

**NEXT-GENERATION
FARMERS**

*Digitally connected
and business-minded*

INTERVIEW

*Josefa Sacko identifies women
as key agents for development*

LEADING LIGHTS

*The women reinvigorating
Caribbean agribusiness*

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SPORE

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Agribusiness leaders

WOMEN DRIVING AGRICULTURAL INNOVATION



A global perspective on agribusiness and sustainable agriculture





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EDITORIAL

New markets for women and youth in agriculture

Michael Hailu, director – CTA



The first Pacific Week of Agriculture (PWA), which CTA has championed for several years to replicate the success of the Caribbean Week of Agriculture, took place in Vanuatu from 16–20 October 2017. The forum brought together the region's Ministers of Agriculture and other senior government officials, farmers,

private sector groups, development partners and representatives of international and regional organisations. The forum was organised by the Government of Vanuatu in collaboration with the South Pacific Commission and FAO.

A key theme of the PWA was agritourism, which offers a major opportunity for farmers and agribusinesses in Small Island Developing States, particularly in the Pacific where tourism and agriculture are two of the largest sectors. To review progress and support further developments in this area, CTA and its key partners organised a workshop on *New opportunities in the agritourism sector in the Pacific*. Agritourism offers opportunities for increasing domestic earnings and developing new lucrative markets, as well as potential to drive product development and diversification. Workshop participants called on Pacific Ministers of Agriculture and Ministers of Tourism to create an enabling environment for local entrepreneurs and support the development of new markets.

In this edition of *Spore*, the *Value Chains* article examines the success of Pacific entrepreneurs in one such new market – natural beauty. The innovative entrepreneurs working with farmers to produce natural soaps, oils and lotions in the Pacific are predominantly women. To investigate the key drivers of success for such women entrepreneurs, the *Dossier Analysis*, *Interview* and *Field Reports* examine the cases of different women-led agribusinesses and the organisations that have supported them. It is crucial for economic growth and food security that women and youth are encouraged and supported to engage in the agricultural sector. The high-level panel on *Promoting youth agri-entrepreneurship in the Pacific* – organised by CTA and partners at the PWA – emphasised the necessity of investing in programmes like CTA's Pitch AgriHack initiative, which promote youth entrepreneurship in agriculture. The *Trends* article in this edition highlights the potential of these 'future farmers', who are harnessing technology to transform agriculture.

The success of the inaugural PWA has strengthened our resolve to continue supporting South-South collaboration and partnerships to promote agriculture, not only for food security and nutrition but also as an engine for economic growth and job creation.

NEXT-GENERATION FARMERS

Digitally connected and business-minded

Numerous initiatives are emerging in the agricultural community that illustrate the potential profile of future African farmers – as informed business leaders, who make a good living and are connected online – and prove that agriculture offers exciting opportunities for young people.

Bénédicte Châtel

“Our parents relied on *daba* hoes and machetes, but young people are not ready to approach farming under the same conditions,” says Léa Boulo, coordinator for the rural development support agency ANADER in Côte d’Ivoire. Africa currently has the lowest level of mechanisation in the world, but things are changing fast. Many initiatives on the African continent are already bearing fruit and provide a composite portrait of the future African farmer – who is determined, online and business-minded.

The image of farmers, who are too often viewed as ‘behind the times’, is changing. At the opening of the 2015 African Green Revolution Forum (AGRF) in Lusaka, Strive Masiyiwa, Zimbabwean chairman and founder of Econet Wireless, declared that if he were to start over again he would still focus his business interests on agriculture.

Contributors to this new image of farmers as agribusiness entrepreneurs also include the Nigerian billionaire

and cement manufacturing magnate Aliko Dangote, who has been investing substantially in agriculture. In July 2017, Dangote announced that he was investing €3.2 billion in the sugar and rice sectors over 3 years with the aim of increasing sugar production from 100,000 t to 1.5 million t by 2020, and boosting current rice production by 1 million t. Additionally, five sugar refineries and 10 rice mills are to be set up in northern Nigeria. But the investor is not stopping there – Dangote Rice will also be listed on the Nigerian Stock Exchange, “when the time comes,” said Edwin Devakumar, Group Executive Director at Dangote. Moreover, the group has invested €680 million to purchase 50,000 dairy cows capable of producing 500 million l/year of milk by 2019.

Start-ups lauded

Agribusinesses or firms associated with agriculture are increasingly being promoted and rewarded by governments,

thus attracting the support of investors and mentors. Akinwumi Adesina, since taking office as the president of the African Development Bank, has never stopped praising farmers. In an exclusive interview for *Spore*, he said, “When Africa manages to feed itself, this will be important for the general market and economic stability of African countries, preservation of foreign exchange, transformation of rural areas, and creation of jobs for millions and millions of people. Therefore, agriculture must be at the centre of the economic diversification strategy and wealth creation in Africa. I believe that the future millionaires and billionaires of Africa will come out of the food and agriculture industry – not out of the oil and gas sector – because nobody eats oil and gas.”

Increasing numbers of agriculture-linked start-ups are now being showcased across the continent. The eFarms platform in Nigeria, which brings together farmers, investors and buyers, was a winner at the Pitch AgriHack 2017



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Digital training delivered by smartphones is enabling young agriculture students to learn new farming innovations to improve efficiency and yields

organised by CTA during AGRF 2017 held in Abidjan. Farmart Limited, a Ghanaian online fresh produce market and the other winning start-ups – AgroCenta (an online marketplace for agricultural produce) and Bayseddo (an agri-financing platform) – highlight the growing importance of agricultural innovation in modern farming. Congratulating the Pitch AgriHack finalists’ efforts, CTA Director Michael Hailu said, “I salute everyone’s efforts. The innovation among these young people has the potential to energise agriculture.”

Farming – a lucrative profession

Future farmers will not necessarily be born into farming families, but will be more likely to become farmers with greater opportunities to learn the trade and adapt their knowledge and skills to address new challenges as they unfold. Mobile phones will be essential.

Wind in the sails of digital platforms

Securing funding and clients are the two main hurdles that African farmers must overcome. The app 2KUZE, which means ‘let’s grow together’ in Swahili, was launched in Eastern Africa in January 2017 to address this issue.

The 2KUZE digital platform was developed at MasterCard’s Nairobi Labs for Financial Inclusion with the support of the Bill & Melinda Gates Foundation. It aims to connect smallholders with agents, clients and banks to enable them to conduct their transactions via their mobile phones without having to walk for hours to markets. “This solution in particular supports women farmers, who often have household duties that prevent them from leaving the farm gate and are more often subject to having to take whatever deal is given to them on the day,” MasterCard claims. 2KUZE is still in its infancy and is being supported by the Cafédirect Producers Foundation to work with 2,000 small-scale tea farmers in Nandi Hills, Kenya. The activity has been extended to Tanzania and launched under the name eKilimo in partnership with National Microfinance Bank.

2KUZE is not alone in this African agriculture-oriented digital platform niche. Phone operators such as Orange have been developing applications in many countries for several years, like the Eastern African Grain Council via its G-Soko Market Platform.

According to GSMA, the number of mobile phone subscribers in sub-Saharan Africa should grow from 420 million in 2016 to 535 million in

2020, with 40% of them having internet access.

Agricolleges International, launched in May 2017, offers education courses via

› its Desire2Learn digital platform. One of its applications measures how fast a student is learning via a smartphone to be able to adjust the pace of training. By using e-learning platforms, the training is less expensive than it would be in a traditional setting and is more readily accessible, which substantially increases the number of agriculture students that could benefit and the likelihood that they will continue their education.

Dissemination of agricultural information via text messaging is another example of this trend. The eShamba programme of the multinational company Syngenta disseminates training and advice on good farming practices to 230,000 young farmers in Kenya and Tanzania. Initial results highlighted that these farmers had already noticed a 50% increase in their crop yields and a return on investment of over 125%.

Training is the cornerstone of future farming, and the role of business incubators is growing. The 2SCALE project – whose programme is largely focused on capacity building for farmers, especially women – provides a brokering role to help farmers network with traders, intermediaries and other operators in the value chain. With information comes content and research, often giving rise to interesting innovations. This is reflected in the partnership agreement signed in August 2017 between the African Agribusiness Incubation Network and the Association for the Strengthening of Agricultural Research in East and Central Africa – agricultural technology can hence be more widely disseminated and promoted amongst farmers.

Farewell to monocropping

Future farmers will quite likely grow a more diverse range of crops using intercropping, rotation and/or agroforestry practices. Avocado and banana trees may, for instance, be planted in cocoa plantations to provide shade and protect cocoa trees from excessive heat, drought and diseases. This also enables cocoa growers, “to increase their income by diversifying their production,” says Moussa Sawadogo, cocoa grower and

Training is the cornerstone of future farming, and the role of business incubators is growing.

president of the SCINPA COOP-CA cooperative, north of Abidjan in Côte d’Ivoire. Syngenta and the Africa Rice Center offer rice varieties that produce 20% higher yields than conventional varieties and can be relay cropped with staples such as maize and cereals.

But what will future African farms look like? According to FAO, 80% of food production in Africa currently comes from low yielding farms of less than 2 ha. Although large-scale farms are currently in favour, they are of considerable concern for civil society organisations because of the land grabbing risk. Alternatives are being sought, such as contract farming which is driven by public-private partnerships (PPPs), which offer a more ‘inclusive’ agricultural model. The process is not new. Both the brewing companies Nile Breweries Limited in Uganda and Delta Beverages in Zimbabwe started sourcing sorghum for their brewery needs from local farmers about 10 years ago. The Dangote Group also recently used a PPP to launch

its operations in the rice sector in Sokoto state, Nigeria.

Meanwhile, a new category of farmers is emerging. These are often people who are interested in farming or getting back to the land, but have had a non-agriculture oriented career. Such farmers are often part of the diaspora who invest in medium-sized commercial farms which they may or may not own. One such woman doing this is the Cameroonian Claudia Ngassa, a banker in South Africa, who decided with the help of the Cocoa and Coffee Interprofessional Council in Cameroon and its New Generation programme to invest in the cocoa sector. “I’m still working in South Africa, but my project is progressing nicely in Cameroon. I have already planted 6 ha of cocoa trees this year,” said the young investor.

Accessible finance

Funding – traditionally a nightmare for farmers – is becoming more accessible. In Nigeria, start-ups like Farmcrowdy and Thrive Agric enable middle-class



Young farmers are adopting new technology to monitor their crops and enhance productivity

Nigerians to invest €170 to €637 in a crop season. Their capital is reimbursed and they get a share of the profits after the harvest. The entire interaction is handled online. Farmcrowdy, which was founded in November 2016 and already boasts a network of 1,000 sponsors and 3,500 farmers, offers funding, equipment and technical support for farmers, while providing pre-harvest opportunities to find buyers. Meanwhile, Thrive Agric leases land and signs contracts with farmers to produce specific crops. This start-up is currently collaborating with 300 farmers.

The relationship between farmers and bankers is also changing, especially via mobile banking. In Kenya, the 2KUZE digital platform connects farmers with agents and buyers (see box p5). Payments are fast and secure, while transactions are more transparent, which enables farmers to better negotiate their share of

With information comes content and research, often giving rise to interesting innovations.



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Geolocation of sustainable farmers

To heighten the visibility of sustainable agriculture advocates, the International Trade Centre, the United Nations Global Compact, and the non-profit organisation GSI, launched the Bluenumber Initiative – a global registry for sustainable farmers. Farmers are provided with a Blue Number, i.e. a geolocation number containing a range of information about them. Once listed in the registry, farmers can connect to a sustainability marketplace that has been operational since 2016, and then find buyers and exchange information with others in the network. By July 2017, more than 60,000 farmers had received a BlueNumber.

In September 2017, Bluenumber, in partnership with slaveFreeTrade, also introduced the Bluemark process – the world’s first certification to show that products are free of modern slavery.

the final price. The fact that these transactions are listed also facilitates bank lending.

These examples also show how new technologies – satellite and drone imagery, meteorological forecasts and soil sensors, which help develop precision farming – will be a mainstay in farmers’ livelihoods. According to the Africa Agribusiness Insights Survey 2016 entitled *AgTech – Don’t Wait for the Future, Create It*, 47% of the surveyed businesses had invested or planned to invest in agriculture via artificial intelligence.

Vital technology

There are already plenty of examples of digital technology being used in agriculture. In February 2017, the French drone manufacturer AIRINOV, in collaboration with CTA, trained farmers from Benin, the Democratic Republic of Congo, Ghana, Tanzania and Uganda on drone operation for monitoring crops, optimising fertiliser applications and mapping crops. In Kenya, UjuziKilimo uses wireless sensor networks, mobile technology and Big Data to enhance productivity. Since 2013, drip irrigation kits provided by the Kenyan company SunCulture have been solar powered, thus reducing irrigation, labour and fertilisation costs. Technology adoption is facilitated via Sunculture’s pay-as-you-grow formula whereby SunCulture advances funds to farmers to enable them to buy a solar pump and, in turn, the farmers reimburse the company once they begin generating a profit. Another example is Zenvus, an agtech business founded by Ndubuisi Ekekwe in Nigeria, which provides farmers with information on their farms and also what is happening elsewhere on other farms.

ICTs are already being widely used in agriculture and becoming affordable and accessible for smallholders. This is crucial. “The future farm may be very large or very small, but at the heart of farmers’ decisions will be a need for a more regenerative use of materials and land,” says Brian Harding, climate change specialist, SNV Netherlands Development Organisation, in a *Spore* opinion post. He also claims that future tools will boost farmers’ awareness of their environment and help them foresee changes.

A population boom has also led to unprecedented consumer food market growth in Africa which could be worth €1.7 billion by 2025. Here again innovative approaches are emerging. In Senegal, Sooretul (launched in 2014) is an online e-commerce platform for the promotion and sale of locally processed items such as juices, jams, semolina, etc., produced mainly by women. Orders can be placed 24 hours a day and customers pay for their orders upon delivery, which is advantageous since many buyers do not have bank cards to pay online.

“While it is still early to evaluate the impacts of the digitalisation of farming systems in Africa, in terms of productivity and improvement of human welfare, there is already a promising trend: technology is making farming exciting for young people,” claimed Ekekwe in the *Harvard Business Review* in May 2017. “As they see that developing mobile apps alone cannot feed Africa, many will turn to farming as a business,” he added. ■

✦ To read the thoughts of five experts on where ‘future farmers’ are headed, follow the link to *Spore’s* opinion posts: <https://tinyurl.com/mdmcktp>



CropGuard provides farmers with real-time information about pests and diseases and access to specialists

© CROPGUARD

ICT APPLICATIONS

Modernising Caribbean crop production

Recent ICT developments in the Caribbean have formed e-solutions to address the inaccessibility of up-to-date and local agricultural information.

Natalie Dookie

In the Caribbean, a crop forecasting system addresses supply and demand challenges in the agricultural sector by providing information about produce availability. The web-based platform, created by Grenada’s Marketing and National Importing Board (MNIB), is updated via field officers who visit farms and capture various information about production capacity. The farm data collected includes location, irrigation and water sources, crops planted (quantity and harvesting period), and pesticide and fertiliser use (frequency and type i.e. organic or chemical). In less than 2 years since its launch, approximately 25% (565) of MNIB’s 2,100 registered farmers use the system.

One of the key challenges to improving agricultural production in the region is a lack of timely and reliable information, a Caribbean Agricultural Research and Development Institute (CARDI) and CTA publication reports. “The crop



30-40%

of agricultural production in Barbados is lost due to pests and disease

forecasting system allows for better planning of agricultural production – we now know what the market will accept and can properly advise farmers on what to plant or not, based on the number of farmers we have in the system and what they are planting,” MNIB’s CEO Ruel Edwards explains. “The system has also improved efficiency in the agriculture sector as we can now undertake improved targeted procurement and marketing, monitor and track

production, and advise on what, when and where produce is coming from, and thus improve farmers’ profitability by matching demand and supply,” he adds.

Before the crop forecasting platform was established, typical monthly produce loss was approximately 10% of purchases, but this figure has now been reduced to under 3%. In the long-term, MNIB would like to have at least 80% of its farmers using the system and to even expand it to other islands. To help achieve this target, the agency is working towards improving the system’s user-friendliness and reporting capability. “Eventually, we would like to refine and integrate this into a single regional platform and, thus far, we have brought Barbados on board,” Edwards reveals.

