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# Four lessons for transforming African agriculture

**To succeed, African countries must narrow their focus and target high-impact projects.**

Sunil Sanghvi, Rupert Simons, and Roberto Uchoa



**African agriculture is at a turning point**, and a long-awaited “green revolution” may be within reach. Many of the continent’s governments are adopting market-friendly policies and committing more resources to the sector. Traditional big-donor countries are increasing their expenditures on agriculture, while China and Brazil are also beginning to contribute to the effort. African agriculture’s private-sector investment is rising rapidly (see sidebar “Sizing Africa’s agricultural opportunity”). High, volatile food prices underline the importance of such development efforts and create not only pressure but also political space for policy makers to act.

But investing these additional resources wisely and fulfilling Africa’s agricultural promise will require better national planning. Work is under way to facilitate such improvements: for example, the African Union’s Comprehensive Africa Agriculture Development Programme (CAADP) aims “to help countries critically review their own situations and identify investment opportunities with optimal impact and returns.” Introducing cost-effective agricultural development plans will be a challenge, however. To succeed, they will have to address multiple technical hurdles in the context of limited human resources, corruption, political pressures, shifting priorities, and inadequate infrastructure (see sidebar “Chinese agriculture: A model for Africa?”).

In recent years, McKinsey has worked on the planning and implementation of agricultural development in more than ten African countries, across the public, private, and social sectors. We have codified insights from this work into four lessons: aim for narrower, higher-impact projects; pay more attention to the final market for agricultural goods; assure clear roles for the private sector; and think about implementation from the start. We offer these lessons to move the issue of African agricultural development beyond the question “what” and toward the “who” and the “how.”<sup>1</sup>

### **Focus on higher-impact initiatives**

Many country plans are broad and diffuse, attempting to cover multiple regions and sectors without devoting sufficient resources to the effort. Liberia’s agricultural-sector investment plan, for example, has 21 initiatives across multiple subsectors, with three to six activities per initiative. This approach would be a management challenge for any organization, but especially for one in a postconflict country striving to rebuild basic public services and relying on significant support from donors. Almost all CAADP country plans set targets for productivity and output, but they do not always present these targets in a way governments can deliver, such as kilometers of road to construct, the number (and location) of warehouses to build, or the number of commercial farms to establish.

Governments should therefore make their plans as targeted and explicit as possible. They can concentrate investment on a value chain (all economic activity, from inputs to market,

<sup>1</sup>This article addresses government-led agricultural development, but plans led by the private sector (for example, creating end-to-end supply chains for cocoa or cashews) or civil society can also have a great impact.

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## Sizing Africa's agricultural opportunity

Acha Leke, Jens Riese,  
and Sunil Sanghvi

Africa has great potential to raise the volume and value of its agricultural production and to expand related business activities. An African “green revolution” would increase agricultural production significantly through the use of new technology and infrastructure. The impact—raising rural incomes, boosting GDP growth, and creating business opportunities—would be enormous. Moreover, global food production may need to rise by 70 percent from 2005–07 levels over the next 40 years to feed the world’s growing population.<sup>1</sup> Cereal production would have to expand by 43 percent, for example, and meat production by 74 percent. Africa could be an important part of the solution.

Several factors explain Africa’s poor performance in agriculture. Transporting agricultural products is costly because of poor infrastructure, for example. Many farmers can’t buy expensive machinery, high-yield seed, and fertilizers, because of inadequate finance systems.

Despite the challenges of transforming Africa’s agriculture, we see hints that big changes are on the way. The size of the potential prize makes this an opportunity that local policy makers, global agribusinesses, and international organizations should all be considering. Agriculture accounts for roughly 15 percent of the continent’s GDP and is still by far the biggest source of employment.

With a green revolution, Africa could increase the value of its agricultural output from \$280 billion a year now to about \$500 billion by 2020 and to \$880 billion by 2030, according to McKinsey Global Institute estimates.<sup>2</sup> Growth of this magnitude also would increase demand for upstream products such as fertilizers, seed, pesticides, and machinery, while spurring downstream activities such as grain refining, other types of food processing, and biofuels. We estimate that the total value of these adjacent markets could reach \$275 billion a year by 2030.

