

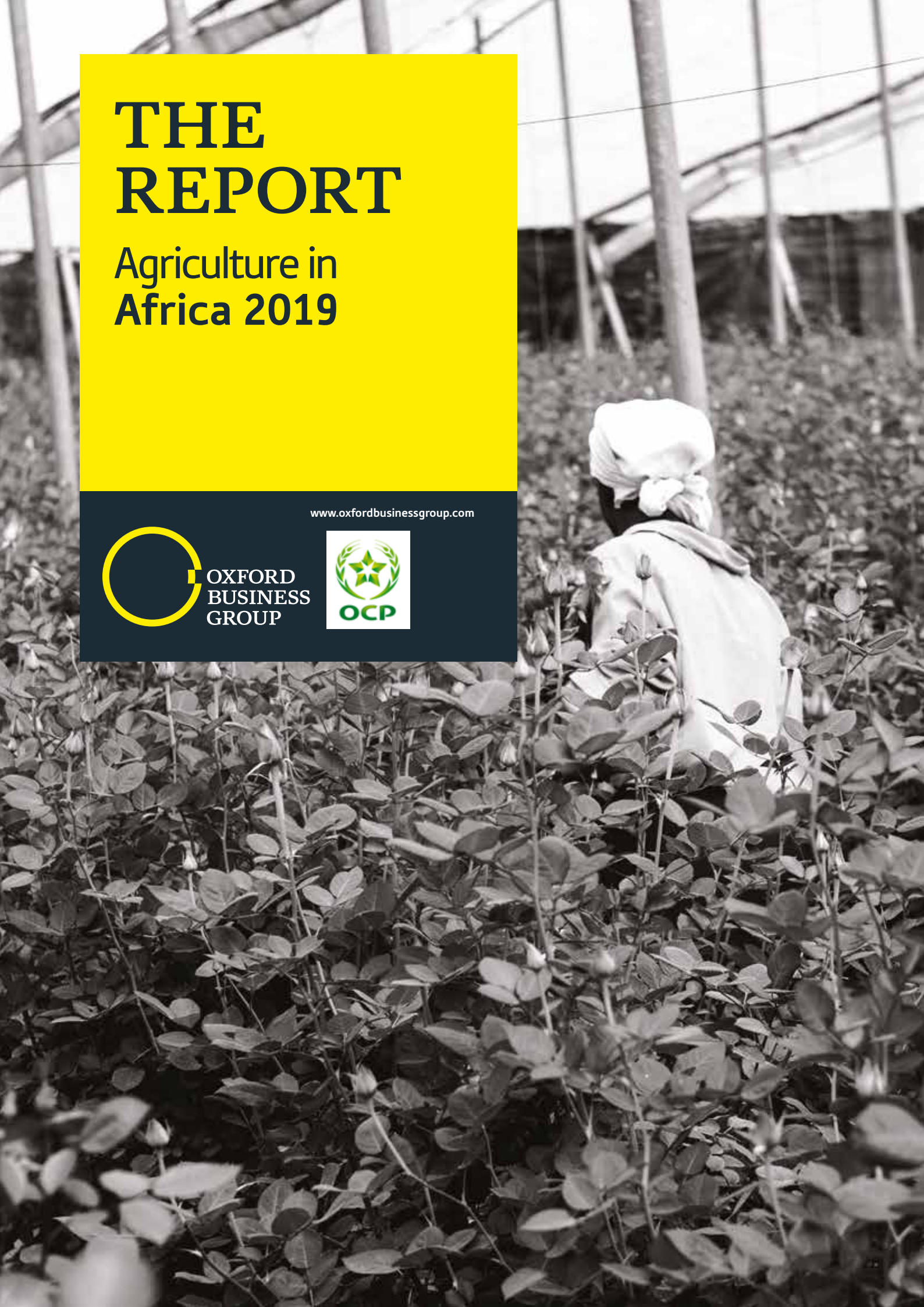
# THE REPORT

Agriculture in  
Africa 2019

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## Cultivating success

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Africa holds more than 60% of the world's arable land, but the continent's share in global agricultural production is low. Vast areas of land are not cultivated and productivity is lower than the rest of the world. Nevertheless, farming is key for the majority of African economies and accounts for at least 15% of the region's GDP. In addition, about two-thirds of the population is employed within the agricultural sector, the majority working in small-scale plantations that contribute at least 90% of food production.

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## Temperature rising

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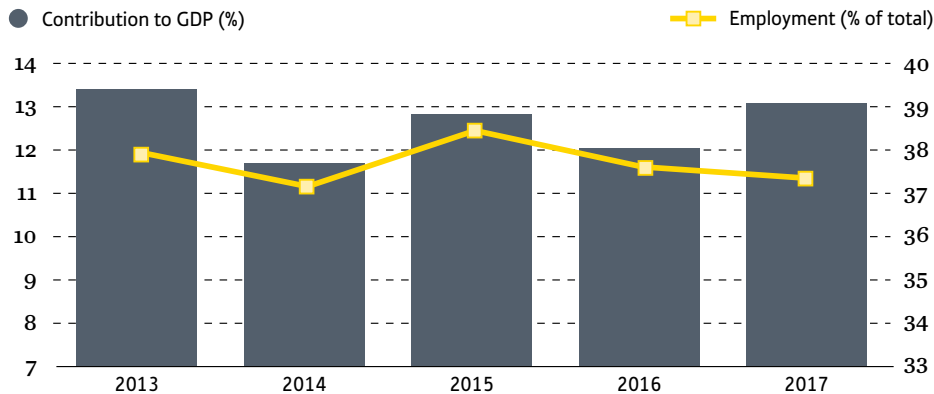
From Morocco to Kenya, farmers in Africa are increasingly affected by weather changes, extreme climate events and the resulting production volatility that makes it difficult to improve productivity. In this context, and in the face of a growing and increasingly urbanised population, boosting farm yields is necessary to increase the incomes of millions of farmers and ensure food security.



# Facts & graphs

Agriculture remains one of Africa's most important economic sectors, accounting for over 15% of the region's GDP and providing employment to more than two-thirds of the population. If the sector's most notable challenges can be overcome, agriculture could play an even larger part in transforming economies. In particular, governments across the continent are working with international organisations to find solutions to the rising effects of climate change. Nevertheless, the overall is quite bright: cultivated areas are expected to expand and farmers are set to increase their use of inputs, such as fertilisers, improved seeds, irrigation systems and mechanisation.

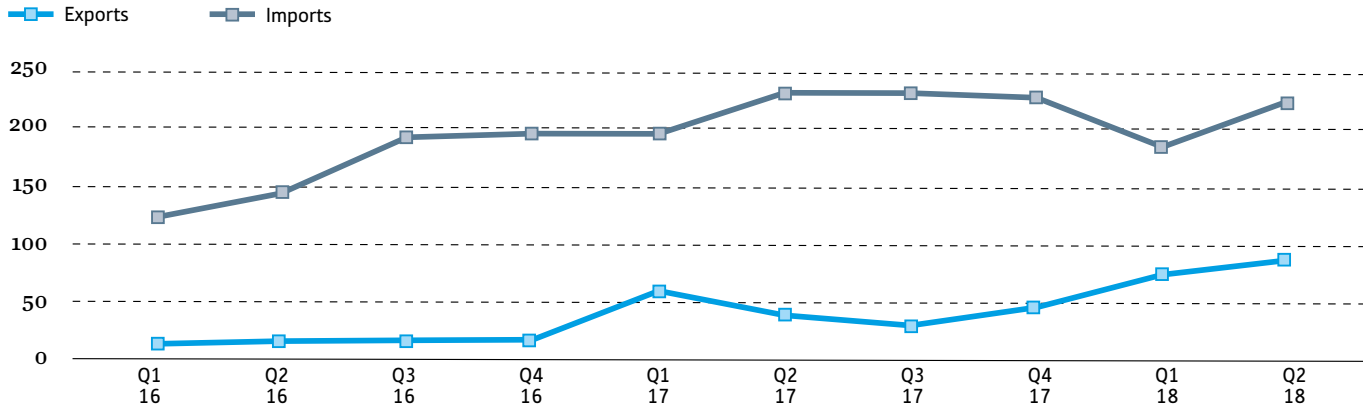
## Morocco's agriculture sector indicators, 2013-17



Source: World Bank

Africa's food production is forecast to grow by **60%** by 2050

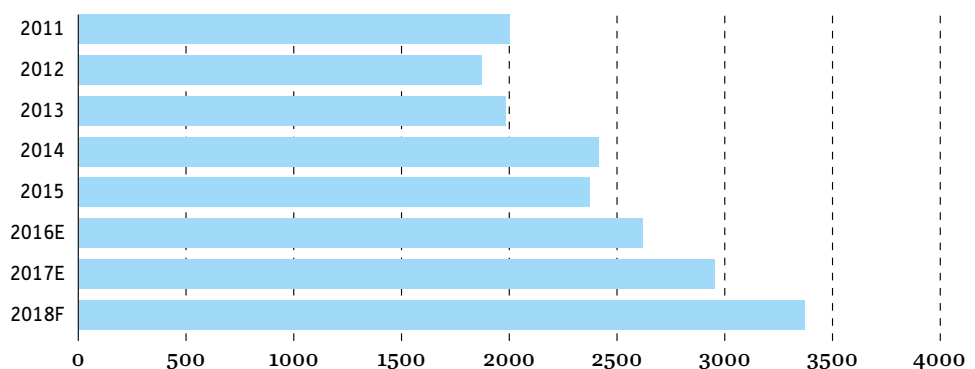
## Nigeria's agricultural goods trade, 2016-18 (N bn)



Source: NBS

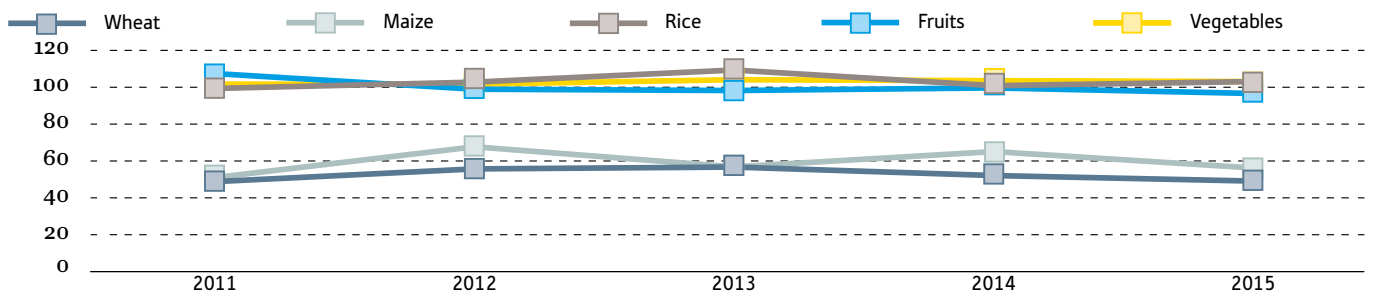
Family farming accounts for **90%** of agricultural activity in Africa

## Ghana's cocoa GDP, 2011-18F (GHS m)



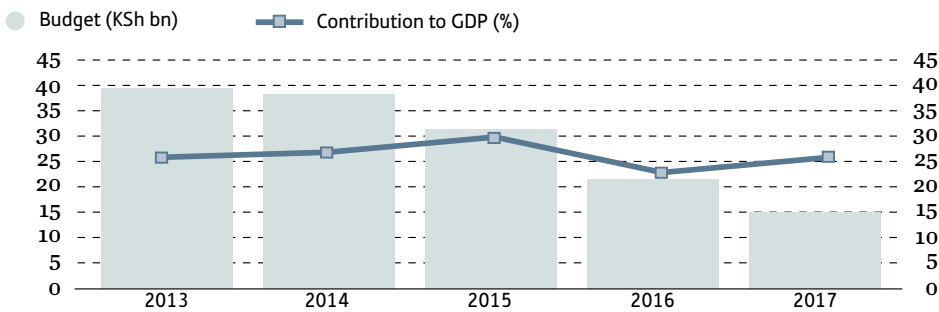
Source: MoF

Egypt's self-sufficiency in agricultural commodities, 2011-15 (%)



