

African Farming

and Food Processing

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Tractor innovations

Driverless tractors and more

Private equity

Unlocking African agri-business potential

Internet of Things

Smart farming with data



Achieving better grain storage. p26

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Connectivity vital for agri-tech development



Case IH's autonomous concept vehicle. (Photo: Case IH)



Agritech Expo Zambia saw increased international presence this year. (Photo: Agritech Zambia). p22



The red palm weevil attacks 40 palm species worldwide. (Photo: wonderisland/Shutterstock). p31

African Farming and Food Processing

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Farming Calendar 2017

MAY

24-25 Value Added Agriculture Expo East Africa NAIROBI
www.reedexpoafrika.co.za/ValueAddedAgricultureExpoEastAfrica

JUNE

07-09 IFTEX 2017 NAIROBI
www.hppexhibitions.com/floriculture/2017/nbo

14-16 Agritec Africa NAIROBI
www.agritecafrica.com

20-22 AVI Africa 2017 GAUTENG
www.sapoultry.co.za

JULY

06-07 Aviana Kenya 2017 NAIROBI
www.avianaafrica.com

13-15 Nigeria AgroFood LAGOS
www.nigeriaagrofood.com

SEPTEMBER

15-16 Naivasha Horticultural Fair NAIVASHA
www.naivashahortifair.com

25-27 AgrikExpo 2017 ABUJA
www.agrikexpo.com

OCTOBER

13-15 Agro & Poultry East Africa Nairobi NAIROBI
www.mxmexhibitions.com

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

Nairobi to host Agritec Africa 2017

THE AGRITEC AFRICA Agriculture Exhibition and Conference in Kenya will be held in Nairobi during 14-16 June 2017.

The show will be a comprehensive forum where international agriculture, food, dairy and livestock industry executives, academia, institutional investors, venture capitalists, analysts, progressive farmers and other experts will have an opportunity to shape the future collaboration landscape of agricultural technology.



Agritec Africa 2016 was attended by more than 9500 visitors. (Photo: Agritec Africa)

The event will also have a pre-scheduled meeting feature wherein interest registered by visitors will be transferred to relevant companies based on their offerings. This feature is aimed at helping both exhibitors and visitors efficiently share and receive information, orders, trends, product details and market insights.

An international conference on agriculture and industry presentations will be organised during the event. This conference will be based on the agriculture industry and will focus on the versatility of agricultural segment in different zones, feature keynote speakers and other key information and activities of the industry.

More than 150 flower growers to participate in IFTEX 2017

IFTEX 2017, the most important floral trade exhibition of Africa, to be held from 7-9 June 2017 June in Nairobi, will bring together more than 150 flower growers from around the world.

Kenya's floriculture Industry is truly a force to reckon with. Never is this more evident than during the annual IFTEX. Attracting thousands of attendees from different parts of the world, the industry-wide event serves all segments of the floriculture chain: breeders, propagators, growers, cargo and trade suppliers.

Since its inception in 2012, the international



IFTEX 2016 brought together stakeholders from the international flower industry. (Image source: IFTEX)

flower trade expo, IFTEX, has seen its list of exhibiting flower growers growing.

The sixth edition of the show is expected to host around 225 exhibiting companies.

One of the five most important cut flower trade fairs in the world, IFTEX 2017 will open its doors at 11:00 on 7 June 2017, after the traditional welcome ceremony is completed.

The great majority of the Kenyan flower growers (an estimated 95 per cent of all existing growers) will be exhibiting at the show.

This year, Ethiopia and Uganda have been allocated separate country pavilions with flower growers collectively presenting themselves and their fresh products in this joint presentation.

Several new big and important flower producing farms will also be exhibiting for the first time this year.

"That is important for the success of the trade fair, as it is always our prime goal to bring flower growers and flower buyers together," said Jasper van Dijk, marketing manager of HPP.

Furthermore, various meetings and social gatherings are being organised by different

umbrella organisations, such as the Kenya Flower Council KFC, the International Rose Breeders Organisation IRBA and others in conjunction with the show.

Commercial companies have also scheduled events for their international visiting customers, making IFTEX the centre point of the Kenyan flower industry.

The organisers are also focusing on attracting Chinese and US flower buyers to attend this year's show.

According to the organisers, since China and the USA are on the main list of newcomers in regards to countries importing fresh flowers, from Africa, it has become key to make sure that these flowers will be Kenya Grown.

With the recent changes in the world floral distribution channels, it is becoming more and more evident that flowers are finding new ways to their final destination; this reason it is crucial that Kenyan flowers will be part of these new routings, the organisers stressed.

The number of pre-registered visitors so far for this year's IFTEX, indicates that there is increased interest from Chinese buyers to attend the show.

Syngenta and USAID to invest US\$1.8mn to help smallholder farmers in Zambia

GLOBAL AGRIBUSINESS COMPANY, Syngenta, has partnered with the Feed the Future Partnering for Innovation, a United States Agency for International Development (USAID) programme implemented by Fintrac Inc, to help smallholder farmers in Zambia gain access to high-quality, disease-free horticultural seedlings, giving them the opportunity to become commercially viable vegetable farmers

The programme aims to build a sustainable seedling distribution model for hybrid vegetables, provide access to market information and linkages, train farmers on good agricultural practices and business management and introduce new technologies to help smallholder farmers dramatically improve their yields.



Paul Kapapula, head of sales at Syngenta Zambia; Ernest Myburgh, head of Syngenta Zambia; Anafida Bwenge, Feed the Future division chief at USAID Zambia and Ndekazi Olive Kaluwa, private sector development specialist at USAID Zambia. (Photo: Syngenta)

Syngenta will establish 20 seedling production sites, each owned and operated by an entrepreneurial young plant raiser (YPR) in 20 districts across Zambia. The YPR will provide business and technical training, as well as facilitate market linkages for the benefit of 12,000 smallholder farmers.

Although the primary focus of the project will be on tomato and cabbage seedlings, Syngenta will also conduct trials and testing regarding the commercial viability of other crops with a high potential in Zambia such as kale (rape), cauliflower, broccoli, carrot and potato.

Furthermore, Syngenta will help in promoting a pilot programme for YPR's "Vegetable in a Bag" concept, where a small portion of YPR seedlings will be sold in reusable packaging, with no ground soil and minimal water, making them suitable for urban and peri-urban use.

"For Syngenta, smallholder farmers around the world and in Zambia are key to solving the growing gap between the supply and demand for affordable food. Our partnership with USAID focuses on testing the commercial viability of innovative business models designed to enable smallholder farmers in Zambia to increase their output and thus their profitability whilst using sustainable and safe agricultural practices," said Mark Stokes, head of customer marketing for Syngenta Zambia.

"This is what Syngenta's Good Growth Plan is ultimately all about, and one that we have proven through the Community Agro Dealer initiative in Zambia over the last years," he added.

Syngenta is a leading agriculture company working towards improving global food security by enabling farmers to make better use of available resources.



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Zimbabwean sugarcane farmers expect increased output

SUGARCANE FARMERS IN Zimbabwe are expecting an average output of 100 tonnes of raw sugar per hectare, up from 95 tonnes produced last year, according to officials.

"We are expecting an increase in yield this year compared to last year. Initially, we had projected 97 tonnes per hectare but we have since reviewed it upwards to 100 tonnes," Commercial Sugarcane Producers Association of Zimbabwe (CSPA) chair Tawanda Mafurutu said.

Mafurutu said that the increase in yield was a result of greater



Sugar is Zimbabwe's second largest foreign currency earner in agriculture after tobacco. (Photo: Isara Kaenla/Shutterstock)

availability of water to irrigate sugarcane. Water rationing has been one of the major setbacks in sugarcane production in Zimbabwe.

The harvesting of sugarcane is set to before the end of May this year. Sugarcane is grown commercially in the south eastern parts of Zimbabwe which include Chisumbanje, Nyanyadzi and Chiredzi.

Part of the raw sugar produced in Zimbabwe is processed locally at Tongaat Hullets in Chiredzi and Gold Star Sugars in Harare. The remainder is exported to the European Union.

Tanzania's bean exports feed 10 countries

TANZANIA EXPORTS MORE than a million metric tonne of beans to ten countries in Africa including Uganda, Rwanda, Burundi, Zambia, Malawi, Mozambique, Zimbabwe, South Africa and the Democratic Republic of Congo

(DRC), as well as India, making it the sole producer of the important legume to millions of people on the continent.

This was discussed during a special agricultural experts meeting aimed at

addressing the issue of "Unlocking potential of seed companies to reach smallholder farmers with quality seeds for improved bean varieties," in northern zone of Tanzania.

The country coordinator for International Centre for Agriculture (ICA), Jean Claude, said that the neighbouring country, Kenya, alone imports over 200,000 metric tonnes of beans every year, a consignment which constitutes the country's 50 per cent of legumes consumption.

At the meeting, however, it was also pointed out that legume production in the country is still far from being satisfactory and hits well below its actual potential, despite commanding good market share elsewhere.

The Kigoma and Kagera regions have the highest bean production with each harvesting an average of 90,000 tonnes per season; other precincts in the top seven include Tanga (50,000 tonnes), Kilimanjaro (45,000 tonnes), Geita (35,000 tonnes), Arusha (35,000 tonnes) and Njombe (20,000 tonnes) regions.



Kenya imports 50 per cent of its legume consumption from Tanzania. (Photo: LightAndShare/Shutterstock)

Promoting investment in Ghanaian agriculture

THE UNITED STATES Agency for International Development (USAID), through the US government's Feed the Future Initiative, hosted the 4th Annual Ghana Agribusiness Investment Summit on 4 May 2017 to showcase investment opportunities in Ghana's agribusinesses. The event brought together business service providers, financial institutions, agribusinesses, farmers, development partners and the Ghanaian government under the theme, "Mobilising strategic investment for agriculture."

At the summit, the deputy minister for the ministry of food and agriculture George Oduro, and US chargé d'affaires Melinda Tabler-Stone stressed the importance of leveraging financial opportunities for Ghanaian agribusinesses.

The aim of the event was to spotlight Ghanaian agribusinesses and link them with viable private investment opportunities. The event featured panel discussions on opportunities in the agriculture sector, the importance of forming strategic partnerships to enhance agricul-

tural productivity, risk-sharing agricultural lending and alternative sources of financing for agribusiness. The summit offered participants business-to-business sessions where they were given the opportunity to network and forge partnerships.

"Today's summit is a call to action," remarked Chargé d'Affaires Tabler-Stone at the event, "It is a call for private, public, and development partners to re-strategise and increase investment in agriculture, so that we can achieve sustainable and broadly shared economic growth. Let me assure you that the US government is committed to working with the Ghanaian government and our partners to boost economic growth and reduce poverty."

This annual event was organised by Feed the Future with support from USAID. In Ghana, Feed the Future has mobilised more than US\$115mn in private sector investment for Ghana's agriculture sector and works to improve agricultural productivity, boost incomes and link farmers to market and trade opportunities.

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Agri-tech innovations breaking barriers for African cassava farmers

ALTHOUGH CASSAVA IS an important part of the diet for 800 million people in Africa, shortage of equipment for processing has meant production has been unable to increase. To meet this need, a social impact business, Aspuna Group, is developing a cassava processing facility in Gambia, to convert the raw material into starch and to reduce unemployment.

The company will be discussing its learning points at Agri-Tech East's "Exporting Agri-Tech to sub-Saharan Africa" event on 12 July 2017 in Cambridge UK; geared towards

businesses developing innovations in the mature UK and US markets, now looking to explore the sub-Saharan market.

While Cassava can be eaten in its tuber form, it is highly perishable, making it impossible to transport over long distances. To make use of its versatility as a food and industrial product, cassava needs to be processed into starch and flour; increasing shelf life from barely 24 hours to up to two years.

Maria Yassin-Jah, CEO of Aspuna Group, said that the company's business model will help it overcome this problem, "We are currently building a 2,000 sq m factory to process fresh cassava into cassava starch, internationally known as tapioca."

As the smallest country on the African mainland, Maria-Yassin believes that Gambia works to their advantage; logistics are not as challenging, and the relatively good road infrastructure reduces transportation time from the factory to the port.

Jelena Duza, trade and investment advisor for the UK Department of International Trade, said, "Sub-Saharan Africa is a diverse market with varying demand trends. However, major opportunities for UK companies are in crop protection, mechanisation, agro-processing, grain handling and the livestock sectors. It should be noted that



The new cassava processing facility in Gambia will convert the raw material into starch. (Photo: Cat Act Art/Shutterstock)

smallholder farms make up the largest percentage of agricultural production in sub-Saharan Africa, numbering around 33 million."

