

ORIGINAL RESEARCH

Global challenges in agriculture and the World Bank's response in Africa

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Introduction

A country's economic, environmental, and social well-being is intricately linked to a healthy, well-performing agricultural sector. Increasing investments in the farm

Abstract

A country's economic, environmental and social well-being is intricately linked to a healthy, well-performing agricultural sector. Across Africa, south of the Sahara, agriculture is the predominant sector in the economies of most countries accounting for between 30 to 40 percent of gross domestic product, and the sector is a leading source of jobs for over two-thirds of Africa's population. With an abundance of labor, land and untapped water, Sub-Saharan Africa has the resources necessary for a massive expansion of agricultural production. Notwithstanding these advantages, over the last 40 years Africa has been steadily losing its share of the global agricultural market. Today, Thailand exports more food products than all of Sub-Saharan Africa combined. The "Green Revolution" that transformed tropical agriculture in Asia and Latin America largely bypassed Africa. A confluence of factors – increasing prices for African agricultural products, booming urban food markets, many opportunities for expanding irrigated area, greater interest by development partners, improved policy environment, technological innovations, rising private sector interest, framework for climate-smart agriculture, and improved infrastructure – present a golden opportunity for African agriculture to realize its full potential. Responding to the challenges, the World Bank is scaling up its support for African agriculture. The medium-term plan is to scale up lending to US\$3 billion a year, with ambitious targets in key thematic areas – irrigation, land administration, access to technology, inputs, financial services and markets, and climate-smart agriculture – so that Sub-Saharan Africa can benefit fully from the transformative opportunity. Greater South-South learning and collaboration, and strengthening of African institutions and building capacity are all needed. Agriculture is the pathway to ending poverty and boosting shared prosperity in Sub-Saharan Africa, backed by improvements in education, health, nutrition and sustainable management of natural resources among others. The prospects for success have never been better.

economy can deliver high-impact development returns such as increasing rural incomes, boosting food security, making cheap and more nutritious food available to bustling cities, and protecting the environment through innovations such as climate-smart agriculture.

The case for transforming agriculture in Sub-Saharan Africa (SSA) is a pressing development priority. Across Africa, south of the Sahara, agriculture is the predominant sector in the economies of most countries accounting for between 30% and 40% of gross domestic product, and the sector is a leading source of jobs for over two-thirds of Africa’s population (World Bank 2008).

This study takes a broad canvas approach to outlining the global challenges facing agriculture and provides a snapshot of the World Bank’s efforts to promote sustainable agriculture for ending poverty and boosting shared prosperity in SSA.

Global Challenges

With global population expected to exceed 9 billion by 2050, food security—producing enough food of sufficient quality and making it accessible and affordable for consumers around the world—is one of the most important policy objectives of our time (World Bank 2008). The United Nations estimates that global food demand will double by 2050 and the world will then need to feed 2.3 billion more people. These populations will be increasingly affluent and will demand more, different, and better food. Meeting this demand requires agricultural production to grow 60% by 2050 (Baulcombe 2010, p. 761).

Agriculture could be hit hard by climate change, but sustainable agriculture, done right, can minimize the impact of such forces with climate-smart production technologies, some of which will have the added benefit of reducing net emissions of greenhouse gases (World Bank 2009; Sachs et al. 2010).

Transforming Agriculture in Sub-Saharan Africa

With an abundance of labor, land and untapped water, Africa has the resources necessary for a massive expansion of agricultural production. Of the world’s surface area suitable for sustainable production expansion—that is, nonprotected, nonforested land, with low population density—Africa has the largest share by far, accounting for roughly 45% of the global total. While some large areas of the continent are arid or semiarid, water resources are, on average, greatly underutilized. Only 2–3% of renewable water resources in Africa are being used compared to 5% worldwide (Foster and Briceño-Garmendia 2010; World Bank 2013).

