

# African Farming

and Food Processing

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## Livestock diseases

Latest research

## Microbial products

Improving plant health and yields

## Fertiliser focus

Digital transformation



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## Farming Calendar 2019

### OCTOBER

01-03	Africa Fertiliser Agribusiness Conference <a href="http://events.crugroup.com/estafrica/home">events.crugroup.com/estafrica/home</a>	CAPE TOWN
02-03	Poultry Africa 2019 <a href="http://www.poultryafrica2019.com">www.poultryafrica2019.com</a>	KIGALI
17-19	Tanzania Foodagro Africa 2019 <a href="http://www.expogr.com/tanzania/foodexpo">www.expogr.com/tanzania/foodexpo</a>	DAR ES SALAM
17-19	Ethio Poultry Expo (Ethiopex) <a href="http://ethiopoultryexpo.com">ethiopoultryexpo.com</a>	ADDIS ABABA
17-19	African Livestock Exhibition and Congress <a href="http://africanlivestock.net">africanlivestock.net</a>	ADDIS ABABA

### NOVEMBER

03-06	IAOM MEA Conference & Expo <a href="http://www.iaom-mea.com/IAOM-DUBAI-2019">www.iaom-mea.com/IAOM-DUBAI-2019</a>	DUBAI
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### DECEMBER

02-03	African Farming's 2nd edition Agriinvestment Summit <a href="http://www.agriinvestmentsummit.com">www.agriinvestmentsummit.com</a>	LONDON
06-08	4th Morocco Food Expo 2019 <a href="http://www.moroccofoodexpo.com">www.moroccofoodexpo.com</a>	CASABLANCA
06-08	SIEMA Expo 2019 <a href="http://www.siemamaroc.com">www.siemamaroc.com</a>	CASABLANCA

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

## USA and Ghana sign declaration of partnership on food security

THE US AND the Republic of Ghana have signed a declaration of partnership at the African Green Revolution Forum hosted in Accra, to launch a five-year 'Feed the Future Country Plan' for Ghana that is set to increase investments in agriculture, build greater resilience and improve household nutrition.

Feed the Future is the US Government's global hunger and food security initiative, bringing together investments from 11 US Government agencies to help accelerate Ghana's journey to self-reliance through agriculture, trade and policy reforms. Through the Declaration, the two nations aligned their priorities for investments in food security, trade, and nutrition in Ghana, in the northern, north-east, upper-east, upper-west regions and in coastal fishing zones.

The new country plan provides a blueprint to accelerate agriculture-led growth. It also strengthens resilience to better cope with drought and other disasters and supports a well-nourished population, especially women and children. The plan identifies opportunities to leverage private sector investment, expand research in agricultural technology, thus increasing economic growth.

"The declaration of partnership aligns with the USAID philosophy of assisting partner countries on their respective journeys to self-reliance. In partnership, we commit to engaging the private sector, research and scientific community, and civil society to strengthen the enabling environment to accelerate broad-based, sustainable and inclusive economic growth for a wealthier Ghana," said the US ambassador Stephanie S Sullivan.

The initial phase of Feed the Future began operating in Ghana in 2010 and has reduced poverty and stunting in northern Ghana. The 2015 Zone of Influence population-based survey revealed a 12 per cent decrease in poverty from 2012 to 2015 and a 17 per cent decrease in stunting. Feed the Future activities spurred private sector investment for maize, rice and soybeans and grew domestic markets by connecting smallholder farmers to markets.

## AgriBriefing launches industry wide survey on women in food and agriculture

AGRIBRIEFING'S WOMEN IN Food and Agriculture campaign, which promotes the role of women across the agribusiness supply chain, has launched the first industry-wide diversity and inclusion survey, supported by Alltech.

Agribusinesses are under increasing pressure from consumers, politicians and their business partners to ensure they are embracing the technology that will revolutionise the sector and build a workforce that has the skills and innovative mindset to utilise it.

Studies have shown that inclusive workplaces with real diversity across their workforce directly correlate with improved business performance.

The global survey, launched on 10 September, will explore the issue of gender diversity and inclusion in the food and agricultural industry.

AgriBriefing's group events director Elisabeth Mork-Eidem commented, "The aim of this groundbreaking survey is to explore the current gender diversity and inclusion sentiment across the entire agricultural supply chain. By accessing personal views and experiences, we can identify potential solutions to help companies act on gender diversity, gain stronger business outcomes and drive the industry forward."

Alltech's president and CEO Mark Lyons said, "The food and agriculture sectors include many talented female leaders and we need to make sure young people see themselves represented and can envision a future career in the industry."

"Through this industry-wide survey, we hope to gain a better understanding of the sectors currently supported by women in ag and identify opportunities for growth," Lyons added.

The event is set to promote the role of women across the agribusiness value chain.



Image Credit: Darren Baker/Adobe Stock

The results will be presented at the Women in Food and Agriculture Summit in Amsterdam from 3-4 December.

With more than 50 senior executives speaking from global agribusinesses, food and retail companies including Alltech, ADM, Bunge, Cargill, Bayer, Nestle, Microsoft, Diageo, Grieg Seafood, Sodexo and many more, the summit will present cutting-edge techniques, industry insights and practical strategies used by top international leaders to empower their workforce, innovate their businesses and promote agriculture as an employer of choice to the next generation.

The survey closes on 14 October 2019.

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## 'African countries can benefit from Japan's healthy foods and diets culture'

AFRICAN COUNTRIES HAVE the opportunity to tap into Japan's knowledge of smart technologies, agricultural machinery and marketing, according to FAO director-general Qu Dongyu.

Qu made the remarks at a NEPAD-JICA event focused on improving nutrition across Africa through the Initiative for Food and Nutrition Security in Africa (IFNA).

According to Qu, Africa can gain knowledge from the East Asian nation's high food safety and nutrition standards and culture of healthy foods and diets. He made a strong case for the need to step up hunger-fighting actions in Africa.

## AUDA-NEPAD and OCP Group to boost Africa's agriculture

THE AFRICAN UNION Commission, together with the African Union's Development Agency, AUDA-NEPAD, and OCP Group have strengthened their partnership to support the development of the African agricultural sector through the signature of a comprehensive MoU agreement.

The African Union, AUDA-NEPAD partnership with OCP Group, a major African private sector player with extensive global reach, demonstrates a shared commitment to deepen collaboration with all actors, including the African private sector, to jointly reduce hunger and poverty through the sustainable transformation of the agricultural sector on the continent.

## Angola set to boost economic diversification and agri investment

ANGOLA'S MINISTRY OF Trade, the Ministry of Economy and Planning and UNCTAD discussed reforms to boost FDI for economic diversification during the presentation of the investment policy review (IPR).

A more diversified FDI portfolio and the targeting of the FDI projects better aligned with Angola's needs could go a long way in supporting the achievement of the national development objectives.

The government has put in place an ambitious programme to reform the business and investment environment. The IPR identified remaining gaps and bottlenecks including the complex system for FDI entry and establishment, burdensome operational regulations, the persistence of restrictive business practices and a lack of institutional capacity and coordination. These gaps and bottlenecks affect the country's ability to fully take advantage of its strategic location, abundant natural resources and preferential access to external markets.

The IPR devoted special attention to investment in agribusiness and its contribution to sustainable development. It calls for concrete measures to foster responsible investment and promote inclusive agriculture modes of production. The recommendations emphasise the need to strike a policy balance between food security and export development



The country is promoting an inclusive agricultural mode of production.

Image Credit: Adobe Stock

objectives, improve access to land and infrastructure, and promote entrepreneurship and skills development.

In his opening speech, Manuel Neto da Costa, minister of economy and planning, said, "FDI used to be neglected and this created a negative cycle for the economy. Many of the problems we face are addressed by the IPR."

The IPR was undertaken by UNCTAD as part of Train for Trade II - a four-year project financed by the European Union. The project aims to help the country strengthen and diversify its economy prior to its graduation from least developed country status in 2021.

In parallel to the national workshop to discuss the IPR, and as a first step for the implementation of its recommendations, UNCTAD conducted a two-day training session. The goal was to build the capacity of government officials on investment promotion and facilitation as well as on policies for responsible investment in agriculture.

UNCTAD has supported more than 50 developing countries and economies in transition by conducting investment policy reviews over 20 years. It has provided technical support to implement the IPR's recommendations.

## UAE and FAO to support rural women in Liberia

AS PART OF the UAE's ongoing humanitarian works across the world, the UAE has initiated a project in Liberia to help rural women achieve sustainable income, food security and nutrition opportunities.

For this purpose, the Ministry of Foreign Affairs and International Cooperation (MoFAIC), the Food and Agriculture Organisation of the United Nations (FAO) and the Abu Dhabi Future Energy Company (Masdar) have signed a US\$4mn cooperation agreement that aims to support 1,500 rural women in three Liberian districts.

The project is set to provide women with improved and sustainable resources for the production of poultry and vegetables. It will provide a variety of seeds for agriculture, build integrated gardens and orchards, water wells and aquifers as part of a network of solar-

powered irrigation systems.

In addition, agricultural tools and advanced machines that suit local conditions will be introduced.

The FAO will contribute to the project by supporting the intensive production of vegetables and poultry, using modern technologies and developing modern marketing plans. The project will help women strengthen their leadership skills and entrepreneurship. Flexible funding will enable the women working in poultry and vegetable production to cope with possible financial crises in their lives.

Masdar will set up a solar-powered power supply system for modern production of vegetables, poultry and rice.

## IOM and private agribusiness to promote youth employment in Sierra Leone

THE INTERNATIONAL ORGANISATION for Migration (IOM) and Sierra Tropical Limited (STL) have signed an MoU during the Seventh Tokyo International Conference on African Development.

The agreement stresses the need for Sierra Leonean youth to acquire the skills needed for the local labour market through technical vocational education and training (TVET), especially in agriculture and machine maintenance. TVET training materials will be developed by both parties.

Sierra Leone has one of the highest youth unemployment rates in Africa, indeed in the entire world. Nearly two in three youth in the country are unemployed or underemployed. This reality pushes thousands each year to seek work abroad, often through irregular routes.

"When opportunity, especially to go abroad, is presented, most young people seize it because they presume, they do not have better alternatives at home," explained Sanusi Savage, head of the IOM Office in Sierra Leone.

"Job creation for youth and capacity building is crucial for African countries and this collaboration is fully in line with the objective of TICAD," added Abdel Moneim Mostafa Hassan, IOM senior regional advisor for the Middle East and North Africa.

In April this year, IOM launched the project Reducing the Risk of Irregular Migration through Promotion of Youth Employment and Entrepreneurship in Sierra Leone. The new project, which is funded by the Government of Japan, will contribute to youth and women's empowerment through vocational and entrepreneurship skills training with private companies, mainly, Sierra Tropical Limited.

## Lagos to train 15,000 youth in agriculture value chain

LAGOS STATE GOVERNMENT has decided to train and empower around 15,000 youth and the unemployed in the next four years in agricultural value chains.

The Lagos state commissioner for agriculture, Prince Gbolahan Lawal said that the training time period would be reduced to six months from one year, highlighting that the goal is to increase the human capacity of the youth involved, thus adding to food security in the state.

As reported in The Eagle Online, Lawal explained that the state's vision for the next four years includes food security and improved nutrition by using local production, sustenance and resilience agricultural practices, the creation of dignified jobs in the agricultural sector using technology as an enabling tool as well as economic diversification.

He said, "This training programme will no doubt improve agricultural production, train new sets of farmers that will drive the development of agriculture, create employment opportunities for new generation of youth, contribute to the food security of the state, improve the standard of living of youth through self-sufficiency in agro-based enterprises and increase economic activities of the surrounding communities."



The training programme aims to improve agricultural production and create employment opportunities.

