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African Farming and Food Processing

March/April 2016

Europe €14.50 - Ghana C1.3 - Kenya KSH150 - Nigeria N200 - South Africa R18 - UK £9 - USA $15

Fish Farming
a growing business

Agritech Expo
a preview

Cultivation
progress

Machinery demonstrations will take place every day during Agritech-Expo. p 10

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Printed by: Buxton Press

US Mailing Agent: African Farming & Food Processing USPS. No. 015-224 is published six times a year for US$90 per year by Alain Charles Publishing Ltd, University House, 11-13 Lower Grosvenor Place, London, SW1W 0EX, UK
Periodicals Postage Paid at Rahway, NJ. Postmaster: send address corrections to: Alain Charles Publishing Ltd, c/o Mercury Airfreight International Ltd, 365 Blair Road, Avenel, NJ 07001.
ISSN: 0266 8017

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Farming Calendar 2016

MARCH

29	2016 FIAAP Animal Nutrition Conference *www.fiaap-conferences.com*	BANGKOK
29-31	FIAPP VICTAM GRAPPAS Asia 2016 *www.fiaap.com*	BANGKOK
30-1 April	6th Africa Sugar 2016 *www.africasugar.com*	MAPUTO

APRIL

13-15	AGFOPEX Nigeria *www.agfopexnigeriafair.com*	LAGOS
14-16	Agritech Zambia *www.agritech-expo.com*	CHISAMBA
28-30	Nigeria Agrofood *www.agrofood-nigeria.com*	LAGOS

MAY

7-12	IFFA 2016 *www.iffa.com*	FRANKFURT AM MAIN
17-20	NAMPO Harvest Day *www.nampo.co.za*	BOTHAVILLE

JUNE

8-10	IFTEX 2016 *www.hppexhibitions.com/floriculture/2016/nbo*	NAIROBI
19-21	Africa's Big Seven 2016 *www.exhibitionsafrica.com*	JOHANNESBURG

Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.

Africa's biggest F&B expo keeps getting bigger

"IT'S TIME THAT Africa gets recognition for its status in the world as an economic powerhouse on a stable path to growth," said John Thomson of Exhibition Management Services, the organisers of Africa's Big Seven (AB7) food and beverage expo. AB7 takes place from 19 to 21 June at the Gallagher Convention Centre, Midrand, South Africa.

"Few people are aware that, of Africa's 1.1bn people, one in three are middle class consumers, and that the African continent is the second-fastest growing region in the world after Asia," continued Thomson. "Of the 10 fastest growing economies in the world, four are in Africa – Côte d'Ivoire, Ethiopia, DR Congo and Mozambique. Clearly, Africa still has vast potential for economic development and consumer market expansion."

"The continent's biggest food and beverage expo, Africa's Big Seven, has been an effective business networking platform for the industry for 14 years, and continues to attract growing numbers of suppliers and buyers together from across the continent and around the world, all in one place at the same time," said Thomson.

The nagging drought in many parts of central and southern Africa is attracting growing interest from food and beverage manufacturers and suppliers keen to fill the many gaps caused by lower crop yields and reduced production volumes – maize and sugar are just two examples.

"This year's AB7 expo is expected to be even bigger than last year's show; more international manufacturers and suppliers are becoming aware of the benefits of exhibiting at AB7, especially as a springboard into Africa's growing consumer markets," added Thomson.

Last year's expo set new records for international participation, attracting almost 14,000 visitors and delegates from 72 countries to the three-day show. Exhibitors from 49 countries participated in the exhibition last year, up from 35 in 2014 – an impressive increase of 38 per cent. New international exhibitors included companies from Belarus, Belgium, Chile, Estonia, France, Peru, Ukraine and Vietnam.

Top international event receives strong institutional support

THE SECOND EDITION of Agrofood & Plastprintpack Nigeria is getting closer. More than 70 technology leaders from 19 countries will display their latest solutions. Organised by German trade show specialists Fairtrade, the event takes place from 26 to 28 April 2016 at the Landmark Centre in Lagos. To round up, a three day seminar on food and drink technology is being organised alongside the exhibition. More than 1,300 visitors are expected.

Global players trust in Nigeria's leading food and packaging event will see more than 70 exhibitors from 19 countries will showcase their latest technologies, namely from Nigeria, Benin, Togo, Morocco, South Africa, the United Arab Emirates, India, Austria, China, France, Germany, the Netherlands, Poland, Spain, Thailand, Turkey, Ukraine, the United Kingdom and the USA.

Agrofood & Plastprintpack Nigeria 2016 is supported by the Delegation of the European Union to Nigeria and ECOWAS, Advantage Austria, AHK-Delegation of German Industry and Commerce in Nigeria, Nigerian-German Business Association, GIZ-German Federal Enterprise for International Co-operation and IOPN-Institute of Packaging Nigeria. Further trust in this event is given by VDMA-German Engineering Federation – hosting a German Pavilion and also holding a VDMA-Symposium on food and drink technology – and by the French agrofood association ADEPTA, who is supporting the French Pavilion featuring French live bakery. They will be demonstrating how to create delicate croissants and other sweets and snacks.

Ms Yetunde Adejumo, Lagos State Director, Federal Ministry of Agriculture and Rural Development discussing with one of the exhibitors at the last AgroFood show.

"Agrofood & Plastprintpack Nigeria supports the Nigerian agrofood industry to meet its challenges in terms of food hygiene, food safety, cost efficiency and creating an ever greater diversity of food and beverage products", said Martin März, managing director of Fairtrade.

"It is all about technological exchange and co-operation between Nigerian food and drink producers and international specialists for food ingredients and food and packaging technology," März added.

Olam and InVivo to develop animal feed solutions in Nigeria

GLOBAL AGRI-BUSINESS ENTITY Olam International Limited and InVivo Animal Nutrition & Health have signed a consulting agreement to develop expertise in animal feed production in Nigeria.

The agreement, which is for two years, will involve technical assistance and sharing of expertise to jointly develop solutions and products in the animal feed space.

The knowledge transfer between the two companies will help develop solutions, formulate animal feed, characterise raw materials and implement R&D trials and protocols to enter the animal feed industry in Nigeria, said InVivo.

As part of the agreement, Olam's experience and network in Africa will be leveraged, while InVivo will lend its expertise in animal feed proficiency. InVivo will support Olam in the design, equipment selection and installation of its feed mills across Nigeria. Nutrition and formulation experts from the company will work closely with Olam's team to develop a better understanding of the local market and develop cost-effective formulations using both local and imported raw materials.

InVivo is also expected to train Olam's staff on providing veterinary field support to poultry and fish farmers in order to help deliver consistent product performance.

In return, Olam will gain access to InVivo NSA's R&D and product development facilities as well as their feed manufacturing units in other developing markets across Asia and Latin America.

Aquaculture sector in Zambia growing rapidly

NUTRECO AND AFRICAN Century Foods (ACF) have entered into a 75/25 joint venture in Zambia, Skretting Zambia, for the production, sale and distribution of tilapia feed. The agreement is subject to regulatory approval. The joint venture will construct and operate the first dedicated fish feed plant in Zambia. Skretting is Nutreco's global brand for aquafeed.

Aquaculture in Zambia is developing at a rapid pace, in order to reduce the dependency on imported fish. A lack of high-quality fish feed is the key bottleneck in the further development of the regional aquaculture sector, which primarily consists of tilapia farming.

The new plant will be located at Siavonga, Lake Kariba, close to major fish farms in Zambia and Zimbabwe, and will have an initial capacity of 25,000 tonnes of extruded fish feed. A substantial part of the capacity will be used to supply the Zambian and Zimbabwean tilapia farms of joint venture partner ACF, Africa's largest fish producer with tilapia farms in Zambia, Zimbabwe and Uganda. Plant capacity will be expanded in a second phase with the aim of supplying the wider southeast African region.

Harm de Wildt, managing director for Nutreco's operations in EMEA, said, "This joint venture is a new step in our commitment to the African market, adding to recent fish feed investments in Egypt and Nigeria. The production of high-quality, extruded fish feed will further support the development of aquaculture in this region. It will help our customers to increase efficiency and profitability, and as a result will also mitigate the environmental footprint of the sector. In ACF we have found the right partner to establish a strong foothold in the southeast African market."

East African agricultural sector attracting thousands of youths

LATELY, MORE AND more youths are being attracted to East Africa's agricultural sector, according to the Tanzanian Ministry of Agriculture, Livestock and Fisheries Policy advisor Professor David Nyange. At the Agribusiness Congress East Africa in Dar es Salaam, Professor Nyange, among others, discussed the prospects of transforming the country's agricultural sector.

"I see a bright future from Tanzania's agriculture," Professor Nyange told the two-day congress, projecting increased export of food and cash crops, technology and innovation-driven sector growth, as well as increased enthusiasm among the youth in farming.

In his paper, *The future of agriculture in Tanzania*, Professor Nyange said, "Resources tend to raise public expectations, but unfortunately they cannot automatically create jobs or wealth." The Professor proposed investment of the revenue accrued from the oil and gas in sectors like agriculture and light manufacturing, which have the potential to promote broad-based growth.

The Permanent Secretary in the ministry, Dr Florens Turuka, reconfirmed the Tanzanian government's commitment to develop appropriate infrastructure in support of agribusiness related activities, but asked the private sector to play its role as well. *Source: allafrica.com*

Aviana – poultry and livestock shows for southern and eastern Africa

AVIANA ZAMBIA – A specialised poultry and livestock expo – to be held on 21-22 July in Lusaka, will not only give a boost to farmers and distributors in Zambia, but will also help exhibitors to reach a huge number of visitors from all over southern Africa, while showcasing innovative products and technologies.

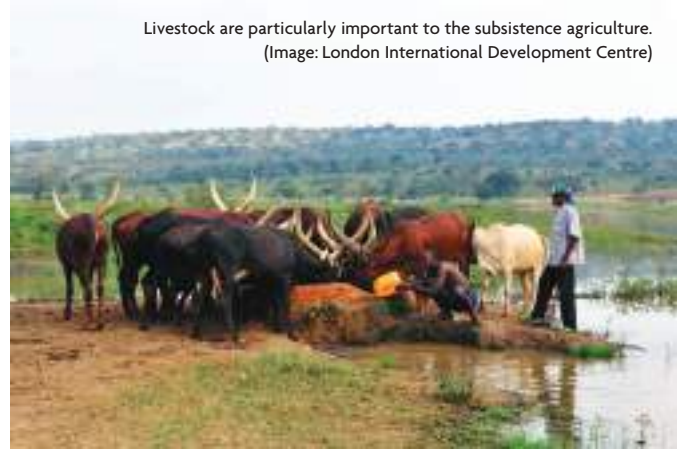
There will also be high-quality technical conferences to enhance products/companies' visibility among manufacturers, distributors, farmers and top decision makers in the poultry and livestock industry.

The poultry industry in Zambia has experienced well-documented and acknowledged growth over the last decade, cementing its ability and zeal to take on the challenges it faces and overcoming these with innovative solutions as a way of assuring continued and sustainable growth.

This success story is a practical example of development and empowerment to the people of the nation through efficient planning and investment and effective government policy.

Presently Zambia has 26mn poultry, 2.5mn cattle, 0.1mn sheep and one million goats.

AVIANA Uganda 2016 – to be held 20-21 October in Kampala – will present a gateway to East Africa by providing a platform to exhibit products, services and innovative technologies to top decision makers and create business partnerships, With serious and potential exhibitors from more than 20 countries, Aviana Uganda will exemplify a single aim of prosperity in the African animal health sector, with the mission "Animals Health Nations Wealth". More than 100 exhibitors from 20 countries are expected to participate.



Livestock are particularly important to the subsistence agriculture. (Image: London International Development Centre)

Livestock represents an essential part of Uganda's agriculture, culture, and economy. The total number of cattle, sheep, and goats more than doubled between 2002 and 2008, and the number of pigs and chickens grew by 88 and 59 per cent, respectively. Beef and milk production both increased by eight per cent in 2008 alone. Livestock are particularly important to the subsistence agriculture on which seven out of ten Ugandans rely for their livelihood.

There will be a high-class poultry and dairy conference during the two days. Visitors from across East Africa will be expected to attend.

Aquaculture sector in Zambia growing rapidly

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Henry Pitman, CEO of ACF, said, "Having consistent supplies of high-quality feed is critical to the success of our aquaculture operations in Zambia and Zimbabwe. This new feed mill will allow us to expand our operations from the current production levels of 10,000 tonnes and help to reduce our cost of production in line with our strategy to become the lowest cost producer of tilapia in the region. Furthermore we will be able to increase our support to the development of aquaculture across the region. In Skretting, ACF is partnering with a worldwide leader in aquaculture feed." *Wattagnet*

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Launch of OCP Africa – fertiliser plant with production fully dedicated to Africa

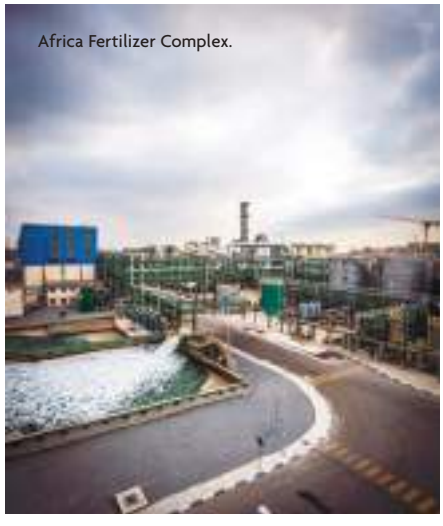
FOR THE SEVENTH "Argus FMB Fertilizer 2016" conference, held in Marrakech in February, OCP Group announced the creation of its subsidiary, OCP Africa.