Aspuna, gained support from the Judge Business School in Cambridge UK and it was there that Maria met fellow agri-entrepreneur Patrick Guyver, co-founder of AGRInsight. The two companies will be collaborating on the initiative. Aspuna Gambia will be using AGRInsight's mapping platform to communicate with farmers and record operational information such as seed

varieties and production data, relevant to the development of the cassava supply chain.

Patrick Guyver, co-founder of AGRInsight, said, "There is currently a poor understanding of the agribusiness 'landscape' in emerging markets and any available data is scattered in different formats. Players in agricultural supply chains all struggle to locate relevant, up-to-date, information to make better-informed decisions."

With access to a smartphone, subscribers to the cloud computing platform – such as agribusinesses, NGO's and investors – can add their own profile, location, data and requirements. In combination with public information such as infrastructure, soil and climate data, the platform can be used to improve planning and coordination.

AGRInsight is also operating in Tanzania and Ethiopia. Meanwhile, Aspuna Group plans to set up a network of subsidiaries with links to markets in Europe and the United States. Research has also been carried out to assess Nigeria and Portugal as possible next locations.

Aspuna and AGRInsights will be joined by other entrepreneurs operating in the Sub-Saharan market and representatives from the UK Department for International Trade.

Promoting Tanzanian horticulture industry

THE TANZANIA AGRICULTURAL Development Bank (TADB) and the Tanzania Horticultural Association (TAHA) are in the process of developing a partnership to promote and support transformation of agriculture from subsistence to commercial undertaking.

According to TADB acting managing director Francis Assenga, the bank wants to address limited financing challenges that face horticultural industry in the country mainly by addressing issues such as commodity trading, high interest rates, short-term loan maturities and rigid repayment terms without flexibility to accommodate the seasonal and/or cyclical nature of agriculture.

He stressed the importance of TAHA and the horticultural industry as a whole in the country that largely depends on smallholder farmers, with export of fruits and vegetables alone being 70 per cent dependent on farmers with land holding less than two hectares.

"We aim to make an arrangement with TAHA that believes in the spirit of public and private partnership in realising TADB's role in increasing access to non-finance support services like business case development, market information, business management and good agricultural practices (GAP) training as well as contract negotiation for horticultural farmers in the country," he said.

Kenya feels impact of Brexit with fall in UK tea exports

KENYA IS NOW feeling the impact of Brexit with the drop in tea volumes purchased by UK as European countries increasingly choose to bypass UK with direct imports.

An industry performance report by the Tea Directorate revealed that the volume of tea purchased by the UK dropped from 5.4 million kg in March last year to 3.1 million kg in the same month this year.

According to the directorate, Britain is no longer buying same amount of tea from Kenya due to a reduced re-exportation market to other European countries who have been securing the commodity from the UK.

"We can comfortably attribute this decline to Brexit, Britain has been a major buyer of our tea in Europe and it was buying for both local consumption and re-export to other European countries," said Samuel Ogola, head of the directorate, AllAfrica reported.

The UK is a major re-exporter of tea with countries like Republic of Ireland, Germany, Poland and France being its major markets. According to official figures, in 2014 the country exported 17 per cent of the beverage it imported.

UN expert warns that Zambia's farmers are vulnerable to land rights

SMALL SCALE FARMERS in Zambia are at significant risk of becoming squatters in their own land, leading to a situation that will severely impact the farmers' right to food.

The UN rapporteur Hilal Elver stated that Zambia's dual land tenure system has resulted in a situation where some landholders on state land enjoy full protection, while landholders under customary tenure, affecting around 85 per cent of the land, are considered as occupants of land and land right remains unprotected.

Such weak land protection law poses risk of pushing farmers off their land and out of production. "This situation affects 60 per cent of small scale farmers who produce 85 per cent of the food for the population, and 40 per cent of them live in rural areas suffering from extreme poverty," said Elver.

In Zambia, many farmers are forced to work on contract basis for large industrial farms, and many times they are obliged to sell agri-products at minimal price to the monopoly market. Sometimes, children are forced to work early at the age of six to secure family's livelihood.

Zambia faces extreme challenges to provide adequate and nutritious food, particularly to the women and children in rural area, where many families eat only one meal a day of very low nutritious value. This has led to severe acute malnutrition in Zambia with 40 per cent mortality rate, which is five times the global average.

In addition, Zambia's intensive commercial farming model has increased the use of agro chemicals like glyphosate, which has scientifically proven adverse effect on human health, particularly on children.

Elver stressed that Zambia must focus on bio-diversity as well as industrial farming's social and economic impact on people rather than short term profitability and economic growth. Also, adequate nutritional aspects must be ensured for the women and the children.

Irrigation expansion vital for Zambian agri-development

THE ROLE OF irrigation in improving productivity of Zambia's farmers was pointed out during a recent parliamentary tour of Zambeef's Huntley Farm in Chisamba.

"Irrigation can help improve productivity for Zambia's farmers, a necessity as the country continues to experience increasing growth in market demand for agricultural produce, Zambeef joint chief executive officer Francis Grogan told parliamentarians during the tour by the committee of parliamentarians. The tour was part of a national study on irrigation systems and aimed at tackling some of the challenges that agricultural companies face in the country. Zambeef, the largest integrated agribusiness and food processing company in Zambia, is one of the major stakeholders in the sector.

Grogan added that establishing sustainable policies on issues such irrigation will be key in reducing uncertainty in production and putting farming at the heart of Zambian economic development.


With Africa's agricultural demand expected to reach US\$1tn by 2030, agricultural policies need to be developed to help farmers meet this demand.

Maxas Ng'onga, chairperson for parliamentary committee on agriculture and livestock, said that Zambian agricultural sector should spur confidence among farmers.



Irrigation would help to ensure farmers grow crops on a much larger scale, multiple times in a year. (Photo: Piyaphong/Shutterstock)

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Content





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"RiceAdvice" app helps farmers improve productivity

MORE THAN 6,000 rice farmers in Mali and Nigeria have benefited from "RiceAdvice," a customised crop management decision support tool, leading to increased productivity, efficiency and profits.

Developed by the Africa Rice Centre (AfricaRice), the RiceAdvice app generates tailor-made recommendations that help farmers in irrigated and relatively favourable rain-fed lowland areas in Africa apply mineral fertiliser more efficiently in order to optimise production and profits and reduce waste.

Efficient use of mineral fertiliser coupled with good agricultural practices is one of the keys to enhancing rice production in sub-Saharan Africa, where the average yield is

around 2.1 tonnes/ha. AfricaRice studies have shown that the adoption of RiceAdvice recommendations can increase rice yield by 0.6 to 1.8 tonnes/ha in fields.

According to Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)-Competitive African Rice Initiative (CARI), which is one of the important project partners in Nigeria, a specific innovative element of RiceAdvice is that it is not only based on the agronomic conditions, but also on the financial capacity of the farmer.

CARI is helping deploy the RiceAdvice technology to over 9,000 farmers in Nigeria through 97 trained service providers. "Farmers are happy with the significant improvement in yield and income that



RiceAdvice helps farmers use fertilisers more efficiently. (Photo: Agota Kadar/Shutterstock)

RiceAdvice has brought to them and are eager to continue with the service."

The app can be freely downloaded through Google Play on Android smartphone or tablet device.

Tuna holds US\$250mn revenue potential for Ghana

THE TUNA INDUSTRY can provide the Ghanaian government with about US\$250mn revenue annually, according to the president of the Ghana Tuna Association (GTA) John Farmer. The association has called for favourable policies from government that will enable Ghana to maintain its status as the tuna hub of West Africa.

Speaking to the Ghana News Agency, Farmer said that Ghana was gradually losing its position as the tuna hub of West Africa to the Ivory Coast. He pointed out that some of the policies and regulations of governmental agencies such as high port charges and operations turned to have a negative effect on the exportation of tuna and its related products.

One among these is the quick turnaround and discharge at the Ivory Coast, which prompts most tuna vessels to use its ports instead of those of Ghana.

"If we do not manage these things well, our position will shift to other competitive countries," he added.

Tuna has a huge market in Europe and Asia and Ghana's waters was dominated with the best tuna species in the sub region.



Ghana currently has 38 tuna vessels comprising of 17 purse-seine and 21 pull and line operating under its flag. (Photo: Pavel1964/Shutterstock)

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AGCO launches high-tech Fendt tractors in Africa

AGCO CORPORATION HAS launched four tractor machines in Africa from the high-tech brand Fendt at NAMPO Harvest Day in Bothaville, South Africa.

The launch is a part of AGCO's global growth strategy. Gary Collar, senior vice president of AGCO and general manager of Asia-Pacific and Africa (APA) region, said, "With this market launch, professional South African farmers can now manage their businesses with efficient and powerful Fendt machines."

The four Fendt vario models –Fendt 200, Fendt 700, Fendt 900, and Fendt 900– are unique and versatile in specifications. The high-horsepower models have flexible belts, self-levelling front axle suspension system, front lift, large tyres, intelligent ballasting and tyre pressure assistants, variable four-wheel drive, etc.

These are the fuel-efficient tractors that guarantee maximum comfort, ultimate driving safety and optimum traction from the light green land use to dynamic transporting, to heavy field or fleet use, thereby giving outstanding manoeuvrability.

"We are expanding our product strategy towards worldwide needs for professional farming under the toughest conditions. South Africa is fully integrated into this strategy and an important contributor to our growing ambition," said Peter-Josef Paffen, vice president and brand director of Fendt.

"We developed the Fendt 2020 strategy. It stands for a strong worldwide growth for the Fendt brand and it is intended to grow the production volume at the German tractor plant from this year of approximately 15,000 tractors to 20,000 in the year 2020," he added.

South Africa became Fendt's natural choice for launching these



Godfried Heydenrych, CEO at BHBW Southern Africa; Roland Schuler, BHBW; Amadou Coulibaly, minister of agriculture Ivory Coast; Senzeni Zokwana, minister of agriculture, forestry and fisheries of the Republic of South Africa; Gary Collar, senior vice president AGCO Corporation Asia Pacific and Africa and Nuradin Osman, vice president and general manager Africa AGCO Corporation. (Photo: AGCO)

tractors, as the country is rapidly progressing towards developing an effective agricultural market with around 40,000 commercial farms, which together generate around 12 per cent of the country's GDP.

Nuradin Osman, vice president of Africa, contended that, "Introducing the Fendt brand in South Africa is another important step for AGCO and also a positive sign for future agricultural development in South Africa."

AGCO has launched the tractors with their sales partner BHBW Holdings (Pty) Ltd which is a joint venture between the South African company Barloworld, and German company BayWa AG. This will fulfil South-African farmers' long-time demand to launch Fendt tractors as the company have set standards in efficiency and performance in Europe.

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Africa is ready to take its place on the world stage, as the poultry industry is evolving, from a national and regional basis to a more global platform, according to RaboResearch's latest report, "Time for Africa: capturing the African poultry investment opportunity."

Africa ready for its modern poultry industry



Currently Africa is dependant on imports to meet its poultry demands. (Photo: Kharkhan Oleg/Shutterstock)

INDUSTRY ANALYSTS HAVE predicted that the year-on-year growth in the global poultry markets is set to continue, with a demand growth of more than 60 per cent expected over the next 20 years. This implies significant global investment streams in the industry.

So far, while most recent investments have focused on Europe, the Americas and

Asia, driven by bullish market circumstances, Africa has attracted relatively limited investor interest. However, new market analyses show that this is changing.

RaboResearch's latest report, "Time for Africa: capturing the African poultry investment opportunity," presents the world of potential offered by the steadily growing modern poultry industry in the continent.

"Driven by a rising middle class and rapid urbanisation, a more modern poultry industry is taking shape in Africa," said Rabobank senior animal protein analyst and author of the report, Nan-Dirk Mulder.

Growing demand for poultry products

Africa has a growing population, which is projected to double to 2.5 billion by 2050,

and this implies an increased demand for the consumption of protein. Mulder explains how the growing middle class in Africa is changing its consumption patterns, moving from vegetable-based consumption to a more protein-rich diet. "In this shifting diet, poultry and eggs are the protein of choice for African consumers — as these protein sources are affordable and available, but also because consumers prefer the taste of chicken and eggs over other proteins," explained.

"Chicken is the first choice of meat for most Africans," Kevin Lovell, chief executive of the South Africa Poultry Association, said in an interview to the BBC, explaining that the higher cost of beef and some of the religious restrictions around pork in parts of

The growing middle class in Africa is changing its consumption patterns, moving from vegetable-based consumption to a more protein-rich diet.



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Africa are reasons for the preference for chicken.

According to some estimates, chicken now accounts for nearly half of the meat consumed in Africa.