Image Credit: meaduraz/Flickr

## Ecobiol® Stabilizing the gut flora – with probiotics



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## AfDB signs agreements to foster fertiliser market in Nigeria and Tanzania

THE AFRICAN DEVELOPMENT Bank (AfDB) and the African Fertilizer and Agribusiness Partnership (AFAP) have signed two grant agreements to implement trade credit guarantees worth US\$5.4mn to support fertiliser value chains in Nigeria and Tanzania, benefitting smallholder farmers.

The organisations held a signing ceremony at the African Green Revolution Forum in Accra, Ghana on 5 September.

Dr Jennifer Blanke, vice-president for agriculture, human and social development at AfDB, said that the agreements would provide the inputs needed for Africa to have "the productivity that we hope for."

## Farm-to-market road rehabilitation activity in Liberia

THE US AGENCY for International Development (USAID) is set to launch farm-to-market road rehabilitation activity (F2MRR) in Liberia, which will be implementing the rehabilitation of Feed the Future (FtF) farm-to-market roads to support goals of poverty alleviation and hunger reduction.

Under the F2MRR activity, USAID works to provide sustainable cost-effective feeder roads network in Liberia. The activity mainly focuses on Bong and Grand Bassa counties.

Rehabilitated feeder roads reduce travel time and transportation costs for surrounding communities and farmers. In addition, road rehabilitation work brings direct employment opportunities for residents of rural communities.

## Research uncovers gene that improves drought resistance in cereals

AS CLIMATE CHANGE is having a devastating impact on cereal crops, scientists at Heriot-Watt University have identified a gene responsible for drought resistance in barley which is thought to help future-proof the cereals industry.

Publishing the results of nearly five years of work in the *Journal of Plant Physiology and Biochemistry*, the team demonstrated that gene HvMYB1 controls stress tolerance in cereals such as barley. This is the first time HvMYB1 has been associated with drought resistance.

Dr Peter Morris from the Institute of Earth and Life Sciences at Heriot-Watt University said, "This is a significant finding that will allow more drought resistance crops to be bred in the future. Drought is already impacting yields with the European cereals harvest hit particularly hard in 2018. A prolonged, dry and hot summer significantly impacted yields and quality."

"As climate change gathers pace and we experience more extreme seasons, it is essential we can maintain continuity of supply. This is significant for major industries like Scotch whisky, one of the UK's leading export items. Our project focused specifically on barley, one of the three ingredients used in the production of Scotch whisky."

"Barley has over 39,000 genes, almost



Image Credit: Adobe Stock

The research will help focus attention on different barley varieties in which this gene is naturally expressed more prominently.

double the number for humans, so characterising one particular gene which promotes drought resistance has been a considerable challenge. By increasing the expression of this particular gene in test plants and simulating drought conditions, we've been able to prove that plants in which HvMYB1 is more prominently expressed are able to survive prolonged periods of drought."

"Genetic variation is essential in plant breeding for resilience so we expect this research will now be used by plant breeders as a marker for drought resistance. It will help focus attention on different barley varieties in which this gene is naturally expressed more prominently. This may lead to greater

variation in the gene pool of crop plants and more drought-resistant crops in future years."

Dr Morris added, "This has important implications for the wider cereals industry including the production of wheat, maize and rice."

Dagmar Droogsma, director of industry at the Scotch Whisky Association, commented, "The SWA works closely with specialists at Heriot-Watt University, and others in the sector, to ensure that the industry is equipped to adapt to any changes that may arise from a changing climate. We, therefore, welcome this research which helps to provide resilience against the effects of climate change and to sustain the diversity of barley varieties used for Scotch whisky."

## Bühler receives the Queen's Award for Enterprise

BÜHLER HAS RECEIVED the UK's most prestigious innovation award – the Queen's Award for Enterprise – for its optical sorting technology.

The award was handed over by John Barber, representative Deputy Lieutenant for London Borough of Newham. Johannes Wick, Bühler Group's CEO for grains and food, said, "This breakthrough technology will make the difference for us in the market for years to come. What are now in reach are applications to grade raw materials for composition and to remove invisible contaminations. This will be a major contribution to provide healthy and safe nutrition around the world."

The Queen's Award could be described as the UK's "Innovation Oscar," which this year acknowledges the leading technology position of Bühler. It is the highest award for British businesses which have

excelled in the fields of international trade, sustainable development or innovation. This year's win is in recognition of Bühler's development of a unique camera technology used in sorting machines, capable of recognizing the subtlest of colour and shading contrasts in materials and foods, thereby significantly increasing detection rates for foreign materials, potential choke hazards, or contaminated foods.

Bühler's PolarVision uses the industry-leading camera technology for the frozen vegetable market. Its technology can detect even the most challenging foreign material in frozen vegetable production lines. Ardo, one of the world's largest producers of fresh-frozen fruit, vegetables and herbs, has introduced PolarVision in its European sorting plants.



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Ahmed Khater, technical manager for gut health solutions in the Middle East and Africa, Evonik, talks about innovative feed additives that provide better animal health.

# The bridge from nutrition to gut health

**E**FFICIENT POULTRY PRODUCTION is a balancing act of nutrition, gut health, and animal welfare, especially when reducing or eliminating antibiotic utilisation. Food safety and quality are increasingly important to consumers.

Evonik Animal Nutrition expanded its portfolio beyond the production of essential amino acids to provide innovative solutions for antibiotic-free livestock management. For Evonik, probiotics play an important part in an integrated response to reduce the use of antibiotics and antibiotic growth promoters.

### The industry challenge

Typical causes of intestinal microbial imbalance include the high variability in the quality of raw feed materials, leading to an increase in undigested nutrients in the intestinal lumen.

This, in turn, can trigger an overgrowth of *Clostridium perfringens* in the gut (Dysbiosis), causing inflammation and oxidative stress. The resulting environment enables the growth of other





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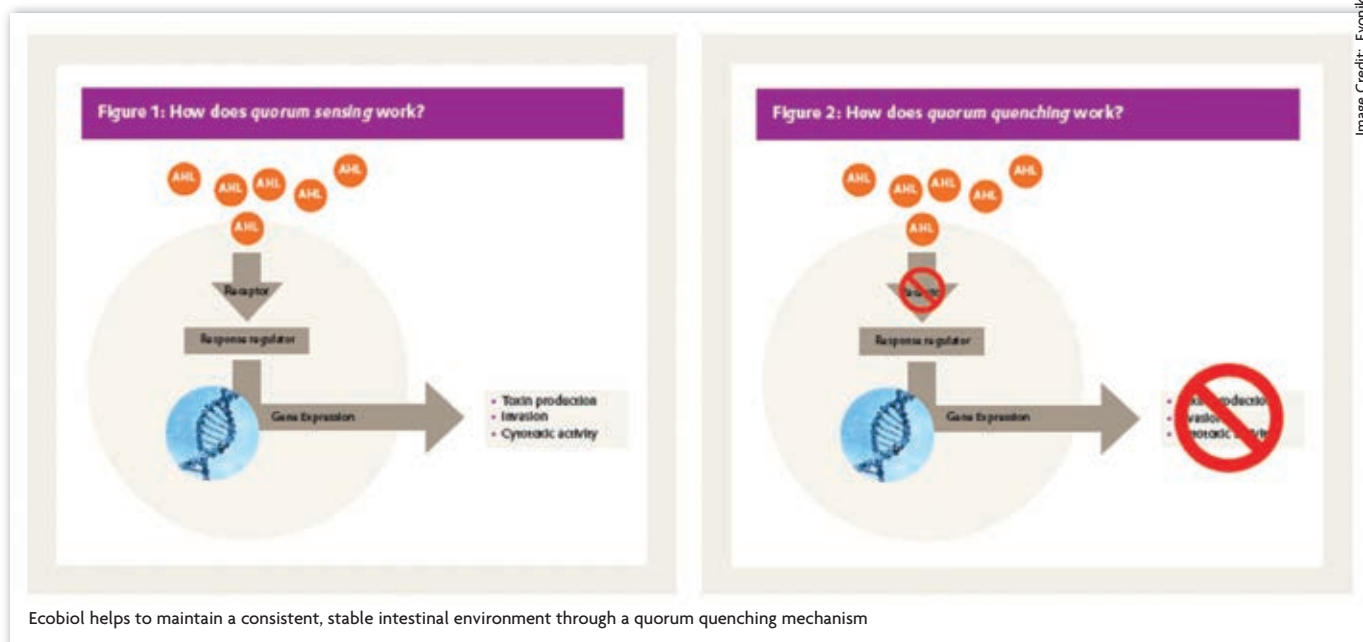
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opportunistic bacteria such as pathogenic *Escherichia coli*. This imbalance in the microbial population disrupts the intestinal barrier and diarrhoea, both responsible for economic losses due to reduced growth rates and increased medication costs.

In addition, the control of *Salmonella* in poultry continues to be a public health concern. Finally, the development of multiple bacterial resistance to different antibiotics increases the need for alternative measures to control *Clostridium perfringens* and *Salmonella* spp.

#### Evonik solution

Ecobiol consists of the spores of a natural fast-growing *Bacillus amyloliquefaciens* CECT 5940 strain, with an inherent capacity to produce secondary metabolites and lactic acid, which can influence interactions between different bacterial populations. By promoting the symbiotic relationship between nutrition, gut microbiota and immunity, Ecobiol can potentially improve the overall health of the gut and help producers to solve quality, profitability and sustainability challenges, such as food safety and low performance.

It is compatible with most commonly used commercial coccidiostats and organic acids. It can survive feed manufacturing processes up to 90 °C and is easily handled at feed mills and farms. Ecobiol persists in the gut for at least three days, ensuring an extended benefit to the host.


#### Ecobiol mechanism of action

It rapidly converted to the vegetative form and started to propagate inside the intestine. It produces macrolactins and other specific secondary metabolites with strong inhibitory activity against pathogens. It also produces lactic acid, which supports the propagation of other beneficial bacteria, enhancing resistance to enteropathogenic bacteria.


Most importantly, Ecobiol helps to maintain a consistent, stable intestinal environment through a quorum quenching mechanism. Bacteria communicate with each other through the production of different specific molecules, a phenomenon termed quorum sensing (QS) as depicted in Figure 1.

One of the known "communicator" molecule groups is N-acyl-homoserine lactone (AHL), which sends bacteria a message to become more virulent, produce toxins, invade cells, etc. Blocking communication among these pathogenic bacteria is called quorum quenching (QQ), and can reduce the impact of this communication, as shown in Figure 2.

The expertise of Evonik in the area of animal nutrition provides the advantage of extending the company portfolio and knowledge to the area of animal health. In addition, as a science-based company, it aims to close present knowledge gaps regarding direct-fed microbes and their potential influence on the microbiome, gut function and animal performance considering differences in the quality and composition of the feed. <sup>15</sup>




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Teun van de Braak, product manager, Hendrix Genetics Layers, highlights the importance of giving hens access to clean drinking water.

## Pay attention to drinking water



Image Credit: Hendrix

The drinking water must not contain any hazardous substances or impurities.

**W**ITHOUT SUFFICIENT WATER intake, laying hens are unable to reach their genetic potential. Just ensuring an adequate water supply is not enough. Every new day, careful water management is necessary to prevent any health issues that will result from poor water hygiene.

In order to stimulate water intake, the drinking water must not contain any hazardous substances or impurities. Further, it is essential to keep in mind that the water provided to the hens, also serves as a solvent for vaccines and medication. Therefore, in order to improve their effectiveness, clean, fresh drinking water is important.

### Essential checks:

What are the important considerations to check the quality of drinking water and make sure that the birds are drinking correctly?

- Check the water at the source (the well) or where the water enters the house.
- It is important to check daily, if the drinkers or drinking nipples are working correctly.
- Monitor if the birds can drink easily, are the drinkers or drinking nipples placed at the correct height?
- The proper drinking position of birds is upright, with their heads up so the water runs through their throats. It is important to keep in mind that chickens cannot swallow.