Notwithstanding these advantages, over the last 40 years Africa has been steadily losing its share of the global agricultural market. Today, Thailand exports more food products than all of SSA combined. The “Green Revolution” that transformed tropical agriculture in Asia and Latin America largely bypassed Africa, with total fac-

tor productivity (TFP) growth in agriculture lagging behind that of other regions. Two main factors are responsible. First, little land on the continent is actually irrigated. Of the 183 million hectares of cultivated land in SSA, 95% is rain fed and less than 5% benefits from some sort of agricultural water management practice—by far the lowest irrigation development rate of any region in the world. Moreover, of the 7.1 million hectares equipped with irrigation equipment, only 5.3 million hectares can be considered usable. Second, modern inputs are grossly underutilized. Africa has, by far, the lowest rate of improved seed and fertilizer use of any region, a rate that has remained virtually constant for the last 40 years (World Bank 2013) (Fig. 1).

A comparison of Africa’s performance with that in South America and three subregions of Asia over the course of two decades indicates that Africa began the 1990s with lower TFP than its counterparts; while other regions enjoyed higher growth in the 2000s than in the 1990s. Africa’s growth rate fell even lower, further magnifying the TFP gap (Fig. 2). Unlike other regions, where production increases were mainly associated with yield growth due to better use of inputs and adoption of improved production technologies, in Africa increases in

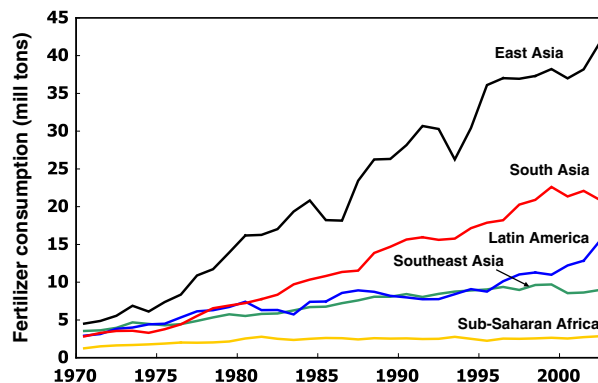


Figure 1. Fertilizer use lags badly in Africa. Source: Calculated from FAOSTAT.

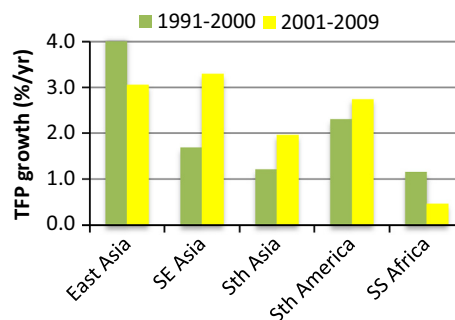


Figure 2. Total factor productivity growth in Africa. Source: World Bank 2013; updating Fuglie 2008.

Table 1. Current yield as percentage of potential yield, by region.

Region	Maize	Oil palm	Soybean	Sugarcane
Asia (excluding West Asia)	0.62	0.74	0.47	0.68
Europe	0.81	n.a.	0.84	n.a.
North Africa and West Asia	0.62	n.a.	0.91	0.95
North America	0.89	n.a.	0.77	0.72
Oceania	1.02	0.6	1.05	0.91
South America	0.65	0.87	0.67	0.93
Sub-Saharan Africa	0.2	0.32	0.32	0.54

n.a., not applicable. Source: Deiningner et al. (2011).

production were largely the result of expansion of the area under cultivation. It is the only developing region in which the percentage of area expansion exceeded growth in yield over the period 1990–2007 (Deiningner et al. 2011).

With respect to input use, Africa now has the largest productivity gap (the difference between actual current yields per hectare of land and estimated potential yield) of any region in the world (Deiningner et al. 2011; Table 1). Yields of maize in demonstration plots were two to five times the actual average yields in the country in a sample of six African countries in which this is an important crop (World Bank 2007a,b,c,d,e).

New research from the International Maize and Wheat Improvement Center (CIMMYT) and the International Food Policy Research Institute (IFPRI) suggests that rain-fed producers in east and southern Africa may be growing only 10–25% of the wheat that is both biologically possible and economically profitable (Pardey et al. 2006).

The fact that the average African farmer's productivity is low even relative to that of the best producers in his or her own country implies that many farmers could improve yields simply by reaching the current production possibility frontiers, without any dramatic new breakthroughs or

international technology transfers. Figure 3 demonstrates the dramatic difference in production potential across Africa, depending on intensity of input use.