Barbados entrepreneurs are also pushing ahead with their own ICT applications. One of the most successful is CropGuard, a web and mobile pest management system initially developed for

CTA's 2014 AgriHack Talent Caribbean programme. Following the competition, where CropGuard was awarded €4,000 for second place, developers Troy Weekes and Leonard Seale from the Addis Alem Cooperative Society Limited launched the app in 2015. Today, 200 farmers use the system informed by 60 agricultural officers and experts, including pathologists and entomologists. "CropGuard is a user-friendly, intuitive ICT knowledge-sharing platform designed to enhance agricultural production by bringing together stakeholders from across the value chain to solve pest and disease problems before they manifest and spread," Weekes explains.

One of the key challenges to improving agricultural production in the region is a lack of timely and reliable information.

Losses from pests and diseases usually account for 30–40% of production but, by using CropGuard, farmers receive pre-emptive information about potential threats and have real-time access to an experienced network of specialists, who can assist in diagnosing pests and diseases, and provide advice to address the situation. Previously, farmers would have had to wait between 3 and 21 days to obtain a credible pest and/or disease diagnosis whereas CropGuard takes just a few hours. With this information Weekes explains that, "Farmers can react quickly and suppliers also have access to insights on product demand." This allows them to ensure they have adequate stocks to meet changing demands as a result of pests or diseases. Weekes continues, "Aggregated information from the system is shared with researchers, regulators and policymakers, and training of farmers (on system use) remains ongoing. We have also recently concluded research in Jamaica and are working on consolidating this information to create a database of content for a wider Caribbean audience." ■

★ For the CARDI/CTA publication, *Regional Synthesis of ICT Uptake and Usage in Agricultural Value Chains in the Caribbean*, visit: <https://tinyurl.com/ycu6ft3g>

INTELLECTUAL PROPERTY

Pepper certification secures farmer incomes in Cameroon

A geographical indication label for a unique variety of pepper in Cameroon is improving the incomes of local farmers and ensuring the long-term future of the product.

Elias Ntungwe Ngalame

A farmer association in Penja village, in the Littoral region of eastern Cameroon, has been awarded an internationally protected geographical indication (PGI) label for its product, Penja Pepper. With support from the French development agency, Agence Française de Développement, the association obtained patented rights over the product name from the African Intellectual Property Organization in 2013. Since then, membership of the farmers' association has increased by more than 10 times, and the price of the coveted white pepper has skyrocketed.

According to agricultural experts, Penja valley's natural micro-climate and volcanic soil on the flanks of Mt. Kupe Muanenguba give the pepper (spice) a unique flavour and taste, which is attracting increasing demand in national, regional and international markets. The product is one of only three African commodities – alongside Oku honey from Cameroon and Zياما Macenta coffee from Guinea – to be given a PGI label, prohibiting the product's name from being used outside of its original region. Approximately 60% of the Penja Pepper is consumed locally and in neighbouring countries, whilst 40% is exported to European markets. "It is a real blessing for Cameroon and especially the farmers in Penja to see that Penja Pepper is fast becoming an export crop like cocoa and coffee," says Henry Eyebe Ayissi, Minister of Agriculture and Rural Development.

Successful certification, and subsequent demand from restaurants around the world, has increased production from less than 150 t in 2014 to 350 t in 2016. The price of the spice has also increased significantly since certification,

from €3.80 per kg before September 2013 to €12 per kg in 2014, and €21.30 in 2015/2016. This price spike is helping farmers improve their incomes and expand production areas. "Since certification, the market for our product has become stable and secure, guaranteeing our income," states David Nzoto, a Penja Pepper Farmers Association member. ■



Penja Pepper is one of only three African commodities to be given a PGI label

WATER SMART AGRICULTURE

Tools for an equitable and food secure future

Women farmers are using water smart techniques to sustainably increase crop yields, whilst maintaining vital soil ecosystems in Ghana, Malawi and Mali.

Stephanie Lynch and Charles Mkoka

An initiative promoting the use of water smart agriculture (WaSA) technologies and practices in Ghana, Malawi and Mali aims to enable a minimum of 40,000 smallholder farmers to improve their access to water for production, so that they are able to sustain their livelihoods and remain food secure in the context of climate variability. Launched by CARE International in 2016, the 3-year WaSA through Pathways programme is based on the premise that smallholder farmers will achieve greater food security through more sustainable access to and productive use of water. The initiative works directly with thousands of small-scale farmers, the majority of whom are women, to provide access to WaSA tools and knowledge.

The benefits of WaSA practices are threefold. Measures such as minimum tillage, the use of compost manure and the vetiver system – which involves planting vetiver grass hedges to create natural terraces that trap silt and ensure water run-off goes into the soil and crop root systems – improve soil

structure and reduce erosion. As well as being soil smart, these techniques, together with other WaSA practices such as the use of small-scale irrigation systems, ensure the efficient and equitable use of water and help to enhance food security by increasing crop yields; for instance, farmers using the vetiver system have increased yields by 30%.

In Malawi, 112 extension workers have been trained in WaSA practices and 42 farmer field business schools have active demonstration plots showcasing improved water management techniques, including mulching, tied ridges and *Zai* pits. Whilst crops are generally planted in two rows either side of ridges and furrows to collect water on sloping land in the tied ridge approach, *Zai* pit planting involves growing crops in pits 20–30 cm in length and 10–20 cm in depth, which are dug in the soil 60–80 cm apart prior to planting in order to harvest rainwater and hold mulch or compost. The compost helps to improve soil fertility and restore degraded dryland by increasing the soil's water infiltration and retention capacity – every 1% of organic matter can hold 185,000 l of plant-available water per hectare. Farmers using *Zai* pits have reported 79% higher yields, and 47% of participants in Malawi have committed to adopting the practice by the end of 2017.

So far, 4,500 farmers, more than 4,000 of whom are women, have participated in WaSA training in the Malawian districts of Dowa and Kasungu. “WaSA practices in Malawi are enhancing natural resources management and improving the soil structure to better store water, ensuring that even during extended dry spells, plants have access to water,” states Charles Mkangara, agriculture coordinator, WaSA through Pathways Malawi. He adds that, “In the medium- and long-term, this will help farmers produce more per unit area and improve household food and nutrition security.” An additional 4,400 farmers, mostly women, in Ghana and Mali have been trained in WaSA techniques, including 423 Ghanaian farmers who have received training in small-scale irrigation technologies to help improve their access to and efficient use of water for production during the dry season.

“In Mali, farmers face major constraints on production, including soil and water availability. In fact, in the Bandiagara area, only 10% of land is cultivable. Most of the lands are unproductive, infertile and vulnerable to drought,” explains Mamadou Fotigui Coulibaly, programme manager for WaSA through Pathways, Mali. However, smallholder farmers have been using the rock line approach to restore the soil in some degraded areas. Stones are laid along the contour line of the land to be reclaimed, which helps to reduce erosion, increase water infiltration and enable plant regeneration so that the soil becomes fertile enough for agricultural use. This approach has so far enabled smallholders to reclaim 41 ha of degraded land in Mali. ■

112
extension workers
have been trained in
WaSA practices in
Malawi



4,500 farmers in Malawi have increased their yields and improved the resilience of their livelihoods and local ecosystems using WaSA practices

SUGAR WASTE

Clean fuel for cooking

In Kenya, a safe, convenient and affordable ethanol cooking fuel is reducing damage to the environment, and impact on human health.

Charles Mkoka

An innovative technology platform is scaling the distribution of ethanol cooking fuel in Kenya. KOKO Networks provides a digital platform to urban consumers by leveraging an agent network and existing infrastructure, such as petrol stations and urban points of sale, to provide an affordable and safe alternative to 'dirty' fuels. Branded SmartCook, the cooking fuel is reducing CO₂ emissions and deforestation associated with the use of charcoal and kerosene, as well as improving the health of households by decreasing indoor air pollution.

In Africa's 40 largest cities, KOKO Networks estimates that the cooking fuel market is worth €21 billion annually. However, the majority of this expenditure is spent on environmentally harmful energy that is also dangerous to human health. Charcoal and kerosene both cause toxic indoor air pollution and, according to

the Global Alliance for Clean Cookstoves, lead to more than 20,000 deaths per year in Kenya alone. As a safe and convenient alternative, SmartCook ethanol cooking fuel is produced from the fermentation of molasses – an agro-industrial by-product from processing sugarcane into sugar. The ethanol produced is unsuitable for use in the beverage industry as it contains impurities and is usually wasted but, by altering the chemical properties of the compound, the by-product can be used to create fuel.

As well as fuel, KOKO Networks also produce a SmartCook stove kit which consists of a two-burner stove and a durable 'smart' canister that can be refilled at 'KOKOpoints' in local retailers, which act as fuel ATMs. KOKO Networks partners with fuel wholesalers and a network of agents, including urban shopkeepers, to increase availability. When a retailer is selected to become a KOKO agent, the company installs a cloud-connected e-commerce KOKOpoint kiosk into the shop. The KOKOpoint brings up customer account details when the KOKO canister docks with the KOKOpoint by recognising the unique chip within the SmartCook canister. A SmartCook stove kit costs €37 – half the price of an equivalent two-burner gas stove.

High consumer demand for ethanol fuel has already been demonstrated through a previous proof-of-concept venture in Mozambique that successfully converted 40,000 homes (10% of total households) in Maputo from charcoal to ethanol within 12 months of its retail launch in 2013. KOKO launched its fuel and stove technology in Kenya in April 2017 and currently retails in 12 neighbourhoods in Nairobi. ■

Local innovation

Waste to watts

IN RIJE VILLAGE, NIGERIA, an electric mini-grid powered by local organic waste is producing power for 550 people. Dubbed 'Waste2Watt', the plant currently generates 20 kW of power per day after converting waste to electricity through a biogas digester. The Rije villagers are now able to power household appliances including lights and freezers. The 1.2 t of waste required daily to produce the power is sourced from abattoirs, poultry farms and homes in the area, which reduces landfilling and the release of methane into the atmosphere through decomposition. Households using the power pay €12.80 per month which, according to Fatima Ademoh, the 25-year-old Waste2Watt innovator, is cheaper than using petrol or diesel for power.

Drought atlas

Increasing resilience

A CARIBBEAN DROUGHT ATLAS – the first of its kind – has been developed by Cornell University atmospheric scientists. Consisting of colourful and topographically complex maps, combined with weather data collated since the 1950s, the atlas provides a historical context of the region's climate. Understanding drought variability and its trends, as well being able to assess the dynamics and predictability of the hydroclimate is critical for improving the resilience and adaptation capacity of the 40 million people in this region. The online database will be updated monthly and "is especially important for the Caribbean, since many of its nations are some of the most vulnerable to severe drought," says Dimitris Herrera, co-author of the drought atlas at Cornell University.

★ For more information visit: <https://tinyurl.com/y8Bmerwt>

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KOKOpoints allow SmartCook customers to refill 'smart' canisters

SEED SECTOR

Renewed maize grain revives Haitian agriculture

In Haiti, a renewed and improved maize seed variety provides seven times the yield of traditional varieties, helping to tackle food insecurity in the country.

Sophie Reeve

A quality protein maize (QPM) variety with greater genetic purity and yield potential than local maize grain has been produced and distributed in Haiti. The improved QPM, known as ‘Hugo Plus’, is more nutritious than local varieties, with a higher content of essential amino acids and a good source of protein. Hugo Plus also produces up to 7 t/ha in comparison with traditional varieties that produce on average less than 1 t/ha. The International Maize and Wheat Improvement Center

(CIMMYT) has grown 150 t of the improved seed, to increase local food security and decrease malnutrition.

The poorest country in the Caribbean, Haiti has the lowest maize yields in the region and roughly 50% of the population is undernourished. According to USAID, which has helped to implement the project, Haiti cannot achieve economic growth and national stability if food security is not addressed. However, in the absence of formal seed companies, improving food security is complicated

says Alberto Chassaigne, a CIMMYT maize seed system specialist. “Farmers often sell their entire crop at harvest, leaving nothing for the next season, forcing them to plant simple maize grain that they buy from local markets rather than certified seed, drastically reducing yield over time,” he says.

A ‘basic’ Hugo variety was first produced and provided to Haitian farmers in 1998 after decades of maize research in Haiti and Latin America by CIMMYT and the Organization for the Rehabilitation of the Environment. Although initially a favourite among farmers, over time, the variety lost its genetic purity due to the lack of certified seed production in the region, leading to a drop in yields.

To ensure genetic purity of the renewed Hugo is maintained, CIMMYT is providing capacity development in the production and processing of Hugo Plus to farmers interested in working in the country’s maize seed sector. Three different entrepreneur groups interested in establishing a seed enterprise have been identified, and each group has received seed production and processing training from CIMMYT. A partner project, Feed the Future Chanje Lavi Plantè (Improving Farmers’ Lives), works with 60,000 farmers including 3,000 ‘master farmers’ who promote the use of Hugo Plus to other local farmers. “We can have an impact in Haiti, but our focus is for this impact to be that they have people well-trained in quality seed production with the criteria of cutting dependency,” says Chassaigne.

Of the 150 t of renewed Hugo Plus grown in 2016/2017 in Mexico, 20 t has already arrived in Haiti where it will be sold to farmers at affordable prices from input shops established by USAID’s Feed the Future programme and partners. The remaining 130 t will be used as a strategic seed reserve in case of natural disasters by providing an immediately available stock of seeds for re-planting. An additional 15 t of seed will be harvested in Haiti, up from 0–3 t in previous years.

Through a systemic series of maize trials, CIMMYT scientists have found new germplasms for two other resilient varieties – ‘Mayi Plus I’ and ‘Mayi Plus II’ – which outperform any other available seed, in both irrigated and rain-fed conditions. These resilient varieties are currently under multiplication to be introduced to Haitian maize farmers. ■



© LEVAEL EUGENE/CIMMYT

Hugo Plus produces up to seven times as much maize as traditional varieties

Food security

Improved seed

TEN CLIMATE-ADAPTED SMALL GRAIN SEED VARIETIES produced by the Crop Breeding Institute in Zimbabwe are increasing yields and reducing crop failure. In the drought stricken province of Matabeleland South, the varieties have been used by about 1,000 farmers, enhancing the food security of the area by doubling yields and increasing farmer incomes. An additional 20,000 farmers in surrounding areas are expected to benefit from the improved varieties through farmers sharing seeds and exchanges. Small grains such as sorghum, pearl millet and cowpeas are farmed for their drought tolerance, early maturing, and nutritional qualities, and are cheaper to grow than staple crops which require more fertiliser and irrigation.

Genetics

Productive chickens

AN INDIGENOUS BREED OF AFRICAN CHICKEN with more meat and egg productivity – on par with breeds such as Sasso from France and Kuroiler from India – has been developed after 20 years of research by Nigeria's Federal University of Agriculture, Abokuta (FUNAAB). Seventeen local breeds with higher body weights and blood lines resistant to diseases such as Avian leukosis were selected, multiplied, and crossbred to produce FUNAAB-Alpha. While local breeds weigh about 0.9 kg when mature and produce 40-60 eggs a year, FUNAAB-Alpha breeds weigh between 1.2-1.5 kg and produce 200-250 eggs a year. Through the African Chicken Genetic Gains collaboration, led by the International Livestock Research Institute, the new breed has been distributed to 2,500 farmers across Nigeria since 2016.

INNOVATION

Eco-friendly farming inputs

A bio-pesticide developed from locally available weeds and a carbon neutral organic fertiliser – a mixture of charcoal, crop residue and plant waste – have shown promising results for Kenyan farmers.

James Karuga

A bio-pesticide that helps Kenyan farmers protect their grain harvests from weevil attacks has been developed by industrial chemist Donatus Njoroge. The low-cost 'Molepse bio-resource', which has repellent and toxic capabilities and kills pests that come into contact with it in less than 5 minutes, is made from several extracts of the *Ocimum* (aromatic plants) species. "The product is formulated from different species of plants that are found locally here in Kenya. A drop of the (essential) oils, extracted from these plants, acts as an effective pesticide," said Njoroge.

The bio-pesticide, which took Njoroge 4 years to develop and is available in powder and liquid form, is applied by fumigating sacks of grain. Two sacks are used in the process; the sack containing the grain is fumigated first, and then

placed in another sack to ensure the bio-pesticide fumes are trapped. Twelve 90 kg bags of grain can be protected with only 60 ml of Molepse, at a cost of €0.80 for up to 6 months. "It has no chemical additives, which of course plays a major role in reducing its production costs and thereby making it affordable for poor farmers," Njoroge adds. "It is eco-friendly and safe." The product, which is being used by over 100 grain farmers in central Kenya, was also the first runner up in the 2017 East Africa Post-Harvest Technologies Competition, which was organised by the Inter Region Economic Network.