**The warm brooding house, combined with a low water flow due to lower water consumption, make the ideal conditions for the development of biofilm.**

- Raise your drinkers to prevent contamination with the litter.
- Clean bell drinkers daily and open water systems.
- Make sure that the number of drinkers or nipples are sufficient (according to the specifications).

Young chicks are sensitive to poor water quality. They are in their growth stage, and therefore, require good drinking water quality. As their gut flora is still developing, they are less resistant to poor water quality. The warm brooding house, combined with a low water flow due to lower water consumption, make the ideal conditions for the development of biofilm: a slimy film consisting of bacteria, yeasts and moulds. Biofilm can form quickly on the surface of the water lines.

When you make use of water from your own well, it is crucial to keep your water quality at the right level. Any substance that should not be in the drinking water should be filtered out.





Temperature is an important aspect of drinking water quality.

### A solvent for vaccines

When you apply drinking water vaccination, always make sure that the water is fresh, clean, cool and that the water supply system is working properly. Also remember that you cannot deliver vaccines in chlorinated water as it will kill or inactivate the vaccine. Turn off chlorine and run vaccine stabiliser 24 hours before vaccination.

**It is essential to check the temperature and the quality of water at both ends of the line. Large differences can be present between the beginning and the end of the system.**

### Water sanitisation

The acidity (pH) affects both the solubility and the effectiveness of the vaccinations and medication. It is essential to flush the drinking systems well beforehand.

Make sure that you always flush the drinking system after every water treatment, as residues can stay behind and can negatively impact drinking water quality and drinking behaviour. Adding vaccines or medication could give the drinker water a bitter taste, as a result birds can drink less. Monitor the drinking behavior of your birds carefully to prevent dehydration.

### Temperature

Another important aspect of drinking water quality is the temperature of the drinking water: bacteria, fungi and moulds grow much faster in warm water. Therefore, always check the temperature and the quality of the water at both ends of the line. Large differences can be present between the beginning and the end of the system. The water temperature should be below 25 degrees Celsius. Protect your water reservoirs / water tanks from direct sunlight to keep the drinking water as cool as possible.

When your water reservoirs are black, paint them white, as this colour will reflect the sunlight which will keep the tanks cooler.

### Testing the water quality

- Fill one glass with water that enters the house and one glass at the end of the water line. Check taste, smell, clarity and colour.
- Collect water in clean bottles that can be closed. Store them for one week and check the water quality again.

### Conclusion

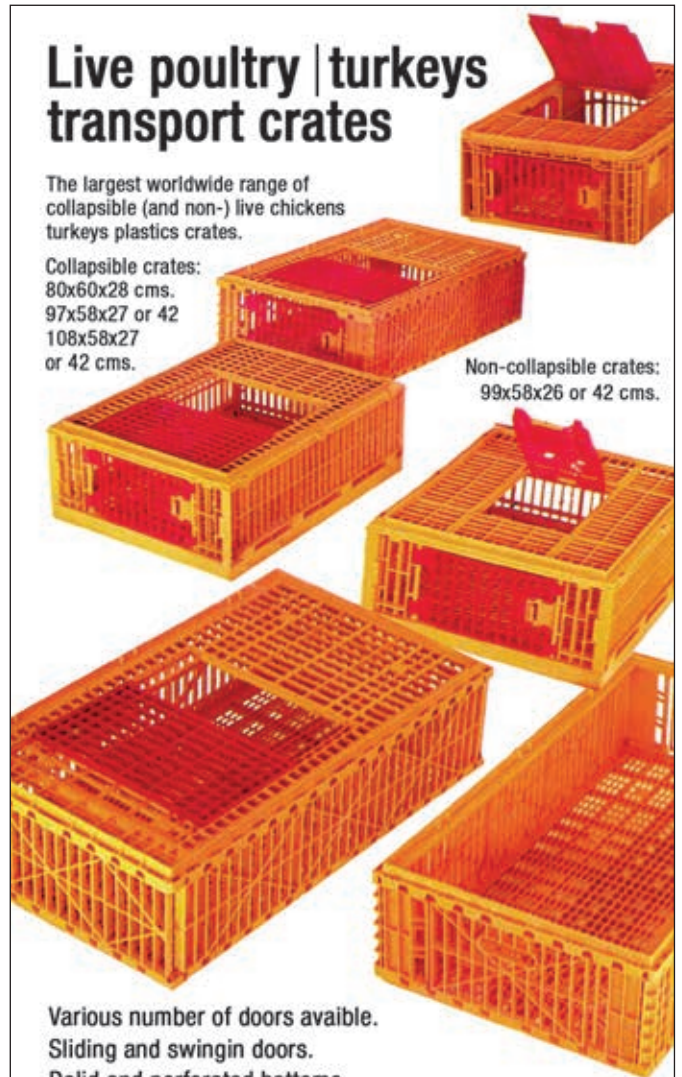
In combination with other aspects such as nutrition, health and light control that impact poultry production, ensuring that adequate water of good quality is made available to the chickens requires close attention to detail and proper flock management. **E**

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Mwangi Mumero looks at the work of various researchers across Africa, investigating better ways of controlling livestock diseases.

# Livestock disease control



Image Credit: Mwangi Mumero

Uses of gene research, biological control as well as application of traditional knowledge are currently being employed by researchers to seek viable disease control methods.

**A**CROSS AFRICA, TRYPANOSOMIASIS and East Coast fever (ECF) have continued to present serious challenges to the overall productivity and profitability of livestock enterprises.

Trypanosomiasis, also known as Nagana, kills an estimated three million livestock in Africa annually. The trypanosomes are passed from one animal to another by tsetse fly (*Glossina* spp). The African savanna that is punctuated by bush habitats provides good breeding places for it.

The disease also affects rural development and livelihoods by limiting options for mixed farming and hindering the balanced use of natural resources.

East Coast fever (ECF) kills one million cattle annually, claiming more than US\$300mn in losses for poor livestock herders in East and Central Africa.

Over the years, researchers have been looking for cheaper ways of minimising the effects of these diseases to replace existing methods of control.

The use of synthetic insecticides is expensive and harmful to people, livestock and the environment.

Uses of gene research, biological control as well as application of traditional knowledge are currently being employed by researchers to seek viable disease control methods.

## Latest approaches

**Zebra odours** – Writing in the PLOS Neglected Tropical Diseases Journal, the researchers at Icipe, in collaboration with their partners at the University of Pretoria, report that zebras, found in African rangelands produce smells that repel tsetse fly, the main vector for the diseases.

“Previous research has shown that tsetse flies avoid, and hardly bite zebras, even though zebras are commonly present in areas infested by the flies. Until now, the reason for this evasion has been unclear, with speculations that the zebras’ striped skin is a contributing factor. However, the zebra stripes are only visible to tsetse flies at around 5–10 metres. Beyond this distance, zebras appear uniformly grey to the flies,” explained Olabimpe Olaide, a Nigerian scholar who conducted the study as part of her PhD research at Icipe, registered at the University of Pretoria.

According to Olaide, the study established that zebras produce certain scents that repel tsetse flies. A blend of three of these odours enhances the effectiveness of existing tsetse management tools, including the Icipe tsetse repellent collar technology and traps.



The tsetse fly traps use colour or smell to attract flies, after which they are killed.

Tsetse repellent collar technology - exploits chemical signals obtained from the waterbuck, an animal that has also been found to repel tsetse flies.

A blend of these chemicals packaged in innovative dispensers, worn as collars around the neck of cattle, essentially make cattle unattractive to the tsetse fly.

"In comparison to the waterbuck repellent, the chemical blend identified from zebras appears to offer a comparable, longer lasting and more affordable alternative, although this potential requires further research," says Baldwyn Torto, Head of Icipe Behavioural and Chemical Ecology Unit, and co-supervisor and mentor of Olaide.

In further research, Icipe scientists have identified genes responsible for chemical sensing in tsetse flies that could improve ways in which the insects are managed.

In a recent issue of PLOS Neglected Tropical Diseases journal, researchers have discovered that different species of tsetse responsible for transmitting sleeping sickness and Nagana use the same set of genes to find their hosts.

Tsetse flies, like mosquitoes, search for their food by detecting chemicals that the hosts produce - such as carbon dioxide.

"Tsetse flies only feed on blood, so they do not need the same number of chemosensory genes as insects that feed on other hosts. However, tsetse flies have more genes that can sense carbon dioxide than," noted Rosaline Macharia, a researcher at Icipe.

According to Macharia, these genes are major players for tsetse fly being able to find food.

"If it is possible to disrupt these genes, then the tsetse fly is less likely to feed on humans and livestock and therefore less likely to transmit Nagana and sleeping sickness."

Researchers now add that the findings will allow them to develop a viable approach to tsetse control.

"This research is exciting, because it means that we can develop a unified approach to control the tsetse fly", adds Daniel Masiga, head of the Molecular Biology and Bioinformatics unit at Icipe.

#### Further research on tsetse fly genetics

The genetic pool of the tsetse fly *Glossina pallidipes* colony reared in the laboratory for mass release in the sterile insect technique

(SIT) should be widened, a team of scientists from the International Centre for Insect Physiology and Ecology (ICIPE) and Glasgow University, UK now recommend.

The colony is reared and distributed by the International Atomic Energy Agency (IAEA) and forms an important tsetse fly strategy that involves mating sterilised males - released from the laboratory - with wild females.

When the sterile males 'outmate' the wild males, the native population of tsetse flies is reduced due to the low number of viable offspring.

According to the scientists, reduced genetic diversity can compromise competitiveness of the released males in the sterile insect technique.

"Success of the SIT programme depends on successful mating of sterile males with native females. While our studies indicate greater genetic diversity among wild populations of *Glossina pallidipes* compared to the available colony, the extent to which this would affect tsetse control over wide areas is unknown," explained Icipe scientist, Dr Dan Masiga.

The researchers recommend enrichment of the genetic pool of the colony flies to

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assure maintenance of important traits that could influence genetic studies, or control over large areas.

### Atlas of African Agriculture Research and Development

In recent years, the International Food Policy Research Institute (IFPRI) has published an atlas indicating the prevalence of trypanosomiasis across Africa to help curb the menace.

The illustration containing information on the location of cattle and production systems is combined with the distribution of tsetse fly species in the area to estimate the presence and absence of trypanosomiasis.

Another related map shows the estimated benefits to livestock farmers expressed in US\$ per square kilometre if there is total eradication of trypanosomiasis.

According to the maps, benefits in the Horn of Africa would amount to nearly US\$2.5bn, discounted at 10 per cent over 20 years to account for the opportunity cost of funds – an average of approximately US\$3,300 per square kilometre of tsetse-infested area.

### East Coast fever

Recent development of the vaccine in Kenya to control this scourge has given farmers a glimmer of hope. Working closely with the Global Alliance for Livestock Veterinary Medicines (GALVmed), ILRI has been pushing for the development of proven technologies and vaccines for taming the disease that is endemic in Eastern and Southern Africa.

“The vaccine employs the ‘infection and treatment method’ that involves infecting cattle with a ‘cocktail’ of live parasites and simultaneously treating them with a long-lasting antibiotic. This ‘live vaccine’ method generates life-long immunity to East Coast fever,” noted Dr. Henry Kiara, an epidemiologist with ILRI.

According to Dr. Kiara, more than 1.3mn heads of cattle have been vaccinated using the vaccine during the piloting phase which started in 2012, proving resilience against ECF.

ILRI said the research involving 250 cattle-keepers in Kenya, vaccine distributors and veterinary staff saw a significant drop in cattle deaths from 50 per cent of the affected herds to less than 10 per cent.

According to ILRI, in Tanzania, 167 smallholder farmers who vaccinated their animals against ECF reduced expenditure on acaricide spraying by 75 per cent.

Lives of 25 million cattle are at risk in 11 African countries that include Burundi, Democratic Republic of Congo, Kenya, Malawi, Tanzania, Mozambique, Rwanda,



Sudan and Zimbabwe.

Symptoms of the disease include tears in the eyes, swelling of lymph nodes, coughing and fever. Affected animals die within weeks if not properly treated.