However, in spite of the sharp spike in demand for chicken, the continent has not been able to increase its production, leading to rise in prices. The demand for chicken in countries such as Ethiopia, Ghana, Nigeria and Tanzania is projected to rise significantly over the next decade. Most African countries are now strongly dependant on import to meet their poultry demand.

According to Lovell, chicken imports from Brazil, the European Union and the US are destroying the domestic sector in South Africa, which is the continent's largest chicken producer.

Lovell pointed out that while South Africa has the capacity to grow its own chickens at a far cheaper rate compared to most countries in the world, it is unable to do so due to imports.

Greater investment in the domestic poultry sector therefore can also help to reduce dependence on imports and improve the GDP of the nations.

Urbanisation and new investments

The growing urbanisation in Africa has opened a world of opportunity for new investments. Supermarkets and quick-service restaurants have responded to the opportunity of a rising African middle class and are expanding across the continent, pulling new investments into the region.

"We see a trend of building a smarter poultry value chain, encompassing breeding, grow-out farms and processing facilities. In some cases, companies are also investing in distribution, through butcher shops and restaurant chains."

- Rabobank senior animal protein analyst, Nan-Dirk Mulder

The report points out how modern poultry supply chains are attracting investors—with companies usually starting with feed mills and hatcheries, and building from there.

Underdeveloped value chains in the region are another area of potential,



Rabobank senior animal protein analyst, Nan-Dirk Mulder.

especially in the light of greater migrations to urban areas. There is a strong need for investors to strengthen the grains-to-feed-to-meat value chain.

"We see a trend of building a smarter poultry value chain, encompassing breeding, grow-out farms and processing facilities. In some cases, companies are also investing in distribution, through butcher shops and restaurant chains," Mulder said.

Many sub-Saharan African countries like Nigeria, Angola, Zambia and Zimbabwe have the potential to further increase their feed ingredient supply, which could support a more competitive supply of poultry in these countries, as feed costs make up around 70 per cent of total costs.

Investment opportunities

With the fast pace of growth of the African poultry and egg industry, there are a wide range of opportunities for international investors in several areas.

Some of them are:

- **Meat processing:** developing a modern poultry value chain
- **Breeding:** establishing a modern breeding supply chain
- **Equipment:** supplying the right equipment for the growing, more modern, industry
- **Animal nutrition:** setting up feed mills to supply more modern compound feed, distributing premixes and additives
- **Grains and oilseeds:** developing adequate supply for local feed manufacturing

The report points out that while modern distribution growth offers a great entrance platform for investors, business models should not depend too heavily on narrow business segment.

"Optimal market, business and risk management is key when investing in sub-Saharan Africa as risks can be significant," Mulder stressed.

"However, capturing this African poultry investment opportunity is not easy. It requires a pioneering spirit, a good market and risk assessment, capable local partners and patience, as investment risks can be high. If done well, the rewards can be large, especially for companies that move early and are well prepared," the report concludes. **E**

The changing investment environment in Africa



The early investor opportunity:

- Need for new investors to strengthen the grains-to-feed-to-meat value chain
- Compound feed and hatchery as basis
- Gradual move to vertically-integrated models: up- and downstream
- Various strategies to reduce business risks in the value chain

Early-mover benefits can be significant

Investment opportunities in African poultry industry. (Photo: Rabobank)

MIAVIT opens new office in Kenya

GERMAN ANIMAL NUTRITION company, MIAVIT GmbH has now opened a new office and warehouse in Kenya to serve customers' needs for quality nutritional products.

Located in Nairobi, the new MIAVIT office and warehouse will ensure that the company's products are available at all times for its Kenyan customers. A dedicated team of animal nutritionists and veterinarians are working in the East African market to give the customers technical advice and to share knowledge on animal nutrition and management.

Rob Koster is the company's managing director in Kenya and Yga Jonker, the country manager for Kenya.

MIAVIT delivers a wide range of products in animal nutrition including feedstuffs, supplements, minerals and vitamins. The company strives to meet the needs of modern, environmentally friendly, economically viable animal nutrition. Some of the products the company has to offer are customised premixtures, complementary feed for millers, farmers, vet shops in powder and liquid form, antioxidants (MiaRadOx), mycotoxin binder (MiaBond), acidifier (MiaCid), specialty feedstuffs, feed supplements (vitamin E powder, choline chloride powder), pet food products, trace element mixtures for biogas plants and toll manufacturing (eg, mineral feeds).

In view of the large number of different formulations produced, MIAVIT's modern manufacturing facilities work with the requisite absolute precision throughout, starting from the precise metering of raw materials.

Thanks to the direct integration of the ERP and production control systems, even last-minute changes to formulations can be immediately



Gintaras Grigisas, export director at MIAVIT GmbH, Rob Koster managing director Kenya, Faustine Wanjala, export area manager at MIAVIT Kenya and Franz Otten, sales director at MIAVIT GmbH. (Photo: MIAVIT)

implemented in production. The products are continuously monitored by certified laboratories, and careful selection of raw materials and suppliers as well as a high degree of automation ensure consistently high quality.

MIAVIT GmbH is a family guided German company at the heart of animal nutrition in Europe and worldwide. For more than 50 years it has worked on the company vision: prevention instead of medication. Today, MIAVIT is an internationally successful company supplying customers in more than 80 countries worldwide.



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According to a BIOMIN survey, the contamination levels have risen considerably around the world.

Mycotoxin increasingly present in feed, endanger livestock

MYCOTOXIN-RELATED THREATS to livestock production have risen in most regions of the world over Q1 2017. More than 14,000 analyses were conducted on 3,715 finished feed and raw commodity samples sourced from 54 countries from January to March 2017 as part of the BIOMIN Mycotoxin Survey.

Reported mycotoxin occurrence data has shown that contamination levels in corn and finished feed samples have risen considerably in Europe and throughout the Western hemisphere. Risk levels in Asia remain elevated.

"Corn, or maize, constitutes a major proportion of animal feed and so trends in finished feed risk tends to match corn risk over time," explained Dr Timothy Jenkins, Mycotoxin Risk Management Product Manager at BIOMIN.



Corn and maize are major constituents of animal feed. (Photo: Bogdanhoda/Shutterstock)

Main culprits

The most prevalent mycotoxin in world feed is deoxynivalenol, a type B trichothecene produced by *Fusarium graminearum* and *F. culmorum*. Easily observed symptoms


include reduced feed intake and feed refusal. Two-thirds of samples contained deoxynivalenol in excess of 150 parts per billion (ppb): the risk threshold for effect on sensitive animals.

Forty seven per cent of samples contained *F. verticillioides*-produced fumonisins above 500 ppb: the risk threshold for effect on sensitive animals. Research has shown the combination of deoxynivalenol and fumonisins severely impair vaccine response and gut health.

and low growth rates," he added.

Industry solutions

"Avoidance of contaminated feed and attention to feed storage conditions are logical approaches to reducing the mycotoxin risk," stated Dr Jenkins.

"However, mycotoxin contamination of feedstuffs occurs despite the most strenuous efforts on prevention. The most reliable approach is to combine prevention and detection with regular application of additives proven to adsorb or deactivate toxins in the intestinal tract of animals," he advised. 

Multiple mycotoxin presence

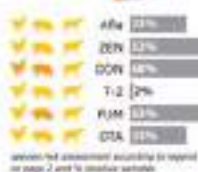
More than three-quarters of samples contained two or more mycotoxins. Multiple mycotoxin contamination of feed presents additional problems, as certain combinations of mycotoxins are known to have synergistic effects that aggravate the negative consequences for animals.

"The main *Fusarium* mycotoxins are frequently related to subclinical symptoms, which are not very obvious on the surface but usually have a greater economic impact for the industry," observed Dr Jenkins. "The presence of several mycotoxins at low levels can silently impair productivity with poorer feed efficiency

Trends

- Recent rise in mycotoxin contamination levels observed for corn, finished feed and soy.
- Deoxynivalenol (DON), detected in 80 per cent of samples, is the most prevalent mycotoxin worldwide, followed by fumonisins (FUM), found in 71 per cent of samples.
- 76 per cent of feed and raw commodity samples contained two or more mycotoxins.

Africa



Unverified assessment according to report on page 2 and % positive samples

Total samples (n)	Afla	DON	FUM	T-2	FUM	OTA
Number of samples tested	40	40	40	40	40	40
% Contaminated samples	100%	100%	100%	100%	100%	100%
% Above risk threshold	100%	100%	100%	100%	100%	100%
Average of positives (ppb)	10	10	10	10	10	10
Median of positives (ppb)	10	10	10	10	10	10
Maximum (ppb)	10	10	10	10	10	10

Emerging technologies in farming is one of the growing investment areas in sub-Saharan Africa. (Photo: Nolanberg11)

Paul Nguru, partner at EXEO Capital, the pan-African private equity investment firm, speaks to *African Farming* about the potential of private equity to unlock investment opportunities in the African agri-business.

Private equity widens horizons for African agri-business

WITH THE COMBINATION of rapid population growth and widespread urbanisation taking place across sub-Saharan Africa, the food and agribusiness sector in this region represents a prime long-term investment opportunity. Given the thin capital markets outside of South Africa, private equity is the ideal avenue through which to access this opportunity.

Food and agribusiness sector represents up to 60 per cent of the country economics in the sub-Saharan region, with food spend in these countries anticipated to grow by 300 per cent over the next decade. The rapid urbanisation and emerging middle class in this region implies increasing consumer preference for processed foods, proteins and food services. Currently, more than 40 per cent of sub-Saharan Africa's processed food is imported, which presents a very large import replacement opportunity for local businesses.

The pan-African private equity investment firm EXEO Capital has done pioneering work in driving investment in African agri-business. With ten years of investment experience in this sector, EXEO Capital recently announced the first close of the second Agri-Vie Fund, focused on the food and agribusiness sector in sub-Saharan Africa, after attracting commitments of over US\$100mn - one third more than the initial target. EXEO Capital focuses on investing in middle to lower mid-cap companies with exceptional growth prospects. Paul Nguru, partner at EXEO Capital, spoke to *African Farming* about investment opportunities in sub-Saharan African agriculture sector.

What is the investment climate like in the sub-Saharan African agriculture sector?

The investment climate in sub-Saharan African has in general continued to improve as evidenced by reduction in the number of people living below the poverty line; improved literacy rates; relative political and country stability and improved health services.

The agricultural sector has been integral to the growth of sub-Saharan Africa given that majority of the economies in this region are agricultural-based. The key factors that are expected to drive growth and hence investments into the region include:

- **Increasing domestic demand:** Africa's population is the fastest growing worldwide and projected to be 40 per cent of the global total by 2030, driven by an increase in the working age popula-

tion. Population growth, coupled with a steadily improving GDP per capita, indicates a significant increase in spending power, with food constituting the largest share of consumption growth.

- **Stable political environment:** Sub-Saharan Africa has experienced a marked reduction in civil conflict and corruption. Characteristic of the long term trends towards improved political

stability of the region is the move towards democratic government with 21 out of 44 countries having elected governments in 2015 from only four democracies in 1990.

- **Demographics geared toward growth:** According to the IMF, by 2035, the number of sub-Saharan Africans reaching working age, classified to be between 15 and 64, will exceed that of the world combined.
- **Continued availability of abundant resources:** Sub-Saharan Africa has a wealth of agricultural and other resources; 60 per cent of the world's arable land is in Africa, while only three per cent of sub-Saharan African land is under irrigation.

What are the fundamentals driving the long-term investment opportunity of the sub-Saharan African food and agribusiness sector?

The attractiveness of the food and agribusiness sector within sub-Saharan Africa is underpinned by the fundamental contribution of the industry to the livelihoods and wellbeing of the population as illustrated by:

- **Contribution to GDP:** Agriculture and agribusiness contribute 44 per cent of the GDP of sub-Saharan Africa including a substantial remaining subsistence agricultural component.
- **Continued increase in domestic demand:** From 2012 to 2020 demand for food, apparel and consumer goods in Africa are expected to grow by US\$185bn and account for 45 per cent of total growth in consumer demand. According to the World Bank, the projected value of food markets in sub-Saharan Africa will rise from US\$300bn in 2010 to US\$1000bn in 2030, driven by expected doubling of the population to more than two billion people by 2050 as well as increasing urban demand for packaged and processed foods.
- **Future agricultural potential:** There are up to 450 million hectares of uncultivated land in Africa, making up 60 per cent of global uncultivated land. Low utilisation of available resources prevail; for example, less than two per cent of renewable water sources are utilised in Africa compared with five per cent utilised globally. Investment into the region will allow businesses to tap into or improve on these aspects and will unlock further growth and, accordingly, higher return potential.
- **Urbanisation:** Between 50 to 60 per cent of sub-Saharan Africa's population are expected to live in cities by 2025, contrasted with 39.1 per cent in 2009. This trend, together with growth in household incomes is generating opportunities, especially related to higher value food products and food service industry development.
- **Emerging technologies:** Especially in information technology, biotechnology, food safety, precision farming and measurement, technologies make it possible to improve food quality, achieve coordination and to drive other efficiencies, so reducing and overcoming a variety of business and food safety risks associated with sub-Saharan Africa production in the past.

