Hunger, Poverty and Biodiversity in Developing Countries

A paper for the Mexico Action Summit, Mexico City, Mexico, June 2-3, 2003

By

Sara J. Scherr
Senior Policy Analyst, Forest Trends and
Director, Ecoagriculture Partners, Washington, D.C.
In 2000, the United Nations committed themselves to achieve key Millennium Development Goals by the year 2015, including to halve the incidence of hunger, to halve the rate of poverty, and to conserve biodiversity and environmental services (United Nations 2000). The scale of this challenge is daunting:

- Nearly 800 million people suffer from chronic undernutrition. Nearly 80 percent of these live in rural areas: roughly half are in farm households, a quarter in landless households and a tenth depend mainly on herding, forests or fisheries. Of the undernourished, 170 million are infants and pre-school children. Some 60 million people each year face famine due to natural disasters or civil conflict. Nearly 2 billion people (including a high proportion of the hungry) suffer from debilitating micronutrient deficiencies (Scherr and the Hunger Task Force 2003).
- Nearly 1.2 billion people worldwide live on the equivalent of less than US$1 per day. Of these, about 75 percent live in rural areas. Chronic poverty is a major drag on economic development, reducing productivity, depleting assets during financial crises, and increasing dependency (IFAD 2001).
- The expansion of agriculture, human settlements and infrastructure has led to massive ecosystem conversion and degradation. Over 83 percent of the earth’s land area is impacted by human activity, as is 98 percent of the area suitable for producing wheat, rice and maize (Sanderson, et al. 2002). Some experts calculate that if present trends of wildlife losses and habitat destruction continue, at least 25 percent of the world’s wild plants and animals could be extinct or vastly reduced in number by the middle of this century (IUCN 2000). Hydrological functions have deteriorated in watersheds around the world (Revenga, et al. 2000).

Present levels of investment to address these challenges are grossly inadequate. Moreover, present investments largely reflect sectoral strategies and ignore the powerful inter-linkages between food insecurity, poverty and biodiversity loss. This background paper outlines the nature of those inter-linkages, shows how sector-focused “solutions” often exacerbate problems, and then highlights some synergistic approaches that could be pursued to achieve the Millennium Development Goals.

Inter-linkages: Food Insecurity, Poverty and Biodiversity Loss

Globally, food insecurity and poverty are often found where biodiversity loss is especially pronounced, as well as in some of the more remote areas of richest remaining biodiversity. In 19 of the 25 biodiversity-rich “hotspots” for biodiversity loss defined by Conservation International, population growth rates are higher than the global average, and in the few remaining wilderness areas, twice the global average. Sixteen of the 25 hotspots are in areas where over 20 percent of the population is malnourished—accounting for a quarter of all the malnourished people in the developing countries (Cincotta and Engelman 2000).

Two thirds of the rural population—and the rural poor—live in higher-risk production environments with variable rainfall, difficult soils and pest complexes. Over 500 million
people live in drylands without access to irrigation, and 625 million live in mountainous regions, where considerable natural biodiversity still remain. It is precisely in such areas that food production must double or triple over the next few decades (often from the low yield levels found today), if nutritional status is to improve. The other third of the rural population live in the “breadbaskets” and “rice bowls” of the world where ecosystems are so heavily modified that ecosystem services have declined.

While international attention is understandably concentrated on the unprecedented rates of urbanization in developing countries, it is often overlooked that rural populations will still be growing in absolute terms in most low-income countries for at least the next 30 years. Despite structural changes in economies, in 2010 at least half the population in developing countries will likely still be in agriculture (IFAD 2001). Thus problems of rural food insecurity, poverty and biodiversity loss will be closely inter-linked:

**Biodiversity loss threatens food security and income.** International attention to biodiversity focuses mainly on conservation of “globally-important” biodiversity: rare, endemic and endangered species and ecosystems. Less widely recognized is the centrality of biodiversity to food security and livelihoods of the poor, and the impact of biodiversity loss. Low-income rural people rely heavily on the direct consumption of wild foods, medicines and fuels, especially for meeting micronutrient and protein needs, and during “hungry” periods. An estimated 350 million poor people rely on forests as safety nets or for supplemental income. Farmers earn as much as 10 to 25 percent of household income from non-timber forest products. Bushmeat is the main source of animal protein in West Africa. The poor often harvest, process and sell wild plants and animals in order to buy food (Scherr, White and Kaimowitz 2003). Sixty million poor people depend on herding in semi-arid rangelands which they share with large mammals and other wildlife. Thirty million low-income people earn their livelihoods primarily as fishers, twice the number of 30 years ago. The depletion of coastal fisheries thus has serious impacts on food security (Scherr and Hunger Task Force 2003; Burke, et al. 2000).

