



Africa Digest

Trends and Issues in Macro Environment

Contents

1. Trends in Agriculture in Africa	2
2. Mining Trends in Africa.....	5
3. Renewable Energy Trends in Africa	8
4. Sustainability Trends in Africa	11
5. Technology Trends in Africa.....	14

1. Trends in Agriculture in Africa

Africa's important agriculture sector contributes greatly to the GDP of Africa's economies, and provides employment opportunities to a vast number of Africans. Unfortunately, Africa imports far too much food (between US\$35 billion and US\$41 billion annually), the average age of its farmers is above 60 years. Many of its youth depart the sector to escape what they perceive as a poverty trap. Meanwhile, due to high rates of population growth and urbanisation, food production is becoming increasingly critical. Although a stronger focus on food production is trending, we also see other trends that are a source of increasing concern.

RENEWED FOCUS ON HORTICULTURE

Rwanda sees a renewed focus on horticulture as a cash crop and export product. Products include avocados, green beans, passion fruit, snow peas, broccoli, bell pepper, chili pepper, eggplants, and bananas. Until recently, the only known cash crops for Rwanda were coffee and tea, and more recently pyrethrum (*chrysanthemum*). Challenges included the shortage and cost of air transportation and no ready market, both necessities due to product perishability.

Non-traditional exports (commodities previously produced solely for domestic consumption, which have recently debuted in export markets) generated over US\$354.7 million from July 2017 to June 2018, an increase of ~60% compared to the US\$221.7 million generated from July 2016 to June 2017. These commodities include fruit, vegetables, roots and tubers, legumes and cereals, meat, eggs and dairy products as well as live animals. The three traditional exports of coffee, tea and pyrethrum increased earnings 20% from US\$134.7 million in the 2016/2017 period to US\$161.2 million in the 2017-2018 period.

The drive for export diversification stems from the price volatility of the traditional agricultural exports, which convinced the Rwandan government to explore alternative avenues to avoid losses and generate profits for its farming community.¹

Ethiopian Airlines currently is on target to benefit from Tanzania's perishable horticultural exports to its global markets. This will be a major improvement to current logistics arrangements that trucked horticulture products from the north of Tanzania to Nairobi for air-freighting to Europe. Given the freighters and terminal facilities in Addis Ababa, Ethiopian Cargo can connect Tanzanian exporters directly with foreign buyers abroad. After the recent upgrade of the airport at Addis Ababa, Ethiopian Airlines Cargo and Logistics now operate one of the largest trans-shipment terminals in Africa. Tanzania's horticulture markets include the Netherlands, Belgium, the United Kingdom, Norway, the Middle East and North America. Currently the bulk of Tanzania's exports include cut flowers, green beans, fruit, seeds and spices, which are air freighted to the Amsterdam global hub through the Kilimanjaro International Airport in Tanzania by KLM.²

VALUE ADDITION TO CASSAVA

In Rwanda, cassava processors have been urged to add value to cassava crops and diversify production in the country to increase returns. To enable this strategy, several government agencies joined forces to launch training and capacity building initiatives for processors.

Although some producers were not yet producing high-quality cassava flour for baking purposes, they have started the process. Farmers will also benefit from access to a wider market for their harvest. Processors gained access to the USA market, which is expected to receive between 500 tons and 1000 tons from Rwanda.

While the current prices for cassava are low, by processing greater volumes, the farmers could benefit from access to wider markets at profitable prices. It is also possible to create additional products from cassava flour. Stakeholders perceive a large potential market for bakery products, and are encouraging cassava processors to tap into the available opportunities.³

THE GROWTH OF AQUACULTURE

Aquaculture in Nigeria seeks to increase its fish production and tap into the economic opportunities in the agriculture value chain. As part of this initiative, the Lagos State Government recently trained 953 workers. Programmes and projects that are part of this initiative include fish farm development; the fish cage culture system; capacity building programmes; agricultural value chain development; and artisanal fisheries

development. Fish is a major source of low cholesterol protein. While Lagos State (22 million people) generates demand for 374,000 tons of fish per annum, current fish production is less than half of demand, at only 155,262 tons per annum. The deficit is met through imports, which consumes scarce foreign exchange, estimated at US\$1 billion annually.

Fish is seen as a possible avenue to increase the export of non-oil commodities and to earn foreign exchange. There were also calls for collaboration between the private sector and government in the development of the agricultural value-chain.⁴

Kenya will undertake a fishery and mariculture expansion project over the next five years along its Indian Ocean coastline. It will be partnering with the World Bank to implement the project costing US\$100 million. The project entails “improving the governance and management of Kenya’s coastal marine fisheries and aquatic resources for easy monitoring of fishing activities.” The end goal is to “ensure sustainable fish stock productivity in addition to boosting the integrity of the related ecosystem.” The private sector will also be encouraged to invest in the project, “especially in improving the efficient utilization of available marine fisheries and coastal aquaculture and enhancing the value addition along the sector’s value chain.” Historically mariculture struggled to establish itself as an alternative to capture fisheries because of inadequate investment and technical expertise.⁵

Mariculture refers to the “farming of marine organisms for food and other uses such as pharmaceuticals, food additives, jewellery (e.g. cultured pearls), nutraceuticals, and cosmetics, either in the natural marine environment, or in land- or sea-based enclosures, such as cages, ponds, or raceways.”

Mozambique’s fishing industry is currently experiencing declining catches and a degraded marine ecosystem. To be truthful, the industry is not doing well. The World Bank describes the country’s fishing communities as “often small, isolated, and poor.” This has moved the government to find ways to revive and implement a major fishing industry initiative. This includes reviving efforts to launch a fishing and security fleet to harness and protect its marine resources. Earlier, this initiative led to debt for the country, amidst allegations of corruption and misuse of funds.

It now appears that Mozambique’s natural gas discoveries pose the potential danger of undermining its fishing industry, as the government shifts its focus to extractive industry.

According to Deloitte, Mozambique’s aquaculture will most likely “remain in its infancy in the medium term, but has the potential to serve as a key source of foreign exchange for the country in the long term.”⁶

Malawi is another country focusing on developing its aquaculture sub-sector. It recently obtained a US\$13.2 million financing package from the African Development Bank Group for its fisheries and aquaculture development project. The focus of the project is to provide infrastructure to increase the productivity of its fishery sector and improve market access. It is expected that these projects will contribute to better diets, boost employment along the fish value chain, and build climate resilience.

The total estimated cost of the project is US\$14.57 million, of which the Malawi government will contribute US\$1.38 million. It will also benefit 20,000 residents around the lake and inland areas, as well as 250,000 fish processors, vendors, retailers, and interns. In addition, fisheries will develop more sustainable income and value addition activities will generate higher incomes. Fish contributes 40% of protein consumption to households in the country.⁷

CANNABIS PRODUCTION OPPORTUNITY FLYING HIGH

The premier of South Africa’s Eastern Cape Province leans toward legalising its cannabis industry. The Department of Rural Development and Agrarian Reform recently hosted a workshop to explore this issue. Participants discussed market potential, the legalisation process, and impact on the provincial (GDP). A “thriving, legal cannabis economy” may create jobs in the Eastern Cape. The following typical uses for cannabis were envisaged:

- Medicinal use to cure ailments such as asthma and for ameliorating the pain associated with rheumatism, Parkinson’s disease, Alzheimer’s disease, and cancer.
- Manufactured products (e.g. fibre used to build aircraft).
- As clothing material
- To produce bio-fuels and other essential products used globally.

An Interpol study in 2004 ranked South Africa as the fourth largest producer of cannabis, with the bulk being produced in the Eastern Cape.

Since the Constitutional Court ruling in September 2018 decriminalised cannabis for private and personal use, the rules are still unclear as far as economic production are concerned.

Reportedly, the City of Cape Town is freeing up land for medical cannabis with the hope of opening up economic opportunities.⁸

VALUE ADDITION TO CROPS

Kenya's nut industry is performing poorly because most of the nut trees that were introduced into the country have aged and now produce low quality nuts. To improve growing, processing and marketing its nut crop, Kenya launched an initiative to study the issues and launch an action plan. The research study focused on macadamia, groundnuts, coconut and cashew nuts to improve their quality and boost trade, locally and internationally. Initial results indicate that the program is producing good results on both quality and yields.