Do you think private equity investment holds potential for the food and agribusiness sector of sub-Saharan Africa?

Indeed. EMPEA, Emerging Markets Private Equity Association (2016 Annual Global Limited Partner Survey) research indicates that sub-Saharan Africa is amongst the most attractive of emerging markets, following Southeast Asia and India in continuing to attract higher levels of investor interest and activity.

While presenting an excellent investment opportunity to tap into a fast growing industry, investment into sub-Saharan Africa's food and agribusiness sector also brings about a significant, positive impact on the population of the geography by playing a role in poverty reduction and economic growth, wealth and job creation, better food choices and prices, better health, rural development,



Paul Nguru, partner at EXEO Capital.

supply chain improvement, contributing towards food security, improved environmental management and supporting increasing levels of urbanisation.

What are the major challenges faced by the private equity investments in the sub-Saharan African food and agribusiness sector?

Some of the challenges faced by private equity firms in this market are as follows:

- Underdeveloped value chains in the food and agribusiness sectors in Africa, resulting in fragmented sub-sectors which inhibit individual company's ability to scale.
- Security of supply is a major challenge facing agri-processors in sub-Saharan Africa, mainly due to a predominantly smallholder farmer base, low yields and high post-harvest losses and ineffective logistics amongst other reasons.
- Competition from imported food products from lower-cost producers, mainly in Asia remains a major challenge in sub-Saharan Africa, imposing a huge barrier to entry for local players as well as significant price pressure for local players.

Can you tell us about EXEO Capital's Agri-Vie Funds and its vision for investment in Africa?

EXEO Capital is an alternative investment partner in Africa, sought after for its business building capabilities and its ethos of partnership and impact, delivering enviable returns.

EXEO manages the Agri-Vie's Funds I and II. Our vision is to be a catalyst for sustainable economic growth in Africa through responsible investment in the growth of one of the foundational sectors in the continent. We aim to partner and build exceptional food and agri-businesses that deliver superior returns to owners and make a positive difference in their communities. As a specialist food and agribusiness investor since 2008, we are 100 per cent dedicated to this sector.

Agri-Vie focuses on selected countries and segments within the sub-Saharan region. Out of the 48 sub-Saharan African countries, those that represent strategic priorities for the Agri-Vie programme are fast growing, have a relatively stable political environment and underserved consumer markets are our targets. Fund I is invested in Ethiopia, Kenya, Mozambique, Rwanda, South Africa, Tanzania and Uganda. In addition to these countries, Fund II is targeting Zambia, Ghana and other Central and West Africa countries.

Agri-Vie fund I and II bring about a sustainable impact on the

competitiveness of a select portfolio of companies in the sub-Saharan African food and agribusiness sector by:

- Raising 10 year capital commitments in excess of US\$250mn in the food and agribusiness space by 2018—Agri-Vie Fund I raised US\$100mn while Agri-Vie II achieved its first close in January 2017 attracting commitments of over US\$100mn, a 33 per cent over-subscription on the initial target.
- Building and expanding capacity in the food and agribusiness sector by originating, structuring, nurturing and exiting a diversified portfolio of a combined 20–25 growth investments positioned for long term success in Fund I and II; and
- Positioning investee companies as role models for sustainable business practices; and as a consequence, is targeting to outperform a net return of two to three times money to Fund investors.

What is different about the investment model of Exeo Capital's Agri-Vie Funds?

Agri-Vie's investment model is very similar to that of other PE funds. Our main differentiating factor is that we are a sector focused fund that holds a wealth of experience in the food and agribusiness sector. Agri-Vie differentiates itself with a strong partnership approach with our investee companies, which creates wealth and long-term relationships. It has a solid team of investment professionals who possess between them over 150 years of investment experience as well as senior level operational experience in the food and agribusiness space. A proven local and regional investment team, exclusive origination channels, which generate a proprietary and transactable pipeline, on the ground presence in focus countries, strategic portfolio construction for risk


mitigation are some other factors that makes us stand apart.

Agri-Vie Fund I is now in its realisation stage, how can its success be seen?

Agri-Vie, which was a US\$100million fund is fully invested in 12 companies across seven countries in sub-Saharan Africa. Deployment of Agri-Vie I was ahead of the scheduled completion of its commitment period, with an average investment size of US\$6M. The Fund has been successful in achieving geographic and sector diversification.

In terms of returns, the intrinsic nature of food and agri portfolio necessitates longer holding periods while the lion's share of upside in a growth capital portfolio typically occurs in the latter stage of the holding period. Having said this, Fund remains on course to deliver a two times (2x) return to its investors, and is now at advanced stages of various exits in line with the Funds exit strategy.

What does the future of investment in the sub-Saharan African food and agribusiness sector look like?

The future of investment in sub-Saharan Africa is promising. The Economist Intelligence Unit proposes that emerging market fundamentals are generally far healthier than they were in the 1990s. As mentioned, Agri-Vie research indicates that sub-Saharan Africa has proved this to be the case, with poverty dramatically reduced, while greater levels of peace, education and health have been achieved. Further fuelling these improving fundamentals are sustained levels of foreign direct investment which in sub-Saharan Africa were at two per cent of GDP in 2015 and forecasted to increase to 2.4 per cent by 2017. 

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The Agritech Expo Zambia 2017, now in its fourth year, has become the country's top farming event that is a focal point for exchange of ideas in the sector, unveiling financial solutions and showcasing technologies. Nawa Mutumweno reports.

Agritech – driving Zambian agriculture



Aerial view of Agritech Expo 2017. (Photo: Agritech)

WITH THIS SHOWPIECE growing in stature, Zambia's quest to become the breadbasket of the region and the continent is attainable. An increase in exhibitors, both local and foreign, signal that it has received overwhelming buy-in.

Greater international presence was evident at Agritech Expo Zambia 2017 with participation from Germany, Zimbabwe, South Africa, Czech Republic, the Netherlands, the United Kingdom and France.

"Agritech Expo has blossomed into an umbilical cord bonding together national, regional and global farmers, agribusinesses, policy makers and development agents as they search for solutions to ever increasing pestilences, adverse weather effects, wasting soil health/fertility, dwindling productivity, inadequate irrigation and mechanisation and increasing livestock diseases," said Coillard Hamusibi, the head of agribusiness for the Zambia National Farmers Union (ZNFU), the owners of Agritech Expo Zambia.

The GART initiative

Held under the theme "Driving a modern agricultural economic vision," the show was officially opened by President Edgar Lungu on Friday, 28 April 2017 at Golden Valley Research Trust (GART) in Chisamba, central Zambia.

GART aims at optimising production, commerce and trade of crops, milk, chicken, goats and their by-products and income security of the target beneficiaries. Its services include conservation agriculture and livestock development.

"Zambia is among 60 countries that have been identified as endowed with enough arable land, abundant water resources and a good climate to grow almost any crop, rear animals and develop aquaculture."

- Zambian President Edgar Lungu

Germany, through its Federal Ministry of Food and Agriculture, has partnered with Zambia to establish the German Agricultural Knowledge and Training Centre (AKTC) on GART premises. The partners are GART and ZNFU. The centre's aim is to promote sustainable and modern agriculture in Zambia and enabling farmers and technicians to receive hands-on training in modern agricultural engineering, sustainable cultivation techniques and good farm management.

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"Zambia is among 60 countries that have been identified as endowed with enough arable land, abundant water resources and a good climate to grow almost any crop, rear animals and develop aquaculture," said President Edgar Lungu at the opening of the show.

"Actualising the national economic diversification programme and driving a modern agricultural vision entails refocusing funding and reorienting investments towards key drivers of agricultural growth. These include research, extension, livestock and fisheries," he added.

AFGRI's country manager equipment – Zambia Willie Dietrehsen identified problems besetting the agri-sector in Zambia as, "the financial situation of farmers due to low dam levels resulting in lesser planting of wheat during the last two to three years, severe drought conditions in the past and poor commodity prices."

The firm introduced new equipment at the expo, including a range of new tractors, implements and a complete range of the KRONE haymaking equipment. AFGRI handles the dealership for JCB Agriculture on the Zambian market. JCB showcased the Fastrac, a highly productive, versatile, comfortable and safe series of tractors on the market.

"There is great potential for development in the country's agri-sector. We are helping the farmer improve his business with solutions in farming and innovations. Our intention is to grow the Zambian market and the whole of the southern African region," said Daniel Erasmus, sales engineer, JCB Agriculture, in an interview with *African Farming* at the expo.

The AGCO Future Farm's vision is to develop a sustainable food production system that is able to increase farm output by utilising agricultural resources more efficiently.

AGCO Future Farm

One company that is leaving a mark on Zambian agriculture is AGCO, which has introduced its Future Farm initiative in the country. AGCO Future Farm is a leading-edge practical facility designed to accommodate small, medium and large-scale commercial farmers as well as dealers and distributors.

"The AGCO Future Farm's vision is to develop a sustainable food production system that is able to increase farm output by utilising agricultural resources more efficiently. The AGCO Future Farm has already planted firm roots in Zambia and is a key component of our commitment to being Africa's partner for development," said Louisa Parker-Smith, manager external affairs. The initiative will help to:

- Educate and train farmers, dealers and distributors on integrated agricultural solutions
- Provide hands-on experience with new technology appropriate to local markets
- Establish new agricultural standards for crop establishment, nutrition and protection
- Build state-of-the-art mechanised solutions to farming problems
- Support professional farmers to feed the world

"In the coming years, we will continue to impact and empower farmers in Africa by rolling out new initiatives as well as seeking opportunities to develop other projects with selected partners," she elaborated.

Industry round-up

In terms of enhancing smart farming, Paratus Telecom Zambia has urged farmers to embrace the use of technologies and internet data connections in order to improve their agricultural business and ensure food security.

Smart farming is a development that emphasises the use of



Agritech Expo 2017 had international pavilions with exhibitors from Germany, Zimbabwe, South Africa, Czech Republic, the Netherlands, the United Kingdom and France. (Photo: Agritech)

information and communication technologies (ICTs) as well as the use of internet data to leverage development.

"This helps farmers conduct their agricultural businesses easily and can enable them use environmental data to guide their decisions, making farming more predictable and profitable. Technology is advancing and farmers need to take advantage of new ways of farming that are making use of data. There is no better way that predicts and guarantees good harvests than making use of new technology," said Marius van Vuuren, country manager at Paratus.

Agricon Equipment Zambia Limited is the official dealer for CASE IH Agriculture, a provider of innovative products and market leading agricultural solutions and services. These encompass tractors, harvesting, advanced farming systems, hay and forage, seeding and application equipment.

Company country manager Michael Woolley said, "We started operations in Zimbabwe four years ago before getting the dealership for Zambia. We operate offices and workshops in Mkushi (Central Province) and Kitwe (Copperbelt) and will be setting up operations in Lusaka by July this year. We provide equipment and back-up support to boost agriculture."

"The business environment in Zambia is good, although there have been a few challenges here and there. There has been political will from Government to drive the sector forward, resulting in growth both on the small- and large-scale fronts of the sector," he elaborated.

CLAAS KGaA mbH is dedicated to benefiting farmers, conserving resources and ultimately making a contribution to securing the food supply on a sustainable basis, thus constantly working to develop innovative solutions and concepts.

Amazonen-Werke, which also markets its products through Falcon Agricultural Equipment (Pty) Ltd of South Africa, exhibited soil tillage implements, seed drills, mineral fertiliser spreaders and crop protection sprayers.

Falcon's primary market is the agricultural sector, with niche efforts into the industrial and turf implements markets. Its products (Falcon and Locust ranges) are distributed through dealers in South Africa, as well as across the frontier into 12 other African countries, including Zambia.

The company has an on-going programme of innovation and improvement, thus ensuring the consistent launch of implements to satisfy customers' ever-changing requirements.

John Deere's current strategy is to focus on achieving technology and analytical leadership and providing best-in-class integrated solutions. To this end, the company is devoting considerable resources to precision farming which is set to shape the future of farming.

Products enhancing the John Deere brand include the 9RX and 6R tractors, a high-speed application for dry nutrients and mobile applications for tractors, tillage tools, planters and harvesters.