Samuel Rigu, another Kenyan innovator, has developed a carbon-neutral fertiliser and soil conditioner using locally available rice husks. Safi Sarvi®, which is a mixture of biochar (charcoal made from crop residues), crushed limestone and other plant waste, increases crop yields by 30% and annually removes at least 5.4 t of CO₂ equivalent from the atmosphere for every hectare of land it is applied to. The fertiliser also lowers soil acidity and aids retention of soil nutrients and moisture, reducing irrigation by 15%.

According to Rigu, Safi Sarvi® is half the price of conventional fertilisers (€12 for a 50 kg bag), and is being used by over 1,000 farmers growing rice, maize, wheat, bean, pea, vegetable and fruits in Kenya. Rigu's company, Safi Organics, also benefits farmers by paying them for a former waste product. As well as being certified organic by Ecocert, the fertiliser has also won a number of awards and was among the finalists for the Innovation Prize for Africa award in 2016. ■

© SAFI ORGANICS



Safi Sarvi® increases crop yields by 30% and is half the price of conventional fertilisers

SCHOOL MEALS

Farmers grow food for education

Thousands of farmers in Mozambique are supporting a drive to improve child nutrition and education by providing food for meals in 170 schools.

Rita Vaz da Silva

To improve poor results and attendance rates of primary school children in Mozambique's rural areas, farmers' associations in Nampula province are providing fresh produce to prepare daily meals for at least 64,000 students. With support from World Vision International, thousands of farmers have been able to sustainably increase their yields and supply enough food to reduce hunger in schools and help students stay in education.

Paulo Adelino, president of the Wakhaliherya farmers' group remembers, "Years ago, many children were dropping out of school, as they were not motivated enough to be at school for hours on empty stomachs." However, at Intenta primary school, he says, "Children in this school are now happy because they are eating *xima* [corn purée] and beans." This food is supplied by Adelino's farmers' association with support from World Vision's Educating Children Together Project (ECTP), which has been running since October 2012 in the Muecate and Nacaroa districts, Nampula province.

In the short-term, the initiative contributes to a reduction in hunger whilst, in the longer-term, it will continue to bring about improvements in agricultural production, as well as health and literacy. "We have two agronomists working with farmers on new farming techniques to improve production, crop diversity and yield. We also provide seeds and agricultural supplies to 80 associations, representing approximately 1,600 farmers. Those associations work with 170 schools," says José Daniel, assistant manager of ECTP's second phase. In the next 3 years, as farmer's associations build their production capacities with the agronomists' support and training in agribusiness skills, they have agreed to donate 30% of their production to schools.

The dietary diversity and nutritional value of children's school meals is an important component of the initiative and is incorporated into the capacity training of local producers. World Vision Mozambique and the Nampula provincial government encourage farmers to invest in high-quality produce with targeted training, including in crop management of selected fruits and vegetables, such as pineapple and papaya. Farmer's organisations are also supplied with



© WORLD VISION MOZAMBIQUE

Nutritious school meals are provided to more than 64,000 students in Mozambique

a range of seeds for nutritional crops, such as maize, peanuts and cabbage. As Anthony Akwenyu, chief of party at World Vision Mozambique, notes, "The farmers' associations have donated corn, beans, cabbage, onions, pepper and tomatoes, which has promoted dietary diversity in the children's school meals."

"The number of children able to read, write and comprehend their grade specific text has improved from 8% when the project started in 2013 to 25% in January 2016."

The beneficial impacts of these diverse nutritional diets on the children's education is already visible. "An impact evaluation conducted by World Vision revealed that the number of children able to read, write and comprehend their grade [or year-group] specific text has improved from 8% when the project started in 2013 to 25% in January 2016," Akwenyu states. ■



1,600

farmers in Mozambique donate their produce for school meals

MISOLA FLOUR

Fighting malnutrition in Mali

Farmers and processors in Mali are working together to produce Misola flour, designed to combat moderate and acute malnutrition in children and adults.

Soumaila Diarra

Misola flour, made of pearl millet (60%), soya (20%) and peanuts (10%) purchased directly from farmers chosen for producing quality grains, has become a staple food in the fight against malnutrition in Mali, particularly for children aged between 6 and 60 months and for pregnant and breastfeeding women.

Nineteen traditional production units, often made up of women, source the cereals and legumes that provide the basic ingredients of Misola flour from local farmers. Additional vitamins and minerals are added to improve the flour's nutritional quality and combat nutrient deficiencies. Finally, amylase

(a digestive enzyme) is also added to the flour. Amylase helps the body process carbohydrates into simple sugars, providing a porridge that is three times richer in energy than traditional porridge.

According to Doctor Moulaye Sangaré, who has monitored the use of the fortified flour since it was launched in Mali, "Misola flour's positive impact on children's health is apparent. Numerous studies have demonstrated its effectiveness." One study published in 2012 in the *Journal of Nutrition and Metabolism* shows that children suffering from severe malnutrition had a normal 'weight-for-height' score after eating Misola for 8 weeks. "The porridge made from the flour allows for a nutritional transition from breast milk to traditional solid food," says Fernand Rolet, co-president of the Misola Association, which created the flour.

Safiadou Coulibaly, 24 years old, is a regular user of Misola flour, and is full of praise for the product: "Misola flour is not just for children. I used it regularly when I was suffering from malnutrition. Even now, I continue to buy it several times a year." A 500 g packet costs €0.60 and will last for several meals.

The traditional production units sign a charter agreeing to respect the quality criteria of the flour, and to provide training to persuade local people to try the product. The units, grouped within a federation, also include agents responsible for promoting Misola flour to pharmacies and food stores, and for carrying out cooking demonstrations in health centres. ■



Pearl millet is one of the ingredients for Misola flour which is purchased directly from farmers

Nutritional NEWS

Technology tackles malnutrition

A NEW TOOL to promote food and nutrition security in sub-Saharan Africa, the Nutrition Early Warning System (NEWS), uses indicators related to climate, government budgets, infrastructure, diets and agricultural systems to formulate country-specific risk assessments of food crises. By alerting decision-makers to nutrition threats and offering tailored resolutions before a crisis breaks out, the tool seeks to deliver proactive solutions rather than reactive responses. The alert system, developed by the International Center for Tropical Agriculture, is facilitated by a machine-learning component that uses algorithms to identify nutritional patterns and trends as new information becomes available. The more data NEWS processes, the greater its capacity to detect warning signs and offer locally relevant recommendations.

✦ For more information visit: <https://tinyurl.com/y7u3ff9w>

Impact evaluation

Factoring in nutrition

TO SUPPORT AGRICULTURAL INITIATIVES in delivering positive outcomes for nutrition, a nutrition-sensitive intervention (NSI) selection tool has been developed by the Food, Agriculture and Natural Resources Policy Analysis Network. The online tool identifies NSIs that are appropriate for the focus of a given project according to the farming system (crop, livestock or mixed), and the areas of intervention (e.g. improved technologies). The tool ranks the impact of potential NSIs for each project on a scale of 1-8, with 1 representing the highest impact. The ranking score is assessed in terms of the NSI's impact in three areas: agricultural productivity, gender equality and nutrition. Practitioners can then make an informed decision about which NSI best suits their project.

✦ To register for the tool visit: <https://tinyurl.com/yc6ookur>

AQUACULTURE

Bringing fresh fish inland in Sierra Leone

Aquaculture is creating new rural markets catering to strong demands for fish and building economic resilience in poor, food-insecure inland areas.



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Community-run fish ponds are providing viable alternatives to rice and cassava farming

Vincent Defait

To provide communities with sustainable access to fish and counteract the impact of the recent Ebola virus outbreak in 2014, which almost halted agricultural production, WorldFish is working in Tonkolili district with the Ministry of Fisheries and Marine Resources (MFMR) to build fish ponds.

Fish accounts for 80% of animal protein consumption in Sierra Leone, yet FAO figures show that only 2% of marine fish make it to inland rural markets because of poor road infrastructure, a non-existent cold chain, and a fish product market that remains in its infancy. People living inland have therefore been confined to small subsistence fish farming, and an aquaculture sector that is still suffering from the effects of the 1991–2002 civil war, which disrupted agricultural activities and led to Sierra Leone's hatcheries being abandoned.

"Aquaculture is a viable alternative

to rice and cassava farming," says fish farmer Mohamed Koroma, who recently filled his 2,000 m² pond with 5,000 juvenile tilapia, under the USAID-funded Scaling up Aquaculture Production project. He adds that, "It's less labour-intensive and a better way to earn a living."

Farmers cluster together to build the ponds, which are then managed by individual farmers. Since 2016, 150 ponds with a density of 2.5 tilapia fry per m² have been constructed, or are undergoing construction or rehabilitation work in inland wetlands, which creates an ecosystem capable of retaining water even during the dry season. According to Colby Silvert, WorldFish project extension coordinator, "This model is promoting semi-intensive

fish farming as a small business and should allow small-scale farmers to turn a decent profit." In order to help farmers generate additional income and enhance market access, "We train farmers to carry out research about the local markets and secondary outlets such as restaurants," adds Silvert. "As more fresh fish comes onto the market, there'll be less need to transport marine fish from Freetown."

The initiative has also renovated the hatchery in Makali that was destroyed during the civil war to address a major obstacle to the development of aquaculture in the country: the current supply of fry, fingerlings, and fish feed – critical inputs in fish farming – is estimated to meet only 34% of the demand according to WorldFish assessments. The factory, which is owned by the government and employs six people, is being used by WorldFish to select genetically viable species to supply fish fry to farmers.

Smoked marine fish is easy to transport and, when packaged, can fetch between €0.95 and €3.30/kg in rural areas. However, "Fresh fish has a higher value, and is more popular with consumers," explains Paul Bangura, an FAO aquaculture consultant. "Fish from local farms can be transported fresh or still alive straight to local markets in rural areas."

In 2015 and 2016, FAO and MFMR launched two projects to build 64 breeding ponds, each 400 m², in Bo, Kenema, Kono and Tonkolili districts. The ponds are owned and managed by community groups of no more than 30 members, mostly young people. About 800 farmers – 30% of whom are women – have directly benefited from these projects, and 128 have received fish farm management training. The initiative has also delivered training to 16 officials from the fisheries and agriculture ministries,

who now have the knowledge and skills to help farmers manage their stock, assess fish quality and bring their products to local markets.

FAO estimates suggest that the 64 ponds will produce 20,000 kg of fresh fish each year in one or two harvests – which represents almost half of the country's current total annual freshwater fish output of 45,000 kg. ■

80%
of animal protein
consumption in Sierra
Leone comes from
fish

Certified shrimp

Boosting exports from Madagascar

THE FIRST SHRIMP FARM IN AFRICA to receive Aquaculture Stewardship Council (ASC) certification has been recognised for boosting community development, reforestation and for its sound environmental management, water treatment and waste management in Madagascar. Located in Mahajamba on the northwest coast, Unima, a pioneer in the Malagasy shrimp industry, partnered with WWF in 2007 to implement good environmental and social aquaculture practices. As a result, the company was awarded with the international labelling ASC certification in late 2016. "A first benefit is that ASC-certified farmed shrimp are given better access to international markets," says Didier Fourgon, former fisheries programme officer at WWF-Madagascar.

Caribbean fisheries

Assessing hurricane impacts

IN THE AFTERMATH OF HURRICANES Maria and Irma, Antigua and Barbuda and the Bahamas, amongst other islands, have suffered extensive damage to fishing vessels as well as to seagrass meadows, which support lobster, shrimp, and conch fisheries vital to fisherfolk livelihoods. The Barbuda fishing industry, for example, depends on conch and spiny lobster production, which has provided €125,000 to €312,000 annually over the last 5 years. In the Bahamas, around 6,000 people are employed in the fishing sector, with €84 million of products exported annually. Initial evidence after the hurricanes show large numbers of dead conch washed up onto sand banks. With the region already suffering from the impact of climate change, as well as reduced fish stocks and damaged marine ecosystems, restoring these valuable fisheries is an urgent priority.

ILLEGAL FISHING

Measuring maritime security in sub-Saharan Africa

A new online tool is measuring the impact of crimes such as piracy, illegal fishing and pollution in sub-Saharan Africa, and showing how each country is working to overcome them.

Sarah Glaser

A first-of-its-kind Stable Seas Maritime Security Index investigates how complex issues like piracy, illegal fishing, human trafficking, and other crimes intersect to create a uniquely insecure maritime environment. The index, developed by the NGO, One Earth Future (OEF), is the first comprehensive attempt to map and measure the unique combination of threats sub-Saharan African countries face, show how each is overcoming these problems, and identify what challenges they continue to face.

In Somalia, illegal, unreported, and unregulated fishing by foreign vessels threaten security and the blue economy. According to Oceans Beyond Piracy, one of the three OEF programmes that developed the tool in

partnership with Secure Fisheries and OEF Research, piracy in Somali waters has cost the global economy approximately €23 billion since 2010. In addition, research by Secure Fisheries shows that foreign vessels catch three times more fish than Somalis, worth about €254 million per year.

The Stable Seas Maritime Security Index explores the drivers and consequences of piracy and illegal fishing, and highlights the importance of combatting these threats as interconnected activities that must be addressed to achieve sustainable maritime security. The index makes clear that solutions to maritime insecurity must address root causes of instability and involve multilateral efforts between cooperating nations.

"Piracy cannot be eradicated if the issue of illegal fishing is neglected. The issue of illegal fishing cannot be solved if pollution is neglected. The solution to one problem involves taking into account the others," says Dr Christian Trimua, executive director of the Yaoundé-based Interregional Coordination Center which leads the regional implementation strategy on maritime safety and security in Central and West Africa. The interactive online tool of maps and solutions focusing on the waters off the coast of sub-Saharan Africa was initially launched in October 2017 in Malta. ■



© JEAN-PIERRE LARROQUE/ONE EARTH FUTURE

Foreign vessels catch three times more than Somali fishers

DR AKINWUMI ADESINA

Agriculture is at the centre of wealth creation

Dr Akinwumi Adesina, president of the African Development Bank (AfDB), discusses the importance of agricultural industrialisation to transform rural areas in Africa.

Sophie Reeve

AfDB, among other initiatives, invests in projects supporting a new generation of agripreneurs. Which projects have had the greatest impact and why?

Africa should be a global power house in food and agriculture because 65% of the cultivatable arable land left in the world is in Africa. And so we want to turn that into real wealth to help Africa benefit. But for that to happen, we have got to make agriculture cool and that is why AfDB launched the ENABLE youth initiative – to initially help young graduates get into agriculture as a business and create a new young dynamic in the agriculture and agribusiness sector in Africa to replace the rapidly ageing population. As a bank, we are committed to investing roughly €12.75 billion in these projects over the next 10 years, and our goal is to help start up at least 300,000 agribusinesses through this effort and create about 1.5 million jobs.

Last year we invested close to €680 million to kick off the ENABLE youth programme in six countries – Cameroon, Democratic Republic of Congo, Malawi, Nigeria, Sudan and Zambia. We also launched another initiative to help young entrepreneurs in particular, but not necessarily in

agriculture, called Boost Africa. This is a joint programme that we launched with the European Investment Bank and invested roughly €200 million to help support about 2,000 young entrepreneurs in various sectors, but mostly small and medium enterprises.

You oversaw the introduction of the first electronic wallet system in Nigeria in 2012. Which technologies do you think have been or will be the most important for connecting farmers with banks and financial services?

The electronic wallet system was a huge success in Nigeria. We tried to address 40 years of corruption in the fertiliser and seed sector as a result of the very corrupt government procurement systems that were in place. We used the power of mobile phones to do that, and farmers were sent electronic vouchers on their mobiles which they used to buy inputs from rural agricultural input traders. We were able to register farmers digitally and, over a 4-year period, we were able to reach well over 15 million farmers. It was a huge success in the sense that it put farmers in the middle of public policy, and there was a significant increase in public property accountability and transparency in terms of

how government resources are used to target smallholder farmers. This allowed Nigeria to increase food production by an additional 21 million t over 4 years.

The power of mobile phone technology is so critical, so AfDB is really pushing the frontier with regard to the use of mobile phone technology. When you look at technology in terms of financial services, a great example is Kenya and the use of M-Pesa – a mobile money transfer system. In Kenya today, about €20 billion goes through the M-Pesa system every year and so, at AfDB, we are working to help improve aspects of digital finance for millions across West and Central Africa in collaboration with the Bill and Melinda Gates Foundation. I think mobile phone and digital technology is transforming the lives of poor people. It has opened up opportunities to connect farmers to markets, and get market price information, insurance, and access to farm inputs and financial services. It is a very transformative technology.

Following the World Food Prize award, how do you intend to continue to drive change in African agriculture and alter the mindset towards farming so that it is conceived as a business?