This new entity aims to contribute to meeting the challenge of creating structured, efficient and sustainable agriculture in Africa, by providing agricultural producers with all the resources they need in order to succeed: suitable, affordable products, services and partnerships, as well as logistics and financial solutions.

With more than half of the non-cultivated arable land that is available worldwide, Africa has the means to feed itself and to feed the rest of the world.

OCP Group's commitment to development of agriculture in Africa is not recent. Numerous initiatives have been taken for years now. The most recent, and the most ambitious is the inauguration, on 1st February by his Majesty the King Mohamed VI, of the OCP factory in Jorf Lasfar, near the city of El Jadida in Morocco.


Panoramic view of the Jorf Lasfar site.


Africa Fertilizer Complex.

Thanks to an investment of US$530mn, the "African Fertilizer Complex" (AFC) is the first fertiliser plant with production fully dedicated to Africa. This milestone, which is part of the ambitious development plan launched by OCP chairman, Mostafa Terrab, in 2008, is an important step in OCP's exceptional roadmap for Africa.

OCP has four objectives to succeed in this agricultural transformation:

- To improve the fertility and productivity of African soils with an offer of suitable products: to achieve this, OCP Africa is investing massively in research and innovation and is strengthening its agronomic skills to serve sustainable, precision agriculture.
- To secure the production of competitive fertilisers, close to major agricultural areas. After the first fertiliser production unit, AFC, with a capacity of one million tons per annum, fully dedicated to Africa, OCP Africa is continuing the industrial development programme in sub-Saharan Africa, with several construction projects being developed close to consumer markets. These major projects will also act as driving forces for African economics, with the creation of local value and local jobs throughout the construction and operation phases.
- To guarantee the transport of agricultural inputs to farmers. The logistics chain in Africa faces many challenges, but OCP Africa is putting in place, both internally and with its local partners, storage and blending facilities in ports and close to consumer regions, and will strengthen and run local distribution networks, serving the whole of the agricultural sector.
- To contribute, alongside African farmers, to the development of sustainable agricultural ecosystems. In the next few months OCP Africa will implement several local and international partnerships in order to provide the end consumer – the farmer – with a complete range of products and services working towards an increase in both yield and income. The company has already initiated the opening of 15 subsidiaries across the continent. "Our objective is to commit specifically to each of these countries, with multi-skilled, dedicated staff, taking into account the diversity of geographies and the maturity of their markets," said Tarik Choho, chairman and managing director of OCP Africa.

Brookside Dairy plans West Africa expansion

KENYA'S BROOKSIDE DAIRY has announced plans to venture into the West African market to sell its products and also launch full-scale operations.

The company chairman Muhoho Kenyatta said Africa also needs to eradicate trade barriers, which, he commented, adversely affect economies throughout African .

Kenyatta made the revelation when he hosted Nigerian President Muhammadu Buhari who visited the Ruiru-based dairy firm, accompanied by a delegation from the Nigerian Agriculture Ministry.

Buhari said his country would send agricultural officers to Kenya to learn more about the East African country's dairy industry and gain technical experience on dairy processing.

"Brookside Dairy has shown the rest of us that dairy processing can be used to transform local societies economically by helping nurture a vibrant dairy sector. What I saw was tenacity of purpose that has built a successful efficient company over the last two decades," he said.

Muhoho said 145,000 Kenyan farmers and 55,000 Ugandan farmers received Sh10bn (US$98.5mn) for milk delivered to Brookside Dairy, adding that it had embarked on a project to train farmers on feed production and storage.

DIY - grow your own

Patricia Akyeampong discusses her experiences.

INSPIRATION FOR A mini-gardening project after returning home from Denmark was drawn from experiences with her landlady, and visits to her summer house to cultivate and harvest cherry tomatoes, potatoes and cucumber.

Back in Ghana, despite missing the main rainy season, and the intended location for the project being used as a landfill, her mini-garden project was born and resourced with the right structures to make it function correctly. She is now the proud owner of a quarter plot of land of tomatoes, okra, lettuce, sweet peppers and onions, basically for subsistence and collaborative consumption purposes.

She encountered various challenges including no running water for a day and getting sick. She also had problems with the tomato seeds when two beds of tomato did not survive, and there was a white fly attack; but later on she used those beds as her research fields. So, together with an expert, she concluded that poor planting material was the cause of the non-survival of the tomatoes.

Making the project her own and putting life into it, she tagged her vegetable beds with the names of her family as a way to engage them into this project, thus carrying out "traceability" to ascertain how much fruit she should expect on each plant, the defects and challenges. So far she has been harvesting almost every other day with enough fruit to share with neighbours and colleagues.

Bayer supports innovative ideas in crop protection

BAYER PLANS TO to drive forward the scientific debate on new chemical solutions in crop protection. Researchers from universities, other scientific institutions and start-up companies all over the world are being encouraged to take part in Bayer Crop Science's new Grants4Targets initiative. The programme is aimed at finding innovative approaches in the field of weed, disease and pest control in crop plants.

Bayer will not only provide financial support for promising proposals, but also accompany ideas and projects on a scientific basis. During the fostering phase, technologies from Bayer can also be used for further research into promising ideas and projects, which may then develop into regular scientific collaborations.

The objectives include fostering innovative ideas that could contribute to the development of selective and non-selective herbicides, and solutions to control plant disease pathogens (such as fungi) and plant pests (such as insects and nematodes). The focus will lie on new molecular targets and mechanisms of action. Applications for the programme can be submitted via a website in a process that takes a few minutes. Only non-confidential information should be submitted; the intellectual property will remain entirely in the hands of the inventors throughout the collaboration.

"The challenges facing agriculture are so great that we need all of the ideas and creativity from small and big companies, universities and other academic institutions alike," said Dr Adrian Percy, head of research and development at Bayer Crop Science. "We want to talk to scientists from all over the world about their approaches and help to accelerate the transition from fundamental research to products that are ready for the market."

Agritech Expo has grown to become one of the largest events on the Zambian agricultural calendar, and is planting the seeds for the future of the country's agriculture. Nawa Mutumweno reports.

Agritech's third edition on course

ZAMBIA'S AGRICULTURAL SECTOR is definitely in the spotlight with the country's government identifying it as the engine for the growth of the economy.

This is evidenced by the government's support, at the highest level, of the Agritech Expo which is now in its third edition, to be held from 14-16 April 2016 at the GART Research Centre in Chisamba, central Zambia, an agro-belt in its own right.

Agritech has indeed contributed to the elevation of agriculture, which holds more promise than any other sector, to lofty levels in the country. As Rob Munro, director of strategy at Musika, one of the key partners of the expo from its inception, noted, "Before Agritech Expo, Zambia never had a means by which the whole agricultural community, from smallholder farmer to corporate agribusiness, was able to come together to see, understand and invest in new technology.

"In my opinion, Agritech Expo has been hugely influential in exposing the community to this technology and driving forwards the advancement of modern farming in Zambia."

Susan Mennell, managing director of CFAO Zambia Limited, a returning bronze sponsor, said, "It is a one-stop shop for the farming sector to see all the equipment and vehicles on offer in one place in a relaxed and friendly environment. Traffic into Lusaka is bad and farmers do not have the time to go around and see what is on offer.

"With the poor copper prices and mine closures, Zambia is going to look to the agricultural sector for more exports. Zambia is able to produce excellent crops and excesses can be exported," she added.

Agritech 2016 promises to be even bigger, more dynamic and exciting, presenting a unique opportunity for agricultural producers, professionals, policy makers and the public to experience first-hand modern agricultural technologies on the market.

"Over the last three years, Agritech Expo has grown to become one of the largest events on the Zambian agricultural calendar, bourgeoning into the leading outdoor agricultural event in the region. It has proven itself as a unique and targeted business platform where actual business is conducted," the Zambia National Farmers Union (ZNFU) said in its Welcome Letter.

Agritech Expo returns to Chisamba in April as ZNFU continues the legacy of the agri-business event.

Zambia is able to produce excellent crops and excesses can be exported.

Zambia's agricultural showcase

A combination of the most recent farming technologies, product variety, innovation, discussions, networking opportunities, farming hospitality, and sales have ensured that Agritech Expo upholds its reputation as Zambia's agricultural showcase.

"Agritech 2016 will build on the many successes of the 2015 version. This year, Agritech promises increased exhibition space, an expanded arena, diverse crop trials/demonstrations, an enhanced livestock sales section, an equipment display arena, a VIP business area, the Zambian agro SME village and the 4x4 vehicle testing track," ZNFU added.

The Commercial Farmers Focus Day will take place on 14 April, while the following two days will be open to all agricultural professionals. The event will be officially opened by Zambian President Edgar Lungu with his Vice-President, Inonge Wina, also expected to attend.

Highlights

- 130 local and international exhibitors
- 35+ countries represented
- 450 commercial farmers
- 15,000 visitors over three days
- 40 industry experts
- 20 targeted media partners

Many challenges

Zambian agriculture faces many challenges, with the most obvious one being the drought that is affecting many parts of the country, impacting negatively on yields and agricultural income in the process. This will, in turn, limit the ability of farmers and agribusiness to invest in the growth of the sector.

Another hurdle on the agricultural path is unpredictable agricultural policies, particularly on grain marketing, which constrains the growth of the sector and affects investor confidence.

It is heartening to note that there has been strong collaboration between the public and private sector to make farmers – particularly smallholder farmers – aware of the impending drought and advising them on risk mitigation practices such as planting short season or drought-tolerant crop varieties. A case in point is the Ministry of Agriculture's facilitation of the integration of commercially available weather insurance into its innovative 'e-voucher' scheme for the delivery of its Farm Input Support Programme (FISP) through private sector input supply channels.

As Pierre Lombard, CEO of NWK Agri-Services noted, the agricultural sector in Zambia is dynamic. Although it has its ups

and downs, it remains one of the main contributing sectors to the country's gross domestic product (GDP).

Limitless agricultural opportunities

"There are thousands of small-scale and emergent farmers contributing to the majority of the agricultural output. With help and guidance, they have the potential to grow and increase their contribution and, therefore, contribute to the development of the agricultural sector as a whole. In short, agricultural opportunities in Zambia are limitless," he elaborated.

Zambia is endowed with a large land resource of more than 40mn hectares of arable land and has abundant water resources, accounting for 40 per cent of the water in the region. Therefore, Zambia's opportunities for food production and the ability to feed the region are huge.

"The future of Zambia's farmers, both small and large-scale, as suppliers of food products to the region and as drivers of Zambian economic growth is very positive."

"It is an over-worn cliché to say that Zambia will one day become the 'bread basket' of the region, but there is no doubt that, despite current challenges, the future of Zambia's farmers, both small and large-scale, as suppliers of food products to the region and as drivers of Zambian economic growth is very positive," Monro pointed out.

One of Musika's core strategies is supporting commodity traders, buyers and processors to establish long-term commercial relationships with smallholders that involve mot just commodity marketing opportunities but unbundled offering of assured off-take, access to inputs and new technologies and the provision of extension services. Musika's investment in fresh produce procurement such as fruits and vegetables, and processing also provides strong marketing opportunities for rural women.

Agritech Expo returns to Chisamba in April as ZNFU continues the legacy of agri-business event. (Image: EXSA)

Zambia National Commercial Bank (Zanaco) has confirmed it is returning as the exclusive diamond sponsor of the event. Other big names in the farming sector that will be at the event are AFGRI, who are platinum sponsors, and Action Auto, JCB, John Deere, SARO Agri and Zamseed who are all gold sponsors. Indeed, it would seem Agritech is planting the seeds for the future of Zambian agriculture.

Mycotoxins in animal feeds

DROUGHT CONDITIONS DURING the 2015-2016 season have resulted in lower production of essential crops, especially maize and soybeans. This has resulted in increased stress on crops during growing. This stress may increase the risk of mycotoxin production. There is also a need for imported raw materials to meet demand due to reduced production from the drought season within southern Africa. This may mean raw materials are transported from further away and stored for a longer time period increasing risk of mycotoxin development. Therefore, some strategies to help cope with the current challenges are needed.