Indeed this year's Agritech Expo Zambia was a myriad of activity and innovation that will go a long way in revolutionising the country's agricultural sector which is top on the diversification agenda. **E**

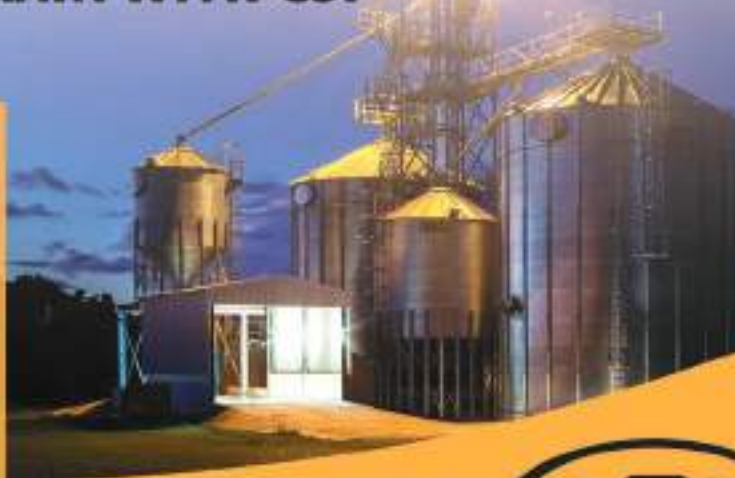
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3 features that make the Heliodor 9 compact disc harrow ideal for Africa

1

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2

Low maintenance requirements...

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3

High speed of operation...

The Heliodor 9 is designed to cope with high working speeds, which boosts output and delivers a high mixing intensity. Thus, even smaller tractors can have a higher output when combined with the Heliodor 9.



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 **LEMKEN**

The Agrovision Company

German agricultural machinery manufacturer LEMKEN is collaborating with the German-African Agricultural Knowledge and Training Centre (AKTC) to provide African farmers hands on training on modern farming machinery and adopted crop production systems.

Supporting modern agricultural training in Zambia

EVEN THE BEST equipment can deliver poor results when used incorrectly. That is why German agricultural machinery manufacturer LEMKEN supports the efforts of the German-African Agricultural Knowledge and Training Centre (AKTC) in Zambia. The AKTC operates on the premises of the Golden Valley Agricultural Research Trust (GART) in Chisamba, just north of Lusaka. Here they provide hands on training on modern farming machinery and adopted crop production systems for grain and potatoes.

The importance of soil health

Both LEMKEN and the AKTC understand that small actions can have big effects in farming. This also rings true when working the soil and it is very important to match soil conditions with the right tool to be financially efficient and environmentally sustainable. Soil is the farmer's most important asset, and can be severely damaged by unsuitable tillage practices.

During training sessions, AKTC trainers dig various profile holes in a single field to demonstrate how different soil conditions can be found in a single field. A good understanding of soil conditions helps farmers and operators to make informed tillage decisions which not only conserve the farm cash flow, but also the soil.

Controlling fuel consumption

When working with a cultivator, like the LEMKEN Kristall 9 that is used by AKTC, working depth and the share type have a big influence on the fuel consumption of the tractor. The unique design of the Kristall 9's shares, tines and frame means that it can intensively till the soil and mix in large volumes of crop residue with fewer tines. The compact design makes it lighter and shorter, which also reduces the size of the tractor required to operate it.

But beyond cultivator design, working depth or soil conditions; there is an even simpler starting point to save fuel: tractor tyre pressure. AKTC trainers like to demonstrate how such a simple adjustment can impact traction and fuel consumption with a simple experiment.



LEMKEN Kristall 9 cultivator being used during training.
(Photo: AKTC/Helmut Anschutz)

They combine a tractor with a Kristall 9 cultivator; the tractor is fitted with two separate transparent diesel containers on the cab with the same fill so that onlookers see how much fuel is being used. The trainers then cultivate a plot with the Kristall 9 with a tractor tyre pressure of 1.8 bar using the diesel from the first container. They then reduce the tyre pressure to 0.8 bar and switch over to the second tank, and till a second plot which is just as big in the same field without changing anything else. The result is that the same sized plot could be cultivated with less diesel in the case of the lower tyre pressure. The reduced tyre pressure increases traction and means that the tractor can put its power to the ground more effectively.

Agricultural training has a big role to play in improving efficiency on farms in Africa, especially in the face of high population growth rates and high levels of urbanisation. Even here, a small contribution can have a lasting effect. ¹

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With emphasis on larger bin sizes, greater capacity and safety grain storage, grain storage is moving towards more advanced, efficient systems. *African Farming* looks at the latest trends in the grain storage industry.

Towards better grain storage

INCREASED EMPHASIS ON productivity in farming has led to changes in the requirements of grain storage. In the past few years, the trends in grain storage have been moving towards greater capacity.

Increased capacity

Bigger bins, better protection for grains and silo designs that are capable of handling greater loads are the need of the hour.

Speaking to *African Farming* about bin sizes, Nick Carter, technical sales manager at Bentall Rowlands said that the most popular bin size currently in the market is 3,000 to 5,000 tonnes. Carter also pointed out how the market is segmented.

"We have found recently that the market is expanding in three ways. The on-farm storage is a fast-growing market with medium and large farms looking to store their grain on-farm. These small storage systems tend to be 100 to 500 tonnes. For the larger co-op style users or flour mills this tends to be 3,000 to 5,000 tonnes. Then we have the very large systems which tend to be portside installations. Here we see the size ranging from 10,000 to 15,000 tonnes," he said.

While 500 tonnes is popular among farmers, industries are looking for bins in the 5,000 tonne range.

Symaga Silos, which specialises in designing, manufacturing and marketing galvanised steel silos for storage too identify this trend. Alfonso Garrido, sales director at Symaga Silos stated that while 500 tonnes is popular among farmers, industries are looking for bins in the 5,000 tonne range.

According to German agri-equipment company AWILA that caters to the African market, this trend for greater capacity in grain storage is growing in the African industry too. Bernd Luellmann, director export Africa and America at AWILA said, "The biggest single grain bins AWILA has supplied are installed in Morocco, each



Awila's 10x500 tonne silo at Katsina, Nigeria. (Photo: Awila)

one holding 10,000 tonnes of wheat. In Libya, we have supplied two silo plants recently, one in Benghazi 10 x 6,100 tonnes wheat and another one near Tripolis holding 5 x 6,100 tonnes wheat. In Onitsha, Nigeria, we have supplied two silo bins, each holding 8,000 tonnes for grains. In Kano, North Nigeria we have installed three silos each of 3000 tonnes. Other smaller silo installations were erected by AWILA in Nigeria, Uganda and Tanzania."

With work systems in silos being pushed harder than ever, proper product design and material usage are critical for durability and longevity. Equipment selection, layout and design, drying and storage capacity are all being centred on moving grain quickly.

Carter points out, "Customers are currently looking at making the silos and installations work hard. The demand is for handling equipment that works more hours per day with less servicing and downtime. Silos too are being used on a higher rotation. Being filled and emptied on a regular basis adds a lot of stress to the structure."

He added that Bentall Rowlands understands the need of the end user and is focussed on designing silos that can withstand the higher loads being imposed.

Galvanized silos with an extra thick layer of zinc or zinc/aluminum to withstand the toughest desert conditions or torrential rainfalls of the tropical areas are also in demand in Africa, according to Luellmann.

Safer storage

Avoiding spoilage and ensuring safe storage of the grains is another increasingly crucial demand placed upon grain storage systems. Luellmann reiterated, "All over Africa inquiries are coming in to improve storage of grains and agricultural products to protect them from pests, insects and losses due to rain and moisture penetration."

Moisture content and temperature are two most important factors in controlling grain spoilage. In order to mitigate the risks and losses related to storing grain, and to ensure that supply is safely stored for an extended period of time, temperature and



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moisture content in silos should be monitored frequently.

25°F to 60°F is generally recommended as the most suitable temperature for storing grain and preventing insect and mould growth, however this is subject to change depending on a range of factors.

In substantially higher external temperatures it becomes difficult to maintain ideal temperature ranges. The grain changes both chemically and physically during storage and creates moisture. Extra moisture and heat in the storage bins can lead to hotspot development, mycotoxin development, and mould growth – all of which can cause grain spoilage.

“All over Africa inquiries are coming in to improve storage of grains and agricultural products to protect them from pests, insects and losses due to rain and moisture penetration.”

Bernd Luellmann, director export Africa and America at AWILA

For safe storage it is necessary to monitor the temperature of the grain inside the bin. This is usually performed by sensor cables hanging from roof to almost the floor of the silos. When temperature shoots up, it is an indication of moisture nests that could burn the stored grains by chemical reactions.

According to Carter, ventilation is the most vital factor to maintain the grain quality in the silo. “The grain is a very expensive commodity and our systems help to keep it that way. Our low volume aeration systems



A wooden chain and flight conveyor which was installed in the 1950's and is still used today in a Bental Rowland silo. (Photo: Bental Rowland)

are designed to give the grain the right amount of air. Our lateral layouts are designed to maximise the amount of open area required while keeping the civil cost as low as possible. The temperature monitoring systems that we offer use the most up-to-date technology. The cables inside the silos are fitted with digital sensors which send real time information to the control program. We also include an automatic fan control system. This uses a weather station which communicates to the control program.

When the ideal conditions for grain aeration are attained, it will automatically stop and start the aeration fans.”

Site management is another important factor is grain health. Grains should have suitable moisture content and be as clean as possible. Wet grain or a lot of green matter will cause hotspots. Temperatures lower than 65 to 70°F also reduces insect reproduction, so it is important to keep grain as cool as possible to restrict insect activity. ^E

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The IITA's 5CP project to fight cassava viruses in Africa has made significant progress in fast-tracking the development of cassava varieties with dual resistance to two viral diseases.

The fight against cassava viruses in Africa

IT IS ESTIMATED that the viral diseases cassava mosaic disease (CMD) and cassava brown streak disease (CBSD) together cause production losses worth more than US\$1bn every year and are a threat to food and income security for over 30 million farmers growing cassava in east and central Africa.

"Africa loses more than a third of its potential cassava harvest to pests and diseases. The most important of these are CBSD and CMD. A severe form of CMD which causes curling of the leaves and drastically reduces yield started spreading in sub-Saharan Africa in the late 1980s and early 1990s," said Edward Kanju, International Institute of Tropical Agriculture (IITA) cassava breeder.

The 5CP project

In 2012, in a pioneering project to fight cassava viruses in the continent, five African countries came together and shared their five best cassava varieties. The main criteria was how well they were able to resist the two viral diseases, CMD and CBSD, affecting cassava production in eastern and parts of southern and central Africa. These varieties were first cleaned of viruses before they were sent to the countries. Each country received 25 varieties to test for adaptation and performance in their local environments.

Five years later, each of the five countries has identified their top four to five best varieties that will be integrated into their national breeding programs to generate more breeding populations, and further testing on-farm for acceptability and possible release as new, dual-resistant varieties.

Each country received 25 varieties to test for adaptation and performance in their local environments.

The sharing and testing of the 25 best varieties pooled from the five countries – Kenya, Malawi, Mozambique, Tanzania and Zambia – was one of the main activities of the "New Cassava Varieties and Clean Seeds to combat CMD and CBSD project" (5CP).

Funded by the Bill & Melinda Gates foundation, the project aimed at fast tracking efforts to provide farmers with improved high-yielding and dual-resistant cassava varieties, and in turn revive the crop's production and contribute to improving income and food security of the target countries.

The project, which began in June 2012 and came to an end on 31 March 2017, was led by IITA, working in collaboration with the national cassava breeding programmes of the five countries.

Virus-resistant varieties

Each country selected and sent its top five improved varieties and one local check – a local variety that is highly susceptible to the two diseases for comparison – to the Natural Resources Institute (NRI, UK) and to Kenya Plant Health Inspectorate Services (KEPHIS) for virus cleaning. This was to avoid the spread of new strains of viruses to new places in the target countries.



Viral diseases CMD and CBSD cause losses worth more than US\$1bn every year in cassava plantations. (Photo: Gopfaster/Shutterstock)


The clean material was then forwarded to the Genetic Technologies International Ltd. (GTIL), a private tissue culture company in Nairobi, Kenya, where it was multiplied and sent to all the five countries as tissue culture plantlets. Researchers first hardened and acclimatised the plantlets before planting them in research fields in areas with high disease pressure. This was to compare their performances against the local susceptible varieties being grown by the farmers and the identified local checks.

Project success

The project helped each country to identify its choice of four or five varieties to integrate into their breeding program for further testing. These were selected from field trials in at least five or more sites per country in areas with high disease pressure. There were a total of 33 field sites across the five countries.

