

Agriculture Leads to the MDGs

Rural Development in Africa

By Glenn Denning

Agricultural productivity improvements have been a major driving force of social and economic change in human societies for millennia. The traditional production of crops and livestock fulfilled household requirements for food, fiber, fuel, medicine and other essential consumables. Surpluses and the income derived from them opened up opportunities for specialized roles for producers, processors and traders of agricultural products and for the emergence of specialist services.



Malawi. Women farmers celebrate a bumper maize crop. (Photo: PHOTO/G. DENNING)

This evolution from subsistence to market-oriented agriculture provided the foundation of a structural transformation—a dynamic process that leads to a relative decline of the agriculture sector and to a more diversified and productive economy dominated by manufacturing and services—as observed throughout Europe, North America and Japan, and more recently in China and India.¹ In most African countries, the majority of the population remains engaged in agriculture with economies at the very early stages of structural transformation. These countries exhibit low agricultural productivity, limited growth of non-farm employment and relatively high population growth rates.²

In large part, the generation of surplus production over and above basic household needs was the result of technical innovation to improve agricultural labour productivity, and improved access to markets. As the world reflects on the uneven and generally unsatisfactory progress towards the Millennium Development Goals (MDGs) in sub-Saharan Africa (hereinafter referred to as Africa), it is important to assess whether enough is being done to harness the potential of agriculture and rural development in fighting extreme poverty.

The most compelling evidence of agriculture-led poverty reduction comes from Asia. During the past three decades, this region experienced unprecedented economic growth and structural transformation. Poverty declined from 50 per cent in the 1970s to 18 per cent in 2004, while hunger declined from 30 to 16 per cent over the same period. These successes are attributed largely to improved agricultural productivity as a consequence of technological change and market liberalization.³ Studies from four Asian countries over the past two decades found that households moved out of poverty through diversification of income, away from rice—Asia's dominant staple—to non-rice crops, livestock and non-farm sources. Increased income generated through increased agricultural productivity was invested in schooling and the development of non-farm rural enterprises, opening important new opportunities for employment and higher incomes in

rural areas.⁴

Asia's Green Revolution began in the 1960s with the development and dissemination of fertilizer-responsive, high-yielding varieties of rice and wheat. Global average yields of these staple crops more than doubled over this period, with the greatest impact in regions with irrigation or more reliable rainfall. Improved access to fertilizer through State-supported subsidies, rural credit and improved infrastructure contributed to strong productivity growth in both crops. The Governments in Asia supported the uptake of new technology through research and extension, and intervened in the market through price support.⁵⁶

In contrast to Asia, agricultural productivity growth in Africa during the past 40 years has not kept pace with population growth. Cereal yields in the region have stagnated at about 1 metric ton per hectare (MT/ha) over this period, while in East Asia cereal yields increased more than fourfold. The per capita growth rate of agricultural gross domestic product (GDP) in Africa was negative during the 1980s and 1990s, though improvements have been noted since 2000. Production growth of the major food crops (maize and root crops) was based almost entirely on extending the cultivated area, with only minor contributions from growth in yield per hectare. Poor infrastructure, high transport costs, inadequate institutional support, political instability, diverse agro-ecological complexities, limited availability of suitable high-yielding varieties and low fertilizer use have all contributed to low agricultural productivity growth in Africa.⁷



Malawi's innovative inputs programme has boosted food security. (Photo: PHOTO/C. MAGOMBO)

With an improved understanding of Africa's unique challenges and potential, a more positive outlook has emerged in recent years. On 5 July 2004, a group of African Heads of State and Government, ministers, scientists and development specialists met at the United Nations Conference Centre in Addis Ababa, Ethiopia, to share practical, innovative solutions to cutting hunger in half before 2015.⁸ The highlight of the event, co-convened by the Government of Ethiopia and the United Nations Millennium Project, was a call by then UN Secretary-General Kofi Annan for a "uniquely African Green Revolution". He said: "So let us show the meaning of global solidarity. Let us all do our part to help Africa's farmers and their families take the first steps out of chronic poverty and to help societies to make a decisive move towards balanced and sustainable development. Let us generate a uniquely African Green Revolution—a revolution that is long overdue, a revolution that will help the continent in its quest for dignity and peace. And let us never again allow needless hunger to ravage lives and the future of the continent."

Later in 2004, Malawi's more than 2 million smallholder farmers prepared their lands for a maize crop that would prove to be the lowest-yielding in a decade. While some farmers responded to good early rains in October and November, most planted their maize late and in many cases without fertilizer because of delayed importation and distribution. Many parts of the country subsequently went without rain for up to one month during January and February 2005. This dry spell had a devastating effect on maize production:

the national average yield dropped to 0.81 MT/ha—one of the lowest on record. Total maize production for the 2004/2005 season was 1.22 million MT—a decline of 24 per cent from the previous year and just 57 per cent of the estimated national maize food requirement. The United Nations issued a “flash appeal” for food aid and agricultural inputs; donors responded with food aid, but were unwilling to support an input subsidy.

