts
- Remittances can improve well-being in home communities

Graph 2: Top Remittance-Receiving Countries, 2006 (as % of GDP)



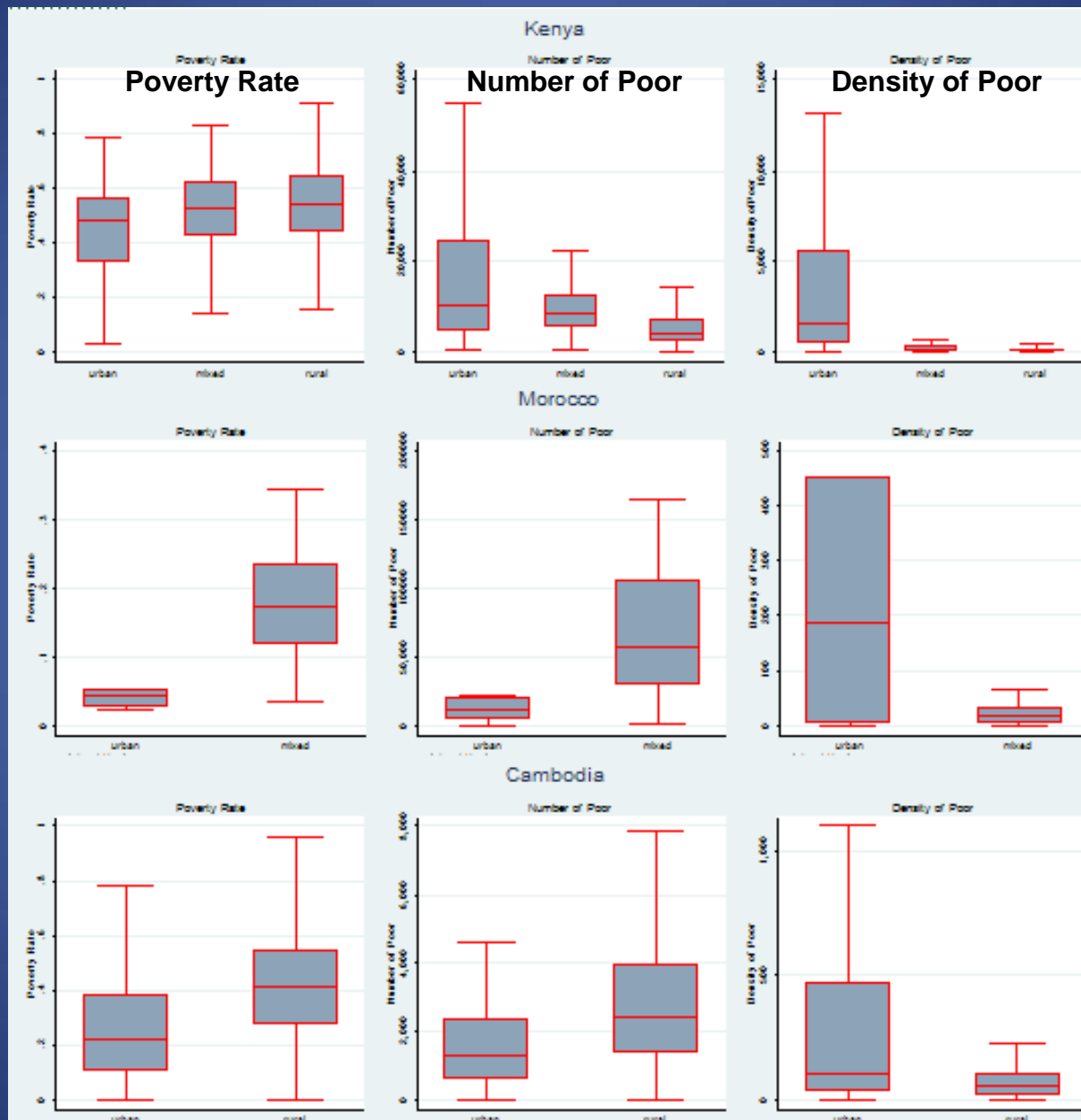
Source: Ratha and Xu, 2008

Urbanization, poverty reduction and ecosystem integrity

By Peter J. Marcotullio, Sandra R. Baptista and Alex de Sherbinin

- Our global future is urban (trend toward urbanization is clear); world's urban population is predicted to double by the mid-21st century to over 6 billion urbanites
- The world's rural population is predicted to remain near 3 billion over the same time period
- Urbanization (i.e., population concentration) is a mediating variable; not the only nor even the most important factor involved in negative environmental impacts
- Attention to only the negative impacts of urbanization has been misleading
- Urbanization is associated with modernization, wealth generation and the potential for poverty reduction
- Cities are not the villains, but may indeed be the heroes by:
 - alleviating poverty through economic development
 - mitigating negative environmental impacts at multiple scales
 - sparing areas for conservation and sustainable management

