

African Farming

and Food Processing

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Paying attention to egg orientation

The new crop

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Image credit: Adobe Stock



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Farming Calendar 2019

AUGUST

1-3	Kenya FOODAGRO AFRICA https://www.expogr.com/kenyafood/	NAIROBI
14-16	Africa Dairy Conference and Exhibition https://www.dairyafrika.com/afda/	NAIROBI
27-28	African Farming's 2nd Edition Agribusiness Summit www.agroinvestmentsummit.com	ABUJA

SEPTEMBER

2-4	EuroTier Middle East https://www.eurotiermiddleeast.com/	ABUDHABI
16-18	HortiFlor Expo hpexhibitions.com/hfz	HARARE
23-24	African Farming's 2nd Edition Agroinvestment Summit www.agroinvestmentsummit.com	LONDON

OCTOBER

1-3	Africa Fertiliser Agribusiness Conference events.crugroup.com/estafrica/ho	CAPE TOWN
2-3	Poultry Africa www.poultryafrica2019.com	KIGALI
17-19	Tanzania FOODAGRO AFRICA www.expogr.com/tanzania/foodexpo	DARES SALAAM
30-31	Commercial Farm Africa https://www.cmtevents.com	NAIROBI

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

African Development Fund impacting lives of millions

IN 38 OF the continent's neediest countries, the Fund is creating linkages to promote regional integration, commercial exchanges and enhance food security by investing in power projects, roads and bridges, and other critical industrial and livelihood buildouts. For instance, a 107km road in South West Madagascar financed by the fund, is helping farmers get their crops to market centres and facilitating the sick to be transported quickly for medical assistance and Zambia's Tezhi Hydro Power project is celebrated for providing clean and renewable electricity to nearly a million people.

ICRC helps farming community in Nigeria's Wuro Dadi

THE INTERNATIONAL COMMITTEE of the Red Cross (ICRC) has helped conflict-affected families in Wuro Dadi, north-eastern Nigeria, by rebuilding houses, distributing maize and rice seeds for planting and providing cash to purchase fertiliser and farming or fishing tools.

Wuro Dadi village, situated on the banks of the Benue River, has been adversely affected by communal violence.

Its residents are predominantly farmers and fishermen. They grow grains and vegetables and fish from a nearby freshwater pond, which is fed by the annual flood waters of the Benue River. Since the attacks, no one has been able to return to their farms.

The seeds and cash that were distributed to the families in Wuro Dadi is part of the ICRC's wider agricultural assistance to victims of armed conflict and other situations of violence in Nigeria.

The distribution targeted more than 80,000 families in nine states including Borno, Adamawa and Yobe in the North-East, Plateau, Bauchi, Benue, Nassarawa, Kaduna in the north-central region and Cross River located in the south.

With the planting season well underway in Nigeria, the people of Wuro Dadi hope to return to farming their lands as they work towards being self-sufficient again.

Avocados, coffee and citrus fruit threaten global food security, says study

A STUDY BY researchers at University of Maryland found how Western appetites for foods like avocados, coffee and citrus fruit are threatening global food security, having looked at 40 years of data.

"The impact of western dietary preferences has started to pose a serious threat to global food security and the environments in which they are grown. This is because the increasing demand for crops such as avocados, citrus and coffee alters the natural cycle of the environment in which they are produced," said Andre Laperrière, executive director of Global Open Data for Agriculture and Nutrition (GODAN).

GODAN is the UK, USA, United Nations and Food and Agriculture Organisation (FAO) supported initiative that backs the proactive sharing of Open Data to make information about agriculture and nutrition available, accessible and usable to deal with the urgent challenge of ensuring world food security.

"If insects and pollinators such as bees are not able to receive year-round nutrition from plants with diverse blooming patterns,



Farmers and those who control the process of agriculture should impose practices that do not disturb the environmental cycle.

Image Credit: Adobe Stock

they face a serious existential threat which could alter the balance of our global food cycle," added Laperrière.

Research has shown a need for more crop diversity and pollinator-friendly methods of farming as a means of restoring a balance to the ecosystems where produce is grown.

"It is therefore essential that farmers and those who control the process of agriculture

impose practices that can work with the environment. All this can only be recognised and actioned if we have the relevant open data and information released by the stakeholders to identify the patterns – supermarket demands, consumption patterns, the food origins, carbon footprint, agricultural output and the environmental reaction," he further added.



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AfDB, Portugal and Cabo Verde to accelerate agribusiness

THE AFRICAN DEVELOPMENT Bank (AfDB) and the governments of Cabo Verde and Portugal have signed a country-specific memorandum of understanding to implement the Lusophone Compact, which aims to transform sectors including agriculture, the blue economy and small-scale industry to support inclusive growth in Portuguese-speaking African countries.

The signing took place on Sal Island on July 1, between Olavo Correia, vice-prime minister and minister of finance of Cabo Verde, Helena de Paiva, Portugal's ambassador to Cabo Verde and Moono Mupotola, AfDB's director for regional integration.

"We are confident that the Compact will assist us in diversifying and strengthening Cabo Verde's economy in the coming years," Correia said.

The focus will primarily be on renewable energies, agribusiness and agricultural value chains, water and sanitation, infrastructures, tourism, financing and ICT.

Ghana and Cote d'Ivoire farmers plan to hike cocoa prices

STAKEHOLDERS IN THE cocoa industry from Ghana and Cote d'Ivoire have succeeded in convincing international processors, manufacturers and traders of cocoa beans to accept to pay US\$2,600 for a tonne of cocoa beans at a two-day meeting, occasioned by Presidents Akufo-Addo and Alassane Ouattara of Ghana and Cote d'Ivoire respectively.

The floor price is the minimum price below which a producer will not sell their beans to a trader. The commodity is selling for a little more than US\$2,500 per tonne currently on the market.

Joseph Boahen Aidoo, CEO of the Ghana Cocoa Board (COCOBOD), who announced the outcome of the deliberations, also revealed that a lot of calculation had gone into the determination of the floor price. According to him, issues such as the tillage, planting, taking care of the plants, weeding, pruning, fertilisation, spraying, the cost of transporting the beans from farms to the house for drying and margin for buyers, among others, had been considered.

Agricultural output growth to keep food prices low over the coming decade

ACCORDING TO AN annual report by the Organisation for Economic Co-operation and Development (OECD) and the UN's Food and Agriculture Organisation (FAO), global demand for agricultural products is projected to grow by 15 per cent over the coming decade, while agricultural productivity growth is expected to increase slightly faster.

"Global agriculture has evolved into a highly diverse sector, with operations ranging from small subsistence farms to large multinational holdings," FAO director-general José Graziano da Silva and OECD secretary-general Angel Gurría wrote in the foreword of the report.

The outlook projects that yield improvements and higher production intensity, driven by technological innovation, will result in higher output even as global agricultural land use remains broadly constant. Direct greenhouse gas emissions from agriculture, meanwhile, are expected to grow by 0.5 per cent annually over the coming decade, below the 0.7 per cent rate of the past 10 years.

At the same time, new uncertainties such as, disruptions from trade tensions, the spread of crop and animal diseases, growing resistance to antimicrobial substances, regulatory responses to new plant-breeding techniques, and increasingly extreme climatic events, are emerging. Uncertainties also include evolving dietary preferences in light of health and sustainability issues and policy responses to alarming worldwide trends in obesity.

Worldwide, the use of cereals for food is projected to grow by about 150mn tonnes over the period – amounting to a 13 per cent increase – with rice and wheat accounting for the bulk of the expansion, largely due to



The outlook project yields improvements and higher production intensity, driven by technological innovation.

the projected growth in population growth, which is expected to rise fastest in Sub-Saharan Africa and South Asia.

"The outlook makes it abundantly clear that trade is critical for global food security," said OECD director for trade and agriculture Ken Ash. "Regions that are experiencing rapid population growth are not necessarily those where food production can be increased sustainably, so it is essential that all governments support open, transparent and predictable agro-food markets."

Consumption levels of sugar and

vegetable oil are projected to rise, reflecting the ongoing trend towards prepared and more processed foods, notably in many rapidly-urbanising low and middle-income countries.

In addition, the demand for feed crops is projected to outpace animal production growth in countries where the livestock sector is evolving from traditional to commercialised production systems, while the use of agricultural commodities as feedstock to produce biofuels is expected to grow primarily in the developing countries.

Image Credit: Adobe Stock/mariesacha

FAO study urges smarter use of small pelagic species

SMALL FRESHWATER FISH around Africa offer an opportunity to boost food and nutrition security, according to a new Food and Agriculture Organisation (FAO) working paper, investigating an array of species and related livelihoods.

Small pelagic fish, generally processed, sold and eaten whole, account for three quarters of the total inland fish catch of the continent but because of their low economic value they are not given the attention they deserve. Yet, their unparalleled production rate and simple technologies used for their capture, make them ideal in nutrient-deficit regions.

In Africa's Lake Victoria, for instance, the introduction of Nile Perch fostered a lucrative industry. Yet, catches of dagaa - an endogenous sardine like cyprinid - actually contribute more to fisheries output by weight and in terms of regional food security.

Ensuring that these vital "vitamin fish" are accessible and available for human consumption hinges on "profoundly social, economic and political" transformations in areas ranging from governance to marketing, the report says. The fish in question are often seen as "trash fish", and catching them is often illegal due to rules drawn to protect higher-value and larger fish species.

"The largely unmanaged shift of many African fisheries towards small species may in fact, represent a shift to more balanced harvesting, rather than a sign of overfishing of species higher up in the food chain," said Jeppe Kolding, a professor of biology at the University of Bergen in Norway and lead author of the technical report. It suggests that potential catches of small species in Africa's lakes and rivers could be sustainably increased - a significant opportunity to tackle Africa's hunger and nutrition challenges.

Africa is the only continent with large, natural tropical lakes, and boasts around 1.3 million square kilometers of freshwater resources, including lakes, rivers, reservoirs, floodplains and swamps. Its small fish species consist of mostly zooplankton feeders such as herring and minnows, which weigh only a few grams and are less targeted than larger species such as breams, carps and perches.

While small, they reproduce their own biomass at twice or more the pace of their fancier peers, reaching rates of five times per year and higher. As a result, from an ecosystem perspective, the fishing pressure on most of them is only a fraction of that on rivals higher up the trophic ladder that draw the attention of fisheries managers and policy makers, and drive a pessimistic

narrative about unsustainable fishing in African freshwaters. A focus on small species may allow Africa to significantly increase its production of inland fish, the report says.

The focus on large, often predatory species can result in complex conflicts between fisher folk and fisheries managers tasked with carrying out expensive enforcement efforts to protect higher value species, said Felix Martin, a FAO fisheries resources officer and co-author of the report. It also leads to "missed opportunities and investments" in a sector rich in promise for

providing relatively cheap, local and highly nutritious commodities on a continent with the lowest per capita supply of animal-sourced protein, he said.

The study - which complements a recent report by the same authors on Fisheries in the Drylands of Sub-Saharan Africa offers a review of numerous tiny species and fisheries around Africa in an effort to fill a knowledge gap that has led to the paradox of rules meant to promote sustainability actually hinder opportunities for maximizing yields while maintaining viable ecosystems.



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ASC releases revisions for freshwater trout and salmon standard

THE AQUACULTURE STEWARDSHIP Council (ASC) has updated salmon standard and freshwater trout standard following a rigorous multi-stakeholder and science-based review process.

This is as part of ASC's ongoing commitment to continuously improve standards and adapt to changes in the industry.

The revision is set to resolve inconsistencies between the two standards, meaning all freshwater salmonid farming, including salmon smolt production, will now be audited against the freshwater trout standard, which is specifically designed to minimise freshwater impacts.

Vaccination programme for livestock owners in Sudan

INTERNATIONAL COMMITTEE OF the Red Cross (ICRC) and the Sudanese Ministry of Animal Resources have undertaken a joint vaccination programme to vaccinate livestock against common diseases.