The Government of Malawi responded in 2005 with a national scheme to subsidize improved seed and fertilizer.⁹ Drawing on \$58 million from its national budget in 2005 and \$63 million in 2006, the programme reached most of the country’s smallholder farmers, most of whom are women. Maize production doubled in 2005/2006 and almost tripled in the following season; favourable rainfall undoubtedly aided this remarkable recovery. However, the growing conditions in the 2005/2006 season were broadly comparable to the 2001/2002 and 2002/2003 seasons, when relatively small subsidies were provided. Maize production in 2005 was higher than that of the 2001 and 2002 seasons by 1.05 million MT and 630,000 MT, respectively, suggesting a large incremental impact of the subsidy beyond the effect of better rainfall. The surplus of over a million MT in 2007 enabled the country to export maize to Zimbabwe and to contribute to the World Food Programme procurements.

Malawi’s experience demonstrates the feasibility and value of investing in food crops as a first step towards structural transformation and sustained economic growth. In a country where agriculture employs 78 per cent of the national labour force and provides food security and livelihood for over 10 million people, agricultural productivity growth will have a direct positive effect on the achievement of the MDGs. The number of Malawians at risk of hunger decreased from 5 million in late 2005 to just over 500,000 in late 2007. Beyond the most obvious impact of reducing hunger, maize surpluses reduced disease incidence and increased school attendance. Communities also reported increased economic activity in areas where productivity increases have been most pronounced. As household and national requirements for food security are met, enterprise diversification to higher-value crops and livestock provides new opportunities for income generation. However, it is important that diversification choices are driven by assessment of market demands and agronomic suitability for local production. The next phase of Malawi’s subsidy programme includes support for non-maize crops, including groundnuts and soybeans.

Solutions are still needed to address the serious risks of drought and dry spells, both through water management technologies and the spreading of financial risk. Improved access to water, through irrigation and water harvesting, increases production options. Access to electricity increases irrigation and processing opportunities, while better roads and telecommunications improve market efficiency. Beyond Malawi, the revitalization of smallholder agriculture in Africa is being accelerated by two important continent-wide initiatives: the Alliance for an African Green Revolution (AGRA) and the Millennium Villages Project (MVP). AGRA was established in September 2006 by the Rockefeller Foundation and the Bill and Melinda Gates Foundation, and aims to spur rapid rural economic growth through multi-partner investments across the agriculture value chain.¹⁰ Chaired by Kofi Annan, AGRA’s initial investments are in support of better seed systems, improved soil health and improved smallholder access to water and markets.

Building on the conclusions of the UN Millennium Project,¹¹ MVP addresses the multifaceted nature of poverty in rural Africa through targeted public-sector investments that raise rural productivity and lead to increased private-sector savings and investments.¹² Like AGRA, the Millennium Villages Project places agricultural productivity improvement at the core of its agenda, but simultaneously invests in health, education, family planning, environment and infrastructure. MVP began in late 2004 in Sauri, a village in Nyanza province in western Kenya. With financial support from the Government of Japan, through the United Nations Trust Fund for Human Security, as well as individual and corporate philanthropic contributions through Millennium Promise,¹³ MVP has rapidly expanded to more than 10 African countries, reaching over 400,000 rural poor. The United Nations Development Programme (UNDP) plays a pivotal role in supporting field operations, linking MVP to national policy and helping take lessons to scale.

In early results, villages have generated crop surpluses, met caloric requirements, provided cash earnings through diversification, increased school attendance through locally grown school meals and reduced the prevalence of malaria.

Both AGRA and MVP support and reinforce the efforts of the New Partnership for Africa's Development's (NEPAD) Comprehensive Africa Agriculture Development Programme (CAADP), which aims to mobilize investment around four strategic themes: land and water management; infrastructure and markets; food supply and ending hunger; and research, technology dissemination and adoption. The scientific underpinning of agricultural productivity improvements in Africa has been strengthened by more than three decades of research by the international research centres of the Consultative Group on International Agricultural Research (CGIAR) and their national, subregional and regional partners.¹⁴ Four of the 15 research centres are headquartered in Africa, while the others have programmes in the region. The CGIAR-supported centres spend more than \$200 million annually on agricultural research for African smallholders.