What are they?*

Mycotoxins are toxic compounds produced by fungi (like moulds, yeasts/mushrooms). Mycotoxins are naturally produced by many different types of fungi/moulds. The fungi spread by means of spores, which they produce, and are then carried via wind or via water to different areas where they will grow under the right conditions. Mycotoxins are produced both in the field when crops are growing (fungal spores are often found in the soil where crops are growing), and also during storage of raw materials and feeds. Fungi grow by decomposing nutrients from plants or other products in their surroundings and are very tough, surviving almost any conditions. Mycotoxins cannot be seen or smelled in raw materials or feed and may thus be there without being detected. They are also not destroyed by heat and so will still be present in pelleted feeds.

When animals eat these mycotoxins, they may have various effects, depending on the level of mycotoxins in the feed.

Common mycotoxins

Within Africa the most common mycotoxins are Zearalenone, Fumonisins and Deoxynivalenol/Vomitoxin. Aflatoxin is also important due to carry-over into milk products, which may be consumed by humans.

What symptoms will be seen on the farm?

Most mycotoxins affect liver and immune function. Symptoms range from poor production/performance to death depending on animal type and health status of the animal. Animals under stress have been shown to be more sensitive to mycotoxins. All animal species can be affected by mycotoxins.

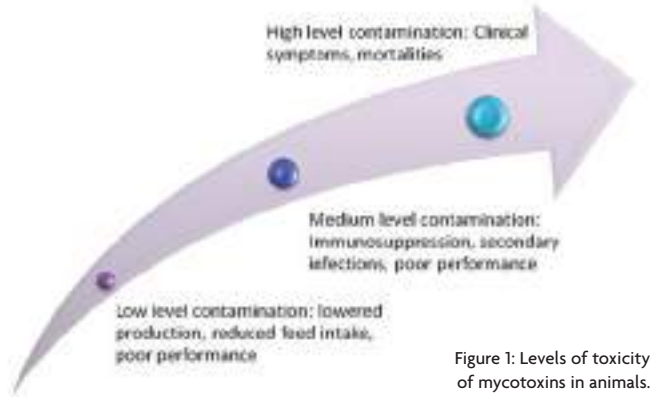


Figure 1: Levels of toxicity of mycotoxins in animals.

Prevention and control strategies

Many different options have been tested to treat raw materials and feed for mycotoxins. There is no quick fix or easy solution to control mycotoxins and a multi-step process is normally the best and safest option.

- Raw materials with high levels of mycotoxins should be restricted in animal feeds to prevent problems.
- Raw materials that are very contaminated can be mixed with clean raw materials to lower the total level of toxin in the product (dilution). This is, however, difficult to perform successfully as toxins tend to form in clumps within raw materials, thus some spots have very high levels of toxin and others very low levels.
- One of the most popular and successful options, is the inclusion of a mycotoxin binder into animal feeds to prevent the toxins from being absorbed by the animal and thus reducing the possible negative effects. Ⓔ

Fliegl Agrartechnik

** More information on mycotoxins in feed mills can be found on pages 28-30.*

Government to bolster Egyptian poultry sector

THERE IS TO be a review of the legislation covering the Egyptian poultry sector aimed at expanding output in the future, according to Khalid Tawfik, head of the animal production and poultry sector in the Ministry of Agriculture. Among the challenges being experienced by the sector are avian influenza and other poultry diseases, rising imports, high feed prices and the transfer of farms out of towns and cities.

Tawfik presented his vision to develop the wealth of the poultry sector at a conference entitled "Expert guide: The challenges and opportunities for Egypt's poultry industry", according to *Daily News Egypt*.

Moustafa Sakr, head of the 'Business News' Foundation, said that the poultry industry is important for national security, and called for its leaders to discuss their challenges, which include outbreaks of avian influenza since 2006. It is important for the government to understand the market and the issues facing the sector, he added.

Musa Freiji, World Federation of Poultry executive and head of the Lebanese Union of Poultry, highlighted the increase in imports of poultry meat that followed the reduction in customs tariff from 60 to 30 per cent. This has harmed domestic producers, and he called for the tariff to be raised again as well as a tightening up of import procedures so documents cannot be falsified.

Despite global developments to maintain the efficacy of vaccines, Freiji said that the Egyptian Ministry of Agriculture must take further measures to address the poultry disease health crisis, including the removal of poultry from residential areas, a factor that has contributed to the spread of avian influenza in the country.

Tawfik said he would take these issues into account as he considers how best to help advance the poultry industry.

Kenyan poultry farmers use low-cost organic supplement

POULTRY FARMERS IN Kenya are saving up to US$120 on feed costs monthly, increasing the maturity rate of their birds by two and a half weeks and taming the spread of aflatoxins from chicken to humans thanks to a low-cost organic supplement that has now caught the attention of Uganda and academic scholars.

Henry Ambwere with staff at the Molaplus factory.

Dubbed MolaPlus Poultry Microbes, the solution, which is a form of supplement, is the first of its kind in Kenya and is organic ensuring that the birds and their products are free from chemicals. It has been developed by animal feed manufacturer MolaPlus Limited and comes in the wake of increasing the cost of chicken feed and diseases that are taking a toll on poultry farming in the country even as the sector struggles to stoke growing competition from Uganda.

Feeds account for 30 per cent of poultry farmers' expenses with the cost of preventing and curing diseases taking another 30 per cent.

"With the increasing cost of feeds, poultry farmers need a feeding formula that ensures right rations with a good nutritional mix while keeping the birds free from diseases. This is no mean feat," said Henry Ambwere, CEO of MolaPlus Limited.

Leading South African poultry organisations are working with the government on initiatives to detect diseases in chickens at the earliest stages and to train more state vets along the way. Tim Guest reports.

Collaborating to fight poultry disease in SA

TOWARDS THE END of last year, the Poultry Disease Management Agency (PDMA) in South Africa (SA) reported on its collaborative work with the government's DAFF Veterinary Public Health (VPH). This saw a successful pilot study of egg sampling, residue and microbial testing as a first step towards the 'development of a national residue and monitoring programme for eggs' looking for early signs of pathogenesis.

Engagement between the PDMA and VPH in developing a national monitoring programme for testing of residues and microbial presence in eggs is ongoing, with the next phase being to determine basic guidelines on the routine sampling of residues and microbial agents.

The year-end report said that the VPH had also taken steps to invite SA's National Department of Health (DoH) to participate in the programme and facilitate a 'One Health' approach to the whole project.

The PDMA, for its part, acts as the conduit between industry and government and is a fully-funded entity of the South African Poultry Association (SAPA), providing information for the public and poultry industry in SA via its website, www.poultrydiseases.co.za. This includes details on state vets, training, poultry diseases and disease acts and protocols, as well as important disease study cases.

State vets in training courtesy of the SAPA.

An expert view

To find out more about poultry disease management in SA, *African Farming* spoke with Dr Charlotte Nkuna, senior executive of both the SAPA and the PDMA, based in Honeydew, Johannesburg.

***African Farming*: What are the main diseases and concerns currently facing commercial poultry farming in SA?**

Charlotte Nkuna: The main diseases are Newcastle Disease Virus (NDV) and Salmonella gallinarum. The main diseases that cut across large commercial and smallholder flocks are Newcastle Disease (ND) and Fowl-pox.

***AF*: How is the commercial sector managing disease in poultry and what more, such as improved living conditions, must be done?**

CN: Vaccines are widely used to control diseases. There is also a lot of focus on biosecurity. There are initiatives to increase sharing of disease incidents and mapping of such incidents to ensure that farmers are alerted and can take appropriate precautionary measures to protect their flocks. Training is also a major component for both smallholder and large commercial farmers.

***AF*: How are the diseases of community flocks, such as ND, being managed and are community small-hold farmers being given the support they need?**

CN: There are two types of community flocks. Those who keep improved commercial breeds, such as Ross, Cobb, Hyline and Arber acres, and those communities who keep indigenous breeds for subsistence. The farmers keeping indigenous flocks do not receive much support. However, the ones keeping the commercial breeds are usually beneficiaries of government initiatives and will, therefore, receive various levels of government support. The support depends mainly on the government department concerned and also the province where they are located. In the beginning the farmers receive housing, feed, vaccines, cleaning products, etc.

Over some time, the government support is withdrawn and the farmers are left to continue on their own. Most do not make it once government support is withdrawn, because most of the initiatives are below the minimum economic unit. Those who survive receive support from pharmaceutical companies, training support from SAPA and government. Most of them continue to vaccinate their flocks and practice biosecurity measures and those who do not understand the value of prevention do not vaccinate for any of the diseases.

For those keeping indigenous flocks and those who do not vaccinate, ND will generally decimate entire flocks and they usually restock months later.

***AF*: So ND in community chickens in SA isn't actually under control; have vaccine programmes been implemented with any success?**

CN: Newcastle disease is a self-limiting disease. It usually kills all community flocks, those which were never vaccinated. Several

initiatives have been attempted to introduce vaccination for ND, however, none have taken off. South Africa does not have any thermo-stable vaccines and any attempts to introduce such have not been successful. The commercial sector is so advanced that people can gain access to cheap chickens with absolute ease, making backyard chickens more of a hobby for most people.

***AF*: How can greater co-operation between industry and government help commercial poultry disease management? PDMA, DAFF VPH and DoH collaboration in terms of sampling for microbial agents in eggs and chicks was discussed in a November 2015 announcement. Is this working well in furthering effective disease management in poultry?**

CN: The Poultry Disease Management Agency (PDMA) was established to bridge the gap between the poultry industry and the government. The agency has been successful in improving relations and collaboration between government and the industry. The current status is that companies do a lot of testing and the results are kept as private records. The retailers also individually require a certain amount of testing from the suppliers. This results in a lot of data that is privately owned, without consolidation. The work done by the PDMA and government is aimed at setting universal standards for all farmers, that are accepted by the retailers and government and also continue to guarantee safe meat for the consumers.

The consolidation for meat is being done through the independent meat inspection scheme, while those for eggs are being done through egg microbial and residue monitoring schemes.

The industry, DAFF VPH and DoH all have the responsibility of ensuring safe food for the consumers. The collaboration

Dr Charlotte Nkuna, senior executive, SAPA and PDMA.

helps to reduce duplication, consolidate resources and also to avoid things falling through the cracks. The aim is to reduce the cost of compliance for the producers, while guaranteeing the safety of the products. Retailers are main stakeholders in this initiative, with consumers as the ultimate beneficiaries.

***AF*: The over-use of antibiotics in the food chain is a growing concern around the world; can disease management in commercial poultry in SA be effective without the over-use of antibiotics?**

CN: Yes it can. However, it requires a major shift in behaviour and mind set. Most of the important diseases can be vaccinated against. The main problem for the producers is managing enteric diseases and also the respiratory diseases during the dry cold winters. A lot of advances have been made in managing enteric diseases with nutrition and also probiotics and prebiotics.

For the respiratory diseases, vaccination and also the management of ventilation has been instrumental in reducing the effects of the dry cold weather. Biosecurity remains the main focus for producers, but it will require a lot of changes in management practices.

***AF*: What part is your organisation (PDMA/SA Poultry) playing in disease management in the poultry industry in SA?**

CN: The PDMA offers a training course for state vets, which is run by the Faculty of Veterinary Science at the University of Pretoria. The agency co-ordinates technical seminars for both private and state veterinarians. Disease reporting and mapping is also one of the initiatives run by the PDMA and the co-ordination of Avian Influenza surveillance is done by the agency in support of the government. We also conduct the microbial and residue monitoring initiative in collaboration with DAFF and DoH.

***AF*: What are the most important benefits of the collaboration between your organisation and the government?**

CN: The most important benefit of the agency is that it has managed to bridge the gap between industry and government. This collaboration has improved significantly since the establishment of the PDMA. We believe that this close collaboration will ultimately reduce the cost of compliance while still guaranteeing the safety of meat and that export initiatives will also be boosted by the collaboration.

Hybrid Poultry opens new Cobb parent hatchery in Zambia

HYBRID POULTRY FARM, the Cobb franchise distributor in Zambia, has opened a new parent hatchery on its farm at Kabwe.

The company has invested more than US$12mn in the fully environment controlled facility on a 2023-ha block of land bought solely for the parent operation. It is situated in an isolated farming area and provides a high degree of biosecurity.

The hatchery has the latest technology with the incubation systems remotely monitored and controlled through a satellite interface.

Managing director, Richard Keeley, was delighted with the quality of the initial hatch of Cobb500 parents for placement on Hybrid Poultry farms.

He stated: "It was our intention to ensure that we developed a world-class facility that would not compromise on any aspects of technology or standards, and I am delighted to say that the first hatches to come through our new facility have shown marked improvement in hatchability and chick quality. "The facility will provide for our future growth not only for our Hybrid integration in Zambia but our associated companies in Kenya and Tanzania in supplying Cobb products to meet regional demands."

Pieter Oosthuysen, key accounts and regional technical manager for Cobb in Africa, added: "I'm very happy to see this new investment in Zambia as the market is expanding and Hybrid is ideally positioned to supply quality chicks to other Cobb customers in the region like Zamhatch. The sister operations Kenchic and Tanbreed will receive imported flock placements as they have large parent flocks, which is a huge benefit for improved uniformity and better chick production."