The programme, which is a re-launch following the last one held in 2013, will be undertaken continuously until 2021 and is aimed at vaccinating 300,000 animals in North Darfur, 200,000 in Central Darfur, 100,000 in South Darfur and 100,000 in West Kordofan.

In addition to vaccinations, the ICRC and the Ministry are providing agricultural extension training to 100 veterinary technicians from North Darfur, Central Darfur, South Darfur, South Kordofan and Blue Nile States.

African crop disease researchers to improve skills following training event

HUNDREDS OF RESEARCHERS working on crop diseases carried by insect vectors in Sub-Saharan African countries will have their knowledge and skills improved as a result of a ground-breaking training course run by the UK government-funded CONNECTED network.

A group of early career researchers from 11 African countries took up fully-funded places at the V4 (Virus-Vector Vice-Versa) Development Programme in June 2019, held at The University of Bristol, UK.

Determined to find new solutions to plant diseases that threaten food security, CONNECTED used the training to draw together a blend of researchers: plant virologists and entomologists.

At the end of the two-week event, those who attended were asked about their intention to share what they had learned with others in their professional networks and how many people this would involve. Delegates confirmed they would share information with hundreds of colleagues in a variety of means, with overall feedback showing the dissemination is now taking place to a minimum of 400 people in countries across Africa.

Prof Neil Boonham, CONNECTED network co-director said, "CONNECTED is bringing together plant scientists and entomologists to find ways to tackle vector-



The V4 development programme brought together a blend of researchers: plant virologists and entomologists.

borne plant viruses.

"The V4 Development Programme formed a key part of the CONNECTED network's formation of new collaborations to address food security challenges in Sub-Saharan Africa. It's very exciting to consider the potential impact that delegates' sharing of knowledge and skills will have on improving crop yields.

The programme combined scientific talks, general lab training skills, specific virology and entomology lectures and practical work, workshops, field visits, career development, mentoring and desk-based projects. During the training event, delegates received peer mentoring and team-building input, as well as inputs focused on helping them communicate their science to a range of audiences.

Plant diseases significantly limit the ability of many of Sub-Saharan African countries to produce enough staple crops such as cassava, sweet potato, maize and yam. Farmers face failing harvests and are often unable to feed their local communities as a result. The diseases ultimately hinder the countries' economic and social development, sometimes leading to migration as communities look for better lives elsewhere.

Findings from delegate feedback also included - 94 per cent of delegates said the new knowledge and skills they acquired during V4 will improve the quality of their research 'a lot' (the highest possible rating), 82 per cent gave the highest possible rating when asked about the relevance of the training to their own professional development and 94 per cent will strongly recommend a CONNECTED training course to others.

OLMIX: Using marine algae to improve immune transfer through maternal milk

AS PART OF a partnership between Olmix Group and the Joint Research Unit for Infectiology and Public Health at INRA Val de Loire, an in vitro study was carried out on differentiated porcine intestinal epithelial cells.

The results showed that the extract of sulphated polysaccharide-rich green algae (MSP IMMUNITY) modulates the production of immune mediators (cytokines and chemokines) involved in the proliferation, differentiation and migration of immune cells.

In the continuity of these results, an in vitro study was carried out on gilt pigs during late gestation to assess the adjuvant effect of MSP IMMUNITY product in an atrophic rhinitis vaccination programme.

The addition of MSP IMMUNITY to the feed of lactating sows vaccinated with a bivalent vaccine containing *Pasteurella multocida* and *Bordetella bronchiseptica* strains increased the content of antibodies (IgG and IgA) in the colostrum and

milk from the beginning and throughout the lactation period.

These preliminary data show that the addition of MSP IMMUNITY to the feed could improve the transfer of lactogenic immunity (through the colostrum and milk) and protect newborn piglets from infection and reduce the use of antibiotics in livestock.

However, the mechanism of action underlying the adjuvant activity of MSP IMMUNITY has not yet been determined.

FAO distributes bulls and other livestock in Nigeria's Borno State

FAO HAS LAUNCHED a massive livestock restocking campaign, targeting vulnerable youth and women in northeastern Nigeria's Borno State.

FAO's campaign is a part of an agricultural support programme, funded by the European Union Trust Fund (EUTF), to support conflict-affected youth for employment and income generation. As of May 2019, FAO has distributed a bull each to 450 youth in Jere, Konduga, Mafa and Dikwa local government areas (LGAs). In Borno, a total of 2,000 bulls will be distributed to youth by 2020.

Beneficiaries will be supported with cash to meet their daily needs while they fatten the animals, disincentivising the premature sales of the bulls. It is envisaged that after six months of fattening, beneficiaries can earn between US\$420 and US\$550 from the sale of each bull. Earnings can be re-invested into another cycle of bull fattening or for strategic investments in petty trading, small shops, etc. The livestock restocking campaign is part of an expansive agricultural support programme, designed to assist 100,000 vulnerable farming households between 2018 and 2020 in Borno State.

Enhancing employment beyond the FAO intervention

"Youth employment is an antidote to radicalisation and is crucial to sustaining peace in volatile regions such as northeastern Nigeria," said Suffyan Koroma, FAO representative in Nigeria. "Through these bulls and other livestock, the livestock value chain in the state,



Image Credit: Red Waddington/Flickr

The inputs are expected to contribute to the restoration of agricultural livelihoods in the State, boost employment and income generation and enhance household nutrition.

which has been affected by the conflict, can be restored and youth will be at the helm of this restoration," Koroma shared.

Under the EUTF project, 4,500 female-headed households are targeted for goat (three females and one male) distribution, and 2,000 youths are targeted for bull distribution. In addition, 24,000 pullets will as well be distributed to 2,000 women in the state. Each woman will get ten pullets and two cockerels. These inputs are expected to contribute to the restoration of agricultural livelihoods in the State, boost employment and income generation, and enhance household nutrition.

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Luke Barnard, a scientist at Danisco Animal Nutrition, a business division of DuPont Industrial Biosciences, has presented a case study on optimal phytase dose.

Maximising phytase profitability



Image Credit: Adobe Stock

Choosing a phytase that delivers quick and effective results is perhaps the most critical step on the path to profitability.

PHYTASE DOMINATES THE monogastric feed enzymes' market and is worth more than US\$500mn a year. Advanced phytases have the potential to deliver production savings of several times that amount through their ability to optimise phosphorus digestibility and uptake as well as increase the availability of energy and amino acids.

The discussion on the best dose of phytase to use for ensuring maximum profitability remains unresolved. Industry standard doses - 500 FTU/kg for broilers and 300 FTU/kg for layers, were introduced more than 20 years ago when phytases were less bio-efficacious, more expensive and less was known about phytate.

Continuing to follow these recommendations could mean losing out on opportunities to maximise the return on investment producers achieve from phytase use. There are some vital considerations for calculating the optimal dose of phytase.

The problem with phytate

Phytate, an anti-nutrient that occurs naturally in feed materials, is estimated to cost the global poultry industry US\$2.1mn a year because of its negative impact on bird performance. It should, in theory, be a valuable source of phosphorus, but without phytase addition, this phosphorus 'pool' remains largely unobtainable to the bird because their own enzymes can't degrade phytate effectively.

Phytate also reduces the availability of essential nutrients such as calcium, protein/ amino acids, iron and zinc to the animal because it binds with these nutrients in various parts of the digestive tract. Higher doses of phytase break down the phytate molecules more rapidly in the digestive tract releasing more nutrients earlier in the gastrointestinal tract to improve growth performance and reduce challenges related to bone mineralisation, phosphorus and calcium metabolism and skeletal disease.

Research has shown that achieving maximum degradation of phytate is a major factor in the release of 'extra-phosphoric' nutrients (for example, amino acids and energy).

Choosing a bio-efficacious phytase

The essential metric is the amount of phosphorus that can be liberated from phytate and absorbed by the bird.

A phytase's ability to replace expensive amino acids in the diet through rapid phytate degradation early in the gastrointestinal tract is another driver of value. Phytases have specific pH optima at which they function at their best. In order to improve phosphorus

uptake and reduce the anti-nutrient effects of phytate, a phytase needs to be highly active at the low pH conditions prevailing in the upper digestive tract.

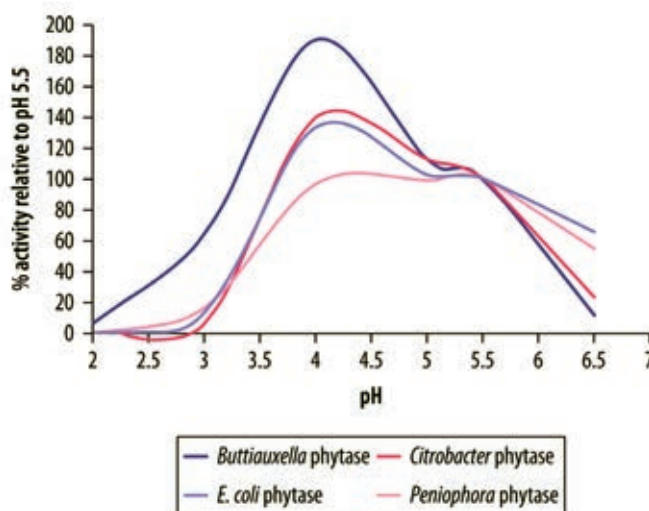
The faster the phytase gets to work, the more the anti-nutrient effect of the phytate molecule in the upper gut can be reduced and the more nutrients are released for the animal to absorb from the digestive tract.

The latest highly bio-efficacious Buttiauxella phytase offers great cost-effectiveness because it offers much higher activity earlier in the gastrointestinal tract.

Figure 1 shows that the activity of this advanced phytase against three other commercial phytases at this early stage is almost double the activity at pH 3.5, indicating the phytase is highly active at this lower pH. This ensures both that the anti-nutrient effects of phytate are minimised and that the time available for nutrient digestion and absorption is maximised. Independent trials at the Schothorst Feed Research Institute in 2012 showed that this phytase offers 79 per cent higher bioefficacy than an *E. coli* phytase.

This unprecedented ability to rapidly degrade phytate and maximise nutrient absorption equates to cost savings of US\$1.50 per tonne compared to *E. coli* phytases used at standard doses. It is also important to break the paradigm that these more efficacious

Figure 1 - Phytase activity at varying pH - Buttiauxella versus competitors.



phytases can be used at lower doses. Indeed, since highly efficacious phytases release more phosphorus at comparable doses, they should be included at higher levels to maximise the value they can deliver in terms of replacing expensive inorganic phosphorus in the diet. Barnard et al (2014) adopted a value-based approach to determine the optimal dose of Buttiauxella phytase in wheat-based laying hen diets.

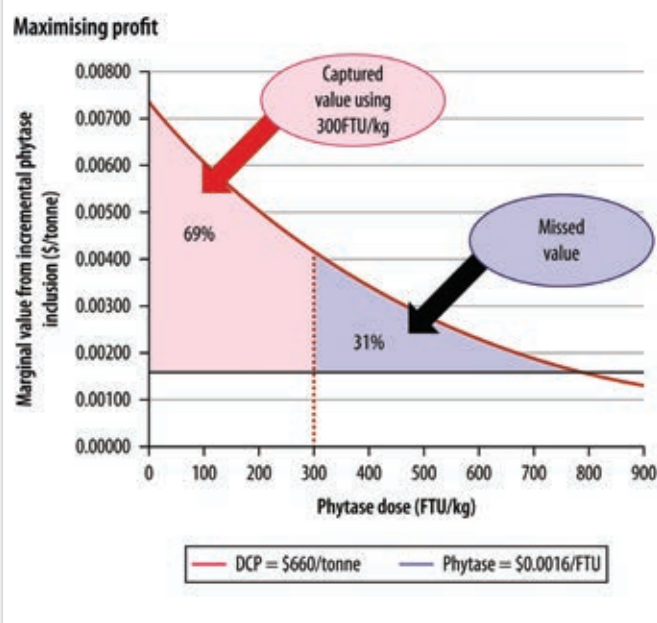
In this experiment, the optimal dose calculated was between 580-985 FTU/kg feed depending on the cost of inorganic phosphorus and the cost of phytase (based on +/- 20 per cent of typical market costs from early 2013). In any case, the optimal dose was higher than the previously used recommendation; this was due to the high levels of phosphorus release achieved with the Buttiauxella phytase. By limiting the inclusion of phytase to 300 FTU/kg feed approximately 31 per cent of the potential value to be captured from phytase was missed (Figure 2). Furthermore, this dosing method considered only the value from phosphorus and not any of the extraphosphoric effects.