Researchers say the vaccine could save affected countries US\$300mn a year.

Farmers under the research reported increased milk yield, reduced water usage and increased manure with which to fertilise croplands and better traction for pulling plough and carts from healthier animals.

ILRI plans to commercialise the vaccine in collaboration with governments and local partners.

Together with other partners, ILRI has been working to increase farmers’ awareness of ECF vaccine and how to access them.

Dipping has in the past been the first line of control, but in recent years resistance to acaricides has presented a challenge.

Withdrawal in the government in management of cattle dips has led to collapse in dipping programmes compromising tick control.

Research has however shown that vaccines give protection of 85-98 per cent, but access to smallholder farmers remains a major bottleneck.

### Using indigenous knowledge

“Herbal formulations are cheaper and more readily available than conventional drugs. Local knowledge on their use has also helped rural communities in treating livestock diseases,” observes Dr. Jack Githae.

According to Dr. Githae herbal formulations for East Coast Fever and new cattle diseases can cure over 80 per cent of the cases if administered at the onset.

Dr. Githae, has in the last three decades developed formulations for treating ECF, parvovirus, rabies and for controlling internal and external parasites.

Among the plant species that have successfully used to manage livestock diseases include the Neem tree, Aloe vera and tree *Prunus africanus*. Herbal formulations are administered as powders or liquid extracts which are administered in prescribed dosages.

Two years ago, the Nairobi-based World Agroforestry Centre (ICRAF) released a manual outlining a wide range of medicinal plants used to treat health conditions in livestock and documents ethnoveterinary practices in Ethiopia, Kenya, Tanzania and Uganda.

“Hundreds of plant species are used by livestock keepers in sub-Saharan Africa to treat a wide range of ailments,” outlines Najma Dharani, lead author and consultant research scientist at ICRAF.

According to the manual, leaves and fruits of the baobab tree (*Adansonia digitata*) can be crushed and mixed with salt lick and given to animals infected with ECF.

Leaves and roots of *Sesbania sesban* can be boiled and used as drench to control worms.

Oil obtained from fresh seeds of *Azadirachta indica* tree can be used to treat wounds in animals. **E**



Besides sugar and bioethanol production and the use of bagasse for power and heat generation, there are many sugarcane resource streams and co-products from which value-added products can be developed.

## More than sugar and bioenergy

**A** NUMBER OF agro-industrial industries based on sugarcane derived products have been established worldwide.

Bagasse co-products under research include for instance, cellulose fiber (rayon pulp), additive for improving product and processing characteristics of food (carboxymethyl cellulose) and xylitol which is an alternative sweetener used in food and pharmaceutical preparations. Biogas and biochar produced from the thermochemical decomposition of sugarcane biomass are co-products of



There are many agro-industrial industries based on sugarcane derived products.

Image Credit: Adobe Stock

sugarcane. Biochar is suggested to improve the water- and fertilizer-retaining capacity of agricultural soil. There are also plastics and other petrochemical-based products.

Sugarcane has also turned into a target crop for biosynthesis, through genetic engineering, of novel products.

There are also novel carbohydrates and sugar substitutes such as nutraceuticals which are derived from food sources and have extra health benefits. Many challenges must still be overcome before these innovations become commercial realities. **E**



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In an exclusive interview, Marcus Meadows-Smith, CEO, BioConsortia, talks to Fyna Ashwath about the company's breakthrough developments in microbiological products for plant trait enhancement and yield improvement.

## 'Microbiomes play an integral role in agriculture'

**H**E IS CREDITED with steering the success of BioConsortia, a company responsible for the development of beneficial 'microbial consortia' that can help plants overcome biotic (pests and diseases) and abiotic (droughts, climate and environmental) stresses and improve the plant health and crop yields. Meadows-Smith reveals his true passions – the environment, science and farming, while speaking about the work of his team at BioConsortia.

As the world battles climate change combined with the urgent need to improve agricultural productivity, it becomes increasingly clear that microbes have an invaluable role to play for the benefit of the people and the planet.

**African Farming (AF): Please elaborate on the use of genomics and microbiome analysis employed by Bioconsortia to help identify the best microbial products that influence the plant's phenotype.**

**Meadows-Smith (MS):** Our R&D platform with its iterative approach, similar to plant breeding, has been involved in the selection of high performing plants. We are pioneering the use of directed selection in identifying teams of microbes – working like plant breeders and selecting plants based on targeted characteristics, then isolating the associated microbial community.

The microbiome analysis comparing high performing versus low performing plants in each round will help identify the microbes, and teams of microbes, that correlate to the high performing plants.

We then test these microbes and consortia to confirm their activity. Genomics, the full DNA sequencing of each of our leads, tells us the genetic potential of each strain of microbe – whether it has the genes for nutrient acquisition, stress tolerance etc, so can it help the plant.

**AF: How are biopesticides helping to meet the challenges of integrated pest management (IPM) and sustainable agriculture?**

**MS:** Biopesticides are additional tools for the grower. When used in IPM programmes, that are used in rotation with synthetic chemical pesticides, the biopesticides bring the added benefits of:

- the same level of disease or pest control as the fully chemical programme.

**“Biologicals are a good method to break resistance that is developing to many synthetic pesticides due to their repeated over-use.”**



The BioConsortia team observing the latest microbial discovery.

Image Credit: BioConsortia

- increased yields (this is a very common observation as the microbes bring both pesticide mode of action as well as a biostimulant effect).
- reduced pesticide residues, keeping the crops under the maximum residue levels (MRL).
- resistance management (many synthetic pesticides are used repeatedly and so the pest or disease develops resistance. The different mode of action of biologicals can break this resistance).

**AF: What is the next stage of innovation for Bioconsortia?**

**MS:** BioConsortia's R&D platform is focused on the discovery of beneficial microbes and a development model to produce agricultural products with superior efficacy and higher consistency in three areas of research:

**Biopesticides** – a pipeline of several biofungicides and nematicides with superior efficacy.

**Biostimulants** – growth promoting products that further increase yields in standard, high-yielding as well as stressed, agronomic conditions.

**Fertiliser use efficiency and nitrogen-fixation** – developing products for major non-leguminous row crops (such as corn and wheat).

BioConsortia has identified a remarkable number of biofungicide leads that are numerically better in efficacy than the best biofungicide products on the market today; two of which are entering the registration phase of development. The biostimulants moving to registration have shown yield increases of more than 15 per cent in tomatoes, potatoes and green beans. Similarly, the nematicide products in early field trials have significantly decreased the number of nematodes infecting the crop plants and have increased yield by 15 per cent. **E**



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It is important to understand the needs of farmers.

At African Farming's Agribusiness Summit in Abuja, Caleb Usoh, country manager Nigeria/deputy managing director, OCP Africa, speaks about the company's role in the development of the farming ecosystem in Africa.

# Supporting sustainable agriculture

Image Credit: Renate Wefers/Adobe Stock

## **African Farming (AF): Please elaborate on the contribution of the OCP group towards boosting farming in Africa.**

**Caleb Usoh:** OCP Africa has been the driving force for the development of farmers and markets in the continent. Backed up by the OCP group's long-standing experience in the production and processing of phosphates and phosphate derivatives, OCP Africa was created to contribute to the development of sustainable agriculture in the continent.

It has several projects that focus on quality agricultural inputs that are needed by farmers for improving productivity. These projects cover a number of areas such as helping farmers gain better access to financing, good agricultural practices, quality seeds, the best fertilisers as well as training.

We also connect farmers to markets. In Nigeria, over the last three years we have established contacts with 63,000 farmers across the agricultural value chain, through the OCP Agribooster project.

The idea is to understand the needs of farmers and unlock the challenges they are facing in various areas of agribusiness.

We believe that by ensuring accessibility to tailored products, we can help them to increase their yields and move from subsistence farming to farming that creates value, a transformation that will ultimately have a significant impact on the continent's economy.

Additionally, OCP Africa is making increased efforts to establish production facilities in many countries, including

Nigeria, and has done a lot of R&D on the fertilisers that are best suited for different territories and crops.

OCP Africa places the farmer at the heart of its strategy and acts across its entire value chain, which is based on four pillars: **Production:** investing in fertiliser production capabilities and fertiliser blending facilities close to consumption areas to ensure availability of tailored products;

**"We need a structure encompassing all the stakeholders in the value chain an integrated approach to solve the issues of financing and market linkages."**

**Logistics:** guarantee farmers the availability of good products, at the right time, in the right quantity, and at a the right price;

**Agronomy and R&D:** supporting the development of sustainable agriculture with products tailored to the soils and crops;

**Sales and marketing:** make every effort to offer stakeholders in various agricultural industries not only products, but networks and services perfectly suited to their needs.

**AF: How are fortified fertilisers making a difference in boosting agriculture?**

**Caleb Usoh:** We are making continued efforts to provide fertilisers suitable for different territories. Farmers have been

applying blanket fertilisers. Fortified fertilisers are important for applying micronutrients, required by humans and plants.

**AF: In Africa, what are the challenges faced by farmers in gaining access to quality agricultural inputs?**

**Caleb Usoh:** Finance is the main impediment. Sometimes, companies provide quality premium inputs that should help farmers boost productivity but when they cannot have access to better finance opportunities, they may not use these products. The farmers may not be able to understand the benefit of investing into these and the difference they make to the output they finally receive, if market linkages are not established.

We need a structure encompassing all the stakeholders in the value chain, an integrated approach to solve the issues of financing and market linkages.

**AF: What was your experience at African Farming's Agribusiness Summit?**

**Caleb Usoh:** We are always keen to be associated with platforms that enhance the productivity of agribusiness, as a whole.

We are at the forefront of providing knowledge and it is part of our drive to collaborate with ventures that help the exchange of ideas and sharing of information.

The Agribusiness Summit has provided excellent learning opportunities and the interactions with exhibitors and visitors have helped us understand exactly what the farmers need. **E**



# African agribusiness attracts Spanish companies

**A**GRAGEX, THE SPANISH Exporters' Association of the agricultural sector, is dedicated towards promoting the products and equipment of Spanish agricultural manufacturers throughout international markets, for more than 41 years.

The organisation emphasises the leading technology of Spain in irrigation equipment and agricultural production in greenhouses.

Spain is an international leader in the manufacturing of plastic greenhouses. Additionally, the largest acreage of crops under plastic in Europe is found in Spain, specifically in the regions of Murcia and Almeria.

There are several challenges associated with the storage of cereal crops and Spain has developed cutting-edge and affordable technology that prevents crop loss due to inadequate equipment.

The agricultural machinery designed and manufactured in Spain focuses on local agriculture which consists of irregular terrain with dry and difficult access. It has witnessed a boost in demand in many countries with a similar landscape.

Spain exports agricultural equipment to more than 110 countries in five continents

totalling a value of US\$2.600mn. Europe is the largest market comprising 55 per cent of the country's total exports. The primary markets are France with 24 per cent, Portugal, 19 per cent, Italy, 11 per cent and Germany, 8 per cent.

**The organisation has been expanding the scope of its activities in Africa as well, over the last few years, keen to be a part of the development of the agricultural sector in shaping the future of the continent and contributing towards the creation of jobs.**

The export trade with the Americas has also prospered and comprises 18 per cent of the total exports of Spain. Mexico and EEUU are principal markets.

Asia is a continent that Spain wants to focus on, accounting for around 6 per cent of total exports. Its financial stability and openness to western products has made

Spanish companies gain a small share of the market in the last few years. This stable market is growing every year.

## **AGRAGEX in Africa**

The organisation has been expanding the scope of its activities in Africa as well, over the last few years, keen to be a part of the development of the agricultural sector in shaping the future of the continent and contributing towards the creation of jobs.

Every year, AGRAGEX organises different promotional activities featuring agricultural equipment and livestock, including commercial trips to countries such as Angola, South Africa, Mozambique, Zimbabwe, Nigeria, Ghana, Ivory Coast, Senegal, Ethiopia, Kenya, Sudan, Cameroon, Namibia, Equatorial Guinea, Mauritania, Morocco, Tunisia, Algeria, Libya, Egypt, Zambia and Tanzania.

