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SUSTAINABLE LAND MANAGEMENT

Lessons from the East African Highlands

John Pender, Frank Place, and Simeon Ehui

As population density increases and agriculture intensifies in Africa in the future, policymakers, development practitioners, and farmers may find useful lessons in the experiences of the East African highlands. The highlands of Ethiopia, Kenya, and Uganda face complex problems of severe poverty, low productivity, and poor natural resource management. These highlands contain some of the most densely populated areas in all of Africa, as well as a wide

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variety of agroclimatic conditions and market opportunities. Despite facing many problems, the highlands have also seen some real successes, where farmers invest in agriculture and improved resource management and generate significant profits. The book *Strategies for Sustainable Land Management in the East African Highlands*, edited by John Pender, Frank Place, and Simeon Ehui, presents studies of income strategies, land use, and agricultural dynamics and their impacts on welfare and natural resources in the East African highlands. It shows how different conditions tend to lead to different intensification pathways, as well as which factors have been most critical in enabling some communities and farmers to prosper.

LAND MANAGEMENT IN THE EAST AFRICAN HIGHLANDS

The studies in the book revealed several broad findings about land management in the East African highlands. For instance, agricultural productivity, household incomes, and welfare tend to be higher in areas of higher agricultural potential and better market access. Farmers tend to purchase more inputs, such as inorganic fertilizer, in areas with better market access. Population pressure and smaller farm sizes are associated with intensification of agricultural production, but also with land degradation in many cases. Cash crop production is associated with adoption of purchased inputs and higher value of crop production per hectare. Nonfarm activities are associated with increased adoption of purchased inputs and household income, but also with lower labor intensity in agricultural production. Investments in soil and water conservation and some organic measures have more immediate impact on productivity in moisture-stressed environments, while inorganic fertilizer and some vegetative agronomic practices are more effective in high-potential areas. Finally, access to credit has a limited impact on technology adoption and outcomes unless the market environment and the profitability of technologies is adequate. These and other findings of the book suggest a number of lessons for policies and programs, which must adapt to different biophysical and socioeconomic conditions to successfully promote sustainable land management.

OPTIONS FOR IMPROVING RURAL LIVELIHOODS AND LAND MANAGEMENT

Strategies for Sustainable Land Management in the East African Highlands considers strategy options for three

broad domains: (1) areas of high agricultural potential and favorable market access, (2) areas of high agricultural potential but less favorable market access, and (3) areas of lower agricultural potential.

Areas of High Agricultural Potential and Favorable Market Access

In areas of high agricultural potential and favorable access to large urban markets, a virtuous circle is possible. Farmers can increase their production of high-value commodities and employment in nonfarm activities, which contribute to higher incomes and make it possible for farmers to invest in land-improving and productivity-enhancing technologies. These help to further increase farmers' production of high-value commodities. Farmer strategies to diversify into several high-value products, such as tree crops, horticulture, and dairy, are key in sustaining the process.

In central Kenya this virtuous circle was stimulated by the availability of the large and growing market in Nairobi, the development of infrastructure and proximity of processing facilities, and the presence of cooperatives providing credit and market outlets for high-value products. These advantages are not present to the same extent elsewhere in the East African highlands. In Ethiopia and Uganda it will take significant investment capital and a supportive policy environment to help nurture the development of such organizations. Development of infrastructure in periurban areas, including roads, electricity, and communications, is also needed.

In some areas of high agricultural potential and favorable market access, such as in central Uganda, pests and diseases are severe constraints to intensive livestock and high-value crop production, owing to the lower elevation and more humid climate in this region. Efforts to address these pest and disease problems—for example, tsetse fly eradication or control efforts—are important public goods that are required before substantial realization of the potential will be possible.

Areas of High Agricultural Potential but Less Favorable Market Access

Areas of relatively high agricultural potential but more remote from major markets, such as the highlands of western Kenya and Uganda and much of the southern and western highlands of Ethiopia, are likely to have a comparative advantage in nonperishable and readily transportable commodities, such as coffee, cereals, and livestock. These areas have suffered from low world prices of cereals and coffee in recent years, which, together with elimination of input subsidies, liberalization of foreign exchange markets, and regional trade restrictions, have reduced the profitability of using inputs in agricultural production. Efforts to promote the use of inputs are unlikely to be successful without major changes in farmers' product portfolios or the market environment.

Although not profitable in all areas, some use of inorganic fertilizer is usually necessary to address deficiencies of some plant nutrients. Where fertilizer use is profitable, farmers' cash constraints can be addressed through fertilizer credit programs. A rapid rise in production, however, owing to adoption of fertilizer and improved seeds, has the potential to cause a collapse in output prices. Avoiding such collapses and making input use more profitable will require development of market infrastructure and institutions, such as roads, transportation and storage facilities, grades and standards, a market information system, and marketing credit.

Improvements in markets for coffee are also needed in high-potential areas. Some East African producers can improve their returns by raising coffee quality and producing for high-value specialty markets (such as for organic or shade-grown coffee). Still, the market for specialty coffees is thin, and many countries are trying to exploit these opportunities. More coffee producers in the East African highlands may benefit from improving the technology and marketing of standard coffee varieties.

Improved food production is likely to complement increased coffee or other high-value cash crop production. Increasing the productivity of food crops may help farmers save land for cash crop production, while cash crop production helps farmers afford to purchase inputs for intensive food crop production.

Woodlots can be highly profitable in densely populated higher-potential areas and can help to reduce pressure on natural forests and depletion of soils caused by the burning of dung and crop residues, as is common in Ethiopia.