Source: CAPMAS

Kenya's gov't spending on agriculture, 2013-17



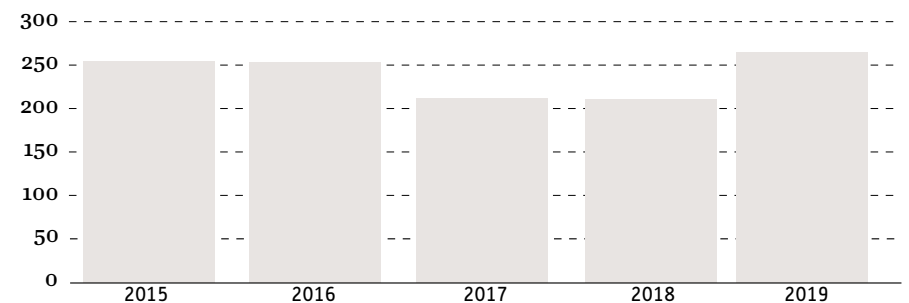
Source: KNBS, National Treasury

6%

of arable land in Africa is irrigated, compared to 14% in Latin America and 37% in Asia

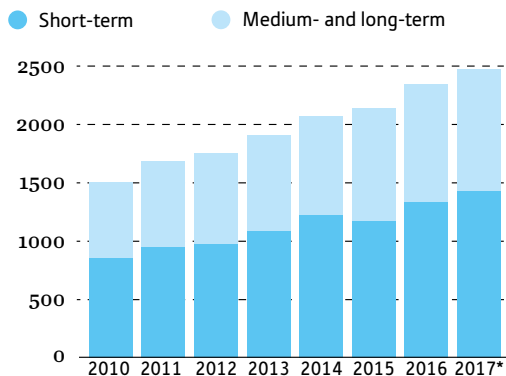
Intra-African shipments account for 15% of exports, the Malabo Declaration aims to triple this by 2025

Algeria's government budget for agriculture, 2015-19 (AD bn)



Source: MoF

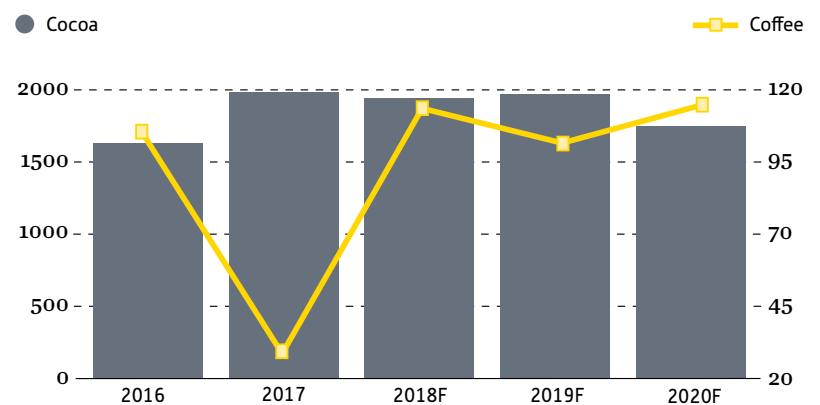
Tunisia's bank credit to agriculture & fisheries sector, 2010-17\* (TD m)



Source: INS

\*as of Sept

Côte d'Ivoire cocoa and coffee bean production, 2016-20F (m tonnes)



Source: MoC



Farmers are particularly vulnerable to the effects of climate change

## Cultivating success

Agricultural production is set to expand as challenges are met with innovative technologies and forward-thinking policies

The sector faces a number of challenges, the most notable of which is low productivity. This is due to a variety of factors, some of which include low use of inputs and irrigation systems.

Africa holds more than 60% of the world's arable land, but the continent's share in global agricultural production is low. Vast areas of land are not cultivated and productivity is lower than in the rest of the world. Nevertheless, farming is key for the majority of African economies and accounts for at least 15% of the region's GDP. In addition, around two-thirds of the African population is employed within the agricultural sector, the vast majority working in small-scale plantations that currently produce at least 90% of overall food production.

Chronic long-term underinvestment and poor governance have resulted in an agricultural sector that has been unable to play a role in transforming Africa's economies, either by ensuring food security, creating jobs or reducing poverty. Now, the sector faces a number of challenges, the most notable of which is low productivity. This results from a variety of factors, some of which include low use of inputs and irrigation systems. In this context, farmers are particularly vulnerable to the effects of climate change – a fact that has shed light on the need for increased attention and investment in the continent's promising agricultural sector.

**GEOGRAPHY:** Africa's 30.4 sq km boast a diverse range of agro-ecological areas and climates. These include rainforest vegetation with tropical weather, found in the south of West Africa and in Central Africa from Sierra Leone to the Congos. Other areas have dry and arid vegetation, such as those countries in the continent's Sahel region.

"This diversity is a tremendous asset, but it also poses a substantial challenge for African agricultural development," Abidjan-based African Development Bank (AfDB) stated on its website. "On the one hand, it creates a vast potential with respect to the mix of agricultural commodities and products which can be produced and marketed in domestic and external markets. On the other hand, the diversity implies

that there are no universal solutions to agricultural development problems across the continent," it said.

**UNDERINVESTMENT:** According to Washington-based International Food Policy Research Institute (IFPRI), during the colonial period – which for most African countries ended around the 1960s – agriculture was the most significant sector in the continent's economy. At this time, farmers were made to produce cash crops which were then exported to European countries as raw materials for their own growing industries. The exported cash crops included: cocoa, coffee, palm oil and rubber from West Africa; cotton from the Sahel region; tea and coffee from East Africa; and tobacco and sugarcane from the south of Africa.

"In general, food crops were not promoted and farmers grew them for subsistence only," the IFPRI reported. "During the colonial period, Africa was developed essentially as an agricultural-exporting economy. This goal was achieved with some success, as evidenced by the number of African countries being top global producers of tropical cash crops." Côte d'Ivoire, for example, has become the world's largest producer of cocoa beans. Today, the country accounts for 40% of the world's cocoa output.

After independence, many African countries focused on financing local manufacturing and considered agriculture to be a less productive food supplier. As a result, the post-colonial period was characterised by underinvestment in the agricultural and rural sectors. Consequently, Africa's agriculture recorded poor performance throughout the 1970s and 1980s, with production in sub-Saharan Africa growing on average by only 1% annually between 1971 and 1980, compared with the 3% growth seen throughout Asia. Land productivity was also two to three times lower than that observed in Asia.

Throughout the 1980s and 1990s the IMF and the World Bank pushed for the implementation of

Côte d'Ivoire accounts for  
**40%**  
of the world's overall cocoa output

structural adjustment programmes (SAPs), which were schemes designed for poor nations and countries in crisis, intended to reduce the role of governments in the economy. Countries were asked to implement these SAPs as a pre-condition for loans or external resources. Key measures included liberalisation of the economies, with the abolition of regulations such as price controls; privatisation of state-owned companies that were considered to be inefficient, reduction of public expenses and promotion of foreign direct investment (FDI).

Further according to the IFPRI, the austerity measures resulted in a reduction of government spending in the sector. In sub-Saharan Africa the share of public agriculture spending in the total budget declined to an annual average of 3.3% in the 1990s, down from 7.4% in the 1980s. The expansion of cultivated land meant that production growth climbed higher than in the 1970s, though productivity remained low, with output per ha of land at approximately \$180 in 1990. This was about one-third of the yields produced in Asia.

In the face of growing challenges and the poor performance of African agriculture, the early 2000s saw the adoption of a more comprehensive strategy to reduce poverty. This was intended to give agriculture a bigger role in the broader economy.

The Poverty Reduction Strategy Papers – the new model designed by the IMF and the World Bank proceeding the SAPs – promoted a variety of strategies to improve agricultural yields. These involved the educated, informed use of technologies and modern management practices. According to the IFPRI, this change greatly helped improve productivity, which returned to levels previously seen in the 1970s. However, yields still remained slightly lower than those of other developing regions.

**NEW STRATEGY:** In 2003 the African Union (AU) launched the Comprehensive Africa Agriculture Development Programme (CAADP), a strategy centred on agriculture, with the goal of reducing poverty and ensuring food security. The programme defined agriculture as a main engine of economic growth, and called for African governments to allocate 10% of their annual budget to the sector with the target of 6% annual growth. The Maputo commitments made in 2003 were renewed in 2014 in Malabo, Equatorial Guinea.

One of the CAADP's most notable achievements has been that it "has significantly raised the political profile of agriculture", according to the IFPRI. Some 40 countries had signed CAADP agreements by the end of 2014, with many nations designing their own investment plans for the agricultural sector.

However, the CAADP's targets are still far from being met. Countries in sub-Saharan Africa only achieved a 2.6% average annual growth rate in the agricultural sector between 2003 and 2009. Nevertheless, six countries – Angola, Ethiopia, Guinea, Mozambique, Nigeria and Rwanda – have managed to meet the growth goal of 6%. In regard to the



Small-scale plantations currently produce at least 90% of overall food production on the continent

investment target, in 2016 just 13 countries had successfully met their pledge to invest at least 10% of their budget in agriculture.

According to the Alliance for a Green Revolution in Africa (AGRA): "Progress has generally been slow, mainly because many countries, despite the willingness to do what is right, grapple with capacity challenges that hinder their ability to design and implement a transformational agenda," it stated in its "2018 Africa Agriculture Status Report."

**AGRICULTURAL GOVERNANCE:** According to AGRA, the recent policies placing farming at the heart of Africa's economic development and promoting public investment in the sector are key to developing agriculture across the continent. However, more needs to be done to improve the poor structural governance seen in some African governments: although the private sector dominates the agriculture sector, its success is only made possible with public investments and policies.

"The past norm in African countries has been poor governance with respect to the agricultural transformation. Poor government performance has been in part associated with past foreign aid efforts at reducing the size and scope of government. Those policies were felt quite harshly by the agriculture sector, which depends heavily on government actions, and thereby inhibited the growth of the small-scale commercial private sector that dominates the sector," AGRA said. "Fortunately, more recently these foreign aid policies appear to have been reversed. However, the quality of governance continues to be poor in many African countries."

According to AGRA, Ethiopia, and to a slightly lesser extent Rwanda and Ghana, are positive examples for the continent when it comes to successful large-scale agricultural expansion. For the past 25 years Ethiopia has recorded sector growth above the 6% target defined by the CAADP. The East African

Recent policies placing farming at the heart of Africa's economic development and promoting public investment in the sector are key to developing agriculture across the continent.



Production of cereal, grain, horticulture crops and livestock has the potential to be up to three times higher

nation has massively invested in its agriculture, including in irrigation (see analysis) and made the CAADP the “core of its agricultural plan”. This has resulted in a 50% reduction in rural poverty.

According to Thomas Jaïne, professor at Michigan State University, public investments in the agricultural sector have had a direct and measurable impact on productivity. Jaïne stated that recent yield improvements were observed in countries that embraced the AU’s CAADP scheme, especially in Ghana, Rwanda, Ethiopia and Burkina Faso. Nations that have implemented the AU goals most quickly, such as Ghana and Rwanda, have seen their yields increase by 6% per year on average, compared to 4.5% in those countries that adopted the scheme with less general expediency.

**RECENT PERFORMANCE:** Agriculture contributed more than \$100bn to Africa’s GDP in 2016. The sector accounts for 15% of the continent’s GDP on average, but its contribution varies greatly from one country to another. For example, according to the UN Food and Agriculture Organisation (FAO), agriculture accounts for 3% of the GDP in Botswana and South Africa, compared with more than 50% in Chad, 40% in Ethiopia and 20% in Nigeria.

Partly due to years of underinvestment, Africa has yet to fully realise its agricultural potential. According to the IFPRI, sub-Saharan Africa has “significantly improved its agricultural performance since the mid-1990s”, but the continent is still lagging behind the rest of the world in terms of land yields.

The region’s agricultural productivity is about half the average growth seen in other developing nations. Modest yields result in large part from low use of fertilisers and improved seeds, a lack of mechanisation and the fact that most still have smallholder farms, preventing them from making the profits necessary to access appropriate bank loans and invest funds back in their own plantations.

According to global management consulting firm McKinsey, the production of cereal, grain, horticulture crops and livestock in Africa has the potential to be two to three times higher than its current level if the continent continues to concentrate on intensifying its agricultural productivity.

“Over the last three decades, increases in agricultural output in Africa have come largely through extending rain-fed crop cultivation, particularly food crops, on to more and more marginal soils and/or by reducing traditional fallow periods in cropping cycles,” the AfDB said. “Unfortunately, raising the productivity of crop enterprises through intensification per unit of land cultivated – for example, through increasing crop yields per ha – has not been adequately promoted as a beneficial, important household food security strategy.”

