

Reducing hunger vulnerability through sustainable development

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The food-price inflation protests that captured the world's attention in the spring of 2008 (1) showed that the hunger problem is bigger than we think (2). Between 75 and 133 million additional people fell into hunger that year, raising the number of hungry people in the world to over 1 billion (2, 3). The events showed that hunger is a problem for those who are both hungry and vulnerable to hunger (4). Three papers in this issue of PNAS indicate that improving local food security is a multiscale challenge (1, 5, 6), because the processes that generate hunger and unsustainable development originate in multiple locations. The contributions that these papers make show that sustainable development, defined as the successful reconciliation of economic development, environmental conservation, and social equity, is a political ecologic process and outcome (7).

Emaciated Rice Sectors

The comparative study of domestic rice production in West Africa by Moseley et al. (1) paints a somber picture of "emaciated rice sectors" in the part of the world where African rice (*Oryza glaberrima*) was domesticated. The dependency of The Gambia and Côte d'Ivoire on imports for 85% and 60%, respectively, of national rice consumption is a recent underdevelopment. When African farmers received subsidies and price supports and governments created credit programs, built roads, and constructed rice mills, they intensified rice production like most farmers in the world. However, when these state-supported development programs were dismantled in the context of World Bank structural adjustment programs, African farmers found themselves on an uneven playing field. They could no longer compete with rice that was made cheap by other countries' farmer-friendly agricultural policies. The disarticulated rice sector of The Gambia, in which urban populations depend on imported rice and rural households consume locally produced rice, reveals the failure of development to foster rural economic growth and national food security.

A New Rurality

The papers also complicate our understanding of the rural farm household, which is often portrayed as a homoge-

neous category (8). Chowdhury's (5) discussion of land use and land cover in the buffer zone of the Calakmul Biosphere Reserve of Mexico points to groups of farmers differentiated by their engagement with agricultural and labor markets, land-rights systems, and off-farm incomes. Differential access to resources results in diverse landscapes characterized by different mixes of agricultural systems (extensive or intensive) and farm sizes. Perfecto and Vandermeer (6) argue that the landscape mosaics fashioned from these complex land-use and land-cover patterns can sustain high levels of

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biodiversity if the agroecologic matrix is of sufficient quality. Even if "agriculture is not the enemy of conservation" (6), that does not mean that just any farming system can produce a high-quality matrix. Small-scale agricultural systems that use natural farming techniques hold more promise than large-scale industrial agricultural systems for strengthening rural livelihoods, improving food security, and preserving biodiversity in the long run (9). But this new rurality is not going to spontaneously spring from the soil (10). Perfecto and Vandermeer as well as others (7, 11, 12) indicate that this reconciliation of conservation, development, and equity necessitates political-economic change such as land redistribution, research and development in sustainable agricultural technologies, and even regulated markets. This is not the type of structural change that the World Bank has in mind (13).

The emphasis of the papers on identifying the appropriate scale of analysis is key to understanding these development and underdevelopment dynamics. At the scale of the rural household in The Gambia, rice yields fell when women refused to work on land wrested from their control by male household heads in the context of a donor-funded irrigated rice-development scheme (1). At the local and regional scales in Mexico, uneven access to land and agricultural subsidies force poor households to rely more

heavily on off-farm work to reduce hunger vulnerability (5). At the global scale, development aid policies and international trade agreements (e.g., North America Free Trade Agreement) groom the uneven playing fields on which smallholders sell their products. Simple household reproduction is made precarious by the high costs of agricultural inputs (6) and the low prices received for farm products in value chains that typically favor merchants and processors more than farmers (14).

Rethinking Conservation and Development

From gender politics at the household level to the politics of structural adjustment at the national and global scales, livelihoods and landscapes are influenced by multiscale processes that now include billions of US dollars in remittances sent each year to developing countries by migrants living abroad (15, 16). International migration and remittances buffer the poor against low agricultural prices and improve food security. Remittances also figure importantly in the dynamics of forest recovery in Latin America. As the economic viability of farming declines, rural households increasingly depend on off-farm income to sustain their livelihoods (17). Forests regenerate on abandoned agricultural land and form the interstices of complex landscape mosaics composed of forest fragments, hedgerows, dooryard gardens, small farms, and scrubland (10, 17). Matrix ecology emphasizes the biologic and economic importance of such diverse landscapes (6). Although undervalued by mainstream conservationists (10, 18), sustainably used environments are now included in a panoply of protected area schemes (19).