Coinciding with the trade fairs FIMA/FIGAN in Zaragoza (Spain), AGRAGEX has organised visits, so the buyers of the continent can learn and observe first-hand, the Spanish agricultural and livestock equipment and get the opportunity to meet the manufacturers.

In 2018, Spain exported

Spanish companies are keen to be a part of the agricultural sector in Africa.



Image Credit: Soru Eparok / Adobe Stock



US\$520million dollars of agricultural machinery and livestock to Africa.

In this supplement in the *African Farming* magazine, AGRAGEX partners with six companies to create awareness regarding Spanish exports in Africa.

#### **RKD Irrigation SL**

The leading manufacturers of high precision irrigation systems in Spain, is recognised for the design, manufacture and installation of open field crops' irrigation projects worldwide.

With an experience in the irrigation sector since 1981, RKD has implemented numerous projects in more than 46 countries across five continents.

The team maintains close collaboration with farmers around the world and continued investment for the development of new products.

The company aims to provide the best irrigation products to every farmer and contribute towards feeding the world.

#### **The Armando Alvarez group**

This is a Spanish manufacturer of plastic polyethylene film exports to more than 105 countries.



AGRAGEX partners with various companies to create awareness regarding Spanish exports in Africa.

Image Credit: Maksim Pasko/Adobe Stock



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They specialise in products including grain bags and silo covers that guarantee secure storage solutions for animal feed and grains, greenhouse and tunnel films and mulch and row covers.

### Enrique Segura S.L.

It is a Spanish company specialising in everything related to cereal combine harvesters: new and used machines and all their spare parts, both original and adaptable of the best quality.

With a wide variety of combine harvesters that can be used throughout the year, the company combines premium quality with competitive export prices.

With the largest stock of agricultural spare parts, the company's products are suitable for all machinery brands. Enrique Segura S.L. has customers in Africa and is keen to expand export operations in the continent.

### Grupo Chamartin S.A (Chamsa)

It offers the most complete irrigation systems in the industry with more than 50 years of experience in the field of irrigation.

The quality and wide range of products offered by Chamsa are interna-

tionally recognised and the desire to satisfy their customers allows the brand to be present in more than 60 countries around the world.

The company has diversified operations in producing aluminium pipes, PE pipes, impact sprinklers in brass and plastic, round drip lines, flat drip lines, labyrinth tapes and centre pivots or linear move machines for irrigation.

CHAMSA has participated in and successfully completed several governmental irrigation projects in African countries, in countries such as Egypt, Nigeria, Sudan, Zimbabwe and Angola.

The main factor in Chamsa's success in its long-term projects is to give the best support to their customers and make irrigation more efficient by saving water and energy while obtaining the best results for each crop.

### Goizper S. Coop.

It celebrates its 60th anniversary as a global reference in spraying, industrial and biotechnology businesses.

Goizper spraying designs, manufactures and markets hand-held sprayers, ensuring accurate and precise applications in: agricul-

ture, horticulture, public health and industry.

The company's R&D innovates continuously, providing integrated solutions and improvements to its products.

Matabi, IK, Osatu and Inter are its brands; products include manual compression, knapsack and electric sprayers, dusters, dosers, trombone sprayers, forest fire-extinguishers and accessories.

Micron Sprayers is now part of Goizper Group. It pioneered Control Droplet Application (CDA) using rotary atomisers for ground and vehicle mounted application equipment.


The combined product range and resources of the alliance allows it to build on past success and develop equipment to meet the needs of growers, users and regulators for greater safety and efficiency in application.

### Grupo Tatoma



Animal feed is the focus of the company Tatoma and its most popular product is the Unifeed mixer.


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


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**A case study of Tatoma's plant: Feeding more than 10,000 cattle daily**

In 2010, the Israeli company Ambar Feed Mills signed a contract with the Tatoma group to build a stationary production plant for total mixed rations (TMR) in order to supply its customers and associates with 5,000 feed rations for dairy cows in the north-eastern region of the Negev Desert. The plant comprised a MT-25 horizontal mixer, a weighing belt, two feed conveyors, an auger feeder and other miscellaneous equipment enabling different rations for loading pre-mixes and to discharge them at the end of the process to be programmed through a control unit.

After commissioning, the plant was found to have made savings of up to 10 per cent in raw materials due to more accurate loading and the reduction in waste and its transport. Customers also experienced substantial improvements in the homogeneity and stability of the ration, and consequently it had a direct impact by increasing milk production and dramatically reducing the percentage of metabolic problems. Those results, led to the addition of three new feeders to the original system.

This year a new extension has been added



Image Credit: Tatoma

Tatoma's stationary plant for Ambar Feed Mills.

to produce 10,000 daily rations and cater to the demand generated by new customers eager to improve their production rates.

After commissioning, the plant was found to have made savings of up to 10 per cent in raw materials, due to more accurate loading and the reduction in waste and its transport. Customers also experienced substantial improvements in the homogeneity and stability of the ration, and consequently it

had a direct impact by increasing milk production and dramatically reducing the percentage of metabolic problems.

**Plant operation**

The operation is based on rations programmed into the automatic system for plant control, requiring only two people to operate it as well as being in charge of both the filling of the feeders and choosing the

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rations comprising a number of ingredients in specific proportions depending on the type of animal (milk production, heifers, beef cattle and so on.)

These ingredients are placed in the feeder according to their physical characteristics; hence feeds and supplements are placed in silos, molasses and whey in tanks, fibrous components in the feeders with movable floors and milling at discharge points. Granular components are placed in feeders fitted with augers and in tall silos.

After choosing the recipe, the individual discharge takes place of the set amount of each of the fibrous and granulated ingredients onto the weighing belt. These loading systems have an accuracy of around two per thousand, when it is usually no better than six per thousand.

Finally, the components are mixed and

## The Spanish Exporters' Association of the agricultural sector is aiming to create awareness about their work and inform African importing and distributing companies of agricultural and livestock machinery about their keen interest to be a part of the future of the continent.

subsequently discharged and prepared for their transport, either by bulk delivery trucks or pressed in different sized bales.


The total cycle time of a mixture is between 10-15 minutes, depending on the composition and amounts of the ration.

Adding a second mixer means that these production cycles can overlap, increasing the productivity of the plant in Israel from 45 to 75 tonnes per hour.

### AGRAGEX: In conclusion

The agricultural equipment manufactured by the Spanish companies combine innovative technology with affordable prices.

Through this supplement in the African Farming magazine, the Spanish Exporters' Association of the agricultural sector is aiming to create awareness about their work and inform African importing and distributing companies of agricultural and livestock machinery about their keen interest to be a part of the future of the continent.

The agricultural products of the Spanish companies combine innovative technology with affordable prices. 



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Tanzania's international trade event for food, hospitality and agriculture returns to Dar-es-Salaam from 07-09 November 2019.

## Enhancing agribusiness in Tanzania

**T**HIS YEAR'S SHOW has an exciting line-up of both local and international exhibiting companies. Co-located with the 22nd East Africa International Trade Exhibition (EAITE) 2019, the show is expected to feature top products, equipment and machinery presented by exhibitors from more than 20 countries, thus giving visitors an excellent opportunity to explore several countries at one time.

Over the past few years, Tanzania has emerged as a major regional trade centre, providing a friendly business environment to foreign investors and products. Duties are considerably low and re-exports to neighboring countries are either very low or exempted.

Countries dominant at this year's Foodagro Africa are Turkey, Italy, Belgium, Pakistan and India with several international brands looking to carve their presence in the East African market. Showcasing a wide range of products and machinery, the exhibition brings to Tanzania companies from a large number of countries who are looking for distributors, retailers, importers and re-exporters.

The event offers an ideal forum for international companies to showcase their products and services to a huge market. Major company leaders from East Africa and surrounding regions are invited directly in collaboration with regional trade bodies in Kenya, Tanzania, Ethiopia, Uganda, Somalia, Mozambique and Congo. The organisers have confirmed that visitor registrations are much higher this year, including top industry leaders, government agencies and trade bodies.

Moreover, the 22nd Foodagro 2019 has attracted a number of the industry's biggest names including experts, stakeholders, directors and other high profile decision-makers that makes it the ideal access point into the African economy for interested investors, manufacturers and suppliers. The event is expected to continue to bring the newest and most innovative products from around the world directly to Africa, also offering an ideal platform for product launches, promoting brands, updating existing customers and providing information on the latest developments in the industry. 



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African Farming's 2nd edition Agribusiness Summit, organised by Alain Charles Publishing, took place from 27-28 August at the Transcorp Hilton Abuja, Nigeria.

## Reinforcing Africa's agribusiness

**T**HE EVENT, SUPPORTED and endorsed by the Federal Ministry of Industry, Trade and Investment and the Nigerian Export Promotion Council provided a dynamic setting for discussions and sharing of experiences with the aim of creating a platform for stakeholders and bridging the gap between farmers, associations, and manufacturers.

The line-up of speakers saw the return of Eric Nyikwagh, country representative, Young Professionals for Agricultural Development (YPARD) and Edu Ogbonnaya, founder of Farm Awareness for Food Preservation Initiative, and welcomed new speakers from the academic world of agriculture, such as Dr. Ibrahim Abbas Sodangi, professor of Agronomy/Weed Science, Kaduna State University; government, such as Charles Onwuka, National Agricultural Seeds Council (NASC); and the commercial world, such as Benneth Ejindu, country manager, Anambra motor Manufacturing Co. (ANAMMCO).

Day one of the summit, saw a double presentation on the overview of agriculture in Nigeria given by Devakumar Edwin, Group executive director and Baba Birma Esq, special assistant to Group vice president, both from Dangote Group. They highlighted the opportunities existing within the agricultural value chain and the measures adopted in growing the Agriculture sector in Nigeria, the agricultural sector being identified as critical to diversifying the national economy.

This was followed by an insightful presentation by Prof. Ibrahim Umar Abubakar, executive director, Institute of Agricultural Research on the importance of implementing crop management. Charles Onwuka from the National Agricultural Seeds Council (NASC) continued by discussing the National Agricultural Seed Act. The first half of the day concluded with a speech by Lawal J. Ahmed, Executive Director, North and Public Sector, Keystone Bank.

The sessions in the afternoon started with a presentation by Gideon Ngedu, executive secretary at Fertilizers Producers and Suppliers Association of Nigeria (FEPSAN), on the effective input distribution



Image Credit: Alain Charles Publishing

The summit provided valuable insights into a range of topics including farm and crop management, inclusive finance and value addition, rural and community development as well as modernisation of farm equipment.

working with the private sector. The presentation gave an overview of the Presidential Fertilizer Initiative. Musa Jacob from Jubaili Agrotec followed, with a discussion on the impact of agricultural pesticides. The evening ended with a presentation by Onuachumba Martin, OCP Africa on the effective use of quality agricultural inputs and their impacts on crop quality and human nutrition.

**The event received great appreciation from the visitors for the networking opportunities, excellent panel discussions and learning.**

On the second day of the summit, Agele Samuel, OCP Africa started the event with a discussion on the implications of quality inputs and plant nutrition on human health and the environment. The challenges addressed included improving the market of safe and environmentally responsible pesticides/fertilisers supply and usage, availability of appropriate financing for agricultural inputs, a need of established efficient, defined and effective distribution

channels that are equitable and traceable, backed by consumer confidence as well as the increased prevalence of counterfeit and poor agricultural inputs in the markets.

This was followed by a presentation on innovative technologies and fintech solutions for post-harvest issues, by Olusegun Falade from the Flour Mills Nigeria about innovative technologies to combat post-harvest issues, outlining the importance of recognising the problems as well as their magnitude, identifying the opportunities associated with post-harvest technologies, evaluating the impact of environmental, human and technological factors during the post-harvest chains as well as understanding the value chain, most importantly the market.