In addition, in many cases crop expansion has been carried out at the expense of the environment (see analysis). For instance, Côte d’Ivoire has lost about 80% of its rainforests since the 1970s, mostly because of cocoa production, with as much as 40% of cocoa crops believed to come from protected forests that have been burned down by farmers in order to plant trees. Similar problems have been identified with other cash crops like palm oil and rubber in West and Central Africa. Forest resources have also been destroyed for fuel wood.

**HEADWINDS:** Africa’s small-scale farming industry faces a number of obstacles preventing it from playing a more prominent role in transforming the continent’s economy, increasing production and boosting the income of the rural population, which makes up the majority of the farmers’ workforce. According to the FAO, tractors are used in only 5% of the cultivated land in sub-Saharan Africa, compared with 60% in Asia. It is estimated that 75% of African farmers work on plantations using only hand tools.

The use of fertiliser is also very low by global standards. Africa’s consumption of fertilisers currently accounts for only 3% of the world’s consumption. Sub-Saharan Africa alone accounts for 2% of the global consumption and fertiliser usage was just 15kg per ha in 2017. Though it has increased from 9 kg per ha used in 2009, it remains remarkably low compared to other developing nations. For example, fertiliser use is at 278 kg per ha in Bangladesh. It is estimated that on two-thirds of Africa’s arable lands, farmers do not have the necessary inputs to maintain soil fertility, meaning the use of improved varieties are only evident in relative gains in yields.

The trend is similar when it comes to irrigation. Currently, only 6% of the continent’s arable land is irrigated. This is compared to 14% in South America and 37% in Asia. This has improved slightly over the past few years: total agricultural surface equipped with irrigation systems increased by a modest 1.5% in the 25 years from 1990 to 2015. This means that African agriculture is mostly rain-fed, making farmers particularly vulnerable to climate change and extreme weather events. In a column on the World

Recent policies placing farming at the heart of Africa’s economic development and promoting public investment in the sector are key to developing agriculture across the continent.

Economic Forum, the Export Trading Group listed four main obstacles holding back Africa's numerous smallholder farmers: government policy and infrastructure; financing; education; and climate change.

Some progress is being made regarding the first three challenges. In the early 2000s, under the AU's CAADP programme, African countries started to define agriculture as the centre of economic development. Although governance is still considered to be poor, there is a general acknowledgment that the new strategy is heading in the right direction.

Although much remains to be done, recent years have seen considerable investment in infrastructure, including in the road networks. Microfinance and mobile banking are providing increasing numbers of solutions to help farmers get access to funds and loans they would not normally be able to procure from traditional financial institutions like banks. Development institutions and multinational commodity companies have multiplied training and capacity building schemes aimed at farmers.

Climate change is a concern at the forefront of many new processes and regulations. Of the 10 countries considered most vulnerable to climate change, eight are located in Africa, according to the ND-GAIN Vulnerability index, which was published by the US-based University of Notre Dame.

African countries are particularly vulnerable because farming is mostly rain-fed and often practised in higher-risk areas such as flood plains, deserts and hillsides, which can contribute to excessive heat, erratic rainfall, proliferation of disease and extreme weather events. For example, in 2016 the most severe drought in decades hit East and South Africa, leaving about 36m people facing hunger.

**FOOD SECURITY:** Climate change in particular represents a major challenge in efforts to improve food security on the continent. The IFPRI estimates that though 209.5m people in sub-Saharan Africa were at risk of hunger in 2010, that number is expected to decline by 10% as food production is forecast to increase by around 60% by 2050. However, climate change will likely hamper these improvements. Indeed, without the effects of climate change, the number of people at risk of hunger in sub-Saharan Africa could be reduced to 150m; roughly 38m more people will be at risk of hunger than would have been the case without these weather changes. Another effect of climate change is that the malnutrition rate for children under the age of five is expected to rise to 24.4% by 2050 from 21.7% currently.

At the same time, food needs are projected to grow significantly across the continent. Africa's population, currently sitting at about 1.3bn, is expected to double by 2050. This means that African nations will have to boost their food production if they want to prevent food insecurity from surging and the agricultural trade deficit from worsening. Indeed, even if exports have increased, they have been offset by even bigger growth in imports, causing Africa's agricultural trade to deteriorate in recent



The value of agricultural production in sub-Saharan Africa increased by 130% between 1990 and 2013

years. All regions of the continent – excluding South Africa – reported a deficit in their agricultural trade between 2001 and 2013. Countries in sub-Saharan Africa currently import approximately \$15bn in food crops, including grains, edible oils and sugar.

The country is also becoming increasingly urbanised, and the wealthiest and fastest-growing countries are seeing the emergence of a strong middle class. These shifts mean that dietary patterns are also shifting and the demand for protein is increasing in response to these changes.

According to McKinsey, consumer spending will likely rise by \$645bn between 2015 and 2025, including by \$167bn for food and beverages. The food products market could be worth \$1trn by 2030.

**CROP STRUCTURE:** Its diverse range of agro-climatic conditions allows Africa to grow a wide assortment of agricultural products including food crops, cash crops and some livestock. Grain is the continent's largest commodity, accounting for 14% of the world's production, according to the OECD-FAO "Agricultural Outlook 2018-27" report. Maize is the most important staple crop, and other important staples include rice, potatoes, sweet potatoes, cassava and plantains. Africa also has well diversified export crops – from citrus, dates and olives in North Africa to cocoa, cotton, peanuts and cashew nuts in West Africa, palm oil in West and Central Africa and flowers, coffee and vanilla in East Africa.

The total value of agricultural production in sub-Saharan Africa increased by 130% between 1990 and 2013. The crops segment accounted for 85% of total production value in the period. West Africa accounted for more the 60% of the total value of agricultural production in the region and Southern Africa accounted for roughly 22%. The production mix varies significantly from one region to another. In West Africa roots and tubers account for 46% of the total production, followed by fruits

Agriculture contributed more than \$100bn to Africa's GDP in 2016. The sector accounts for 15% of the continent's GDP on average, but its contribution varies greatly from one country to another.



Poultry continues to account for the biggest share of livestock production across sub-Saharan Africa

and vegetables (19%), cereals (19%), cash crops (6%), oilseeds (5%) and pulses (3%). In Central Africa, oilseeds account for 50% of the total output, followed by cash crops (14%), cereals (13%), fruits and vegetables (10%), roots and tubers (7%) and pulses (5%). In East Africa roots and tubers account for 32% of the total output, followed by cereals (31%), fruits and vegetables (18%), cash crops (10%), pulses (5%) and oilseeds (4%). In South Africa, fruits and vegetables continue to have by far the biggest share of production, with 52% of the total, followed distantly by cereals (26%), cash crops (8%), roots and tubers (7%), oilseeds (5%) and pulses (0.4%).

**ANIMAL FEED:** Poultry continues to account for the biggest share of livestock production in sub-Saharan Africa, however, there are important and notable differences by regions. In West Africa poultry represents the largest production with 27%, followed by sheep and goat (24%), beef (23%), dairy (11%) and pork (9%). In Central Africa the largest output also comes from poultry (46%), with dairy (10%), beef (6%), sheep and goat (2%), and pork (1%) coming next. In East Africa dairy accounts for the biggest production (45%), followed by beef (18%), pork (16%), poultry (12%), and sheep and goat (6%). Lastly, in Southern Africa, poultry is coming first with a share of 45%, followed by beef (26%), dairy (14%), sheep and goat (8%), and pork (5%). Livestock production systems are “largely extensive, with pasture-based ruminant production often the only system able to add value in semi-arid areas,” the FAO-OECD report states, adding that “often the movement of livestock in line with seasonal changes and fodder availability remains the only way of securing feed for large herds.” On the contrary, in South Africa, Zambia and Tanzania, vertically integrated, intensive poultry operations that link commercial feed grain producers to feed mills abattoirs and wholesalers targeting urban consumption dominate the industry.

As for fisheries and aquaculture, sub-Saharan Africa’s fishery production accounts for 4% of the world’s total output. The industry operates well but growth prospects are limited, as it faces major challenges, including poor management of fish stocks, lack of knowledge, limited development of small-scale fisheries, weak institutions and scientific research, lack of infrastructure and climate change, the OECD-FAO report said.

**FORECAST:** The “OECD-FAO Agricultural Outlook 2018-2027” report anticipates robust growth in agricultural production in sub-Saharan Africa will develop throughout the next 10 years, forecasting that crop production will increase by 30% as cultivated areas for maize, soybeans and sugarcane expand and productivity rises thanks to an increased use of fertilisers, pesticides, improved seeds, irrigation and mechanisation, it said.

The OECD and FAO also expect meat production to grow by 25%, dairy output by 25% and fish production by 12%. Palm oil output is anticipated to increase by 22% over the next decade due to productivity gains, while cotton, sugarcane and sugar will see their production growing by approximately 33%, 18% and 34%, respectively, according to the report. “Even with the projected strong growth, the region’s ability to produce food will continue to depend on global markets as domestic production capacity will remain insufficient to meet the region’s growing consumption needs,” it said.

In addition, the organisations stated that new challenges – including the recent outbreak of fall armyworm that affected nearly 30 nations across the continent – could end up putting at risk any increased production that is planned for maize, rice, sorghum, sugarcane and soybean.

As for North Africa and the Middle East, the OECD and FAO both project agricultural and fisheries output to rise by 16% over the coming decade to 2029. However, “greater agricultural production will depend on innovation to enhance productivity growth in the face of scarcity of water and arable land across the region,” it said.

**INVESTMENT:** Driven by the AU’s CAADP scheme, public investment in agriculture has consistently increased across African countries since the 1990s. Investment from government rose by 15% from 1995 to 2014, going from an average of \$186.4m per country in the 1995-2003 period to \$219m on average in the 2008-2014 period. If all the countries meet their pledges to invest 10% of their annual budget in agriculture, public spending for the sector across the continent would reach \$40bn, an increase from \$12bn currently, Jaïne told OBG. “The composition of public investment in agriculture matters greatly. The evidence shows that investments in roads, rails and ports, agricultural research and development, and effective extension systems powers agricultural growth as well as poverty reduction much more effectively than investments that crowd out the private sector, such as input subsidy programmes.”

Food production is forecast to increase by

**60%**

by 2050

## YOUTH IN AGRICULTURE

The ageing workforce of Africa's agriculture sector will be one of its key challenges in the medium term. According to the UN Food and Agriculture Organisation (FAO), the average age of African farmers is currently 60 years old. In many cases, farmers across the continent are struggling to convince their children to take over when they retire. Low incomes and the inherent difficulties of farming in rural areas are pushing many young people to take their chance and move to sprawling urban centres to find a job.

However, unemployment is extremely prevalent among Africa's youth. The African Development Bank estimates that only around 3.1m new jobs are created each year – which is equivalent to roughly one-quarter of the 12m young people who are entering the workforce annually in Africa. Indeed, the continent has the youngest population in the world, with an estimated 60% of people under the age of 25. Unemployment or underpaid jobs are driving millions of youth into poverty each year, pushing some to take significant risks to migrate to Europe.

In this context, agriculture is increasingly seen as key to providing jobs for Africa's youth and convince them to stay in their countries and the rural areas in particular. "Africa's youthful workforce could open up a wide range of economic opportunities with the right mix of policy and public investments," Thomas Jaïne, a professor at Michigan State University wrote in 2016. "Conversely, if governments do not pursue policies that make agriculture attractive to youth, the result will be widespread youth unemployment and disillusionment. Government policies and public investment can make agriculture much more attractive to young people."

Innovations can play a major role in that objective. ICT is increasingly being used in Africa's agriculture sector, often through smart or precision farming. New technology could be an effective way to lure young people towards the sector. "Innovative ways of facilitating youth participation in agriculture have the potential to drive widespread poverty reduction among youths and adults alike," the FAO and OECD said in their "Agricultural Outlook 2018-27".

The report also asserted that a coherent and integrated approach that focused on addressing the existing obstacles related to "education, land access and tenure, access to financial services, access to markets, access to green jobs and involvement in policy dialogue has the potential to make the agriculture sector more attractive to young people, providing the additional push that may be needed for them to enter the sector."

According to McKinsey, sub-Saharan Africa (excluding South Africa) will need to increase the use of fertilisers and improved seeds by eight and six times, respectively, to unlock its full agricultural potential. At least \$8bn of investment in basic storage and \$65bn spending on irrigation will be necessary in order to boost total irrigated area to 15% from its 2019 level of 5%. Furthermore, additional investment will be needed in basic infrastructure such as roads, ports and power.

