

AFRICAN AGRICULTURE: WAITING FOR THE TECHNOLOGICAL OVERDRIVE

After missing the first and second industrial revolution, Africa looks set to adopt the third. As for agriculture, the challenge is complex: producing more while minimizing negative impacts on the environment. Along with an effort in education and training, African leaders are increasingly aware of the crucial contribution brought by technological innovation. Radical innovators are on the verge of changing the game. By combining low-cost services, live information and simple innovations, by making these features available to farms of all sizes, the mobile Internet can allow African agriculture to move up a gear in order to meet its immense needs.

To feed 9 or 10 billion people in 2050, the UN stated in December 2013 that farmers all over the world should increase their production by 70%. The challenge for Asia, Africa and the Middle East may prove particularly demanding. The 50% increase intended today for yields and agricultural land (only 20% of production increase) will not allow these regions to meet their needs. Africa, which is far from having completed its demographic transition, will be particularly affected.

The situation is extremely varied across the continent. In North Africa, malnutrition has remained stable, fairly close to that of developed regions. However, Sub-Saharan Africa gives rise to serious concern. In 2050, according to the UN, the African population will reach 2.4 billion people. Without a genuine agricultural revolution in the continent, the worst is yet to come. To reach the famous Millennium Development Goals (MDGs) in 2015, the number of undernourished people in Africa should

decrease by half in the early 1990s, that is to say, it should fall below 90 million people. That's virtually impossible within this timeframe. In the long run, the challenge is no less demanding.

In its 2013 report on "[The State of Food Insecurity in the World](#)," the Food and Agriculture Organization (FAO) of the United Nations estimated that there were 239 million undernourished Africans during the 2010-2012 period, 19 million more than during 2007-2009. This increase isn't only in terms of absolute value. The prevalence of undernourishment has increased from 22.6% to 22.9%. In its 2013 report titled "[Sustainable Intensification: A New Paradigm for African Agriculture](#)," the Montpellier Panel – a group of international experts hosted by the London Imperial College – offered an even more gloomier assessment: if the current trend continues, in 2050, the African agricultural production will be able to ensure only 13% of the food needs of the continent.

The challenge of producing

Given this situation, the effort made on increasing the agricultural production is clearly not enough. Agriculture provides 70% of employment and 30% of the continent's GDP, but only five African countries spend at least 10% of their total expenditure on agriculture: Burkina Faso, Ethiopia, Mali, Niger and Senegal. With the exception of Ethiopia, none of the ten greatest agricultural powers in Africa has achieved this goal, as highlighted by researchers from ReSAKSS, a network dedicated to the monitoring of the implementation of the Comprehensive Africa Agriculture Development Programme (CAADP). Only six countries have exceeded 6% in agricultural growth: Angola, Guinea, Nigeria, Ethiopia, Rwanda and Mozambique. Thanks to the distribution of fertilizers and seeds, local corn and rice have become more productive, but not enough to cover the anticipated needs.

The challenge is complex: producing more – a lot more – while minimizing negative impacts on the environment. Climate change is a key element: some of its effects need to be anticipated while developing solutions that avoid increasing its impacts. The issue of deforestation is an important part of this challenge.

For a long time, agronomists from the North (both East and West) deemed it possible to implement, in Africa, thousands of acres large mechanized farms similar to those found in Kansas, Argentina and Ukraine. Today, most experts have adopted a different strategy: the massive expansion of agricultural land has been abandoned in favor of the increase of the production of small farms. To meet the same objectives, production must achieve a threefold increase. First of all, production must comply with environmental standards by using natural processes than enhance production efficiency (living soil, no-till farming, use of parasites rather than pesticides). Second, by using genetic selection of the most efficient seed, including GMOs. Third and last, the socio-economic environment and the infrastructure must support the market.