Contagious Caprine Pleuropneumonia (CCPP) is a highly infectious disease of goats which causes inflammation of the lungs and accumulation of fluid in the chest cavity. Mortality rates can reach 100 per cent. Mwangi Mumero reports.

Contagious goat disease

Goats being vaccinated against Contagious Caprine Pleuro Pneumonia (CCPP). (Image: Batik Billy)

ENDEMIC IN MORE than 30 countries in Africa and Asia, Contagious Caprine Pleuropneumonia (CCPP) threatens more than 300mn goats globally. First isolated from lungs of goats in the mid-70s, Mycoplasma capricolum subspecies capripneumoniae (Mccp) was identified as the causative agent for this disease which has more than 80 per cent morbidity and 60-80 per cent mortality rates.

Transmitted through infected aerosols – tiny droplets coming from the mouth or nose – the disease is introduced in a new region by health carriers. Interaction of animals through housing, transportation or watering points helps spread the disease.

In remote parts of Africa where nomadic-pastoralism is practiced, the disease spreads quickly among goats that huddle together at water points or near temporary structures constructed for the night.

"Cases of CCPP are quite common among goats in Kenya and many African nations. Government veterinary officials issue alerts, whenever there is an outbreak, to inform farmers and herders on the need to vaccinate and reduce animal interaction, especially near watering holes and during transportation," observed Cleopus Wahome, a Kenyan livestock expert at the Sheep and Goat Station in Naivasha.

In remote parts of Africa where nomadic-pastoralism is practiced, the disease spreads fast among goats that huddle together.

Goat multiplication programme

The station is part of the government's goat multiplication programme where new and existing goat breeds are improved and multiplied before being distributed to prospective farmers.

Recently, Kenya has had 12 outbreaks of CCPP with 75 reported cases and 19 deaths.

The disease has also been observed in Chad, Ethiopia, Sudan, Tunisia, Turkey, Oman and India.

In a recent research conducted by Ethiopia's National Veterinary Institute (NVI), Debre Zeit, the overall CCPP prevalence in the regions of Itang, Gambella Zuria and Lare were 24.7 per cent, 14.7 per cent and 12.6 per cent respectively.

Gambella Region Bureau of Agriculture and Rural Development noted that CCPP is the most devastating disease of goats in the region with outbreaks occurring in recent times. In the recent past, Ethiopia has experienced 12 outbreaks with 1,236 cases and 486 deaths.

A similar survey conducted in southern Tanzania in January 2013 indicated that 73 per cent of livestock keepers indicated that CCPP was a major constraint of livestock keeping in the area.

The study involved 141 goat keepers in Tandahimba district of Mtwara region.

In the recent past, Somalia had the highest outbreaks of the disease at 228 with 3,614 cases reported. Out of these cases 567 deaths were reported.

Other African nations reporting cases were Chad with 17 outbreaks, 636 cases with 213 deaths. Overall, Africa had a total of 280 outbreaks, 5,833 cases with 1,342 deaths in the recent past.

Common signs of the disease

Common signs of the disease include production of a straw-coloured pleural fluid, fever (where the temperature ranges from 40.5-41.5°C), coughing, body weakness and failure of the animal to feed.

"The animal experiences difficulty breathing and shows frothy salivation. In acute cases the animal dies quickly," said Dr Maina Kibata, a vet currently working with the Food and Agricultural Organisation (FAO) in its Lowdar office in northern Kenya, which also covers South Sudan and lower Ethiopia.

Poor diagnosis leads to increased mortality

While the disease is quite common across many African nations, poor diagnosis leads to increased mortality and losses to many farmers.

"A lot of farmers fail to diagnose the disease early, assuming it is a normal coughing, common in goats," noted Wahome. "Cool weather affects the goats in a similar way. Only when the goat succumbs do the farmers rush to veterinary officers for guidance."

Researchers and veterinary officials advise that diagnosis of CCPP should be done both in the field and in the laboratory.

"Diagnosis should be done quickly to prevent epidemics, so that control measures, such as treatment of sick goats and vaccination of those at risk, can be carried out immediately," said Dr Kibata.

Among the lab tests carried out for CCPP cases is the Polymerase Chain Reaction (PCR) test performed directly on the pleural fluid or the affected lung.

Basically, the PCR machine, also known as a DNA amplifier, has the ability to produce DNA copies of a specific segment that can range from thousands to millions in numbers.

Disease causing micro-organisms such as Mycoplasma contain either DNA or RNA within their nucleus. A PCR machine – a combination of test bottles connected to a laptop – is able to identify the DNA or RNA in the suspect blood or fluid sample and

compare it with the pre-recorded information.

"This is the most conclusive use of technology in disease diagnosis. It is fast and cheaper in the long run, as it reduces any chances of missing the disease causal agent and providing the wrong treatment. For instance, it takes less than five hours to get conclusive results for a disease while it might take over 14 hours using the long and tedious process of culturing material in the laboratory," observed Dr Bridgit Syombua Muasa, a veterinary officer with the Kenya's Department of Livestock.

Serologic tests include passive hemagglutination and ELIZA tests can also be carried out in the field directly.

Annual vaccination

According to Dr Kibata, vaccination should be done annually. During an outbreak, however, mass vaccination coupled with quarantine helps to curb disease spread.

Post-mortem examination also helps to ascertain the disease.

Experts say that regular vaccination of goats is the only effective way of controlling the disease. Unfortunately, nomadic communities – always on the move seeking better pastures and water – are hard to adhere to this strict vaccination regime.

Somalia in 2014 exported a record five million livestock to markets in the Gulf of Arabia thanks to heavy investments in animal disease prevention backed by the EU and the UK, according to the FAO. (Image: KassFM)

"Governments need to establish mobile units to vaccinate animals in the expansive African Savanna where most of the goat herding takes place. Some herders may also be trained on reporting, documentation and eventual vaccinations of all animals within their migratory communities," observed Dr Kibata, an experienced vet official with more than 10 years in South Sudan.

A liquid vaccine is currently in use in many countries. The Kenya Veterinary Vaccines Production Institute (KEVEVAPI) manufactures the CCPP vaccine for local farmers.

Affected animals can also be treated using antibiotics such as oxytetracyclines or Tylosin. Quarantine of the affected animal is the best way of preventing herd infection.

In some countries where continued effort against CCPP has been well funded, the impact on the local economies has become apparent.

A recent vaccination campaign in Somalia against CCPP, which previously negatively impacted on livestock sales in the country, has brought fortunes, according to the FAO.

According to FAO, at least 12mn goats were treated and vaccinated against CCPP in 2014 – helping open up the export markets for live goats to the Middle East.

Somalia exported a record five million livestock to markets in the Gulf states – mainly due to heavy investments in disease control by the European Union and the UK.

FAO data indicates that Somalia exported 4.6mn goats and sheep, 340,000 cattle and 77,000 camels in 2014, worth an estimated US$360mn and contributing 40 per cent of the country's GDP.

Buyers have been flocking from Saudi Arabia, Yemen, Oman, Kuwait, Qatar and the United Arab Emirates to take advantage of the thriving livestock sector in Somalia and its improved disease surveillance and control mechanisms.

African strides in fish farming are gaining momentum and many Africans have turned to it to complement their diets on the backdrop of nutritional deficits. Nawa Mutumweno reports.

Fish farming – a growing business in Africa

Combining aquaculture and agriculture to promote food security in Malawi. (Image: World Fish)

UNEMPLOYMENT CONTINUES TO rear its ugly face in all corners of the continent with many people, women and youths included, finding it difficult to put three square meals on the table. Many Africans live on less than one dollar a day, a sad situation that needs urgent redress.

One business opportunity that begs for investment is fish farming which is viable, what with ample water resources that fill the length and breadth of Africa. Fish farming indeed remains untapped and has the potential to turn around the fortunes of many.

Fish farming or pisciculture involves raising fish commercially in tanks or enclosures, usually for food. It is the principal form of aquaculture.

Fish is one of the cheapest sources of animal protein and the most widely accepted animal product in Africa. Unlike pork, it is heavily consumed across the various religious, ethnic and social lines throughout the African continent.

With the growing awareness for healthy meats, fish is slowly gaining an upper hand in many African kitchens and dishes. Rising above its traditional reputation as a poor man's protein, it is now regarded as a healthier alternative to beef, chicken and pork.

Starting the fish business

A number of prerequisites are required to establish a successful fish farming business. These include, inter alia:

Capital: Fish farming is a business that can be started with a small amount of money. Initial capital is needed for the construction of the pond, acquiring land and buildings. In addition, running costs will include cost of feed, fingerlings, fuel and electricity.

Fish is one of the cheapest sources of animal protein and the most widely accepted animal product in Africa.

Securing land: It is important to look for land where it is cheaper. Depending on the capacity you want to operate on, a half plot of land is just good enough for an average fish farm. One may seek to expand as the business thrives.

Construct ponds: It may be worthwhile to engage the service of an expert pond construction engineer. Alternatively, one could visit another fish farm to get the specification and construction requirements. Another consideration is plumbing work which must be properly done to ensure proper drainage.

Digging a borehole: Adequate water supply is the 'engine' of a fish farm. Naturally available sources of water such as borehole and river water are the most suitable.

Water tank: This is the water reservoir from which water is supplied to your ponds. The tank has to be connected to your ponds through a plumbing system to make it convenient for water to flow into them as and when required.

Globally, the FAO estimates the value of fish trade to be US$51bn per annum, with more than 36mn people employed directly through fishing and aquaculture, while as many as 200mn people derive direct and indirect income from fish.

The FAO also reports that, across Africa, fishing provides direct incomes for about 10mn people – half of whom are women – and contributes to the food supply of 200mn more people.

According to the FAO, fish farming currently accounts for more than 30 per cent of global fish supply; of which Africa as a whole contributes less than two per cent.

Significantly untapped in Africa

Fish farming remains significantly untapped and unexplored in Africa, as only

secondary and part-time efforts by small-scale fish farmers attempt to support local consumption.

African strides in fish farming are gaining momentum at a time the United Nations is urging nations the world over to ensure sustainable consumption and production patterns as part of the new Sustainable Development Goals (SDGs), which have replaced the Millennium Development Goals (MDGs).

The SDGs are a universal set of 17 goals, targets and indicators that UN member states are expected to use as development benchmarks in framing their agendas and political policies over the next 15 years.

Many Africans have turned to fish farming in towns, cities and rural areas to complement their diets on the backdrop of nutritional deficits.

The Inter-Press Service (IPS) reports that in Zimbabwe, an estimated 22,000 people are involved in fish farming, according to statistics from the country's Ministry of Agriculture.

The Aquaculture Zimbabwe Trust was established in 2008 to mobilise resources for the sustainable development of environmentally-friendly fisheries in the country as a strategy to counter chronic poverty and improve people's livelihoods.

Over the years, it has been offering training aimed at building capacity to support the development of fish farming in Zimbabwe.

The figure for fish farmers is understood to be even higher in Malawi, where some 30,000 people are active in fish farming-related activities, the FAO says. Fisheries are reported to contribute about 70 per cent to the protein intake of the developing country's estimated 14mn people, most of whom are too poor to afford meat.

In Uganda, for example, lake fishing yield catches are worth more than US$200mn a year, contributing 2.2 per cent to the country's gross domestic product (GDP), while fish farming employs approximately 135,000 fishers and 700,000 more in fish processing and trading.

Zambia's Yalelo Limited is to invest US$9.5mn to increase production at the firm's cage fish farming operations in Siavonga, Southern Province, near Lake Kariba, one of the biggest man-made lakes in the world.

Company CEO, Bryan McCoy, said the expansion programme will enable Yalelo to increase its annual fish production from 7,000 tonnes to 30,000 tonnes in the next five years.

According to a statement issued recently, McCoy said the investment will also create an additional 150 specialist full-time jobs and engage 100 non-skilled staff.

Yalelo fishing hatchery ponds.

"Yalelo is extremely proud to be investing further into local production capacity. Zambia has the resources to be the leader in regional fish production, and Yalelo is ready to anchor Siavonga's emergence as the aquaculture capital of sub-Saharan Africa," he said.

Speaking earlier, Yalelo Limited director, Fisho Mwale, said the decision by the company to increase production has been necessitated by national encouragement for the development of the aquaculture sector, evidenced by the creation of the new Ministry of Livestock and Fisheries in addition to the growing momentum behind the Aquaculture Development Association of Zambia.

Fish farming helps poor African communities add high-value protein to their diet since Africa often suffer challenges of malnutrition.

It is heartening to note that the rising fish farming trend comes in the wake of the New Partnership for Africa's Development (NEPAD) call for initiatives such as fish farming to be replicated in order for Africa to harness the full potential of its fisheries in order to strengthen national economies, combat poverty and improve people's food security and nutrition.

In view of an increase in the shortage of traditionally harvested fish, the South African government recently invested US$6.2mn (ZAR100mn) in aquaculture projects in all four of the country's coastal provinces.

According to figures from South Africa's Department of Environmental Affairs, about 71,000 South Africans in 2014 were involved in fish farming.