**WORKFORCE:** It is estimated that more than 60% of the sub-Saharan population is comprised of smallholder farmers. Although the number of medium-sized – which span 5 ha to 100 ha – farms is rising, small-scale plantations still account for the vast majority of cultivated land throughout the continent. In Nigeria there are currently fewer than 100 farmers throughout the whole country who operate at least 50 ha of land.

Small-scale commercial farmers, who own cultivated farms bigger than subsistence farming, produce about 85% of Africa's agricultural output, while the remaining 15% comes from subsistence farmers and large-scale plantations. Though many of Africa's subsistence farmers live below the poverty line, this is not necessarily the case for small-scale commercial farmers. However, the lack of education, difficulties in gaining access to funding and the low use of inputs can all have a substantial and negative impact on productivity levels.

In many African countries women account for at least half of the labour force. The average age of farmers in Africa is 60 years, according to the FAO. However, this may change in coming years as the increased use of technologies in agriculture on the continent, especially in precision farming, may assist young people and women in moving into farming.

**FINANCING:** Beyond public investment, access to finance is a major issue for most of the continent's farmers, especially for smallholders. Estimates show that only about 10% of African households in rural areas are connected to formal financial institutions.

However, innovations such as microfinance and mobile banking are opportunities to boost African farmers' access to loans. As mobile penetration has increased to reach 44% in 2017, local entrepreneurs and international institutions have developed digital financial solutions for Africa's farmers.

These solutions are wide in scope and variety, including products like e-wallets that can be used as business accounts by farmers or mobile phone apps, such as FarmDrive, that can help farmers to develop much-needed credit history.

Mobile applications providing micro-insurance and index-based crop insurance are also being developed across emerging markets, including Africa. The World Bank, for example, is developing an index-based agricultural insurance in Côte d'Ivoire for Ivorian farmers who are increasingly vulnerable to climate change and extreme weather events. A pilot phase was launched in 2018 for four

As mobile penetration has increased to reach 44% in 2017, local entrepreneurs and international institutions have developed digital financial solutions for Africa's farmers.

About 85% of Africa's agricultural output comes is produced by small-scale commercial farmers, while the remaining 15% comes from subsistence farmers and large-scale plantations

crops – cocoa, cotton, rice and corn. The World Bank listed index insurance as a good tool to improve the farmers' resilience, helping them boost their yields and get access to desirable funding.

**CULTIVATION:** Africa has vast swathes of uncultivated area. In 2013 the World Bank said the continent had 200m ha of suitable land that could be used to grow crops, which is almost half of the world's usable and uncultivated land. However, the region faces major issues hindering the development of additional land. Over 90% of rural land in Africa is undocumented, making it vulnerable to land grabbing. In Côte d'Ivoire, where most of the rural area indeed remains unregistered, the land continues to be extremely fragmented, making it difficult to develop profitable businesses on some of the larger plots of land. In Egypt, meanwhile, almost 85,000 acres of agricultural land have been lost to illegal construction projects since the 2011 unrest, according to data from the Ministry of Agriculture. This prompted the Egyptian government to crack down on people building illegally on farmland. In some countries, women are also banned from land rights due to customary laws that are regularly enforced.

Recent analysis cited in an article from consulting firm McKinsey said the majority of the unused land across Africa is located in areas barely reachable due to poor road networks and infrastructure, while some others are located in conflict or forest areas. It is estimated that only approximately 20m to 30m ha of additional land in sub-Saharan Africa - which is mostly located in nine countries and would represent a potential increase of 10% - has the potential to be turned into cultivated area in the shorter-term.

Large land deals are also under rising scrutiny in Africa. In 2018 India's Karaturi Global asked for compensation from the Ethiopian government, which had cancelled the company's lease, saying it failed to reach progress targets. According to McKinsey, 420 large agricultural deals, that each span 10m ha have been signed in Africa during 2000-16, but few of them have yet to be effectively implemented.

**VALUE ADDITION:** Most countries in Africa have a greatly underdeveloped agro-industrial sector. That means that Africa's exports are mostly comprised of raw products like agricultural commodities, including cocoa and coffee, and that finished goods account for the majority of the continent's many imports. According to the AfDB, "little attention has usually been paid to the value chain through which agricultural commodities and products reach the final consumers within the country and abroad. This neglect results in enormous potential losses of value-added and employment opportunities." In the areas of Africa that are considered more rural, agro-processing is usually non-existent or quite basic, a fact that can sometimes result in significant harvest losses, the bank said.

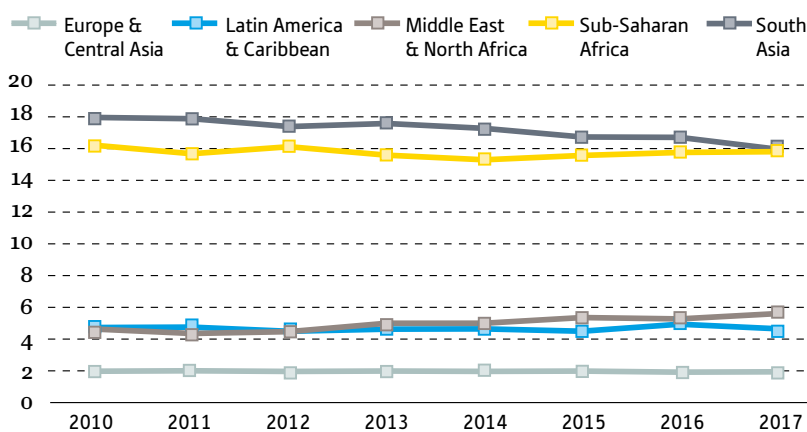
In 2014 Carlos Lopez, former executive secretary of the UN Economic Commission for Africa, said that scaling up agribusiness could be the next growth frontier, potentially lifting many people in rural areas out of poverty and creating a good number of jobs. He called on the government to offer incentives to boost private investment, encourage competitiveness and increase investment in infrastructure, which in turn would help to "overcome the current challenges associated with poor access between farm-level production and downstream activities".

In Côte d'Ivoire, the government has been trying for a long time to develop local processing of cocoa beans, but the country still exports mostly raw or semi-processed product. Over the past several years, the government has granted some incentives to processors, but the nation still faces challenges when it comes to developing its agro-industry, mostly because of low overall competitiveness.

**OUTLOOK:** Despite the challenges ahead, prospects for Africa's agricultural sector are relatively positive. UN institutions expect cultivated areas to expand and farmers to increase their use of inputs, such as fertilisers, pesticides, improved seeds, irrigation systems and mechanisation. Innovations and greater access to technologies are expected to aid in developing smart and precision farming techniques and promoting their widespread use.

Despite increased production, food security will continue to depend on global markets and significant imports of finished goods for the medium term. Contributing to this, food consumption is projected to surge as the population is expected to double by 2050 and become increasingly urbanised. At the same time, the continent is facing growing challenges. Climate change is anticipated to be the most influential and is already directly affecting millions of farmers and households across the continent. In this context, experts have called for African governments to increase investment in the sector, including in infrastructure and agri-business and to continue improving their policies and governance. These changes would encourage agriculture to truly transform into one of the strongest pillars of Africa's successful long-term economic development.

Agriculture, forestry and fishing value added, 2007-17 (% of GDP)



Source: World Bank



Technology will help boost farmers' resiliency to climate change

# Farms of the future

## Adoption of technology and precision farming set to give the agricultural sector an enthusiastic boost

With a start-up ecosystem focused on agricultural issues faced by African farmers, the use of digital and precision farming has been growing rapidly across the continent. In the face of low but slowly growing productivity levels and threats from climate change, technology is an essential tool to help African farmers boost yields and lift millions out of poverty.

**FARMERS' CHALLENGES:** African farmers face a number of notable challenges. First, while African governments have implemented policy instruments to increase farm productivity, these initiatives resulted in minimal improvements to yields, with many farmers still using traditional agricultural methods and tools such as hoes or cutlasses. Additionally, a lack of farming advice and weather information has had a significant negative impact on crop yields. Some studies suggest that green revolution policies, which focus on improved seeds and supplies, may harm low-income farmers who cannot afford to take out credit for the purchase of new seeds.

In recent years these issues have been exacerbated by climate change. Indeed, African farmers are facing growing risks linked to climate change, including significant production and income volatility. This is particularly serious given the fact that the majority of African farmers own small-scale farms – generally less than 2 ha – and are dependent on rain-fed and groundwater methods, increasing vulnerability to the effects of climate change and natural disasters.

According to the International Food Policy Research Institute (IFPRI), climate change will neutralise any anticipated improvement in agricultural productivity in sub-Saharan Africa. It is projected that climate change will lead to an additional 38m people facing hunger by 2050 as child malnutrition rises, from 21.7% in 2013 to an estimated 24.4% by 2050.

**PRECISION FARMING:** With climate change taking a toll and a rapidly growing population straining the current food supply, technology will be useful in boosting African farmers' resiliency to climate shocks and helping

them cope with increasing demand for food. Precision farming – which is the integration of technologies into farming practices to manage variables such as field variations, soil conditions and weather more accurately – is one such technology that will be key, as it allows growers to use a sophisticated range of tools including drones, satellite data and soil sensors.

While precision farming was picked up quickly in markets like the US and Europe, African farmers' lack of capital, low literacy rates and smallholder status have led to slower adoption rates on the continent. This is slowly changing as the cost of technology drops and mobile phone penetration rates surge. The potential is substantial, as the World Bank noted in a 2014 report, highlighting the application of ICT in agriculture in Africa is “the best opportunity for economic growth and poverty alleviation on the continent”.

In recent years non-governmental organisations, international institutions, multinationals and African entrepreneurs have been developing solutions specifically tailored to small-scale farmers in the region, transforming agriculture across the continent. “The barrier of entry into farming technology has dropped as cloud computing, computing systems, connectivity, open-source software and other digital tools have become increasingly affordable and accessible,” Ndubuisi Ekekwe, founder of the non-profit African Institution of Technology, wrote in the Harvard Business Review in 2017. “Entrepreneurs can now deliver solutions to small-sized African farms at cost models that farmers are able to afford.”

**MOBILE APPS:** Precision agriculture applications include digital advisory services, drip irrigation combined with soluble fertilisers, solar-powered pumps, soil and crop monitoring by humans or drones, and farm machinery guidance using positioning and mapping technology. Such applications can provide information on weather and growing conditions, crop prices and ideal harvest times. One such app is Zenvus, a Nigerian

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Precision farming allows growers to use a range of tools including drones, satellite data and soil sensors

# 60%

of Africa's population is under 35

start-up founded by Ekeke that uses electronic sensors to collect and analyse soil moisture levels and nutrients. Zenvus provides farmers in the continent's most populated country with guidance on fertilisers, irrigation and planting timelines. Among other companies developing precision farming tools in Africa is AgroCenta, an online platform that provides smallholder farmers in Ghana with access to finance and the wider supply chain, as well as information on the weather and market. With its AgroTrade application, farmers can sell their crops online to large companies including breweries and feed manufacturers.

Non-profit and international institutions have also developed similar applications and strategies. In Kenya, Ethiopia and Rwanda, US-based Precision Agriculture for Development provides agricultural updates and tips to farmers through SMS messages and phone calls. According to the organisation's 2013 study, its instructions increased yields of sugar cane by 11.5% compared to farmers that did not receive its advice.

In June 2017 the UN Food and Agriculture Organisation (FAO) launched four agri-apps to provide growers with better agricultural services. Cure and Feed Your Livestock gives real-time information on animal disease and feeding strategies; e-Nutrifood provides information on nutritious foods to successfully fight malnourishment; Weather and Crop Calendar provides information on weather, crop and warning system for risks; and AgriMarketplace connects producers and traders in order to facilitate sales.

**DRONES:** The expansion of precision farming throughout Africa is also made possible by the increased use of drones that provide aerial images, making it possible to assess and manage production in real time. In South Africa agri-tech start-up Aerobotics uses drone imagery and artificial intelligence to identify pest and diseases in tree crops such as macadamia nuts. In West Africa, Senegalese start-up GeoRisk Afric is also using drones to provide cartography, risk management for natural

disasters and environmental assessment services. According to Malick Diagne, the head of GeoRisk Afric, "The use of drone services will bring significant added value, especially as Senegalese agriculture is heavily dependent on rainfall. This would allow state authorities in charge of agricultural management to benefit from accurate, reliable data allowing them to manage campaigns for the distribution of agricultural inputs."