Inadequate use of purchased inputs, along with low private sector investment in general, has been exacerbated by an unfavorable policy environment that has reduced the profitability of agricultural investments. While all developing regions taxed agricultural production from the 1960s through the 1980s, only Africa maintained net taxation of this sector—albeit at lower levels than in the past—well into the mid-2000s (Anderson and Masters 2009). Public investment in the sector was low in quantity and quality, and much of the policy toward the sector was driven by ineffective state-owned enterprises.

Recently, however, a confluence of factors has changed the farming environment for the better, presenting a golden opportunity for African agriculture to realize its full potential.

- Prices of all major African agricultural products increased dramatically in the decade beginning in 2000 and are generally forecast to remain for many years at levels higher than in the 1990s.
- Urban food markets are booming in Africa, creating a potential trillion-dollar regional market for African producers by 2030, more than triple its current size.
- Many opportunities for profitably expanding irrigated areas and increasing the use of modern technology have been identified, and the fact that African farmers are far from the technological frontier means that there is significant potential for catch-up.
- There is a much higher level of development partner interest and activity in the agricultural sector today than there was in the 2000s, with pledges of increased resources for financing and many initiatives being

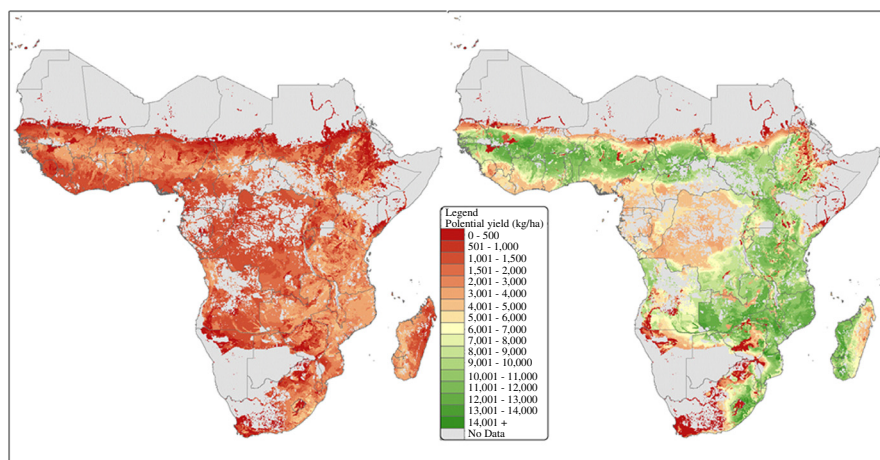


Figure 3. Potential maize yields on currently cultivated area, low input versus high input. Source: Author's calculation, using FAO Global Agro-ecological Zone database.

undertaken in collaboration with the African Union’s New Partnership for Africa’s Development Planning and Coordinating Agency (NPCA) and the Comprehensive Africa Agricultural Development Programme (CAADP) to build the policy-making and technical capacity of African governments.

- The policy environment has greatly improved, as governments have revised macroeconomic policy (including exchange rate policies that discriminated against agricultural exports in the past), reduced or eliminated the overall net taxation of the sector, and—through the Maputo Declaration—adopted a sectoral expenditure target of 10% of total expenditure, a figure in line with that of the Asian economies during their Green Revolution.
- Technological innovations have been lowering costs associated with implementing needed reforms, especially in land administration, which will improve security of tenure and help protect vulnerable populations from exploitation, while creating more liquid land markets. Many countries have undertaken pilots, often with World Bank support, which can now be scaled up.
- Private sector interest is on the rise, driven by the factors mentioned above; this new interest has elevated the potential for the sector’s profitability, provided sound policies, and access to capital and technology are mobilized to support the sector.
- The groundwork for climate-smart agriculture (CSA) has been laid, as under CAADP, draft frameworks have been adopted for developing and financing initiatives to mainstream these kinds of approaches into country-level plans, programs, and policies.
- Improved and improving transport and ICT infrastructure have opened access to new markets for produce and greater access to inputs and information.

The stage is set for African agriculture to begin to redress the imbalances of the past and assume its proper place as a major agricultural powerhouse for ending poverty and boosting shared prosperity.

For an agricultural transformation to occur in SSA, however, many impediments must yet be overcome.