Fish farming has indeed added nutritional value to many poor people's diets as nutritional experts contend. "Fish farming helps poor African communities to add high-value protein to their diet since Africa often suffer challenges of malnutrition," said Agness Mwansa, an independent nutritionist based in the Zambian capital, Lusaka.

Many benefits

From experts' point of view, benefits of fish farming are many as fish from aquaculture ponds are preferred by consumers because they are bred in water that is exposed to very little or no pollution, thus it is in high demand, guaranteeing higher income for fish farmers.

Donor agencies such as the UK's Department for International Development (DfID) have helped to give Africa's aquaculture industry the much-needed push over the last decade.

FAO studies indicate that about 9.2mn sq km (31 per cent of the land area) of sub-Saharan Africa is suitable for smallholder fish farming, while 24 countries in the region are battling with food crises, twice as many as in 1990.

The State of Food Insecurity in the World 2015 report released jointly by FAO and the World Food Programme (WFP) says that the East and Central Africa regions are most affected, with more than 30 per cent of the people in the two regions classified as undernourished.

The decreasing fish stocks in rivers and oceans across the world (due to global warming and environmental pollution) have severely affected fish supplies. This makes a strong point for fish farming.

Riding on increased popularity, fish farming could be an obvious and smooth path out of poverty and hunger for many Africans.

New knowledge of the biochemistry of the crop has proved that the proteins embedded in the leaves are equal in quality to the protein in egg. Cassava leaves and roots, if properly processed, can therefore provide a balanced diet protecting millions of African children against malnutrition.

Cassava – Africa's food security crop

BECAUSE OF ITS massive leaf production which drops to form organic matter thus recycling soil nutrients, cassava requires little or no fertilisation and yet will maintain a steady production trend over a fairly long period of time in a continuous farming system. With its ability to suppress weeds, particularly the improved varieties, which develop many branches early enough to form a canopy shading weeds from solar radiation, cassava as a crop is a friend of the scale farmer whose weeding operation is drastically reduced.

Whereas other crops such as yam, maize, banana and plantain, cowpea or sorghum and millet are ecoregionally specific, cassava is probably the only crop whose production cuts across all ecological zones. Talking about cassava's adaptability to the tropical African environment, Alfred Dixon, a cassava breeder at the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria says, "Cassava is to the African peasant farmers what rice is to the Asian farmers, or what wheat and potato are to the European farmers."

Cassava, the neglected crop of the down-trodden, is fast becoming an elite foodcrop in sub-Saharan Africa.

IITA scientist with improved cassava variety. (Image: IITA)

Advances in cassava research

Cassava is fast becoming an elite foodcrop in sub-Saharan Africa, thanks to the research efforts of scientists at IITA and national agricultural research systems in the continent. Two major diseases of cassava – the Bacterial Blight and Leaf Mosaic – have been controlled through genetic breeding and the incorporation of resistance genes into high yielding cassava varieties by IITA. Also, through its ambitious, Africa-wide programme of the biological control of the cassava mealybug, IITA has waged a successful war on a devastating pest.

Having freed Africa's most friendly crop from the vagaries of some of the prevailing diseases and pests, IITA now has many improved cassava varieties available that are high-yielding and early maturing. The unattractive six tons-per hectare-varieties, which are late maturing, have now given way to varieties that yield 20-30 tons per hectare in just 12 months.

The Institute has embarked on a campaign strategy to constantly transfer these improved varieties to African research institutions. IITA's new research thrust is pushing cassava yield to more than 40 tons per hectare on the farmers' fields. Dubbed "super cassava", the new varieties will be available to farmers in a few years' time. Equally, IITA – in collaboration with the Centro International de Agricultura Tropical (CIAT) in Colombia – has been pushing improved, drought-tolerant cassava varieties to the drier areas of the Sahel, the Kalahari and the high altitudes of eastern and southern Africa.

The adoption has been gradual, first on a farmer-to-farmer basis in Nigeria and in other countries with strong collaboration with IITA. Later, Nigeria's National Seed Service (NSS) and the National Accelerated Food Production Program (NAFPP) became interested and multiplied the improved varieties for distribution to farmers. Recently, however, African governments' interest in the rapid multiplication and distribution of IITA-improved cassava varieties has added a new impetus to the adoption rate by farmers in almost all of sub-Saharan Africa.

In Malawi, an IITA cassava multiplication and distribution project funded by the United States Agency for International Development (USAID) has successfully taken off. Also, there is the FAO/IITA and East and Southern African Rootcrops Research Network (ESARRNET) helping to spread IITA improved cassava varieties to farmers. The network, which is being funded by the FAO, covers all countries in East and southern Africa. In Nigeria, Benin, Cameroon, Zaire, Ghana, Mozambique, Niger, Guinea, Angola, Rwanda, Uganda, Togo, Tanzania, Sierra Leone and Zimbabwe, there is an assurance of a new wave of cassava production that will go a long way to alleviate the food situation in the continent.

The early realisation of this feat will depend largely, of course, on the individual government's positive approach towards assisting farmers in procuring improved planting materials and educating farmers on the new processing techniques to eliminate or minimise loss.

Already, some of the countries are on the right path. In Nigeria, for example, both the government and farmers are taking advantage of IITA's proximity to adopt new technologies on cassava production and utilisation. Since 1990, FAO figures have consistently shown Nigeria as the world's largest cassava producer. The achievement – according to the FAO – is largely due to the availability of improved varieties from IITA.

A favourable factor is the Nigerian government's creation of a conducive atmosphere for cassava expansion and spread. In 1986, the Nigerian government introduced the Structural Adjustment Program (SAP) and banned the importation of rice, wheat and maize thereby encouraging farmers to increase local food production.

At the same time, the government adopted aggressive and positive campaigns to popularise the improved cassava varieties, urging all relevant national institutions to embark on the multiplication and distribution of cassava planting materials in the rural areas.

Also, UNICEF, the International Fund for Agricultural Development (IFAD), and international non-governmental organisations became fully involved in the multiplication and distribution programme.

After a five-year multi-locational testing programme spanning all the cassava growing areas, Ghana recommended three of the best IITA cassava varieties for adoption by farmers in that country. The varieties TMS 30572, TMS 4(2)1425, and TMS 50395 were given local names that mirror their characteristics and food qualities both in the farmers' fields and when processed. In addition, private companies in Ghana who are desperate for planting materials made a request to IITA to supply cassava planting materials valued at about US$35,000 from accredited Nigerian farmers and seed companies.

After years of testing, in which the IITA's improved cassava varieties outscored all available materials, the Ugandan government has officially recommended to farmers three IITA varieties for massive adoption. As a vegetatively propagated crop, cassava multiplication is generally slow. However, as a result of the crop's potential in alleviating hunger and malnutrition, rapid multiplication techniques are being developed by IITA scientists to cope with the demand.

If the present awareness on cassava adoption is sustained by farmers in sub-Saharan Africa, it is believed that, given adequate government support, the food situation will soon improve.

Apart from the procurement, production and utilisation strategies, the governments need to organise and put in place extension strategies that facilitate the spread and adoption of improved varieties.

If the present awareness on cassava adoption is sustained by farmers in sub-Saharan Africa, it is believed that the food situation will soon improve.

IITA's research and impact

IITA scientists have played a leading role in developing improved cassava varieties which are disease- and pest-resistant, low in cyanide content, drought-resistant, early maturing, and high yielding. Disease-resistant varieties give sustainable yields of about 50 per cent more than local varieties. Distribution of CMD-resistant varieties in response to the CMD outbreak in East and Central Africa resulted in production levels recovering to pre-epidemic levels in less than five years. Improved cassava varieties are now used in most cassava-growing countries in SSA.

Farmers in field of cassava. (Image: Neil Palmer/Flickr)

The IITA's biological control programme resulted in a 95 per cent reduction in cassava mealybug damage and a 50 per cent reduction in damage caused by the cassava green mite.

Post-harvest strategies include the development of effective and simple machines and tools that reduce processing time and labour, and production losses. With these machines, losses can be reduced by 50 per cent and labour by 75 per cent.

During the past three decades, IITA has trained more than 9,000 researchers and technicians in 10 African countries in processing and in new uses for high-quality cassava flour (HQCF). As a result, the private sectors in Madagascar, Nigeria, Tanzania and Uganda have begun using HQCF as a raw material for processing secondary products such as biscuits and noodles.

Consumption

Nearly every person in Africa eats around 80 kg of cassava per year. It is estimated that 37 per cent of dietary energy comes from cassava. The Democratic Republic of Congo is the largest consumer of cassava in SSA, followed by Nigeria.

Disease and constraints

The major pests of cassava in SSA are the cassava green mite and the variegated grasshopper. The main diseases affecting cassava are cassava mosaic disease (CMD), cassava bacterial blight, cassava anthracnose disease and root rot. CMD alone accounted for an estimated 47 per cent of East and Central Africa's cassava production losses during a serious outbreak beginning in the early 1990s until 2006. Pests, disease and poor cultivation practices combined can cause yield losses as high as 50 per cent in all of Africa.

Taye Babaleye, IITA

CMT's 2nd Cassava World Africa

THE RECENT ACCRA summit brought together the cassava value chain players from Ghana, Nigeria, Mozambique, Tanzania and Malawi including plantation owners, processors and end users. Leading the programme was a presentation on 'Food Security in Africa & Encouraging Public-Private Partnership in Agriculture Sector' with a special focus on cassava by Bukar Tijiani, assistant director-general and regional representatives for Africa of the FAO.

Nigeria's Shonga Farms shared the country's large-scale commercial cassava plantation model while Ghana Industrial Cassava Stakeholders Platform presented a case study on the plantations in Ghana and its challenges of cassava starch processing.

Caltech Ventures' managing director Chris Quarshie shared insights on the market prospects for high-quality cassava flour (HQCF) in Africa. Export Marketing (EMCL) provided inputs on enhancing cassava production in Africa and tackling supply chain and processing challenges. William Oppong-Bio, executive chairman of Amantin Agro Processing highlighted Africa's preparedness for cassava chips exports by overcoming supply chain barriers while Chuka Mordi, managing partner at CBO Capital Partners described a case study of Union Dicon cassava starch processing.

'Ethanol projects in Nigeria' by Rajavelu Rajasekar, director (Agro), Allied Atlantic Distilleries (AADL), cassava adhesive for paperboards by Gregory Mhango, supply chain manager of Nampak Malawi and cassava for animal feeds by Dr. Kivuyo Cuthbert, managing director of Misenani Agri Services were also reviewed.

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The Minister of Agriculture, Chief Audu Ogbeh, has said Nigeria must develop agriculture because the transition from oil to agriculture as the country's major foreign exchange earner is vital to the country's survival.

Agriculture to the rescue as oil prices falter

THE MINISTER OF agriculture and rural development, Chief Audu Ogbeh was optimistic about set programmes for the development of smallholder farmers and the development of agriculture in the year 2016, but stakeholders, while optimistic and speaking on their expectations for the year 2016, insist that will only happen if the government creates an enabling environment and the necessary support for Nigerian farmers.

He has said that this government is committed to achieving an all-inclusive growth. While noting that agriculture has regrettably been seen to be synonymous with poverty, the minister of agriculture said no country can practise agriculture sustainably without agricultural mechanisation. Ogbeh explained that the low level of mechanisation limits the ability of farmers to expand cultivated areas, perform timely farm operations and achieve economies of scale in increasing food production.

"Although over 50mn ha of arable land are presently not in use, the 40mn ha in use are poorly developed and not very tractorable. Although Nigeria, for a very long time, has not conducted a valid inventory of our tractor density, this may be less than five tractors to 1,000 ha," he said.

Audu Ogbeh noted that, with the renewed commitment of the present administration to end unbridled importation of all kinds of food items and make the country self sufficient in food, this will deepen and widen the private sector-driven Agricultural Mechanisation Framework, PSDAMF, strategies in partnership with local fabricators and manufacturer representatives.

"This flag-off serves as the commencement of the Buhari Administration's vision to aggressively commercialise and mechanise Nigeria's agriculture by introducing about 2,000 units of tractors and various kinds of harvesting and processing equipment to mechanise our farming annually, while also building Nigerian local content and capacity to sustain and advance mechanisation to suit best practices worldwide."

2016 will be an interesting year to watch in the development of Nigerian agriculture.

Rivers State critical in the country's development

Ogbeh has stated that Rivers State remains critical in the development of agriculture in the country, considering the fact that it hosts the two biggest fertiliser plants in Nigeria, Notore Limited and Indorama Petrochemical Company Limited.

Responding, Rivers State Governor, Chief Ezebunwo Nyesom Wike, stated that agriculture should be developed as the country's next foreign exchange earner in view of dwindling oil prices, pointing out that developing agriculture would generate employment and strengthen the economy.

Wike said, "Agriculture is a critical sector which should be developed as a major foreign exchange earner for the country. Rivers State Government will work with the Federal Government to develop agriculture."

Encouraging youth farming. (Image: Obafemi)

The governor, who stated that the state government has initiated school farming to encourage youths to be involved in agriculture, said his administration has also extended loans to farmers for greater agricultural production.

He approved the hosting of the 2017 agricultural conference in Rivers State as requested by the Minister of Agriculture.