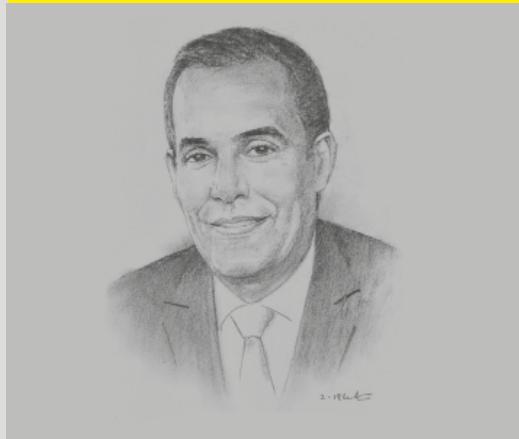
**FINANCIAL SOLUTIONS:** With mobile penetration rising throughout sub-Saharan Africa, reaching 44% in 2017 and up 25% from a decade prior, digital financial solutions for farmers have been developed to grant underserved farmers access to credit. In Kenya for example, FarmDrive uses mobile phones, data and machine learning to help smallholder farmers receive lending from banking institutions. Agri-wallet is a mobile financial tool that provides mobile business accounts that farmers can use to save, borrow and pay in Kenya. The e-wallet, in which farmers can be paid for their sales, uses a virtual currency based on blockchain technology to help growers get access to short-term banking loans through Netherlands-based Rabobank.

**ATTRACTING YOUTH:** With 60% of Africa's population under the age of 35, the continent has one of the youngest populations in the world. The youthful population, however, is struggling with high levels of unemployment. According to the African Development Bank, only 3.1m jobs are created each year for the 12m youth entering the workforce. As such, nearly one-third of Africa's 430m youth are unemployed, while another third are vulnerably employed. The organisation estimates 263m young people in Africa will lack an economic stake in the system by 2025. High levels of youth unemployment and underemployment are among the main causes of migration flows from Africa to Europe, with many young men and women taking significant risks to cross the Sahara Desert and the Mediterranean Sea in order to reach Europe.

One major advantage of using ICT in agriculture is that it can provide an appeal for young people who are unemployed in sprawling cities to return to the land and turn to farming as a business on a continent where the average age of farmers is 60. The FAO noted that targeting youth was one of the primary reasons for launching its precision farming apps in 2017. "In Africa agriculture is predominantly an occupation for the aged," Jim Bakoume, the founder of the Cameroon start-up AgroSpaces said. "Young people shy away from going into farming because of a perceived mind set." Bakoume's enterprise and others are "changing this mind set by making agriculture more attractive to the younger generation with the use of technology and innovation, thus empowering increased youth employment in the agricultural sector".

The adoption of technology is set to play a significant role in mitigating the effects of climate change and attracting a new generation of youth to farming in Africa. Through precision farming, mobile apps and drones, governments and others in agriculture hope the sector will increase profitability, sustainability and attractiveness as a profession in the years to come.

High levels of youth unemployment and underemployment are among the main causes of migration flows from Africa to Europe, with many young men and women taking significant risks to cross the Sahara Desert and the Mediterranean Sea to reach Europe.



Karim Lotfi Senhadji

# High-potential yields

Karim Lotfi Senhadji, CEO, OCP Africa, on unlocking Africa's untapped agricultural potential to meet global demand

## What structural challenges can Africa's agricultural development help to resolve?

**SENHADJI:** Today, these challenges are global issues, as we are 7bn inhabitants worldwide, and forecasts predict that we will be more than 9bn by 2050. Taking into account this evolution and changes to consumption patterns in some developing countries, we will need to double grain production to feed the global population. Given that production in most developed markets has already reached optimal yield levels, Africa is the only market that will be able to meet this growing need for food in the years to come.

Africa accounts for 4% of total agricultural production, yet 60% of the world's unused, arable lands are in Africa. In addition, four-fifths of its population work in agriculture, and the continent has substantial water resources, which is the foundation of its development potential. By 2050 half of the world's population growth will be occurring in Africa. It will be necessary not only to feed these people, but also to find work for them, and agriculture can help to solve both these challenges.

Africa currently imports \$40bn worth of food products. If no structural changes occur, this will rise to \$110bn by 2030. Local agriculture must address the need to reach self-sufficiency in food products. Reaching a balance in trade by 2030 is achievable and a priority. The second step will be to become a food exporter.

Lastly, we need to focus on the development of agri-business. With a few exceptions, there is virtually no local processing in Africa. The example of cocoa is alarming: Côte d'Ivoire and Ghana together account for 60% of global production, but only get 5% of the world's chocolate profits because there is no local processing.

## How can public-private partnerships (PPPs) help to unlock Africa's agricultural potential?

**SENHADJI:** All actors must be aware of the issues at stake and share a common vision. It is crucial that the continent move from subsistence farming to

competitive and commercial agriculture. To do this, it will be necessary to reinforce PPPs.

At the moment, measures are being taken to help farmers and regional agricultural institutions better understand their soils. This is a necessary starting point for using the right fertilisers and optimising agricultural yields. Next, we must find connections with markets and develop a full ecosystem around the farmer. This will involve finding input producers, micro-finance and insurance underwriters, and output buyers who can guide farmers through the sale of their products. Long-term solutions must also be identified so that farmers have the proper tools to work independently. In addition, private companies must bring their know-how to governments to assist them in formulating public agricultural strategies and training staff.

## In what ways could new tools help to enhance farming productivity across Africa?

**SENHADJI:** Agricultural technologies will play a key role in the years to come. For instance, they will help us to overcome logistical difficulties by connecting various actors: we will set up a virtual platform to encourage investors to finance real logistics infrastructure by making them aware of both the state of the market and the insured returns on investment.

Innovative tools will also help us to be more precise, and we will move to techniques that make the most of the soil while treating nature sustainably. African soils have been subject to a lot of deforestation, and now climate change is also having a major impact. We must keep our soils in a state of maximum productivity, and technology will enable this, with faster, more accurate and less expensive analyses.

Lastly, technologies will make it possible for farmers to access information and adapt their production cycles to the weather. The mobile penetration rate is currently around 60% in Africa and increasing quickly, which should accelerate agricultural connectivity significantly.



Agnes Kalibata

## Cultivation on the continent

Agnes Kalibata, President, Alliance for a Green Revolution in Africa, on tailored approaches and policies to increase agricultural production and investment

### How can Africa's agriculture industry be improved?

**KALIBATA:** It is important that governments prioritise investment in infrastructure to drive agricultural productivity, open up markets and increase private investment in the sector. Without infrastructure, the sector cannot grow. A lack of infrastructure is a particular issue in rural areas, which are the centre of agricultural production. Rural areas need roads, especially feeder roads, in order to connect farmers to input and output markets. Infrastructure for post-harvest handling of produce, including aggregation facilities where farmers collect their produce for sale and drying infrastructure to reduce post-harvest losses, is also needed. Additionally, irrigation infrastructure is key to securing yields in the event of drought. This area has huge potential as less than 6% of Africa's arable land is irrigated.

Moreover, investment in energy infrastructure is a critical stimulus for industrialisation. This will require investment in affordable energy infrastructure, as one of the key constraints to manufacturing in Africa and growth of the industrial sector is the cost of energy and the resultant lack of competitiveness.

### What kinds of policy can further encourage the development of irrigation systems in Africa?

**KALIBATA:** Irrigation in Africa is constrained by three main factors: First, the irrigation models available focus on large-scale activities, whereas 80% of African farmers are smallholders. Second, the skills base to develop irrigation technologies is very weak. Third, the financial requirement in terms of capital investment is huge. Achieving food security calls for a shift from over-reliance on large-scale irrigation to a hybrid that accommodates the needs of small-scale, household farms. This is becoming increasingly possible as technologies like solar-powered water pumps are made available to help smallholder farmers adapt to the changing climate.

Governments should also provide financial incentives and make accessing irrigation affordable to farmers.

Large-scale irrigation can also benefit from government support through a reduction in the cost of equipment by removing taxation and providing affordable financial tools. This will encourage the private sector to invest in irrigation. Africa should explore a large-scale irrigation infrastructure model that allows farming communities across the continent to connect and use water at a fee. This is a common model in Asia, and as a result, 44% of Asia's agriculture is currently irrigated.

### To what extent does land ownership impact land use for agricultural purposes?

**KALIBATA:** Very few African countries have policies that define how land is used between competing needs. As a result, most developments are not a product of a well-planned process. There is therefore a need to thoroughly define land ownership, as it impacts how farmers think about the value of land and what they could use it for. For example, Rwanda, despite having one of the lowest amounts of land per capita in Africa, has a completely liberalised land policy. This framework acts as an incentive for households to obtain financing to invest in land improvement – for instance, by investing in better seeds, fertilisers and other technologies. However, even under such an organised system, there is still work to be done on plot allocation for agricultural purposes to ensure optimal land use.

### How else can smallholder farm yields be increased?

**KALIBATA:** Smallholder farming in Africa depends a lot on rain-fed agriculture. A green revolution in Africa would have to be backed up by solid knowledge of agro-ecology as the continent's lands are extremely diverse. Farmers would need better-performing seeds and fertilisers, and better access to financial instruments that enable them to acquire technologies, including those that reduce harvest loss. More importantly, farmers will need access to structured markets to grow their business and to farm sustainably.



Africa's consumption of fertiliser stands at 7.6m tonnes per year

# From the ground up

## Modernisation policies and a growing population expected to lead to increased levels of fertiliser usage across the African continent

Though Africa has the lowest rate of fertiliser consumption in the world, it has vast areas of uncultivated land on which most farmers engage in subsistence farming on plots of less than 2 ha. Heightened use of fertilisers will be essential in increasing agricultural productivity, which remains weak across the continent. As the population and demand for food grows rapidly and investment from companies increases, industry analysts expect consumption to rise substantially in the next 15 years.

**LOW CONSUMPTION:** Africa's consumption of fertilisers is low by global standards and measures under 5% of that utilised in Asian and Latin American countries. Consumption for the continent stands at 7.6m tonnes per year, or 3% of the global consumption. There are regional differences as well, with Southern Africa consuming 34% of fertiliser on the continent, followed by West Africa (33%), East Africa (30%) and Central Africa (3%). East and West Africa are expected to have the highest future levels of usage rates in sub-Saharan Africa, with consumption in West Africa set to more than double to 4.6m tonnes a year by 2030, up from 1.9m tonnes in 2018, according to London-based commodity analysis firm CRU.

In a bid to increase fertiliser usage rates, in 2006 government leaders signed the Abuja Declaration on Fertiliser for an African Green Revolution, which called for countries to increase fertiliser use from an average of 8 kg per ha in 2005 to 50 kg per ha by 2015, so as to improve productivity and meet growing demand for food. The continent, however, missed the target. According to Côte d'Ivoire-based African Development Bank (AfDB), consumption of fertilisers across Africa increased slightly from 25 kg per ha of arable land in 2010 to 27 kg per ha in 2018. In sub-Saharan Africa, consumption was around 15 kg per ha in 2017, up from about 9 kg per ha in 2010, but still below the Abuja target, according to the International Fertiliser Industry Association (IFA).

To compare, the fertiliser usage is at about 1600 kg per ha in Malaysia, 1300 kg per ha in Hong Kong and 278 kg per ha in Bangladesh, according to *Africa Renewal*, a publication managed by the UN.

The small-scale and fragmented nature of African farming has prevented the wider use of fertilisers. Family farming accounts for 90% of agricultural activity in Africa and smallholders usually struggle to access credit from banks. As a consequence, many farmers still lack the required funds to upgrade and invest in their plantations. Second, although it has improved in recent years, distribution networks remain quite poor. Lastly, as noted by the African Green Revolution Forum, the continent has failed to establish harmonised policies and a regulatory framework that allows increased consumption to be possible. These include measures such as tax breaks and the elimination of tariffs and other barriers of trade, the organisation said.

**ANTICIPATED GROWTH:** Although fertiliser consumption remains low, the annual growth rate forecast for the 2015-20 period is 3.9%, one of the highest globally, the AfDB said in a June 2018 report. In 2018-19 the highest rate of growth for demand of fertilisers is anticipated to be in Africa, followed by Eastern Europe, Central Asia and Latin America, the IFA said in its 2018-22 outlook. Demand in sub-Saharan Africa alone is expected to grow by 8% annually through to 2021. According to CRU, annual fertiliser consumption on the continent will nearly double in the next 12 years, reaching 13.6m tonnes in 2030, up from 7.6m tonnes in 2018.