Dr Baba Ashmara from GIZ-AFC followed, speaking on the adapted methodology for sustainable mechanisation. He discussed the new GIZ GIAE (Green Innovation Centres for the Agriculture and Food Sector) Nigeria approach. The first half of the day was concluded with an insightful talk by Alh Al-Mujtaba Abubakar, Abuja Chamber of Commerce, on the impacts of agribusiness on the rural and community development, highlighting the lack of mechanisation of the farming system



detering the youth from joining the sector, the low return on investment, due to the high cost of production, the low marketable cost of the products, and little or no access to finance due to the rural location of the farmers. The four major points of infrastructure still need attention: power, transportation, education and irrigation infrastructure.

After lunch, Oladipupo Baruwa, Nigeria Investment Promotions Commission (NIPC) kicked off the second half of the day with a presentation on promoting value addition in agribusiness. He outlined the key requirements: Engaging key stakeholders to build an economy driven by agribusiness; fast-tracking the development and execution of irrigation projects; ensuring self-sufficiency in major agricultural products including tomato, rice and wheat; and extending the Anchor Borrowers Programme to all states and major crops.

The debate-driven panel discussion led by Taiwo Oyanira, PwC focused on experiences in agriculture in Nigeria, looking at the pitfalls, how to recover from difficulties and the help required. It was very active, lots of input from the panel but made more interesting by some challenging questions from the audience. The panel was formed of Eric Nyikwagh, Young Professionals for Agricultural Development (YPARD) Nigeria; Edu Ogbonnaya, Farm Awareness for Food Preservation Initiative; Prof. Job Nmadu, Nigerian Association of Agricultural Economists and Benneth Ejindu; Anambra Motor Manufacturing CO. (ANAMMCO). Jemimne Memuduaghan, Nigerian Export Promotion Council (NEPC) closed the summit with a presentation on the cross-border trading issues across Africa, focusing on the trader impediments such as cultural barriers (languages), governmental barriers including policy inconsistency, unnecessary bureaucracy, enforcement of rigid policies and excessive requirements as well as tariff and non-tariff barriers.



The panel discussion on experiments in the agricultural sector of Nigeria.

Image Credit: Alain Charles Publishing

The event received great appreciation from the visitors for the networking opportunities, excellent panel discussions and learning.

**“This summit provides the synergy for the different voices to come together and unite about how they can trickle this effect to the farmers and the youth in the rural areas,” commented Eric Nyikwagh, country representative, YPARD.**

“I appreciate this programme for enabling me to learn about the best practises in agribusiness and opportunities to network with people in the industry,” said Dafei Ishaku Fei, Plateau State Coffee Farmers and Marketers Co-operative Union.

Researched and developed by the African Farming and Food Processing magazine, the summit provided valuable insights into a range of topics including

farm and crop management, inclusive finance and value addition, rural and community development as well as modernisation of farm equipment.

“This summit has helped me understand about how we can engage in agriculture across the value chain. We have so many sectors in agriculture – transportation, marketing, processing and hence it has a lot of opportunities. My takeaways from this summit and the previous edition, both developed by African Farming magazine, is that these platforms present an opportunity to encourage discussions from the government, private and research sectors to create something sustainable. This summit provides the synergy for the different voices to come together and unite about how they can trickle this effect to the farmers and the youth in the rural areas,” commented Eric Nyikwagh, country representative, YPARD.

African Farming will be conducting its 2nd edition Agroinvestment Summit from the 2-3 December 2019 in London. It will, once again, create a cohesive platform for trade and investment opportunities, attracting major investors and buyers from around the globe. 

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## Boosting the fertiliser industry

THE AFRICA FERTILISER Agribusiness Conference 2019 is returning to Cape Town for the fifth event in the series.

The event has been providing a forum for the global fertiliser supply chain to meet with African policymakers, importers, distributors and farmers in some of the world's fastest growing markets.

The comprehensive three-day event has consistently brought together a truly global delegation, and always ensured the participation of a large audience of the African SMEs and agrodealers that are driving the African agricultural revolution.

The conference will deliver an opportunity to meet with all the major players from the whole fertiliser and agribusiness supply chain to boost trade into the region, according to organisers.

It also offers potential solutions for Africa's commercial farming operations: The conference will explore technology advances in agriculture, financing techniques that have been successful for large farming, and lessons from agrobusiness operations in challenging environments around the world, that can be applied to Africa's large farming and agrobusiness operations.

The Africa Fertiliser Agribusiness Conference also boasts good agrodealer, SME and emerging farmer participation. Working in conjunction with the African Fertiliser Agribusiness Partnership (AFAP) and other important stakeholders, the event partners will again ensure the participation of a large delegation of agrodealers and farming community leaders from across Africa, in an effort to find real solutions for smallholder farmers. The African Fertiliser and Agribusiness Partnership (AFAP) is an independent non-profit African social enterprise founded in 2012 by a partnership of African development organisations.

The conference series has built a reputation for meaningful discussion and networking opportunities. In 2019, the event will add additional features to allow for closed-door stakeholder training, speed networking, round table discussions, and site visit field demonstrations. Participants can look forward to gaining new contacts and knowledge that can make an impact on their business, according to organisers.

The 2019 conference agenda will include: Updates on fertiliser demand in key African markets, exploration of the potential for increased fertiliser production and blending in the region, cash crop market insights on cocoa, coffee and other growth markets, the latest trade and investment opportunities, regional economic dynamics and policy developments and a comprehensive overview of the fertiliser supply and agribusiness value chain. Global leaders in fertiliser production will discuss how to deliver high quality and cost-effective fertiliser for African agribusiness and smallholder farmers, and there will be a chance to discover how the latest agricultural innovations and fertiliser products are boosting African agribusiness and being promoted across the region.

Conference sessions will be centred on how partnership, investment and innovation can boost fertilizer trade and allow agribusiness to flourish in this region. It promises the opportunity to gain first-hand understanding of the challenges and opportunities and unrivalled access to high-level, hard to reach decision makers. The event also offers networking opportunities with senior decision makers of the biggest fertilizer buyers and manufacturers in some of the world's fastest growing fertiliser markets.

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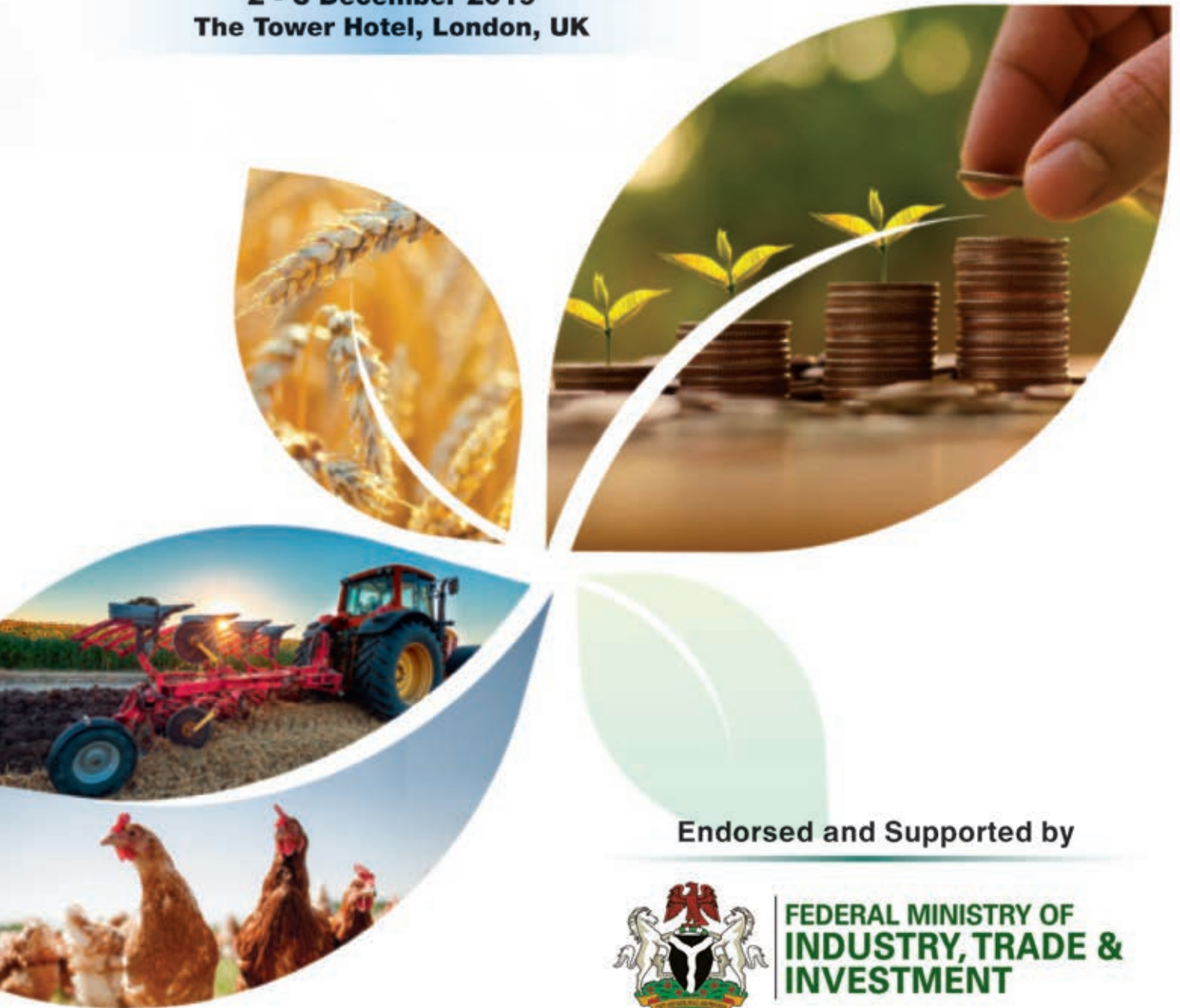
# African Farming's 2<sup>nd</sup> Edition Agroinvestment Summit



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Case IH, a brand of CNH Industrial, and Northmec Agricultural Equipment (Northmec), its long-standing distribution partner in South Africa, showcased state-of-the-art technologies at NAMPO Cape 2019.

## Highlighting farm equipment and technologies

THE COMPANIES FEATURED two new products, the AGXTEND SoilXplorer sensor and Case IH Axial-Flow 250 Series combine harvesters with AFS Harvest Command automation at the event.

"NAMPO Cape 2019, the largest agricultural show in the Southern and Western Cape, has become a very important event for both companies," stated Jaco Prinsloo, Case IH product marketing. "Northmec has developed market-leading levels of sales, service and support which benefit customers across many Case IH product lines and have contributed significantly to our continued strong growth in this region."

For Northmec, the event is a celebration of 150 years of providing farmers in South Africa with excellent products and service.

Northmec imports and distributes agricultural equipment, predominantly in grain-producing areas, through an extensive network of 13 branches and 37 dealers, together with one subsidiary (shareholding) in Zimbabwe.

### New AGXTEND SoilXplorer

One of the highlights of NAMPO Cape 2019, the SoilXplorer sensor, is part of the innovative AGXTEND range of precision farming technologies. Complementing Case IH Advanced Farming System (AFS) products, it will eventually include a full range of precision solutions and connected services.

Helping farmers to refine their field and crop management while improving returns on precision farming equipment investment, each AGXTEND component is designed to aid decision making, improve the efficiency and accuracy with which inputs are used and make the most of measured data.

The SoilXplorer contactless soil sensor collects all the data needed to optimise soil management, such as soil texture, relative water content and compaction. Because it does not require direct soil contact, the sensor is independent of weather conditions and vegetation. Furthermore, with the addition of DepthXcontrol it can control, in



Image Credit: Case IH

The AGXTEND SoilXplorer sensor and Case IH Axial-Flow 250 Series combine harvesters with AFS Harvest Command automation were featured at NAMPO CAPE 2019.

real-time, the working depth of tillage operations and adjust seed rates.