First and foremost, I feel tremendously honoured to have been awarded the World Food Prize. But what is important to me is what we do from here. For me, the work is not yet complete. Today, we have 243 million Africans that are malnourished. We've got 58 million African children under the age of 5 years old that are stunted, which is the highest rate in the world. You have got 10 million young children in Africa who are obese. So the challenge is to rapidly eliminate



Dr Akinwumi Adesina recently won the 2017 World Food Prize for his leading role in expanding food production in Nigeria

food insecurity and malnutrition on the continent to make sure that we eliminate the wasting and the stunting of our children in Africa.

We must also turn all of the rural areas of Africa from what I call zones of economic misery to zones of economic prosperity, and that can only happen when we get agriculture working. And so the work ahead of me is to get countries to understand that agriculture is not a way of life, agriculture is not a development activity, agriculture is a straight line business.

Africa today produces 75% of cocoa beans in the world, but Africa accounts for only 2% of the €85 billion global chocolate market. Africa produces a lot of cotton but all of it is exported as raw cotton fibre. And the same thing goes for coffee. African countries are in the top 10 major coffee bean producing countries in the world, but we export them abroad as coffee beans. Now taking a look at chocolate, the price of cocoa will always decline, but never the price of chocolate or any derivatives of cocoa. And the price of coffee beans may go down, but not the price people pay at Starbucks for drinking coffee. So what Africa must do is get to the top of the global value chains in the things that it produces, in other words agricultural industrialisation, to add value to everything that Africa produces to be able to be competitive in the global market.

“Agriculture must be at the centre of the economic diversification strategy and wealth creation in Africa.”

Today, Africa spends €30 billion a year importing food. If nothing is done, that is going to reach €93.5 billion by 2030. And so, when Africa manages to feed itself, this will be important for the general market and economic stability of African countries, preservation of foreign exchange, transformation of rural areas, and creation of jobs for millions and millions of people. Therefore, agriculture must be at the centre of the economic diversification strategy and wealth creation in Africa. I believe that the future millionaires and billionaires of Africa will come out of the food and agriculture industry – not out of the oil and gas sector – because nobody eats oil and gas.

What is the significance of public private partnerships (PPPs) in transforming smallholder farms into productive and profitable businesses?

If you take a look at Thailand’s smallholder farmers, they produce the bulk

of the rice we eat globally. Smallholders in India are the ones that produce rice and some of the pulses we eat globally. That tells me there is nothing wrong with smallholder farmers. What we must do is make sure that smallholder farmers are provided with the support systems that they need. They need access to finance, information, markets, the best technologies in the world (including mechanisation), and rural infrastructure to transform the rural economy.

I think this is where the role of the private and public sector needs to be clear. You need smallholder farmers, medium-scale commercial farms and large-scale farms. The key is being able to connect them all, with the large and medium-scale commercial farms providing access to markets and supporting the infrastructure for farmers. So the role of PPPs here will be making sure, on the private sector side, that private agribusinesses are located in rural areas. The problem in Africa today is that private agribusinesses, especially food processing companies, are all located in urban areas. They sell very close to the ports where they bring in the raw materials, process them, and send products back. That is not creating any jobs in Africa at all.

At AfDB, we are pushing for a new PPP arrangement and infrastructure that we call ‘staple crop processing zones’ or ‘agricultural industrial development zones’. These are going to be vast areas located rurally where private businesses in agriculture will be encouraged to locate their food processing companies. That way they are closer to the farmers, can create markets for farmers, process and add value to all the agricultural commodities in place, review the massive amount of raw materials coming out of the rural economy and create a massive amount of jobs there. These areas are going to be enabled by governments with support from AfDB and others, with enabling infrastructure – power, water, roads and ICTs – that will drive down the cost of doing business. So these would transform all of the rural areas into what I would call zones of economic prosperity. ■

JOSEFA SACKO

Women: agents for development

Josefa Sacko, African Union (AU) Commissioner for Rural Economy and Agriculture, explains how women in agriculture need to be empowered.

Emeline Wuilbercq

As you take on your new role at the AU, what do you see as the best way to empower women to benefit from agriculture and food security in Africa?

If you look at Africa as a whole, women represent 70–80% of the labour force and yet they are discriminated against because they don't have access to land. In October 2017, the AU Commission launched the African Land Policy Centre, and land access for women and youth will be a priority. Our member states should put access to land in their national agricultural investment plans (NAIPs). Each country has got its own land tenure system but if a government gives a woman a 10-year concession, she will have a land property document which could serve as collateral if she wanted access to funding. I'm currently working with the AU Directorate of Women, Gender and Development to see how this strategy can be included in NAIPs.

How do you feel women in agribusiness could be better supported?

The issue of land or involvement of women in agriculture has to be looked at as a business. We should try to empower women and make them organise themselves into small and medium enterprises. Women and youth need support from the government, private sector and civil society. I'm going to meet with non-state

organisations of women in order to see how we can work together and, above all, how we can get the voice of vulnerable women heard by our heads of state.

We should not look at women as victims but as agents for development. When I was secretary general of the Inter-African Coffee Organization, there was a strong women's association in the coffee sector in Yaoundé (Cameroon) who organised themselves well. They were even able to elect one of the women farmers as a legislator in parliament. Africa has a problem seeing women at this level of decision-making and bringing their concerns. You have to choose women with knowledge so that they can defend the interest of their communities and address key issues at parliament. This is a lesson that we need to reinforce and multiply in other countries to empower women.

Where are the greatest opportunities to make a real difference in the next few years at the policy level?

Food security and nutrition have made good progress in spite of climate change variability. We need to build smart agriculture in order to address the issue of climate change. We need to work on initiatives like the Great Green Wall of The Sahel to stop desertification. We need to adapt ourselves to desertification, drought, floods, etc. otherwise,



Josefa Sacko explains how she intends to implement Africa's agricultural transformation

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it's really going to affect our progress in terms of food security and nutrition. Smart agriculture is coming mostly from Eastern African countries but the AU is also about to launch a smart agriculture initiative in Mozambique.

Today, Africa is importing more food than it exports. How can this pattern be reversed and Africa's agriculture sector transformed to be competitive on the global stage?

First, we need to organise ourselves and boost our income through commodities, through agricultural trade. Secondly, you have to secure national food security and then try to encourage continental trade, South-South trade. We want to encourage exports of our food. We don't want to depend on raw materials anymore.

Africa's agriculture sector can be competitive on the global stage if we invest. We need to invest public expenditure in agriculture, in research, development and innovation in order to improve productivity. We need to invest in human capital, to do proper land reform, to make land accessible to women, youth, and foreign investors.

Above all, we have to share experiences so that we get the transformation that we want. You cannot do things if you are isolated. We need to integrate our efforts to work together; multilateralism is the way forward. ■

SPORE

Dossier

**AGRIBUSINESS
LEADERS:
WOMEN DRIVING
AGRICULTURAL
INNOVATION**

Innovative businesswomen from across the ACP are joining international agricultural markets as they strive to overcome gender inequalities and achieve sustainable success in the sector.

WOMEN ENTREPRENEURS

Key factors to success in agribusiness

Women around the world are overcoming barriers to establish profitable businesses in the agricultural sector. However, strong links to high-value markets, access to necessary finance and resources, and sufficient business training are essential requirements for women business leaders to break through the ‘glass ceiling’ and expand their agribusinesses to compete on an international scale.

Stephanie Lynch with contributions from Jemimah Njuki



In Africa, 62% of economically active women work in agriculture as producers, traders and processors. Despite their high representation in the sector, rural women are still worse off in terms of productivity and earnings than men. At a session on *Investing in women entrepreneurs* at the European Development Days (EDD) in June 2017, CTA director Michael Hailu highlighted, “When you look at the entire value chain, women have a much bigger role in production, which is not very lucrative, but as you go further along the value chain they have much less of a role because they don’t have access to the resources that are needed, in terms of capital or land, for example.”

This limited access to resources contributes to a consistent wage gap

between rural men and women in Africa, which ranges from 15-60% depending on the country. If women were given the same access to productive resources, such as fertiliser, machinery and (market or weather) information as men, studies show that they could increase farm yields by 20-30%. The EDD session went on to discuss how to address this disparity between men and women in the agricultural sector and debate the best practices to support women’s entrepreneurship in agribusiness, including the importance of giving them an equal voice and representation in decision-making at policy level.

Supporting women’s empowerment

The economic empowerment of women in agriculture, through their

increased participation in commercial, value-added agribusinesses, is essential to transform the productivity and prosperity of the sector as a whole. “The future of our continent depends on it,” stated Dr Jemimah Njuki, senior program officer at the International Development Research Centre (IDRC), at the recent African Green Revolution Forum (AGRF) in Abidjan, Côte d’Ivoire. “In sub-Saharan Africa, gender inequality costs us an estimated €79.47 billion a year,” she added.

In spite of the current challenges, there are approximately 187 million women-owned businesses worldwide, including many in the agricultural sector in ACP regions. *Spore’s Value Chain* article, *Beautiful benefits: Natural beauty the Pacific way*, and *Field Report*,



Sarah Mubiru, managing director of Aroma Honey Toffee Ltd, brainstorming at a Gender in Agribusiness Investments for Africa workshop

strengthen linkages between private sector companies, WEConnect International identifies and registers women-led businesses on its online database (eNetwork) of local and multinational corporate buyers. To qualify, companies must be based outside the United States and be at least 51% owned and managed by women. After an individual consultation with a WEConnect International assessor, businesses are certified as a Women's Business Enterprise (WBE) and receive customised feedback on their readiness to access new markets and connect with global buyers. Certified WBEs are offered training on how to leverage their certification and interact with large multinationals, as well as the opportunity to connect with and learn from other WBEs. Between 2009 and 2015, WEConnect International held 143 market access trainings, attended by 6,643 women business leaders, and facilitated 388 connections between WBEs and corporate companies.

Technology: opening new doors

Seeking to harness web and mobile technology to broaden women's access to agricultural markets, Awa Caba co-founded Sooretul, an online marketplace for Senegalese women to promote and sell their agricultural goods to the country's 7 million digitally-connected consumers. Customers can find and purchase the products they are looking for online and have them delivered to their chosen location. By providing an online platform for agricultural products, Sooretul bypasses the difficulties women producers have in travelling long distances to markets to sell their products.

It is vital that women embrace the potential of technology to make their businesses more competitive and relevant, and CTA is well aware of the need to support young women, as well as men, to develop ICT innovations that help strengthen women's capacities in agriculture. As the winner of CTA's Pitch

Leading lights for Caribbean agribusiness, provide some inspiring examples of successful women-led agribusinesses in these regions. The success of such businesses not only relies on resilient leadership of women entrepreneurs, but is also dependent on strong market linkages and sufficient access to resources and finance, as well as opportunities for capacity building and mentorship. Njuki argues that a concerted and coordinated effort needs to be made to increase women's opportunities in all these areas, citing IDRC's experience that 93% of young women who receive business support in addition to funding succeed in their ventures, compared to the 57% success rate of those who receive financial aid alone.

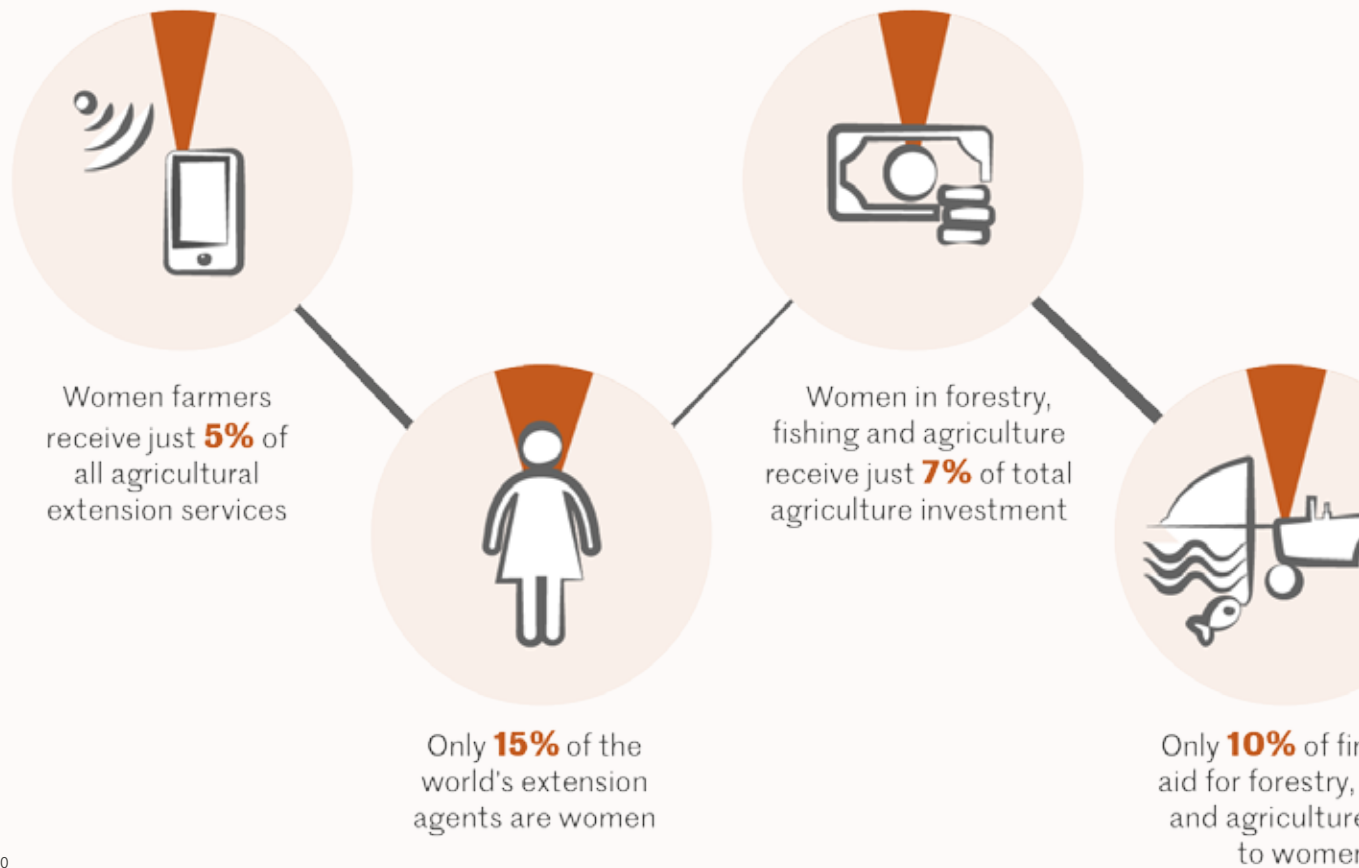
Access to profitable markets

Analysis of key barriers to the success of women's agribusinesses has revealed the limited opportunities for women to access high-value markets and connect with large-scale buyers. Dr Peter Hazell, technical advisor for the *African Agriculture Status Report 2017*, stressed the importance of facilitating such market access at the report launch during the 2017 AGRF: "Connecting small farmers to the value chains feeding into geographically growing urban markets is the key for commercialising them. You can make a lot of farmers rich and prosperous if you can get them into those value chains." He believes this task can be bridged by actively engaging the private sector.

To support women-owned businesses to access global markets and

Access to resources and power

Women's access to resources and positions of power in the agricultural sector remains limited



SOURCE: FAO

- › AgriHack 2016 advanced-stage category, which aims to support young entrepreneurs to scale-up their ICT-enabled agribusinesses, Sooretul received a €15,000 grant, as well as networking and mentorship support from Prohaus VC – a global, women-led venture capital platform for tech start-ups.

In addition to facilitating market access, technology can also improve rural women's access to finance to allow them to build more profitable businesses. CTA identified this potential in Rose Funja's innovation, which uses GIS technology to provide farm data for financial services to assess farmers' creditworthiness. This service is particularly valuable for women farmers, who often face difficulties acquiring loans due to limited collateral and land

ownership rights. Funja's Tanzanian-based company, AgrInfo won €4,000 as runner-up in CTA's 2013 Eastern Africa AgriHack Talent Programme, during which she received technical advice and support to develop her idea into an investible business model. Explaining the centrality of this support to AgrInfo's success, Funja stated, "CTA's help and the training we received took our idea to a whole new set of levels."

Expanding capacities of women entrepreneurs

Capacity building and mentorship support are often key to the commercial success of new agribusinesses. Initiatives specifically targeting gender-responsive businesses – such as the African Women Agribusiness Network in East

It is vital that women embrace the potential of technology to make their businesses more competitive and relevant.