Land administration investments and irrigation are key elements of the transformation, and these have particularly high preparation costs. A new study (Byamugisha 2013) notes that more than 90% of Africa’s rural land is undocumented, making it highly vulnerable to land grabbing and expropriation with poor compensation. But preparation and implementation of investments in land administration are complicated both by concerns over land grabs and by the shortage of professionals working in this field in Africa.

And as noted earlier, there is great potential to expand irrigated area. But here, high costs are partly explained by

the need to take full advantage of instruments such as Strategic Environmental and Social Assessments when preparing projects to ensure that they are socially and environmentally benign.

For producers to participate fully in the “trillion dollar opportunity” of regional food and beverage markets (Fig. 4), existing barriers to trade will need to be addressed. These include formal trade barriers, irregular customs procedures, poor infrastructure, erratic trade policies, and regulatory problems such as inappropriate and inconsistent testing requirements for agricultural inputs (Pray et al. 2011; Haggblade 2013).

The new African Green Revolution must begin at the farm level, with producers using modern technologies (Morris et al. 2009). This will not happen as long as inputs in Africa remain overpriced. This problem is illustrated by a breakdown of the cost of fertilizer in Thailand and in three African countries (Fig. 5). The delivered cost at the port is similar, but the African

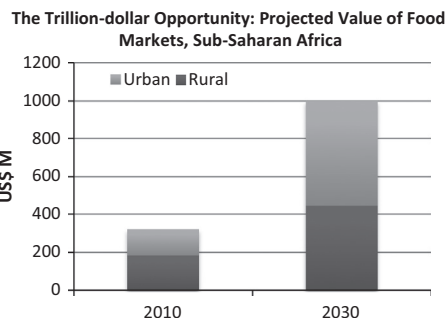


Figure 4. Increases in food demand in Africa will be driven largely by growing Urban population. Source: World Bank 2013.

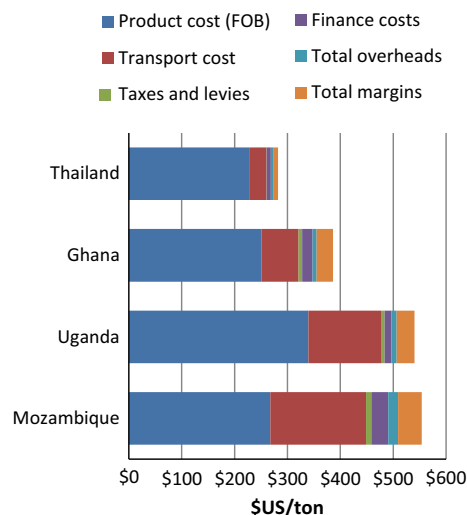


Figure 5. Comparison of fertilizer value chain costs, Thailand and Three African countries. Source: World Bank 2013, from IFDC and Chemonics.

countries sampled had higher additional costs of distribution, especially with respect to transport, reflecting poor infrastructure as well as a lack of competition and inappropriate regulations. Subsidy programs have been a common policy response to help farmers overcome this handicap; as one might expect, however, such programs have tended to disproportionately benefit wealthy farmers and have often been managed in ways that crowd out the private sector.

Climatic risk, which will be amplified by global warming, poses an additional challenge, especially in Africa's dryland areas. More than any other productive sector, rain-fed agriculture depends crucially on weather, so Africa's low percentage of irrigated cropland makes it especially vulnerable to droughts. Global circulation models are not always in agreement as to whether a given area is likely to receive more or less rainfall, but there is a virtual consensus that it will come more often in the form of extreme events, with droughts and floods likely to increase in magnitude and frequency in most areas. Since Africa (excluding South Africa) has the world's lowest water storage capacity—43 m³ per person, compared to 6150 m³ per person in North America and 750 in South Africa—it has little ability to control water flow and distribute it from periods of overabundance to seasons of scarcity.

Vulnerability to climatic shocks is especially acute in dryland areas, which have a fragile ecology that limits agricultural potential, and where land has been degraded over time (deforested, eroded, nutrient depleted), increasing its sensitivity to weather-induced shocks and reducing the resilience of rural populations and ecosystems.