"Although Africa as a whole accounted for 3% of world consumption in 2016, of which 2% is for sub-Saharan Africa, the fast-rising demand from rapid population increase and food deficits offers bright future prospects," the AfDB said in its 2018 study. "Opportunities for increased production of fertilisers in Africa abound. For example, West

Family farming accounts for **90%** of agricultural activity in Africa

Although fertiliser consumption remains low, the annual growth rate forecast for the 2015-20 period is 3.9%, one of the highest globally.



As demand for food grows rapidly, analysts suspect consumption to rise substantially in the next 15 years

Africa's vast and largely untapped natural gas resources make the region ideally suited for the manufacture of nitrogen fertilisers. It also has ample deposits of phosphorus and already exports the mineral to Europe and India. If these minerals can be utilised in local production, Africa would need to import only potassium fertiliser."

After the 2008 launch of the Green Morocco Plan, a strategy to modernise the country's agriculture sector, demand for fertilisers increased, with consumption per ha of arable land reaching 71 kg in 2015, up from 57 kg in 2010. Morocco's OCP has indeed played a central role in driving fertiliser consumption and is now eyeing expansion into the rest of the continent and looking to increase awareness about the benefits of fertilisers. OCP has also focused its efforts in recent years on expanding production, easing distribution and enhancing awareness regarding the more responsible use of fertilisers. In 2012 it partnered with the Ministry of Agriculture and Fisheries and toured the country to provide instructions and training to small-scale growers on the modern usage of fertilisers.

**DEVELOPMENT:** Building on its success in Morocco, the company is now seeking to expand into other parts of Africa. As part of Morocco's South-South agenda, OCP has put the continent at the heart of its growth strategy and in 2016 established OCP Africa, which looks to increase intra-African collaboration to enhance the production of food on the continent.

OCP's exports to Africa more than doubled between 2013 and 2014, and in the first half of 2017 exports to Africa drove a record turnover of Dh23bn (€2.1bn). It has also expanded operations into the continent. In February 2019 OCP partnered with the government of Ethiopia to create a subsidiary, Pan-African Fertilisers, that aims to increase fertiliser production in the East African nation by 3.8m tonnes a year. OCP and the Ethiopian Chemical Industry

Corporation, created by the Ethiopian government in 2013 to develop the industrial sector, will each hold half of the newly formed firm's assets. In March 2019 Karim Lotfi Senhaji, the CEO of OCP Africa, told international media the company expects to reach a deal to build a \$1.5bn ammonia plant in Nigeria with a capacity of 1m tonnes and is also eyeing a facility in Ghana to bring customised fertilisers closer to key markets. The firm is also working to launch a blending facility in Rwanda, one in Côte d'Ivoire, one in Ghana and three in Nigeria in 2019.

A growing number of companies are also looking to expand in Africa ahead of the expected boom in fertiliser consumption across the continent. For example, Nigeria's Dangote Industries built a fertiliser plant with a capacity of up to 3m tonnes in Lagos, the country's commercial capital. The plant is expected to begin operations in April 2019 and will be the largest single-train refinery. Also in Nigeria, Singapore's Indorama Eleme Petrochemicals is planning to double production at its Nigerian unit to 2.8m tonnes annually. Other firms planning to invest in the fertiliser industry in Africa include Norway's Yara International and Saudi Arabia's Ma'aden.

**INNOVATION:** While important first steps, increasing awareness and investment in production and distribution networks is not enough to meet African farmers' specific needs. Innovative solutions are also needed to cater to the demands of the continent. To that end, after expanding its research and development activities in recent years, OCP created tailor-made fertilisers to suit different crop and soil varieties. In addition to these custom fertilisers, agricultural players on the continent are also developing specialised methods for the African market.

One such adaptation is microdosing, a strategy that involves the use of small and affordable quantities of fertiliser during planting and later as top dressing three to four weeks after the plant begins to emerge. Authorities in Zimbabwe have been promoting this method to its cereal farmers, which allows farmers to use 8-10 kg of nitrogen fertiliser per ha, or one-fifth of the usual application rate.

"Microdosing enhances fertiliser-use efficiency, instead of spreading fertiliser over the field, and improves productivity," the International Crops Research Institute for the Semi-Arid Tropics, a non-profit that promotes the technique, noted. "Rather than asking how a farmer can maximise his yields or profits, microdosing asks how a farmer can maximise the returns to a small initial investment that might grow over time, turning deficits into surpluses." Because it is affordable, microdosing is seen as a potential breakthrough method to boost the use of fertilisers throughout the continent. Expanded fertiliser use is expected to increase crop yields and boost food security in Africa, a continent with a rapidly growing population. While adoption rates of fertiliser use have been slow, efforts to enhance awareness and modernise the sector are expected to increase usage rates throughout the coming years.

West Africa's vast and largely untapped natural gas resources make the region ideally suited for the manufacture of nitrogen fertilisers. It also has ample deposits of phosphorus and already exports the mineral to Europe and India.



Audu Ogbeh

# Strengthening efficiency

Audu Ogbeh, Minister of Agriculture and Rural Development of Nigeria, on rebuilding self-sufficiency in food production

**What steps can the Federal Ministry of Agriculture and Rural Development (FMARD) take to increase self-sufficiency in food production?**

**OGBEH:** Our first duty is to address the continued population growth. We have 200m inhabitants, and in 30 years this will reach 450m. Meanwhile, we have less than 1m sq km of land – a key challenge for a large population. In the past oil and gas revenue left us content, but we misapplied this fortune. Now we need to intensively mechanise our agricultural activities, as well as analyse our soil to determine what fertilisers and crops best suit our resources. Additionally, we need to research high-yield seeds and the effects of climate change.

However, the most important issue is attracting the younger generation to the sector. Many young people would rather not participate in agriculture, but we must convince them that this is an important field, while providing them with the necessary resources, such as credit and land. Greater involvement of the younger population will substantially step up production.

**How are production challenges being addressed?**

**OGBEH:** The FMARD is working with the Ministry of Power, Works and Housing, and we have established a list of high-priority roads to access agriculturally important areas. Also, the upcoming railway system will be of great use to the sector. Furthermore, we have formed a strong partnership with the Federal Ministry of Water Resources to plan irrigation works to connect underutilised resources with farmers.

**Which measures could mitigate the financing gap?**

**OGBEH:** Access to foreign exchange and credit are both important for agriculture, because we have to import machinery, technology and chemicals. We are talking to partners across the globe about how to use technologies and research to increase efficiency.

While exchange rates are an issue, loans from partners such as the African Development Bank allow us

to continue implementing projects. Nigeria has high interest rates, and we are working to bring these in line with global norms to attract investment and market participation. Lastly, we strongly encourage farmers to work in cooperatives and clusters. If farmers work together, they can use common resources and share the costs of machinery. Also, banks are more likely to lend to clusters, as they are easier to monitor.

**What key reforms came from Agricultural Inputs Mechanisation and Management Services (AIMMS)?**

**OGBEH:** The AIMMS initiative has replaced previous, ineffective schemes. Every local government should have at least three agricultural input distributors, which are in constant contact with the FMARD. These distributors must receive certifications, which serve to strengthen trust within the agricultural sector, as they facilitate the tracking of distributors and the prosecution of fraud. Subsidies and machines are shared through these distributors to be passed on to farmers. In turn, the farmers regularly inform the FMARD on the performance of the distributors, and if we encounter abuse, we will revoke our partnership. A lack of traceability and accountability has been a fixture of the agriculture sector and the economy as a whole for too long. AIMMS establishes a system of oversight and control that will significantly diminish fraud and abuse. In addition, we are launching an awareness campaign to inform people and get them engaged.

**How are agricultural exports being developed?**

**OGBEH:** The world is importing agricultural products from Africa and especially from us. For instance, we export fruits to Europe, sesame to China and goat meat to Gulf countries. This presents a lot of opportunities, but we have to ensure that our products meet international standards so we can export everywhere. Our crops need to penetrate foreign markets to lay the groundwork for the growing global export market.



The government is targeting 660,000 ha of modern irrigation by 2020

## Slow drip

On a continent grappling with climate change, irrigation may hold the key to future food security

6%

of arable land in Africa is irrigated

In Africa, a continent where 6% of arable land is irrigated, governments are implementing policies to encourage the use of irrigation technologies. It lags behind other regions in terms of irrigated land, with 14% of land in Latin America irrigated and 37% in Asia. From Tanzania to Senegal, the population is growing and rapid urbanisation is under way, putting pressure on food supplies as climate change affects rainfall and strains the water supply across the continent.

**CLIMATE CHANGE:** According to the Malabo Montpellier Panel (MaMo Panel), a Senegal-based group of international agriculture experts, the total area equipped with irrigation systems in Africa grew by 1.5% between 1990 and 2015. As farms on the continent are mostly rain-fed, the potential for expansion of irrigation schemes – especially for smallholders, who account for 90% of African farmers – is significant. Irrigation will help boost the output, efficiency and incomes of farmers. It can also extend growing seasons, possibly resulting in higher output over time and making farmers less vulnerable to unreliable rain.

According to the MaMo Panel, weather changes are putting more people on the continent at risk of hunger. If substantial investments in irrigation are not made as climate change continues to negatively impact agriculture, the number of people at risk of hunger in Africa could increase by 5% by 2030 and by 12% by 2050. “The reliance of African farmers on rain-fed agriculture makes them particularly vulnerable and susceptible to extreme weather events,” the panel noted. “Many studies predict a decline in yields for some of Africa’s major crops, including rice, maize, sorghum, groundnut and cassava due to higher temperatures and more frequent droughts. Irrigation offers a critical coping mechanism for farmers to respond to the adverse impacts of climate change.”

**WATER SHORTAGES:** Climate change and corresponding increases in temperature are also impacting water resources. According to the UN, about 40% of

the world’s population is affected by water shortages and this percentage is rising. South Africa, Morocco, Algeria and Tunisia have all been significantly hit by water shortages. In Morocco, demographic growth, urbanisation, expanding industrial and agricultural sectors, and climate change mean the consumption of water has been rising considerably and straining supplies. According to the World Bank, demand for water will increase by 60% to 100% in the country’s largest cities by 2050. The World Resources Institute, a Washington-based non-profit, estimates Morocco could see an 80% depletion of existing water resources by 2040. In 2014 Morocco’s water resources were at 22bn cu metres, five times less than in 1960 and under 500 cu metres per inhabitant, well below the minimum of 1000 cu metres recommended by the UN.

**DRIP IRRIGATION:** Though the situation in Morocco is less acute than in most of sub-Saharan Africa, Morocco is still largely dependent on rain-fed farming. Even so, the country has the highest level of irrigated area in Africa, with 18.9%, according to the MaMo Panel. The US Agency for International Development put the figure slightly lower, at 15%.

Efficiency is key in Morocco, where irrigation swallows 90% of available water. To improve the efficiency of the irrigation system while also expanding the area under irrigation, the government initiated several programmes under the Green Morocco Plan, which was launched in 2008 to modernise the country’s agriculture sector. A 10-year scheme called the National Irrigation Water Saving Programme was implemented to equip 550,000 ha with modern drip irrigation systems by 2020. By 2018, around 560,000 ha had been equipped, exceeding the target two years before deadline and saving the country 1.6bn cu metres of water since 2009. The government is now targeting 660,000 ha of modern irrigation by 2020. The government also launched the Irrigation Expansion Programme in areas with large dams. As of 2018 an

Irrigation in Morocco swallows 90% of available water. To improve the efficiency of the irrigation system while also expanding the area under irrigation, the government initiated several programmes under the Green Morocco Plan, which was launched in 2008 to modernise the country’s agriculture sector.

additional 82,300 ha were irrigated under the scheme, representing 51% of the 2020 target. The programmes have greatly impacted production, with irrigated farming products accounting for half of Morocco's agricultural GDP and about 75% of agricultural exports.

Moroccan authorities have also been exploring alternative solutions to secure the nation's water resources, including desalination and water treatment plants. In the province of Chtouka Ait Baha, construction on a seawater desalination plant was launched in 2018. The reverse osmosis plant, financed through a public-private partnership, will have a production capacity of 275,000 cu metres per day.

**ETHIOPIA:** Ethiopia is another country on the continent focused on developing its irrigation systems. According to the MaMo Panel, Ethiopia experienced the fastest growth in irrigation in Africa between 2002 and 2014. During that period, total irrigated area in Ethiopia increased by 51.5% due to the government's focus on agriculture as a means of developing the country's economy and boosting revenues. Agriculture accounts for one-third of Ethiopia's GDP and it is estimated that approximately 12m households in the country rely on small-scale farming.