Wild plants are used in farming systems for fodder, fertilizer, packaging, fencing and genetic materials. Farmers rely on soil microorganisms to maintain soil fertility and structure for crop production, and on wild species in natural ecological communities for crop pollination and pest and predator control. Wild relatives of domesticated crop species provide the genetic diversity used in crop improvement. The rural poor rely directly on ecosystem services for clean and reliable local water supplies. Ecosystem degradation results in less water for people, crops and livestock; lower crop, livestock and tree yields; and higher risks of natural disaster (McNeely and Scherr 2003).

**Food insecurity threatens incomes and biodiversity.** Crop and planted pasture production—mostly in low-productivity systems—dominate at least half the world’s temperate, sub-tropical and tropical forest areas; a far larger area is used for grazing livestock (Wood, et al. 2000). Food insecurity threatens biodiversity when it leads to over-exploitation for wild plants and animals. Low farm productivity leads to depletion of soil and water resources, and pressure to clear additional land that serves as wildlife habitat. Some 40 percent of cropland in developing countries is degraded. Of more than
17,000 major protected areas, 45 percent (accounting for one fifth of total protected area) are heavily used for agriculture, while many of the rest are islands in a sea of farms, pastures and production forests that are managed in ways incompatible for long-term species and ecosystem survival (McNeely and Scherr 2003). Hunger itself reduces labor productivity, and the need to meet food needs during periods of food shortage lead to depletion of household and community capital, compromising future potential (FAO 2002).

Poverty threatens food security and biodiversity. Poor farmers are unable to invest in farm improvements to raise yields sustainable, such as grade cattle, improved seed and other farm inputs, and conservation practices. High regional rates of poverty result in inadequate effective demand to build the market size needed to justify investment in food market infrastructure and institutions. Poverty often reflects the lack of rights to land, water and forests, and the income options they provide (IFAD 2001). When income-earning opportunities are limited in the farm and non-farm manufacturing and service sectors, pressures on natural resources for subsistence use and cash income increase. Poverty is also associated with higher human fertility rates that indirectly increase food demand and pressure on ecosystems (Cincotta and Engelman 2000).

Sector-focused “Solutions” Can Exacerbate the Problems

Historically, policy responses to food insecurity have emphasized increasing the supply of food, through agricultural research and investment, provision of food aid, and development of urban safety nets. Poverty reduction has focused on urban and non-farm development, and to a lesser extent agricultural commercialization by larger-scale farmers. Policy responses to biodiversity loss have primarily focused on establishment of protected areas and regulation of land and resource use. While all of these approaches can claim some success, sectoral “stovepiping” of policies has often exacerbated problems in the other sectors, posing problematic trade-offs (Lee and Barrett 2000).

Some biodiversity solutions increase poverty and food insecurity. For example, the expansion of public parks and protected area by excluding local people from using the resources for food production or gathering has hurt food security, and impoverished them by confiscating their assets (Molnar 2003). Strict regulations on the harvest of timber and non-timber forest and woodland products have hurt the rural poor by increasing the transaction costs and criminalizing their activities; while fear of harassment leads them to destroy seedlings of tree species that are “protected” or reserved for exploitation by the state (Kaimowitz 2003).

Some food security solutions increase poverty and biodiversity loss. Efforts to address food security by promoting intensification of production through high agrochemical input use has resulted in cases in serious pollution of freshwater and coastal biodiversity. Hypoxia due to excessive nutrient loads is especially severe in gulf waters below the Mississippi and Mekong Deltas (Burke, et al. 2000). Irrigation investments that divert water from critical natural wetlands and failure to provide adequate drainage for irrigation waters both threaten biodiversity (Wood, et al. 2000).
Some poverty solutions increase food insecurity and biodiversity loss. Some agricultural commercialization strategies encourage whole-farm or landscape conversion to monocultures. Such conversion not only eliminates biodiverse habitats and ecological communities of associated species that could thrive if some natural features and corridors were retained in the landscape, but also deprives the very poor of access to food and fodder from these natural areas (Forman 1995). Poverty reduction strategies that concentrate public investment in urban and industrial development often starve farming areas of critical investments needed for sustainable food security (IFAD 2001).