Areas of Lower Agricultural Potential

Lower-potential areas, like the highlands of eastern Amhara and Tigray in Ethiopia, have a comparative advantage neither in coffee production nor, in most cases, in

intensive cereal production using high levels of inputs. The profitability of inputs such as fertilizer is low and subject to substantial uncertainty in these areas. Combining targeted use of costly inputs like fertilizer and improved seeds with soil and water conservation or water-harvesting measures and organic soil fertility management practices is likely to be more effective than heavy reliance on external inputs.

Livestock are very important in the livelihood strategies of most households in the lower-rainfall highlands. Achieving the potential contribution of livestock in such environments requires efforts to improve water, feed, and fodder availability and quality. Better management of communal grazing lands and more investment in fodder trees, shrubs, and grasses are needed. Appropriate technical assistance, credit, and health facilities oriented toward improved livestock production can be very helpful. Nonetheless, livestock are a risky asset in drought-prone areas, since they are susceptible to substantial losses during drought years. Efforts to develop rural financial institutions that provide farmers with remunerative and less risky savings alternatives to holding livestock as a store of wealth could be useful.

Improved management of communal lands also can contribute to increased income from forestry and related activities. Tree planting is one of the most potentially profitable investments available to communities in these less-favored environments.

Investments in irrigation, especially in drought-prone environments, are also needed where feasible and profitable. Small-scale irrigation can significantly raise production in such environments, but this is not always the case. To make irrigation effective, policies and investments need to address problems like inefficient irrigation practices, lack of trained manpower to design irrigation structures, lack of coordination between those who promote and those who maintain irrigation structures, and the need for complementary inputs of technical assistance, credit, infrastructure, and institutions to facilitate adoption of higher-value irrigated crops.

Regardless of what is done to promote improved agricultural production in less-favored areas of the East African highlands, these areas are likely to remain heavily dependent on off-farm income for the foreseeable future, so efforts to promote development of the nonfarm economy in these regions will continue to be important.

LESSONS FOR POLICIES AND PROGRAMS

A primary lesson of the studies in this book is the critical importance of identifying and promoting profitable income strategies and land management practices in

different biophysical and socioeconomic contexts. This lesson appears obvious, but technical assistance and credit programs sometimes attempt to promote activities and technologies that are not profitable in particular contexts.

Technical assistance programs are more likely to be successful in identifying and promoting profitable technologies if they take a farmer-centered, demand-led approach and provide farmers with a broad menu of options rather than a narrow package of technologies. Farmers need information about the potential profitability, costs, and risks of alternative livelihood and land management options in different contexts, as well as about postharvest and marketing technologies, prices, and marketing options, especially for newer commodities that they are less familiar with.

Investments in infrastructure and market institutions can help increase profitability and reduce market risk. It is important to have realistic expectations, however, about how much such investments can accomplish. Where such investments can enable expansion of an already profitable enterprise, such as dairy production in periurban areas, they will likely yield high returns in the near term. By contrast, building roads in remote areas of the highlands will not likely have major impacts on agricultural production or household incomes in the near term. Nevertheless, construction of roads and other infrastructure is an important step toward longer-term rural development, and its importance should not be discounted even if it does not show immediate impacts.

In addition to profitability, risk is important to farmers in the East African highlands. For farmers in high-potential areas, weather risk is often less important than market risk, and addressing this risk requires developing market infrastructure and institutions. Pests and diseases are also a major concern, especially in humid environments, and investments in efforts to combat pests and diseases are critical.

In drought-prone environments, weather risk is usually the primary concern. To address this risk, households commonly diversify their livelihood strategies and commodities. Education, technical assistance, and credit

programs should recognize and support the variety of income strategies that households may pursue.

Irrigation, other water-harvesting technologies, and soil and water conservation measures can help to reduce risk and increase profitability of agricultural production, especially in drought-prone environments. Given that irrigation and water-harvesting projects can have substantial negative health and environmental effects, as well as being costly to implement and maintain, policymakers and development agencies should be careful to ensure that such effects are minimized, while maximizing the economic and social benefits of such projects.

Education can contribute substantially to households' livelihood options and income, although its benefits accrue only in the long term. Incorporating the principles of sustainable land management into educational curricula could help improve farmers' capacity to innovate and adapt technologies to their particular circumstances.

Even when profitable and risk-reducing technologies are available, households may not adopt them because of a lack of cash, labor, or knowledge. Women farmers often face particular cultural constraints, and agricultural research, technical assistance, education, training, and credit programs are needed to provide livelihood and land management options suitable for them. Households affected by HIV/AIDS and other diseases also require special consideration, particularly when promoting labor-intensive methods.

Overall, the findings of *Strategies for Sustainable Land Management in the East African Highlands* suggest that policies and programs that account for the diversity of situations in the region can help improve land management, raise productivity, and make agriculture more profitable for poor rural people in the highlands of East Africa.

This brief is based on the mid 2006 book *Strategies for Sustainable Land Management in the East African Highlands*, edited by John Pender, Frank Place, and Simeon Ehui (the volume is a joint effort by researchers from the International Food Policy Research Institute, the World Bank, the World Agroforestry Centre, and the International Livestock Research Institute).

John Pender (j.pender@cgiar.org) is a senior research fellow at IFPRI. Frank Place (f.place@cgiar.org) is an economist at the World Agroforestry Centre (ICRAF). Simeon Ehui (sehui@worldbank.org) is lead economist at the World Bank Nigeria country office.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

2033 K Street, NW • Washington, DC 20006-1002 • USA • T + 1.202.862.5600 • F + 1.202.467.4439 • ifpri@cgiar.org

www.ifpri.org



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