Evidence-based dosing

Factors such as the age and type of the bird and its health status as well as diet need to be taken into account when calculating the optimum phytase dose. The amount of species-specific performance and digestibility data behind a phytase will determine how confident producers can be in applying the matrix values in a feed formulation.

As science opens the door to new phytase benefits and opportunities, producers should work closely with their suppliers to ensure the dose they are using is maximising their return on investment. ^⑤

Figure 2 - A value-based approach to optimal phytase dose for laying hens.



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Gerd de Lange, senior poultry specialist, Pas Reform Academy, has outlined the ways to ensure correct orientation of the eggs when placing them on setter trays.

'Correct egg orientation impacts quality and hatchability'



Orientation of eggs when placing them on setter trays is important.

Image Credit: Pas Reform

IT IS IMPORTANT to pay attention to the orientation of the eggs when placing them on setter trays as this has quite an impact on hatch results.

The embryo lies on the surface of the yolk and is connected to the latebra ('white yolk'), located in the centre of the yolk. The water-rich latebra has a lower specific gravity than the lipid-rich yolk and according to the laws of physics, the embryo will always move to the top of the egg.

By about day 14 the developing embryo lies on top of the yolk sac. It then turns so it lies lengthwise in the egg and by day 18 the embryo's head is under the right wing with the beak pointing upwards, ready to pierce the air cell (internal pipping) and inflate the lungs prior to finally emerging from the egg. But what if the air cell is out of reach of the embryo?

The air cell is situated at the blunt end between the shell membrane and the egg

membrane. The egg shell is more porous at this end and therefore air will enter here as the egg contents shrink due to cooling down after laying. During storage and incubation, the air cell gradually increases in size as water evaporates from the egg contents.

When eggs are set accidentally sharp-end-up, the head of the embryo is at the opposite end from the air cell and internal pipping is impossible. It is very difficult for

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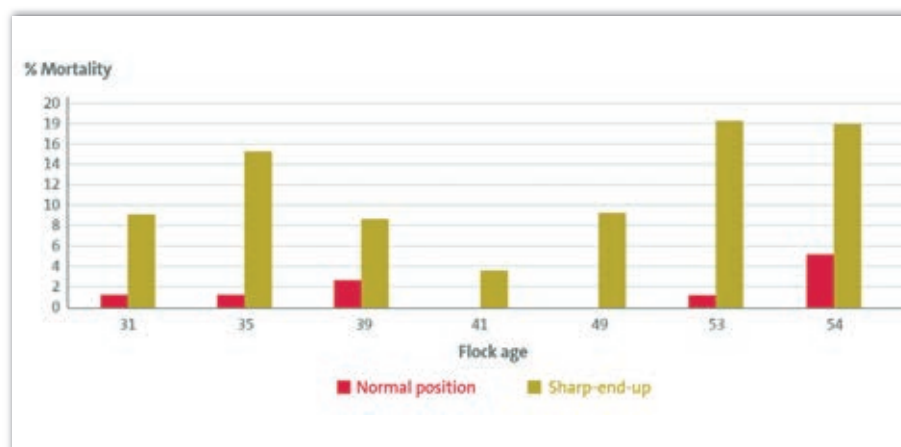
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the embryo to hatch in this position because it is fully dependent on the limited oxygen supply through the chorioallantoic membrane, and because the shell is stronger at the sharp end and there is less space for pipping and moving around. Unsuccessful embryos can be recognised during break-out of hatch residue by their legs being near the air cell; however not all eggs that are incubated sharp-end-up fail to hatch.

When eggs are set accidentally sharp-end-up, the head of the embryo is at the opposite end from the air cell and internal pipping is impossible.

A customer in Turkey carried out an experiment in 2016 using different breeds and flock ages. 300 eggs were set sharp-end-up and 300 eggs in the normal position. This resulted in 12.7 – 21.0 % lower hatch of fertile, mostly due to a difference in late mortality (see figure). Moreover, among the eggs that had been incubated



sharp-end-up there were more culled chicks. When sharp-end-up incubation is combined with in-ovo vaccination, the results are even more dramatic. A small-scale experiment conducted by a customer in Hungary in 2019 with 162 eggs per treatment resulted in 93 saleable chicks from sharp-end-up incubated eggs. When eggs in this position were also in-ovo vaccinated, only 39 saleable chicks were obtained. The control group (sharp-end-down and in-ovo vaccination) showed normal hatch results.

Advice

Lange points out the need that if 10 per cent of eggs are accidentally set sharp-end-up hatchability will be up to 2 per cent lower. It is important to train staff to set eggs with air cell up (sharp-end-down/blunt-end-up). It is good to consider automated sharp-end-down setting, especially in-ovo vaccination and also helps to pay more attention to egg orientation if you notice the 'legs near air cell' sign during break-out of hatch residue. ¹⁰



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Fyna Ashwath finds out more about the report by New Frontier Data on the impact of African hemp and cannabis cultivation around the globe.

Hemp is a hearty, environmentally sustainable crop with a low production cost.

Cashing in on cannabis

Image Credit: Adobe Stock/Lumppimin

AFRICA HAS A wealth of experience in the production of cannabis, but recent developments are helping to shine the spotlight on the potential offered by the industry.

With Lesotho legalising medical cannabis in 2017, followed by South Africa's functional legalisation in 2018, and now Zimbabwe approving the first project for its farming and processing, the growing market is making waves in Africa.

Legalisation of hemp cultivation in the continent's already agro-based economies could open vast medical and industrial avenues. The plant and the industries surrounding it can support several of the United Nation's current Sustainable Development Goals (SDGs), including those of highest priority to African citizens.

New Frontier Data, which provides analytics and reports to elevate the discussion around the legal cannabis industry globally, released its latest industry study, covering 13 African nations - The Africa Hemp and Cannabis Report: 2019 Industry Outlook.

What is cannabis?

Hemp and psychoactive cannabis (or marijuana) are varieties of the same plant, *Cannabis sativa*. Cannabis used for recreational and many medical purposes contains the cannabinoid THC, or tetrahydrocannabinol, the compound responsible for users' psychoactive highs, while hemp is defined as having less than 0.3 per cent THC (or less than 1 per cent THC in some

countries) and offers no psychoactive effects.

When cannabis is grown for its THC content, the plants are cultivated to maximize the size and quality of the flowers, generally resulting in shorter, wider plants. Hemp - used for a wide variety of purposes, from food to building materials to semiconductors, is planted more densely, and grows taller by comparison. While typically only the flowers are sought-after parts of THC-rich cannabis, the flowers, stalks, leaves, seeds of hemp can all be used for myriad purposes. Hemp is a hearty, environmentally sustainable crop with a low production cost.

New Frontier Data estimates Africa's overall market to account for 11 per cent of the total global cannabis market, with US\$37.3 bn in combined legal and illegal sales out of the total US\$344.4 bn worldwide.

Important takeaways

The latest report of New Frontier Data points out the following important aspects about the industry:

- Medical cannabis offers low-cost treatment for many widespread diseases and their symptoms.
- Hemp seed has the potential to address under-nourishment as a supplemental food, rich in protein and essential nutrients.

- Well-regulated medical cannabis and/or industrial hemp industries have potential to stimulate economic growth and create jobs around the continent.
- Hemp can benefit farmers by revitalising soil and boosting yields of other plants when used as rotational crop.

With increasing population, the projected growth in Africa's labor market estimated at 40 per cent by 2030 and consequently the need to develop labour-intensive industries, cannabis and hemp cultivation have the potential to help African countries to take advantage of untapped farmlands and drive employment.

New Frontier Data estimates Africa's overall market to account for 11 per cent of the total global cannabis market, with US\$37.3bn in combined legal and illegal sales out of the total US\$344.4 bn worldwide, in 2018.

The estimated value of global cannabis demand relies heavily on the country-level estimates for each the number of cannabis consumers, consumption volumes, and price levels. It is important to note that New Frontier Data's analysis does not make distinctions as to whether the consumption occurs in a legal medical, a legal recreational market, or an illicit market, and is solely an approximation of the totality of demand for cannabis across the world. The analysis does not include industrial hemp.

John Kagia, chief knowledge officer, New Frontier Data remarks, "Hemp seed is a superfood — it is one of nature's best

plant-based sources of protein. Hemp seed is rich in several essential amino acids, vitamins, and minerals (notably iron, zinc, and magnesium) which are lacking in many African dietary staples, leading to various negative health outcomes."

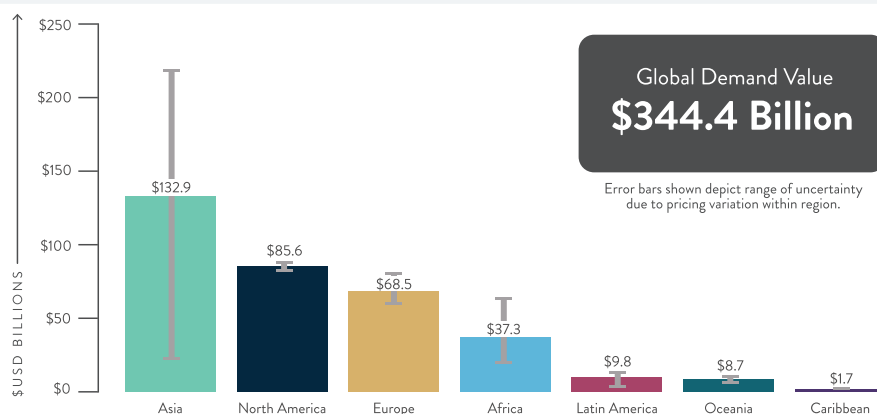
"Hemp seed is rich in several essential amino acids, vitamins, and minerals (notably iron, zinc, and magnesium) which are lacking in many African dietary staples."

"Furthermore, farmers who integrate hemp seed and hemp seed cake into their livestock feed report healthier, less disease-prone animals, and higher yields for market.

The nutritional benefits of hemp and its rapid growth cycle present an opportunity for hemp to serve as an emergency food intervention in communities facing acute food shortages, but it can also serve as a low-cost nutritional enhancement to the diets of impoverished communities," he adds.

Commenting on hemp's potential impact

TOTAL ESTIMATED VALUE OF CANNABIS DEMAND BY REGION
(ESTIMATE IN \$USD BILLIONS)



Source: New Frontier Data

on Africa's food supply, Kagia says that it extends beyond the plant's nutritional profile. He further adds, "Two areas of particular interest include:

- Biochar from hemp is a powerful soil additive, improving nutrient retention and water management, with some farmers reporting yield improvements of 30 per cent or more.
- Hemp is widely used in phytoremediation

(using plants to clean up soil and water) because of how effectively it leeches contaminants from the environment. Hemp can help restore lands damaged by industrial development or over-cultivation, enabling farmers to restore depleted farms and to expand cultivation into underused and underperforming land." ¹⁶

Source: www.newfrontierdata.com



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Certified forest management is proving to be a major asset in the region, in reducing poverty while improving education and strengthening community development.

Sustainable forest management in Congo Basin

THROUGH SUSTAINABLE FOREST management, Fair & Precious (F&P) is helping to impact lives of people in the Congo Basin, home to the second largest tropical rainforest in the world. An umbrella brand created at the initiative of the International Tropical Timber Technical Association (ATIBT), the F&P programme aims to promote forest certification in tropical regions and preserves forest resources by harvesting less than its natural increase.