FG asked to involve more young Nigerians in farming

THE INTERNATIONAL FUND for Agricultural Development (IFAD) is asking the Federal Government of Nigeria to formulate policies that will encourage young people to go into farming and also reduce farmers' risks.

According to IFAD President Kanayo Nwanze, agriculture provides a better revenue and job creation alternatives to Nigeria.

He also attributed the growing number of rural-urban migration experienced in most cities to lack of development policies that consider rural dwellers who are mainly farmers.

A large number of Nigeria's youth are unemployed and, according to IFAD, agriculture is a good means to get them engaged.

At a meeting of representatives from Central and West African countries in Abuja held to brainstorm on best ways to encourage young people into agriculture, IFAD decried the rate of rural-urban migration among young people.

For the Minister of Agriculture, Audu Ogbe, who represented President Muhammadu Buhari at the forum, good initiatives of the government alone are not enough to change the narratives.

He stressed that implementation framework must be developed for impactful programmes.

Nigeria has participated in several fora of this kind in the past, with successive governments formulating policies aimed at developing the agricultural sector.

Yet, the practice of agriculture has continued to remain in the hands of peasant farmers with low capacity to produce food for Nigeria's growing population.

This has led to a growing import index for food items including some perishables that could be grown locally.

Evolution Super from Goizper

THE NEWEST MATABI model, Evolution Super in its 20 and 16 litres versions, has been developed to meet the needs of the most demanding users of knapsack sprayers world-wide, adaptable to many types of crops, increasing yield and spraying quality.

For this purpose the Matabi Evolution Super range offers:

- **Sturdiness:** Maximum duration of critical parts such as the fibre glass lance (90 cm and cones attached to the lance), stainless steel handle, polypropylene concentric pressure chamber, standard Viton seals, a denser locking washer in order to prevent leaks in the user's back.
- **User friendly:** No screws or loose parts and user friendly maintenance, as it is tool-free, avoiding the frustration of having to stop in the middle of an application. It has excellent availability of spare parts at all times through the extensive network of distributors world-wide.
- **Comfort:** Despite being a piece of equipment with a 21.5 litre-capacity in its tank, is the lightest sprayer having a net weight of 3.7 kg. It includes back

adjustable padded straps, without hooks; provides greater stability when moving over rough terrain, with steep slopes. It also has a translucent graduated side visor for easy filling and to view the emptying progress.

- **Accuracy:** Includes highly useful standard accessories such as pressure regulator to optimise applications, saving water and users' effort, reducing wear and tear of parts. This device maintains the pressure constant at 45 pounds or 3 bars (green dot suitable for foliar applications) and 22.5 pounds or 1.5 bars (red dot for herbicide applications) as well as a deactivation and depressurisation function. The nozzles included are made in special plastic (polyacetal).

The sprayer includes a lightweight, durable and non-oxidising lance due to the contact with salts (foliar fertiliser) and other phyto-sanitary products which usually eats away brass and metal. This lance resists bends and blows which are often made when spraying.

A special nozzle with a one litre/min flow rate (at 45 psi or 3 bar) provides great coverage and penetration with greater penetration in the foliage. The four empty cones are intertwined to form a full cone 80° fast wetting, causing a mist with very fine droplets, increasing the impact on the foliar area in addition to reducing product waste.

Each Evolution Super includes a set of five nozzles.

www.goizper.com

Case IH extends JXT series tractor range with new compact models

CASE IH HAS launched three new JXT tractor models below 50 hp, extending this easy-to-use, reliable and economical tractor line to provide compact solutions to farmers.

The Case IH JXT range offers totally reliable, high performance utility tractors that are real workhorses and great all rounders. Due to the strong heritage of Case IH tractors, they can be relied on to provide efficiency, productivity and an excellent return on the customer's investment.

The JXT Series consists of five models ranging from 35 hp to 75 hp, with the addition of three new models. The new JX35T, JX40T and JX45T, available in two- or four-wheel-drive, deliver power and economy in a compact package.

The new JXT models feature rugged and reliable 3-cylinder, naturally aspirated engines that offer a powerful performance with exceptionally low operating costs. The engines on the two smaller models deliver 35 and 42 hp at 2000 rpm. The biggest of the three, the JX45T, generates 47 hp at 2300 rpm: this is a true heavyweight in the 45 hp segment. The low rpm result in a great performance with excellent fuel efficiency.

The JXT Compact range is available with a choice of 8x2 or 8x8 mechanical transmissions engineered to deliver high output and feature a new driveline with side shift and inboard epicyclic rear drive. The transmission housing provides a common reservoir for the transmission oil and hydraulic system oil.

The JXT tractors feature an independent PTO clutch that is engaged and disengaged with a lever, resulting in longer clutch life. The ground PTO, whose speed is proportional to the tractor's travel speed, is capable of powering a wide range of implements with ease and precision also at low speeds. The Lift-O-Matic rear linkage control with height limiter ensures the accurate setting of implement lift height.

The wide platform provides ample space for the operator. The

ergonomic layout puts the controls within perfect reach, including the side shift gear lever. The modern and elegant instrument cluster is easy to read. The single piece front hood offers excellent visibility to the front and makes it easy to service the tractor. With power steering, the operator will enjoy minimum fatigue on long working days.

The JX45T delivers a powerful performance in its horsepower segment which, together with its weight, gives it the means to pull and control bigger loads. The high hydraulic flow results in fast cycle times on scissor tip trailers. With the independent and ground speed PTO, and the waterproof transmission, it provides an excellent solution for the harsh conditions rice and palm oil growers face.

Rice is the second most important source of calories in sub-Saharan Africa, according to the Africa Rice Center (AfricaRice), a research organisation working to contribute to poverty alleviation and food security.

Improving yields and the quality of rice in Africa

AFRICA IS EATING more rice than other food staples, though the continent produces less rice than it consumes, and researchers say the cereal has the potential to help sub-Saharan Africa out of poverty.

Thanks to fast urbanising Africa, consumption of rice is growing by six per cent annually. "Rice is important for Africa food security and the reasons are clear," AfricaRice Center, deputy director general, Marco Wopereis, said, adding that "consumers like it and the consumption growth is just mind boggling as a result of population size and change of preference, as people in cities want food that can be prepared quickly and stored easily and rice is just perfect for that." Projections are that in 25 years, the world will be eating 110mn tonnes more of milled rice, and one third of that will be eaten in Africa, according to AfricaRice.

Grown in 40 out of 54 countries in Africa, rice is the most important agricultural activity and source of income for more than 35mn smallholder rice farmers. However, current demand for rice is outpacing local production, which covers only 60 per cent of demand. As a result, the continent is spending more than US$5bn annually on importing 12.5mn tonnes of rice each year. This accounts for 32 per cent of the world's rice imports, making Africa one of the largest rice importers in the world and a major player in the rice trade.

A man working in a rice field in Nanan, Yamoussoukro, Côte d'Ivoire. (Image: Reuters)

This situation is changing, said Wopereis, who is convinced that the rice sector represents a route out of poverty for Africa. Under its 2011-2020 Strategic Plan, AfricaRice has prioritised improving yields and the quality of rice in Africa. "Since 2008 we have seen a tremendous increase in production, and good news came out of Africa, where we have seen yields up by 30 per cent, reaching 2.1 tonnes on average per hectare in 2012," he said, noting that since then yields have remained flat but the area of production has increased.

"We would need a clear investment from public and private sectors to boost the rice sector with enabling policies to make it work, because we are currently importing more than 12mn tonnes of milled rice, and if we do not increase production, we have to import more and more, and we could run into the same crisis as we had in 2008," he emphasised.

The 2008 food crisis jolted some countries in sub-Saharan Africa, forcing governments, international agencies and donors to invest in ambitious production programmes which have yielded results. More than 200 participants comprising researchers, private sector partners – especially seed partners – and government representatives from over 20 African countries, Europe and Asia met in Cotonou in mid-February under the banner of the AfricaRice 2016 Science Week and Global Rice Science Partnership (GRiSP), to take stock of developments in the rice sector in 2015. The Science Week served specifically as an annual review for reflection and planning of rice research-for-development (R4D) activities in 2016 for AfricaRice Center and its partners around the world.

Good news on rice research

There is good news on rice research. Indigenous rice varieties have received a facelift

by helping develop resilient and high-yielding lines of the cereal. Cultivated for more than 3,000 years in parts of Africa, the African rice, known by its scientific name, Oryza glaberrima, is unique to the continent and has become an economic and political crop.

Over the last six years, AfricaRice has worked with policy makers to implement the rice strategy at country level. For example, Senegal, one of the top rice growers in Africa, has identified regions that will be rice self-sufficient and produce for the market. Sustainably enhancing the production, processing and marketing of rice are some of the critical challenges that need to be overcome to transform the cereal into Africa's key to food and economic security.

Africa has the technologies and continues to improve them, but the continent should link up with the big players, such as Africa Development Bank through its projects and also with the private sector to scale up rice technologies.

Rice production per hectare should go up with improved seed varieties, efficient weeders, threshers and mini combine harvesters.

AfricaRice is currently undertaking a study on what it means for sub-Saharan Africa to be self-sufficient by 2025. An estimated US$20bn would be needed in investments to reach self-sufficiency by then. This will be reached through improved management of existing rice land, closing yield gaps, and increasing production and, where possible, double cropping.

The advantage of the five ARICA rice varieties that have been selected is that they have higher yields compared to the existing popular rice varieties. (Image:AfricaRice)

New high-performing varieties

Three years ago, AfricaRice developed seven high-performing rice varieties known as the Advanced Rice Varieties for Africa (ARICAs) which have been developed with traits for tolerance to flooding at a vegetative stage, salinity, iron toxicity and cold. These are high performing compared to the New Rice for Africa (NERICA) varieties developed for rain-fed environments in the 1990s.

Moussa Sie, a senior breeder at AfricaRice and co-ordinator of the Rice Breeding Task Force in Africa, said ARICAs will help increase the number of rice varieties available and boost production by at least 40 per cent. These have been developed using participatory variety selection tools that breeders use to involve farmers in developing what is suitable for their needs and conditions in vier of flooding and droughts as a result of climate change.

"We are working in particular to breed varieties that are more robust and more ready to face the threats of climate change, because rice is grown mainly by poor farmers and we need to develop varieties for such farmers," Sie said.

"We have rice champions like the NERICA-4 varieties which we developed by involving farmers, and ARICAs will follow the same route."

According to 'Realising Africa's Rice Promise' – the most comprehensive reference publication on rice research in Africa – this staple is the future for Africa.

The study, a global collaboration by 100 authors with considerable expertise, says sustainably increasing rice production and productivity, enhancing quality and marketing are key to the transformation of the rice sector.

"Rice is critical for food security and political stability throughout Africa and it has the greatest potential to fuel economic growth," the study notes.

IPS

Mycotoxins are almost impossible to exclude and/or destroy so mycotoxin management programmes designed for feed mills must be comprehensive, co-ordinated and integrated by using all prevention and control options available. Dr Terry Mabbett discusses these.

Practical mycotoxin management for feed mills

GIVEN THEIR SHEER size and the volumes of raw materials going in at one end and finished feed coming out at the other, it is more than ironic that natural chemicals called mycotoxins, synthesised by some fungal pathogens and contaminating grain in just trace amounts (parts per million or parts per trillion), pose the single biggest risk, hazard and threat to the commercial feed mill.

Mycotoxins exhibit a wide range of toxic effects, including nephrotoxic, carcinogenic and genotoxic. They are exceptionally resistant to high temperatures and chemical agents and passed down the food chain and into the human diet essentially unchanged. As such, it is no exaggeration to say that mycotoxins pose the single most important risk to the reputations of feed mills, threatening their operation activities and even their very existence.

No one is absolutely sure how many different fungal species there are in the world, but estimates put the figure somewhere between one and five million. Be that as it may, air-borne and water splash-borne spores are the main means of dissemination and infection whether the fungus is a field pathogen like the fusarium species – causing deep-seated infection and disease on cereal panicles and their developing grain – or a surface-active fungus such as the penecillium species causing superficial mould on stored feed grain and finished feed.

In its simplest terms, mycotoxin contamination occurs in the field and is carried on grain into the store – eg, fusarium culmorum and f. graminearum cause ear blight and scab in growing wheat and produce deoxynivalenol (DON). Another example is aspergillus flavus, which grows on stored grain, groundnuts and copra to produce aflatoxins.

That said, head blight of wheat (*F. culmorum*) can rapidly colonise moist grain in store to produce DON and other trichothecene mycotoxins, while spores of the storage mould fungus *pencillium verrucosum* (an Ochratoxin A [OTA] synthesiser) may attach to developing grain kernels in the field.

Mycotoxin production primarily depends on temperature and moisture affecting infection, growth, development and spread of mycotoxin producing fungi. The various fungal species responsible for mycotoxin contamination have different temperature and moisture requirements for growth and therefore mycotoxin synthesis.

Mycotoxins pose the single most important risk to the reputations of feed mills, threatening their operation activities and even their very existence.