Synergies: Food Security, Poverty Reduction, and Biodiversity Conservation

While such trade-offs are sometimes unavoidable, there is far greater potential for synergies in achieving food security, poverty reduction and biodiversity conservation than is generally recognized. A variety of strategies can mobilize and support local people to conserve areas of high biodiversity, restore biodiversity in degraded working landscapes, and thereby enhance the natural resource assets of low-income, food-insecure populations. By engaging with local people to conserve aspects of biodiversity that are critically important to their livelihoods, such strategies can build broader-based, long-term public support for protected of globally threatened biodiversity.

Support the development and adoption of ecoagriculture. Investment to increase agricultural productivity is essential in many low-income rural regions. But new “ecoagriculture” approaches can be used that at the same time conserve or enhance natural biodiversity. This is achieved by using the spaces in and around productive areas for habitat networks and by improving the habitat quality of productive areas themselves by reducing agrochemical pollution, modifying water, soil and vegetation management, or by modifying farming systems to mimic natural ecosystems. For example, scattered trees, woodlots and forest strips can not only provide woodfuel, vitamin- and calorie-rich fruits, and raw materials for locally processed goods, but to restore habitats for threatened plant and animal species. Dozens of ecoagriculture systems have been documented around the world, from intensive irrigated rice systems to improved fallow system, to shaded coffee and cocoa and other forest garden systems (McNeely and Scherr 2003). In Costa Rica, a conservation organization worked with farmers in 19 communities to create 150 hectares of windbreaks that not only increased the herd-carrying capacity of the pastures and raised milk and coffee yields, but also serve as an important biological corridor connecting remnant forest patches in the area (Current 1995). The Equator Initiative has identified hundreds of low-income tropical communities that have increased agriculture, livestock, forestry or fisheries production and income, while also protecting biodiversity (www.equatorinitiative.org). To develop, promote and support ecoagriculture innovations will require increased research, the re-building of technical assistance services that support producers in managing both agricultural and natural resources, and in some cases policy changes.

Develop biodiversity reserves as community “safety nets.” Communities can establish, enrich or conserve special biodiversity reserves. These can be designed and managed to
protect wild species that serve as “safety nets” for the poor in times of food scarcity, as well as ecosystem services of local importance. For example, in the drylands of southern Zimbabwe, wild foods, fuels, housing inputs, fertilizer and other products from common woodlands and rangelands provided 24 percent of average total income for the poorest fifth of households (Cavendish 1999). Farmer groups working through the Landcare program in Australia to rehabilitate degraded crop and grazing lands in Australia have taken land out of production and jointly set up and fenced protected areas for wildlife (Sutherland and Scarsbrick 2001).

**Strengthen local communities’ ownership and use rights of forests and other natural resources.** Devolution of state forest land to local communities, as private individual or group holdings, has already doubled in the past 15 years and is continuing. An estimated 22 percent of all forests in developing countries are owned or administered on behalf of indigenous and other rural communities. This trend is expected to continue, as governments simply do not have the resources necessary to manage and protect these lands (White and Martin 2002). Priority areas for reform can be those indigenous and other local managed lands that are already being well-managed for biodiversity conservation, and where communities have organized to defend their resources from outside encroachment. In southern Mexico, for example, since 1997 organized indigenous forest communities with strong tenure rights and technical assistance have improved management on 650,000 hectares, increased total timber production by 60 percent (but staying well below legally allowable cut), certified over 90,000 hectares. The communities have also established 13,500 hectares of permanent old-growth biodiversity reserves. The new volume generates over $10 million in value annually, and generated 1500 new jobs (DeWalt, Olivera and Betancourt-Correa 2000). In Mindanao, the Philippines, illegal activities in one of the most important public protected areas dropped by more than 95 percent when indigenous communities living in the buffer zone around the park were granted secure tenure rights and provided with technical assistance to establish agroforestry systems (Garrity 2003).

**Pay rural communities for the ecosystem services they provide.** New approaches are being developed to provide financial incentives for farmers and other land owners to manage their resources in ways that enhance ecosystem services and biodiversity. These include special tax incentive and direct payments to farmers and communities for keeping land out of production or for practicing ecoagriculture. Several hundred systems are already underway around the world for upland watershed management, biodiversity conservation, carbon emission offsets, and landscape beauty (Landell-Mills and Porras 2002; Pagiola, Bishop and Landell-Mills 2002). Low-income rural communities that own or manage high-value or high-impact natural resources can benefit from such payments, where their rights are respected, the rules are established fairly, and organizations are present that can help to reduce transaction costs (Smith and Scherr 2002).