The Kenyan government intends to address weaknesses in its marketing strategy and to open up local and international markets. This is part of an initiative to address the poverty trap in which the growers find themselves. Farmers will also receive support to adopt new superior and pest resistant varieties. The crop will be processed and value will be added locally before selling nuts into the local and international market.⁹

POINTS OF INTEREST

- The diversification of products produced in Africa can only be good for agricultural sectors. On the one hand it creates opportunity to broaden the range of products for export, while reducing dependency on a small number of products to generate export revenues. Given that farmers are frequently price-takers, a wider range of products reduces the risk of the negative impact of international price volatility.
- Africa's airlines play a significant role in freighting fresh produce (including flowers) from its producers to global markets. The Ethiopian Airlines Cargo initiative to move produce directly to various countries reduces the dependency of the continent's farmers on a single mega hub. This links with the previous point where farmers are price-takers. Having more markets to supply reduces the vulnerability to price and demand volatility.
- Cassava seems to be a product that is gaining increasing visibility due to the many potential value-added products that can be produced with cassava as the main raw material. In addition to flour (producing bread, biscuits, etc.), other value-added products include glucose, maltose, ethanol, and starch. There seems to be a high demand for glucose/maltose by global majors in the following fields: beverages (beer, soft drinks and fruit juices); candy and biscuits; and industrial use (Unilever and Nestle).
- Aquaculture is another increasingly popular sector, with the potential to provide protein at affordable prices. However, Africa seems to be struggling to provide sufficient volumes of fish for its population. Various countries have called upon their entrepreneurs to produce fish to feed the population. In addition to the countries mentioned above, Lesotho is also embracing aquaculture. Ethiopia, Tanzania and Uganda count amongst those who are supporting their "fish-preneurs".
- As noted in the previous African Digest Macro), we again see signs of growers moving to producing stimulants as an alternative to food. In Ethiopia, farmers grow khat. In Kenya, they are turning towards muguka. In South Africa, the government is deliberating the production of cannabis to boost provincial economies. Various licences have been issued to farmers to grow the product. One JSE-listed company formally adopted cannabis as a product in its scope of operations. Given South Africa's situation, the provincial governments of other provinces are likely to adopt a similar position. Weed certainly pays better than agriculture products such as vegetables, and is hardier. Setting aside medical issues surrounding the product, we again face a potential challenge of neglecting food production for cultivation of a product that is illegal in many parts of the world. Also, we should give careful consideration to potentially serious unintended consequences.

2. Mining Trends in Africa

A number of interesting trends in the mining sector have recently emerged. Governments in Africa now realise that exporting raw commodities leaves a lot of money on the table, and are thus putting in place the policies and infrastructure required to ensure value-addition.

MINES AS DRIVERS OF ECONOMIES

Ghana is currently Africa's largest gold producer. Its mining sector is a key driver for economic progress. Banks such as Stanbic Ghana not only finance mining companies, but target their suppliers and contractors. The mining sector employed 12,503 people directly in 2017, creating 350,000 indirect jobs at a multiplier factor of 28. The total amount of employee compensation amounted to US\$515 million, while electricity providers received US\$307 million, all of which amounts to 8% of mineral revenue. The Ghana Revenue Authority received total taxes of ~US\$370 million. This provides a clear snapshot of the contribution of the mining sector to the economy of a country on the African continent. An additional factor that needs to be considered, is the unlocking of a country's local content potential. Africa exports too much of its raw commodities without exploiting the potential to add value. Limiting factors in this regard include limited industrial capacity and business-unfriendly environments with high interest rates and cost of manufacturing input.¹⁰

However, in other countries, such as South Africa, it seems the mining industry first has to transform itself to ensure its longevity. At a recent conference in South Africa, the point was made that the mining industry in the country needs to tap into technology and innovation to exploit "a small window of opportunity to fix itself and move forward." In addition, the industry has to educate stakeholders on the value the industry contributes to South Africa. It also needs to build a culture of diversity and improve its skills development to enable it to better deal with the global challenges.

The industry also has to position itself to benefit from the circular economy, which is about eliminating waste and reducing the use of unsustainable materials through recycling. Doing this will position mining companies to take advantage of the opportunity it presents. One speaker warned that, should mining companies not position themselves in a "looping system", given the impact of the circular economy affecting consumers' demand, consumers might at some point stop buying their products.¹¹

NEW REFINING CAPACITY

Angola will build a new high-conversion crude oil refinery in its Cabinda province. The provincial governor of Cabinda and the chairperson of the Sonaref executive board recently signed the land rights contract for the construction site of this refinery. Sonaref will build the refinery, with United Shine as the investing company. The refinery will have a processing capacity of 60,000 barrels of oil per day for the production of gas oil, gasoline, fuel oil and Jet A1 fuel. It will provide 1,000 direct jobs in its first phase.¹²

Tanzania is in the process of completing the construction of its first gold refinery plant in its capital city, Dodoma. Previously, gold was exported as a raw commodity to be refined abroad. This development will allow Tanzania to export fully refined gold from October this year onwards. It will also allow the country to establish a national gold reserve, as determined by the Mining Act. The Central Bank of Tanzania will also now be able to purchase and store gold, as directed by President John Magufuli.

In a concurrent development, the Tanzanian government has set up 28 mineral trading centres since March this year to improve revenue collection from artisanal miners. Since then, the centres have traded gold worth US\$60 million, while the government has collected US\$3 million in royalty and clearance fees.¹³

NEW GAS DEVELOPMENTS

Mauritania and Senegal recently discovered significant gas reserves in the greater Tortue Ahmeyim offshore project on the border between the two countries in West Africa. The exploitation of these gas reserves bodes well for the economies of the two countries. It is expected that known gas reserves will grow over time, which could lead to further expansion. The first discoveries in the area were in 2015, and the field is expected to produce its first gas by 2022. Mauritania and Senegal signed a cooperation agreement in 2018 and will share the returns of gas production. The Greater Tortue Complex is estimated to hold more than 25 trillion cubic feet of gas.¹⁴

In July, at a seminar in Mozambique, stakeholders attempted to establish mechanisms that would create such an opportunity by exploiting its natural gas to stimulate the country's industrial development. Mozambicans were encouraged to tap the many business opportunities brought by the gas discoveries. These opportunities resulted from high demand for goods and services to support the gas projects.

For the Rovuma Basin Offshore Area One project, a total investment of around US\$23 billion is expected. This makes this liquefied natural gas (LNG) project the largest investment in Mozambican history, and will also make Mozambique the largest producer and exporter of gas in Africa.

The total investment envisaged in Mozambique's gas industry is estimated to be more than US\$50 billion, with a total production of LNG of over 30 million tons a year.¹⁵

South Africa's state-owned freight logistics firm Transnet will launch a tender in 2020 for the country's first terminal to import liquefied natural gas (LNG) at Richards Bay port. The first gas is expected to land in 2024. This is part of an attempt to develop additional sources for its energy generation and move away from coal. The latter currently supplies more than 90% of South Africa's electricity.

The International Finance Corp (IFC) pledged US\$2 million to help finalise the design, finance, construction and operation plans. The project requires re-purposing existing pipelines to transport gas between the east coast city of Durban and commercial hub Johannesburg.

Transnet saw it as vital to secure new gas supplies as Sasol, which pipes the bulk of South Africa's gas needs from Mozambique, had cautioned it would face supply constraints from 2023 due to maturing of existing fields at Temane and Pande. Angola and Mozambique were seen as potential LNG suppliers.¹⁶

Further up north, state-owned enterprise Qatar Petroleum (QP) acquired a block of Kenya's offshore oil and gas exploration fields. There is a growing list of global corporations who want to exploit the large fuel deposits believed to be beneath the Indian Ocean seabed. QP signed an agreement with Total (from France – a 11.25% stake) and Eni (from Italy – a 13.75% stake) to take over three offshore exploration blocks in the Lamu Basin.

QP views this deal as an opportunity to strengthen its position in the exploration of frontier basins with significant hydrocarbon resource potential, as well as to strengthen Qatar's presence in Africa.¹⁷

THE IMPACT OF THE US-CHINA TRADE WAR

The US-China trade war is negatively impacting several mining companies active in Africa. Glencore, for example, moved to shut a cobalt mine in the DRC and two shafts in its copper mines in Zambia. These moves could lead to a potential loss of about 4,400 jobs.

The cobalt mine in the DRC will be placed on care and maintenance following a slump in cobalt prices. This mine produces about 20% of the metal used to make batteries for mobile phones and electric cars. The impact could be severe, as the mine supports about 3,000 jobs and paid US\$600 million in taxes last year. Shutting the two mining shafts in Zambia will put 1,400 people out of work. Copper plays an important role in Zambia's economy as it generates more than 67% of the country's export revenue and 20% of its tax revenue.

Partly as a result of the trade war, and partly due to a slowing global economy, demand for commodities has been weakening. The price of cobalt fell from more than US\$90,000 per ton in early 2018 to about US\$28,000 per ton. Copper prices also fell from US\$6,555 per ton in February 2019 to about US\$5,700.

According to the AfDB, the trade war could lead to a 2.5% per cent drop in the GDP of resource-rich African countries in three years.

According to Charles Robertson, the global chief economist of Renaissance Capital, the trade war has developed into a double-edged sword for African countries. Countries that sell hard commodities like oil, cobalt, copper or iron ore, including Angola, Zambia, Congo, Sudan and Nigeria, will be hurt. In contrast, countries such as Kenya, Ethiopia, Ivory Coast, Ghana, Uganda and Rwanda, as sellers of soft commodities such as tea, cocoa and coffee as well as gold, may benefit from the trade war.¹⁸

POINTS OF INTEREST

- I agree with Dr. Martyn Davies, MD of Emerging Markets and Africa at Deloitte, when he states that China's demand for commodities has underpinned Africa's growth for 20 years. This situation has

resulted in complacency in many commodity exporting countries because “if you had China growing at 7 or 8%, you don’t need to struggle.” Countries that are able to wean themselves off this commodity-driven model, will succeed.