"Today, if approximately five million hectares of forests are already certified as sustainable management in the Congo Basin, we are convinced that this area can be significantly increased thanks to the F&P brand and the enhancement of certifying companies, FSC and PAFC-PEFC," says Benoit Jobbe Duwal, executive director of ATIBT."

"A social life can bring well-being and entertainment to the people of these areas, including employees of forest concessions."

The ATIBT was founded in 1951 at the request of the FAO and the Organisation for Economic Cooperation and Development (OECD).

The association plays a leading role in the implementation of international projects dedicated to responsible and sustainable management of forests.

The members of the F&P brand are committed to working for local economic and social development by contributing to generating income for the people and by providing access to education, medical care and housing.

Cultural impact

Compagnie Equatoriale des Bois PW-CEB, a subsidiary of Precious Woods and a certified F&P forest management company, manages and operates 600,000ha of tropical forest in South Eastern Gabon. The employees and families of the company are in the 'Bambidie' camp, located in the heart



Image Credit: Adobe Stock/ChrWeiss

of the forest, 30 kms from the nearest town, where leisure facilities are very limited.

PW-CEB launched a cultural project in 2016, comprising the creation a cultural centre equipped with a library. It has now become the epicentre of local recreational life for the 'Bambidie' camp residents.

Interholco, another F&P operator, manages more than one million hectare of certified forest in the northern part of the Republic of Congo, with more than 16,000 people depending on its business.

The social team of Interholco, with the help of the local population, is involved in locating and protecting sacred or medically significant trees.

Companies that carry the Fair & Precious brand voluntarily commit themselves to respecting social, environmental and economic concerns in their activities. The production of Fair & Precious timber allows for the socio-economic enhancement of forests.


Sustainable forest management

The company elaborates that, responsible forest management involves managing forest areas to meet the social, economic, ecolog-

ical and cultural needs of current and future generations. Sustainable forest management involves respecting and preserving biodiversity, soils and water resources. Certificate standards consist of preservation of the resource, respect of the rights of indigenous peoples and the preservation of biodiversity so that the forest prospers and benefits all members of society, both today and for future generations.

Fair & Precious timber production generates income for local populations while preserving forests. In these remote rural areas, the company is driving growth while taking on a social role.

The Food and Agriculture Organisation (FAO) emphasises the need to address the need for greater understanding and awareness about the many ways in which forests give back to global society.

Hundreds of millions of people around the world depend directly on forests for their income and subsistence, according to the World Bank, which strives to achieve the balance between conserving and regenerating forest areas with economic growth for poverty reduction. 



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A case study on water management conducted for chili pepper production.

Agricultural flocculant improving drip irrigation

AS WATER BECOMES an increasingly precious resource, improving its usage efficiency in irrigated systems is an important objective for agriculture. Underground drip irrigation increases water efficiency by 70 per cent, compared to traditional surface gravity furrow irrigation.

SNF has developed an agricultural flocculant that increases the irrigation bulb size, and reduces percolation water losses providing better water usage by plants.

Soil humidification

Bringing water as close as possible to the roots of a plant is important for the efficiency of irrigation water. Improving water localisation diminishes percolation losses and increases irrigation bulb size.

One method to improve water efficiency is to increase the number of drips. However, this approach is sometimes too expensive to be a good business strategy. Increasing the quantity of irrigation water, unfortunately, systematically implies increasing percolation losses. These two methods have their merits but are not the best.

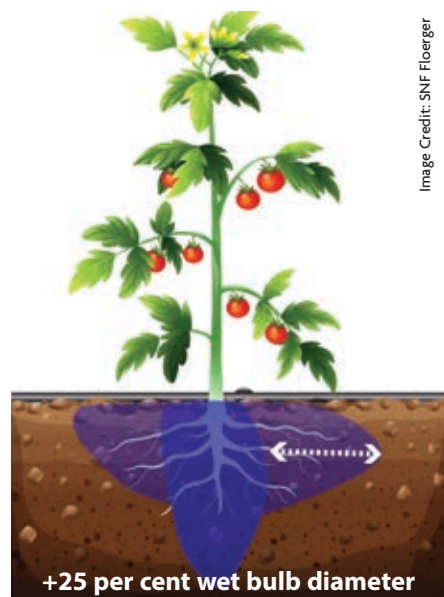
Ideally, increasing wet bulb size with the same quantity of water provides a better



The agricultural flocculant (right) provides better water availability to this culture of chili peppers, straw fed by drip irrigation. Georgia University, USA, 2018.



The agricultural flocculant increases irrigation bulb size.



The agricultural flocculant decreases water losses by leaching.

and more uniform water distribution in the soil, increasing water availability for the plant, without increasing costs in equipment and without increasing water losses. This will ensure a better root system development and improve fertiliser usage.

Improving water availability

A new agricultural flocculant has been used in the US since 2018 to improve the size of irrigation wet bulbs. Available in liquid form, it is easily dissolved and simply applied through the surface or subsurface drip irrigation system and helps improve soil humidity and water localisation in the soil. This further leads to better water availability for the plants and limits percolation losses (Photo 1).

Trials made by the University of Georgia, USA in 2018 have showed a significant increase in chili pepper production compared to a blank test using the same

quantity of water and fertiliser (Photo 2). By using an agricultural flocculant in underground drip irrigation, it now becomes possible for a producer to invest in low water consumption techniques in regions where this resource is rare.

Improving germination

In addition to water savings, the flocculant acts on aggregate stabilisation and reinforces the soil's agronomic properties. During germination, water availability is increased within the irrigation wet bulb and seed growth is homogeneous. During the growth period, stable aggregates maintain water and fertilisers in the soil preventing leaching.

The application of new and useful techniques such as these are essential to overcome the challenges of water scarcity and promote sustainable crop production. **E**

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A tool to battle poverty: Agriculture plays a major role in improving the socio-economic situation of sub-Saharan countries.

Committed to agricultural transformation

THE CHALLENGE OF food security is particularly significant in sub-Saharan Africa, one of the most food-insecure regions in the world, where the prevalence of chronically hungry people and rates of malnutrition are both relatively high.

Smallholders produce about 80 per cent of the food supply in Asia and sub-Saharan Africa, according to UN' Food and Agriculture Organisation (FAO). Resilient, sustainable agricultural systems are essential to providing people with access to food at all levels.

To feed the growing population, smallholder farmers have to increase production and this must be achieved by preserving natural resources. Sustainable agriculture is vital and it is climate friendly and environmentally benign and also means no-till, conservation agriculture.

At the Africa Sustainable Agricultural Summit 2019 held in Nairobi, Kenya, the FAO subregional coordinator of Eastern Africa, David Phiri, highlighted that hunger and malnutrition are on the rise again in Africa, after two decades of progress.

"Governments should create an enabling policy environment where the private sector, including in agriculture, thrives and creates jobs, particularly for the youth and women. Agricultural policies that spur farm productivity, commercialisation and the agro-processing industry are crucial for agricultural transformation," remarked Phiri.

Global food security requires sustainable production of safe and nutritious food, with fewer inputs of water, energy and nutrients.

Concerted efforts

Africa's leaders are increasing the focus about the way in their food, land and water systems are bringing about greater food security. This growing commitment is bringing a transformation in agriculture.

Ethiopia's Agricultural Transformation Agency, for example, is integrating environmental regeneration, biodiversity and improved governance in agricultural commercialisation, helping smallholder farmers to achieve greater incomes.

In Tanzania, on the other hand, the President's Agriculture Sector Development Programme aims to reform small-scale farming, livestock and fishing industries to increase productivity, revenues for farmers and food security.

As in other parts of sub-Saharan Africa, the agricultural sector of Zimbabwe is intertwined with environmental and animal protection. In rural Uganda, women are building food security through community-oriented training programmes, with the help of programmes such as the Quaker Service Australia, supported by the Australian government.

Global food security requires sustainable production of safe and



Image Credit: Adobe Stock

Sustainable agriculture is vital for increased production.

nutritious food, with fewer inputs of water, energy and nutrients.

"If young Africans see real professional opportunities in the agricultural sector, with possibilities for economic and personal development they will turn to that sector" - said Calvin Picker, general manager of Africa Bio during the European Development Days event.

Mechanisation is also fundamental to the process of sustainable agriculture.

The United Nation's Sustainable Agricultural Mechanisation (SAM) initiative elaborates, "Mechanisation covers all levels of farming and processing technologies, from simple and basic tools to more sophisticated and motorised equipment. It eases and reduces hard labour, reduces labor shortages, improves productivity and timelines of agricultural operations, improves the efficient use of resources, enhances market access and contributes to mitigating climate related problems. Sustainable mechanisation considers technological, economic, social, environmental and cultural aspects of the food and agri sector."

There are several technological advancements that are creating a revolution in African agriculture. Through technology, farmers receive aid, for example, providing them with timely and relevant weather forecasts, strengthens farmers' ability to reach their day-to-day needs, leading to meteorological literacy and ultimately developing sustainable farming communities.

Many companies are also bringing innovations that help farming communities. AGCO, a global company in the design, manufacture and distribution of agricultural solutions, recently signed a memorandum of understanding with AT Capital South Africa, to collaborate together to create the Parque Agro-Industrial de Moamba (PAM), agri-industry park in Maputo, Mozambique. The aim of this agricultural project is to build reliable and resilient food production capacity.

Rain-fed agriculture is the most dominant source of food production in sub-Saharan Africa. However, subsistence farmers lack essential weather information to foresee and mitigate negative impacts to their crops.

New planting and harvesting technologies are transforming fortunes of Nigerian rice farmers. Simple mobile-phone based offerings are also having great potential to produce great results in Africa.

Emphasising the importance of sustainable agriculture, FAO Director-General José Graziano da Silva said recently at the Caritas Internationalis' General Assembly in Rome, "Nourishing people must go hand in hand with nurturing the planet."

Graziano da Silva noted that since the adoption of the 17

"Sustainable mechanisation considers technological, economic, social, environmental and cultural aspects of the food and agri sector," according to the Sustainable Agricultural Mechanisation initiative of the United Nations.



Image Credit: Adobe Stock/Monticello

There is a growing commitment towards sustainable agriculture in Africa.

Sustainable Development Goals in 2015, global hunger has only increased driven largely by conflict and the impacts of climate change.

In order to reverse this alarming trend, FAO's chief urged to act on three main fronts: firstly, to build the resilience of rural communities in conflict areas; secondly, to promote the adaptation of family farmers to the impacts of climate change; and finally, to mitigate economic slowdowns through social safety nets and public policies, like school-meal programmes, which are based on local food purchases from family farming. ¹²

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African Farming's 2nd edition Agribusiness summit will be held at the Sheraton Abuja hotel, Nigeria, from 27-28 August, followed by the Agroinvestment summit in London from 23-24 September.

Providing a catalyst for African agribusiness



Image Credit: Alain Charles Publishing

AGRICULTURE HOLDS THE potential to unlock Africa's future. The continent has the world's most arable land, more than half its population is employed in the sector, and the pre-eminence of agriculture in its gross domestic product is indisputable.

Nigeria is one of the countries that contributes a large chunk of agricultural productivity. Although there has been some clear progress through the implementation of the Agricultural Promotion Policy 2016-2020, the country still faces many challenges in its most important industry. Poor irrigation systems, outdated machinery and food processing are just some of the

issues farmers are facing daily. As a result, the low output in both horticulture and livestock farming puts pressure on feeding an ever-increasing population.

Agribusiness summit in Abuja

Building on the success of the previous year, the Agribusiness summit brings a unique blend of exceptional expertise, incisive analysis and visionary strategies of industry leaders and policy makers to help provide meaningful discourse to boost African agribusiness.

Day 1 of the summit will begin with an overview of African agriculture and an understanding of Nigeria's situation

including its laws and regulations.

Prof Ibrahim Umar Abubakar, executive director of the Institute of Agricultural Research, will trace the path of Nigeria's journey to become the largest producer of rice in the continent and the importance of implementing better crop management through improving the marketability of crops as well as creating awareness about soil management.