Comprehensive and co-ordinated management

Mycotoxins are almost impossible to exclude and/or destroy, so dealing with them is essentially about managing levels and maintaining them at or below an acceptable figure according to risk and hazard to health and well-being of livestock and human consumers of animal products.

Wet maize grain is brought for cleaning and drying at Masindi in Uganda. (Image: Alvan Blanch)

Mycotoxin management programmes designed for feed mills must be comprehensive, co-ordinated and integrated by using all prevention and control options available. Quality assurance is the 'name of the game' in prevention of mycotoxin contamination. Knowledge about the biology of mycotoxin production, commodity flow, factors that encourage or deter mycotoxin production and established good management practices are used to perform a hazard/risk analysis, such as HACCP (Hazard Analysis Critical Control Point) right along the supply chain.

- **Hazard** – an event (mycotoxin level) that threatens livestock (and human) health
- **Risk** – likelihood of the event happening
- **Critical Control Point (CCP)** – a step or stage in the feed production/marketing chain at which a control essential to prevent, eliminate or reduce the mycotoxin hazard can be applied. Accurate identification and management of CCPs is crucial to the success of HACCP and ensuring that mycotoxin contamination does not occur.

Three distinct phases for feed mills are required:

- Stopping mycotoxin contamination getting into the feed mill
- Preventing the proliferation of mycotoxins within the feed mill operation
- Ensuring that finished feed leaves the feed mill and reaches the customer in a mycotoxin 'free' condition.

Mycotoxins can become a problem on growing cereal grain crops long before the feedmill stage. In this respect Aflatoxin has become a significant problem on maize crops across large parts of Africa. (Image: Omex)

In practice it is virtually impossible to completely exclude or eradicate mycotoxins from animal feed so a realistic and practical aim is reduction and maintenance of contamination below recommended levels, usually expressed in parts per million (ppm) and dictated by governments and/or livestock industries, or simply by the feed mill.

From cornfield to feed mill

Risks arise and real hazards presented by mycotoxins long before grain laden trucks arrive at the feed mill from the supplying farms. Environmental conditions under which crops are grown, governed by climate, weather and soil factors and modified by crop agronomy including crop and variety, fertilisation, irrigation and fungicide application, will affect the level of fungal disease and therefore mycotoxin presence in panicles and grain in the standing crop.

These risks and hazards extend into the harvest and post-harvest period with harvested grain moisture content, extent of grain cleaning prior to on-farm storage and conditions of on-farm storage all contributing to the risk and reality of mycotoxins. Harvesting grain at too high a moisture content and failing to sufficiently dry the grain prior to storage, absence of grain cleaning to remove potentially infected glumes and other crop debris, and failure to maintain stored grain in cool, dry conditions and within an insect- and mite-free environment, all raise the risk of mycotoxin contamination.

However, failure to maintain on-farm stored grain at moisture content no higher than 13 per cent w/w (weight to weight) is probably the single most important factor leading to on-farm problems with mycotoxins.

Feedmill managers clearly have no direct control over these matters, but they do have absolute control over what they accept and what enters the feed mill, and control should be ruthlessly exercised. They can avoid sourcing grain from areas where climatic/weather/soil conditions inherently favour potentially high fungal disease and mycotoxin levels in the harvested crop.

As a general rule, increased aflatoxin contamination in corn (maize) caused by the fungus *aspergillus flavus* is associated with frequent periods of drought and heat stress during the reproductive stages of the maize plants. Kenya is currently suffering severe problems from aflatoxin in its home-grown cereal crops, especially maize, but also sorghum and wheat. Conversely fusarium fungi including *fusarium culmorum* and *F. graminearum* causing head blight and ear blight in wheat and maize, and synthesising a wide range of trichothecene mycotoxins (eg, DON) and zearalenone, are generally encouraged by wet growing and harvesting conditions.

Feed mill staff must visually scrutinise incoming loads for mould, grain debris and foreign matter, as well as insect and mite infestation, backed up by rigorous monitoring for mycotoxins using user-friendly mycotoxin testing kits. There is no time to take samples for laboratory

analysis, but testing kits, used by non-scientific staff to give accurate on-the-spot results, are ideal. Mycotoxins are not uniformly distributed throughout a grain load or heap but confined to 'hot spots' generated by dampness and/or insect infestation. Therefore it is essential to take samples from a moving load (eg, a conveyor) or multiple points in a heap rather than from a static load or heap.

Once inside the feed mill

Once inside the feed mill, maintaining a mycotoxin free environment is all about grain storage conditions, hygiene and cleanliness all backed up with an on-going mycotoxin monitoring programme using user-friendly testing kits.

Besides ensuring that only sound clean grain is stored (broken kernels, crop debris and foreign matter is removed), ingredient bins inside the mill should be emptied and inspected every four weeks at least to avoid accumulation of feed materials offering substrates for fungal growth. Failure to clean feed bins according to a strict schedule allows material to accumulate on the sides of the bin to foster mould growth and cause cross contamination. This will prove to be a particular problem if the feed is not properly cooled down after the pelleting process, or if warm mash feed is sent to the finished feed bins. As such, bins holding the finished feed must also be inspected at least once every four weeks and cleaned as required.

Once inside the feed mill, maintaining a mycotoxin-free environment is all about grain storage conditions, hygiene and cleanliness.

Choice, installation, operation and preventive maintenance of feed manufacturing and processing machinery and equipment are crucially important in avoiding growth of mycotoxin producing mould fungi. Selection should take into account the potential for cross contamination; equipment should be chosen that is easily accessible for cleaning and can be properly sealed to prevent ingress of moisture.

Feed material handling equipment including conveyors, which will be positioned outside of the feed mill, should be fitted and equipped with peaked covers to prevent water from accumulating on the covers and subsequently running into the conveyors. Lids must always be sealed with silicone to avoid dust leaks and moisture ingress.

Feed product in the boot section of any bucket elevator is static, thus presenting the potential for moisture build over time and as such must be routinely cleaned to avoid growth of mould fungi. Bucket elevators located outside of the feed mill should be positioned on

Custom-designed, manufactured and constructed cereal grain silos are the secret to success in maintaining mycotoxin-free stored grain prior to the feed manufacturing stage. (Image: Bentall Rowlands)

elevated concrete pads to stop water from running into the boot section when it rains. Bucket elevators positioned in receiving tunnels or pits should be inspected more frequently because they are in a cool and damp environment, ideal for fungal growth. However, the bucket elevators with the greatest prospect and potential for build-up of condensation are those associated with the hammer mill grinding system, caused by the heat generated and moisture driven off from the grain during particle size reduction.

Finished feed from mill to farm

The quality assurance programme does not stop at the end of the feed manufacturing process. Delivery of finished feed and its on-farm storage is the final but crucial step in minimising mould growth and mycotoxin contamination. Failure to pay proper attention to the requirements of this final stage in the 'feed chain' means all preceding efforts will have been wasted.

The feed delivery driver should routinely check that each compartment in his or her vehicle is empty and clean with no accumulation of residual feed, while also ensuring that the bulk bin lid is closed and locked prior to leaving the farm.

Build-up of moisture from rainfall within on-farm finished feed bins will invariably lead to fungal mould growth and mycotoxin accumulation, even at this late stage in the process. Thus the slide gate on the boot section of a farm bin is another critical point where farmers should be aware of the potential for mycotoxin contamination.

Last but not least, farmers must routinely inspect and clean all bins on the farm to prevent any build-up of finished feed on the side wall and cone which will surely act as a substrate and focal point for fungal mould growth and mycotoxin production.

Lemken's Kristall 9 cultivator is available with working widths from three to six metres and has a frame with two beams.

Cultivation progress

Reduced or minimum cultivation methods are attracting increased interest in many parts of the world, and particularly in African countries where retaining soil moisture is an important priority. Michael Williams reports.

IN AREAS WHERE plough-based crop establishment is being replaced, the alternatives are likely to include using discs or tines for cultivation, and implements in the Lemken machinery range recommended for medium to large acreages in Africa are Rubin 12 series disc harrows and Karat 9 tine cultivators.

Disc diameter on Lemken's Rubin 12 series is 736 mm, working widths are three to seven metres and the working depth adjusts between seven and 20 cm. A special design feature of Lemken disc harrows, including the Rubin 9 and Heliodor 9 series with smaller disc diameters is that each disc is individually mounted and spring loaded, an advantage in difficult conditions, including cleared areas where there may be obstructions such as tree roots. The discs have sealed bearings and are maintenance free, and the harrows are designed with most of the weight on the roller to aid consolidation.

One of the biggest cultivator ranges is offered by the Brazilian-based Baldan company.

Lemken Kristall 9 and Karat 9 tine cultivators have working depth adjustment in the five to 30 cm range controlled by a rear roller. Working widths are three to six metres for the Kristall 9 and three to seven metres for the Karat 9, and the main difference is that Kristall tines are on a frame with two beams, while the triple-beam Karat frame carries more tines and needs a bigger tractor but is suitable for more difficult conditions. The specification for both cultivators includes quick-change points, and the optional spring-operated overload protection is specified for most of the cultivators supplied to African countries.

Pottinger has recently announced a number of design updates for their Terradisc series disc cultivators.

Design improvements from Pottinger

Design improvements on the latest 1001 series Terradisc series disc harrows added to the Pottinger range from Austria include new discs that are thicker and have a 13 per cent extra diameter, resulting in up to 45 per cent increase in the working life. Other changes on the mounted disc harrows include depth control adjusted from the tractor seat; the new disc bearings equipped with six-fold seals are maintenance free and the new headstock has three top link positions and two angle settings to allow maximum adjustment. The 1001 design also includes the new Twin-Arm-System with two extra concave discs on clamping brackets giving maximum stability and a constant disc angle.

In addition, Pottinger has updated the Synkro 1020 series duckfoot stubble cultivators with a list of design changes including more clearance for soil and crop residues. This also reduces the power requirement, and the 2.5-metre cultivator needs a minimum of 70hp, helped by a design that brings the centre of gravity closer to the tractor to reduce the lift requirement. The working depth adjusts between five and 20 cm and the duckfoot share width is 47 cm with a choice of share angle to suit different soil loosening and mixing requirements. Working widths up to six metres are available, and cultivators from four metres upwards fold for transport.

One of the biggest cultivator ranges is offered by the Brazilian-based Baldan company with a choice of disc type ploughs and harrows plus tined cultivators and subsoilers available in 74 countries, including most of Africa. The cultivators include a selection of smaller machines to suit lower horsepower tractors, as well as wide implements for big acreage farms, and they are part of a range which currently totals more than 150 different products in 2,000 versions.

Baldan tined cultivators include the CEH series for three-point linkage mounting, which are available in nine working widths from 220 to 4,676 cm. The tines have a spring operated breakback action, the maximum working depth is 25 cm and the number of

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tines varies from five on the smallest model to 21. The tractor recommendations start at 50 to 55hp and the top model in the CEH range needs between 100 and 110hp. An example of the Baldan disc type cultivators is the trailed NV series levelling harrow available in 18 different versions with from 28 to 56 discs. The discs are spaced at either 175 or 200 mm to provide working widths in the 235 to 550 cm range, the working depth is adjustable between 50 and 150mm and the minimum recommended tractor sizes are from 73hp for the smallest model to 156hp at the top of the range.

The Dominator very popular in Africa

The Kuhn machinery company is based in France but one of their most popular machines in African countries is the DMR primary cultivator made at a Kuhn factory in the United States where it is known as the Dominator. It is designed to work straight into uncultivated soil with crop residue, and the aim is to leave a more level surface that requires less secondary cultivation before planting or drilling.

Kuhn DMR design features include extra large 63.5 cm coulters with the downward pressure controlled by a hydraulic system allowing on-the-move adjustment to match the ground conditions. There are 15 coulters with working depth in the 20.3 to 40.6 cm range and the transport width reduces to 4.2 metres. The power recommendation is a tractor in the 200 to 350hp range.

The big cultivation success in Africa for the American-based manufacturer, Great Plains, is what the company describes as 'vertical tillage' and the Turbo-Max is part of their vertical tillage machinery range. The aim of vertical tillage, says Great Plains, is maximising yields through better water infiltration, root development and nutrient uptake, and an important part of the process is creating

In Africa the Turbo-Max is the biggest selling cultivator in the vertical tillage range from Great Plains.

The Mzuri Pro-til cultivator and drill combination for strip seeding crop establishment.

vertical cracks in the soil to promote capillary action, penetrating to depths between 25 and 38 cm, leaving a uniform and unrestricted soil profile for root development and moisture absorption.

Turbo-Max is used mainly for seedbed preparation ahead of crops such as maize, sugar cane, wheat and sunflowers in South Africa and Kenya and is increasingly used in other African markets. It is a trailed implement using 51 cm coulter blades arranged in gangs with hydraulic adjustment for changing the gang angle between 0° and 6°.

Increasing the angle can improve crop residue incorporation in the autumn, while a zero angle leaves a smoother finish ready for spring drilling or planting. Depth adjustment is hydraulically controlled with a 125 mm maximum, working widths from 3.7 to 12 metres are available.