- African governments should also take their mining industries more seriously. Investments in the mining sector have a long waiting period before they generate attractive returns. Any uncertainty regarding policy changes can and does, therefore, act as a deterrent to investments.
- We again see another country developing a gold refinery in order to add value locally before export. Angola is in the process of developing its first oil refinery. We will increasingly see these developments becoming commonplace throughout Africa and over a broad spectrum of sectors. For too long Africa has been exporting raw commodities, in the process losing opportunities in employment creation, export revenue generation, and import substitution. There seems to be a greater understanding amongst Africa’s leaders that they have to diversify away from the old model of commodity exports to value addition. On this point, it is interesting to note that at the 2015 FOCAC Summit in Johannesburg, President Xi Jinping stated China would help African governments to add value at source in order to reduce their dependence on the export of raw commodities.
- Gas reserve finds in Africa is becoming another commonplace activity. While Africa struggles with the technology and infrastructure locally to exploit these reserves, many foreign companies are standing in the queue to support governments such as in Mozambique (as well as Tanzania, Kenya, South Africa, Uganda, and Rwanda, to name but a few) to produce LNG. Qatar moving to support Kenya in the exploitation of its gas reserves, is an indication of its interest in Africa. It is also ensuring that QP will be able to generate returns for the small state of Qatar.
- It will be interesting to see when LNG takes over from coal as the major fossil fuel involved in energy generation. With the bad reputation of the latter in global warming, as well as more efficient technology, LNG has a good chance of becoming popular as an alternative. On the other hand, both coal and LNG have to keep an eye on renewable energy as a threat to replace them as a business model for energy. This is not only true for developing countries, but also for the developed world. Germany is obtaining 38% of its energy requirements from renewable energy sources.
- The dual impact of the US-China trade war on Africa is not surprising. The way the situation is currently unfolding, makes it unlikely we will see the trade war being ending in the short term. This conflict will continue to have a negative impact of Africa’s mining sector, but hopefully will add impetus to the drive by many governments to diversify their economies away from dependence on raw commodity exports, to a stronger focus on agriculture products. Stakeholders such as former president of Nigeria, Olusegun Obasanjo, has often promoted agriculture as the sector on which governments should focus. More recently, a former prime minister of Ethiopia made the same statement.

3. Renewable Energy Trends in Africa

In Africa, the volume of writing on the topic of renewable energy in the sub-sectors — i.e. hydro, solar, and wind, and even geo-thermal — boggles the mind. Rising equipment efficiency and the rate at which costs decline combine to make renewable energy an increasingly popular choice.

THE INCREASING IMPORTANCE OF OFF-GRID SOLAR

In Africa, more than 600 million people live without access to electricity from the grid. Even in countries where people have connection to a local grid, reliability of supply is an issue. To make matter worse, the population and per-capita use of electricity are expanding faster than grid capacity, and many homes still rely on kerosene, generators and torches for light. Off-grid solar technologies now allow those living in Africa to get clean electricity for considerably less than keeping a generator on hand, with the monthly payment deducted from the customers' mobile phone air time.

Lumos, the largest Nigerian provider of off-grid solar, reportedly has 100,000 customers paying significantly less for electricity than for running a generator. Households that used to spend US\$70 a month to fuel their generators now pay \$15 a month for off-grid solar. Lumos plans to supply solar power to 100 million people in the next 5-7 years, through installation of a solar panel and a storage device in a box, linked by the necessary cables.¹⁹

SOLAR PV FOR THE BUSINESS SECTOR

Solar PV system costs continue to decrease as a result of increased demand combined with technological developments. Experts expect the annual cost reduction rate for PV power to continue. Today, a solar PV system can reduce the cost of electricity for an SME up to a third, with a payback period of three to eight years from installation. While solar irradiation in the Northern Cape is much higher than in the Western Cape, businesses in provinces with low irradiation levels have benefited significantly from solar PV when the system is sized correctly.

The cost of the installation of such PV systems is always a challenge. However, a Power Purchase Agreement (PPA) - a model offered by the Engineering, Procurement & Construction (EPC) company— is an emerging solution. In this model, the PPA provider provides the capital to install the solar PV system and owns it. The client buys electricity from the PPA provider at a rate lower than the current grid tariff. PPAs are long-term agreements - usually 15 years - and include 'buy-out' clauses.

Currently available solar systems can also reduce exposure to energy price volatilities and increase property value for the owner. As battery storage for energy becomes cost-effective, it will be a game changer. The business case will improve, motivating even more investment in solar PV systems.²⁰

INTERNATIONAL FUNDING FOR RENEWABLE ENERGY

Solar power products manufacturer d.light solar obtained debt funding of US\$18 million from a consortium lenders focused on renewable energy. The consortium members consist of two responsibility-managed funds, along with SunFunder, DWM and SIMA. The funding will be used by d.light solar to grow its operations across Africa by expanding its product line, entering new markets and reaching more customers.

d.light solar has been active in Africa since 2007, providing solar energy to nearly 100 million people, using pay-as-you-go financing solutions and generating 171GWh of renewable energy in the process. The pay-as-you-go business model will enable off-grid customers to pay for solar lighting products in affordable instalments, through a range of mobile payment options.²¹

Nigeria still has far to go in terms of electricity creation, development and consumption, and the EU supports initiatives to improve its performance. The EU recently announced it would invest US\$165 million to fund Nigeria's renewable energy sector. The EU sees this investment as an element of its continued support for Nigeria's efforts to implement renewable energy in its energy mix. The investment will improve access to power for nearly 90 million people in Nigeria. Nigeria's Renewable Energy Master Plan aims to increase the use of renewable energy in the country to 10% by 2025.²²

DEVELOPING HYDRO ENERGY IN AFRICA

Zambia is developing its hydroelectricity capacity through the Ngonye project. Western Power Company, an independent power producer, announced it would invest US\$500 million to implement the project on the Zambezi River Falls in western Zambia. The next step is a call for tenders to select a company to carry out engineering, procurement and construction (EPC) of the hydro power plant.

The company responsible for carrying out the project will build a diversion dam on the river above the Ngonye Falls. The diverted water will travel 3 km through a canal to a hydroelectric power station located below, where it will spin two power station turbines to produce 60 MW of electricity.

The project includes construction of a transmission line to connect the hydropower plant to the National Grid. Western Power Company will sell the electricity to Zambia Electricity Supply Corporation (ZESCO), under a power purchase agreement (PPA).²³

IED Invest Cameroon will construct a mini-hydroelectric power plant in Mbakaou, in Cameroon at a cost of €6.8 million, financed by the EU, IED, BGFI Bank and the Rural Electrification Agency. The 1.4 MW mini-hydro plant will save €457,000 euros annually in fuel costs, and reduce greenhouse gases by up to 2893 tons per annum.²⁴

Morocco is increasingly active in the development of renewable energy, installing 1,212 MW of wind power, 1,770 MW of hydropower and 700 MW of solar capacity across the country in 2018. Morocco's objective is to grow the share of green energy to exceed 52% of the energy mix by 2030. In October 2018, Moroccan company Platinum Power received authorisation from the Moroccan Ministry of Energy to carry out eight hydroelectric projects in the country.

One upcoming project is building a 108 MW hydroelectric dam, with assistance from China. Platinum Power will build the infrastructure in partnership with the China First Highway Engineering Company (CFHEC), at an estimated cost of US\$300 million. This project will enable Morocco to achieve its objectives for exploitation of renewable energies. Platinum Power will also lead hydroelectric projects with a capacity of 325 MW in Morocco (Cascade Ahencal), 365 MW in Cameroon (Makay) and 300 MW in Cote d'Ivoire (Gao and Tayaboui).²⁵

In Tanzania, the huge Rufiji hydropower project should give its economy a significant boost. The US\$3 billion hydropower project was launched by President John Magufuli on 26 July 2019. Once completed, the project will produce 2,115 MW of electricity. The project is part of Tanzania's strategy to boost its energy sector for broader national industrialization.

Larger reservoirs to be constructed will serve multiple purposes, e.g. flood control, water supply, irrigation, fisheries and recreation. The Rufiji project will boost tourism through sport fishing, boat rides and photographic safaris. An estimated 12,000 people will be directly employed during the three years of the project's implementation.²⁶

In Central Africa, senior government officials of Burundi, the DRC and Rwanda recently endorsed the Rusizi III hydropower plant project. The project will generate 144 MW of power by 2026, and will cost US\$625.19 million. This is the first regional power plant in East Africa to be established under a PPP. Construction will start in 2021.²⁷

POINTS OF INTEREST

- We continue to see evidence of foreign government involvement with internal organisations in the financing of renewable energy plants in Africa. One reason for this could be that renewable energy is cheaper, easier, faster and more efficient to implement (especially solar plants) than constructing coal-fired or nuclear plants. Renewables are environment-friendly compared to both coal and nuclear, and even LNG. Should Africa turn towards fossil fuel to generate energy, and they develop economies to the same level as in the developed world, global warming would receive an unwelcome boost. There is possibly also a bit of a guilt complex involved, as Africa is the victim of global warming generated elsewhere by mostly, if not exclusively, the developed world.
- The number of businesses turning towards solar rooftops is also increasing. They turn to this model as they realise that transformation of South Africa's electricity supplier, Eskom, is not a short-term initiative, but will take several years. Meanwhile, Eskom's electricity supply is becoming increasingly expensive and unreliable. In the week of writing this digest, Eskom implemented a rolling blackout,

plunging many households, businesses, industries and even schools (where senior learners are writing their final school examinations) into darkness without warning. Given the importance of electricity to manufacturing, businesses will continue to reduce their dependence on Eskom. Of course, the phenomenon is not restricted to South Africa.