A clear understanding about the National Agricultural Seeds Act will be provided by Dr Phillip Ojo, director general of the National Agricultural Seeds Council (NASC), through a focus on the problems of the seeds sector, innovations in certified seeds and the benefits of seed banks.

This will be followed by a panel discussion on how modern machinery, irrigation solutions and innovative technologies play a major role in increasing agricultural productivity.

While discussing the impact of pesticides, Dr Ibrahim Abbas Sodangi,

"We have bigger and better summits for both Abuja and London, with support from all over the agricultural sector. Hear from the ministries, banks, investment groups, academics and associations about how agriculture is growing into new and lucrative markets," says Martyn Black , Alain Charles.



Both Agribusiness and Agroinvestment summits will facilitate discussions, learning and networking opportunities.

Image Credit: Alain Charles Publishing

Professor of Agronomy/Weed Science, Kaduna State University will elaborate upon the benefits, effects and challenges of using them as well as their impact on crops, soil and business.

The first day of the event will conclude with a discussion on post-harvest handling providing a link between farm and market. The panelists will include Dr Augustine E Okoruwa, president, Organisation for

Technology Advancement of Cold Chain in West Africa (OTACCWA), Prof Lateef Oladimeji Sanni, president - International Society for Tropical Root Crops (ISTRIC), deputy vice-chancellor (development), Federal University of Agriculture Abeokuta.

Day 2 will begin with the topic of livestock farming, analysing a feasibility study on animal husbandry and also exploring the methods of maximising poultry and livestock

production output.

The presentation by Alh Al-Mujtaba Abubakar, first deputy president, Abuja Chamber of Commerce will delve deeper into using agribusiness for rural and community development by generating employment and empowering the youth. Futher Eric Nyikwagh, country representative, Young Professionals for Agricultural Development (YPARD) Nigeria, will elaborate on integrating youth into the agricultural sector. The discussion on the importance of education in agriculture will emphasis e on the importance of training of agripreneurs and revitalising research facilities.

A representative of the Nigeria Investments Promotion Commission will provide insights into various approaches to value addition in agribusiness and help understand its challenges and benefits.

This will be followed by a panel discussion on the innovative assessment of the agricultural market prior to investment. The participants will include Richard Ogundele, founder/CEO, JMSF Agribusiness Nigeria, Taiwo Timothy Amos, Professor of Agricultural Economics, The Federal University of Technology Akure, Prof. Sanni, and the deputy chancellor (development) -



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Image Credit: Alain Charles Publishing

The summit received overwhelming response for its debut event last year.

Federal University of Agriculture Abeokuta.

An onstage interview about successful smallholder farming will shine the spotlight on understanding various paths to become more commercialised and profitable. The participant will include Davou Fei Ishaku, president, Coffee Farmers' Association of Nigeria and Uka Eje, CEO and co-founder of Thrive Agric.

The event also includes a presentation on cross-border trading across Africa by William Ezeagu, director, product development – Nigerian Export Promotion Council.

The summit partners include Nigeria Agribusiness Group (NABG) and the Abuja Chamber of Commerce and Industry. Federal Capital Territory Administration (FCTA) is a delegate partner of the event and is endorsed and supported by the Federal Ministry of Industry and Investment as well as the Nigerian Export Promotion Council.

Agroinvestment summit in London

African Farming's Agroinvestment summit in London in September, will be conducted in association with Nigeria Agribusiness Group (NABG).

The inaugural address and introduction will be provided by Martyn Diamond Black, events head of Alain Charles Publishing.

The summit will create a cohesive platform for trade and investment opportunities, attracting major investors and buyers from around the globe.

The agenda will include a variety of discussion on topics such as deployment of agro-machinery in Africa and technology via OEM partnerships, local assembly investment, challenges and opportunities in West Africa, funding for development and

value addition, harnessing, processing and packaging via private and public partnerships for sufficiency and exports, improvement of rural infrastructure that will support agroinvestment in Africa – solutions and challenges, cross-border trading and increasing productivity and output.

"It was an absolute privilege to be involved with our first Agroinvestment summit with excellent panels and speakers for thought-provoking discussion and knowledge-sharing. Its great to see this flagship event go from strength to strength," says Georgia Lewis , Alain Charles.


One of the highlights of the event is the opportunity to hear from Ahmed Sule, minister/head Industry, Trade and Investment, Nigeria's High Commission, who will make a presentation about the country's vision and strategies on how it aims to become the first destination of choice for investing in Africa. The on-stage interview by Gavin Serkin, founder and managing editor, New Markets Media and Intelligence as well as Wesley Davis, co-founder and chairman of the Alluvial International Advisory Council, alluvial agriculture, Niger delta, on Solving smallholder poverty and food insecurity through block farming will present a case study on the Niger Delta project and an analysis of the reasons behind grandiose

ribbon-cutting initiatives failing.

A panel discussion on managing commodity risks, potential political risk, managing and retaining staff etc will throw light on the challenges that are experienced across the continent. The summit also covers the development of the next generation of youth incubators and a look at the development of business models to create and launch a sustainable, investor-ready product.

The attendees can look forward to impactful presentations on comparing agricultural investments into early stage businesses vis-a-vis those that have an existing track record. The Agroinvestment summit will end with a panel on the medium-term outlook for the global agricultural sector, highlighting the major drivers that it will witness over the next 10 years, what trends will arise and the direction of trade prices. This session looks at the impact of food security, nutrition and natural resource conservation issues.

The content of both agricultural events is specifically designed to embrace a wide range of stakeholders, such as government officials, importers, distributors, agribusiness owners, senior executives from food companies, trade union members and manufacturers and suppliers of agricultural equipment, machinery and services.

The Agribusiness and Agroinvestment summits will facilitate discussions, learning and interactions about emerging trends in agricultural development and food markets, besides providing plenty of networking opportunities. Expect thought-provoking presentations and interactive panel discussions on the Nigerian agricultural industry. 

Kenya' food and agriculture exhibition returns to Nairobi from 1-3 August, 2019.

FOODAGRO Africa 2019



This year's line-up includes both local and international companies.

THIS YEAR, PRESENTING exhibitors fare expected rom more than 26 countries.


FOODAGRO AFRICA 2019 will showcase products, equipment and machinery.

FOODAGRO AFRICA 2019 will provide insights into emerging trends in the food, hotel, kitchen and agriculture industries.

The exhibition will feature a mix of consumer interaction and industry presence. The organisers have confirmed that the show boasts high attendance per day as well as a large number of business

dealings per individual. The number of exhibitors and visitors in 2019 is expected to rise by at least 20 per cent. Trade visitors from all over East and Central Africa are being invited directly and in collaboration with several regional trade bodies in Kenya, Tanzania, Ethiopia, Uganda, Somalia, Mozambique and Congo.

This year's show has a line-up of both local and international companies and will provide a platform for product launches, finding new buyers and distributors, promoting brand names and image and updates about the latest developments in the industry.

Some of the exhibitors this year are Tmarillo Kenya, Podere Gusto, Bangkok Ranch PCL, SGK Industries and Modern Cicolata, among others. 



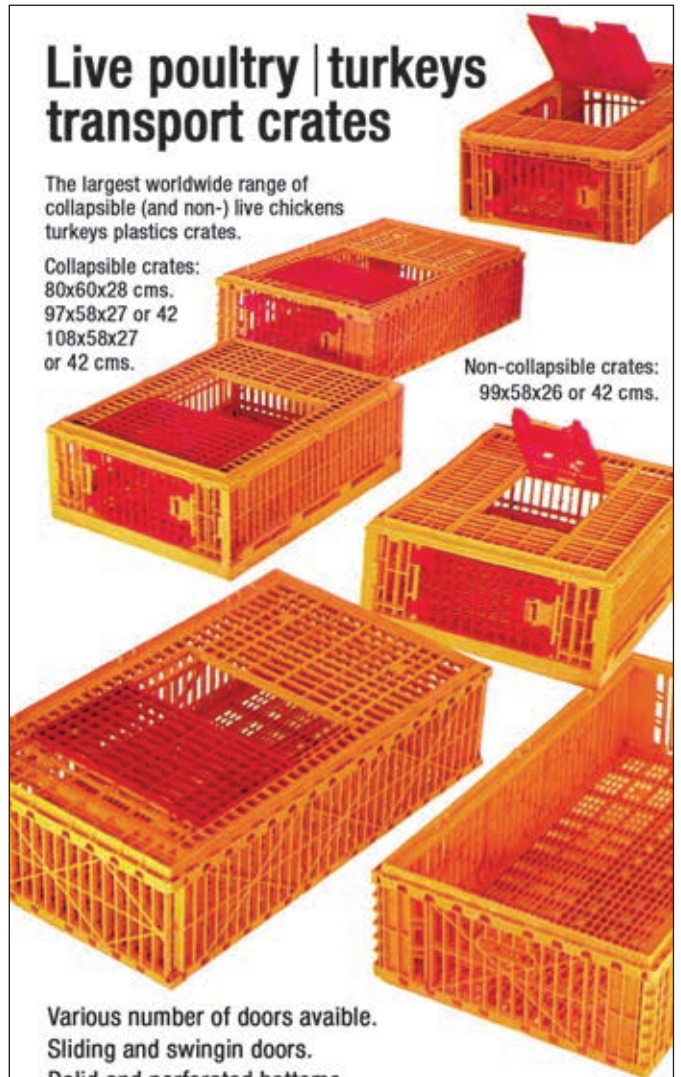
The exhibition will feature a mix of consumer interaction and industry presence.

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Poultry Africa, the biennial boutique event for poultry meat and eggs production takes place from 2-3 October 2019, in Kigali-Rwanda.

Adding value to sub-Saharan Africa's poultry production

ACCORDING TO THE organisers, 85 per cent of the exhibitors' line-up for Poultry Africa 2019 is already confirmed. Building on the appreciation won from the industry by the first edition conducted two years ago, this year's event prepares for success with more than 100 companies exhibiting. With an increase of 30 per cent in the number of exhibiting companies, the event aims at presenting an even wider selection of Feed to Food suppliers in poultry and eggs covering feed, crop-tech and feed-tech, feed ingredients and additives, animal health, breeding and hatching, farm production and equipment, poultry and eggs processing as well as handling.

Among the African exhibitors, Poultry Africa will showcase Abusol Ltd, AGCO South Africa (Pty) Ltd, Agrotech Ltd, Avipro East Africa Ltd, Urban Farmer, Essential Drugs Ltd, ME VAC, Vetcare Africa. Half of the exhibitors are from European countries, including major suppliers especially in the animal health, farm production and feed ingredients and additives sectors. India, Turkey, China and Southeast Asia will also be exhibiting at Poultry Africa 2019.

Visitors will be able to meet professionals at their booths and also attend the experts'



Image Credit: Jaarbeurs

This year the organisers anticipate a 30 per cent increase in the number of exhibitors.

technical best practice seminars. Some of the interesting topics addressed by these sessions are : 'heat stress, sustainability and antibiotic growth promoters (AGP) free food', 'poultry health – the way to productivity and profits' and 'women in poultry business'.

As part of the event, companies from breeders to processors will present best practices for profitable poultry production.

According to Poultry Africa manager Diána Tóth, the edition lined up for October 2019 looks likely to be bigger than before. "However, I think one of the main points about the expo at Poultry Africa 2019 is that it will contain not only new exhibitors, but also a wider variety of products and services. As two examples of this, the stands this time will include more manufacturers and distributors of systems for slaughtering and processing poultry and more companies offering animal health products."

The expo will take place in the Kigali Convention Centre, in conjunction with the Leadership conference, providing opportunity for networking internationally and learning about practical solutions tailor-made for the African poultry industry.

Leadership conference

This will include four sessions on 'Profitable poultry production in Africa'. After an economic overview on the Sub-Saharan



Image Credit: Jaarbeurs

1500 professionals are expected to attend the event.

region, the retail and digital aspects of the poultry business will be covered by the second session of the conference, followed by a presentation on the importance of animal protein in nutrition and of investing in poultry protein in Africa. The one-day programme will conclude with practical insights from speakers sharing their expertise on regional and global topics. The Leadership conference is held at the Kigali Convention Centre and will host speakers from within Africa and abroad.