Responding to the Challenge: Role of the World Bank Group

The World Bank's agricultural program in Africa has been scaled up to tackle these challenges, both quantitatively and qualitatively.

- The analytical work program has received an increased focus to ensure that the lending program is informed by the best possible knowledge base. Following the World Development Report of 2008, *Agriculture for Development*, the Africa region has undertaken a series of regional flagship studies and knowledge products that have (i) distilled lessons of experience from other countries that had conditions similar to those of Africa, particularly Brazil and Thailand, which now have successfully led the way to creating a successful, vibrant agribusiness sector; (ii) focused on how to break down the barriers to regional trade in Africa; and (iii) collected best practices to scale up successful experiences in land policy and administration.

- The World Bank is rebalancing partnerships. In addition to hosting the TerrAfrica and CIWA programs, the Bank has formed strong partnerships with many regional institutions, particularly the CAADP and Grow Africa, and has aligned Bank lending and analytical activities with the four pillars of the CAADP.
- The Bank lending program is being expanded to respond to new and emerging demands. There has been a very significant scale-up in agricultural lending, from US\$0.4 billion in 2008 to US\$1.2 billion/year in FY11/12, with a changing mix of instruments tailored to meet the new requirements of these challenges, including increased focus on sector budget support, public-private partnerships (PPPs), and larger sub-regional operations that generate economies of scale. In fiscal year 2013, total commitments to agriculture and related sectors were \$1.3 billion.

Looking to the future, providing the transformational impact to help Africa achieve its own Green Revolution will require delivering simultaneously on productivity growth and market connections, while enhancing resilience to climate change. Given the long-term nature of this agenda and the weight of policy change it entails, the mix of instruments will need to shift toward more policy-oriented and programmatic approaches, with 30% of new lending consisting of Development Policy Operations (AgDPOs) and Sector-wide Approaches (SWApS). African countries through CAADP would be in the driver's seat for implementation of sector investment plans, which may be supported with SWAp operations.

The medium-term plan is to scale up Bank lending to about US\$3 billion/year, with ambitious targets in five key thematic areas:

Irrigation

Doubling irrigated area from the current 20–40% of area by 2030. This goal has a corresponding investment cost roughly estimated at US\$40 billion, of which the Bank could finance one-quarter of the investment needs. The rest would come partly from other development partners or government's own resources, but much would need to come from the private sector, through innovative partnership arrangements, such as those that have been piloted in some World Bank projects.

Land administration

Moving from modest and fragmented small-scale and pilot projects to bold and systematic projects. Building on the recent major pieces of knowledge work on land policy and administration and pilot programs in several coun-

tries, it is time for a big push to scale up best practices, to improve security of tenure, guard against land grabs, and develop well-functioning land markets. The aim would be to prepare at least two new land administration projects per year for annual lending of at least US\$150 m, totaling at least US\$1.5 billion over 10 years. In this span of time, targets would include reducing the time required for registering property from 65 days currently to 30 days (Byamugisha 2013).

Access to technology and inputs

Reducing the yield gap by half by 2025, while enhancing resilience to climatic shocks through dissemination of climate-smart agricultural technologies. One key element will be to increase the availability and reduce the cost of productivity-enhancing inputs. Other elements include a deepening relationship with CGIAR Centers and partners in South-South technology transfer (e.g., with EMBRAPA, Brazil's state agricultural technology agency), and expanding to other subregions the highly successful model of regional cooperation in technology development embodied in promising projects, such as the West African Agricultural Productivity Program (World Bank 2007a,b,c,d,e; Morris et al. 2009).

Climate-smart agriculture

A priority in the Bank's support of technology generation and diffusion will be the mainstreaming of CSA, focusing on water management, agricultural risk management, and conservation farming. Climate-smart agriculture is about strengthening farmers' resilience to climate change, while at the same time reducing agriculture's climate imprint through curbing greenhouse gas (GHG) emissions by limiting deforestation and increasing carbon storage, including in the soil. Climate-smart agriculture relies on the limitless ingenuity of farmers, and includes proven techniques such as mulching, low- or no-till production techniques, and developing drought- or flood-tolerant crops to meet the demands of a changing climate. But CSA is also about weather forecasting, early warning systems and risk insurance. Finally, CSA seeks to highlight changes in policy that will help farmers adapt to and succeed in combating the ill effects of climate change (World Bank 2009).