The sensor emits an electromagnetic signal into the soil, while four coils measure soil conductivity at different depths. When the sensor is located 40cm above the soil, these layers are at 0-25cm, 15-60cm, 55-95cm and 85-115cm. Associated with a GPS receiver, the system can record and map in-field soil heterogeneities for each of the four soil depths. Light and easy to handle, the unit can be mounted on the front weight/linkage of a tractor or other suitable agricultural machine.

Data gathered by SoilXplorer is converted into valuable files for a farm's Farm Management Information System by SoilXtend software. DepthXcontrol enables tillage depth to be controlled in real time, allowing variable depth soil cultivation with compatible equipment. It has three operating modes: shallow cultivation, sub-


**Data gathered by SoilXplorer is converted into valuable files for a farm's Farm Management Information System by SoilXtend software.**

soiling and depth contour, which optimise work rates, save fuel and wearing metal, while promoting continuous improvements in soil structure.

### New Axial-Flow 250 series combines

Powered by FPT Cursor engines, Axial-Flow 250 Series models meet the demands of large progressive farming and contracting businesses by delivering high-speed harvesting and increased threshing capability even under the most challenging conditions, combined with unbeatable grain quality.

The three new models deliver improvements in combine and operator productivity by offering significant technology, durability and productivity enhancements over the 240 series models they replace. These include larger fuel tanks, up to 1,200 litres, and larger grain tanks, up to 14,400 litres, which maximise harvesting time, together with headers up to 13.6m wide.

While their new automated features are designed to allow operators to more easily maximise machine performance in terms of crop throughput and quality, the new models preserve the simplicity, grain saving and grain quality performance for which Axial-Flow combines are renowned. 



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There has been a widespread failure to prevent food loss and waste. Technology can be a catalyst for change.

# Sorting technology impacting food waste

ACCORDING TO THE United Nations' Food and Agriculture Organisation, the world is currently wasting 1.3 billion tonnes of the food produced for human consumption every year, which amounts to a third of all food produced for that purpose.

From farm to fork, the issue of food waste is rife across all aspects of the supply chain and all corners of the globe. There isn't just one solution to help reduce the impacts of food waste, however actionable steps can be taken to lessen the amount of food wasted.

While richer, industrialised countries are guilty of food waste whereby they discard the produce that reaches them, poorer developing countries have a problem with 'food loss'.

By way of distinction, food losses occur in the production chain and hit small farmers in developing countries the hardest. The Food and Agriculture Organization (FAO) estimates that 30-40 per cent of total production can be lost before it reaches the market, due to problems ranging from spillage to lack of proper post-harvest storage, processing or transportation facilities.

Not applying the right seeds, irrigation, pruning and crop protection leads to immense losses. A significant proportion of agricultural products are not harvested or are harvested too early or too late.

Strengthening the supply chain through the direct support of farmers and investments in infrastructure, transportation, as well as in an expansion of the food and packaging industry, could help to reduce the amount of food loss and waste.

Annual food losses for fruits and vegetables in sub-Saharan Africa are estimated at 40 to 50 per cent. Around half are lost between agricultural production, post-harvest handling, processing, distribution, and consumption. Shockingly, over 80 per cent of fruit and vegetable waste comes after the farmer has grown the fruit or vegetable and before the consumer purchases it.

Though many factors including changing consumer behaviour affect food waste, the Internet of Things (IoT) could offer a potential solution for this problem in the form of



Image Credit: Tomra

Food losses occur in the production chain and hit small farmers in developing countries the hardest.

sensor technology at any given time, based on real-time measurements of food quality parameters.

## Using innovation to improve yields

A lack of precise sorting can lead to unnecessary food losses. To the human eye, a batch of produce which has come out of the field may be deemed as being of a poor quality – something which may purely be based on the aesthetics.

By adopting and implementing technology, it can be determined that the crop is actually of a good enough quality to be used either for its intended purpose or for an alternative source.


This innovation can have a profound impact. Through implementing efficient sorting technology, there can be an increase in both yields and food quality, bringing the number of tons of potatoes used closer to the

number of tons of French fries produced, for example, thus reducing waste.

The improvement in yield-enhancing technology is not simply about ensuring that food can be used for its initial purpose, but also identifying alternative uses for produce that might otherwise have been discarded and lessening waste.

Developments in technologies, such as a 360-degree surround view of the produce for optimal inspection, combined with innovative detection and rejection technology, result in more valid decisions about the quality of the product.

This technological progress not only improves the quantity of available food, but it also maintains the high levels of quality expected by consumers who are increasingly interested in what they are purchasing.

As a manufacturer of sensor-based food sorting systems, Tomra Sorting Food is acutely aware of the food waste issue and works closely with farmers, processors and retailers to reduce food waste, optimise yields and maximise profits. The company designs and manufactures sensor-based sorting machines and integrated post-harvest solutions for the food industry, using the latest grading, sorting, peeling and analytical technology. Tomra is committed to continuously developing sorting and grading systems to sustainably keep food in our supply chains and out of the waste heap. 

**The improvement in yield enhancing technology is not simply about ensuring that food can be used for its initial purpose, but also identifying alternative uses for produce that might otherwise have been discarded and lessening waste.**



Flour Mills of Nigeria Plc (FMN), has over the years, continued to invest in developing infrastructure required to secure its supply chain and ensure the sustainability of its operations.

## Empowering farmers through backward integration strategy



IN THE AGRICULTURAL sector, FMN has developed a unique ecosystem where it partners with local farmers as a source for its essential raw materials for production. To strengthen the capabilities of these farmers, FMN through the operations of its subsidiary, Golden Agri Inputs (GAIL) continues to provide adequate support in the areas of input provision, specialised training, agronomy support and related extension services.

GAIL essentially offers a platform that supports and strengthens FMN's well-defined Backward Integration Programmes in cassava, oil palm, sugar, soybean and maize. In addition to providing extension services to farmers, GAIL develops out-grower schemes for more than 50,000 farmers across Nigeria. Partnering with Corteva Agriscience, it also distributes hybrid pioneer maize seeds to partner farmers across the country. Additionally, GAIL is developing a seed propagation facility to ensure availability of seeds locally, at affordable prices.

Harnessing the expertise and reach of its business, FMN through Golden Fertiliser Company Ltd, has continued to flourish in Nigeria as the farmers' friend, with its flagship brand "Golden Fertiliser" providing an array of blended NPK variants, an effective distribution network and



Image Credit: FMN

insurance for its quality fertilisers. This insurance is a partnership between Pula and Leadway Assurance, ensuring compensation for a shortfall in expected yield on the area planted by the farmer. The organisation is also participating in the Federal government's presidential fertiliser initiative, providing fertilisers at a subsidised rate.

FMN has, over the years, further invested in the vertical integration of its business through the manufacture and marketing of laminated woven polypropylene sacks and flexible packaging materials. Through one of its divisions, Bagco, which is a manufacturer of total packaging solutions and Africa's largest and leading commercial manufacturer of premium bags sustained through state-of-the-art machinery. With a heritage of more than 47 years, Bagco supports both the industrial and agricultural sectors of Nigeria, by supplying quality polypropylene sacks and flexible packaging materials.

FMN continues to demonstrate its commitment to the environment and corporate social responsibility by engaging only in sustainable business activities and social investments to improve the lives of communities where it does business. **1B**



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As a company that constantly strives to exceed customer expectations, Bagtech continues to develop its products with the latest in digital technology.

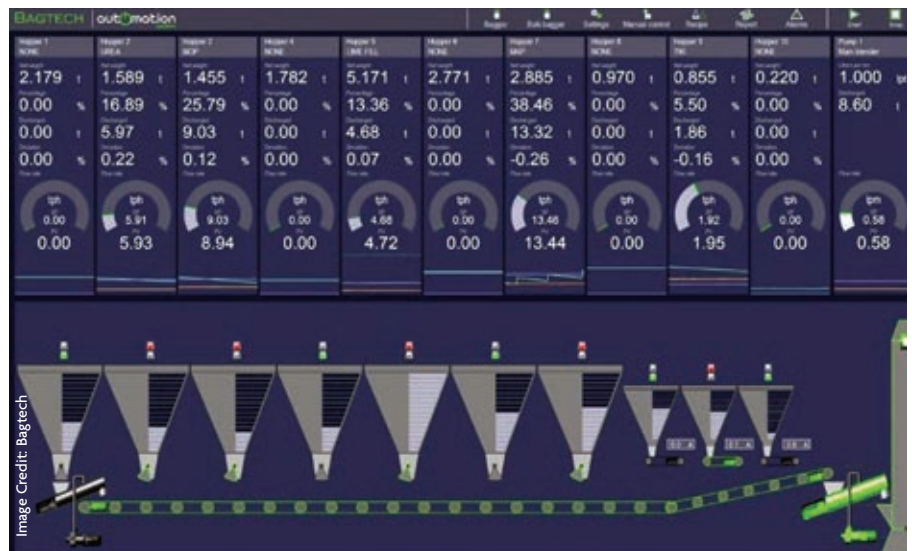
“From basic level sensors, Servo controllers, loadcell amplifiers, right through to the central plant controller, all devices are connected to a high-speed industrial network and accessible via the internet,” said Fred Coelho, CEO of Bagtech.

The core of digitalisation is the vertical integration of business value chains and the horizontal integration of production, using internet services. The objective is the ability to produce customised products in small lot sizes. Imagine, in the future, every product will have a digital counterpart – a digital twin – which contains all information pertaining to the real product. Machines and plants change their parameters and settings on the fly, based on the type of product they are running, without any human intervention.

**In all Bagtech blending systems, operators can see how multiple blends of widely varying sizes are easily changed during the course of a day, with little downtime.**

Let us imagine a scenario in the future: A precision farmer requires a specific fertiliser blend for a small section on the farm, based on data received from soil testing. The farmer opens an app and places an order for that particular blend. An enterprise resource planning (ERP) system and manufacturing execution system (MES) automatically plan and send a bill of materials (BOM) to the fertiliser blending plant.

The farmer is notified when the blend will be ready, based on the current production and order pipeline. Production is executed



The detailed operational information at one's fingertips when running Bagtech's automation system.

based on the farmer's requirements without human intervention.

For systems mentioned above to run flawlessly, maintenance needs an entirely different outlook. Waiting for something to fail before replacing it is not an option. However, replacing something before it fails indicates that its full life cycle may not have been used.

Digitalisation allows for everything to be monitored, and its data logged to cloud servers, right down to a simple sensor. Algorithms can monitor devices and pinpoint anomalies before they become critical. Perhaps the maintenance department would like a notification when a specific part has done a set number of cycles to schedule a replacement. This is digital maintenance.

### Bagtech automation

In all Bagtech blending systems, operators can see how multiple blends of widely varying sizes are easily changed during the course of a day with little downtime. Other characteristics of this industrial automation are the ability of assistance systems to support humans by aggregating and visualising information comprehensively for making informed decisions and solving urgent problems at short notice. Interfaces where people and machines meet are

designed to be simple and intuitive in nature with free use of graphical communication being leveraged to unclutter these spaces. On this system, the motor drives can be accessed and set remotely, allowing feedback and adjustment.

Secondly, the ability of cyber physical systems to physically support humans by conducting a range of tasks which are unpleasant, too exhausting, or not safe for their human co-workers. This can be seen in the procedure for finding the exact mass flow rate of a given raw material, which can differ even within the same raw material batch due to separation of fines. Breakdown of the product over time can physically alter the characteristics of the stock.

The procedure for finding the mass flow rate of a raw material and changing the value to be in line with the bulk discharging at that moment is now automated to reduce repetitive work and to allow this task to now be carried out by a shift supervisor. The function is now self-learning, and the plant automatically allows for variations in the raw material.