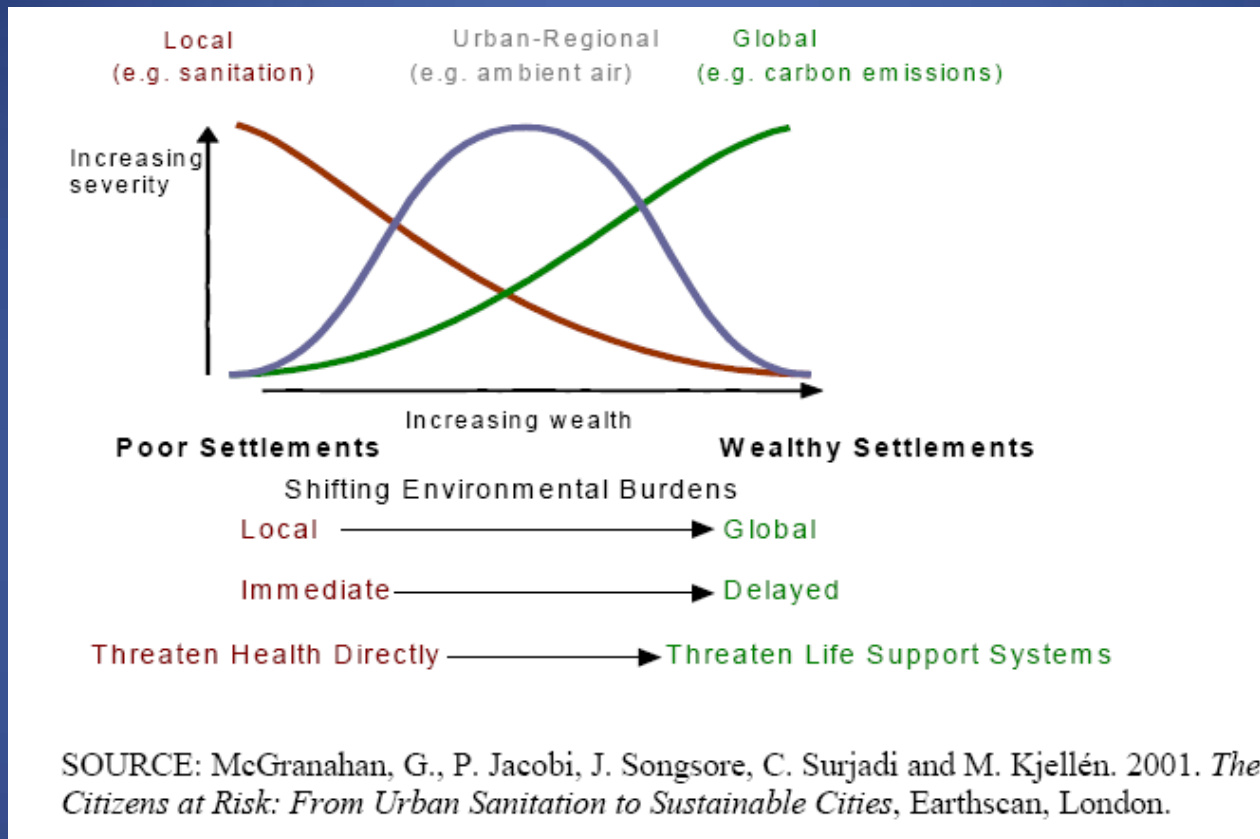
Urban and rural poverty using separate urban/rural poverty lines



Source: Maria Muñiz, CIESIN, Columbia University

Urbanization (cont.)

Environmental Transition Theory



- In this model, changes in environmental impact are not directly related to urbanization. Theory uses changes in income to examine environmental burdens related to cities and suggests that wealth rises with increasing urbanization
- Identifies shift in the scale of environmental impact with increasing urban affluence
- Importance of recognizing the variation in experiences of urban environmental transitions during different historical periods

Urbanization (cont.)

Poverty reduction & enhanced ecosystem integrity in urban settings

- Cities have had beneficial ecological impacts (local, regional, global)
- Developed country cases in which per capita energy consumption (ghg emissions) is lower in cities than averages for the respective nations (e.g., Dodman 2009)
- The quality of urban governance and urban design influence social and environmental outcomes
- Rapid population growth in developing country cities often makes it more difficult (but not impossible) to improve systems of governance and infrastructure

Specific examples:

- Economic and health benefits of urban agriculture & aquaculture
 - Job provision
 - Food security and improved nutrition
 - Enhances local ecosystem services (e.g., bio-remediation and soil conservation)
- Forest transition dynamics have been observed in urbanizing settings in Latin America (e.g., Florianópolis, Brazil and Puerto Rico)

Concluding summary

- Population dynamics are among the factors that affect ecological change, but are not always the most important factors
- Population growth is a necessary but insufficient explanation of relationships between population, ecosystems, and poverty
- Governance systems are important for ensuring equitable and ecologically positive outcomes
- Population mobility and urbanization can contribute to ecological benefits and poverty reduction
- Population dynamics can be “reimagined” to make the prospect of an urban, more populous, and increasingly mobile world less threatening and the possibilities of positive environmental outcomes more plausible



http://en.wikipedia.org/wiki/Albuquerque,_New_Mexico
Satellite image of Albuquerque taken by NASA.



S. Baptista



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Thank you!

sandra.baptista@ciesin.columbia.edu

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