Africa, which provides business support and needs-based services to women-led enterprises in agricultural value chains, and the Gender in Agribusiness Investments for Africa (GAIA) fellowship – are vital in the promotion of gender equality in the agricultural



Women only hold
14% of management
positions in the
agricultural sector

Financial
fishing
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Pineapple Juice: Beninese businesswoman's thirst for success

Beninese entrepreneur, Bertille Guedegbe Marcos, has successfully realised her childhood dream to become an agribusiness leader with the growth of her internationally competitive pineapple business, Les Fruits Tillou. The combination of strong and ambitious leadership, a profitable business model that responds to market demand, and availability of the necessary financial resources has allowed her to achieve this success. In 2000, with less than €1,000 of her own savings, Marcos rented an 11 ha plot in a small village in the municipality of Allada, Benin. She began by cultivating maize as it is less expensive to plant and maintain than pineapple and it has a shorter production cycle. After 3 months she had earned enough revenue from the maize to start her first pineapple plantation, and within 3 years she was producing 2 t of pineapple a week.

In 2009, Marcos began processing pineapple juice, as she knew that there was greater demand for juice both within Benin and internationally, and she would be able to fetch a higher price compared to fresh pineapples. The commercial success of this venture enabled her to acquire a pineapple crusher and expand production from 24 to 2,000 bottles a day, which she sold in local markets and exported throughout the rest of West Africa. Despite this growth in production capacity, she realised that, "The daily demand for juice is strong and ever increasing and it exceeded the real production capacity of the factory."

Consequently, in 2015, she sought financial assistance from the Société Générale de Banques au Bénin to build a modern juice processing unit. The new unit, which was built in 2016, has the capacity to process 24 t of pineapple a day, allowing Marcos to commit to supplying 1.5 million l of quality tested organic pineapple juice to businesses in Marmande, France. Les Tillou Fruits now exports 50-60 t of fresh pineapples each week to France and West Africa, relying on 1,600 local producers and 60 factory employees. Looking back at the long journey to reach this point, which began with the completion of her diploma in agronomy in 1986, she declared that, "The existence of the market, the raw materials, the human resources and the determination to succeed have enabled us to achieve these objectives".

sector. In 2016, in partnership with the African Development Bank and UN Women, African Women in Agricultural Research and Development piloted GAIA in Eastern Africa, sending out a call for innovative agribusinesses with high profit-earning potential, which demonstrated clear benefits for groups often marginalised in agriculture. Over 100 applicants from Ethiopia, Kenya, Tanzania and Uganda were narrowed down to 31 quarter finalists who participated in GAIA's 2-day bootcamp, where they learnt how to improve their pitches to investors, evaluated each other's ideas and innovations, and had the opportunity to network with potential partners.

Sarah Mubiru, managing director of Uganda-based Aroma Honey Toffee Ltd, described how GAIA has helped her

company to create a value-added honey product, which it has been able to sell at a premium price (a packet of 12 toffees costs €4.64) to increase profit margins and pay its women producers more. She explains that, as a result, "We are also looking forward to being able to build the capacity of these women beekeeper groups, in terms of the technical skills in their honey production businesses and also their business skills." With sufficient support and resources, agribusinesses can thus extend efforts to empower other women in the agricultural sector.

Inter-continental collaboration

By capitalising on the knowledge and experience of its network of women entrepreneurs from Canada and 15 African countries, the Canadian and

African Business Women's Alliance facilitates the access of African women-led businesses to training and resource information. Such inter-continental collaboration offers strong potential to help women-led agribusinesses scale-up their operations, as can be seen from the experience of Lucy Karuga, managing director of Eldoville Dairies in Kenya. Under the Danish government's Danida Private Sector Development Program, Eldoville Dairies has been able to utilise dairy processing and waste management technologies to improve efficiency and productivity with close support from Danish consultants.

Karuga's staff have also received training from world-class cheese makers in France and Kenya, enabling them to diversify production to seven different

› types of cheese, in addition to a range of full- and low-fat yoghurts, butter, as well as jam, marmalade and honey. The capacity-building support from Danida has facilitated expansion of the company’s operations resulting in the establishment of a second branch in Mombasa to supply the coastal tourist circuit and help to broaden supply to the country’s leading hotels, hospitals, airline caterers and supermarkets, as well as to Rwanda and Uganda.

Engaging the private sector

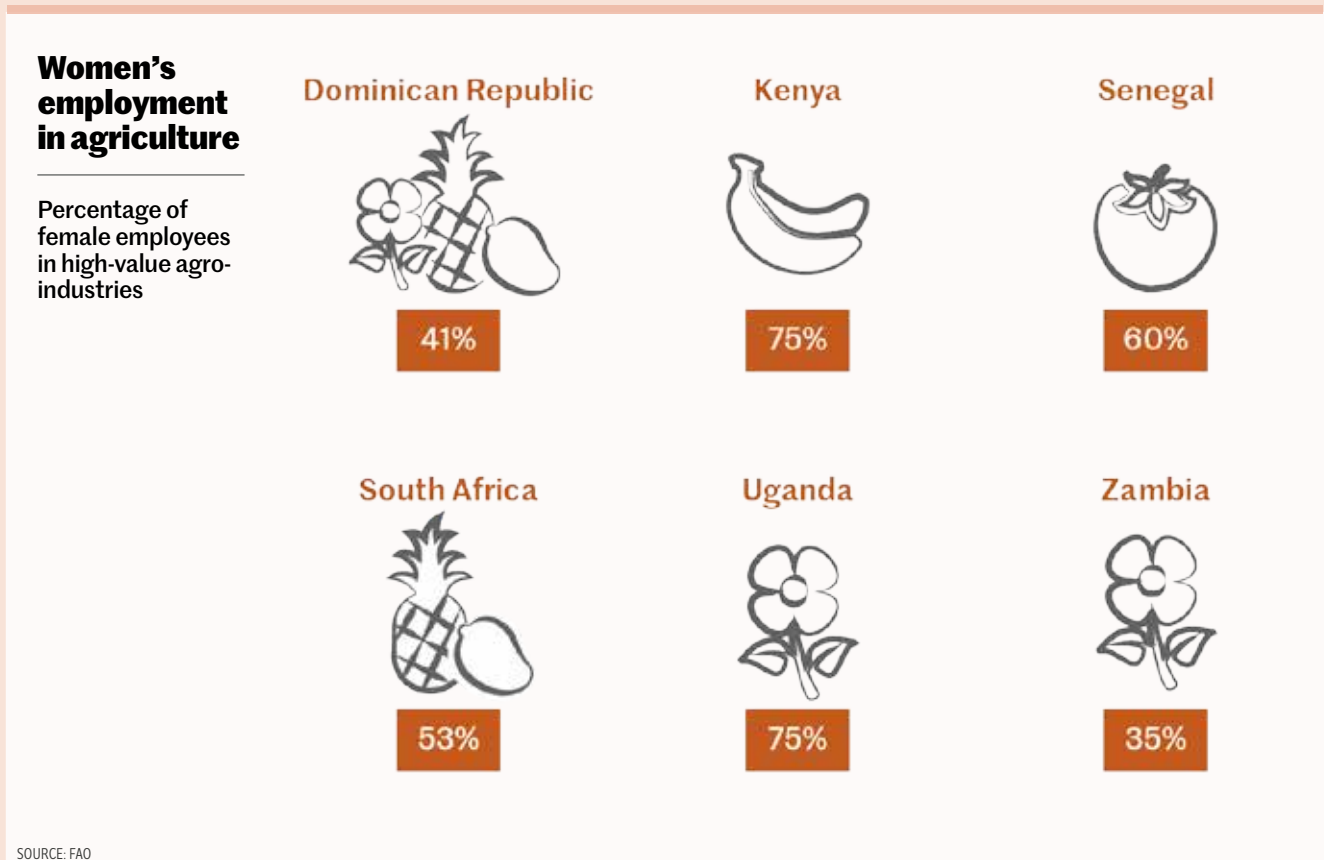
While business training and mentorship are key to commercial success, agribusinesses cannot expand if they do not have access to the necessary resources, including labour, equipment and finance. Dawn Hines, co-founder of Aventura Investment Partners, realised that difficulties in accessing resources were holding many women back from running and growing their own agribusinesses when she first visited Senegal. To address the issue, Aventura invests in input service providers in

“Inter-continental collaboration offers strong potential to help women-led agribusinesses scale-up their operations.”

agricultural value chains to increase the affordability and accessibility of such services for smallholder farmers wishing to increase their yields and income. In an interview for the Overseas Private Investment Corporation she explained, “Women manage 56% of rice production in Senegal... Aventura offers ploughing and harvesting services on a per-hectare basis, providing these women with financially viable access to machinery services that increase yields and improve paddy rice quality.”

For Hines, the key to economic growth and empowerment of women is investment from the private sector.

As Malian business leader, Halatou Dem, stated in her interview with *Spore*, “Financing is a major handicap for most of these women, but it is impossible to industrialise and develop with sparse funds.” To increase financial investment, it is crucial to engage banks in efforts to reduce the current financial exclusion of 2.5 billion people in developing countries. Plan International and CARE International capitalised on the potential of collaborating with a commercial bank through their Banking on Change partnership with Barclays. Between 2009 and 2015, the partnership successfully extended basic financial access to over 758,000 people in Africa and India and, since 2013, more than 4,400 informal savings groups have been linked to formal financial institutions. *Spore’s* Nigerian Field Report, *Inclusive cassava business grows from strength to strength*, offers an inspiring example of the widespread economic benefits that can result from fostering such links between banks and women-led agribusiness. ■



INTERVIEW

Halatou Dem: The promising business of processing

Soumaila Diarra

Thirty-two-year-old Halatou Dem has been managing the Bamako-based cereal processing company Danaya Céréales for 7 years. The Malian company – with a staff of 33 – exports its processed products to Europe, the US and throughout West Africa.

Danaya Céréales was founded by your mother in 1992. What were the main challenges she faced and how did they differ from those you are now encountering?

When my parents moved to Bamako, my mother invested in a shop using the severance pay they had received from the factory where they both worked. At the time, few local inhabitants purchased processed cereals apart from those living outside of Mali and returning home on holiday. My mother processed cereals at home for about 10 years and then in 2004 she built a 100 m² processing unit on land she owned. The main difficulty at the time was that processing was considered a non-professional small-scale activity. It was also impossible to get a bank loan and she had to manage everything herself. We have now demonstrated that processing can be a profitable venture with a promising future. Together with our partners, we try to formalise the processing activity carried out by women, who also need training and support to become professional and generate high quality products. Financing is a major handicap for most of these women, but it is impossible to industrialise and develop with sparse funds.

How have you fostered your mother's entrepreneurial vision and helped develop and industrialise the company?

When I returned home after finishing school, the first thing my mother said was, "You have to come and work with me rather than looking for a job." But I had never taken her business seriously so I first worked with a

foundation that supported rural women, where I saw the impact this sector could have. In 2010 we became partners and founded the limited liability company Danaya Céréales. I helped formalise the business, set up a straightforward management system with an accounting firm handling the book-keeping. Then I promoted the company through social networks to heighten its visibility, thus boosting its credibility in the eyes of many partners. This prompted the Malian trade bank, BICIM, to grant us our first loan of €114,346 to complete the construction of the plant. We are now in the process of qualifying for ISO certification and are striving to get as professionalised as possible. We recently began exporting to the US, in addition to Europe and throughout West Africa.

How could more women be supported in setting up and developing their own agribusiness?

I've noticed that all women wish to work in the same sector, but everyone cannot make cereals or fruit juice. The first step is to identify sectors lacking businesses and then encourage women to invest in them. Suitable training and financing must be available for them. In Mali, suitable processing equipment and skilled labour are not readily available, so it took us over a year and a half to find a quality manager. There are some business areas that young people do not consider, but should be showcased.

What advice would you give young women considering investing in agriculture?

Be brave – you won't get rich in this sector and you have to invest a lot. Financing is very slow, so you reinvest whatever you earn. Be ambitious, rigorous, patient and love what you do. Many people have not been able to hang on even for 5 years because the work is tiring and not as profitable as expected. This all has to be taken into account before getting started.



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Halatou Dem, CEO of Malian cereal processors, Danaya Cereales, helped her mother to industrialise production to respond to international demand

NIGERIA

Inclusive cassava business grows from strength to strength

Yemisi Iranloye, managing director and CEO of Psaltry International Limited, a large cassava processor based in southwest Nigeria, has built her success on an inclusive business model that places smallholder farmers at the centre of operations.

Oluyinka Alawode

In 2005, Yemisi Iranloye founded her cassava production company, Psaltry International Limited, with personal savings from marketing farm produce. Six years later, in response to market demand for processed cassava products, she expanded the business with the establishment of a factory to produce high-quality food-grade cassava starch and high-quality cassava flour (HQCF), in Alayide village, Oyo State. Demand for these high-quality cassava products among Nigeria's manufacturing industries continues to grow due to fluctuations in foreign exchange rates and scarcity of imported grains such as wheat and barley, which make locally-sourced and readily-grown raw materials like cassava more cost-effective.

"Connection to the market has not been difficult because our product (food-grade starch) is a raw material used by the industrial sector and our quality is very high. It can be compared to quality food-grade starch anywhere in the world," Iranloye explains. Large Nigerian companies such as breweries, pharmaceuticals and food processors use food-grade starch to manufacture their products, whilst confectionary and flour milling companies use HQCF as a cheaper alternative to wheat for incorporating into their sweet treats and flour. Since expanding, Psaltry International has become one of the largest starch producing companies in Nigeria



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with two production lines each producing 20–30 t of food-grade starch per day, amounting to 10,000 t per year.

Financial investment

Even with this scale of production, Iranloye is aware that demand for starch in Nigeria still outweighs her company's current supply. However, investment from manufacturing companies is helping to address this shortfall. For example, after trial use of cassava starch in its brewing process in 2014, Nigerian Breweries Plc partnered with Pсалtry International, and the International Fertiliser Development Centre (IFDC) under the Dutch-funded 2SCALE programme to improve the cassava value chain, and ensure a steady supply of high-quality cassava from within the country. Through the partnership, IFDC and 2SCALE trained Pсалtry's outgrower farmers to improve the quality and output of cassava, and, as a result, Nigerian Breweries Plc is now the largest buyer of Pсалtry International's food-grade starch.

Nigeria's national banks have also played a role in financing the company's operations. Pсалtry's Alayide factory was built with funds from the Central Bank of Nigeria's Commercial Agriculture Credit Scheme, distributed through FirstBank Nigeria. Two years later, the subsequent growth in the company's profits enabled Iranloye to build a second factory.

Putting farmers first

According to Iranloye, Pсалtry's inclusive business model – based on sourcing raw material from smallholder farmers – is the key to the company's overall success. In 2012, Pсалtry began its first outgrowers' programme by deliberately targeting smallholder suppliers and offering them higher prices to encourage subsistence farmers to expand and commercialise their cassava production. The programme's success enabled Pсалtry to expand its sourcing to other rural communities within a 50 km radius of the Alayide factory and increase the number of outgrower suppliers to about 2,000 farmers.

The Alayide factory was strategically positioned near to these smallholder suppliers to reduce post-harvest losses. Through her experience in the cassava sector, Iranloye had observed that when

farmers transported their cassava over very long distances, the starch content could drop from 17% to 5% and tubers would often rot. The proximity of the Alayide factory to the farmers ensures that good quality, mature cassava tubers with high starch content are processed within 24 hours, avoiding unnecessary losses. The steady and reliable supply generated by these local farmers has allowed the company to maintain a relatively stable price throughout the year to undercut international pricing.

GPS monitoring

Busari Dauda, the Alayide village head, who has farmed cassava for 30 years, states that with the introduction of the outgrowers' programme, "the first major improvement was the increase in my farm size from 2 to 20 ha in 2 years as a result of the services rendered by Pсалtry. Currently, I have over 60 ha of farmland." Pсалtry has been able to support the growth of smallholders' farms with help from a cloud-based app called Farmforce, which uses GPS technology to track outgrowers' yields and monitor their needs in terms of extension services. The app can predict the yield and date of harvest for each individual farm, allowing Pсалtry to oversee its supply. This data not only discourages farmers from side selling, but also helps them to obtain bank loans for planting material and inputs, such as herbicides and fertilisers, which Pсалtry supplies at a subsidised rate.

To ensure the company receives its expected supply, farmers are required to sign a memorandum of understanding committing them to selling their produce to Pсалtry alone and adhering to the company's cassava quality standards before receiving the loan payment. However, to further increase outgrowers' commitment, as well as their economic empowerment, Iranloye is keen to grow the shares that the outgrowers themselves have in Pсалtry so that they collectively own 10% of the company.