As part of the government's bid to develop the sector, Ethiopia has invested in new technologies, including irrigation systems. "Agriculture and irrigation have been featured in the Ethiopian policy agenda since 1991, when the government implemented its strategy of agricultural development-led industrialisation, which sees agriculture as the engine of growth," the panel noted. The Ethiopian government has developed a number of small-scale irrigation schemes throughout the country and plans to allocate around \$7.5bn to irrigation development through to 2020.

The authorities have also worked to improve data collection. In 2013 Ethiopia's Agricultural Transformation Agency launched a programme to map around 30,000 sq km in search of shallow groundwater, which



About 40% of the world's population is affected by water shortages



Moroccan authorities have been exploring alternative solutions to secure the nation's water resources

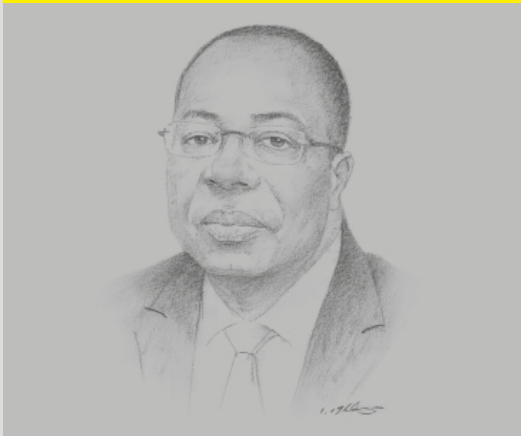
can be easily used by small-scale farmers for irrigation. The mapping found 3bn cu metres of water at a depth of less than 30 metres, enough to irrigate roughly 100,000 ha of land. According to Gebisa Ejeta, an agronomy professor at Purdue University, mapping "is an invaluable asset that allows for careful monitoring and management of resources such as water, especially in times of drought".

While the results to date have been promising, as of 2018 only around 5% of Ethiopia's arable lands were irrigated, highlighting the need for continued irrigation-focused policies and investment.

**ECONOMIC GAINS:** It is widely accepted that irrigation boosts agricultural productivity, which is imperative in ensuring food security in Africa. The MaMo Panel noted small-scale irrigation in sub-Saharan Africa could increase maize yields by up to 195% and paddy yields up to 283%, compared to the productivity achieved with rain-fed farming. Irrigation also has the potential to increase the revenue of farmers. In Ethiopia's northern Tigray region, households that use irrigation earn double the revenue of those not using a system of irrigation, with income gains of between \$145 and \$173 per household annually, the MaMo Panel found. "Elevating irrigation to a top policy priority and bringing irrigation to scale could help ensure the continent's food security in the face of more extreme weather conditions and be an engine of agricultural transformation," the panel said, noting that the expansion of irrigation systems throughout Africa would necessitate a three-way partnership between governments, farmers and the private sector.

It is clear that irrigation is necessary to boost agricultural production in a continent grappling with the effects of climate change, most notably water shortages that put a strain on rain-fed agriculture. Increased levels of irrigation have not only led to boosted productivity but have also resulted in higher incomes, highlighting the potential for future gains.

As of 2018 only around 5% of Ethiopia's arable lands were irrigated, highlighting the need for continued irrigation-focused policies and investment.



Yves Brahima Koné

# Local cooperation

Yves Brahima Koné, General Manager, Coffee and Cocoa Council (CCC) of Côte d'Ivoire, on protecting farmer revenues

## How have producers been affected by the financial difficulties that face exporters?

**KONÉ:** Producer exports depend mainly on the international market, while the financing difficulties encountered by certain local exporters with banks are merely the consequence of governance, or lack thereof. Banks are entitled to require guarantees from exporters. Only exporters with the resources to purchase cocoa beans can offer these guarantees, and supply and demand is well balanced. I do not think that the evolution of the relationship between banks and exporters has an effect on producers. When the price offered on international commodities markets does not reward the work of planters, the government makes efforts to find a solution.

In October 2018 the joint action of the government and CCC led to an increase in minimum farm gate cocoa prices. Côte d'Ivoire's authorities would have wished for a larger increase, but the international market conditions would not allow it. We are not content with this increase and we are looking for ways to ensure that farmers are encouraged to produce higher-quality cocoa. In this regard, Côte d'Ivoire and Ghana are putting into place cooperation mechanisms on the storage, processing, marketing and promotion of the regional and domestic consumption of cocoa. The main objective of this cooperation is to improve the income of our producers.

## What agricultural initiatives are currently under way to drive modernisation in the sector?

**KONÉ:** The bodies in charge of the supervision of the rural landscape have always promoted agricultural modernisation as a means to improve the sector's competitiveness. Cocoa production has traditionally been dominated by small family-based organisations. Given intensity of resources allocated to cocoa harvesting and its importance for the country's economy, the CCC strives to modernise all of the value

chain's segments. At the production level, irrigation and harvesting techniques are improved using new tools. Specifically, the council has provided producers' cooperatives with the tools to improve the productivity of *écabossage* (breaking the cocoa pods to extract beans). In addition to increasing productivity levels, this also contributes to an improvement in the quality of the beans harvested. The modernisation of agriculture is not only aimed at the farm level, but also at transport and distribution. The transport of cocoa bean bags or funds that are related to the cocoa trade is subject to a security problem. For this reason, the council is pushing to develop the use of electronic payment systems within the cocoa segment.

## What are some of the economic implications involved in local cocoa processing?

**KONÉ:** The government has set the goal of locally transforming 50% of Côte d'Ivoire's cocoa production by 2020. Côte d'Ivoire is currently highly exposed to international raw material price fluctuations and speculation. Our export bargaining power is affected by the fact that beans do not keep well and must be processed and sold quickly. Considering speculation is less intense on semi-finished products than beans and that semi-finished products can be kept longer than raw products, we believe that local transformation will enable us to protect the sector from international commodity price fluctuations.

At the same time, local transformation is a challenge that is aligned with the desire to structurally transform Côte d'Ivoire's economy by 2020. The CCC has received instructions from the government to move towards the transformation and seeks to attract foreign investors. As such, the CCC is working on two new processing plants in Abidjan and San Pedro with capacities of 100,000 tonnes and 50,000 tonnes, respectively, set to open by the end of 2020, and it is looking for international investors to form a partnership with.



Agriculture is sensitive to a variety of unpredictable weather changes

# Temperature rising

## African countries work together to limit the growing effects of climate change on the agricultural sector

From Morocco to Niger to Kenya, farmers in Africa are increasingly affected by weather changes, extreme climate events and the resulting production volatility that makes it difficult to improve productivity. In this context, and in the face of a growing and increasingly urbanised population, boosting farm yields is necessary to increase the incomes of millions of farmers and ensure food security.

**ERRATIC RAINFALL:** Agriculture is sensitive to weather changes, unpredictable seasons, prolonged periods of excessive heat and erratic rainfall. These fluctuations disrupt farming activity and can cause a surge of diseases in plantations. Climate change is also behind the proliferation of extreme weather events such as droughts, floods and storms.

While countries around the world are struggling to deal with climate change, African countries are particularly affected because the continent's agriculture is mostly rain-fed – only 6% of arable lands on the continent are irrigated – and is often established in flood plains, deserts and hillsides. In addition, the vast majority of African farmers hold small-scale plantations of less than 2 ha.

The fractured nature of the sector makes it difficult for farmers to make investments necessary to mitigate the effects of climate change. In 2016 many countries in the east and south of Africa experienced the most serious drought in decades amid rising temperatures that had a catastrophic impact on crops and left 36m people facing hunger. In recent years, countries in sub-Saharan Africa also had to deal with outbreaks of fall armyworms, a caterpillar that devastates maize plantations.

**CLIMATE CHANGE:** According to researchers at the US-based University of Notre Dame, eight of the 10 countries most vulnerable to climate change are located in Africa. The sector provides income and livelihood for over half of the continent's population and is a major contributor to every African economy.

According to the International Fund for Agricultural Development, the challenge is set to be compounded by an expected reduction of farmland areas and the doubling of the population by 2050.

Rising temperatures also threaten areas with desertification, which could result in reduced harvests and lower output. The Sahel region, which covers a large part of West Africa including Senegal, Mali, Burkina Faso and Niger, is particularly vulnerable to desertification and the effects of coastal erosion, with Senegal and Djibouti losing 1-2 metres per year. In February 2019 the situation prompted governments of 17 countries in the region to launch a climate investment plan of nearly \$400bn to span from 2018 to 2030. Through six projects, the scheme will attempt to protect both the ecosystems and the livelihoods of millions of farmers by limiting greenhouse gas emissions and enabling individuals to adapt to climate change.

**CROP OUTPUT:** It is projected that if global temperatures rise by 4°C by 2100, maize yields in some African countries may decline by more than 20%. The World Bank estimates that by 2030, crop yield losses in sub-Saharan Africa could lead to a roughly 12% increase in food prices.

The International Food Policy Research Institute (IFPRI) also found that total production of cereals in Africa would be 24m tonnes lower in 2050 than what they would be without climate change: closer to 279m tonnes instead of 303m tonnes. "Cereal production is projected to double in Africa south of the Sahara by mid-century, but production in 2050 will be about 5% less than it would have been in the absence of climate change," IFPRI noted. "Net imports of cereals in the region are projected to increase three-fold relative to 2010 levels."

The organisation also found that fruits and vegetables will be affected (378m tonnes instead of 435m tonnes), as well as roots and tubers (468m

Rising temperatures threaten areas with desertification, which could result in reduced harvests and lower output. The Sahel region, which covers a large part of West Africa including Senegal, Mali, Burkina Faso and Niger, is particularly vulnerable to desertification and the effects of coastal erosion.

Governments of 17 countries have launched a climate investment plan of nearly

**\$400bn**

for 2018 to 2030

tonnes instead of 506m tonnes) and even oilseeds (110m tonnes instead of 118m tonnes).

The IFPRI expects that by 2050 aggregate food production will increase 60% from 2010 levels – lower than the projected 69% rise without climate change. The organisation expects the number of individuals at risk of hunger in sub-Saharan Africa to fall to 188.7m in 2050, compared to 209.5m in 2010. Without climate change, the IFPRI said an additional 38m individuals would not be at risk of hunger. In addition, child malnutrition is expected to increase from 21.7% in 2017 to 24.4% in 2050.

**STRATEGIES:** According to the One Acre Fund, a Nairobi-based non-profit that provides small-scale farmers in east Africa with financing and training, access to better farm inputs and agricultural training is essential to help growers increase yields and offset the effects of weather changes. Advances in research can also be helpful in combatting these effects, as seen in Morocco, where climate change is causing droughts, depleting water resources and exacerbating desertification and soil erosion.

The country's National Institute of Agricultural Research (Institut National de la Recherche Agronomique, INRA) focuses on the impact of climate change with a long-term objective of helping agriculture become more resilient. The INRA developed direct seeding technology for semi-arid and arid areas, as well as weather-resistant seeds tailored to different types of soil and climates. The institute created chickpea varieties that can be sown during winter and resist weather challenges and diseases while being more productive than varieties that are usually sown in spring. The INRA also developed drought-tolerant cereal varieties that now account for about 70% of the planted areas of this segment. Olives, citrus fruits and dates are also benefitting from the institutes's research. As a result, a new date variety resistant to Bayoud disease, a fungal disease affecting date palm, was created. The new variety helped double the country's date production between 2008 and 2015.

Other market leaders have played an important role in research. Phosphate producer OCP developed fertilisers that are tailored to different crops and soil varieties. The country aims to double fertiliser consumption to 2m tonnes by 2020 from 900,000 tonnes in 2016. In 2010 the Ministry of Agriculture and Fisheries, the INRA and OCP joined forces to establish a soil fertility map that would help growers identify their needs and encourage a more rational and efficient use of both fertilisers and water.

While climate change poses significant challenges to African economies, governments and the private sector are working together to mitigate its effects and increase crop yields and agricultural productivity. Whether through advanced seed varieties, fertiliser use or region-wide agreements to protect the ecosystem, strong steps are being taken today to limit the impact of climate change tomorrow.

## PULSE OF THE LAND

According to the UN Food and Agriculture Organisation (FAO), Africa is the world's second driest continent, with desert accounting for 50% of its total surface. And, since 1950, an estimated 60% of Africa's farmland has been hit by land degradation such as losses of topsoil and soil nutrients due to mining, illegal logging, and poor farming practices. The use of slash-and-burn farming also plays a role in making swathes of land unusable for agriculture.