One major pillar of the climate change strategy of the World Bank's Africa Region (World Bank 2009) is to assist African countries in taking advantage of opportunities to "do well while doing good" by reducing net GHG emissions and then selling these reductions in international carbon finance markets. Given the high share of emissions from land and forest degradation

and deforestation in the region's emissions profile (over 60% of Africa's GHG emissions come from land and forest degradation), it is clear that agriculture will play a key role here. In a significant development, a new, cutting-edge methodology has just been approved by the Verified Carbon Standard (VCS) to measure and value carbon sequestered through the sustainable management of agricultural land. The VCS remains the gold standard in the voluntary carbon market, and this methodology gives project developers the opportunity to account for emission reductions from improved management of land. The quantified carbon can then be sold on the voluntary market on behalf of farmers to generate additional revenues.

Market access

Removing trade barriers and improving competitiveness to double trade in 10 years. Through multisectoral efforts, the Bank's Poverty Reduction and Economic Management team (PREM), the CAADP trust funds, and other partners will support regional economic commissions in their efforts to develop regional standards for food trade and to improve and harmonize regulatory requirements for inputs. Development Policy Operations (DPOs) at the country and regional levels focused on these issues would support the reform agenda. The strategy would also include a push to improve trade and transport infrastructure as well as food safety systems, with a 10-year target of cutting by half the costs related to bringing produce to market (World Bank 2012).

Access to financial services

Unlocking commercial lending and long-term financing. All of the measures above that improve the sector's profitability will make it a more investment-worthy client in the view of financial institutions. Another key to unlocking this access will be reducing the risk, both real and perceived, of lending to the sector by improving insurance and collateral instruments (e.g., by improving land security, developing warehouse receipts, and establishing commodity exchanges). Interventions to support the development of value chains will also involve improving access to short- and medium-term finance, for example, through outgrower schemes and contract farming. The enabling environment for these developments lies in the public domain, and for this the Bank will deploy knowledge-based instruments, including DPOs for policy reform. But finance itself is primarily a private sector function, so much of this agenda will need to be tackled in conjunction with the IFC and with civil society organization (CSOs) such as the Gates Foundation, which is

sponsoring an initiative to facilitate the wider presence of financial institutions in rural areas (World Bank 2013).

Moving forward in all of these areas will also require increasing private sector investments in agriculture by facilitating and fostering PPPs. In view of the long gestation periods associated with bringing projects to financial closure, the sector needs a dedicated PPP project preparation facility. Under the New Alliance Initiative adopted by G8 in 2012, efforts led by USAID are ongoing to set up a Fast Track Facility for this purpose. The Bank has been providing advice about the governance structure of this Facility and about ways in which to align it closely with CAADP (www.NEPAD-CAADP.org).

To the extent that this Facility would be able to mobilize resources from traditional donors as well as from the private sector, it is of strategic interest that the Bank be a close and constructive partner in this initiative as a pathway for further scale-up of its engagement in African agriculture, while leveraging private sector investments through innovative PPPs (UNIDO (United Nations Industrial Development Organization) 2010; Webber and Labaste 2010).

Looking Ahead

Agriculture in SSA is at the cusp of a transformative opportunity. High annual growth rates—5% and more—in much of SSA are underpinned by public and private investment. An improved policy environment has been increasingly accompanied by larger investments by the public sector, indicating a greater awareness on the part of policymakers about agriculture's potential to increase incomes, make more food available, and help protect the environment. There is a pressing need for strengthening South-South learning and collaboration. The World Bank and China are exploring the option of collaborating on promoting agricultural technology transfer from China to Africa, working in partnership with renowned institutions such as the Chinese Academy of Agricultural Sciences. The World Bank is committed to playing a facilitative role, supporting joint research activities, strengthening African institutions and building capacity through its Regional Centers of Excellence program, and through joint and parallel financing of agricultural projects. Agriculture is the pathway to ending poverty and boosting shared prosperity in SSA, backed by improvements in education, health, nutrition, and sustainable management of natural resources among others. The prospects for success have never been better.

Conflict of Interest

None declared.

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