Globalization and Sustainability

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Anthropocene — the “Age of Man”

Rockström et al. 2009, Nature

Figure 1: Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue Johan Rockström and colleagues.

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More than one hundred definitions of sustainability exist (Marshall and Toffel 2005). But the “mother” of most other definitions is:


“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987).

“可持续发展是人类满足当代需求而同时不损害其子孙后代满足他们将来需求的发展”（世界环境与发展委员会 1987）。“

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GLOBALIZATION?
Globalization and Sustainability: Conflict or Convergence?


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A Modern Myth: Sustainability Through Growth

Contemporary history illustrates just how ready humanity is to delude itself in the face of contrary evidence. In recent years, the governing elites of the market democracies have persuaded or cajoled virtually the entire world to adopt a common myth of uncommon power. All major national governments and mainstream international agencies are united in a vision of global development and poverty alleviation centered on unlimited economic expansion fueled by open markets and more liberalized trade.

At the heart of this expansionist vision (the “dominant economic paradigm”) is the belief that human
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Figure 1. The Expansionist Perspective

Expansionists treat the economy as an open, growing, independent system which, because of technological innovation, lacks any fundamentally important connectedness to the 'environment' (which is therefore treated as infinite).

Growing Economy
- Separate from environment
- Free of biophysical constraints

Infinite "Environment"
- Source of resources
- Sink for wastes

Energy and Resources
Wastes
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**Figure 3. The Ecological (Steady-State) Perspective**

Ecological economics sees the economy as an open, growing, wholly dependent subsystem of a materially-closed, non-growing, finite, ecosphere.
The prevailing forces of globalization tend to exacerbate rather than level these gross ecoeconomic inequities.

Ecofootprinting thus reveals the hidden (thermodynamic) role of global trade. The enormous purchasing power of the world’s richest nations enables them to finance their ecological deficits by extending their ecological footprints deeply into exporting nations and throughout the open ecosphere (Rees, 1996, 2001b).
Pros of Free Trade

According to conventional trade theory (and common understanding), freer trade is to the mutual benefit of all trading partners. Because trade can relieve local shortages (thus seeming to increase local carrying capacity) and catalyze growth, more liberal trade is a mainstay of contemporary globalization. In theory, if each country specializes in those few goods or commodities in which it has a comparative advantage, and trades for everything else, the world should be able to maximize gross material efficiency and therefore total output.

Cons of Economic Globalization

Unfortunately, there is a significant downside. Globalization creates an increasingly prominent role for transnational corporations, encourages the transportation of resources and manufactured goods all over the planet, facilitates the instantaneous opportunistic movement of finance capital across national boundaries in search of the highest returns, and generally encourages the integration of regional and national economies (Korten, 1995). These trends represent a threat to national sovereignty, to accountable democracy, and to economic stability even as they undermine options for community economic development. Trade in these conditions also accelerates natural capital depletion. Meanwhile, corporate agglomeration and other advantages accruing to capital accumulation foster today’s characteristic trickle-up (or flood) of wealth to the top.
The effects of globalization on Ecological Footprints: an empirical analysis

Lukas Figge¹ · Kay Oebels¹ · Astrid Offermans¹

Fig. 1 Scatterplots and linear regressions of the MGI and the logarithm of a the Ecological Footprint of consumption, b the EF of exports, c of imports, d of production (n = 181)
The effects of globalization on Ecological Footprints: an empirical analysis

Lukas Figge¹ · Kay Oebels¹ · Astrid Offermans¹

Abstract Whether globalization is sustainable is a contested issue. The quantitative literature on the Maastricht Globalization Index (MGI) and the KOF index of globalization shows that globalization contributes positively to economic and human development, environmental performance, mortality, gender equality and physical integrity rights. However, globalization also drives within-country income inequality, especially in developing countries. Evidence on the effects of globalization on the ecological environment does not provide clear patterns; various dimensions of globalization have different effects on various pollutants. This article analyzes the statistical relationship between the most recent MGI (2012 edition) and the ecological dimension of sustainable development. The latter will be operationalized by considering four variants of the Ecological Footprint. The relation between globalization and sustainable development will be controlled for GDP per capita as a proxy for affluence and report the results for Pearson’s correlations and multivariate regressions for up to 171 countries. We conclude that the overall index of globalization significantly increases the Ecological Footprint of consumption, exports and imports. The decomposition of globalization into different domains reveals that apart from the political dimension, all dimensions drive human pressures and demands on the environment. Globalization needs to go into new directions if it is to make a contribution toward all aspects of sustainable development.