The realization of the African Green Revolution and its contribution to structural transformation and economic growth is threatened by climate change. The recently released Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) highlighted the vulnerability of African agriculture and all who depend on it.¹⁵ Agriculture will be affected by reduced growing seasons and higher temperatures. The IPCC reported that rain-fed crops in some countries are anticipated to decrease by 50 per cent, and 50 million to 250 million Africans will face increased water stress by 2020. With less than 4 per cent of African croplands irrigated, the impacts on smallholders could be catastrophic. Women, who bear the major responsibility for household food security in rural Africa, are especially vulnerable. These direct effects on agricultural production and food security will be exacerbated by greater exposure to malaria and other climate-influenced diseases that reduce labour productivity and employment opportunities. African farmers have no alternative but to adapt to climate change. Fortunately, several practical options for adaptation exist and need to be deployed as a matter of urgency:

- Intensification of food-crop production by smallholders, through better access to improved seed, fertilizer and water.
- Water harvesting, sustainable extraction of groundwater and other underutilized water resources, conservation farming and improved water use efficiency.
- Shifts towards crop varieties and livestock breeds with greater drought and heat tolerance, and improved pest and disease resistance.
- Enterprise diversification towards higher value crops, value-adding and off-farm employment.
- Agroforestry and tree crops that can also help mitigate the effects of climate change through carbon sequestration.
- Grain storage improvements, from household to national levels, to ensure security of carry-over stocks and access to surpluses.
- Weather forecasting and provision of timely advice to farmers.
- Weather-related crop and livestock insurance.

These interventions are already being implemented on pilot scales throughout Africa and can be stepped up by national programmes through the collective and coordinated support of AGRA, CAADP, CGIAR, MVP, United Nations agencies and others. These are “no regrets” investments that would be valuable even in the absence of climate change. However, the vulnerability of Africa's farmers and pastoralists to climate change requires an unprecedented level of political commitment, increased resources for research and extension, and enhanced implementation capacity.

The World Development Report 2008 called for greater investment in agriculture in developing countries. It recognized that agriculture had been neglected by Governments and donors for the past 20 years, despite the finding that GDP growth originating in agriculture is four times more effective in reducing poverty than GDP growth originating outside the sector. It warned that agriculture “must be placed at the centre of the

development agenda if the goals of halving extreme poverty and hunger by 2015 are to be realized". In launching the Report, World Bank Chief Economist François Bourguignon declared: "The challenge is to sustain and expand agriculture's unique poverty-reducing power, especially in sub-Saharan Africa and South Asia, where the number of rural poor people is still rising and will continue to exceed the number of urban poor for at least another 30 years."

A pro-poor African Green Revolution that increases agricultural productivity of smallholders, while safeguarding the environment, provides a proven entry point for meeting this challenge. With increased, complementary investments in health, education, family planning and infrastructure, a holistic road map to achieving the MDGs in Africa is available and now only needs to be applied.

Notes

1. T.A. Tomich, P. Kilby and B.F. Johnston, *Transforming Agrarian Economies: Opportunities Seized, Opportunities Missed* (Cornell University, 1995).
2. E.Z. Gabri-Madhin and B.F. Johnston, *Accelerating Africa's Structural Transformation: Lessons from East Asia*. MSSD discussion paper no. 34 (IFPRI, 1999).
3. IFPRI ADB, *Agriculture and Rural Development for Reducing Poverty and Hunger in Asia: In Pursuit of Inclusive and Sustainable Growth* (2007).
4. K. Otsuka, *Changing Sources of Household Income and Poverty Reduction in Rural Asia, 1984-2004*. Paper presented at IFPRI-ADB Policy Forum, 2007.
5. R.E. Evenson and D. Golin, "Assessing the Impact of the Green Revolution, 1960 to 2000", *Science* vol. 300, no. 5620 (2003): 758-62.
6. G. Djurfeldt et al., *The African Food Crisis: Lessons from the Asian Green Revolution* (CABI Publishing, 2005).
7. World Bank, *World Development Report 2008: Agriculture for Development* (2007).
8. MDGs Technical Support Centre, *Africa's Green Revolution: A Call to Action*. Proceedings of the 5 July 2004 High-level Seminar, convened by the Government of Ethiopia and the UN Millennium Project (Addis Ababa, 2004).
9. G.L. Denning et al., *Improving Smallholder Maize Productivity in Malawi: The Foundation of an African Green Revolution* (in review).
10. **Alliance for a Green Revolution in Africa (AGRA)**
11. UN Millennium Project, *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals* (London: Earthscan, 2005).
12. P. Sanchez et al., "The African Millennium Villages", *PNAS* vol. 104, no. 43 (2007): 16775-80.
13. **Millennium Promise**
14. **Consultative Group on International Agricultural Research (CGIAR)**
15. M. Boko et al., "Africa", *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2007).

Biography



Glenn Denning is Director of the Earth Institute's Millennium Development Goals Centre in Nairobi, in which he played a lead role in its establishment. He joined the Institute at Columbia University in July 2004 as Associate Director of the Tropical Agriculture Program. Dr. Denning, who has more than 30 years

experience in international agricultural research and development, has held senior management positions at the International Rice Research Institute and the World Agroforestry Centre.