The coexistence of human poverty and landscape diversity does not add up to sustainably used environments. For this to be achieved, a high-quality agroecologic matrix must be complemented by a high-quality socioeconomic matrix that promotes human development (7, 20). This integrated approach to environment and development is inherently political,

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because resource access, control, and management issues always have distributional effects. The resurgence of the protectionist paradigm and the back-to-the-barriers movement that advocate fortress-style conservation represent anti-sustainable development politics (7, 21).

Alternative Development Paths

The food-price protests of 2008 revealed that hunger is linked to multiscale processes that make poor people vulnerable

to exacerbating conditions like price shocks, disasters, and violent conflicts (4). Media typically emphasize these exacerbating conditions rather than the political economies that produce vulnerability in the first place. The papers in this issue illuminate the terrain of hunger vulnerability with emphasis on alternative development paths that can lead to more sustainable farming systems. These include agroecologic technologies, road networks, credit systems, and price support that will

nurture small-scale and environment-friendly agroecosystems. In light of this research, the Green Revolution for Africa, with its emphasis on expensive seeds and chemical fertilizers and pesticides, needs to shift its research and development focus from industrial to natural farming techniques (9). Taken together, these alternative development paths will help to reduce world hunger by improving farmer incomes, social equity, and crop diversity in high-quality socioecologic systems.

- Moseley WG, Carney J, Becker L (2010) Neoliberal policy, rural livelihoods and urban food security in West Africa: A comparative study of The Gambia, Côte d'Ivoire and Mali. *Proc Natl Acad Sci USA* 107:5774–5779.
- Food and Agricultural Organization of the United Nations (2008) *State of Food Insecurity in the World 2008* (FAO, Rome).
- United States Department of Agriculture (2008) *Food Security Assessment 2007* (USDA, Washington).
- Bassett T, Winter-Nelson A (2010) *The Atlas of World Hunger* (University of Chicago Press, Chicago).
- Chowdhury RR (2010) Differentiation and concordance in smallholder land use strategies in southern Mexico's conservation frontier. *Proc Natl Acad Sci USA* 107:5780–5785.
- Perfecto I, Vandermeer J (2010) The agroecological matrix as alternative to the land-sparing/agricultural intensification model: Facing the food and biodiversity crisis. *Proc Natl Acad Sci USA* 107:5786–5791.
- Adams W (2009) *Green Development: Environment and Sustainability in a Developing World* (Routledge, London), 3rd Ed.
- Woodhouse P (2008) *Inside Poverty and Development in Africa: Critical Reflections on Pro-Poor Policies*, eds Rutten M, Leliveld A, Foeken D (Brill, Leiden, The Netherlands), pp 25–56.
- UNCATD-UNEP (2008) *Organic Agriculture and Food Security in Africa. UNEP-UNCATD Capacity-Building Task Force on Trade, Environment and Development* (United Nations, New York).
- Hecht S (2010) The new rurality: Globalization, peasants and the paradoxes of landscapes. *Land Use Policy* 27:161–169.
- Scoones I (2009) Livelihoods perspectives and rural development. *J Peasant Stud* 36:171–196.
- Forsyth T, Walker A (2008) *Forest Guardians, Forest Destroyers: The Politics of Environmental Knowledge in Northern Thailand* (University of Washington Press, Seattle).
- Goldman M (2005) *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization* (Yale University Press, New Haven, CT).
- Bassett T (2008) *Hanging by a Thread: Cotton, Globalization and Poverty in Africa*, eds Moseley W, Gray LC (Ohio University Press, Athens, OH), pp 35–64.
- Bebbington T, Batterbury S (2001) Transnational livelihoods and landscapes: Political ecologies of globalization. *Ecumene* 8:369–380.
- International Fund for Agricultural Development (IFAD) (2008) Sending money home: Worldwide remittance flows to developing countries Available at <http://www.ifad.org/remittances/maps/index.htm>. Accessed March 1, 2010.
- Klooster D (2003) Forest transitions in Mexico: Institutions and forests in a globalized countryside. *Prof Geogr* 55:227–237.
- Marris E (2009) Ecology: Ragamuffin Earth. *Nature* 460:450–453.
- Zimmerer K (2006) *Globalization & New Geographies of Conservation* (University of Chicago Press, Chicago).
- Hecht S (2004) *Liberation Ecologies: Environment, Development and Social Movements*, eds Peet R, Watts M (Routledge, London), pp 64–103.
- Wilshusen PR, Brechin ST, Fortwangler CL, West PC (2002) Reinventing a square wheel: Critique of a resurgent "protection paradigm" in international biodiversity conservation. *Soc Nat Resour* 15:17–40.