

Sustainability challenges and opportunities in Africa

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In much of international development literature, the sub-Saharan African region represents a prolonged development crisis (Stiglitz 2007; Sachs 2005; Easterly 2006; Collier 2007; Moyo 2009). Despite the recent remarkable development gains by some sub-Saharan African countries driven by a combination of factors—increasing democratization and transparency, strengthening and reform of governance institutions, surge in commodity prices, and the adoption and implementation of more effective macro-economic policies—the region still faces daunting sustainable development challenges. With 48 countries, a population of over 700 million, and an average per capita income of roughly US\$1 a day, sub-Saharan Africa remains, in economic terms, the poorest region in the world. Put in the context of global development trends, Africa's development travails are complicated by a stark paradox—whereas extreme poverty levels have declined globally in various regions of the world since 1980, the proportion of people living in abject poverty in Africa have increased. To paraphrase Moyo (2009), the number of Africans living in abject poverty nearly doubled in 2 decades (1991–2002). Notwithstanding Africa's development crisis, the continent is endowed with abundant renewable and non-renewable natural resources (African Development Bank 2007). In the context of sustainability, especially the often complex links between environment and development, how best could Africa's natural resources be harnessed to advance sustainable development of the continent? How can Africa's governance and institutional frameworks and policies be strengthened to respond to the

emerging and re-emerging sustainability challenges facing the continent and its people?

While the twenty-first century has witnessed sustained demand for Africa's natural resources—oil, minerals, and other raw materials—the continent continues to lack effective institutional capacity to manage these resources sustainably. Added to the continent's vulnerabilities to climate change, Africa's ongoing sustainable development efforts must, as of necessity, link the environment (nature), economic growth (wealth) and governance (power) as the essential elements in poverty reduction strategies (African Development Bank 2007). Although the linkages between Africa's socioeconomic development and the continent's natural, ecological, and climatic factors have been the subject of relevant development literature (Sachs 2005; Collier 2007), this discourse has also identified the need for the continent to develop effective, accountable, and transparent governance institutions to manage these complex development-environment-climate linkages. Economic and investment policies in Africa that recognize and integrate these approaches will likely yield positive development outcomes towards achieving the Millennium Development Goals (Kates and Dasgupta 2007; World Bank 2002; United Nations Development Programme 2006; UN Millennium Project 2005).

This Special Issue—focusing on African Regional Perspectives—offers an overlapping theme that spans four broad categories of local and continent-wide sustainability challenges in Africa: evaluation and assessment; integrating indigenous knowledge; climate change; and policy and governance. The selection process, to the greatest extent possible, prioritized inter-disciplinary and multi-institutional research. The African research priorities set out in the *Strategy for Global Environmental Change Research in Africa: Science plan and implementation strategy* (Odada

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et al. 2008), and their broader themes are well represented in this special issue, especially the articles focusing on vulnerability in farm income, forestry management for climate change, and water supply governance as these issues affect particular regions of the continent.

As one example of sub-Saharan Africa's unique geographical, ethnic, historical, and political features, Mozambique is a coastal country with a large drainage basin from which to produce hydropower, and a wealth of natural resources. In comparison to Ghana, a top cocoa and gold exporter with similar geographic features, Mozambique has not taken advantage of its resources to develop more sustainably. At the low end of Transparency International's Corruption Index, Mozambique's weak institutional infrastructure indicates that the country's natural resource wealth may, in fact, have a negative impact on the economy (Bucuane and Mulder 2007) and therefore requires a different development model.

The first article in this special issue examines climate change impacts and adaptation options in Mozambique using modeling approaches. Thurlow and co-authors present a modeling framework that investigates the range of impacts on Mozambique's environment and economy by using the wettest and driest climate scenarios, at global and local levels. The first striking result is the contrasting impact depending on whether the extreme scenarios were local or global. The authors predict that the frequency of most severe floods will double or quadruple under the global extreme scenarios, but will remain about the same in the local wet/dry scenarios. Crop yields show both negative and positive impacts under most conditions, but the authors found that hydropower generation and road networks will suffer negative long-term impacts from just about all climate change scenarios. The study concludes with transport, agriculture, and education adaptation strategies.

In his article, Ernest Moula introduces a different variable, gender, into the analysis of climate change impacts on agricultural yield in Cameroon where three quarters of food crop farmers are women. The study shows how women, whose farms often earn lower profits, adapt to uncertainties in yield versus those of men, relying less on adaptations that require extensive resource use, and are less likely to consider migration. In general, farmers are willing to employ various risk management options to deal with uncertain weather patterns, and women tend to shift to crops that require less work and investment when responding to rainfall signals. Women were also found to be less likely to resort to labor migration in times of low farm productivity.

The next two articles examine the institutional limitations in implementing government policies for water sanitation in Tanzania and Environmental Impact Assessment in Malawi focusing on the policy implementation process led by

various levels of governments. The contributors assess how these policies facilitate the engagement of relevant stakeholders in the project. Jimenez and Perez-Foguet explore the decentralization of responsibilities to regional governments and village councils towards ensuring adequate water supply to rural communities. Although local leaders have a better understanding of needs, and are seen as more responsive, the authors found that lack of accountability at the village level, inadequate top-down support, and political influences are major barriers to effectively reaching the vulnerable communities. They state that the decentralized model can work well with a stronger central government role. Ishmael Kosamu similarly finds some major limitations to conducting environmental impact assessments (EIAs) for development projects in Malawi as they were identified through examination and quality ranking of recently submitted EIA reports, and a field survey. These limitations include inadequate human capacity to conduct EIAs, excessive cost, and political will to effectively link the assessments to the development planning process.

In the final article Dennis Sonwa and co-authors review the land change patterns of Central Africa focusing on the benefits of forestry conservation for climate change mitigation. They found that habitat protection for biodiversity preservation reduced impact logging, and in some cases, small holder agroforestry was significant in securing carbon stocks in natural forest stands. They conclude with an overview of the current efforts to develop funding programs under the Clean Development Mechanism and Reduction of Emissions through Deforestation and Degradation (REDD or REDD+) that would compensate communities for maintaining vegetation biomass.

The articles in this special issue, as an overlapping theme, confirm that environmental sustainability must be combined with poverty alleviation for a functioning ecosystem to produce resources and services as a basis for development that improves individual well-being and community resilience. These articles, focusing on selected African regional studies, highlight some of the policy challenges and opportunities for communities—from the local to the national levels—to tackle these interrelated problems sustainably. We hope that these studies, although limited in scope, offer a microcosm of the larger sustainability challenges facing African societies and address some of the gaps in sustainable development literature in Africa. As the African Development Bank observed, sound environmental management and effective governance are indispensable policy frameworks to ensure that Africa's natural resource wealth generates rapid development and poverty reduction (African Development Bank 2007). In order to be successful, these frameworks must be transparent, accountable, representative, and take into account public participation.

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