Partners and networks

Organised by VIV events for worldwide shows encompassing the feed-to-food network and animal husbandry, Poultry Africa will work in conjunction with the Ministry of Agriculture and Animal Resources Rwanda (MINAGRI), the WPSA, the WVPA, the Africa Agribusiness Academy, the Dutch Poultry Centre, the Netherlands-Africa Business Council (NABC), Rwanda Development Board, the Embassy of the Netherlands in Kigali, and around 100 partners such as government institutions, trade associations, industry media, and stakeholders in Africa and across the globe.



Image Credit: Jaarbeurs

The exhibition will include a wider variety of products and services, this year.

1,500 professionals are expected to visit this event, among which 50 industry leaders will be invited to join a personalised programme.

The relatively small size of the poultry business in Rwanda itself is outweighed by the country's position in a part of the

world that has enormous potential for further increasing its production of chicken and eggs.

"This concept is a very cost-effective investment in meeting sub-Saharan Africa's top poultry professionals," says Toth. ¹



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The event provided a forum for experts from international agriculture, food, dairy and livestock industries.

Empowering agriculture

AGRITEC AFRICA 2019, international exhibition and conference on the agricultural industry was held from 19-21 June 2019 at Kenyatta International Convention Centre (KICC), Nairobi.

The exhibition was inaugurated by Mwangi Kiunjuri, cabinet secretary, Ministry of Agriculture, Livestock, Fisheries and Irrigation; Dr Andrew Tuimur, CBS chief administrative secretary, Ministry of Agriculture, Livestock, Fisheries and Irrigation; Prof Hamadi Iddi Boga, principal secretary; Dr Gabriel Rugalema, representative in Kenya, Food and Agriculture Organisations of the United Nations (FAO); Duncan Marigi, chair of the Agriculture and Rural Development Donor Group; Rahul Chabra, high commissioner of India in Kenya; Wycliffe Oparanya, chair of the Kenya Council of Governors; Sanyal Desai, CEO, Radeecal

Communications.

Agritec Africa 2019 has witnessed around 11,000 visitors from across Africa and abroad. The content of the event was designed to suit the needs of farmers, agribusiness owners, agronomists, biotechnologists, government employees and for everyone who are willing to take the next giant steps forward in agriculture.

This year, the 6th edition of Dairy, Livestock and Poultry Expo Africa 2019 and Graintech Africa 2019 were also organised as concurrent events.

Agritec Africa Conference 2019

The 2019 conference of Agritec Africa, based on the theme of "The role of agricultural technology to achieve the Big 4 Agenda's target of 100 per cent food and nutrition security" was organised by the Food and Agriculture Organisation (FAO) of the United Nations, during the three days of the exhibition. The




Image Credit: Radeecal

The conference provided a platform to share expertise and practices.

conference had invited more than 200 professionals including academia, youth organisations, government associations and development practitioners.

Several international

speakers shared their experiences, bringing the most innovative and pertinent technologies to empower hundreds of local farmers, business associates, academia researchers and all those who had gathered at the venue.

The varied topics covered by the exhibition included food and nutrition security production, value chains and opportunities for MSME's and the private sector, natural resource management and agriculture, the state of extension in Kenya, challenges and innovations in the provision of agricultural inputs and services in remote countries, food safety management in urban areas and practical strategies to reduce food waste and loss, climate change adaptation through climate-smart agricultural practices, future of livestock commercialisation, and markets as the drivers for commercialisation of agriculture. 



Dignitaries at the inauguration of the exhibition.

Image Credit: Radeecal

Boosting Africa's agribusiness

THE 6TH COMMERCIAL Farm Africa focuses on the latest developments in Africa's agribusiness – from investments to financing, farm mechanisation, digitalisation and agro-processing.

The conference will be held in Nairobi from 30-31 October 2019 and help provide the latest updates on Africa's agribusiness market, that has attracted recent investments.

Honing on "Enhancing Cost Competitiveness in Africa's Agribusiness", Commercial Farm Africa's programme highlights include a focus on East, West and Southern Africa (grains, tea and coffee, oil crops, cash crops), the latest on farming mechanisation, irrigation technologies and digitalisation, multi-stakeholder dialogue: access to innovative financing, best agronomic practices for a profitable farm and investment case studies, access to land, input materials and quality seeds as well as agro-processing and route-to-market challenges.

The conference offers avenues to tap into Africa's fast growing commercial



Image Credit: monticello

The conference helps share expertise in agribusiness.

farming market and also provides networking facilities with stakeholders.

The organisers confirm that the event is an excellent platform to promote organisations, products and innovative technology to influential players and investors in the industry and there also opportunities to showcase products to a global audience.

The visitors at the event will include farm and plantation investors and owners, asset management companies, private equities, investment banks and agricultural funds companies, fertiliser suppliers, seeds, biotech and agro-chemicals producers and traders and machinery companies among others.

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Victam and Grapas International 2019 witnessed a large number of visitors and an impressive array of products on display.

Driven by innovation



Image Credit: Victam

AT VICTAM HELD at KoelnMesse in Cologne, Germany, from 12-14 June, there were 248 exhibitors and co-exhibitors from 31 countries present, according to the organisers.

Exhibitors were able to have discussions and negotiations with their clients as well as potential customers that they had met at the show.

The organisers confirmed that over three days, almost 5,000 visitors from 85 countries were present, the highest number of countries participating, so far. Although the majority of the visitors were from Europe, there was increasing representation from other parts of the world, for example, 8 per cent from Asia, 7 per cent from the Middle East and Africa, 5 per cent from Latin America and 5 per cent from the rest of the world, as confirmed by organisers.

The conferences had extensive programmes, which were well received, including the newly introduced International Feed Technology Conference (IFTC), a cooperation between the University of Wageningen and the Victam Foundation. The conference included, (among others), Prof Dr Jürgen Zentek from the University of

Berlin, Dr. Menno Thomas from Zetadec and Dr Reza Abdollahi, Massey University.

Other conferences and seminars included Aquafeed Horizons 2019, which focused on production technology and specialist ingredients for aqua culture feeds.

Global industry executives from the animal feed, flour and rice milling, grain processing and biomass pelleting industries attended the Victam and GRAPAS International 2019.

The bioenergy international pellet workshop organised by Bioenergy Europe, discussed how technology is innovating the efficiency and quality of pellet production. The feed efficiency seminar by All About Feed presented new approaches to feed processing and formulation and the feed strategy seminar organised by WATT Global Media covered feed additive solutions for reducing emissions in livestock and poultry production.

GMP+ International had a seminar on

feed safety and short presentations on a variety of subjects including silo design, aeration fans, grain coolers, ozone treatment of grain, grain sampling, remote monitoring systems for silos conducted by Perendale Publishers Ltd.

Additionally, the GRAPAS and Global Milling conference by Perendale Publishers Ltd had a full day of innovative presentations from the milling industry.

IFTC 2019 organised by Wageningen University and Victam Foundation was directed towards the developments in animal feed processing from a scientific and technology standpoint. Petfood Forum Europe was organised by WATT Global Media on the latest research and newest information for pet food nutrition, global pet food marketing trends and growth, pet food safety, processing, packaging and much more.

Additionally, several exhibitors like Stolz, Promtek, KSE, UWT, Clextal, Statec Binder and Riedel Filtertechnik presented technical seminars, in the theatres on the exhibition floor, during the three show days.

To put all the innovations presented at the event in the limelight, there were three innovation awards presented at the event: the Animal Feed and Nutrition Award, The

Aquafeed Award and the GRAPAS Innovation Award.

During the Network Reception on the first show day, the winners of the Innovation Awards were announced.

The GRAPAS Award had three winners this edition:

- Buhler with the LumoVision, a data-driven optical sorting technology that closely targets grains affected by Aspergillus Fungi, the cause of Aflatoxin contamination.
- Petkus with OptoSelector 901t, a unified system of analysis combining the full-colour RGB method and a special light transmission method based on the translucent features of the seeds.
- Selis with their Dynamic Angular Positioning System (DAPS). The DAPS system offers a big solution to the important problems on the smooth roll passages and fine grooved roll passages.

The Animal Feed and Nutrition Award had three winners as well:

- Van Aarsen for their Hot Start Steam mixer. The Hot Start Steam Mixer helps to optimise the feed conditioning process



The majority of visitors were from European countries, but there was increasing representation from other parts of the world.


and feed safety while minimising spoilage.

- Geelen Counterflow for the Counterflow Cooler Plus which is a new generation counterflow coolers' innovation that improves product quality, operational costs and efficiency.
- Famsun for their SWFL170 Vertical Pulveriser. The SWFL170 vertical pulveriser is designed for particle size reduction in the industry of aquatic feed production, including but not limited to the feed production for fishes, shrimps, crabs and turtles.

The Aquafeed Award had two winners:

- Prairie Aquatech for their ME-PRO

protein ingredient for aqua feed. ME-PRO is a plant-based protein ingredient that reduces aquaculture's reliance on dwindling supplies of fishmeal.

- Geelen Counterflow took the award home for their electric dryer. Recovering the energy and water contained in the exhaust air of the dryer, it will reduce energy consumption for drying by up to 65 per cent. 

The next event organised by the Victam Corporation is VICTAM & GRAPAS Asia held together with VIV Health & Nutrition. It will be held from March 24 – 26, 2020 at the BITEC in Bangkok, Thailand.

Image Credit: Victam



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Mwangi Mumero explores the extensive possibilities created by digital technologies in agriculture and their impact on smallholder farmers.

Image Credit: Adobe Stock/Sirichai

Mobile telephony is enabling rural farmers to access critical information.

Smart solutions transforming East African agriculture

IN SUB-SAHARAN AFRICA, smallholder farmers remain an important part of food production – both for subsistence as well as in supporting local markets.

Smallholders, who mostly reside in rural areas, earn incomes from their small parcels of land and feed their families from their produce.

Estimates from the Food and Agriculture Organisation (FAO) indicates that in Kenya and Tanzania smallholder farmers produce 63 and 69 per cent, respectively, of the food in the country.

Yet, many of these rural farmers have little access to vital information that would help them increase their food production.

Research has also shown that smallholders typically harvest 30-50 per cent of what their land could potentially produce.

Even with expansion of agricultural extension services in recent years across Africa, production remains low mainly due to poor access to information on new crop varieties, disease and pest control measures and access to viable markets.

However, the entry of mobile telephony over the last two decades is changing this state of affairs- enabling rural farmers avail critical information via their mobile handsets.

Service providers have also quickly developed agricultural solutions delivered directly through the phones – boosting their incomes as well as the farmers' fortunes.

According to research by the global association of mobile operators GSMA, sub-Saharan Africa has 747 million people

who have a SIM connection. Of these 250 million have a smartphone.

With a 44 per cent mobile subscriber penetration – against a global average of 66 per cent, Africa has room for growth. It is these smart solutions that were showcased in a recent Agri-Food Trade and Investment (AFTI) summit held in Nairobi.

Service providers have quickly developed agricultural solutions delivered directly through the mobile phones – boosting their incomes as well as the farmers' fortunes.

Combating fall armyworm

Originally from South America, the fall armyworm (FAW) has become a real menace to farmers in 12 countries across Africa.

It is estimated that the pest- which mainly attacks maize and other cereals- has led to annual losses of between 4- 17.7mn bags of maize across 12 top maize producing countries in Africa. The annual loss is estimated at between US\$1bn to US\$4.6bn.

"Working with the government of Kenya, we have been able to develop a SMS platform where farmers can receive timely information on the fall armyworm. Farmers send and receive messages on their phones which will assist them to make vital decisions in combating the pest," observed

Emmanuel Bakirdjian, director, Precision Agriculture Development (PAD), during his presentation.