- In the past few months, hydro energy also received wide attention. Hydro is slightly less efficient than some of the other modes, as Africa frequently experiences seasonal droughts. Yet some countries adopt the hydro energy model as their primary mode of electricity generation. Ethiopia, for example, has the second largest hydropower potential on the continent. While only 10% is developed to date, it still covers 90% of Ethiopia's electricity demand. The country is also exploring wind farms and solar plants, and has discussed the adoption of nuclear energy with Russia.

4. Sustainability Trends in Africa

Africa is actively pursuing sustainability across a wide range of innovative projects, in water management, sustainable brewing, waste-to-energy, and recycling waste. Recycling waste in various formats is a trend that moves from strength to strength. The goal is to reduce waste on the one hand, while creating value for the community on the other. This value frequently takes the form of new employment opportunities, as well as development of a physical product or service.

PROVISION OF POTABLE WATER TO THE POPULATION

The Senegalese Rural Water Company (SDER), a subsidiary of the Senegalese Water Authority (SDE), won a tender for water management in rural areas. The project will run in three regions in Senegal over a 10-year period. The purpose of project is to provide people in rural areas with sufficient and higher quality water on a daily basis. The tender requires managing 544 structures in 93 municipalities and more than 2,000 villages. The project will provide water to 1.5 million people in the three regions.²⁸

RECYCLING PLASTIC WASTE

In Kenya, PET Recycling Company is partnering with Weeco, a Chinese company, to recycle 4,000 tons of plastic bottle waste. The plastic waste will be collected from across the country. Two plants will be set up, i.e. one in Athi River town in Eastern Kenya, and the other in Mombasa. The latter plant will cost US\$6 million. The plastic pellets created by Weeco are exported to China and used to make polyester fibre. The parties to the partnership also started a programme at some schools to focus on consumer awareness and donate books to the schools collecting plastic bottles for recycling.²⁹

Reform Africa, an entrepreneurial company in Uganda, is transforming discarded plastic bags into backpacks for everyday use. Women are hired to collect and wash plastic bags, which are then used to manufacture durable, sustainable and waterproof bags. The driving force behind the initiative is to do something about the plastic bags soiling the environment. The most popular imported polythene bag is the 30 microns polythene, which will decompose in about 1,000 years. The people at Reform Africa are cleaning the environment and generating income in the process.³⁰

In South Africa, GiLo Lifestyles (founded by two women) manufactures men shorts from disposed plastic waste in Cape Town. Approximately 20 plastic bottles are needed to make material for a pair of shorts that are water repellent, fast-drying, light, soft to touch and stretchy. The technology comes from China, where fabrics are made from plastic, and specifically plastic from the sea. After collection, the plastic waste is washed before being converted to smaller pellets, where after they are then stretched out made into yarn, then woven into fabric. The resulting fabric is finally printed digitally.³¹

Nigeria generates more than 32 million tons of waste annually. The city of Lagos produces about 10,000 tons each day. Wecyclers and Nestlé recently partnered to recycle waste in the country. The partnership will allow Wecyclers to expand its plastic waste recovery systems across Nigeria. Wecyclers will set up five collection points in Nigerian communities.

Nestlé Nigeria sees the partnership as a path to involvement in waste management, which remains a major concern for many states. Nestlé announced its decision to invest in the circular plastic economy, and will collaborate with other governments and civil society organisations to recover, recycle and reuse waste, such as plastic. Nestlé has the ambition to achieve the objective of zero environmental impact in their activities, while striving for a waste-free future. As part of this, Nestlé aims to make 100% of their packaging reusable or recyclable by 2025.

Wecyclers is a Nigerian start-up that specialises in collecting waste from households. Families receive points for waste collected, which are then used to buy phone time and consumer goods. It employs 120 people and have nearly 17,000 subscribers. The young firm is already making a profit of around US\$100,000. Its global partners include DHL, Coca Cola and Unilever.³²

RECYCLING TYRES

Volco Power, a South African company, and Green Distillation Technologies (GDT), an Australian company, recently signed an agreement to recycle used tyres. They will develop five recycling plants for used tyres in

South Africa. South Africa reportedly generates more old tyres than all other southern African countries combined. It produces at least 300,000 tons of used tyres every year, and of these, only 20% are recycled. The remaining 80% ends up parked in illegal storage sites.

The establishing of the five plants requires an investment of more than US\$33.7 million. Each plant will have 10 tyre processing and transformation modules and each facility will be able to recycle 700,000 used tyres per year. These tyres are loaded into an airless and hermetically sealed chamber, where they melt through exposure to high heat. This operation produces three products that are used in industry, i.e. black carbon, oil and steel. It is estimated that each of these plants will produce 8 million litres of oil, 7,700 tons of black carbon and 2,000 tons of steel annually. A by-product of the process is the production of electricity from the heat from melting tyres. The two partners intend to sell the electricity produced by the recycling plants to private companies.³³

BREWING BEER IN AN ENVIRONMENTALLY FRIENDLY MANNER

Diageo has recently invested £180 million in renewable energy resources across seven countries in Africa (Kenya, Uganda, Tanzania, South Africa, Seychelles, Nigeria and Ghana) to ensure its breweries are carbon-friendly and energy-efficient. Eleven breweries are involved in this initiative. This is the company's largest environmental investment in a decade. The project will ensure the breweries receive efficient modes of power and water technology such as solar energy, biomass power and water recovery initiatives.

In Kenya, Diageo's brand new brewery Kisumu has already had solar power and water treatment facilities installed to ensure its operations have minimal impact. The company believes that with 100% renewables and cutting edge water efficiency, "Tusker will be the most environmentally sustainable brewery in sub-Saharan Africa."

Diageo has achieved a 45% reduction in its carbon emissions and a 44% reduction in its water consumption over the past decade. The investment in Africa will enable them to position themselves for the future.³⁴

In Nigeria, Nigerian Breweries (a Heineken subsidiary) contracted with CrossBoundary Energy to operate its rooftop solar facility as part of a 15-year service agreement. Nigerian Breweries will pay for solar power produced on a monthly basis, including all maintenance, monitoring, insurance, and financing costs. The solar plant will supply 1GWh annually to the brewery, while reducing the site's CO₂ emissions by over 10,000 tons over the lifespan of the plant. The brewery expects this initiative to deliver energy to the brewery at a significant discount to their current electricity cost.

The project is about far more than cost savings. Heineken adopted a "Drop the C programme" for renewable energy, and wants to grow its share of production-related energy sourced from renewables from the current level of 14% to 70% by 2030. Nigerian Breweries has also targeted a 40% reduction in CO₂ emissions by 2030.³⁵

FROM WASTE TO ENERGY AND LIQUID DETERGENTS

Egypt intends to build a factory near Cairo that will convert waste to fuel. Orascom Construction will partner with Besix (from Belgium) to launch this initiative. The waste will be obtained from the new city under construction in Upper Egypt, which is expected to accommodate 6.5 million inhabitants in the near future. The plant will receive 2,000 tons of waste daily, for a period of 15 years. The fuel produced by the facility will be used to power a cement production plant.

It is the second initiative of this nature in Egypt. In July 2019, Fas Energy (a Saudi company) obtained approval to invest US\$300 million to build a plant to convert waste into electricity. In Phase 1, they will build a plant at a cost of US\$60 million that will incinerate waste and supply 20 MW of electricity.³⁶

In the city of Douala in Cameroon, an entrepreneur, Martial Gervais Oden-Bella –a chemist - makes soap and detergents by recycling cooking oil. The initiative originated when a hotel, concerned about protecting the environment, requested support to recycle large quantities of used cooking oil it had been discharging into nature. Oden-Bella now produces 165 kilograms of soap and two tons of liquid detergent per month. Used cooking oil waste clogs sewers and drains, pollutes the environment, and can harm wildlife. Douala hotels alone produce 20,000 litres of waste cooking oil per month.³⁷

POINTS OF INTEREST

- Until quite recently, Africa's waste problem was a growing giant with no real solution in sight. We then saw two developments, i.e. the Reppie Waste to Energy plant in Addis Ababa and the waste to gas plant in Cape Town, South Africa. The two plants being developed in Egypt are therefore welcome from a waste disposal point of view, with the added benefit of energy being generated. It cannot be overstated that Africa's waste challenges must be utilised in a way that creates jobs, reduces the volume of waste, and creates value in the form of electricity generated.
- The same principle is concerned where cooking oil, plastic and tyres are transformed into useful products. While banning the use of plastic in various forms is a step in the right direction, the existing volumes of plastics, etc. still need to be dealt with. More innovative initiatives such as those mentioned above are needed to deal with these problems. The examples show what can be done when people apply their minds to the problems at hand. These are the kind of challenges that can be addressed by social impact investments, where one can do well by doing good.
- The range of solutions to challenges are constantly increasing. Solutions have included plastic in tar roads, plastic bricks for schools, men's shorts from plastic, electricity, biofuels, fertilizer, chairs, buckets and bowls, and backpacks, to name but a few. This is in addition to those mentioned above. Frequently the beauty of the initiative lies in the simplicity thereof. Reminds one of the saying, "you don't need to be a rocket scientist..." You do, however, need to be mindful of the challenges and open to suggestions on solutions to the problems besetting Africa.