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**Questions**

- Does globalization promote sustainability? Why and why not?
- How can we make globalization more sustainable?
- Can localization and globalization work together to better promote sustainability?
* Landscapes are cultural.
* Landscapes are coupled Human-Environmental Systems (CHES)
Four channels of human interactions with ecosystems: (a) knowing, thinking about an ecosystem or just the concept of an ideal ecosystem; (b) perceiving, remote interactions with ecosystem components; (c) interacting, physical, active, direct multisensory interactions with ecosystem components; and (d) living within, everyday interactions with the ecosystem in which we live.
Stress and the city: Urban decay

Scientists are testing the idea that the stress of modern city life is a breeding ground for psychosis.
The relationship among soil natural capital, ecosystem services, and human needs (modified from Dominati et al. 2010).

ECOSYSTEM SERVICES
- Cultural ecosystem services
- Regulating ecosystem services
- Provisioning ecosystem services

BIODIVERSITY
- ecosystem
- species
- genetic

ECOSYSTEM PROCESSES/ FUNCTIONS
(Supporting ecosystem services)

LANDSCAPE COMPOSITION & CONFIGURATION

HUMAN WELL-BEING
- Freedom of choice and action
- Good social relations
- Health
- Safety and Security
- Basic material for a good life

DIRECT DRIVERS
- Climate change
- Land use/land cover change
- Others

INDIRECT DRIVERS
- Human demography
- Economic development
- Institutions (laws, policies, and regulations)
- Others

KEY RESEARCH TOPICS
- Ecosystem services
- Human well-being
- Pattern/process
- Spatial variability
- Tradeoffs/synergies
- Thresholds/limits
- Scale/scaling
- Sustainability
- Spatial resilience
- Vulnerability
- Risk governance
- Planning/design

(Modified from MEA 2005)
The prime footprints model or concept, in other words, refers to the primary source-and-sink areas connected to a city or urban region by routes of inputs and outputs. Establishing and maintaining a balance, where nature and people thrive.

Forman, R.T.T. 2008, pp. 319
The prime footprints model/concept
Forman (2008, 2014)

Prime footprints
--- Integrating urban areas with their near and distant footprint impacts, plus the transportation network linking residents to sources and sinks, would provide spatial, environmental, and economic clarity for reducing impacts and accelerating benefits.

--- Forman 2014, pp.30
What Is Landscape Sustainability Science (LSS)?

Landscape sustainability science (LSS) is a place-based, use-inspired science of understanding and improving the dynamic relationship between ecosystem services and human well-being in changing landscapes with spatially explicit methods.

Fig. 3. A triadic conceptualization of contemporary urban ecology, showing that the spatiotemporal patterns, environmental and socioeconomic impacts, and sustainability of urbanization interact with each other in the study of cities, making urban ecology a truly interdisciplinary and transdisciplinary science that integrates research with practice.
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Where to put the next billion people

Richard T. T. Forman and Jianguo Wu call for global and regional approaches to urban planning.

By 2050, 7 billion more people will live on Earth—bringing the total to about 8.5 billion. Most of them will arrive in dense Asian and African cities, exacerbating pollution and resource shortages. Urban expansion alters a city’s “big seven”: natural vegetation; agricultural land; clean water; jobs; housing; transport; and communities. Rapidly growing cities such as Kano, Niamey, Sika and Bobo-Dioulasso in sub-Saharan West Africa, for example, are already converting woodland into irrigated farmland to feed their rising populations.

Urban planning can slow such degradation, and even improve matters. But protecting natural and agricultural land, water bodies and biodiversity are rarely top priorities for municipal governments. Planners focus on creating jobs, housing, transport and economic growth.

A new approach to planning cities is called for: one that is both global and regional. It must consider which areas are best placed to support higher populations without greatly increasing the already heavy ecological footprint on our finite Earth.

Globally, planners should prioritize development in the most suitable (or least bad) areas. That rules out regions that arenumberOf resource-poor or hotspots for native biodiversity. It points to places that have the warm and moist climates amenable to growing crops, such as grassy and forested lands in temperate and tropical regions. We see promise in large areas in the Americas, central Africa and Asia as well as pockets of Oceania.
Integrating ecology and design/planning for urban sustainability