Determining the magnitude of an African green revolution is difficult, given the complex issues at play. These include the technologies needed for various agro-ecological conditions, governance, infrastructure, market access, gender issues (most farmers are women), climate change, other sustainability issues, both better nutrition and additional calories, and the special issues facing vulnerable populations. Many people and institutions have extensively studied how to drive such an African green revolution. We, however, have made an initial attempt to estimate the potential value of one by looking at the successes already achieved on the continent, the recent agricultural plans of several African countries, and experience elsewhere. Africa should combine three approaches:

- The continent’s yields of major crops are well below world averages.

Sub-Saharan Africa's annual average yield of these crops was 2.6 metric tons per hectare from 2002 through 2007, for example—less than half that of other regions. If Africa could raise yields on key crops to 80 percent of the world average (like other areas that experienced green revolutions), the value of its agricultural production would rise by \$235 billion a year over the next two decades.

- Africa must continue to increase the area under cultivation. The continent has millions of hectares of unused arable land—about 60 percent of the world's total. Over the past decade, many African countries have begun to expand their cultivated lands, but more can be done. From 1987 to 1996, Brazil, for instance, added one million hectares annually to its land under cultivation. If Africa could achieve half that rate, production would rise by \$225 billion annually no later than 2030. The big challenge to this increase in cultivated land is that it must be done in an environmentally and socially responsible manner. The World Bank and others have created thoughtful guidelines on how to do this.
- In addition to increasing food production, African farmers could boost their revenues by investing more in higher-value crops, such as fruits and vegetables. Kenya, for example, has tripled its horticulture exports to \$700 million annually through such efforts. If we assume that higher-value products such as horticulture or sustainably produced biofuels could

replace 20 percent of Africa's low-value crops (such as cereal grains), agricultural production could rise by \$140 billion annually by 2030.

If Africa achieves these goals, the value of the continent's agricultural production could grow twice as fast over the next 20 years as it has over the past decade. Nearly three-quarters of the absolute increase in output would occur in 11 countries: Angola, Cameroon, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Mozambique, Nigeria, Sudan, and Tanzania. Many more countries could raise their agricultural growth rate, but these 11 have the biggest commercial-farming opportunities.

A green revolution on this scale would, in turn, fuel the growth of many other businesses. Our analysis suggests that upstream input markets would increase from about \$8 billion a year today to \$35 billion a year by 2030. The largest of these opportunities would be fertilizers. Africa's use of them, at 24 kilograms<sup>3</sup> per hectare, is only one-quarter of the world average. Increased fertilizer use—an essential component of an African green revolution—would present suppliers with \$14 billion a year in potential revenues and, depending on margins, about \$3 billion in profits.

Downstream markets may grow even faster, from about \$40 billion a year today to \$240 billion a year by 2030. The largest of the downstream opportunities is vegetable and food processing. But biofuels, now the fastest-growing

opportunity, could become a more than \$20 billion a year market by 2030 if global oil prices remain above \$70 a barrel. Ethanol production could be particularly attractive for Africa's inland oil-importing countries, where high transportation costs raise consumer fuel prices. Africa also could become a major supplier of biofuels to Europe, assuming that they do not threaten food security and are produced in an environmentally sustainable way.

<sup>1</sup>*How to Feed the World in 2050*, UN Food and Agriculture Organization, 2009.

<sup>2</sup>This article is adapted from the McKinsey Global Institute (MGI) report *Lions on the move: The progress and potential of African economies*, available free of charge on [mckinsey.com/mgi](http://mckinsey.com/mgi). See the report's appendix for more details on the model and assumptions. In discussing agricultural opportunities, we focus on the 20-year projections because of the long-term nature of a green revolution.

<sup>3</sup>About 53 pounds.

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associated with a crop), on a “breadbasket” region positioned for large productivity increases, or on an infrastructure corridor. Countries could move sequentially, learning from success in one region or sector before spreading investments to others.