Crop establishment with strip tillage

Crop establishment with strip tillage restricts the cultivation process to narrow bands where the seeds are sown, leaving the rest of the ground undisturbed. The technique, first developed in the United States, offers particular benefits in Africa, according to Martin Lole. He farmed in Africa before returning to the UK where he established the Mzuri company making farm machinery, including the Pro-Til one-pass strip till drill which, he said, is the perfect answer to the problem of African soil losses through wind and rain erosion. Reducing cultivation to narrow bands where seed is placed means his Mzuri system is drilling into previous crop residue and using the trash to reconsolidate the soil. The surface residue also helps retain moisture in the soil, he said, and the soil structure improvements can be seen within a season.

"As well as improving soils and yields, the Mzuri Pro-Til offers huge financial gains. The one-pass system requires only one-fifth of the fuel compared with plough based conventional cultivations, and just 15 minutes instead of 2.5 hours per acre to establish the crop," said Mr Lole.

Subsoiler essential to deal with compaction

An essential for soil health in most farming systems including reduced cultivations is using a deep tined cultivator or subsoiler to deal with compaction. The usual cause of compaction is heavy tractors and machinery, but compaction can also occur in intensively grazed pasture. Increased density can restrict air and water movement in the soil and it can form a barrier to root penetration, limiting the plants' access to moisture and nutrients. The result can be significant yield reduction, and digging a few holes with a spade is an effective way to check if a compaction problem is developing and soil loosening or subsoiling is needed.

Pinocchio series subsoilers from the Maschio range are designed to complete three different tasks in one pass, starting with the tines which are angled to achieve better penetration in difficult soil conditions and have 45 cm maximum working depth. The tines are followed by double spike or disc rolls with a counter-rotating action for levelling and consolidation at the surface to encourage faster crop residue breakdown while leaving the surface ready for one-pass seedbed preparation later.

Design features on Pinocchio subsoilers include shear bolt protection for the tines, and the double rear rollers adjust using a pin system. Popular in a number of countries in Africa, the subsoilers are available with working widths between 130 and 300 cm and with from three to seven tines made of 3 cm thick steel. The tractor requirement is from 50hp with the biggest version needing at least 100hp.

A special feature of the McConnel Shakaerator soil loosener is the p-t-o operated unit that makes the tines vibrate as they are pulled through the soil, helping to increase the soil fracturing action while reducing the power requirement. The first Shakaerator was developed by McConnel in 1977 and since then the range of models has expanded and there is also a choice of points to suit different requirements plus optional rear rollers. Standard models are designed for 50 cm maximum working depth and are available in widths from three to six metres for tractors from 125hp upwards, with special versions for pasture or sports turf offered in widths from two metres and needing 50hp plus.

Maschio Pinocchio subsoilers are available with 3, 5 or 7 tines with 45 cm maximum working depth.

Shakaerators are working in a number of African countries including Ethiopia, South Africa and Zambia, and the most recent order came from Sudan where a Shakaerator is used on a large dairy farm. E

Fliegl Agrartechnik - pioneer in agricultural machinery

FROM A ONE-MAN-SHOW to a global player – Fliegl Agrartechnik has written a fast-paced success story within four decades. Fliegl Agrartechnik is now the biggest agricultural trailer manufacturer in the world. The enterprise produces quality technology for agriculture and transport, biogas and forestry worldwide.

Fliegl's high innovation power is the key to success. One of its central innovations is the push-off technology – since the 1990s a trend-setting concept that has brought Fliegl Agrartechnik to the top of the European agricultural machinery sector.

In 2013 the company moved its headquarters to Mühldorf. In the new factory premises with a surface of 30 ha, 300 employees build trailers, liquid manure technologies and push-off trailers, as well as efficient solutions for biogas and forestry and a quantity of agricultural machinery. The plant includes highly modernised laser installations for the processing of steel and sheet metal as well as a central high-end storage.

The Fliegl push-off trailer (ASW) is a milestone in the development of agricultural technology. Josef Fliegl Senior revolutionised unloading – with a push-off process instead of dumping – with the development of state-of-the-art push-off technology.

Fliegl push-off trailers are now used in a wide range of applications – in agriculture and forestry, but also in industry. Agritechnica recognised this in 1999 and awarded a silver medal to the Fliegl "Gigant" push-off trailer.

The Fliegl push-off trailer is an all-rounder for year-round use, adapting to the respective demands. The Fliegl ASW can be used flexibly when combined with spreader mechanisms, overhead conveyors or an overhead screw conveyor: for example, when switching to a fertiliser, manure or compost spreader, for using as a grain or wood chip transfer trailer or for potato or sugar beet harvesting.

It can also be used year round for transporting a wide variety of agricultural goods. Whether it's corn silage, grass silage, compost or wood chips – the Fliegl ASW transports and pushes off everything in no time at all. The body can also be used for heavy goods, such as earth, sand and even snow or asphalt.

The service life of a high-quality Fliegl push-off trailer is estimated to be well over 10 years, compared to a dumper. A push-off trailer can simply do and achieve more: it reduces the number of journeys needed as it can transport more – the loading capacity can be increased by up to 60 per cent through optimum compaction.

Fliegl's ASW271 with a Fendt 6 tractor.

An ASW saves the need for special vehicles as a wealth of accessories cater for every specific application and it allows for safe and fast unloading regardless of the terrain, whether it's outdoors or in low ceiling warehouses.

Fliegl has also improved intermodal transport with the push-off technology. The key element of intermodal transport is the overloading process for which Fliegl push-off trailers can be quickly and easily converted and fitted out.

Fliegl push-off technology saves work, time and money. The push-off trailers can be supplied in a standard or heavy goods version depending on the vehicle, operating conditions and customer requirements.

New Massey Ferguson 6700 Series platform tractors for Africa and the Middle East

MASSEY FERGUSON HAS introduced the new MF 6700 Series, a major step forward in the evolution of the Massey Ferguson Global Series, and the most powerful range in this series with engine power outputs from 112hp to 132hp.

Following the path set out by the MF 4700 Series for a strong workhorse across a full range of applications, the MF 6700 Series provides greater performance in a modern straightforward design, low cost of ownership and enhanced reliability.

Aimed at larger farms in Africa and the Middle East, the MF 6700 Platform Series may be the enterprise's main cultivations tractor, or take the role of all-round workhorse where there are already more powerful tractors in the fleet.

The MF 6700 Platform Series is aimed at larger farms.

Thierry Lhotte, Massey Ferguson vice president marketing, Europe/Africa/Middle East, explained: "This range represents a key element in our 'three-segment tractor strategy' in Africa and the Middle East, aimed to provide farmers with the right choice of machines across a spectrum of power and specification requirements. The three segments comprise progressive emerging farmers; established farmers; and larger agricultural businesses including contractors and fleet owners.

The MF 6700 Global Series is ideal for this third segment, offering carefully balanced technology and a modern design with power capabilities required by large farms and estates."

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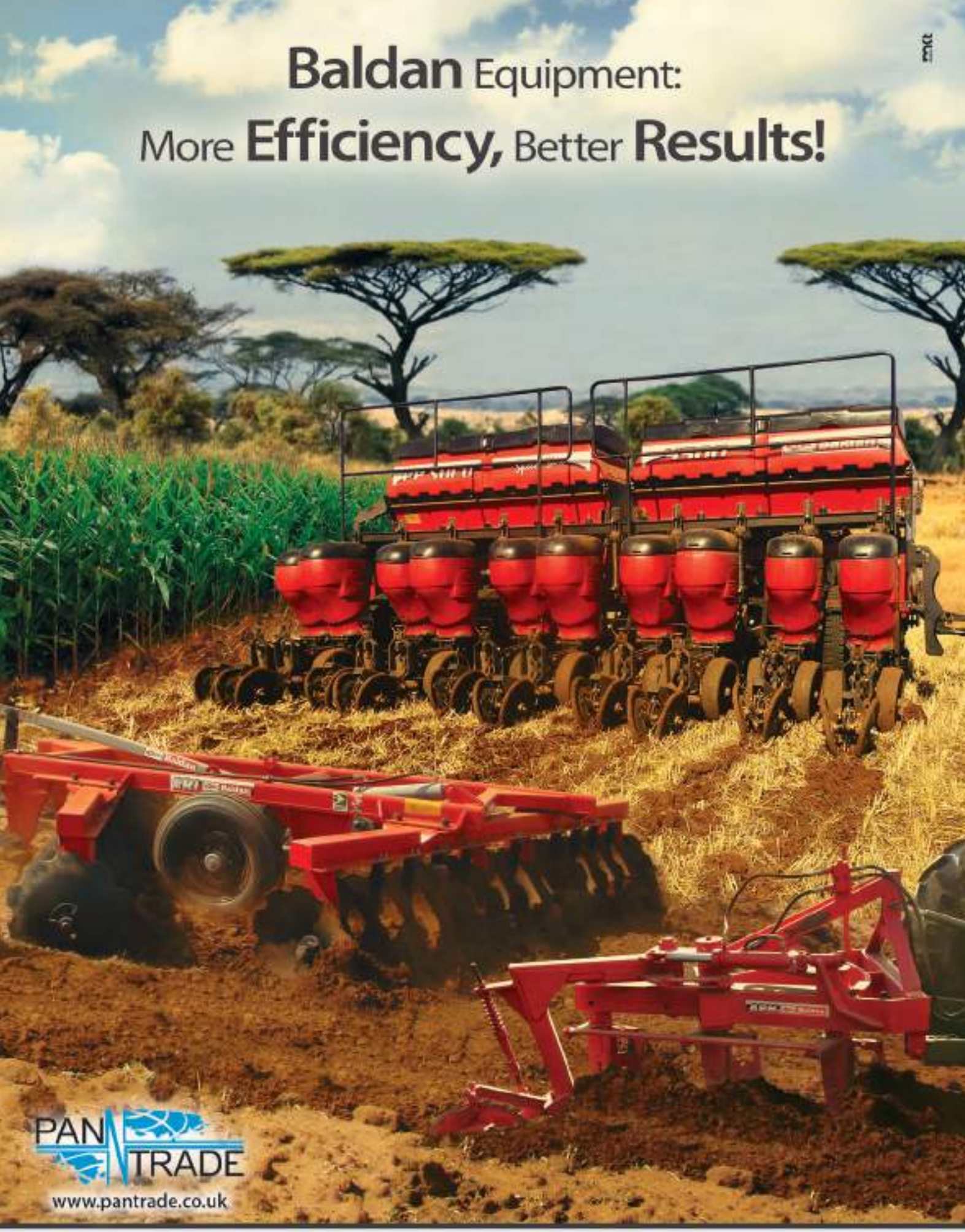

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John Deere introduces SMART campaign

JOHN DEERE HAS announced the SMART campaign to bring together the company's established initiatives and programmes designed to enhance and advance productivity in African agriculture.

The first element of SMART is the Small Farmer Solutions that John Deere has developed and introduced over the past five years which allow a customer to have a one-stop shopping experience. "John Deere has previously introduced a complete line of tractors and implements that have the features and affordability required for smaller African customers," said Lafras Cronje, marketing manager for sub-Saharan Africa. "Mechanising for Higher Yields, the second part of SMART, leverages the Small Farmer Solutions to put more income in the farmer's pocket," said Cronje. Yield increases of three or more times are possible as farmers adopt mechanisation and integrate new farming practices. Getting higher yield from the same amount of land is what makes mechanisation a key element of a sustainable approach to food security and improving incomes for small farmers and contractors.

Access to financing is critical for small farmers and contractors. "We recognised quickly that our customers needed to be able to work with banks that understood agriculture, understood mechanisation, and could relate to these customers who would soon have higher yields and new income from offering contracting services," said Jason Brantley, managing director for sub-Saharan Africa. As a result John Deere Finance has partnered with local banks in many African countries to offer special finance solutions.

Reliability for Lower Costs and Technology Education complete the SMART campaign elements. John Deere products are designed to be reliable, and they are backed with servicing dealers and spare parts support that can make them lower cost to own and operate over time. Technology Education is a key element, with John Deere already having trained thousands of farmers and contractors in Africa on how to leverage mechanisation to improve yields and increase profits. Additional sessions are planned in East and West Africa in 2016.

"We realised that we had to take the training to the farmer because they valued that more than travelling long distances to training centres," according to Brantley. "This approach has been especially important for improving access to training for women, which is a key goal for us."

With a mix of mobile training units, regional Outpost Days, and sessions at existing facilities in Africa, John Deere is ensuring that more small farmers and contractors have an opportunity for education and development.

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REFERENCE:
Zambia Bags2Bulk project

◀ Vertical storage solution for smallholders

Baskets2Bulk

CHALLENGE: reduction of post harvest losses of highly perishable items (e.g. cassava, mangos, tomatos)

GSI SOLUTION: solar powered cold storage solution for smallholders and traders.

YOUR BENEFITS: decreased post harvest losses, resulting in higher incomes or extended storage of own production.

REFERENCE:
Pilot project in Zambia and Kenya.

◀ Cold storage model

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