The project also brought the breeding programs of the five countries to work closely together, sharing their knowledge and skills, and cemented their relationship for future collaboration. It brought breeders and virologists to work together in the development of new varieties with dual resistance to CBSD and CMD.

The project also supported the five countries to carry out degeneration trials of their own five best varieties. This was to understand how they respond to the viruses and identify those that remain healthy for a long time even when infected.

With the project coming to an end, the next step is for each country to integrate the varieties they have selected into their national breeding programs for further testing and breeding. 

For more than 15 years the UN's FAO has worked with farmers in developing regions educating and collaborating with them on methods of Integrated Pest Management (IPM) through the organisation's Integrated Production and Pest Management Programme (IPPM). A new FAO action plan against the red palm weevil will see proven IPM methods in action. Tim Guest reports.

FAO's long-time IPM emphasis in action

The red palm weevil attacks 40 palm species worldwide.
(Photo: wonderisland/Shutterstock)



ACROSS WEST AFRICA over the past 15 or more years, the United Nation's Food and Agriculture Organisation (FAO) has been working with farmers through the participatory, community-based farmer field school (FFS) network to deliver its Integrated Production and Pest Management Programme (IPPM). This has been aimed at creating more productive and resilient agricultural systems in an age of increasing food insecurity across many regions. With growing populations, improved ways of increasing crop productivity, while at the same time safeguarding the environment, are

essential. IPM is one way of dealing with common and non-common pests without the need to use vast amounts of pesticide or any at all, in some cases; the IPPM Programme currently has active projects in several Sahelian West African countries, as well as new projects in East and Southern Africa.

Working through the FFS system, the FAO has provided education and resources on areas such as agro-ecology and adaptive ecosystem management with the main focus of the IPPM Programme being smallholder farmers. One of the programme's crucial aims is to help farmers understand that agricultural practices can either complement and build, or undermine

and destroy, the biological processes and natural ecosystem on which their productivity and agricultural activity depend. A further message is how the goals every farmer has of improved production and profits are, also, not contradictory to the goals of improved human and environmental welfare.

Overall, the IPPM Programme is complementary to existing and what the FAO describes as more conventional extension systems and is resulting in more knowledgeable farmers who can rely on their own improved skills and knowledge on which to base key decisions.

One of the key aims of the IPPM Programme is to increase understanding of IPM and to encourage farmers to willingly reduce their use of toxic pesticides in favour of feasible, low-cost non-toxic or less-toxic methods.

Avoiding toxic chemicals

One of the key aims of the IPPM Programme is to increase understanding of IPM and to encourage farmers to willingly reduce their use of toxic pesticides in favour of feasible, low-cost non-toxic or less-toxic methods. By explaining the science and field-proven

successes of IPM methods, farmers are becoming their own experts in safeguarding their homesteads and local environs from the often well-intentioned ravages and damage that can be caused by the mismanaged use of highly toxic agro-chemicals.

Since the late 1960s, farmers across Africa have been encouraged to treat crops with chemical pesticides, and this, today, continues as the most common pest management tool. Considering that some of the pesticides currently used across Africa are banned in more developed countries and often require protective equipment for use unavailable to African farmers, it is essential that the amazing opportunities and arguments for using IPM alternatives are made clear.

The IPM has involved farmer training, regular inspections, trapping using pest-attracting pheromones, tracking infestations, removing heavily-infested trees, tight quarantine controls, and monitoring progress of the integrated approach.

A recent partnership involved in the FAO programme between the CERES Locustox Laboratory (Senegal) and the US-based Integrated Plant Protection Centre at Oregon State University, has resulted in development and adaptation of major new



The weevil's larvae eat the trees from the inside after the eggs hatch. (Photo: lauro55/shutterstock)

tools that monitor pesticides in the environment and estimate potential negative biodiversity impact and human health. The research has also involved the first comprehensive, high-quality assessment of water in the Niger and Senegal River basins together with associated irrigation systems.

Through the FFS approach training via this collaboration, the programme is encouraging regional farmers (some 180,000 across West Africa are involved in the IPPM Programme as a whole) to reduce their use of chemical pesticides in favour of practical, proven, low-cost, non-toxic/less-toxic IPM methods and alternatives.

It is also refreshing to know that under the whole IPPM training programme by the FAO, farmers are advised on how to avoid commercial pressure from local and visiting

sales persons to use pesticides.

IPM and the red weevil

At the end of March, the (FAO) of the UN announced that a new action plan aimed at stopping the spread of the red palm weevil had been approved. Part of the plan will be the use of proven methods of IPM. Agriculture ministers and other government representatives met in Rome at the end of March and agreed on a new strategy to fight the pest. The plan includes national interventions like improved pest monitoring and a much greater involvement of farmers. International efforts will also swing into action, such as a proposed ban on the import of palms larger than six centimetres wide from infested countries.

As a result of some key and far-reaching studies, it has been determined that the red palm weevil has rapidly expanded its global spread to more than 60 countries; it destroys palm trees by eating them from the inside, and poses a major global threat to date and coconut palms, as well as ornamentals. While only four palm species were affected by red palm weevil when studies were done in 1956, now the pest attacks 40 palm species worldwide. The three most-affected species today are coconut palm, date palm and the tall ornamental Canary Island date palm.

Scientists, pest control experts, farmer representatives and others endorsing the new plan in Rome were all participants in the Scientific Consultation and High-Level Meeting on red palm weevil, which took place in the two days running up to the action plan decision and announcement. Hosted by both the FAO and CIHEAM – the International Centre for Advanced Mediterranean Agronomic Studies – the event shared the latest research and decided upon the best way forward to deal with the global crisis. It scrutinised the



Field training in the oasis of Tidjikja, Tagant Wilaya, Mauritania, on red palm weevil eradication. (Photo: ©FAO/Noureddine Nasr)

factors contributing to the spread of the weevil including the late detection of infested palms due to insufficient inspections, a lack of engagement with date and coconut farmers and the improper assessment of the risks. Other factors cited were that few natural enemies of the pest exist, and that managing mass trappings across large oases networks were proving difficult. Poor or ineffective quarantine procedures, improper disposal of infested trees and difficulty controlling the pest on private lands and in private homes and gardens were also scenarios leading to the spread of the pest.

In a statement, FAO director-general José Graziano da Silva said, "The red palm weevil has become a global threat and demands a global strategy to eradicate it. The message coming from the scientific consultative meeting is a positive one: the red palm weevil can be controlled and defeated."

If proof were needed to support that statement, then it was given in the form of two recent case studies. The first was from the Canary Islands, which were declared free of the red palm weevil in May 2016, after implementing a coordinated strategy



Treatment against red palm weevil in the streets of Tunis. (Photo: ©FAO/Daniel Beaumont)

that included tight monitoring controls and the removal of all infested trees.

The second was from Mauritania, where detection of the pest in an oasis triggered a very swift action by the government, along with the support of FAO, to implement an IPM strategy that had farmers and farmer cooperatives at its core. The IPM has involved farmer training, regular inspections, trapping using pest-attracting

pheromones, tracking infestations, removing heavily-infested trees, tight quarantine controls, and monitoring progress of the integrated approach. As a result, the pest has been successfully contained to the original infestation area, without any outbreaks in the past six months, and with continued control efforts it is likely the area will be declared a "red-palm-weevil-free" zone in due course. ^E



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The FAO Stakeholders Consultation Meeting on the fall armyworm advocated an integrated approach to fight the growing infestation of the pest in Africa.

Multi-pronged approach vital to fight fall armyworm in Africa

ISOLATED IN AFRICA in early 2016, the fall armyworm has caused havoc across the continent attacking more than 100 different plant species, causing major damage to economically important cultivated grass crops such as maize, rice, sorghum and sugarcane as well as other crops including cabbage, beet, peanut, soybean, alfalfa, onion, cotton, pasture grasses, millet, tomato, potato and cotton.

The FAO organised a Stakeholders Consultation Meeting on the fall armyworm in Nairobi to arrive at a solution to fight the armyworm invasion. Scientists at the meeting were of the opinion that tackling the menace of the tenacious fall armyworm pest and avoiding economic hardship for smallholders across Africa requires quick and coordinated action, a massive awareness campaign, scientific innovation and multi-institutional collaboration.

The first step to an effective Integrated Pest Management (IPM) strategy is to survey and monitor pest movements, assess yield loss levels and to compile data using remote sensing equipment and at the field level.

- Gabriel Rugalema, the FAO representative in Kenya

"The truly frightening risk of the fall armyworm to food security in Africa must be recognised and tackled with a holistic integrated pest management programme," said BM Prasanna, Director of the Global Maize Program at the International Maize and Wheat Improvement Center (CIMMYT) and the CGIAR Research Programme on Maize. "We cannot eliminate the pest from Africa – now that it is here, it will stay, but we can provide support to farmers and provide options to manage their crops against the fall armyworm."

According to Dr Roger Day, sanitary and phytosanitary coordinator at the Centre for

The fall armyworm has spread across all countries in southern Africa at an alarmingly rapid pace. (Photo: Mikhail Kochiev/Shutterstock)



Agricultural and Biosciences International (CABI), loss of Africa's maize due to the fall armyworm could cost the continent US\$3bn in the coming year.

The fall armyworm has been reported in all countries in southern Africa except Lesotho and the island states; plus most countries in eastern Africa, including Kenya, Tanzania, Uganda, Rwanda, Ethiopia and Burundi. It has also been reported in several countries in West and Central Africa, including Nigeria, Ghana, Benin, Togo, Democratic Republic of Congo and the island nation of Sao Tome Principe.

It is not yet clear how this pest, native to the Americas, entered the African continent or how it will adapt. In North America, cold winter temperatures halt its proliferation. This could explain why it has not been reported in Lesotho, which experiences colder winters than other mainland countries in Southern Africa. "We just don't know how far this could go," said Joe DeVries, vice president, program development and innovation at the Alliance for a Green Revolution in Africa (AGRA). "Fall armyworm is a very recently-introduced pest in Africa and even the experts are unsure what its long-term impact will be. We agreed on the urgency

of enabling national plant protection groups to work with farmers in controlling the level of damage on their farms. Longer-term, though, only a truly collaborative effort between international and national agencies can provide a solution."

Arriving at a solution through integrated management

One of the solutions explored by various governments is to provide emergency pesticides to smallholder farmers. However, this costly option can deliver only mixed success due to plant resistance to the chemicals used as well as poor application by farmers.

"The first step to an effective Integrated Pest Management (IPM) strategy is to survey and monitor pest movements, assess yield loss levels and to compile data using remote sensing equipment and at the field level," said Gabriel Rugalema, the Food and Agriculture Organisation of the United Nations (FAO) Representative in Kenya.

"Accumulated data can contribute to establishing uniform cross-continent government standards for identifying and fighting the pest", he added.

"We need to act fast, failure is not an option," Rugalema said, adding that

adequate funding and taking a regional approach to controlling the fall armyworm are vital.

Future challenge

Scientists believe that climate change might have had a role to play in the proliferation of the fall armyworm in Africa as the continent has witnessed warmer global temperatures over the past few years. They suspect the pests may have travelled from the Americas in warm ocean jet streams or arrived by some other form of transportation.

Scientists fear the fall armyworm could continue to multiply and become endemic across the continent. Professor Kenneth Wilson at Britain's Lancaster University, who has extensive experience working on the African Armyworm, predicts the pest could potentially spread into the Middle East and eventually to Europe.

The moth has been known to fly distances of up to 1,600 km (1,000 miles) in 30 hours, according to experts.

Building resilience is the key

"Despite the challenges, we are continuing to build resilience, increase agricultural productivity and regional coordination on

agriculture," said Candace Buzzard, deputy mission director at the US Agency for International Development (USAID) in Kenya and East Africa.

"Resilience is the ability of communities, countries and systems to respond to shocks," she said. Hopefully by building more resilience within all these systems, which includes early warning, we can reduce the effects of these shocks and be more prepared for them."

Some ideas suggested by the FAO for building resilience and combatting the fall armyworm are as follows:

- Combination of cultural, biological and bio-pesticide control

- Develop host plant resistance (conventional and transgenic)
- Low-cost chemicals, protective clothing, spraying equipment
- Heat, drought, pest resistant hybrid crops
- Heat, drought, pest resistant genetically modified crops where
- Identification of predatory insects
- Pheromone traps to lure moths to target and destroy eggs and larvae
- Use of bio pesticides for natural distribution by birds or other animals
- Tool allowing farmer to pluck pest larvae out of plants
- Build a strong communications network about the pest. 