Morocco, for example, shifted its focus about four years ago from supporting staples to investing in a few high-value crops that could accelerate GDP growth while raising income for smallholder farmers. The country is more than halfway to its target of converting 300,000 hectares<sup>2</sup> of land from cereal to citrus-fruit and tomato cultivation, among other high-value crops. Another success story comes from Ethiopia, which decided in the 1990s to invest in sesame and cut flowers for export. Close collaboration between the government and the private sector enabled strong year-on-year export growth in an otherwise stagnant agricultural sector. Oilseeds and flowers are Ethiopia's fastest-growing exports, the latest statistics show.

A breadbasket approach concentrates investment in a particular geographical area. In the 1970s, Brazil's Cerrado region, for example, began investing in infrastructure, agricultural research, and soil recuperation. Several African countries are adapting this model to existing agricultural areas and emphasizing smallholders. Mali, for example, is considering a pilot breadbasket program for its Sikasso region. The initiative aims to raise cereal production by 60 percent through a combination of yield increases and limited expansion onto new land. There will also be strong support for export development, new roads and warehouses, and measures for climate mitigation and adaptation (such as water harvesting and locally adapted drought-resistant seed).

Another approach is an agricultural-development corridor, in which commercial farms and facilities for storage and processing are concentrated around a major infrastructure

<sup>2</sup>About 441,000 acres.

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## Chinese agriculture: A model for Africa?

Steve Davis and  
Jonathan Woetzel

African countries have spent decades trying to jump-start agricultural production. In the search for new approaches, many experts are looking for answers in China's impressive agricultural achievements, which raised hundreds of millions of peasants from rural poverty in the past 30 years. China's agricultural investments and development projects in Africa are growing. How relevant is the country's model to the continent?

China, of course, is very different from Africa: it is a single country with homogeneous demographics; a powerful and stable central government; well-developed public-sector institutions, infrastructure, and capabilities at every level; and a long tradition of rice and wheat cultivation. Africa comprises 53 countries with different tribes, ethnic groups, and languages. Many of these countries have unstable leadership, nonexistent or weak institutions and infrastructure, little consensus on policy and planning, a postcolonial legacy, harsh climate and health conditions, and agricultural traditions that are not naturally suited for a green revolution. Yet Africa has some important competitive advantages over China—for instance, more arable land and water, as well as a smaller, but fast-growing, population.

Significant agricultural reform must be rooted in priorities promulgated and carried out by political leaders.

China's commitment in the 1980s to increase food production and rural income rapidly was a central pillar of the broader economic-development agenda of "opening up." In fact, agricultural reform in China was not really an independent development goal but rather a key strategy for broader economic reform. The objective was to create the food security, rural stability, surplus income, and labor supply to drive broader industrial development. In Africa, agricultural policy is too often subordinate to the demands of more politically influential urban interests and incidental to other development policies.

Moreover, attempts to solve agricultural challenges through surgical approaches, such as a focus on accelerating one input or other (say, fertilizer, seed, or irrigation), have failed across Africa as input was turned into a commodity politicians traded and abused as political currency. Strong, comprehensive, and integrated development and investment policies, with agricultural reform as a centerpiece, must therefore serve as a starting point in Africa.

People and programs matter, but institutions endure and thus enable true transformation. China has set out to create institutional capacity at every level and across many aspects of the agricultural value chain. These include R&D institutes; the world's largest and most comprehensive agricultural-

extension system; credit and financing capabilities at the national, provincial, and local levels; and systems for managing seed, irrigation, production, market integration, and export support. While China's strong government bureaucracy may be difficult to replicate, putting in place the necessary institutions and ensuring support for them will be critical.

China undertook its agricultural transformation on a massive scale, but its genius lies in small, practical approaches. The drivers of Chinese reform, focused on smallholders, manifested themselves in programs at the microlevel: extension programs in every village; agricultural engineering that emphasized small tools, machines, and systems; and incentives that engendered self-financing, iterative improvements, and incremental learning. By contrast, African leaders, as well as Western donors and investors, sometimes try to tackle problems with large-scale models and expansive programs that are inappropriate for smallholders.

It is also easy to overlook the role of technology in China's rural-development story. China created or expanded scores of R&D institutes and universities focusing on agricultural innovations. New models for seed, fertilizers, and hydraulics were implemented; agronomics flourished as an academic pursuit with practical applications; a million-person extension service

created direct links to farmers to ensure appropriate training and uptake; and private-sector investments were supported to ensure further innovation.

The African experience to date has often underemphasized the role of technologies and extension services. But these will be critical to address the gaps, in productivity and market access, that continue to stifle agricultural development. Except for large infrastructure projects, there has so far been only limited success in transferring Chinese agricultural engineering and technologies to Africa. Yet this kind of uptake will probably flourish in the coming decade as better distribution channels emerge, more sophisticated models for adapting technologies to local conditions prevail, and Chinese private-sector investments in Africa are strongly encouraged and supported by huge multibillion-dollar commitments from the Chinese government.

No doubt there are fundamental limits to the application of lessons and opportunities from China to African agriculture, particularly given the vastly different political and economic environments and cultures of accountability and entrepreneurship. Yet it is no foolish exercise for the continent to see China as a source of important clues. For one thing, Africans should consider the negative consequences of China's aggressive agricultural development: environmental degradation, labor exploitation, and

social inequities. Nonetheless, China will continue to be a vital player in all economic-development activities across Africa, through its vast aid, investments, and strategic programs. Many of China's specific approaches to increasing agricultural productivity and food security, if appropriately adapted to the realities and societies of Africa, may

help more of the world's poorest people to improve their daily lives greatly.

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project. Two such corridors are under way: one linking the port of Beira, in Mozambique, with Malawi and Zambia; the other connecting southern Tanzania to Dar es Salaam along the TAZARA Railway. In both cases, private investors in mining and infrastructure provided the impetus, supported by governments that want to develop neglected regions of their countries.

### **Develop markets to complement supply measures**

Most agricultural-development plans focus on supply side interventions, such as improved seed and fertilizers. Many pay too little attention to the demand side—the place where the increased production will ultimately go. Unless the planners know the answer to this critical question, that increase will probably fail to produce economic gains and will make it hard to carry on with the program.

Once the subsistence requirements of the producers' families and local communities have been met, there are three main sources of demand: export markets (international and regional), domestic urban markets, and food processing. In Morocco, the government helped facilitate the export of high-value crops to Europe through a combination of technical assistance, economic and political measures (such as helping growers to meet European farm certification requirements), and an agreement with the European Union to expand tariff-free access for Moroccan producers. In Ghana, the government plans to create a staple-crop breadbasket in the Northern Region to supply more rice and maize to urban markets, which currently rely on imports.

Food processing is attractive to many governments because it is both a source of demand for agricultural products and a job creator. For export goods, downstream processing may be discouraged by US and European tariff regimes, which favor raw over processed goods. African countries can, however, counter this problem by cutting their export taxes on those goods. Côte d'Ivoire and Ghana have used this approach to increase their share of cocoa processed in-country to 40 to 50 percent today, from less than 10 percent in 2000.



Meanwhile, as African countries urbanize, processing for domestic use will become more attractive. The challenge is to ensure that quality standards and infrastructure—especially power—make the industry competitive.

Reliable domestic sources of demand are particularly important in countries where poor transport connections or a lack of comparative advantages constrain the ability to export. In Ethiopia, for example, improved seed and good weather led to a surge in maize production in 2002. Farmers couldn't sell the surplus, however: the country had little export infrastructure, while high domestic-transport costs and low purchasing power made it uneconomic to move the maize to cities or regions with food shortages. Maize prices eventually fell by more than 50 percent, forcing farmers to let the crop rot in the fields. The government's goal of doubling cereal production will therefore require substantial investment in transport, storage, and processing.

### **Create clear roles for the private sector**

Governments cannot succeed alone. The evidence suggests that agricultural-development programs also require the active engagement of private agents such as farmers or farmers' organizations, input suppliers, warehouse operators, buyers, and traders, including international trading companies. Development programs often overlook or disdain agri-dealers and other middlemen, yet they perform essential coordination work—for instance, linking small farmers to markets or providing inputs appropriate for local soil conditions. Governments and donors rarely have the local knowledge or capacity for these jobs. Also, international trading companies can not only contribute technologies and management skills but are also major buyers. Private investment in infrastructure, such as mines and ports, may play a role in agricultural development too.

Relying on private-sector agents such as input suppliers, buyers, or both has several advantages. They typically have access to capital and organizational know-how. In a competitive market, they must learn quickly to survive and make money. Private-sector agents can also link smallholder farmers to markets effectively. Large “nucleus” farmers, agri-dealers, and warehouse operators can market the output of many smallholders at once, reaping economies of scale that give smallholders better prices than they could get on their own. A similar service could be provided by farmers' groups—in some cultures, they have a record of success; elsewhere, private-sector entrepreneurs have a better one.

In Morocco, for example, the government has developed an aggregation program for smallholders. The program revolves around a nucleus farm, with 50 hectares of land leased by the government to a commercial farmer who makes a commitment to work with surrounding smallholders through an “outgrower” program. Outgrowing means that the commercial farmer facilitates access to inputs (such as bank loans, seed, and advisory services) for the smallholders, in return for the right to market their output. Morocco created an agricultural-development agency to encourage and direct these investments

and manage the contracts. One of the government's key roles has been ensuring equity in the relationship between outgrowers and nucleus farmers. More than 30 aggregation partnerships have been launched since the program began, two years ago.

Bringing the private sector into the picture is no quick fix for agricultural development: often, when the government's capacity is weak, so too is that of the private and social sectors (including cooperatives and other farmer's organizations). In the past, governments used this argument to justify bypassing the private sector. When the government of Malawi launched its voucher-based fertilizer subsidy, in 2005, for example, farmers could redeem the vouchers only at government distribution centers. The result was a diminution of the role of private agri-dealers and the eventual closure of some dealer locations. Ultimately, the private sector can develop capacity only if its incentives are aligned with the government's strategy and those of the sector's agricultural customers.

### **Design implementation into the strategy**

To carry out an agricultural-development strategy, government officials must work with farmers and the private sector across departments, from the central ministry to extension workers. Since most African countries face capacity constraints, governments must design clear, simple strategies. They can reduce the number of agents they use by working with aggregators, such as nucleus farmers in Morocco, who in turn deal directly with smallholders.

Effective implementation starts with assigning responsibilities clearly. At the central-government level, the relevant agency has three main tasks: managing agricultural programs within its own organization, coordination with other parts of the government and with donors and the private and social sectors, and monitoring the progress of the strategy, intervening as necessary. Each country has different institutions and capacities, so there is no universal solution. What the agencies actually do is more important than which part of government they are in.

One approach is to assign implementation to the department that developed the strategy—typically, a ministry of agriculture—investing in capacity and bringing in outside experts as needed. This approach can make use of existing institutions without undermining them. The downside is that it's difficult to change the culture of large institutions, both public and private, to deliver the impact required. Since capacity-building projects in Africa have a mixed record, using existing capacity may be best when the strategy involves strengthening or expanding a program that the government has already shown it can administer.

Another approach is to set up a special delivery unit to guide implementation. This may be appropriate if the government decides that capacity in an existing ministry is low or feels that the strategy is so innovative it would be better to create a unit with an explicit

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mandate. Such a unit is rarely in charge of programs but sets targets, tracks progress, and solves coordination problems. It may well drain capacity from other government departments as it typically offers more attractive salaries and interesting work. Yet it can also build capacity within the government: rotations, secondments, and placements spread its way of working to other departments. Morocco, for instance, created the Agency for Agricultural Development with a specific mandate to establish public–private partnerships for high-value crops. Other aspects of the government’s strategy remain the responsibility of a restructured ministry of agriculture, whose budget has risen to \$1.4 billion a year, from about \$800 million.

Several other countries are considering the delivery-unit model to promote agricultural transformation. These units would serve as a contact point for government and donor organizations, track the progress of critical initiatives, and intermediate between public and private entities.



Given the capacity constraints most African countries face, our central message is that to succeed, agricultural-development plans must be less ambitious and more targeted. They will differ for each country, so a uniform implementation isn’t possible. But agricultural development comes to life when government, working with all interested parties, pursues selected initiatives that have identified sources of demand and appropriate enabling investments supervised by a nimble implementing authority. ○

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