According to Bakirdjian, the SMS messages cover various topics including monitoring, identification, non-chemical and chemical control measures and best practices.

Farmers send and receive free messages through Safaricom and Airtel networks, Kenya's largest mobile telephony firms. The messages are available both in English and Kiswahili.

The special messages have been developed by the Ministry of Agriculture, Kenya Agricultural and Livestock Research Organisation (KARLO), Centre for Agriculture and Bioscience International, Kenya Plant and Health Inspectorate Service, and Pest Control and Poisons Board.

PAD has registered 363,000 users on the platform since its launch last year.

It also provides actionable, customised and high-quality farming advice for maize, beans, and potatoes to help farmers increase their productivity.

Digital platforms

Liquid Telecom Kenya has worked closely with the Kenya Agricultural and Livestock Research Organisation (KARLO) to launch an e-service platform and three mobile apps for chicken, pasture seeds and dryland crop farmers.

Through these platforms farmers can receive real-time updates from meteorological agency and research labs.

"Delivering new technologies through internet-based infrastructure is changing the way farmers produce crops and livestock. There is need to adapt to new methods of accessing up-to-date data on crop varieties and farming methods. We believe our involvements in this area will ensure food security and improve diets of millions of Kenyans," noted Adil Youssefi, CEO of Liquid Telecom Kenya during his presentation.

According to Youssefi, his firm recognises the role of technology in research, generation and creation of new knowledge, which is vital in national development.

"KARLO's new e-services will be driving our common vision and goal of restructuring agricultural and livestock research into a dynamic, innovative, responsive and well-coordinated system," he observed.

Water availability and sources for agriculture also proved an important area for developers of smart farming solutions.

Already, Liquid Telecom Kenya has installed a Wide Area Network and VSAT internet connection offering up to 100 bps across 42 KARLO research stations.

For instance, farmers can now access information on feed availability, diseases as well as other chicken information on the Indigenous Chicken app. Kenya is estimated to have at least 32 million indigenous chicken which produce most of the poultry meat consumed in the country.

On the other hand, the 'Range Pasture Seed Production App' avails information on soil and water management technologies



Image Credit: Adobe Stock/Eaknarin

Many rural farmers have little access to vital information that would enable them to increase food production.

as well as seed varieties tolerant to drought, pests and diseases.

Water availability and sources for agriculture also proved an important area for developers of smart farming solutions.

"Our solutions are able to collect information on underground water sources available to farmers. They can also advise farmers on soils and synchronise data in relation to water and climate information," observed Andrew Denu, products manager with Sun Culture, a firm that develops irrigation solutions.

The company's 'Rainmaker 2' is a solar powered irrigation solution which uses artificial intelligence to collect information on water sources for farmers. The solution can also provide water both for domestic and irrigation purposes.


The firm has also developed 'Agoptimised farmer Sensor' app which is available on smartphones.

"The app helps farmers to build weather models, helps in crop yield monitoring, pests and diseases data as well as map out water sources data," noted Denu during the presentations.

The app provides real time data on possible drought conditions and is valuable for government and development organisations especially those with activities in arid and semi arid regions.

Other smart applications

Another smart solution presentation was done by WeFarm, a global network that offers free SMS to farmers seeking answers to their farming activities.

With the success of M-Pesa, Kenya's premier money transfer application, fintech organisations have moved to fill the gaps in farmer financing. Repayment of the loans by farmers takes place with mobile transfer service M-Pesa. 

Three photographs showing the Lemken Rubin 10 harrow in different stages of operation. The first shows it from the side, the second from the front, and the third is a close-up of the disc arrangement.

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Improving fogging systems

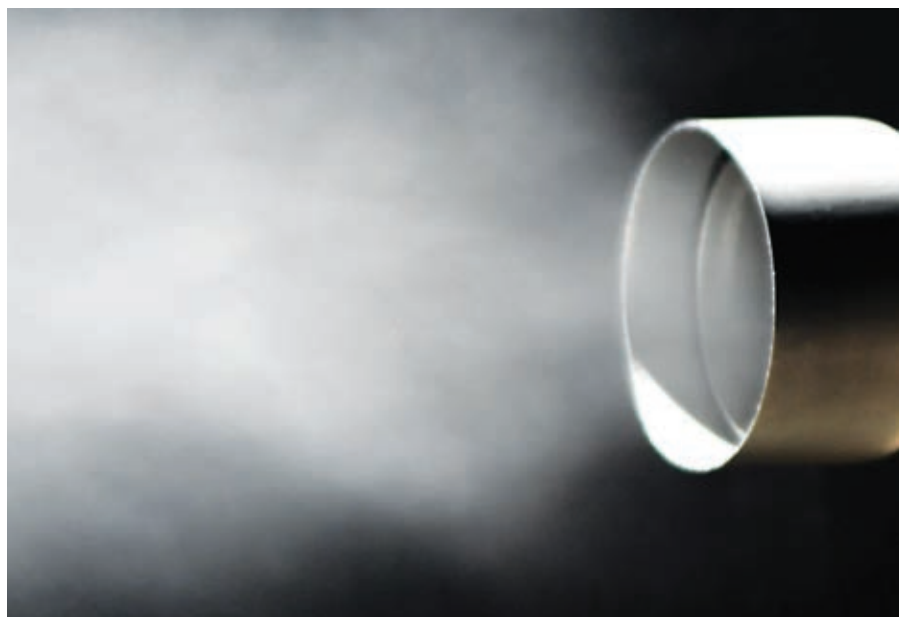
OIL-BASED FOG OR spray liquids have been widely used in thermal fog generators for vector control by the ultra low volume application method.

For this, relatively small quantities of the chemical agents are mixed with high amounts of oily carrier substances like diesel oil or kerosene to get the total application quantity.

However, there has been a shift towards water-based fog liquids. This is due to better environmental protection, costs of oily carrier substances as well as possible traffic hazards by a dense visible fog and oily residues, in particular when treatment is done inside a building.

Water vs oil based fogging solutions

Oil-based fog liquids can be fogged in a narrow and homogenous droplet spectrum of below $30\text{ }\mu\text{m}$ VMD (volume median diameter), which is in accordance with World Health Organisation specification guidelines for vector control equipment. Water has a much higher surface tension than oil, and cannot as easily be processed in thermal fog generators. When using water as a carrier substance, the droplet spectrum is not as homogenous and much wider with droplets



High performance fogging tube flow rate 27 litres per hour with nozzle 1.2

ranging from $0\text{ }\mu\text{m}$ to $200\text{ }\mu\text{m}$ emitted.

This means that nearly all droplets which are bigger than 40 or $50\text{ }\mu\text{m}$ do not float as aerosols in the air, and settle down in front of the fog generator, where they cause wet spots and deposits, not reaching the target or are lost and also

lead to pollution. Depending on the flow rate, such losses could be approximately 20 per cent and more.

Swingtec's High Performance Fogging Tube

To solve this problem, Swingtec has launched High Performance Fogging Tube, developed especially for the application of water-based fog liquids. This invention is patented in the USA, China and South Korea. The High Performance Fogging Tube is applicable for all types of swingfog machines.

With the portable machine swingfog SN 50 along with the High Performance Fogging Tube, a droplet spectrum of below $30\text{ }\mu\text{m}$ up to flow rates of 27 litres per hour is achieved. With the company's truck-mountable or stationary used devices swingfog SN 81 and swingfog SN 101, flow rates up to 60 litres per hour in the same ideal droplet spectrum can be applied.

All other brands of thermal fog generators (including swingfog machines with standard fogging tubes) can also fog water-based fog liquids in a somehow narrow droplet spectrum, but by no means can do this at only nearly as high flow rates compared with swingfog equipped with the High Performance Fogging Tube. **E**



Standard fogging tube flow rate 27 litres per hour with nozzle 1.2

Image Credit: Swingtec

Image Credit: Swingtec

APV unveils Grassland Harrow

THE AGRICULTURAL TECHNOLOGY provider's Grassland Harrow is designed to boost agricultural productivity.

The Grassland Harrow GS 600 M1 full edition from APV, pulls out unwanted dead grass, creates space for high-quality seeds and aerates the soil.

High quality basic fodder is an important source of energy in the dairy industry and the APV harrow stimulates the natural formation and the germination of a diverse plant stock.

It aims to ensure the best conditions for seeding in combination with a Pneumatic Seeder PS 300 M1.

Together with the Pneumatic Seeder, it helps to till fields in one working process and seed grasses and legumes. In this way, it is possible to control the relationship between grasses, legumes and herbs. APV's Grassland Harrow thus leads to improved grassland stock and increased yields.

The APV Grassland Harrow is mainly used in areas where intensive grassland cultivation is necessary. The two front tine rows tear out lawn thatch, tangles and grasses, while the two weaker back tine

rows of thinner tines separate the soil from torn out weeds and work the applied grass seed into the ground.

Additionally, the APV Grassland Harrow is equipped with four tine beds, each with two rows of 10 mm and two rows of eight mm cranked spring tines. The first two rows have a tine spacing of 7.5 cm and the last two rows have a tine spacing of 5 cm. This combination of different tines is unique in agricultural technology and only offered by APV. The tine rows can be used in different modes of aggressiveness to each other. This achieves optimal soil adaptation.

The Pneumatic Seeder is controlled by the Control Box 5.2, as well as the speed and linkage sensors. For the operation, tractors with 70 hp or more are required. The folding of the side arms requires a double-acting hydraulic connection.

The APV Grassland Harrow GS 600 M1 is used to catch crop application in agriculture. Optionally, customers can go for the APV TOP training since last spring. This covers the preparation for the first use on the field. Furthermore, plant cultivation expertise, applications and machine

settings are transmitted and explained.

The benefits of the Grassland Harrow include spring-mounted levelling plate for levelling irregularities, two harrow sections with cranked spring tines of various thicknesses. Every harrow section can be used at various relative thicknesses. This achieves optimal soil adjustment. Also, it includes simple tine adjustment of the third and fourth rows. Up to four working steps (levelling, tilling, seeding, retilling) may be combined into one.

Due to the shape and numerous adjustment possibilities, it is possible to achieve the optimal harrow pattern with all the requirements.

Applications include levelling molehills and grassland, removal of weeds and lawn thatch, open and aerated soil, space for the germination of valuable fodder plants, perfect reseeding in combination with an APV Pneumatic Seeder and nitrogen release - approximately 10 - 15 kg per crossing.

APV is continuously developing implements that are characterized by time-saving operation, efficient economics and maximum effectiveness.



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African Farming spoke with Octavius Hunt, UK-based manufacturer of smoke generators that provide effective solutions for pest and disease management.

Fuming about pests

SMOKE GENERATORS ARE used in various applications including grain and food storage, crop protection, disinfection as well as public health and include products that offer natural treatment to combat the menace.

Also referred to as fumigators or smoke bombs they are potent against a broad range of pests and insects, offering a rapid knockdown and kill effect, besides helping to prevent numerous diseases.

Nick Dale, managing director, Octavius Hunt says, "By including smoke generators as part of their treatment plan for pests, farmers can ensure the protection of crop as well as the hygiene safety of livestock and poultry."

The technology

The development and manufacture of smoke generators involves a unique blend of formulation skills and production expertise. It consists of four elements: an active ingredient, a fuel source, an oxidant and an inert or bulk carrier.

The components are mixed together in a precise formulation and are packed into easy to use canisters (generators) or compressed into pellets. The smoke generators are ignited through the use of slow burning pre-formed wicks and all components are contained within the pre-dosed canisters. Once the generators are lit, the fully sealed treatment area is left undisturbed for a minimum of two hours. The controlled combustion forces out smoke particles carrying the active ingredient which rise in a column to the roof of the enclosed space and subsequently fall as they cool, descending to settle on all surfaces within the treatment area. Following the required treatment time, users ventilate the area for another two hours.



Biofume greenhouse smoke generator.