The opportunity to have business growth simplified in a screen and being ready for the digital era is always the best and easy way to improve the productivity of the fertiliser business. **B**



**LEMKEN partners with Sulky for fertiliser spreaders**

LEMKEN HAS PARTNERED with the agricultural soil preparation, drilling and fertilisation solutions provider Sulky Burel. From November this year, LEMKEN will expand its product portfolio and provide Sulky fertiliser spreaders in its own, blue design.

The product range comprises three series with a total of five models, which LEMKEN retail partners will distribute in Germany, Austria, Switzerland, the Benelux countries, Ireland, the UK and Poland.

The three series including Spica, Tauri and Polaris come with tank volumes from 900 to 4,000 litres and a broad range of control options, from a basic version through to 100 per cent ISOBUS.

According to LEMKEN, the new fertiliser spreaders meet the most stringent requirements regarding the precision of



LEMKEN Tauri.

Image Credit: LEMKEN

application and economy, complementing the company's existing product portfolio in tillage, sowing and crop care.

The companies focus on developing innovative technology

which is strongly aligned with farmers' current needs. Nicola Lemken commented that the partnership will allow the company to support its customers better.

"Optimally harmonised processes, from stubble cultivation through to fertilisation, produce clear economic and agricultural benefits to farmers," Nicola Lemken added.



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# New technologies for the insect industry

**B**ÜHLER HAS DEVELOPED a string of technologies and capabilities to offer total rearing and processing solutions for the insect industry.

“Our proposition to the market is to support the industry through solutions that produce and process a range of insect species,” says Andreas Aepli, CEO Bühler Insect Technology Solutions.

The first industrial black soldier fly plant opened in June. Bühler is executing a new facility for a second species, the yellow mealworm.

Livestock production, especially the pig industry, is under enormous pressure because the already tight margins continue to decline – in particular in Europe. While retail prices for pork have remained broadly stable, farm gate prices for pigs have plunged to levels where many producers are struggling to break even. Furthermore, production costs are on the rise, since grain prices have increased substantially and feed makes up 75 per cent of the cost to produce pig meat. That is why the number of pig producers, who have already destocked or are leaving the industry completely, is rising. These producers are now looking for alternative but more



Insects can be produced anywhere in the world and can be used almost directly as a high-quality source of nutrition and protein.

Image Credit: Adobe Stock

sustainable businesses, in which they can leverage their animal farming skills.

**Alternative proteins are in high demand and innovative sources such as algae, fungi, single-cell bacteria as well as insects are on the rise.**

### First project for the new species

A first project has been started in the Netherlands with a farmer who has already worked on the concept of producing yellow mealworm in an old pig farm. Bühler will support the project and design, installation and commissioning of a complete mealworm production facility in a 2,300 sq m facility.

“With this project we will set the bar on modularised mealworm production in an automated and hygienic way,” says Aepli. “Our technological solutions can be readily integrated into existing farms, but larger-scale facilities can also be realised.”

### Yellow mealworm as an alternative

The yellow mealworm (*Tenebrio molitor*) offers interesting market opportunities in predominantly food applications. They have

a great nutritional value which includes proteins, fatty acids, vitamins, minerals, and dietary fibres.

Thus, they are used in various food products with very attractive marketing concepts. While the mealworm market has shown significant growth in the last years, the global market size is predicted to even exceed its current growth rate. In addition, mealworm farming could offer a new and stable production and commercialisation outlook for farmers. Another interesting aspect of mealworm farming is the resource use.

Mealworms can grow on, for instance, wheat bran and rice husks, by-products that many existing Bühler customers produce and could get increased value out of.


Globally, the pressure on protein is rising as the worldwide population is expected to rise to around 10 billion by 2050. The global supply of protein is under pressure due to land erosion, ocean depletion and climate change. Alternative proteins are in high demand, and innovative sources such as algae, fungi, single-cell bacteria as well as insects are on the rise. Insects offer one of the biggest potentials as they can be produced anywhere in the world and can be used almost directly as a high-quality source of nutrition and protein. 

Image Credit: Bühler



Andreas Aepli is the CEO of Bühler Insect Technology Solutions.



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## Funding farmers

THE BAYER FOUNDATION has launched a US\$22.07mn Social Innovation ecosystem fund, awarding US\$3.31mn to four pioneering social innovators, namely myAgro, MercyCorps, Path and Living Goods.

Bayer's four awardees will provide more than one million people in African farmer households with access to entrepreneurial solutions that increase their crop yields and access to health services. The investment is in line with Bayer's objective to improve the lives of 100 million smallholder farmers and their family members by 2030.

The four awardees will use the funding to scale innovative nutrition and health programs across Senegal, Mali and Uganda. myAgro will train 200,000 smallholder farmers in Mali and Senegal to increase their yields and provide health interventions including deworming and nutrition training for 250,000 children in farming households.

The fund aims to scale up technology and entrepreneurial solutions that can lift African smallholder farmers out of poverty.

MercyCorps will deploy a data platform based on weather, GPS and crop type to connect 200,000 smallholder farmers with farming input



The initiative is set to enable smallholder farmers to drive the development of local markets.

Image Credit: BAYER

providers. Living Goods will train 350 community health workers in Uganda to reach 280,000 families, strengthening the country's health system. Path will deploy a programme to fight malaria in the Tambacounda region in Senegal. This initiative is set to reach 125,000 people directly and 700,000 via TV spots, as part of its effort to eliminate malaria in these farming communities.

"With our funding, we aim to provide health and agricultural expertise and services to smallholder farmer communi-

ties via local organisations," said Monika Lessl, executive director of the Bayer Foundation. Lessl said this while speaking at Bayer's first Social Innovation Day, which convened social entrepreneurs, NGOs, corporations, funders, government representatives and academia in Berlin to build partnerships.

Lessl added, "The support will enable smallholder farmers to further develop their entrepreneurial ideas, create jobs and increase their income. This can be achieved in a systems' approach, which is

why we are building an inclusive ecosystem of cross-sector partnerships."

Liam Condon, member of the Board of Management of Bayer AG and president of the Crop Science Division, commented, "These social entrepreneurs have developed innovative and inclusive business models that will enable smallholder farmers, who currently have little purchasing power, to develop and drive the development of local markets. This is a huge step towards lifting their communities out of poverty."

### Progress so far

Bayer's collaboration with myAgro has boosted the income and productivity of 46,000 smallholder farmers. Bayer has collaborated with One Acre Fund to advance two programme innovations for smallholder farmers in Kenya and Rwanda. These include an improved poultry delivery model, which has delivered hybrid chickens to an estimated 33,000 farmers through partnerships with local brooders, and the expansion of digital technologies within One Acre Fund's programme, improving their services for more than 600,000 smallholder farmers this year.



Bayer has collaborated with One Acre Fund to advance two programme innovations for smallholder farmers in Kenya and Rwanda.

Image Credit: Adobe Stock



With the increasing use of artificial intelligence, robotics is gaining ground in harvesting.

# Robotic technology to transform harvesting

**T**HE HARVESTING ROBOTICS market which is getting popular in many countries to tackle rising labour cost and increase farm profitability. Harvesting robotics are applied in several agricultural aspects including horticultural sector, greenhouse urban agriculture as well as harvesting of strawberries, tomatoes, barley, peppers, lettuce, grapes, apples and other agricultural produce.

Modern farming is way more complicated than conventional farming methods. Besides the right use of pesticides, herbicides and fertilisers, the final harvesting timing is very crucial, which relies on a fully data-driven approach to understand the state of the crop. Addressing this, the use of robotic applications can be very important as they provide timely surveillance of the field, accurate evaluation of crop yield, final harvesting time as well as autonomous harvesting.

## Harvesting robots for pepper

In an EU project, researchers of Wageningen UR and international colleagues developed a prototype of a harvesting robot for peppers. The robot searches for the fruits, takes 3D pictures of them, assesses their colour and shape and harvests those that fit the requirements.

The sweet pepper harvesting robot has been developed within the EU project "Clever Robots for Crops" (CROPS). The CROPS robotic platform will be capable of site-specific spraying (targets spray towards foliage and selective targets) and selective harvesting of fruit (detects the fruit, determines its ripeness, moves towards the fruit, grasps it and softly detaches it).

In strawberries, barley, wheat, grapes and apples too

In line with the Industrial Revolution 4.0, especially in agriculture, robotics is being used in many agricultural produces. Companies such as Agrobot and Harvest Croo have developed robotics solution for the picking of strawberries.

The "Hands Free Hectare" project by the researchers at Harper Adams University and



Image Credit: Adobe Stock

Robotics is being used in many agricultural produces.

**The use of robotic applications can be very important as they provide timely surveillance of the field, accurate evaluation of crop yield, final harvesting time as well as autonomous harvesting.**

agricultural company Precision Decisions harvested crops such as spring barley and winter wheat using autonomous vehicles and drones in rural England.

Robotics has been used in wine grape harvesting as well. The French Pellenc is one of the wine and grape machine makers that aim to provide sustainable mechanical harvesting solutions for grapes. The Israeli company FFRobotics has developed technology to provide robotics solutions in apple harvesting.

The University of Plymouth is bringing researchers together with producers in Cornwall to create robots which could potentially work alongside their existing workforces and ensure any availability gaps

are filled. The Automated Brassica harvest in Cornwall (ABC) project aims to develop technology to help with the cauliflower harvest as well as other fieldwork operations.

Tomato harvesting robots getting popular in Japan

As the country's elderly population is rapidly increasing, Japanese agriculture faces a decrease in farmworkers. According to Panasonic Corporation's report, whereas the number of people engaged in Japan's agriculture was 3,353,000 in 2005, it dropped to 2,606,000 in 2010 and 1,922,000 in 2016.

Therefore, agricultural high-tech is a viable solution to these problems and so, AI-driven harvesting robots are gathering attention.

Panasonic Corporation has deployed a harvesting robot at an advanced farm in Japan. The farm contains three glass greenhouses covering a total of five hectares and cultivating several types of tomatoes. Robots are harvesting a portion of these tomatoes for verification, thus aiming to increase productivity and improve functions. **B**

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## WEDA develops effective animal control solution

THE LOWER SAXONY animal house outfitter WEDA Dammann & Westerkamp has unveiled Smart.Light solution with an aim to render animal control easy and efficient for the house staff.

According to the company, with the help of this innovation, the status of feed intake of the individual animals or pens is indicated directly at each valve in the house.

The Smart.Light aims to ease and speed up animal control in the compartment. Due to the LED lamp, which is visible from a distance and displays different colours, animals with deviating feeding behaviour can be identified immediately.

This means daily animal control is optimised, and animals that fall ill can be treated much sooner than in the past, the company says.

## GODAN strengthens multilateral co-operation in Africa

GLOBAL OPEN DATA for Agriculture and Nutrition (GODAN) has announced an MoU with the Regional Centre for Mapping of Resources for Development (RCMRD) to extend capacity development efforts within countries located across Eastern and Southern Africa.

The partnership, aimed at developing geo-information services and ICT products among its member states, is set to see parties work closely together on geospatial solutions which will enhance African collaboration with both the Secretariat and its extensive partner network. They discussed activities including open data sourcing, working groups and publications and research papers.

Kenya, South Africa, the Democratic Republic of the Congo, Sudan, Kenya, Uganda, Sierra Leone, Rwanda and Ghana are part of this 15-country agreement.

GODAN seeks to support global efforts to make agricultural and nutrition-relevant data available, accessible and easy-to-use on a global scale, by building high-level policy, public and private institutional support for open data.

Speaking about the initiative, Andre Laperrière said, "Africa has continued to enhance its position as an innovative region, and much of this is due to its developing framework for the gathering, managing, and analysing of data which is instrumental in helping to make smarter, more informed decisions. RCMRD has been at the forefront of this for many years, responsible for many of the open data benefits countries in the initiative have experienced.

"This collaboration aims to provide a platform to strengthen multilateral collaboration within the region and will provide an example for the rest of the world to emulate. This is an exciting time for all parties, and we expect to see Africa becoming a hub for technological advancement with the next few years.

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