5. Technology Trends in Africa

Technological advances are pervasive drivers of change in most, if not all, sectors in both the macro and industry environments. They change how we do business (operating models), with whom we do business, against whom we compete, the nature of our revenue and cost models, the nature of value chains, and our value propositions, to name but a few aspects. These transformations bring about both challenges and advantages.

The latest collaborative effort by [Briter Bridges](#) and the [GSMA Ecosystem Accelerator programme](#) identifies 618 active tech hubs. This figure is based on the GSMA's 2016 – 2018's definition –The 2019 figure represents a 40 per cent leap since last year's study, which counted [442](#).

The hubs categories have been predominantly based on the type of support or facility offered to entrepreneurs, and include incubators, accelerators, university-based innovation hubs, maker spaces, technology parks, and co-working spaces. It is, however, worth noting that 25 per cent of the active total hubs only offer co-working facilities instead of specifically tech-focused support programs or funding. However, we considered it appropriate to include such organizations in light of the broader social role they play in the tech community, as safe spaces for the youth and catalysts of digital professionals.

GROWTH OF TECHNOLOGY HUBS IN AFRICA

According to Briter Bridges and the GMSA [Ecosystem Accelerator program](#), Africa's digital technology ecosystems experienced "incredible growth," from 442 tech hubs in 2018 to 618 active hubs in 2019. These hubs offer facilities and support for tech and digital entrepreneurs, and provide the backbone of Africa's tech ecosystem. Growth in the tech ecosystem is driven by several venture funds, through development finance, and corporate involvement, as well as innovative communities. Research by the GMSA identified an "innovation quadrangle" consisting of Nigeria, South Africa, Egypt and Kenya. Of these, Nigeria and South Africa have the most advanced ecosystems, with 85 and 80 active tech hubs respectively. Kenya, with approximately 50 tech hubs, represents East Africa, while Egypt, with 56 hubs, is positioned as the node between the African and Middle Eastern ecosystems. Cairo houses one of the largest venture fund pools.³⁸

TECHNOLOGY IN AGRICULTURE

Agrorite is a recently introduced Nigerian digital agricultural commodity trading and logistics platform. Its goal is to help Nigerian smallholder farmers to sell their farming products to local and international buyers at fair and competitive prices, thus overcoming one of the main challenges for African smallholder farmers. Agrorite aligns itself with the UN's Sustainable Development Goals, with Goal 2, Zero Hunger, as its focus. Specifically, Agrorite helps farmers with crop yields, financial inclusion, trading and logistics. To increase transparency and integrity of the system, Agrorite plans to incorporate blockchain on its platform sometime in the future.³⁹

Nigeria also recently experienced the launch of EZ Farming, another agricultural technology start-up. This company benefitted from US\$150,000 seed funding from USA-based accelerator 500 Startups. EZ Farming is a platform that enables farmers to fund their business operations through the provision micro-loans and easy access to produce buyers across the world. 500 Startups require participants in the accelerator to exchange a 6% equity stake in their business for funding, mentorship and hands-on training. In addition, participants must pay a fee of US\$37,500 to participate in its 500 Seed Programme. Since its inception, EZ Farming attracted more than 600 microlenders to invest over US\$600,000 in more than 120 verified and trusted farmers. Many of its clients are scaling rapidly, to become commercial farmers.⁴⁰

GROWING THE E-COMMERCE PRESENCE IN SOUTHERN AFRICA

Safaricom, Kenya's largest mobile telecoms operator and parent of mobile money app, M-Pesa, recently announced its intent to expand its Masoko e-commerce platform within Southern African by 2020. They envision many opportunities for business beyond Kenya's borders. As most families have access to mobile phones, these devices can accelerate economic development. Safaricom estimates that by the end of 2020, more than 525 million mobile phones will be in use in Southern Africa. Masoko's vision is to bring the market to small businesses wherever they are and to provide access to opportunities presented by the rapid growth

of e-commerce across the globe. Masoko entered a partnership earlier this year with AliExpress.com, the online shopping division of the Alibaba Group.⁴¹

NUCLEAR ENERGY EXPANSION A GROWING OPTION

South Africa still appears interested in building additional nuclear power. According to Minister of Mineral resources and Energy Gwede Mantashe, instead of a “big bang” approach, they will add capacity at a pace and price the country can afford. This involves adding capacity in a modular approach. As one of his first moves after becoming leader of the ANC in late 2017, President Ramaphosa stopped his predecessor’s attempt to launch a large nuclear expansion project with Russia. The general view is that South Africa cannot afford such a large nuclear project. Mantashe made the interesting point that, while corruption was suspected in the previous attempt, this did not mean that nuclear was irrelevant for the country in 2019. He also said that South Africa’s Integrated Resource Plan provided for “modular nuclear technology” as a potential source to replace obsolete energy capacity that will be decommissioned in the medium to long term.⁴²

Uganda is another country interested in developing a nuclear power capacity. In view of its uranium deposits, Uganda’s president is pushing the nuclear agenda and has agreed to work with Russia’s nuclear agency Rosatom. Russia’s state-owned companies appear to be at the centre of Russia’s strategy to boost its presence in Africa. According to Rosatom, the deal signed by the two countries lays a foundation for cooperation between Russia and Uganda in the nuclear energy field. This is in addition to the creation of nuclear energy infrastructure and the production of radio-isotopes for industry, medicine, agriculture, and the training of personnel. Russia first signed an MoU with Uganda in 2017, followed in 2018 by the signing of an MoU between Uganda and China.⁴³

These developments follow a pattern in which at least seven other sub-Saharan African states in recent years have signed agreements to deploy nuclear power with backing from Russia. Ethiopia, Sudan, Kenya, Uganda, Nigeria, Rwanda, Zambia and Ghana are countries that have signed agreements with Rosatom, with most of these agreements signed after 2015.

According to available data, Chinese state-owned nuclear firms are also active on the continent and have signed deals with Kenya, Sudan and Uganda.

The driver for rising interest in nuclear energy lies in the scarcity of coal. Also, most of the natural gas available in Nigeria and Tanzania is exported for profit. Strong population growth and pressure to reduce climate change and global warming are additional explanations for the interest in nuclear energy. However, high costs to build nuclear plants and the supporting infrastructure place constraints on expansion of the number of nuclear plants in Africa. There are also concerns about the potential for terrorism acts against these plants in areas with rebel groups and weak government institutions.⁴⁴

TELEMEDICINE GROWING ITS FOOTPRINT

In Cote d’Ivoire, the prevalence of heart disease, diabetes and other lifestyle diseases are increasing significantly. Unfortunately, fees for appointments for heart patients have been a major financial drain on many Ivorian families. These fees included the fee for the doctor or specialist, the hospital fee, the transport costs, and the costs of food and accommodation. However, due to the development and adoption of telemedicine, most of these costs are no longer an issue. Patients can now book an appointment at a telemedicine facility, where they are attached to monitoring machines that send the data to Bouake University Hospital in the centre of the country, where it is scrutinised by a cardiologist that can see the results in real time, provide a diagnosis and prescribe treatment.

This hospital’s cardiac department is linked with health centres in several towns, some of which are a four-hour drive away. Over the past five years, the project linked 10 health centres to seven cardiologists at Bouake. A total of 4,800 patients in other towns now receive consultations by telemedicine each year. The goal is to expand this to 20 sites, doubling the intake. There are now also calls to expand telemedicine to other medical fields, such as neurology and psychiatry, not just in Cote d’Ivoire, but across the entire West African region.⁴⁵

Liquid Telecom Kenya makes telemedicine available for thousands of patients through the Aga Khan Hospital, Mombasa. Liquid Telecom uses its high-speed fibre network equipped with the relevant software to connect the main hospital in Mombasa to seven of outreach centres in the coastal region. The roll-out of telemedicine helps to improve access to medical services that are often consistently available in more rural

communities. These services include online consultations and diagnostic services, and focus on family medicine, obstetrician-gynaecologist, ear, nose and throat as well as dermatology illnesses and conditions

In addition to online consultations, the dedicated network enables the hospital to run e-learning courses covering Continuous Medical Education and Continuous Nursing Education between the main hospital and outreach clinics.⁴⁶

POINTS OF INTEREST

- Both Russia and China are cultivating relationships in Africa to sell their nuclear technology to African governments desirous of providing electricity to their populations. As it is, more than 600 million people do not currently have access to electricity. In spite of its costs and other negatives, nuclear energy seems to have an attraction for various governments in Africa. With the negative impact of the climate associated with coal-fired systems, and the increasing number of global financial institutions no longer willing to finance the construction of coal-fired systems, it is not strange that nuclear is becoming popular as a base-load technology. This is in spite of the strong growth in the adoption and expansion of renewable energy technology.
- Mobile tech applications in the field of medicine appears to be rapidly gaining ground. With a huge shortage of medical practitioners, lack of infrastructure, long distances and high costs associated with medical service, there has always been a dire need for medical attention for most of Africa's population. A number of applications have surfaced in attempts by various groups and start-ups to address this need. These applications vary from linking symptoms for medical conditions to providing information on relevant treatment. Some have also developed a system where social media and mobile technology is used to better link patients to their doctors. This takes place at a much lower cost to the patient.
- The use of mobile technology in the agriculture sector is a rapidly growing phenomenon, only constrained by the imagination of the developers. Currently, applications linking investors (mostly tapping crowd-funding) to farmers and opening up opportunities in the market in a seamless value chain are becoming increasingly popular. Some, like Agrorite, focus on market growth to help the farmers find more profitable opportunities. All of them have the added benefit of addressing the challenge of food security. In Nigeria, FarmCrowdy has become a benchmark for other applications to copy, or to use as a point of departure for additional developments.
- Africa seems to be ripe for exploitation by e-commerce companies. E-commerce platforms require scale to succeed. Masoko's struggles in East Africa to gain scale seems to be its rationale for the planned expansion into Southern Africa. However, there it will compete with the likes of e-commerce platforms such as locals Takealot and Superbalist, African platform giant Jumia, as well as the global giants Amazon and Alibaba. It is therefore quite unlikely that Masoko will be successful on the short-term, if at all. The reasoning behind Masoko's venture into Southern Africa can probably be found in the fact the Masoko's parent is Safaricom, which in turn is a subsidiary of the Vodacom Group. The latter is the largest mobile telephony company in South Africa, and also has a significant presence in other Southern African countries. Bottom-line is that Masoko is probably betting on the subscribers of Vodacom Group to support them. It is unlikely that this strategy will succeed.

Author: Mr Johan Burger
Editor: Dr. A. Lee Gilbert
Editor-in-chief: Prof. Sam Park

ADDITIONAL READINGS

1. Trends in Agriculture in Africa

Anon. 2019. Lagos trains 955 in aquaculture to harness opportunities in agric value chain. *Newsdiary*. 19 August 2019. Available at https://agriculture.einnews.com/article_detail/493946933/C1McdDMVuAwKB627?n=2&code=rpdmgS26UQMEUBV6&utm_source=NewsletterNews&utm_medium=email&utm_campaign=Agriculture+News&utm_content=article. Accessed 14 October 2019.

Anon. 2019. Eastern Cape aims to create thriving economy through cannabis. *Fastmoving*. 2 August 2019. Available at <http://www.fastmoving.co.za/news/economic-15/eastern-cape-aims-to-create-thriving-economy-through-cannabis-13486>. Accessed 14 October 2019.

Ikade, F. 2019. African Development Bank approves \$13.2 million for aquaculture in Malawi. *Ventures Africa*. 17 October 2019. Available at <http://venturesafrica.com/the-board-of-directors-at-south-africas-old-mutual-could-face-jail-time/>. Accessed 18 October 2019.

Mutai, P. 2019. Kenya launches program to help improve nut crops. *IOL Business Report*. 26 July 2019. Available at <https://www.iol.co.za/business-report/international/kenya-launches-program-to-help-improve-nut-crops-29895250>. Accessed 14 October 2019.

Nkurunziza, M. 2019. Cassava producers turn to research to save operations. *The New Times*. 24 September 2019. Available at <https://www.newtimes.co.rw/business/cassava-producers-turn-research-capacity-save-operations>. Accessed 14 October 2019.

Ntirenganya, E. 2019. Horticulture: Rwanda's new cash cow. *The New Times*. 22 July 2019. Available at <https://www.newtimes.co.rw/news/horticulture-rwandas-new-cash-cow>. Accessed 14 October 2019.

Oirere, A. 2019. Mozambique faces pitfalls on path to harnessing fishing industry. *Seafoodsource*. 30 August 2019. Available at <https://www.seafoodsource.com/news/supply-trade/mozambique-faces-pitfalls-on-path-to-harnessing-fishing-industry>. Accessed 14 October 2019.

Oirere, S. 2019. Kenya, World Bank partner on mariculture development project. *Seafoodsource*. 7 October 2019. Available at <https://www.seafoodsource.com/news/aquaculture/kenya-world-bank-partner-on-mariculture-development-project>. Accessed 14 October 2019.

Ubwani, Z. 2019. Ethiopian Airlines to open Tanzania's horticulture to the world. *The Citizen*. 3 August 2019. Available at <https://www.thecitizen.co.tz/news/1840340-5221530-99ebew/index.html>. Accessed 14 October 2019.

2. Mining Trends in Africa

Anon. 2019. Qatar Petroleum signs deal on three Kenyan offshore blocks. *Business Daily Africa*. 25 July 2019. Available at https://www.businessdailyafrica.com/news/Qatar-Petroleum-signs-deal-on-three-Kenyan-offshore-blocks/539546-5208358-12an1lc/index.html?utm_source=traqli&utm_medium=email&utm_campaign=bdafrica_newsletter&tqid=306vN2AkDEIBlq02sB2G0b53fTq1FDyWkV4tYbmvnA. Accessed 16 October 2019.

Anon. 2019. New gas discovery boosts Mauritania and Senegal production potential. *The North Africa Post*. 4 July 2019. Available at <http://northafricapost.com/32361-new-gas-discovery-boosts-mauritania-and-senegal-production-potential.html>. Accessed 16 October 2019.

Anon. 2019. Mozambique speaks openly about the exploitation of natural gas. *ESI Africa*. 4 July 2019. Available at <https://www.esi-africa.com/industry-sectors/generation/mozambique-speaks-openly-about-the-exploitation-of-natural-gas/>. Accessed 16 October 2019.

Anon. 2019. Angola: Contract for refinery site signed. *AllAfrica*. 2 July 2019. Available at <https://allafrica.com/stories/201907030059.html>. Accessed 16 October 2019.

Liedtke, S. 2019. South African mining as 'small window of opportunity to fix itself,' says panel. *Mining Weekly*. 3 October 2019. Available at <https://www.miningweekly.com/article/south-african-mining-has-small-window-of-opportunity-to-fix-itself-says-panel-2019-10-03>. Accessed 16 October 2019.

Mu Xuequan. (ed.) 2019. Tanzania to open first gold refinery plant in October: official. *Xinhuanet Africa*. 20 August 2019. Available at http://www.xinhuanet.com/english/2019-08/20/c_138324245.htm. Accessed 16 October 2019.

Roelf, W. 2019. South Africa sees new LNG import terminal; ready by 2024. *Reuters*. 25 July 2019. Available at <https://www.reuters.com/article/safrica-lng/south-africa-sees-new-lng-import-terminal-ready-by-2024-idUSL8N24Q5A1>. Accessed 16 October 2019.

Stevens, L.M. 2019. Stanbic Ghana reiterates commitment to mining and energy sector. *African Mining Market*. 20 June 2019. Available at <https://africanminingmarket.com/stanbic-ghana-reiterates-commitment-to-mining-and-energy-sector/4170/>. Accessed 16 October 2019.

3. Renewable Energy Trends in Africa

Anon. 2019. Rwanda, Burundi and DRC sign on joint power project. *Political Analysis Africa*. 30 July 2019. Available at <https://www.politicalanalysis.co.za/rwanda-burundi-and-drc-sign-on-joint-power-project/>. Accessed 14 October 2019.

Anon. 2019. Solar PAYG provider secures debt financing worth \$18m. *ESI Africa*. 2 July 2019. Available at <https://www.esi-africa.com/industry-sectors/finance-and-policy/solar-payg-provider-secures-debt-funding-worth-18m/>. Accessed 14 October 2019.

Anon. 2019. Solar PV: The solution for businesses. *ESI Africa*. 27 June 2019. Available at <https://www.esi-africa.com/industry-sectors/renewable-energy/solar-pv-the-solution-for-businesses/>. Accessed 14 October 2019.

Feukeng, L. 2019. Morocco: Platinum power to build a 108 MW hydroelectric dam. *Afrik 21*. 15 July 2019. Available at <https://www.afrik21.africa/en/morocco-platinum-power-to-build-a-108-mw-hydroelectric-dam/>. Accessed 14 July 2019.

Nduli, M. (ed.) 2019. Nigeria's renewable energy sector gets \$165 million boost. *Africa Oil & Power*. ND. Available at <https://africaoilandpower.com/2019/07/09/nigerias-renewable-energy-sector-gets-165-million-boost/>. Accessed 14 October 2019.

Ngounou, B. 2019. Cameroon: IEP Invest starts mini hydroelectric power plant construction in the north. *Afrik 21*. 3 July 2019. Available at <https://www.afrik21.africa/en/cameroon-ied-invest-starts-mini-hydroelectric-power-plant-construction-in-the-north/>. Accessed 14 October 2019.

Silverstein, K. 2019. Off-grid solar power is making Africa's emerging economies a little brighter. *Forbes*. 19 August 2019. Available at <https://www.forbes.com/sites/kensilverstein/2019/08/19/off-grid-solar-power-is-making-africas-emerging-economies-a-little-brighter/#30ad6ad46cd3>. Accessed 14 October 2019.

Takouleu, J.M. 2019. Zambia: Western Power allocates \$500 million to Ngonye hydroelectric project. *Afrik 21*. 3 July 2019. Available at <https://www.afrik21.africa/en/zambia-western-power-allocates-500-million-to-ngonye-hydroelectric-project/>. Accessed 14 October 2019.

Xinhua. 2019. Tanzania to launch mega 2,115 MW hydropower project. *IOL International*. 23 July 2019. Available at <https://www.iol.co.za/business-report/international/tanzania-to-launch-mega-2115-mw-hydropower-project-29713678>. Accessed 14 October 2019.

4. Sustainability Trends in Africa

Anon. 2019. 11 African brewing sites to become carbon-friendly by 2020. *ESI Africa*. 6 August 2019. Available at https://www.esi-africa.com/industry-sectors/future-energy/11-african-brewing-sites-to-become-carbon-friendly-by-2020/?utm_source=Spintelligent+Publishing+mailer&utm_medium=email&utm_campaign=ESI+Daily+Enews+6+August+2019&utm_term=https%3A%2F%2Fwww.esi-africa.com%2Findustry-sectors%2Ffuture-energy%2F11-african-brewing-sites-to-become-carbon-friendly-by-2020%2F. Accessed 17 October 2019.

Anon. 2019. Nigerian Breweries set to install rooftop solar facility. *ESI Africa*. 21 March 2019. Available at <https://www.esi-africa.com/industry-sectors/renewable-energy/nigerian-breweries-set-to-install-rooftop-solar-facility/>. Accessed 17 October 2019.

Athumani, H. 2019. Ugandan woman turns plastic bags into backpacks. *VOA Africa*. 25 September 2019. Available at https://www.voanews.com/africa/ugandan-woman-turns-plastic-bags-backpacks?utm_source=Africa.com&utm_campaign=a884436027-EMAIL_CAMPAIGN_2018_06_22_02_06_COPY_01&utm_medium=email&utm_term=0_12683c81a6-a884436027-29147709. Accessed 16 October 2019.

Feukeng, L. 2019. Nigeria: Nestle partners with Wecyclers against plastic waste. *Afrik 21*. 3 October 2019. Available at <https://www.afrik21.africa/en/nigeria-nestle-partners-with-wecyclers-against-plastic-waste/>. Accessed 16 October 2019.

Nzouankeu, A. 2019. Cameroonian chemist cleans up environment with waste oil soap. *VOA*. 16 October 2019. Available at https://www.voanews.com/africa/cameroonian-chemist-cleans-environment-waste-oil-soap?utm_source=Africa.com&utm_campaign=db853afe1d-EMAIL_CAMPAIGN_2019_05_27_09_40_COPY_01&utm_medium=email&utm_term=0_12683c81a6-db853afe1d-29147709. Accessed 17 October 2019.

PK. 2019. Sino-Kenya business venture is helping reduce plastic waste. *How Africa*. 25 September 2019. Available at https://howafrica.com/sino-kenya-business-venture-is-helping-reduce-plastic-waste/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+howafrica+%28How+Africa+and+More%29. Accessed 16 October 2019.

Takouleu, J.M. 2019. Egypt: besix and Orascom will transform waste into fuel near Cairo. *Afrik 21*. 10 October 2019. Available at <https://www.afrik21.africa/en/egypt-besix-and-orascom-will-transform-waste-into-fuel-near-cairo/>. Accessed 17 October 2019.

Takouleu, J.M. 2019. South Africa. GDT partners with Volco to set up 5 recycling plants for tyres. *Afrik 21*. 5 October 2019. Available at <https://www.afrik21.africa/en/south-africa-gdt-partners-with-volco-to-set-up-5-recycling-plants-for-tyres/>. Accessed 16 October 2019.

Takouleu, J.M. 2019. Senegal: SDER secures rural water management contract in 3 regions. *Afrik 21*. 3 October 2019. Available at <https://www.afrik21.africa/en/senegal-sder-secures-rural-water-management-contract-in-3-regions/>. Accessed 16 October 2019.

Towett, L. 2019. This African clothing brand is turning discarded plastics into men's shorts. *Weetracker.com*. 5 October 2019. Available at <https://weetracker.com/2019/10/05/african-clothing-brand-is-turning-discarded-plastics-mens-shorts-gilo-lifestyle-sa/>. Accessed 16 October 2019.

5. Technology Trends in Africa

Anon. 2019. Russia's Rosatom eyes nuclear projects in East Africa. *Middle East Utilities*. 24 September 2019. Available at https://www.utilities-me.com/news/13878-russias-rosatom-eyes-nuclear-projects-in-east-africa?utm_source=newsletter&utm_medium=email&utm_campaign=utilities-me-newsletters&utm_email=johanhburger@mweb.co.za. Accessed 13 October 2019.

Anon. 2019. Nigerian Agri-tech startup, EZ Farming clinches \$150,000 seed funding. *NIPC*. 27 August 2019. Available at https://nipc.gov.ng/2019/08/27/nigerian-agric-tech-startup-ez-farming-clinches-150000-seed-funding/?mc_cid=69fb77359d&mc_eid=5996ec09d0. Accessed 13 October 2019.

Anon. 2019. Agrorite.com unveils digital platform for smallholder farmers. *African Farming and Food Processing*. 2 August 2019. Available at <http://www.africanfarming.net/crops/agriculture/agrorite-com-unveils-digital-platform-for-smallholder-farmers>. Accessed 13 October 2019.

Cook, J. (ed.) 2019. Safaricom to expand e-commerce presence in Southern Africa. *IT News Africa*. 22 July 2019. Available at <https://www.itnewsafrica.com/2019/07/safaricom-to-expand-e-commerce-presence-in-southern-africa/>. Accessed 13 October 2019.

Esnault, D. 2019. In Ivory Coast, telemedicine revolution proves blessing for heart patients. *Medical Xpress*. 14 September 2019. Available at <https://medicalxpress.com/news/2019-09-ivory-coast-telemedicine-revolution-heart.html>. Accessed 13 October 2019.

Maseko, F. (ed.) 2019. Liquid Telecom connects Aga Khan Hospital to remote communities. *IT News Africa*. 24 April 2019. Available at <https://www.itnewsafrica.com/2019/04/liquid-telecom-connects-aga-khan-hospital-to-remote-communities/>. Accessed 13 October 2019.

Reuters. 2019. Russia, China back nuclear as a clean-power fix for Africa. *Middle East Utilities*. 11 February 2019. Available at https://www.utilities-me.com/news/12406-russia-china-back-nuclear-as-a-clean-power-fix-for-africa?utm_source=Jarvis&utm_medium=utilities-me.com&utm_campaign=recommended. Accessed 13 October 2019.

Shapshak, T. 2019. Africa's booming tech hubs are "backbone of tech ecosystem" having grown by 40% this year. *Forbes*. 11 July 2019. Available at https://www.forbes.com/sites/tobyshapshak/2019/07/11/africas-booming-tech-hubs-are-backbone-of-tech-ecosystem-having-grown-40-this-year/?utm_source=Africa.com&utm_campaign=598c0faac6-EMAIL_CAMPAIGN_2018_06_22_02_06_COPY_01&utm_medium=email&utm_term=0_12683c81a6-598c0faac6-29147709#d1494b624c24. Accessed 13 October 2019.

Winning, A. and Reid, H. 2019. SA considering modular nuclear technology. *Business Day*. 20 August 2019. Available at https://www.businesslive.co.za/bd/national/2019-08-20-sa-considering-modular-nuclear-technology/?utm_source=&utm_medium=email&utm_campaign=Shoprite+shares+fall+on+slump+in+profits+%7C%2%A0Duma+Gqubule+on+how+IMF+loan+will+gear+down+SA+economy+%7C+Newly+signed+historic+labour+pact+already+in+tatters&utm_term=http%3A%2F%2Fwww.businesslive.co.za%2Fbd%2Fnational%2F2019-08-20-sa-considering-modular-nuclear-technology%2F. Accessed 13 October 2019.