A central question remains: what should Africa produce or not produce? Food crops for local consumption or export crops designed to earn foreign exchange and reduce the trade deficit? There is no unequivocal answer to this question but the principles are known: first of all, the race for food independence isn't necessarily a winning strategy for all countries. North Africa, for example, will continue to buy wheat. Besides, several countries have comparative advantages in tropical export crops and must develop their production, without sacrificing the essentials. Export crops meet the needs of northern investors, which is not the case of egg, corn or cassava production. To take a paradigmatic example, Zambia shouldn't have to import three-month-old chicks from the Netherlands.

There is no universal African recipe however, some African countries have found their way. Ghana, for example, was able to mobilize its small producers on export crops such as rubber and cocoa, with well-tailored financing schemes. Similarly, the Senegal River is an agricultural success achieved through a combination of public investment, irrigation techniques and taxation of Asian rice – all of these actions have significantly reduced the trade deficit in rice.

The economic context and its constraints

Although essential, the increase of production isn't enough. Agricultural production may increase; but if the household purchasing power stays too low, food insecurity will not recede accordingly. Recent crises have been linked to soaring prices. Agricultural performance needs to be increased without causing unemployment. This will force economists and policy makers to reconsider the concept of productivity, replace it in a comprehensive economic and social context. With population growth, 300,000 young people arrive each year in the labor market in sub-Saharan Africa. Giving them a job is a priority. Producing more, in Africa and elsewhere, also requires restructured distribution channels for agricultural products to protect small farmers but also a storage policy to mitigate price volatility. It takes quite high agricultural prices to encourage farmers to produce and invest without being too high and at the same time, protect the purchasing power of rapidly growing urban populations.

Obviously, there are also more optimistic views. Based on the fact that only 30% of agricultural land is used across the continent (40% in West Africa), some agro-food multinational companies claim that by 2050, sub-Saharan Africa will be an exporter region of many agricultural raw materials. To achieve this status, Africa would have to overcome two glaring gaps. First, its lack of infrastructure: without roads or ports, many lands are virtually

inaccessible and some crops can simply not be transported. In sub-Saharan Africa, according to the FAO, the amount of food lost before reaching the consumer's plate exceeds 150 kg per year per person. In addition, yields are very low. To take off, agriculture must be completely reorganized, especially in terms of education, training, selection of seeds and fertilizers. To increase productivity, mechanization must be increased. Agricultural employment would decrease and other sectors must diversify to avoid massive rural exodus. We can only insist: reforming African agriculture without provoking a social crisis will be very challenging.

Another major shortcoming: the lack of structured and efficient industries (production, storage, transport, processing, and distribution) makes development difficult. Without an integrated production chain, there can be no genuine specialist know-how, no processed products, and therefore no added value. Let's consider the case of Niger: despite a strong economic growth (10% in 2012), and even if it has one of the largest herds of ruminants in the area, this large country – almost three times France – has no slaughtering facility technically adapted to its sanitary requirements and issues, nor any equipment to ensure the cold chain or milk processing plants... It also lacks of any kind of land transport infrastructure (no railways) to facilitate exchanges with its neighbors and major trading ports. In these vast, sparsely populated countries, distribution must operate on very long distances. Logistics has a very crucial role to play.

The weakness of agricultural policies is closely linked to the difficulties faced by spacial planning and socio-economic development policies. To be effective, agricultural and agro-industrial policies must necessarily take into account cultural traditions, the complexity of land issues, energy policies, water policies, the management of natural hazards, as well as that of transport and equipment. Therefore, designing an agricultural

policy requires investment in infrastructure and the development of public policies beyond the agricultural sector. This requires strong skills in public engineering as well as in design and implementation of public policies. It is primarily these skills that Sub-Saharan Africa needs.