Loss caused by fall armyworm to Africa's maize could amount the continent US\$3bn in the coming year. (Photo: Eakwiphan Smitabhindhu/Shutterstock)







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Paul Gudonis, president of Inmarsat Enterprise speaks to *African Farming* about Inmarsat's pioneering work in the African agri-sector and the potential of IoT to transform agriculture.

IoT applications can help make irrigation systems more efficient and sustainable.
(Photo: Fotokostic/Shutterstock)

Transforming agriculture with data

DATA IS GROWING to be a very important aspect of our lives these days. With the introduction of Internet of Things (IoT) and precision agriculture, the role of data in agriculture is also growing more crucial. Right from managing irrigation, monitoring crop health, ensuring safety in farms, the potential of IoT in agriculture is immense.

The agriculture industry, which contends with challenges such as water shortages, asset theft, pollution and limited land availability, stands to be one of the key beneficiaries of IoT, which promises to increase efficiencies in this sector by enabling smarter management of resources.

Inmarsat, the leading provider of global mobile satellite communications services, has been driving innovative IoT solutions in various sectors across Africa.

Speaking to *African Farming* about Inmarsat's work in the agriculture sector, Paul Gudonis, president of Inmarsat Enterprise, said, "Agriculture is an exciting sector for us. The booming world population implies that it is becoming increasingly more important for us to find ways to make food production more efficient. Adopting technology to drive those processes in forms of water management and driving productivity using data in farming is an exceptional part of our business."

Applications of IoT in agriculture

According to Gudonis, one of the biggest applications of IoT in agriculture is in using sensors to make irrigation more efficient and sustainable in plantations and farms. "Using sensors in the ground, different factors like the amount of moisture, the pH

balance of the soil, how well it has been irrigated or how hydrated it is can be monitored. The collected data from across the plantation can then be fed into an analytic platform data to help farmers understand the optimum irrigation and soil pH content patterns to create the best production and efficiency within the plantation. What we can do is provide that data back to the farmer to show where irrigation needs to be altered, where soil is too saturated or too dry and how those parameters can be adjusted."

More complex applications that can automate irrigation and ensure productivity are also being deployed.

"There are other more complex applications like automated harvesting – these autonomous vehicles can actually tell what the weather is like, how long a crop has been in the field, sense information with regards to soil saturation and properties, judge when the best time to harvest is and send out autonomous harvestors. This is a project ongoing in the UK at the moment but we are looking at how we can deploy

The agriculture industry, which contends with challenges such as water shortages, asset theft, pollution and limited land availability, stands to be one of the key beneficiaries of IoT.

them in some of the corporative farms in Africa where it can be deployed as a service."

Livestock is another area where IoT has a lot of application. In livestock, there are solutions that can be used for tracking cattle and also for monitoring the health of cattle. This can be combined with monitoring water sources to ensure that they are getting enough hydration. These systems can help livestock farmers improve their productivity.

Inmarsat has early projects going on in Kigali at the moment. "This is an early case for us but from the level of interest we have seen and the obvious challenges that are present in food production, we believe this is a good way to aid the sustainability of that in a very, very short time."

Deployment in Africa

Speaking about the deployment of IoT solutions, Gudonis pointed out that Africa, Asia-Pacific and Latin America are the three main regions that are showing a lot of interest. "What we found during our discussion in Africa, in particular in Rwanda, is that it is not about us bringing solutions to the farmers. The farmers know what they need and what we are doing is we are helping them develop and enable those solutions. It was quite amazing to spend time in Rwanda and to see how entrepreneurial the people in Rwanda, and especially in Kigali, were. And how they were focussed on using technology to improve their systems and processes."

"We see Africa as a market where we can grow our own business but also partner with local organisations to drive innovative solutions," Gudonis noted.

The LoRaWAN network

In partnership with Actility, Inmarsat has recently launched the LoRaWAN network, which is being described as the world's first global IoT network. It allows customers and



Paul Gudonis, president of Inmarsat Enterprise.

partners to cost-effectively bring to market IoT solutions that can be delivered anywhere in the world, to any type of business, with LoRaWAN-based connectivity on the ground and satellite connectivity as the network backbone. The integrated platform provides an end-to-end solution that transmits site-specific data to applications in the cloud for analysis, delivering insights and supporting decision making, and creating value for the end customer.

LoRaWAN network will contribute to bringing cost effective IoT solutions and improved connectivity across the world.

Inmarsat will deploy LoRaWAN infrastructure around the city of Kigali to support the Rwandan capital's flagship smart city project. The network, which will be active for an initial period of a year from 1 May 2017, will be the connectivity platform for a variety of IoT applications, and will provide a blueprint for smart city projects throughout Africa. The deployment also coincides with the Transform Africa Summit (10-12 May 2017), a forum that will bring together African presidents, other dignitaries and leading technology innovators, to

discuss plans for building a smarter Africa.

To demonstrate the IoT's transformative potential, Inmarsat will, in conjunction with partners such as Actility and Jersey Telecom, deploy a number of proof-of-concepts and technology demonstrations around Kigali. These include: environmental monitoring that will include sensors being deployed in buildings to monitor air quality; a smart bus which will be equipped with satellite internet, providing ubiquitous connectivity for remote communities, and LoRaWAN-enabled providing real-time data acquisition in communities that it services; and a precision farming initiative, intended to increase crop yield and better manage water resources.

"We're not saying that satellite is the answer to everything. What we are saying is that we at Inmarsat can act as the enabler to bring various connectivity solutions to the farmer and provide the most cost effective solutions for that environment. We have our own satellite network and we are partnering with cellular communication providers and by building both together we can build cost effective solution for the market," Paul reiterated.

Future of IoT in farming

Discussing the future of data in farming, Gudonis said, "The more we can embrace the use of data and make smart decisions, the better. I think we'll come to a conclusion very soon that making decisions based on gut instinct or anything other than data provided is an antiquated way of doing things. Where you can actually say that doing X, Y and Z will produce this particular output rather than just guessing, will mean that there will be a lot of less wastage in clean water supplies, it will mean that we are able to use a lot less fertiliser, usher in more sustainability and make farming more profitable for the farmers themselves. Across all walks of life, adoption of data will become of biggest drivers of success." **E**

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We are looking for the dealers !

Vimal Alawadhi, managing director and chairman of Best Agro Group, discusses market potential of the African agrochemical industry in an exclusive interview with *African Farming*.

African agrochemicals industry poised for growth

Can you tell us about Best Agro Group and the markets it caters to?

Best Agro Group is a privately owned diversified agrochemicals company serving global markets with a range of crop protection products, including insecticides, herbicides, pesticides, fungicides and plant nutrients. Its business platforms use innovation and technology to address customers' demanding requirements.

The company has introduced more than 50 agro chemicals in the Indian market and promises to add more product ranges devoted to increasing crop yields and providing farmer-friendly solutions. The group operates four production units involved in technical manufacture and formulation.



Vimal Alawadhi, managing director and chairman of Best Agro Group.

While the pesticide market in Africa is valued at US\$1.7bn, it accounts for only three per cent of the global market.

The group is catering to export markets and successfully operates its brand 'BEST' in the Indian domestic market. Our business has been built on the company's reputation for quality of its products and service.

Can you tell us about your presence in Africa?

In Africa, we are establishing our presence in around five markets including Uganda, Ghana, Egypt, Nigeria and Sudan. We are planning to expand our African territories through required investments and building co-operations with partners and valued customers. Africa is an important focus market for us and we are expecting good growth in some regions like Algeria, Sudan, Kenya and Ethiopia.

Can you tell us about the African agrochemical market and what makes it different from other markets?

The reality of agriculture in Africa is that 70 per cent of the population lives in rural areas with land holding per family in the

range of 0.5–5 acres. Farmers have very little cash in hand and due to low yields, there is not enough produce to help them generate good income. African agrochemicals market is going through a transformation right now. Small farmers are industrious, innovative and willing to learn about agrochemicals. A recent study by Cornell University covering Ethiopia, Malawi, Nigeria, Tanzania and Uganda revealed that 30 per cent of farmers in Ethiopia and Nigeria use agro-chemicals like pesticides and herbicides.

While the pesticide market in Africa is valued at US\$1.7bn, it accounts for only three per cent of the global market. Farmer knowledge is slowly percolating and we expect this market to grow at six to seven per cent with a market potential of more than US\$10bn.


What are your plans for the African market?

Farmer education is critical for Africa and I believe the industry can play an important part in this endeavour. We observe the need for good quality agrochemicals available at farmer friendly prices. We are very interested in tapping the large potential of agrochemical usage in Africa. We have started work with one of the largest farm

holding company in Egypt and are excited to establish a firm footing in Africa.

I see Best Agro Group as playing a vital role in developing solutions for farmers. We are planning a strategic expansion for reach of our products in different territories of the continent.

How do you see the market reacting to the many mega mergers at the international level, such as between Bayer and Monsanto or ChemChina and Syngenta?

Whenever an African farmer uses agrochemicals, the chances are that these are from Syngenta. Whenever an Indian farmer plants a cotton crop, there is a 75 per cent chance that he is buying a seed from Monsanto. The three large mergers would control about 60 per cent of the global patented seed market and 64 per cent of the agrochemical market. While analysts and regulators are worried about the creation of larger monopolies, I see this as a transformation for the betterment of the farmer. I am optimistic that the mergers will help the companies remove their duplications, reduce costs and drive synergy. I am hopeful that we will see better molecules at affordable prices. 

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With the power trend for tractors showing a firmly upwards trend in the mechanised farming industry, Mike Williams reports on the latest developments in the tractor industry, with a special focus on the African market.

Hungry for more power



A 116 hp John Deere 6110J tractor with a 1750 planter. (Photo: John Deere)

THE POWER TREND for tractors in almost all countries with a mechanised farming industry is firmly upwards, as farmers look for increased output to cover more acres and combat rising labour costs.

It is a trend that is expected to continue in some African countries for at least the next two decades, said Jurgen Schlebusch of John Deere, sub-Saharan Africa. The power trend on larger commercial farms is linked to a demand for wider implements and planters to optimise productivity and achieve economies of scale, while other pressures include rising costs, he said.

The power trend on larger commercial farms is linked to a demand for wider implements and planters to optimise productivity and achieve economies of scale.

The versatility of power ranges

Currently the most popular power range is 75 to 100 hp, but the upward trend is taking this towards the 100 to 130 hp sector. For the larger commercial farms the demand is already in the 145 hp plus range, including some tractors of 500 hp or more. Most of the new tractors in this sector are now equipped with a cab, and precision farming technology is already increasingly popular for driving productivity and efficiency to higher levels, explained Schlebusch.

New arrivals announced by John Deere for 2017 availability include the latest 5R series models with engine outputs from 90 to 125 hp. The power units are 4.5-litre John Deere PWX engines equipped with the Transport Power Management system or TPM to produce a 10 hp boost for transport work. Three transmission options are available, starting with the entry-level 16+16 manual gear drive with four powershift gears, and the design includes a new cab and a front axle suspension

option. Further up the power range is the new 8R series which includes a range-topping model producing up to 450 hp maximum output from a nine-litre engine.

Expanding potential

The Kubota company's recent expansion has been one of the farm equipment industry's major developments. Tractor production started more than 50 years ago when Kubota was the leading manufacturer of compact models up to about 30 hp, but recently there has been a major investment in new models covering the big selling small to medium power ranges. The investment has also included taking over some of the big names in the farm machinery industry to strengthen the Kubota equipment range, with Kverneland, Vicon and other leading brands now under Kubota ownership.

Recent additions to Kubota's tractor range include the five MGX III series models with power outputs from 104 to 143 hp. Specifications include an eight-speed powershift transmission, the lift capacity on

the rear linkage starts at 5,000 kg for the lower horsepower models and increases to 6,100 kg on the top three tractors, and the options include front axle suspension. Engine outputs for Kubota's M7001 Premium series are from 130 to 170 hp or from 150 to 175 hp including the power boost. All models have 9,000 kg lift capacity with electronic draft control, transmission choices include Kubota's single range CVT, all models have front axle suspension plus mechanical cab suspension, and a pneumatic cab suspension is also available.

Catering to both ends of the sector

The Case IH tractor range covering the lower horsepower sector has recently been extended by adding the Luxxum series with 99, 107 and 117 hp engines featuring electronic fuel management and a four stage powershift transmission with 32 forwards and reverse speeds. The Luxxum is a step up in power and specification from the entry-level JXT tractors, a popular five-model range providing simple, cost-effective power for smaller farms and as an additional power unit on larger acreages. The three-cylinder engines produce outputs from 35 to 75 hp, the manual gearbox provides eight forward speeds and two in reverse and the lift capacities on the rear linkage range from 1,500 to 1,920 kg.