Image Credit: Octavius-Hunt

Advantages of smoke generators

The rapid smoke output of a generator enables the active ingredient to be carried throughout the treatment area, accessing roofs, cracks, crevices as well as inside machinery, with deposits on all surface areas, both vertical and horizontal. Comparing total release aerosols (TRA) with smoke generators, Octavius Hunt has found the generators to be almost 40 per cent more effective in the same treatment area.

The benefits to operators using smoke generators over other treatment methods are also significant. Smoke pesticides result in less operator exposure due to the fact that the active ingredient is contained within the device with no mixing or spraying required and that once the device is ignited the operator leaves the treatment area. Also, there is no over-use of the active, which can occur in the case of aerosols and sprays. Use of smoke generators allows a controlled and even dose, ensuring an optimum effect while using a small quantity of pesticide. Not only do these benefits limit operator exposure, they also minimise the impact on the environment.

Octavius Hunt has also developed a further innovation to allow smoke generators to be produced in tablet form, significantly reducing production costs for price sensitive markets. Further, these can be 'sleeve wrapped', with the wrapping serving as the ignition wick, thus eliminating the need for another component. It also ensures that the user does not come into contact with the tablet containing pesticides.

Practical applications

Octavius Hunt's range of smoke generators contain pirimiphos-methyl (actellic) for grain pests within empty stores; o-phenylphenol (OPP) for disinfection within various areas including poultry production, food production and post-harvest storage; pirimicarb (pirimor) to target aphids in glasshouses; and broad spectrum pyrethroid actives such as permethrin or cypermethrin for public health applications.

Dale specifies, "We are happy to discuss and collaborate on new product development. As long as the active particles are stable and efficacy is not lost through heat, most are effective within a smoke generator".



Image Credit: Octavius-Hunt

Smoke generators are potent against a broad range of pests and insects.

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QUALITY WINS

Bjorn Thumas, TOMRA Food's VP Business Development, Product Management Food Sorting and Marcom Food explains how automating food processing lines with the right technology can improve sustainability in many ways.

Sustainability in food processing

THERE IS A common misconception among businesses that being sustainable will cost money. In fact, sustainability and profitability are linked, as both rely on the most efficient use of resources.

Sustainability is in fact, the efficient use of resources, which is vital for ensuring food supply for future generations. And technology is the answer to making the food sector more sustainable, efficient and profitable.

In agriculture, highly sophisticated technology can meet both the needs of nature and demands of consumers.

The following are some ways in which the right technology can lead to sustainable practices in food processing:

Reducing food loss and waste

In-line sensor-based sorting machines are very effective at optimising product yield, ensuring quality and maximising profits.

Previously, when bad weather conditions damaged a crop, it would go to waste. For example, following a potato blight or hail damage to blueberries, the food producers would decide not to recover any of the crop at all. Now, food producers who partner can recover a small percentage of the crop through 'reverse sorting', removing the majority of bad input and recovering the one or two percent of good product available.

These technologies and platforms are inspiring companies to think outside of the box. Whereas in the past waste was waste, now processors have multiple waste streams depending on the quality of the product: a misshapen carrot can be diced

or juiced, a lower-grade one will be used for cattle feed, and only truly defective ones will be rejected.

Reducing energy consumption and emissions

Some machines such as peelers can reduce energy use through recycling and reusing. For example, TOMRA's Eco steam peeler uses 28 percent less steam than similar machines, making it the most efficient steam peeler in the industry, simply by

Reducing water usage

Some technology solutions improve the efficiency of the whole processing line. Just as in the examples above, machines can now remove defects from salads and lettuce before washing them. This not only means that washing is more efficient, but also that water stays cleaner longer and needs replacing less frequently. As such, water consumption and waste water treatment is reduced significantly.

Technologies leading to sustainability

Combined, several technologies can unlock huge potential in every local farm and have a global impact.

Sensor-based sorting technology is giving food producers access to more data than ever, allowing the supply chain to eliminate vast amounts of food waste. This reduces pressure on land use, ensuring we always use what we grow and we only grow what we need. Reverse vending technology drives remarkable recycling rates of up to 98 percent, helping consumers reimagine waste and collecting 40 billion used beverage containers a year which may otherwise end up in the ocean.

TOMRA Food designs and manufactures sensor-based sorting machines and integrated post-harvest solutions for the food industry, using the world's most advanced grading, sorting, peeling and analytical technology. Today TOMRA provides technology-led solutions that enable the circular economy with advanced collection and sorting systems that optimize resource recovery and minimize waste in the food, recycling and mining industries. 



Image Credit: TOMRA

Technology is crucial to enhanced sustainability.

reusing hot air. This reduces emissions, increases efficiency and brings down energy bills for the business.

Similarly, while it was common for companies to freeze fruit and vegetables before sorting, new technology means they can reject defective product before freezing – optimising the yield and cutting energy costs.

Technology-driven agriculture is improving every aspect of the sector, helping farmers gain more efficiency.

IoT solutions to connect crops and livestock

IMPROVED TECHNOLOGY IS enabling farmers everywhere connect to the global agricultural value chain. Applying technological advancements such as the Internet of Things (IoT), to agriculture could help the sector overcome several challenges.

By 2024, more than two million farms and 36mn cattle will be connected, announced ABI Research, a market-foresight advisory firm providing strategic guidance on compelling transforming technologies.

A new report by the company unveils the opportunity for the Internet of Things within the agricultural market, specifically connected agriculture in field crops, tree crops, and livestock. For field and tree crops, the primary driver for the introduction of connectivity and the IoT is not only to irrigate sufficiently but also to limit excess water application for usage efficiency and to align with government regulation. For livestock, it is about collecting data relating to the health of the animals, including birthing activities, as well as knowledge of their whereabouts. Across all agriculture sectors, the benefits are improved yields, a higher quality product, and greater insight for farmers to more efficiently manage their operations.

"Hi-tech systems involving drones are sometimes referenced when discussing the future of farming, but a drone's primary function is to provide high-level aerial imagery, including strategic analysis of large areas to provide analytics on indices like chlorophyll content. While this is useful, it is time-consuming and can lack granular information. Ground-based sensor-based systems are more insightful and cost-



Image Credit: Adobe Stock/belyjrnishka

Technology is helping farmers secure the optimum yield.

effective for focusing solely on monitoring soil under the crops and animal behavior. This is exactly the information farmers need to map out their plan of action to secure the optimum yield," explains Harriet Sumnall, Research Analyst at ABI Research.

The technologies that will power IoT in connected agriculture will heavily rely on gateways and low-power wide area products. The cost of a connected agriculture system depends upon the number of sensors suitable for large farms, and the smaller ones.

"The reasons for adopting IoT in agriculture are universal – cost reduction, improved productivity, and better profit margins, but the specific prompts in terms of readiness to adopt can be more pragmatic and localised. For example, in North America, the political climate is proving challenging for the immigrant workforce required by the agricultural sector, and more automation could make up for this lack of manual labor. And, in Europe, farmers are notably younger than elsewhere in the world and are more naturally receptive to adopting new technology. In general, however, there is a lack of education among farmers about the benefits of connected agriculture. This is a vital issue that vendors must continue to be active in remedying if Agricultural IoT is to succeed," Sumnall concluded. **E**

"The reasons for adopting IoT in agriculture are universal – cost reduction, improved productivity, and better profit margins, but the specific prompts in terms of readiness to adopt can be more pragmatic and localised."

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Cooperation between China and Africa in agriculture is proving beneficial for the sector in several ways.

Boosting agriculture

ZOOMLION HEAVY MACHINERY Co. Ltd, Chinese manufacturer of construction machinery and sanitation equipment, has revealed plans to strengthen agricultural cooperation between China and Africa.

During the First China-Africa Economic and Trade Expo in Changsha, the company revealed plans to modernise agricultural equipment in Africa. Zoomlion announced a series of 'Africa-ready' and upgraded agricultural and construction equipment for high-temperature and humid environment in Africa, while excelling in functionality, durability and cost-effectiveness.

Agriculture is an important field in China-Africa cooperation. In 2018, China's imports from Africa increased by 32 per cent, of them 22 per cent being agriculture goods. However, the agricultural mechanisation level in Africa is not high, which makes the crop productivity low, therefore there is a great potential for agricultural mechanisation cooperation between China and Africa by maximising the use of machines.

A number of Chinese enterprises in agricultural technology and plantation field, as well as the agricultural machinery enterprises such as Zoomlion plane, strive to tap the segmented fields in Africa in the process of agricultural modernisation. For the promotion of agricultural mechanisation cooperation with African countries, Zoomlion has formed a long-term strategy to share in African agriculture modernisation under the principle of a win-win situation.

Zoomlion has unveiled solutions to customise agricultural machines to be suitable for local needs in African countries.

During the expo in Changsha, Zoomlion signed a memorandum of understanding with Tractors & Engineering Company, Egypt's agriculture equipment company, to help agriculture field development in Egypt.

At the seminar on China-Africa Agricultural Cooperation and



Considering the huge market potential in Africa, Zoomlion is planning to select African countries with good industrial foundation to localise parts of the production.

Development, Jimmy Pan, vice-president of Zoomlion Heavy Machinery Co. Ltd, said that Zoomlion aims to promote the agricultural mechanisation cooperation with African countries. To solve the problems which the African countries face, including the low agricultural mechanisation level as well as the problems in the technology, finance and talent, Zoomlion has unveiled solutions to customise agricultural machines to be suitable for local needs in African countries.

The agricultural equipment that the company had exhibited included a wheat harvester, rice harvester, sugarcane harvester and tractors. Construction equipment includes concrete mixer, excavator, truck cranes and industrial vehicles.

Additionally, the company is willing to provide consulting services and technical support to the agricultural mechanisation and the technological solutions for local enterprises. It further added that it is willing to help African countries to create modern agricultural planting mode and to cultivate local agricultural mechanisation talent.

In respect of cultivation of agricultural mechanisation talent in Africa, Zoomlion plans to set up some pilot projects in Africa

and cooperate with local governments and plantations to set up some modern agricultural cooperation demonstration zones. During the process, it will employ advanced agricultural equipment as well as mechanical cultivation and management methods with an aim to create high-quality planting mode in line with the conditions of African countries.

In addition, it started to execute the plan of building 10 manufacturing bases abroad. Considering the huge market potential in Africa, Zoomlion is planning to select good African countries with a good industrial foundation to localise parts of the production and improve the supplying ability of agricultural equipment.

Since entering the African market in 2007, Zoomlion has established a comprehensive network with strong spare parts support and services to support a product lineup across more than 10 African countries. Its major infrastructure projects include Algeria's East-West highway and capital airport terminal construction, South Africa's World Cup venues' construction, Kenya's Mombasa-Nairobi Standard Gauge Railway (SGR), and oil projects in Mombasa. **E**

The latest Bühler innovations bring greater safety as well as increased profitability and reduction in costs.

Advanced solutions for the food and feed industry

Image Credit: Bühler



PolyOne single-screw extruder

AT VICTAM INTERNATIONAL 2019, Bühler showcased solutions for the entire feed value chain, with a special focus on how to use digital services to make the feed industry safer, and more profitable. LumoVision, the revolutionary data-driven maize sorting technology, finds its way into the feed processing industry. Bühler has launched the multifunctional single-screw extruder PolyOne to deliver high product quality pet food and aqua feed industry.

"PolyOne enables our customers to maximise their productivity, and helps to prevent product recalls," says Christoph Naef, head of Business Unit Nutrition at Bühler Group. PolyOne meets the Advances in digital technology, together with our sorting, food, and feed safety expertise, make this an unrivalled system highest food and feed safety standards thanks to its perfected hygienic design. PolyOne is based on a modular system capable of being customised to customer needs, such as higher capacities.

"Advances in digital technology, together with our sorting, food, and feed safety expertise, make this an unrivalled system."

Kubex T: High-capacity pellet mill with full process transparency

Equipped with an application that connects it to Bühler Insights, it is a pioneering cloud platform for the food and feed industry. A dashboard visualises data for customers, making their processes transparent. This allows for seamless tracking and brings production downtimes to a minimum. