

economic development and the environment

Economic development in low-income economies is initially highly resource-intensive. Resource depletion and pollution damage is often estimated to reduce 'real' GDP growth by between one and two per cent per year. Growth and structural change alter the environment–development nexus in nonlinear fashion. Policy reforms, global market integration, and institutional development all alter the propensity for growth to generate environmental damage. The emergence of new trade patterns among developing countries has created new challenges in the measurement and analysis of development–environment interactions. Larger developing economies are now emerging as major sources of emissions that contribute to global climate change.

Economic development depends on sustained per capita income growth and entails dramatic changes in production structure. In low-income economies, growth typically stimulates markets and promotes the evolution of institutions that constrain behaviour according to social norms. The expansion of trade in relation to GDP is another common accompaniment to growth. Each of these has effects on 'the environment', which in a developing-country setting refers not only to phenomena such as water and air quality but also, importantly, to natural resource stocks such as forests, fisheries and soils.

Conversely, changes in environmental quality, including resource stock drawdowns, may affect economic development in a dynamic interaction. This feedback is hard to quantify; however, the World Bank's *World Development Indicators* series now includes 'adjusted' national accounts data reporting GDP and savings net of the implied value of resource depletion and environmental damage (Bolt, Matete and Clemens, 2002). These indicate that environmental damage can reduce GDP growth by as much as one to two per cent per year. On a broader scale, growth of large low-income economies like China and India is beginning to have ramifications not only for their own environmental conditions, but also for the global environment through transboundary pollution spillovers and greenhouse gas (GHG) emissions.

The welfare of the poor in low-income countries is intimately linked to their access to environmental assets, and especially to the natural resource base. Despite this, the central concerns of environmental and resource economics – the economic costs of pollution and natural resource depletion – have only recently begun to be linked to models of economic development. Publication of the so-called Brundtland Report (WCED, 1987) was a watershed event; since then, 'no account of economic development would be regarded as adequate if the environmental-resource base were absent from it' (Dasgupta and Mäler, 1995, p. 2734).

Growth in low-income economies is inevitably associated with higher resource demands and increased pollution intensity per unit of income generated. Other things equal, more economic activity generates more environmental damage monotonically through a scale effect. The relationship may be nonlinear, however. As income grows, environmental damage per unit of additional income may initially rise, then decline. This conjecture, known as the environmental Kuznets curve (EKC), posits that scale effects dominate all other influences on the growth–environment relationship at low income levels, but that, as incomes rise, changes in the composition of production, technological improvements, and income-elastic preferences for conservation and a cleaner environment become more influential (Grossman and Krueger, 1993). Institutional and legal constraints on pollution and

resource depletion, initially so weak as to create a form of open access for polluters and resource depleters, may also evolve or be applied with greater vigour as incomes increase, whether due to income effects or to increased recognition of limits to growth imposed by pollution and resource scarcity (Stokey, 1998). Despite the heuristic value of EKC, however, empirical tests in low-income economies are plagued by data and measurement problems. Most notably, there is no robust evidence of an EKC for resource-depleting activities such as deforestation.

Changes in production structure and factor demands are also inherent to development. The most prominent manifestation of structural change in low-income countries is the relative decline of agricultural and resource sectors as contributors to GDP and employment. This has clear environmental implications when the majority of the population is initially dependent on the natural resource base. In capital-scarce economies, forest and land conversion for agriculture and the exploitation of fisheries and other resource stocks are standard strategies for increasing labour productivity and generating surpluses. Accordingly, early stages of development are characterized by rapid resource depletion – most visibly in the form of tropical deforestation. Such processes are abetted by conditions of open access (Barbier, 2005).

Whether the depletion rate eventually slows – a prerequisite for sustainable development – depends largely on the extent to which surpluses are used to build capacity in secondary and tertiary industries making more intensive use of reproducible resources such as labour, technology and human capital. In this way, the central story of structural change in low-income economies is intimately linked to the evolution of demands on the environmental and natural resource base. Sustained growth leads to a relative reduction in dependence on natural resources, and thus makes it easier for society to agree to promote conservation, biodiversity retention and non-use amenities. Conversely, macroeconomic failures, often in combination with rapid population growth, high transactions costs and market failures, can lead low-income economies into unsustainable cycles of poverty, resource over-exploitation, and institutional failure.

Trade is another influential source of structural change. Early development policies stressing import substitution and de-emphasizing trade have, in most countries, been supplanted by greater outward orientation. Trade-to-GDP ratios have risen and domestic prices have tended to converge on world market prices, thus altering domestic production and investment incentives. With the exception of resource-poor East Asian countries like Korea and Taiwan, the pursuit of comparative advantage in low-income countries initially means expanded exports of tropical agriculture, forestry and fisheries and of resource-based semi-manufactures such as sawnwood. Both the growth of global demand and the pro-trade effects of policy reforms encourage accelerated resource drawdowns; unless property rights and externalities are adequately dealt with, these are likely to occur at socially excessive rates (Coxhead and Jayasuriya, 2003). A related idea known as the pollution haven hypothesis posits that weak environmental laws and unresolved externalities may lead developing countries to specialize in pollution-intensive industrial activities (Copeland and Taylor, 1994).

Whereas early policy advice to developing countries typically stressed the desirability of exploiting resource wealth to create jobs and earn foreign exchange, contemporary concerns about exhaustibility and the integrity of ecological systems have led to more cautious counsel and an emphasis on sustainable development. Such advice, however, is often difficult to implement as policy in the face of pressures to promote growth and alleviate poverty in the current generation.

New issues in the development–environment relationship continue to emerge as economies grow and become more globalized. Traditionally, trade–environment analyses used Ricardian or Heckscher–Ohlin models of North–South interactions in which welfare growth in resource-abundant South is contingent on trade with industrialized North and on domestic externalities or market failures (for example, Chichilnisky 1994). However, South–South trade – or, in the case of China’s emergence as a major market for resource exports from Asia, Africa, and Latin America, ‘East–South’ trade – is now growing much faster than trade of the North–South type. South–South trade is a form of internationally fragmented production in which primary products or semi-manufactures are exported from one low-income country to another to be used in production of final goods. The latter low-income economy thus moves to ‘clean’ growth based on labour-intensive manufactures, while growth in the former becomes more resource-intensive. Countries in the South may have comparative advantage in either clean or dirty goods – or both. Conventional models and measures for evaluating environmental costs of growth must be adapted to such new modalities.

Other new trends reflect the growing global influence of large developing economies. In poor countries, about 50 per cent of carbon dioxide emissions (the primary sources of GHGs) comes from land conversion. But total emissions increase rapidly with energy demands driven by growth, urbanization and industrialization. According to the International Energy Agency, China accounted for 13 per cent of global energy-related CO₂ emissions in 2006, and is expected to overtake the USA as the largest CO₂ source by 2009; India is now following a similar path (IEA, 2006). Under the 1997 Kyoto Protocol, these economies are not required to limit GHG emissions. But, even if they do take major steps to limit pollution intensity, scale effects of their growth will ensure that global pollution externalities will continue to expand for the foreseeable future. In turn, concerns over the global environmental consequences of growth in low-income countries will find increasingly forceful expression in international negotiations not only on the environment but also on trade and other forms of international integration.

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See also

< xref = xyyyyy > climate change, economics of;
< xref = E000096 > environmental economics;
< xref = E000211 > environmental Kuznets curve;
< xref = xyyyyy > North–South economic relations;
< xref = P000313 > poverty alleviation;
< xref = S000482 > sustainability.

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Index terms

biodiversity
 comparative advantage
 conservation
 economic development and the environment
 environmental economics
 environmental Kuznets curve
 greenhouse gas emissions
 growth and international trade
 Heckscher–Ohlin trade theory
 import substitution
 income effects
 natural resources
 non-use amenities
 North–South economic relations
 pollution
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 structural change
 sustainable development

Index terms not found:

environmental economics
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 North–South economic relations
 poverty alleviation
 Ricardian trade theory