For customers with a high horsepower requirement, Case IH offers wheel and rubber track choices. Steiger based tractors with articulated steering are available with four equal sized wheels and 405, 462 and 517 hp outputs, and the 517 hp model is also available in a Quadtrac version with front and rear rubber tracks. A more recent development is the Rowtrac arrangement of front wheels and rear tracks available on special versions of Magnum series tractors with outputs from 347 to 417 hp or from 382 to 435 hp with power boost.



Case IH demonstrated this experimental driverless tractor last year. (Photo: Case IH)

The options list for Kubota MGX III series tractors includes a front linkage and p-t-o. (Photo: Kubota)



Currently the most popular power range is 75 to 100 hp, but the upward trend is taking this towards the 100 to 130 hp sector.

Targeting fruit growers and vineyards

Special models designed for fruit growers and vineyards are an important sector of the tractor market in some African countries, and the Nexos range from Claas offers five models with outputs from 75 to 112 hp and in three different versions. The narrowest overall width is 1.0 m for the

smallest VE model, increasing to 1.26 m for the VL series and the Nexos F version used in orchards and as a general purpose tractor is from 1.45 m wide. The four-cylinder engines are from the FPT range with 3.4-litres capacity, and the five transmission options include a 12x12 shuttle with a mechanical reverser while the 24X24-speed transmission is available with clutchless reverse engagement. Cab models can be equipped with carbon filtration for extra protection during chemical application work, lift capacity on the rear linkage is 3,100 kg and a front linkage plus p-t-o is available.

Deutz-Fahr's 6-series

There are 12 models in the 6-series recently added to the Italian owned Deutz-Fahr tractor range, providing power outputs from 156 to 226 hp from a 6.1 litre Deutz engine. The three transmission choices include a five-speed manually operated powershift, the RCSHIFT option is a new fully automatic transmission with 30+15 or 54+27 speeds, and the TTV drive system provides continuously variable speed control between 0.2 and 50 kph. Special features on the 6-series tractors include the "intelligent" front axle suspension, a unique design offering maximum stability in a range of situations, and some 6-series models are said to be the only standard tractors offering high performance disc braking on the front axle.

The smallest Nexos VE series tractor from Claas is 1.0 m wide. (Photo: Claas)



New Holland's latest offerings

Recent tractor developments from New Holland include last year's launch of the T4 series models to replace the previous T4000 range. The new arrivals cover the power range from 56 to 114 hp and offer a varied choice of transmissions and specification options. Lift capacities on smaller models are 2,760 kg, increasing to 3,884 kg further up the range, electronic draft control is an option on some models and the options include a front linkage and 1,000 rpm p-t-o.

New Holland has also updated the T5 range, which covers the 82 to 120 hp sector. New features include the addition of the Electro Command semi-powershift transmission, replacing the previous powershuttle unit, and the rear linkage options on the Electro Command models include a 5,420kg lift capacity with electronic draft control.

Massey Ferguson's Global series

Much of the recent tractor news from Massey Ferguson has been the introduction of the new Global series models designed for ease of use and cost-effective operation to meet a worldwide demand for general-purpose workhorse tractors. The new tractors are built in Brazil and Turkey plus a new factory in China owned by AGCO, the parent company of MF. The first of the Global series models arrived in 2015 with the launch of the MF4700 range powered by three-cylinder engines with 75, 85 and 95 hp outputs. They are available with two or four-wheel drive and either a cab or a platform, and transmission options include a basic 12-speed Synchro Shuttle gearbox which is also offered on the other Global series models.

The next Global series instalment arrived last year when Massey Ferguson announced two MF5700 series tractors



A small number of Carre driverless tractors are doing weed control and crop scanning work on French farms this year. (Photo: Carre)

producing 100 and 110 hp from four-cylinder AGCO Power engines. Basically similar engines are used in the two MF6700 models announced last year to complete the Global series introduction. They deliver 120 and 130hp and the 6,700 models share the MF5700 tractors' 5,200 kg lift capacity on the rear linkage, which has electronic control.

Carre, based in France, has developed a robot tractor for working in vegetables and other row crops.

The drive towards driverless tractors

Nobody is quite sure how tractors will develop in the future, but one prediction is that some field work will be taken over by driverless tractors or robots. The robot tractor idea has been around since the early 1960s when engineers in England designed a tractor that followed signals from a network of wires buried beneath the ground

surface. A production version of the wire guidance system attracted some interest for grass mowing in large orchards, but there were too many limitations and the project was abandoned.

Since then the driverless tractor idea has never been far from the headlines, particularly during the last 20 years or so with new technology available for improved guidance systems. Most leading tractor manufacturers have built robot tractors and other farm vehicles using GPS plus camera based guidance systems, but so far these have been available only for research and demonstration, like the robot tractors shown by CNH Industrial last year in Case IH and New Holland colours.

An early stage in the long delayed commercial use of robot tractors could be close. Carre, based in France, has developed a robot tractor for working in vegetables and other rowcrops. Called the Anatis, it works with a hoe to control weeds between the rows, and also within the rows of suitably spaced crop plants. It can also carry sensors to detect some pest and disease problems in the crop, and it can take soil moisture measurements to check if irrigation is needed, with data from the sensors transferred to the farm office for assessment.

A small number of Anatis robots will be delivered to customers in France this year, with increased production planned for 2018. The tractor unit is powered by an electric motor supplied from a cable, which limits its use to small scale crop production, but future versions for larger fields could be battery powered. Another option, already used on lightweight electric powered rowcrop tractors made by the De Jongh company in Holland, includes a self-contained electricity supply from a generator powered by a small petrol engine. **E**



Massey Ferguson's recently introduced MF5700 series Global tractors have 100 and 110hp engine output. (Photo: Massey Ferguson)

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iWayAfrica's new Ku-Band satellite service, Jola, is bringing connectivity to farmers in sub-Saharan Africa and helping them access agri-tech developments.

Connectivity vital for adoption of agri-tech developments

(Photo: Wolf Avni/Shutterstock)

A KEY TECHNOLOGY that is becoming more commonplace in 2017 is the Internet of Things (IoT) whereby our working and personal lives are shifting to being always online and reliant on an internet connection for daily operations generating big data. The agricultural sector is no different. Whether it is for email and VoIP communications, or access to YouTube for training and instruction manuals, or online streaming entertainment for the farmstead, VSAT connectivity is becoming more critical for farm life and management, especially as the industry moves to collating real-time data from farming equipment.

Enviroflor is a Dutch-Zambian investment venture that grows vegetables for the local market and also exports to the Netherlands. The company is a good example of how VSAT connectivity can be used to improve farming operations. Enviroflor utilises VSAT connectivity with iWayAfrica for internet access at its locations for operations that include for collating data feedback from its tractors that are equipped with WiFi to provide real-time updates on yield and other key metrics for farming efficiencies and crop productivity.

Telemetry, the recording and transmitting of machine readings, is helping to drive farming's future with big names in the industry looking to come on-board with their own services.

Jola Ku-Band satellite

iWayAfrica, a wholly owned division of Gondwana International Networks, has recently launched Jola, pan-African Ku-Band managed retail satellite service into sub-Saharan Africa. Jola, is the most affordable VSAT connectivity with the widest coverage in Zambia. "With one of the largest VSAT customer bases in Zambia, we understand our customer requirements for service delivery and

value. Reliable internet uptime and consistent speeds are key for these real-time applications," said Ulrich Lassen, general manager at iWayAfrica Zambia.

The scope of agri-tech services

Telemetry, the recording and transmitting of machine readings, is helping to drive farming's future with big names in the industry looking to come on-board with their own services. John Deere's new tractors, such as the 6250R, comes as standard with JDLink telematics, including remote display access (RDA) and wireless data transfer (WDT) linked to the MyJohnDeere.com website portal. In fact, the 180-year old machine manufacturer is considered an industry pioneer in precision agriculture with its investments in GPS navigation, telemetry, Big Data and IoT to optimise farm machine efficiencies.

Beyond machinery, livestock is the next telemetry subject. The UK government is undertaking a research study on remote gyroscopes with dairy cows to monitor behavioural patterns and using WiFi telemetry to send data back to the farm.

Even in the exciting software world of app development, agricultural applications are being noticed with Cape Town start-up, Agri Apps, being short-listed in a global competition for its app that integrates with services companies to provide a cost-effective solution to the farmer. The initial area of deployment is in soil disease modelling.

This year's season has seen armyworm outbreaks in Southern Africa which is expected to cause a corn shortage and subsequent inflation hikes in Zambia, thus improved yield management and better cost controls are required now more than ever before to ensure the long-term sustainability of the sector.

Adoption of agri-tech services can play a major role in singling out new market leaders. According to Ulrich Lassen, head of business at iWayAfrica Zambia, getting connected is the first step. He points out that Jola aims to bring connectivity to farmers in the remotest rural sites. **E**

New Holland Agriculture launches new combine harvester

NEW HOLLAND AGRICULTURE has unveiled its brand new TC5.30 five strawwalker combine, further extending its wide combine harvester offering. The new TC5.30 has been designed to deliver impressive performance in a variety of crops and conditions and to meet specific needs of customers across Africa, Asia, Latin America and the Middle East. It offers arable farmers and contractors in these markets the ideal combination of the lowest cost of ownership and the highest productivity in its segment.

"New Holland has long heritage in the conventional combine segment. The launch of the TC5.30 expands our already wide offering and responds to the needs of an ever changing world where agricultural mechanisation continues to gain momentum," stated Lars Skjoldager Sørensen, New Holland Agriculture head of harvesting product management. "We have drawn on our extensive knowledge and combined with the latest manufacturing techniques to develop a new combine that ensures maximum flexibility, productivity and reliability in even the most challenging conditions."



The TC5.30 is powered by a 130 hp, 5.9-litre, 6-cylinder turbocharged Tier-3 engine with very low fuel consumption. (Photo: New Holland)

The new five strawwalker TC5.30 is designed to offer the highest productivity in its segment, thanks to the best-in-class 1300 mm wide and 607 mm diameter threshing drum. The optional three drum technology with Rotary Separator and Multi-Thresh concave increases the separation capacity, even in difficult crops with long and green straw, assuring optimal performance throughout the day. On the other hand, the

standard double cascade cleaning shoe, with its 4.3 sq m cleaning area under wind control, ensures extraordinary cleaning capacity and excellent grain samples in all crops.

The large 3000-litre graintank extends in-field autonomy. According to the company, when combined with the 15-foot high-capacity grain header, the TC5.30 will maintain a high daily output delivering first-class harvesting performance.

Case IH expands digital information offering with new app

THE NEW APP provides comprehensive product information in a convenient, user-friendly way for users of iPads, tablets and smartphones and is compatible with Apple, Android and Windows devices. It can be downloaded free-of-charge in English and French under the search term 'Case IH Africa/Middle East.'

With the app, the company aims to give users easy access to technical specifications, product features and benefits for the entire range of Case IH equipment, including tractor and harvesting models, hay and forage tools, advanced farming systems, seeding, tillage and sprayers. The app also allows users to view product brochures, images and videos.



Screenshot from the app.
(Image source: Case IH)

The Case IH Africa/Middle East app opens with a 3D wheel that enables the user to select an individual model. More detailed information is accessed via a series of images and "hot spots" – information trigger points with descriptions and close-up pictures. A useful comparison function allows users to evaluate key data from two different Case IH models side-by-side.

In addition to being helpful to customers, the new Case IH Africa/Middle East app will support the brand's distribution network. The app enables the Africa and Middle East network to reach all relevant e-documents with just one click.



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AGCO reaffirms commitment to Challenger farm machinery brand in Africa

AGCO, THE GLOBAL agricultural equipment company, has announced plans to further develop its Challenger farm machinery business in Africa as part of the company's global strategy for this leading brand.

Challenger's product offering includes high-performance tracked tractors and sprayers built by AGCO in North America for the African market. AGCO's Challenger manufacturing plant in Jackson, Minnesota has been the subject of multi-million dollar investments over the last five years including a 6,967 sq m expansion to the tractor assembly line and the opening of a new visitors' centre. In 2013, a US\$42mn upgrade and expansion was announced for engineering and manufacturing facilities to improve quality and

increase production capacity. This upgrade included new component manufacturing facilities, new robotic welders, end-of-line quality testing, and new engineering and collaboration capabilities using virtual reality modeling in 3-D.

Challenger is a core brand for AGCO in Africa. The company has plans to expand its product portfolio and utilise its established brand equity and dealer network strength to propel further growth in the Africa region.

In Europe and Middle East (EME), where Challenger product has more of a niche market position, AGCO has proposed to integrate Challenger into the organisation of its Fendt operation from January 2018.

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