**Reform governance systems for local resource management.** To protect and restore habitats and watersheds will require coordination and planning at landscape scale. Devolution of significant real authority and budget for land use planning to the local level is essential, with adequate access to specialized expertise. Participatory planning
processes can facilitate negotiations among farmers, conservationists, agribusiness, local residents and other groups that include food security, biodiversity conservation and economic development objectives (Buck, et al. 2001; Chung 1999). The highly inefficient, generally ineffective and sometimes oppressive regulatory systems presently in place for forests and protected area systems in many countries need to be changed. Alternatives may include promotion of “best management practices,” establishment of minimum environmental standards, use of third-party certification systems, “social contracts” guaranteeing biodiversity conservation in exchange for tenure rights or development investments, and regulatory systems set and enforced by local organizations (Kaimowitz 2003; Molnar 2003).

Promote partnerships among key stakeholders in rural landscapes. Partnerships can be developed that actively link farmers, conservationists, policymakers and natural resource managers from different parts of the world to share information, successful strategies and expertise. Examples include the Equator Initiative, which links together rural communities around the tropical world who are successfully reducing poverty while increasing biodiversity, and Ecoagriculture Partners, an international partnership of farmers, conservationists, public agencies and researchers to develop and promote ecoagriculture systems that was established at the Johannesburg Summit.

Integrate biodiversity conservation and rural development in international conventions, investments and donor assistance. Concrete steps can be taken to integrate biodiversity, food security and poverty reduction initiatives in international conventions and programs:

- The rules for the Clean Development Mechanism (CDM) of the Kyoto Protocols, which are to be finalized in 2004, should fully embrace forestry and agroforestry carbon emission offset projects, and ensure that most, if not all, such projects contribute significantly to poverty reduction, food security and/or biodiversity, as well as meeting rigorous climate change mitigation criteria (Smith and Scherr 2002).
- The Convention to Combat Desertification (CCD) should support investment in natural capital and in the conservation and restoration of biodiversity, as well as promoting sustainable dryland food production systems.
- The Global Environment Facility (GEF) should pursue new lines of investment to combat land degradation and enhance agricultural biodiversity, in ways that also reduce poverty and protect threatened wild biodiversity.
- The Convention on Biological Diversity (CBD) should develop more active strategies for biodiversity conservation in working landscapes (complementary protected area systems) and strategies for conservation by low-income rural communities that also meet their livelihood needs.
- The Consultative Group on International Agricultural Research (CGIAR) should increase investment in research to increase agricultural productivity while enhancing ecosystem services and biodiversity conservation at landscape scale, especially for production systems in regions where poverty, food insecurity and biodiversity threats are most acute.
Conclusions: Meeting the Millennium Development Goals

Rural populations in developing countries, especially in the low-income areas with high biodiversity, are continuing to increase and are still largely dependent on local food production and agriculture-related incomes. Protected areas are inadequate to maintain long-term wild species populations and habitats, without a surrounding matrix of land use that is compatible with ecosystem health. Moreover, local people effectively control a high share of resources and have the greatest capacity and responsibility for environmental husbandry.

We draw three conclusions from assessing these inter-linkages:

• One of the root causes of hunger today is biodiversity loss associated with ecological deterioration; restoring ecosystem services and biodiversity will be essential in many regions to meet the MDG on hunger;
• Biodiversity will not be conserved in many ecosystems unless efforts are explicitly linked to increasing food security for large and growing rural populations.
• There is compelling evidence that integrated strategies for biodiversity and food security can work; these need to be scaled up dramatically.

To meet the MDGs, it is essential to reposition agricultural, forestry and fisheries policies in food-insecure regions to recognize the crucial role of biodiversity, and to reposition biodiversity conservation policies in such regions to prioritize strategies that explicitly support hunger and poverty reduction. The synergies between food security, poverty reduction and biodiversity conservation could be greatly expanded by investing in programs and technologies that explicitly seek such synergies. Even in places where the challenges are less acute, such linked approaches will often be more cost-effective in meeting policy objectives. In regions that are “hotspots” for both rural poverty and biodiversity, such as the Mesoamerican Biological Corridor, montane Southeast Asia and the east African highlands, such direct program linkages and policy harmonization will be essential. A starting point is to organize national or regional Policy Forums to explore sectoral inter-linkages, conflicts and policy options in such high-stakes regions, and to brainstorm about the design of both sectoral and inter-sectoral programs and policies to jointly meet biodiversity, food security and poverty reduction objectives.
References


