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Transforming African agriculture

**Three McKinsey experts discuss what it will take to
create a “green revolution.”**



Sunil Sanghvi: Agriculture is in the newspapers every day now, and it's an enormously exciting but also an enormously dangerous time.

Lutz Goedde: For the first time since I remember, it seems like supply and demand are fundamentally running apart.

Sunil Sanghvi: Demand has been growing exponentially now, with more and more people—people getting more affluent and therefore wanting to eat higher value crops, meats, dairy—[and] that takes a lot of calories to produce. Supply is experiencing more and more constraints, with water shortages, soil reduction, reduction of the underlying yield. We put those two together and you get these price spikes, and all the social and political unrest that comes with that.

Lutz Goedde: We've seen an interesting trend on the supply side, where global productivity, decade after decade, has been going down. We started with over 3 percent, in the '60s; now we're down to [a] 1 to 1.5 percent annual increase in productivity. At the same time, global demand is increasing quite dramatically.

Assessing the African opportunity

Sunil Sanghvi: Well, Africa's going to be really central to resolving this conundrum we have, and there's three or four ways we're going to work our [way] through this. The solutions are: one, just getting small farmers more productive, and the yields in Africa and Asia are a half, a third, sometimes even less of what the yields in the West are. We know how to bridge that gap: it's seed, it's fertilizer, it's some farming practices. So the first step is just to get small farmers [to be] more productive.

Another part of the solution is to get more land into cultivation. There is still a lot of arable land [that] is available; some of it has big environmental cost to it—it's deforestation, the Amazon—and the whole world understands that that's not on the table as part of the solution.

But there's lots of land which is not like that—where there's been farming in the past and it's degraded, or there's relatively low environmental costs. But you have other costs; you've got social costs. There's oftentimes people who are informally living there or grazing their cattle there.

Lutz Goedde: I'm probably more optimistic about agriculture in Africa than I have ever been. I think we're seeing a number of encouraging factors coming from the continent. Countries going in the right direction and growing their economies substantially, and equally importantly, also starting to make improvements on the agricultural production side. We seem to have some fairly stable democracies with increasing domestic production.

Sunil Sanghvi: Ghana's going to make the breadbasket work partly through getting small holders much more productive. And what the Ghanaian plan is, is to get a[n] aggregator called "warehouse aggregator."

They have analyzed the value chains and said, "What's missing is a person, a private-sector business, that has a silo, and when people harvest their crop they can come and store it." If you had a warehouse system like you have in most parts of the West, farmers could come and say, "I'll store it, I'll have a receipt, and I might be able to sell it three months later when prices are higher."

The other nice thing about the aggregator is the ability for that aggregator to deal with a bank. A bank will loan money to him because he's got an asset; banks have a hard time loaning money to a one-hectare farmer. The warehouse aggregator can then on-lend, either directly or through fertilizer and seed, to the small farmers. The small farmers then, when they harvest, can take part of their harvest and pay off the loan and then keep the rest in storage, or sell some of it.

Roberto Uchoa de Paula: To me, the clearest picture that I have is when I drive through Mozambique, which to a certain extent reminds me a lot of Brazil, where I'm from. You have places with very similar weather, though totally similar patterns of soil, very similar cultures, the same language. But on one hand, you see Brazil being a major exporter and considered now a breadbasket for the world. And on the other hand, you see Mozambique as of right now [with] food riots, and food dependent in some areas.

I can totally see Mozambique being a next Brazil, given its own scale in the next 10 to 20 years. They are now develop[ing] some infrastructure that will provide roads, railroads, and energy across the country. There [are] investments in credit, and irrigation. They're providing, now, fields similar to Brazil into production. But most importantly, I see Mozambique actually engaging their small holders as part of their solution.

So I see a world where instead of being in the port of Mozambique in Maputo, with food grains being shipped in, I can see food grains being exported out.

Profiling the average farmer

Sunil Sanghvi: So an African farmer is a woman—80 percent of African farmers are women—and it's a hectare or half a hectare, an acre or two of land. Usually, it's rain-fed. There's no irrigation. You rely on the unpredictability of when the rains come. It's cultivated at a very low-intensity level.

So, if you go driving through the Midwest of America, you see a lot of very productive agriculture. In most parts of Africa, you've got much lower density of seed spacing. You have poorer seed. You don't use fertilizer. So if you look at a field [that] is fully grown, it looks much more scrubby, much less productive than a field in Iowa would, and it's based on manual labor. Hence, you'll see out in the fields, during planting time and harvesting time, the whole village out there and working very hard from day up to when the sun sets, trying to get the harvest in.

It's an agriculture [that] doesn't do much to help send your children to school, or have good medicine, or have any amenities in the house. It's a subsistence agriculture.

Making the case for systemic change

Sunil Sanghvi: To make a green revolution work—to have an agricultural transformation—you're really changing a system. Part of what is different is people are starting to think of real, large-scale holistic solutions, where you not only have a fertilizer subsidy, which allows people to buy fertilizer, but you also have seed systems with improved seed, and you have irrigation, and you've got connections to markets.

Any of those done individually helps but doesn't help a lot, because if you have seed but no water, you don't get much of a bang. All those things, four or five things put together, can have a really multiplicative effect, and you get a systems benefit. What the world is doing right now is experimenting with large-scale implementations of big systems transformations.

There are several which are worth noting. You know, there's a value chain transformation where you say, "All the things that need to work for a cocoa value chain or a dairy value chain, let's make sure those are in place." Or you could have, [as] we call it, a place-based transformation, where you say, "All the things that need to work to get this state or this region of a country to have an agricultural transformation, let's make sure those work." And the public sector, the private sector, [the] social sector can all contribute to that.

Roberto Uchoa de Paula: For instance, in Liberia, the needs for human capital, financial capital infrastructure are so great they might overwhelm anyone on what needs to happen [to] have a vibrant industry going. So, Liberia: one of their major pushes was, “I need to bring focus.” Not only [did] they provide on priority crops that are clearly articulated [in] their plans, but also a need to focus on, “Where do I develop the infrastructure?”

So, one of their ideas is, “How can I invest my scarce resources on developing a connection between my port in Monrovia to my areas that have potential to be a breadbasket.” And the corridor would be this integrated plan where the government articulates, with the support of multilaterals and foundations, where there is needed infrastructure [to] be developed—not only roads, but also storage, collection points.

By articulating that corridor from point A to point B, it helps [the] private sector to assess, “Where should I be putting my investments,” so it can benefit from this infrastructure development and bring a whole region more quickly up to production.

Sunil Sanghvi: Another part of it is thinking about who is going to be the frontline change agent. If you have hundreds of millions of farmers who need to do something different in order to have a green revolution in Africa, the question is, who is going to work day to day with those [farmers] to get them to change.

One of the examples in Morocco that we’ve been involved in is using nucleus farmers as a change agent. In that case, the government of Morocco invited 500—actually had to tender a solicitation—to ask Spanish farmers, Moroccan farmers, Moroccan businesspeople to take up franchises to come in and provide the nucleus farm that would be the catalyst for allowing thousands of farmers in the vicinity to also move to more productive agriculture.

So if you’re farming a part of Morocco which is wheat and you know that it’d be much more productive to move the tomatoes or the olives which you could export to Europe, how do you do that? Historically, you would have the government have extension agents out in the field trying to get individual farmers or groups of farmers to move. And what the government of Morocco said [is that] it’s a better change process if you have a private-sector change program.

If you can attract a nucleus farmer who is relatively sophisticated, knows how to find markets in Europe, can bring in some investment, can show that you can move from wheat to tomato in an effective way—he could be the change agent for all the thousands of farmers in their vicinity. And so the government created a set of contracts and incentives to get the nucleus farmers attracted, to get them going in business, to build roads, to

provide a lease; when, in return, the nucleus farmer has agreed to be the change agent to help all the farmers around the farm to also participate in this.

Roberto Uchoa de Paula: One example of this need to think about the market is what we observe in Mozambique for the development of the poultry industry. One of the key potentials in the country is, given their soil and weather conditions, soybean production as well as corn production. We just don't want to produce more soybeans and corn without having an outlet for that.

The realization of that market came from the form of a chicken. That integrated view provided the demand and the incentive for farmers to plant more of the soybeans and the corn. With that literally symbiotic relationship, you start seeing the potential for a higher-end industry to develop—poultry—bringing along several small holders planting their own corn and soy that they use not only for their own food uses, but also they know that all the excess can be consumed by a poultry processor nearby.

The important role of technology

Lutz Goedde: When we see the right incentives for farmers in Africa, we actually see a very rapid technology adoption. Cell phones are the most obvious one that everybody talks about: within five years, we saw in Kenya penetration going from virtually no cell phones to 60 percent of the population having cell phones or access to cell phones.

Roberto Uchoa de Paula: And what people are realizing in Africa is that not only can [mobile phones provide] the information the farmer need[s] for price discovery, for pest outbreaks, but it can actually get information back.

Since labor is so cheap—if [mobile phones] start offering its most cents on the dollar for farmers to provide information back, if an outbreak of disease is happening, if there is a need for more seeds, if there is a need to actually ship a truck—these information services now actually create not only wealth for the provider of that information but actually, as we start to aggregate, creates so [many] data-mining opportunities for us to assess where the diseases are coming and going. Where the weather is actually providing benefits for higher production [or] less production, which then are creating new business models that we don't have yet, for instance, in North America.

And that example of technology leap that Africa's taking is capable, because they have a very different structure than [the] US and that becomes very important for us. The technology cannot just be, let's copy and paste what Brazil did, or Europe did, or North America did.

Sunil Sanghvi: So, getting technology into the seeds for African crops is a big opportunity; the Gates Foundation and others are really funding this [on] a big scale. There's also technology which has to do with making implements [that] are easier for small farmers to use.

The Chinese have three-wheeled tractors, which are terrific. They can be used for planting at the beginning of the season, and for harvesting at the end of the season, and for moving things around—or for taking your family to the city. These are multi-use small vehicles, which are very appropriate for small farmers.

How the private and public sectors help

Lutz Goedde: We're also seeing an ever-increasing commitment both from the public sector and the private sector to fund agriculture in Africa, and that has really been a dramatic turnaround since the early part of the last decade.

A lot of it is on the higher-value...what we call higher-value specialty crops—crops like cocoa, coffee, cotton, fruits, and so forth. We're hoping that over the next years, that commitment will also translate in the basic staple crops like corn, like rice, like wheat, like soy, legumes, and so forth as well.

Sunil Sanghvi: The private sector is great at understanding demand. The private sector is great at giving incentives for people to work really hard and stay up nights worrying about things. The private sector is great at operating things efficiently. And to get a system of agriculture moving, you're going to need all of those things. But the government also has a role to play.

If I think about in Ghana, you've got many large multinational companies; you've got many large private-sector investors who say, "I could see making money in Ghana, but I'm scared about the land loss. I don't know if I go and contract a farm [on] this set of land, whether I really have the rights to it, whether I'm going to have a problem with it." They're scared about some of the tax policies, or some of the import and export policies.

So the government has a great role to play [in] making it easier for private sector to come in and to make sure that the value that's created—that a fair portion of that stays in the country, either in terms of contractual agreements with the local population, or taxes, or clinics and hospitals. But the government is critical to creating the conditions to get private sector to come in. Some of the longer-term research in seed is something donors or governments are more suited to do; training of people and building educational skills are things that governments are more likely to do.

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Roberto Uchoa de Paula: Agriculture is also a game for long-term bets. You do not develop a plantation or do not develop an infrastructure just for [a] one-year gain; you need to have at least a five- to ten-year horizon. That entails, then, a long-term partnership. You are in a marriage, not on a speed date. And the challenge with this world is if one of the parties decide[s] to forget their promises—either the government or the private sector, or even the small holder—that marriage falls through.○

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