REFERENCES

1. Trends in Agriculture in Africa

- ¹ <https://www.newtimes.co.rw/news/horticulture-rwandas-new-cash-cow>
- ² <https://www.thecitizen.co.tz/news/1840340-5221530-99ebew/index.html>
- ³ <https://www.newtimes.co.rw/business/cassava-producers-turn-research-capacity-save-operations>
- ⁴ https://agriculture.einnews.com/article_detail/493946933/C1McdDMVuAwKB627?n=2&code=rpMgS26UQMEUBV6&utm_source=NewsletterNews&utm_medium=email&utm_campaign=Agriculture+News&utm_content=article
- ⁵ <https://www.seafoodsource.com/news/aquaculture/kenya-world-bank-partner-on-mariculture-development-project>
- ⁶ <https://www.seafoodsource.com/news/supply-trade/mozambique-faces-pitfalls-on-path-to-harnessing-fishing-industry>
- ⁷ <http://venturesafrica.com/the-board-of-directors-at-south-africas-old-mutual-could-face-jail-time/>
- ⁸ <http://www.fastmoving.co.za/news/economic-15/eastern-cape-aims-to-create-thriving-economy-through-cannabis-13486>
- ⁹ <https://www.iol.co.za/business-report/international/kenya-launches-program-to-help-improve-nut-crops-29895250>

2. Mining Trends in Africa

- ¹⁰ <https://africanminingmarket.com/stanbic-ghana-reiterates-commitment-to-mining-and-energy-sector/4170/>
- ¹¹ <https://www.miningweekly.com/article/south-african-mining-has-small-window-of-opportunity-to-fix-itself-says-panel-2019-10-03>
- ¹² <https://allafrica.com/stories/201907030059.html>
- ¹³ http://www.xinhuanet.com/english/2019-08/20/c_138324245.htm
- ¹⁴ <http://northafricapost.com/32361-new-gas-discovery-boosts-mauritania-and-senegal-production-potential.html>
- ¹⁵ <https://www.esi-africa.com/industry-sectors/generation/mozambique-speaks-openly-about-the-exploitation-of-natural-gas/>
- ¹⁶ <https://www.reuters.com/article/safrica-Ing/south-africa-sees-new-Ing-import-terminal-ready-by-2024-idUSL8N24Q5AI>
- ¹⁷ https://www.businessdailyafrica.com/news/Qatar-Petroleum-signs-deal-on-three-Kenyan-offshore-blocks/539546-5208358-12an1lc/index.html?utm_source=traqli&utm_medium=email&utm_campaign=bdafrica_newsletter&tqid=3O6vN2AkDEIBlg02sB2G0b53fTq1FDyWkV4tYbmvnA
- ¹⁸ https://www.scmp.com/news/china/diplomacy/article/3023019/us-china-trade-war-hits-africas-cobalt-and-copper-mines-4400?utm_medium=email&utm_source=mailchimp&utm_campaign=enlz-gme_trade_war&utm_content=20190820&MCUID=7f8f006e64&MCCampaignID=adb4adc5e8&MCAccountID=7b1e9e7f8075914aba9cff17f&tc=9

3. Renewable Energy Trends in Africa

- ¹⁹ <https://www.forbes.com/sites/kensilverstein/2019/08/19/off-grid-solar-power-is-making-africas-emerging-economies-a-little-brighter/#30ad6ad46cd3>
- ²⁰ <https://www.esi-africa.com/industry-sectors/renewable-energy/solar-pv-the-solution-for-businesses/>
- ²¹ <https://www.esi-africa.com/industry-sectors/finance-and-policy/solar-payg-provider-secures-debt-funding-worth-18m/>
- ²² <https://africaoilandpower.com/2019/07/09/nigerias-renewable-energy-sector-gets-165-million-boost/>
- ²³ <https://www.afrik21.africa/en/zambia-western-power-allocates-500-million-to-ngonye-hydroelectric-project/>
- ²⁴ <https://www.afrik21.africa/en/cameroon-ied-invest-starts-mini-hydroelectric-power-plant-construction-in-the-north/>
- ²⁵ <https://www.afrik21.africa/en/morocco-platinum-power-to-build-a-108-mw-hydroelectric-dam/>
- ²⁶ <https://www.iol.co.za/business-report/international/tanzania-to-launch-mega-2115-mw-hydropower-project-29713678>
- ²⁷ <https://www.politicalanalysis.co.za/rwanda-burundi-and-drc-sign-on-joint-power-project/>

4. Sustainability Trends in Africa

- ²⁸ <https://www.afrik21.africa/en/senegal-sder-secures-rural-water-management-contract-in-3-regions/>
- ²⁹ https://howafrica.com/sino-kenya-business-venture-is-helping-reduce-plastic-waste/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+howafrica+%28How+Africa+and+More%29
- ³⁰ https://www.voanews.com/africa/ugandan-woman-turns-plastic-bags-backpacks?utm_source=Africa.com&utm_campaign=a884436027-EMAIL_CAMPAIGN_2018_06_22_02_06_COPY_01&utm_medium=email&utm_term=0_12683c81a6-a884436027-29147709
- ³¹ <https://weetracker.com/2019/10/05/african-clothing-brand-is-turning-discarded-plastics-mens-shorts-gilo-lifestyle-sa/>
- ³² <https://www.afrik21.africa/en/nigeria-nestle-partners-with-wecyclers-against-plastic-waste/>
- ³³ <https://www.afrik21.africa/en/south-africa-gdt-partners-with-volco-to-set-up-5-recycling-plants-for-tyres/>
- ³⁴ https://www.esi-africa.com/industry-sectors/future-energy/11-african-brewing-sites-to-become-carbon-friendly-by-2020/?utm_source=Spintelligent+Publishing+mailer&utm_medium=email&utm_campaign=ESI+Daily+Enews+6+August+2019&utm_term=https%3A%2F%2Fwww.esi-africa.com%2Findustry-sectors%2Ffuture-energy%2F11-african-brewing-sites-to-become-carbon-friendly-by-2020%2F
- ³⁵ <https://www.esi-africa.com/industry-sectors/renewable-energy/nigerian-breweries-set-to-install-rooftop-solar-facility/>
- ³⁶ <https://www.afrik21.africa/en/egypt-besix-and-orascom-will-transform-waste-into-fuel-near-cairo/>
- ³⁷ https://www.voanews.com/africa/cameroonian-chemist-cleans-environment-waste-oil-soap?utm_source=Africa.com&utm_campaign=db853afe1d-EMAIL_CAMPAIGN_2019_05_27_09_40_COPY_01&utm_medium=email&utm_term=0_12683c81a6-db853afe1d-29147709

5. Technology Trends in Africa

- ³⁸ https://www.forbes.com/sites/tobyshapshak/2019/07/11/africas-booming-tech-hubs-are-backbone-of-tech-ecosystem-having-grown-40-this-year/?utm_source=Africa.com&utm_campaign=598c0faac6-EMAIL_CAMPAIGN_2018_06_22_02_06_COPY_01&utm_medium=email&utm_term=0_12683c81a6-598c0faac6-29147709#d1494b624c24

³⁹ <http://www.africanfarming.net/crops/agriculture/agrorite-com-unveils-digital-platform-for-smallholder-farmers>

⁴⁰ https://nipc.gov.ng/2019/08/27/nigerian-agric-tech-startup-ez-farming-clinches-150000-seed-funding/?mc_cid=69fb77359d&mc_eid=5996ec09d0

⁴¹ <https://www.itnewsafrica.com/2019/07/safaricom-to-expand-e-commerce-presence-in-southern-africa/>

⁴² https://www.businesslive.co.za/bd/national/2019-08-20-sa-considering-modular-nuclear-technology/?utm_source=&utm_medium=email&utm_campaign=Shoprite+shares+fall+on+slump+in+profits+%7C%C2%A0Du+ma+Gqubule+on+how+IMF+loan+will+gear+down+SA+economy+%7C+Newly+signed+historic+labour+pact+already+in+tatters&utm_term=http%3A%2F%2Fwww.businesslive.co.za%2Fbd%2Fnational%2F2019-08-20-sa-considering-modular-nuclear-technology%2F

⁴³ https://www.utilities-me.com/news/13878-russias-rosatom-eyes-nuclear-projects-in-east-africa?utm_source=newsletter&utm_medium=email&utm_campaign=utilities-me_newsletters&utm_email=johanhburger@mweb.co.za

⁴⁴ https://www.utilities-me.com/news/12406-russia-china-back-nuclear-as-a-clean-power-fix-for-africa?utm_source=Jarvis&utm_medium=utilities-me.com&utm_campaign=recommended

⁴⁵ <https://medicalxpress.com/news/2019-09-ivory-coast-telemedicine-revolution-heart.html>

⁴⁶ <https://www.itnewsafrica.com/2019/04/liquid-telecom-connects-aga-khan-hospital-to-remote-communities/>



NTU-SBF
Centre for African Studies
Nanyang Business School

NTU-SBF Centre for African Studies

The NTU-SBF Centre for African Studies (CAS) is to develop thought leadership and capacity for doing business in Africa. It includes bringing Africa to Southeast Asia and Singapore and helping Singapore to be positioned as the gateway into Southeast Asia. As such, CAS aims to build and expand its local and international profile by means of publications, conferences, seminars and business forums through collaboration with local businesses, other research entities and business schools in Singapore and Africa. <http://www.nbs.ntu.edu.sg/Research/ResearchCentres/CAS>



Nanyang Centre for Emerging Markets
Nanyang Business School

Nanyang Centre for Emerging Markets

The Nanyang Centre for Emerging Markets (CEM) is a new initiative by Nanyang Business School to establish global thought leadership on business-related issues in emerging markets. It conducts research on pressing and timely business issues in emerging markets through a global research platform of leading scholars and institutional partners. It closely interacts with corporate partners to identify research topics and manage the research process. Its research outputs include valuable and relevant implications for sustained profitable growth for local and multinational companies in emerging markets. It delivers a variety of research reports and organizes forums, seminars, CEO roundtables, conferences, and executive training programmes for broad dissemination of its research outputs. <http://www.nbs.ntu.edu.sg/Research/ResearchCentres/CEM>

Partner Organizations



Contact Information:

Que Boxi

Email: cas@ntu.edu.sg

Phone: +65 65138089

Address: S3-B1A-35 Nanyang Business School

Nanyang Technological University

50 Nanyang Avenue Singapore 639798