Capacity strengthening

In addition to building the capacities of smallholder suppliers, Pсалtry International concentrates on strengthening the capacity of its employees, which have more than doubled since 2013 to 300, of which 40% are women. The company holds an annual staff training programme in partnership with Nigerian Breweries' Training School at Ibadan and technical training from Sino-Food Machinery which have made it possible for Pсалtry staff to carry out in-house factory maintenance to reduce technical breakdowns. At the management level, Stanford Institute for Innovation in Developing Economies Seed Coaches provides strategic training for Pсалtry staff. "In the last 17 years, I have received several trainings – training on entrepreneurship, on how to lead as a woman and in agriculture itself," emphasises Iranloye. ■

Yemisi Iranloye's cassava-processing business is one of the largest starch producing companies in Nigeria



CARIBBEAN

Leading lights for Caribbean agribusiness

The rise of successful female agriculture entrepreneurs in the Caribbean region is welcome. Combining profits and passion, in an otherwise male-dominated sector, women are creating jobs, empowering others and providing food security by producing locally-sustainable food products.

Natalie Dookie



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Founder of B's
Homemade Ice
Cream, Katherine
Bethel, has grown her
business into a
household name in
Trinidad & Tobago



Sustainable food security in the Caribbean requires the effective participation of women in food production. On average, women comprise over 43% of the agricultural labour force in the developing world, however in Latin American and the Caribbean, this is closer to 20% and, according to FAO, women only receive 10% of total global aid for agriculture, fishing and forestry. While there are a number of commercial female farmers in the region, women mainly remain involved in the distribution of food in local produce markets. The development of more inclusive value chains in support of agribusiness is giving more Caribbean women the opportunity to lead agro-processing businesses.

Promoting a sea change in fish processing

Allison Butters-Grant, CEO of Global Seafood Distributors in Guyana, is one of these change agents. Growing up in Guyana, Butters-Grant's parents owned several shrimping trawlers and, at an early age, she worked for the family business. After completing college, she lived in the US where, along with her husband, she opened a wholesale/retail outlet importing and distributing frozen and smoked fish products from Guyana. When their supplier went out of business, Butters-Grant returned to Guyana to set up a facility to supply the products.

Today, Butters-Grant's business is more focused on value-addition, with 95% of raw materials coming from artisanal fisherfolk. She procures the seafood and converts it into products such as fillet steaks, skinless boneless nuggets and salted fish; Butters-Grant owns the only facility in Guyana with a solar salted fish dryer. Together with a number of large local clients, including the Guyana Defence Force, gold mining firm Guyana Goldfields Inc., regional restaurant chain Royal Castle, and local restaurants, the company also exports to Jamaica and the US.

Reflecting on her success, Butters-Grant says "My marketing and business development skills, and the ability to network with the right people have been crucial. Also, having lived in the US, I already had knowledge of how to market there and knew how to secure new markets. In addition, in Guyana, my parents were already an established household name in the local fishing industry, which gave me local

recognition and credibility. At our facility, we also invest in mentorship and upward mobility programmes for our employees, 95% of whom are women. We also undertake continuous training in good manufacturing and hazard analysis and critical control points practices to maintain quality of our products."

As well as managing a commercial fish processing plant, Butters-Grant also finds time to be heavily involved in community activities. She is the chair of the National Standards Council and a founding member of the African Business Roundtable in Guyana, which works to promote the interests of African business enterprises. She also founded Women in Fishing and Agriculture (WIFA) to encourage women to

become part of the industry. As a business role model, she mentors entrepreneurs providing business support, and even recently assisted in the design of a kiln for a local smoked fish business. Butters-Grant believes that, "Women are essential contributors to the seafood

"My marketing and business development skills, and the ability to network with the right people have been crucial."

industry, including primary and secondary fisheries activities, but not a lot of attention is given to women in fishing in Guyana, as they are mostly fish processors with lower paid jobs."

According to the 2016 Bank of Guyana's Annual Report, the fishing sector increased by 17.5% after a decline of 2.6% in 2015. With the potential for added growth in the local market, Global Seafood Distributors is currently expanding and in the process of setting up a new €6.8 million zero-waste facility on 0.8 ha in the coastal village of Victoria. Looking to the future, Butters-Grant states, "We will work on sustaining our supply by collaborating with WIFA, and the Coastal Fishermen and Marine Services organisations, to build capacity which will allow fisherfolk to expand their fleet stock that, in turn, will help us increase our supplies and expand our value chain. We will continue to lead by innovating and will use every part of the fish to manufacture value-added products, nothing will be wasted. We also intend to use alternative energy sources – solar and self-generated energy."

Whipping up business

In Trinidad and Tobago, more than 30 years ago Katherine Bethel, founder of B's Homemade Ice Cream, started her micro home-based business with

her spouse. From very humble beginnings with one ice cream cart, and making the ice cream at her mother-in-law's house, B's Ice Cream is now a local household name. "We started the business with very little capital, €380, which was our savings; so a critical point came when we realised that the business was growing beyond our current space," Bethel explains. "We started speaking to financial institutions and began building a relationship with them. They supported us in purchasing our 2,500 m² warehouse, and in gradually filling this over time with equipment, including our first cold storage unit. After that, we invested heavily again when we began distribution and needed financing to purchase normal trucks and then convert these into cold storage trucks."

"I always tried to align myself with stakeholders who had competencies and facilities that could help me enhance the business."

Bethel continues that another crucial step was learning the science of ice cream, and standardising the processing. "We implemented a quality management system to ensure we were following good manufacturing standards. During this phase, we focused on improving what we were doing, so we also looked at our brand and packaging to ensure that we were able to compete with national and international brands," she explains. "We were able to access business development services from the Caribbean Industrial Research Institute (CARIRI), Trinidad and Tobago Agri-Business Association, and the former Business Development Company, amongst others in the food and beverage industry and agriculture sector. I always

tried to align myself with stakeholders who had competencies and facilities that could help me enhance the business."

Bethel credits building relationships for her success, "It is through our affiliation with CARIRI that I began to develop partnerships with agro-processors at the Trinidad and Tobago Alliance of Small Agro-Processors. They began processing all of the fruits we sourced in Trinidad and Tobago into pulp, which we used for the finished ice cream product, thus ensuring a high standard of quality through a consistent supply of sustainable raw materials for processing. We also began to strengthen our fruit and vegetable supply chain with farmers to secure pineapple, passion fruit and coconut, as well as other fruits. We keep expanding our supply network and now have relationships with soursop farmers in Grenada."

Another major step in the company's growth, was its step into mainstream distribution, which it started 16 years ago by first establishing outlets across the east-west corridor in Trinidad. The company also developed a frontline team which made B's Ice Cream more accessible by securing space in Massy Stores – a leading regional supermarket chain – as well as positioning their products in other major supermarket chains throughout Trinidad and Tobago and the Caribbean. The company also currently exports to Bequia and St. Vincent as key tourist destinations.

With a strong entrepreneurial spirit, Bethel says, "My main driver is having a passion for what I do. I have always had a personal development drive and have participated in a lot of courses from food preparation to quality management, as well as completing formal graduate and post-graduate studies. I wanted to be certain that I had the competences to manage the business, and investing in training and development made a big difference for me. Today, I have transitioned into a business coach, using my experience of launching a successful micro-business to help other small businesses." ■

Caribbean treats enter new markets

Established in 2012, Caribbean Treats Inc. is a family-owned business, based in Barbados, which produces over 40 condiments, including pepper sauce, jams, jellies, syrups, seasoning marinades, chutneys, coffee and even a line of souvenirs. The company was setup by its director, Paula Manning, when she was working as an IT consultant in the Bahamas and had difficulty finding suitable Christmas presents for her employer's wife who liked to cook; thus, the idea for her business was born.

With her main focus on marketing, and an expansive network of regional contacts, the business first served export markets in the Bahamas and the Grand Cayman before establishing itself in the local Barbados market. As an active member of Slow Food Barbados, a global grassroots organisation founded 'to prevent the disappearance of local food cultures and traditions,' Manning leveraged this connection with like-minded stakeholders to form linkages with local farmers and chefs across the agriculture and tourism sectors. These

partnerships helped to her to grow the business and expand its product line.

Entrenched in innovation, Caribbean Treats differentiated the Barbados market by expanding the traditional offerings of local jams and syrups to include lemonade, gooseberry and tamarind, thus filling a niche with new flavours. While the initial start-up capital was from the family's savings, later on they became aware of programmes geared towards manufacturers, offered by The Caribbean Agri-Business Association and the Inter-American Institute for Cooperation on Agriculture.

"There was a lot less pressure on me to succeed," Manning explains. "I was very eager to do something new and to understand the creative process. Caribbean Treats is currently in transition as we have outgrown our base, and recently obtained approval for a new building through the Barbados Investment and Development Corporation. We are in expansion mode and gearing up to enter new markets. I am thrilled to see how fast we have grown in 6 years and what we will achieve in the future."

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BEAUTIFUL BENEFITS

Natural beauty the Pacific way

In Pacific Island countries, entrepreneurs are working together with small-scale farmers and local communities to develop world-class natural beauty products for sale in the regional tourist sector as well as for export to international markets.

Wendy Levy

Pacific women have been using coconut and other natural products as moisturisers for centuries. Traditionally, coconuts have been used for food and cooking products as well as for hand-made oils highly valued for their restorative properties. Now the same traditional-based processes – for coconuts and for other produce such as sea grapes (a type of seaweed) – are creating luxurious soaps, scrubs, oils and lotions for national and international markets. From the village to the factory, business successes are growing.

Essence of Fiji, established in 1998 by beauty therapist and pioneer of the Fiji beauty and spa industry, Debra Sadranu, uses marine and plant extracts in its range of spa therapies. Sadranu's late husband was born in the Yasawa village of Tamasau and, through him, she met rural women seeking a steady income stream to support their families. Sadranu partnered with the Market Development Facility (MDF) in Fiji, an Australian Government-supported agency that provides funding to train and set up village enterprises. Launched in 2015, the company's latest premium skin care range uses sea grapes (*nama*) which is a type of seaweed found in the blue lagoons of Fiji's Yasawa Islands.

The marine product has high mineral and anti-oxidant levels and is used as the base for a range of gels, lotions, creams and scrubs. "The product extracts are not processed at all. The villagers harvest and send the organic *nama* to us," explains Sadranu. The sea grapes are transported from the Yasawa Islands by small fishing boats and the company is now establishing *nama* farms to ensure that the seaweed is managed sustainably.

In Samoa, another successful village-level business supplies organic virgin coconut oil to international beauty firm, The Body Shop. In 2007, the company approached Women in Business Development Incorporated (WIBDI), an NGO working to improve the livelihoods of small farmers, with a view to sourcing coconut oil from Samoa. WIBDI assists women farmers to create a cash income without leaving the land and, by 2016, 200 Samoan families were supplying The Body Shop with 32 t of extra virgin coconut oil annually for use in more than 30 Body Shop products. "We focus on smallholder farmers, but we also need sufficient volume, so we work with semi-commercial farmers as well," says WIBDI's associate director Alberta Vitale.

Strengthening capacity for bigger businesses

WIBDI has five processing sites, the farms are organically certified and every bit of the coconut is used, including the shells, which are made into charcoal. Local families have developed skills ranging from extracting cold-compressed coconut oil to developing micro-business structures with minimal set-up costs. Now small farmers can pay school fees and contribute to families and communities, rather than relying on money sent by family working overseas. WIBDI covers training and financial transactions with The Body Shop and keeps the premium paid for the oil to fund other coconut oil ventures, whilst Earth Oil – a business-to-business supplier of ingredients to the cosmetics industry – provides support in logistics and testing. The project has created new markets for farmers, increased farm incomes and reduced reliance on foreign remittances, which are 25% of the country's GDP.

For WIBDI, as for many other organisations and companies working in the natural beauty sector, training is key. To help build capacity, the Pacific Islands Private Sector Organisation (PIPSO) is working with national private sector organisation members, who have



Island Rose Dream employs 10-15 people to produce coconut oil for body oils, soaps and scrubs

networks of growers, producers and businesses. PIPSO assists members to attend regional and international training, trade workshops, ICT seminars and business forums to foster trade and competitiveness. Financial training including basics such as bookkeeping, cash flow forecasting, business goals as well as training for more advanced strategic planning and capital expenditure decisions are provided. Whilst beauty products are a relatively new sector for PIPSO support, in 2016 PIPSO supported four beauty entrepreneurs to take part in the Pacific Business Forum in New Caledonia.

PIPISO has also provided funding to Essence of Fiji to train women with disabilities to make soap and other beauty products. Sadranu currently employs around 130 people, including students, working in product manufacturing, training, spa operations, administration and management. “We primarily employ women, with my executive team being trained from within our company,” she says. The company sponsors training for around 30 rural women including those with disabilities.

Adding value for niche markets

Essence of Fiji products are manufactured at the head office in Nadi,

which also houses a training school for local and international beauty and spa therapy students. Sea grape products are available at Sadranu’s factory outlet shop, along with products from other small local businesses. The *nama* products are also sold in Fiji’s hotel spas and resorts, and as part of Fiji Airways’ duty-free range. To help boost production and quality of raw materials, MDF has also provided training to local suppliers. Sadranu has also been helped by MDF to reach new buyers with a better website and videos, and the company has recently appointed distributors for their *nama* products in Australia, the Czech Republic and New Zealand.

Obtaining organic certification is key to reaching new markets. Regional body POETCom has an advocacy role, working with organic farmers and national and UN bodies such as FAO to improve organic farming practices. Sadranu, along with Rosie Akauola of Island Rose Dream, are currently pursuing certification for organic products, and for animal testing-free products.

Island Rose Dream was established in May 2014 by Tongan businesswoman Rosie Akauola. The company now employs 10-15 villagers, mostly women, to produce coconut oil for

body oils, soaps and scrubs. “I wanted to use Tonga’s natural ingredients, such as coconut oil and botanical and herbal curatives that are beneficial for the skin,” Akauola emphasises. Akauola buys coconuts from several regular suppliers, which are delivered to Lapaha village where the oils are made by hand. “I believe there’s more value when products are handcrafted,” she states. The oil is then infused with herbs, such as red ginger and ylang ylang, packed into 10 l containers and taken to the warehouse for packaging, labelling and shipment for sale in Australia and Tonga.

The lucrative wedding market for tourists and overseas outlets has also been targeted by the Tongan company, which packages a special miniature range of products complete with personal cards for wedding guests. “My aim was to tap into the Australian market, so I thoroughly researched product requirements and we are hoping to get certified by Fairtrade Australia soon,” Akauola explains. She wants to expand into stores in Australia, New Zealand, the Pacific Islands and the US. “Attending international expos and networking with the right people will hopefully make this happen,” she says. ■

WHITE GOLD

The potential of dairy in Eastern Africa

Fuelled by high demand, the Eastern African dairy sector is growing rapidly and attracting investors. However, to promote further national and regional trade, the formal sector requires restructuring.

Vincent Defait

“The dairy sector is one of the fastest growing agricultural sub-sectors in Eastern African countries, which has generated significant economic returns and employment opportunities along dairy value chains,” according to a Briefing Note of the European Centre for Development Policy Management (ECDPM). In addition to providing a regular source of income and nutrients to most rural households in Eastern Africa – which accounts for 68% of all milk produced on the continent – milk is the focus of growing demand due, in part, to the emergence of an urban middle class that is very fond of dairy products.

Between 2002–2005 and 2010–2013, the volume of average annual

intra-regional trade in dairy products increased by 1,106% from 1,530 t to 18,449 t, according to an International Growth Center (IGC) report. Meanwhile, over the same period, exports to other African regions increased by 597%, from 1,576 t to 10,988 t. This significant growth was made possible by the greater economic integration of the East African Community (EAC), which simplified customs procedures by setting up the Single Customs Territory in 2013. The situation varies between countries, as reflected by the annual consumption of dairy products, with Kenya in the lead with 93 l per person, followed by Uganda (42 l), Rwanda (26 l), Tanzania (24 l) and Ethiopia (19 l).

Formalising trade

In Kenya and Uganda, dairy value chains are more advanced, with a high number of stakeholders, milk processing plants and distributors. Feed suppliers, as well as veterinary and artificial insemination services, are also found in both countries. Tailored policies and significant investment by the government and development partners has also boosted milk production in Rwanda, from 51.5 million l in 2000 to 445 million l in 2012. Conversely, in Burundi, the dairy sector remains informal, unstructured and mainly geared towards meeting the consumption needs of local farmers.

Overall, more than 80% of the milk produced in Eastern Africa (up to 95%



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Workers at a processing plant in Kenya pour milk through a cloth strainer



© CNFA (CULTIVATING NEW FRONTIERS IN AGRICULTURE)

Selectively bred cows have more than tripled dairy farmers' income in Ethiopia

in Tanzania and 98% in Ethiopia) is still generated by the informal sector, thus eluding quality control measures and limiting the scope for value chain investment and structuring. Less than 1% of EAC dairy products are exported to member countries or outside the region. Uganda – the leader in this field – exports long-life UHT milk, powdered milk, butter and ghee mainly to Kenya, where national supply does not meet demand, but also to the Democratic Republic of Congo, Egypt, India, South Sudan, Sudan and the United Arab Emirates.