This sub-region suffers from a lack of agronomic and agro-food centers of excellence that could train technicians, executives, operators, processors, agro-engineers, logistics providers, who in turn, would strengthen its innovation capacity and improve the control of production operations. These gaps are explained. So far, programs of development assistance have been devoted either to food emergency and peasant self-sufficiency, or the creation of infrastructure, but without sufficient support to skills or capabilities to use and maintain these particular infrastructures. The implementation of the Tropical Agriculture Platform (TAP) led by the FAO, endorsed by the G8 and launched at the first meeting of agricultural experts (Meeting of Agriculture Chief Scientists, MACS) led by the G20 (in September 2012) is a result of this analysis, as well as the objectives of the New Partnership for Africa's Development (NEPAD of the African Union).

Finally, countries in this region are also facing challenges due to the globalization of trade in agricultural and agro-industrial products. The level of development of industrialized countries is the now the benchmark (especially in terms of health) against which other countries are assessed within the WTO context. To meet these standards, these countries need their own technical, economic capabilities as well as a strong expertise, especially in health.

ICTs to the rescue

Along with this effort in education and training, Africa is becoming increasingly aware of the crucial contribution brought by technological innovation.

Obviously, it is first of all a matter of progress in agricultural methods, including the knowledge gained in recent years in the field of agro-ecology. The challenge is twofold: first of all, preserve the short to medium term potential of farmland by avoiding to weaken them; and second, bet on the future: in the context of climate change, agricultural lands favorable to cultivation will become a scarce factor and a crucial advantage in international competition. The implementation of an innovative agronomy depends on the strategic vision of what the world will be in thirty years.

But technological innovation as a whole will also make a difference, especially information technology. The Internet, especially in its mobile version, can bring to African agriculture drastic productivity gains at the level of the continent's productivity deficit. In the 2013 report titled "[Lions go digital: the Internet's transformative potential in Africa](#)," McKinsey estimated that these gains would reach \$3 billion per year by 2025.



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There are already many examples. The first priority is to improve production management and avoid unnecessary losses. There are solutions: to avoid the deterioration of the meat, slaughterhouses can use digital thermometers and hygrometers, transmit and receive data through smartphones from experts in Africa or from anywhere in the world as well as advice on transport and storage of sensitive products such as meat. A very cheap way to avoid health crises.

Internet can also prove itself a powerful weapon against maladministration. Nigeria implemented the mobile Internet in its support program for farmers. Only 11% of farmers had access to the old system of fertilizer subsidies and huge sums have been diverted by corruption. The new “e-wallet” program launched in 2012, sends the subsidy vouchers directly to the farmers’ mobile phone and redirects them to the nearest dealer. The country has made significant savings, it now has a more efficient distribution system of fertilizers and has reached its production target. As for the farmers, their investment capacity is increased, as is their ability to develop their productivity.

Access to relevant information is a major challenge both for the culture itself as for the good understanding of the markets. Internet can improve the farmers’ access to expertise and information on weather, crop selection, and pest control, but also on management and finance. This support is available throughout the whole agricultural cycle. The Ethiopian Commodity Exchange (ECX) receives each month over one million requests for information on the market. 80% of these requests come from rural areas. The East African Stock Exchange provides online services such as warehousing, logistics and market intelligence on stocks and the expected yields of the main crops.

There have been also other initiatives, often on the local scale. In Kenya, the “iCow” platform has been developed for small dairy

farmers. It distributes information online and on mobile phones and disseminates educational videos. Milk production allegedly increased up to 30% for the users of this initiative. In Uganda, a call center provides farmers with expertise, in four languages, on crops, livestock, weather, market prices and input suppliers. Internet also plays a key role in market access, in practice, by providing the best prices for products and animals. In many African countries, Esoko provides weekly advice to farmers through their mobile phones, which allows them to negotiate better prices, to choose between different markets and receive offers for their products. According to McKinsey, Esoko members saw their incomes increase by more than 20%. The Internet also allows coffee producers in East Africa or cocoa farmers in West Africa to follow the exchange of commodities in New York. The Internet transformed what was an impenetrable jungle into a more transparent market.

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