Tackling the soil infertility crisis is vital to fight malnutrition and food insecurity across the continent: about one-quarter of undernourished people in the world are living in Africa. There is also urgency to protect soils before they are irreversibly damaged. According to the FAO, lost or severely spoiled soils are difficult and costly to rehabilitate. However, many countries in Africa do not have soil regulation policies, nor do they have the funds or knowledge to establish soil management schemes.

To help countries on the continent cope with these issues, in June 2018 the FAO's Global Soil Partnership launched a scheme to improve productivity and halt the degradation of soils in 47 nations. The programme, called Afrisoils, hopes to increase yields by 30% and reduce soil degradation by 25% by 2028. It will use a range of soil interventions and implement sustainable soil management practices to boost the soil's organic content. The programme will increase organic carbon and matter in the soil by using crop residues and compost, and to encourage the use of natural fertilisers and crop rotation. Smart agro-forestry practices, irrigation, farmer training and support for legislation and policy guidelines are also part of the plan, which is estimated to cost approximately \$50m over 10 years.

The FAO project is part of a number of schemes put in place to help African countries tackle soil degradation. In 2007 the African Union launched the Great Green Wall (GGW) initiative for the Sahara and the Sahel, regions affected by desertification, droughts and land degradation. The initiative helped individuals in the area embrace sustainable practices that respect the environment and protect soils and the land. In The Gambia, an education project supported by the GGW about land restoration methods is being implemented in schools.

Precision farming is also an increasingly useful tool for researchers. In March 2019 a group of Kenyan scientists partnered to develop a soil fertility analysis that is intended to help determine macronutrients, pH and moisture content. According to Vijayalakshmi Vulesami, the project's lead researcher, said "Our project aims to ensure farmers in low- and middle-resource areas have access to cost-effective technologies that can foster productivity while promoting the health status of the soils."



Ghana and Côte d'Ivoire account for 65% of global cocoa production

# The root of the problem

## Deforestation threatens the future of rubber, palm oil and cocoa production throughout the continent

Concerns are growing that the production of commodities such as rubber, palm oil and cocoa are putting Africa's rainforests at risk. While there is increased awareness about the necessity of protecting forests, regional governments appear divided between long-term environmental issues, and the social and economic consequences of halting the production of crops that provide a living for thousands of farmers.

**BIODIVERSITY:** Tropical rainforests in Africa are home to a wide range of flora and fauna, with half of the plants and almost one-third of animals living in the Guinean Forests found there. The forests span an area that includes Sierra Leone, Guinea, Liberia, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria and Cameroon. The Congo Basin, which covers six countries and 251m ha, is the world's second-largest tropical forest after the Amazon. Africa's forests harbour more than 20,000 plant, 2000 bird, 600 amphibian and 400 mammal species, and are home to three of the world's four types of great apes.

**COCOA:** Due to rising rates of deforestation, the continent's biodiversity is under threat. Côte d'Ivoire – the world's biggest cocoa producer, with about 40% of global output – has one of the highest deforestation rates in Africa. The government estimates that more than 80% of the country's forests have disappeared since the 1970s, mostly because of the consistent production of cocoa beans over a long period of time.

For decades the Ivorian government encouraged smallholder farmers to turn land into cocoa plantations and the cocoa industry has been at the centre of Côte d'Ivoire's overall economic development. As the effects have become more pronounced, the Ivorian government has committed to halting deforestation. However, around 40% of the country's cocoa production is believed to come from protected forest areas. With cocoa providing a direct or indirect living to one-quarter of the population and accounting for around 30% of the nation's export earnings, tackling forest degradation is a challenging task. In March 2019

the governments of Ghana and Côte d'Ivoire, which together account for 65% of global cocoa production, announced an agreement to combat deforestation. In Côte d'Ivoire, the first phase of the programme will aim to halt deforestation and degradation between 2018 and 2020, with second 10-year phase set to begin in 2020. In Ghana, the authorities will first focus on the six areas with the highest rates of deforestation, and then implement the initiative country-wide through to 2043.

**RUBBER & PALM OIL:** The cultivation of other cash crops is also leading to forest degradation. According to the non-profit EarthSight, 500 sq km of forests were cleared in the Congo Basin between 2013 and 2018 in order to develop rubber and palm oil plantations. While most of the world's palm oil is produced in Asia, production has expanded into Africa in recent years, threatening the continent's ecosystem. "Although oil palm cultivation represents an important source of income for many tropical countries, its future expansion is a primary threat to tropical forests and biodiversity," the Proceedings of the National Academy of Science of the US said in a report published in August 2018. "Large-scale expansion of oil palm cultivation in Africa will have unavoidable, negative effects on primates," it said.

In 2016 ministers from countries accounting for 66% of Africa's rainforests signed the Marrakesh Declaration for the Sustainable Development of the Oil Palm Sector in Africa, committing themselves to protecting tropical forests and making oil palm cultivation more sustainable. Deforestation and forest degradation remain a threat to biodiversity and the agricultural sector in general and commodities production in particular. Many individuals on the continent are dependent on these industries, underscoring the need for governments to develop the sectors in a way that promotes sustainability. The future of commodity production in Africa depends on governments across the continent working together and with the private sector to ensure balanced, smart and forward-looking development.

The Congo Basin, which covers six countries and 251m ha, is the world's second-largest tropical forest after the Amazon.

In Côte d'Ivoire, cocoa provides direct or indirect employment to one-quarter of the population and accounts for 30% of the nation's export earnings.



A number of initiatives have been designed to empower farmers

## Reaping rewards

Africa's private and public sectors are working to empower farmers to take their businesses to the next level

Most farmers engage in subsistence agriculture, which can prevent them from making a profit and investing in their plantations. A number of initiatives have been designed to empower farmers, particularly women and youth, and help them turn their farming into sustainable businesses.

Agriculture is the largest employer in sub-Saharan Africa, providing jobs to over 60% of the continent. The sector is dominated by small-scale, family-run plantations that produce 90% of the continent's basic food. However, from Côte d'Ivoire's cocoa growers to Ethiopia's cereal producers, the majority of African farmers are trapped in poverty. Most engage in subsistence agriculture, which can prevent them from making a profit and investing in their plantations. A number of initiatives have been designed to empower farmers, particularly women and the youth, and help them turn their farming into sustainable businesses.

**CAPACITY BUILDING:** Lack of training is a major constraint that impedes farmers from making higher profits from their farms. In 2016 the World Economic Forum named education as one of four factors holding Africa's small-scale farmers back, and illiteracy rates are high among farmers across the continent. To address the issue, in recent years non-profit organisations, development institutions, private companies and governments have created capacity-building programmes and training plans aimed towards farmers. One example of this is the Alliance for a Green Revolution in Africa, which launched a programme to build the capacity of 270,000 smallholder farmers from 2018 to 2021. The project aims to teach farmers good agriculture practices and group dynamics management throughout the input, production and marketing stages.

The EU-funded Technical Centre for Agricultural and Rural Cooperation also launched projects in support of farmers including training for young people in entrepreneurship, market access and the use of drones in Burkina Faso, as well as the support of women cassava farmers in Chad and Angola. According to the organisation: "By helping to integrate farmers into markets and providing exposure to more information and emerging innovations, farmers' organisations can contribute to boosting employment and incomes across the food value chain, as well as fostering inclusive growth."

**TRAINING:** The private sector has also stepped in to provide training to farmers. This training not only helps farmers but also aids companies in securing future supplies and increasing productivity. Multinational Nestlé regularly provides training to cocoa farmers in West Africa, and the Louis Dreyfus Company (LDC) ran training schemes for female maize farmers in Limpopo in 2017 and 2018, targeting yield improvements through sustainable agriculture best practices. Additionally, LDC aims to help farmers move from subsistence farming to a more business-oriented approach and encourage the youth to take up the practice.

In a similar approach, Morocco's OCP the world's largest phosphate producer, has a programme to enhance market linkage and teach good agricultural practices to boost farmers' productivity and revenues. The scheme, called Agribooster, includes hybrid seeds, crop protection chemicals, fertilisers and training. The firm's OCP School Lab is a mobile laboratory designed to educate farmers on soil analysis and the most efficient usage of fertilisers. Since 2017, 160,000 farmers in Nigeria, Togo, Ghana, Côte d'Ivoire, Kenya, Burkina Faso and Senegal have benefitted from OCP School Labs.

**MECHANISATION:** Officials are working to increase access to modern machines in order to boost productivity and reduce the physical strain of agricultural activity. Tractors are currently used in 5% of cultivated land in sub-Saharan Africa, compared with 60% in Asia. According to the UN Food and Agriculture Organisation (FAO), over 75% of farmers in sub-Saharan Africa prepare their land using only hand tools. To increase mechanisation, in 2018 the FAO and the African Union (AU) launched a framework to help farmers get access to mechanisation such as two-wheeled tractors. "Doubling agricultural productivity and eliminating hunger and malnutrition in Africa by 2025 will be no more than a mirage unless mechanisation is accorded utmost importance," Josefa Sacko, the AU commissioner for rural economy and agriculture, stated at the launch of the framework.

Over  
**75%**  
of farmers in sub-Saharan Africa prepare their land using only hand tools



Exports on agricultural products grew 8% annually from 1998 to 2013

# Agricultural imbalance

## A growing population and stagnant crop productivity lead to a widening agricultural trade deficit in Africa

Although in recent years Africa's exports have increased, becoming more diversified and competitive, the continent runs an agricultural trade deficit and imports are rising more rapidly than exports. This highlights the continent's difficulties boosting agricultural productivity and food production, as well as the need for increased regional and global trade integration.

**TRADE:** Africa's exports are mostly made up of raw products, notably crude oil, precious metals and agricultural commodities such as cocoa, coffee and rubber. Finished goods account for the majority of imports, resulting in a trade deficit that deteriorated in recent years. Between 1998 and 2013 Africa accounted for approximately 4% of global agricultural exports. These low figures contrast with the fact that agriculture is a major contributor to the GDP of most African countries. According to figures from the World Bank, agriculture, fisheries and forestry account for approximately 15.8% of sub-Saharan African countries' GDP.

Due to higher commodity prices, improved infrastructure and increased integration at regional and global levels, exports of agricultural products from Africa have been rising steadily, and grew at an annual average of 8% between 1998 and 2013. As the shipment of commodities has gained competitiveness, exports have become more diversified. However, agricultural imports surged as the continent's population boomed – doubling between 1985 and 2013, and expected to double again by 2050 – and became more urbanised.

The increase in food imports underlines the difficulties farmers face in meeting demand due to muted levels of productivity. Hampered by low use of fertilisers, lack of mechanisation and the small-scale, fractured nature of the sector, farmers are largely unable to make profits and invest in their farms. "The growing agricultural trade deficit suggests that it is necessary for African countries to take relevant steps to improve export performance based on the region's agrarian environment," the International Food Policy Research

Institute stated. "African agriculture must gradually be transformed from being subsistence-oriented to having a more commercial focus."

**PARTNERS:** The EU is Africa's largest trading partner, but trade flows with the European market have decreased over time, while intra-African flows and trade with Asia have grown. If these trends continue, Asia will likely overtake the EU as Africa's largest trading partner.

While free trade agreements necessary to boost agricultural trade exports, they have been met with opposition in some countries, including in Nigeria, Africa's most populous country and second-largest economy. The EU has been pushing a free trade deal between the two continents that builds on existing Economic Partnership Agreements (EPAs) and converts country-to-EU trade agreements to continental free-trade agreements. However, in April 2018 Nigerian President Muhammadu Buhari declined to sign the EPA between West Africa and the EU because he feared it did not protect domestic industry. "Our industries cannot compete with the more efficient and highly technologically driven industries in Europe," Buhari said. **CONTINENTAL TRADE:** According to the IFPRI, boosting Africa's agricultural trade is required to improve food security and make African food markets less vulnerable to shocks. Intra-regional trade is also essential. However, intra-African shipments account for only 15% of total exports, compared to 58% for intra-Asian trade and 67% for intra-European trade. Thus, in the Malabo Declaration of 2014, African governments committed to tripling agricultural trade within Africa by 2025.

In 2018 the Africa Union launched the African Continental Free Trade Area with the aim of integrating economies, reducing trade barriers and boosting regional trade. More than 40 countries signed the deal while also committing to removing tariffs on 90% of goods and services. As of March 2019, 19 countries had ratified the agreement, nearing the 22-country threshold necessary for the implementation of the programme.

The EU is Africa's largest trading partner, but trade flows with the European market have decreased over time, while intra-African flows and trade with Asia have grown. If these trends continue, Asia will likely overtake the EU as Africa's largest trading partner.

Intra-African shipments account for **15%** of total exports