18,449 t

of dairy products were traded within Eastern Africa during 2010-2013

80%

of the milk produced in Eastern Africa is still generated by the informal sector

What is at stake in formalising the sector? “Food safety,” says Jan van der Lee of the Wageningen Livestock Research. “Quality cannot be guaranteed in the informal system that supplies urban centres. This works well in very short supply chains, but the shelf-life of stocks must be guaranteed for remote production and consumption centres.” Structuring and formalising the dairy sector could also help build a trusting relationship between milk producers and processors, which is often lacking. This could in turn promote development of the dairy product market.

Transforming the dairy value chain

According to a WUR report, which refers to milk as ‘white gold,’ “the largest opportunity in the region is the huge potential to produce large quantities of milk through simple improvements.” These include improved cow productivity, establishment of a cold chain for milk collection, and reduction in milk losses. In Ethiopia, WUR’s Dairy Business Information Service and Support project showed that improved cows (local cows crossed with European dairy breeds)

produced almost four times more milk, with a subsequent three-fold increase in dairy farmers’ income – €3.9 per day, compared to €1.12 for farmers rearing local cattle breeds. The different steps in the value chain must also be improved via the adoption of new technologies, increased traceability and better market access.

Such transformations in the Eastern African dairy sector could be facilitated by further investment from major international groups. In 2013, the Danone group acquired 40% of Brookside Dairy’s capital, which enabled this Kenyan company to expand its operations to Tanzania and Uganda, while the Indian enterprise Amos Dairy invested €17.8 million in Uganda in 2014. ■

✦ *For more information visit: ECDPM Briefing Note, Recent Developments in the Dairy Sector in Eastern Africa (<https://tinyurl.com/ya7lj3ro>); IGC report, East Africa Dairy Value Chains: Firm Capabilities to Expand Regional Trade (<https://tinyurl.com/yd6s43vq>); and WUR report, White Gold: Opportunities for Dairy Sector Development Collaboration in East Africa (<https://tinyurl.com/yd9hoslv>).*

© SOPHIE REEVE



Mukete Estates is aiming to be one of the biggest suppliers of pineapples in Central Africa

AGRIBUSINESS SUPPORT

Boosting pineapple cultivation in Cameroon

Mukete Estates Limited, an agri-food company in Cameroon, produces a range of products from cocoa to rubber, and more recently, with the help of an agricultural support programme, pineapples.

Elias Ntungwe Ngalame

Nfon Victor Mukete introduced a pineapple plantation to his business, Mukete Estates Limited, in 2014. With a workforce of 25 people to grow pineapples on 44 ha, the plantation produced 1,200 t of pineapples in the first year. A government programme to support agribusinesses, Agropole, also extended support to Mukete from 2014, providing the business with a processing unit to produce fruit juices on site and farm equipment (including two tractors, a generator and water pumps) worth over €1 million. With this support, Mukete has been able to dramatically expand production; with a workforce of over 500 people, 8,260 t of pineapples were produced in the first 9 months of 2017 on 118 ha.

The processing and marketing of pineapples on site has added value to the fruit; pineapples from the farm

weigh 2 kg on average and can be sold for €0.60, whereas 1 l of pineapple juice sells for €3. Adding value by processing the pineapples into fresh slices and fruit juice has also attracted a chain of

8,260 t

of pineapples were produced in the first 9 months of 2017

200

young people are trained by Mukete Estates in pineapple cultivation each year

auxiliary marketing businesses. The packaged slices and juice are mostly bought from the estate by women and youths at wholesale prices who, in turn, resell them at markets and at other social gatherings.

Mukete's son and manager of the plantation, Godfred, explains that the plantation's pineapples are washed and cut at the crown to make packaging easier and the fruits are packed in crates for export to Cameroon, Chad, Equatorial Guinea and Gabon with the trade mark 'Ananas du Cameroun'. Godfred states that 20% of production is currently exported, but with increasing demand and production the aim is to double exports in the near future.

The expansion of Mukete Estates has also opened up employment opportunities for young people. Some youths have set up road-side stalls to sell the pineapples and pineapple juice that they have bought from the estate. "I am happy with the business," explains 25-year-old Justice Ngwe, who makes a profit of about €4 a day selling fresh pineapple slices. "It provides me with income to support my daily living."

The company also trains over 200 youths every year in pineapple cultivation from the planting stage through to nursing, harvesting and selling. "Engaging youths in agribusiness is a sure way to create jobs and eliminate food insecurity and poverty in Cameroon in particular, and Africa at large," states Louis Magloire Mbarga Atangana, Cameroon's Minister of Trade. "The Mukete Estate pineapple plantation is setting the example for other investors," he adds.

The company is planning to continue to increase production to 16,000 t by 2018 and 26,000 t by 2020. "Over the next 3 years we hope to become one of the biggest suppliers of pineapples in the Central African region," Godfred explains. The government has also announced plans to construct a 15 km road to serve the estate and improve transport links to markets. ■

DECREASING RISK

Innovative credit scoring systems to help farmers

Alternative credit scoring pilots are springing up to help banks assess the true risk of would-be borrowers. But while some pilot scoring models are proving their worth, most are augmenting rather than replacing traditional assessment methods such as farm visits.

Helen Castell

In an effort to build accurate risk profiles for smallholders that do not rely on conventional data, such as borrowing history, the developers of credit scoring systems are being forced to innovate.

Psychometric testing

To raise acceptance rates and cut processing times for farmer loans, Juhudi Kilimo, a provider of financial solutions to smallholders in Eastern Africa, is piloting technology from EFL Global, a private

firm that uses psychometric testing to create risk profiles for borrowers across Africa, Asia, Europe and Latin America. The pilot – funded by the Mastercard Foundation – involves agents from six Juhudi branches in Kenya visiting loan applicants and inviting them to take tablet-based psychometric tests that EFL claims give lenders a picture of their character, including their self-control in relation to spending and approach to budgeting. Based on this, EFL gives applicants a three-digit credit score.

From its initial assessment of over 6,000 clients using the EFL tool, Juhudi found 6% of those in the lowest-scored quintile experienced 60-day arrears at least once in a typical 1-year loan, versus 1.5% in the highest-scored quintile.

Juhudi is now actively using the model in its credit decisions, accepting high-scoring clients that would previously have been rejected based on insufficient collateral, a lack of credit history or limited financial information. The financial provider is also allowing higher-scoring clients to access a loan valued at up to 100% of their collateral, versus 67% without the EFL data.

Banks driving demand

Following enquiries by banks who saw opportunities to expand their revenue by lending to farmers, but wanted to do it safely, the Thomson Reuters Foundation's for-profit Bankable Farmer initiative was developed. The initiative aims to build credit risk profiles for African smallholders and charge lenders – its target clients – to access them; in June 2017, the first such client was secured – a Kenya-based commercial bank with a presence across Eastern Africa.

The Kenyan bank will help the Foundation calibrate its credit-scoring model ensuring the selection and weighting of data meets lenders' needs, says Saidah Nash Carter, Thomson Reuters' head of innovation for Africa. The idea is to create a credit score so rich in data that banks are comfortable lending to farmers without collateral.

These innovative credit scoring schemes can help influence banks' lending decisions to take into account more systematically the myriad factors that can undermine a farmers' capacity and incentive to repay and so may help to overcome long-standing obstacles to farmer bankability. However, to fully mitigate such risks, banks still need to rely not only on credit scoring, but also on creative structuring of financial products through integration of other services such as agri-insurance, extension, and offtake arrangements. ■

✦ For more examples of credit scoring read the full Spore article online: <https://tinyurl.com/ydbn4ahy>



Juhudi Kilimo gives loan applicants psychometric tests to help make more inclusive credit decisions

INTERVIEW

Food systems: a passion for transforming Pacific agriculture

Matai Seremaia Nawalu, Vanuatu Minister for Agriculture, discusses the CTA publication, *Transforming Food Systems in the Pacific*, and in the week before the Pacific Week of Agriculture (PWA) 2017 highlights the significance of such events to help stimulate agriculture.

Tony Wilson

How does regional collaboration, through events such as the PWA, help boost sustainable agricultural productivity in the Pacific?

The goal of the PWA 2017 is to elevate awareness of agriculture amongst global agricultural leaders and international and regional participants to its rightful place as a major driver of Pacific economies. Delegates will explore innovations, discuss challenges and look for ways to protect and expand agriculture in the Pacific. In addition, the PWA will showcase the nation's advances in agriculture and agritourism, and we hope it will prove to be a great learning curve for Vanuatu and the Pacific. Regional collaboration and partnership, through events such as the PWA, will help boost sustainable agricultural productivity in the Pacific through the sharing of ideas from people from other parts of the world who are faced with similar problems experienced in the Pacific.

What can the Pacific learn from other regions?

Knowledge sharing is important and learning from each other is of great value. Take Chefs for Development, which originated in the Caribbean and brings chefs together with smallholder farmers and agro-processors who can supply quality products. Our chefs



Matai Seremaia Nawalu highlights the importance of regional collaboration, knowledge sharing and partnership to stimulate Pacific agriculture

face the same problems as those in the Caribbean, with many of our ingredients being imported. Through the Chefs for Development initiative we have now developed in the Pacific, we have a good network with our chefs to promote and come up with recipes to put on our tourists' plates.

With support from CTA, over 30 participants from ACP countries are expected to participate at the PWA. Through innovative ideas from elsewhere, we are hoping to share that knowledge and also find ways to share local ingredients around the Pacific. For example, Vanuatu has some of the finest organic beef and veal in the world, but the Solomon Islands and Fiji do not have a strong beef industry, so we can help them in that regard.

Most food consumed in the Pacific, by locals and tourists, is imported. What is the government doing to support the region's agriculture and tackle malnutrition?

The Vanuatu Government is promoting the consumption of healthy, locally-grown food to try and stop the onslaught of diseases like diabetes, which is a scourge throughout the Pacific. We have also begun to realise the true value of agritourism and how it can help the country economically, while presenting healthier food choices to locals and tourists alike. The government has declared 2017 as the 'Year of Agritourism' and the ministries have been working together to develop an agritourism strategy. The PWA will also be preceded by an agritourism and trade festival.

Boosting agriculture

A food-secure future for the Pacific



Many Pacific islands import most of their food, much of which is calorie-dense and of low nutritional value. Consequently, the Pacific has the highest rates of obesity in the world with increasing rates of non-communicable diseases such as type 2 diabetes, heart disease and strokes. Although tourism in the Pacific has expanded in recent years – from 1.6 to 1.9 million visitors between 2011 and 2015 – 70% of the food used by the tourist industry is imported.

Transforming Food Systems in the Pacific presents a range of initiatives in the Pacific region linking chefs to local

farmers to reduce the food import bill and boost local food production. The South Pacific Tourism Organisation (SPTO) is working to change the mindsets of chefs to use fresh, local foods through regional culinary workshops. By mid-2016, SPTO had trained 162 chefs interested in using local produce through seven workshops.

Another organisation providing grassroots cookery training is the Samoan Culinary Association, which was founded in 2015 by restaurant owner and head chef Joe Lam and hotel executive chef Michael Hardy. The scheme trains unemployed and unskilled men and women to work in a busy kitchen environment. Ten restaurants are now involved, providing young people with a better understanding about the importance of healthy food and the skill sets required to work in a kitchen.

Transforming Food Systems in the Pacific

By C Pye-Smith

CTA, 2017; 26 pp.



ISBN 978-92-9081-616-4

Downloadable as a PDF file from: <https://tinyurl.com/yazb9eyg>

CTA's publication, Transforming Food Systems in the Pacific, explores how farmers are increasing their revenues through agritourism in Vanuatu. What are the key challenges that need to be overcome to better facilitate farmers' access to profitable tourist markets and expand Pacific agriculture?

We face many key challenges to accessing profitable markets that need to be overcome, with basic things like transport representing a big hurdle on many of our islands; the distance between Pacific islands and states is a major challenge and transport is expensive.

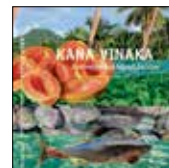
Our harvest techniques, storage and logistics also need to be improved. We also need to be more competitive with our prices compared to imported products, but with mechanisation – tractors, farm machinery and tools – productivity is increasing

Pacific agriculture is highly vulnerable to climate change and natural disasters. What measures are currently being taken to build the sector's resilience?

Members from the Ministries of Agriculture and Climate Change, and the National Disaster Management Office, have formed a risk and resilience cluster to coordinate the response to natural disasters and conduct training with farmers on best practise techniques to deal with the aftermath of disasters and climate change. We are also learning constantly from world bodies like FAO on the best resilience measures available and we are working to adapt them to become suitable for Vanuatu. ■

✦ *The PWA was co-hosted by the Pacific Community and FAO, and supported by CTA. For more information visit: <https://tinyurl.com/y8hadpfn>*

Good food Pacific style



Kana Vinaka, a term often used in Fiji that means 'good food' or 'eat well', is the title of the first cookbook written by chef Colin Chung. Recipes revolve around locally available, nutritious produce from the Pacific Islands, and Fiji in particular, to encourage use of fresh seafood, meats, and fruit and vegetables – as opposed to imported products – in a contemporary way. The initiative aims to provide lasting development for the tourism and hospitality industry in Fiji, as well as promote healthy and sustainable eating, while lowering dependence on imports and promoting vibrant economic growth.

Kana Vinaka: Contemporary Island Cuisine

By C Chung

PIRC, 2017; pp. 102

€58

www.colinskitchen.co.nz

Climate change Vulnerable regions



With mean summer temperatures expected to increase above preindustrial levels over parts of Asia and the Pacific by the end of the century, drastic changes could occur in the agriculture and

fisheries sectors, trade, migration and health. To mitigate such impacts, *A Region at Risk* highlights the importance of implementing the 2016 Paris Climate Agreement commitments, including public-private investments focused on sustainable economic development, and the implementation of adaptation measures to protect the most vulnerable populations, particularly those in small island states.

A Region at Risk: The Human Dimensions of Climate Change in Asia and the Pacific
Asian Development Bank; 2017; pp. 131
ISBN: 978-92-9257-851-0

Downloadable as a PDF file from:
<https://tinyurl.com/yb8pohec>

ICTS

Tools for interactive learning

ICTs offer exciting opportunities to enhance information services for rural smallholder farmers, however, service providers need to acknowledge the challenges that this consumer group face, both in terms of accessing and understanding new technologies.

Mike Davison

The reach of mobile phone coverage and the widespread ownership of basic handsets in sub-Saharan Africa offer exciting possibilities for information dissemination. However, serving the information needs of small-scale producers can be fraught with difficulties, with many organisations underestimating the challenges involved. In reviewing seven ICT for agriculture (ICT4Ag) projects from Africa and the Caribbean, the authors of *Beyond the Hype* highlight some of the pitfalls that can hamper efforts to boost farmer knowledge through ICTs.

One risk is that the communication channel becomes too complex or technical to be useful. For instance, though mFisheries – a mobile app developed by the University of the West Indies to provide navigation support, weather and price information, and tips on good practice – has the widest range of features of the seven apps reviewed, uptake of the service has so far been poor as many target users do not even own smartphones with the necessary GPS capabilities. The University of the West Indies has thus begun to distribute subsidised smartphones to users to help kick-start adoption, but it is likely to take some time before fishers are familiar enough with the basic features of smartphones to take advantage of the services mFisheries offers.

In contrast, *Advice on Beans* examines the success of Farmerline's farm advice service, Mergdata, which is designed to work on simple mobile phones and

provides Ghanaian farmers with weather forecasts, information on good agricultural practices and market prices in their local language. Despite the accessibility of the service, increasing farmer adoption has proved a major challenge, with Farmerline organising 20 workshops to train potential users on how to sign up for Mergdata, as well as how to interpret and act on the information provided. As the majority of target consumers are illiterate, Farmerline now supplies information via voice recordings, in addition to text messaging.

Farm Radio International (FRI) uses ICTs to maximise its ability to respond to audience needs. FRI's 'beep-2-vote' system allows listeners to vote on the topics they would like to be covered simply by calling particular numbers and hanging up. Interactive Voice Response systems are also used for more complex multiple-choice polls and quizzes, which – together with messages from listeners – are used to provide content for future broadcasts. Beyond the delivery of useful, timely information, these interactive tools have been shown to contribute to women's empowerment by offering them a platform to share their opinion and the opportunity to contribute to decision-making processes. *Using Radio and Interactive ICTs to Improve Food Security Among Smallholder Farmers in Sub-Saharan Africa* urges policymakers to adopt policies that extend mobile coverage in rural areas to broaden the reach and responsiveness of broadcast radio. ■



Beyond the Hype: Mobile Phones and the Web to Improve Agricultural Value Chains
By P Mundy, B Kwasi Addom & K Bheenick
CTA, 2017; 16 pp.
CTA Technical Brief 6



Downloadable as a PDF file from:
<https://tinyurl.com/yat9s7tv>



Advice on Beans: Farmerline's Mergdata Farmer-Advice Service in Ghana
By P Sakyi & M Abdul-Fatawu
CTA, 2017; 4 pp.
CTA Technical Brief 13



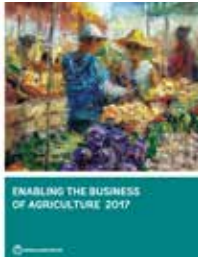
Downloadable as a PDF file from:
<https://tinyurl.com/ybp3bpjh>



Using Radio and Interactive ICTs to Improve Food Security Among Smallholder Farmers in Sub-Saharan Africa
By HE Hudson *et al.*
Telecommunications Policy, 41(7-8):670-684
Elsevier, 2017; 15 pp.
Available at: <https://tinyurl.com/y6w8pkpr>

Global report

Strengthening business through better regulation



Excessive or poorly-designed regulations are a significant barrier to growth in any industry, and agriculture is no exception. For instance, overly restrictive regulations can impose high transaction costs, which reduce trade and productivity, as well as discourage firms from operating within the formal sector. However, with the right regulatory framework, governments can increase the competitiveness of farmers and agricultural

entrepreneurs, enabling them to join regional and even global markets.

The World Bank's Enabling the Business of Agriculture (EBA) initiative aims to measure and monitor regulations that affect the functioning of agriculture and agribusiness. For example, in the seed industry, the initiative would investigate the time and costs required to register a new seed variety in any given country, as well as the level of quality control in the seed market. Such information is highly valuable in enabling policymakers to identify current deficits in the law, and design regulations that ensure safety and quality without being too costly or time-consuming.

The 2017 *Enabling the Business of Agriculture* report covers 62 countries from both the developed and the developing world, and examines 12 topical areas, including seed, fertiliser, machinery, markets, transport and water. For each topic, data is gathered in the form of legal and efficiency indicators. The legal indicators reflect the text of laws and regulations and assess how closely they follow regulatory

good practices. Meanwhile, the efficiency indicators measure the transaction costs that firms have to bear to comply with national regulations on the ground, expressed in time or monetary units.

Regions lagging behind in EBA scores include South Asia, sub-Saharan Africa and the Pacific, with countries in these regions having, on average, less than half of the regulatory good practices promoted by EBA. In sub-Saharan Africa, the study reveals great variation in regulation, both between and within countries. Overall, Kenya is the best performer on EBA indicators in the region, being particularly strong on water resource management thanks to a series of regulatory reforms and a permit system introduced in 2002. However, the country is weak on fertiliser registration and plant protection, and the report highlights the need for the Kenyan government to streamline agricultural export processes.

Of the 21 countries surveyed in the region, only Tanzania and Senegal have a publically available database with information on plant pests and diseases. Such findings enable countries and policymakers to take stock of their current regulatory environment, identify barriers to growth and promote change. ■

Enabling the Business of Agriculture 2017

By World Bank Group

World Bank Group, 2017; 295 pp.

ISBN 978-14-6481-022-0

Downloadable as a PDF file from: <https://tinyurl.com/y8b9eteq>

Agro-industry

Territorial approach for inclusive economic growth



For millions of young rural Africans, migration to urban areas has failed to be the pathway out of poverty they were expecting. Rather than finding work in higher-earning manufacturing or service sector jobs, young migrants often end up in low productivity, informal services with scarcely an improvement to their standard of living. While urban industrialisation has been slow in much of sub-Saharan Africa and South Asia, this annual report from

FAO suggests that significant potential for agro-industrial growth in rural areas, as well as small towns and cities does exist.

Creating a dynamic agro-industrial sector will require supportive policies and investment, the report asserts. Demand for higher value foods in urban markets will be a key driver for agro-industry, but if small producers are to benefit from this they will need improved access to inputs, credit and markets, stronger land tenure rights and support for farm mechanisation. Developing infrastructure, including roads, power supplies, storage and refrigerated transport, to enable agro-industrialisation and connect rural areas to urban markets will also be key.

Beyond this, the report advocates an 'agro-territorial' approach to rural development planning to strengthen the physical, economic, social and political links between small urban centres and their rural catchment areas (for more information on the importance of secondary towns, see *Spore* article <https://tinyurl.com/y944c7zp>). For instance, the creation of agro-industrial parks and agro-corridors – lines of transportation between farms and processing units – help link production areas to small urban hubs. The report emphasises that, by creating such networks among food producers, processors and related institutions, agribusiness clusters stimulate inclusive rural economic growth by encouraging expansion of the food processing industry beyond small-scale family enterprises. ■

The State of Food and Agriculture 2017:

Leveraging Food Systems for Inclusive Rural Transformation

By FAO

FAO, 2017; 179 pp.

ISBN 978-92-5109-873-8

Downloadable as a PDF file from:

<https://tinyurl.com/yb8e5k5g>

Are UAV regulations good for agricultural development?

LUKE WIJNBERG

Do drone laws stifle agri-services in South Africa?



Luke Wijnberg
CEO of 3DroneMapping

In my years in both the manned and unmanned aerial survey environment, I have seen the importance of mapping and data in farming for land planning and management. Some may say that farmers are the first geographic information system (GIS) users. For instance, they are increasingly using Google Earth as a data source for farm planning work. However, this comes at a risk since satellite imagery is often not ortho-rectified very accurately and can lead to major inconsistencies. Additionally, Google Earth's acquisition of satellite images in rural areas (especially in Africa) is typically years apart, meaning farmers may not necessarily have access to the latest imagery for an area.

Alternatively, thermal, multispectral and high resolution ortho-photo/contour surveys from manned aircraft are now being used on a private basis. Since the most expensive part of the operation comes from the site establishment, many farmers join together, sharing the costs. But this may still be as much as €5,760 for 500 ha and therefore unaffordable for most smallholder farmers. On the other hand, unmanned aerial vehicles (UAVs) have challenged the traditional manned aviation sector, specifically for smaller to medium growers. For smaller areas, UAVs can and do carry the very same sensors as their full scale counterparts, with much lower deployment costs and turnaround times. They can be transported to reach very remote and difficult places easily and do not require prepared surfaces for take-off or landing.

Data generated from UAVs can be viewed in the very same fashion as historically produced data. GIS maps can be generated

or interrogated via GIS software both online and offline or via hard-copies. Tools such as line of sight or profiling are easily available to assist with planning irrigation design or water attenuation areas. Multispectral imaging can assist with spot checks of plant health and offer possible reasons for a lack of growth. Even monitoring of livestock and fencing is now possible for the most modest of budgets. High resolution ortho-photos now allow for individual plants to be identified, which in turn can be automatically counted to assist with densification and yield predictions.

Despite the agronomic industries' benefit from UAVs, South Africa has arguably the most restrictive regulations in the world for their commercial use. This heavy-handed approach has both forced UAV companies to either operate illegally locally, out of the country to stay in business, or close up shop entirely. The regulations recognise that using UAVs as a tool for agriculture means that they are being used commercially and therefore assumes their use should be governed in the same manner as commercial manned aircraft. This requires UAV operators to:

- Hold a remote pilots license
- Register aircraft
- Hold an air service license (ASL) from the Department of Transport
- Gain a remote operators certificate (ROC) from the South African Civil Aviation Authority

The above is only in brief and each point requires a number of sub-steps. The regulations are not possible to comply with as a single business owner and require a large number of positions to be filled, such as a quality assurance

manager, flight operations manager, safety officer, security officer, etc. The total cost to comply with the regulations runs over €32,600 and takes over 2 years to complete. Often, some sections such as the ASLs will expire and require renewal before the final ROC is issued.

Since the regulations were published in 2014, only 14 companies may legally operate UAVs with a back log of over 400 applications. Of those 14 legal companies, it is questionable whether any of them can even undertake the specialised requirements that are involved in agricultural work. Agricultural work often involves flying long distances away from the operator, meaning that special dispensation must be made to overcome the legal maximum range of 500 m from the operator. This means that the application of UAVs in agriculture is challenged even more as it is up to the company to prove to the authorities that it can perform such work in a safe manner and have manuals to ensure this safety. It is unlikely that a small to medium-scale farmer would even bother to undergo such an expensive and arduous process.

It has been suggested that the South African Civil Aviation Authority does not have the capacity to fully implement and regulate all proposed UAV operations. This will only become worse as the number of registered (over 500) UAV pilots is ever increasing, putting more pressure on the system to approve such operators. Some feel that it would be best to do away with the ASL to speed up and simplify the process. Far more simple UAV registration and regulation processes have been put in place in other countries with great success. ■

A smooth ride for drone operators in Ghana



Worlali Senyo
 Director of Growth,
 Research and Development,
 Farmerline Ltd

The potential of using UAVs, or drones as they are commonly known, to support smallholder farmers to make key decisions on their farms is huge and cannot be overstated. Drone support services, such as farm mapping, yield estimation, input application and crop health assessment, can help smallholder farmers to improve their productivity and increase income.

However, there are some challenges which hinder the ability of service providers in using the technology to address farmer issues; a notable one being government policy and regulation.

In Ghana, although there are no drone specific laws as yet, existing laws like the Ghana Civil Aviation Authority (GCAA) Act, 2004 (ACT 678) and the Ghana Civil Aviation Safety Regulations 2011, provide a framework that governs drone operations. The current directives by the authority require that:

- One has obtained a permit to import and fly the drone.
- The operator of the drone must be registered and certified where applicable.
- The drone must be operated under specified guidelines given by GCAA.

My organisation, Farmerline – a technology company that aims to empower smallholder farmers to become successful entrepreneurs by connecting them to information, services and markets – has met these requirements to operate a number of drones and explore extending support services to farmers through a capacity-development initiative supported by CTA.

The process to register for a permit and operate a drone at the GCAA is reasonably quick and straightforward. First, a one-page application form providing details about the organisation/individual, the type of drone, and stating whether the drone is for private or commercial use must be completed. Then, copies of the

operator’s national identity document have to be included and a registration/ permit fee of €17 needs to be paid, which has to be renewed annually for each operator. Following that, the GCAA provides a letter granting a permit to import and fly drone(s). The authority records each drone’s serial number and provides a unique registration number.

Beyond the delays that are characteristic of most public institutions and the initial lack of clarity about what is required, our experience with securing a permit to use drones to support smallholder farmers was a relatively easy process. Compared to other African countries, where permit and application processes cost thousands of dollars, I can confidently say the regulation in Ghana is very supportive of service providers. This is most likely to foster the development of innovations that deliver value-added services to users, especially farmers and it is no surprise that the GCAA mentioned in a personal communication that they have over 400 drones registered since September 2016.

I see an opportunity for GCAA to further enhance the regulatory environment and make it friendlier for organisations and individuals to register and secure a permit to operate drones by automating application and payment processes. Secondly, providing a section on the website with information on how to get UAVs/drones registered, and an interactive map to help operators know areas that require explicit approvals to fly drones would be beneficial. Beyond that, engaging with the public to create ample awareness of what is required to operate a drone will encourage more people to regulate and register their drones. ■

✦ *To learn more about the use of UAVs in agriculture and share your experiences, join the UAV4Ag community at: www.uav4ag.org or follow them on Twitter at: @uav4ag and Facebook at: @uav4ag*

Poll

How do UAV regulations impact agricultural development in your country in Africa?



UAV regulations improve the safety of national airspace and facilitate the provision of UAV-based services to farmers.



UAV regulations increase costs and set overly high skills’ standards, acting as a disincentive for their use in agriculture.



UAV regulations are an unnecessary burden for UAV operators that choke development of the agricultural industry.



There are no UAV regulations in place. This represents a threat to safety and individual privacy.

Other debates

Find *Spore’s Opinion* pages and three more blogs on this topic online. New debate topics are published each month on the *Spore* website:

<https://tinyurl.com/mdmcktp>

In the next issue

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Commercialisation, Women's Empowerment and Poverty Reduction

APRA is a five-year research programme led by the Future Agricultures Consortium which aims to produce new evidence and policy-relevant insights into different pathways to agricultural commercialisation in order to assess their impacts and outcomes on rural poverty, empowerment of women and girls, and food and nutrition security in Sub-Saharan Africa.

APRA's research will

- Assess different types of agricultural commercialisation and explore people's selection choices and their outcomes on livelihoods and well-being;
- Examine longitudinal change resulting from the pursuit of different pathways of agricultural commercialisation; and
- Analyse key policy issues and implications associated with these agricultural commercialisation types and pathways in different settings.

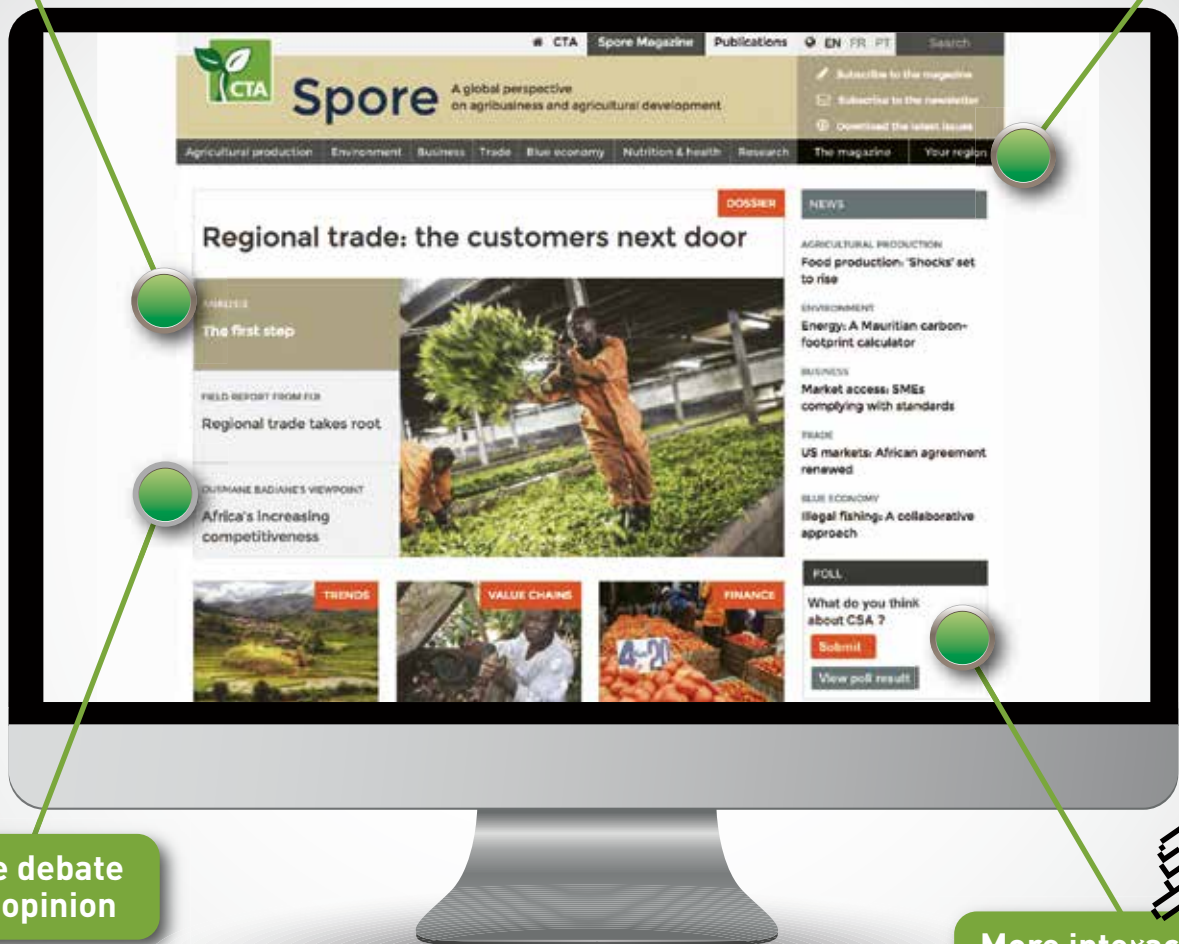
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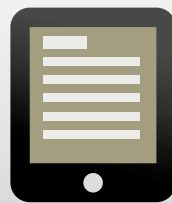
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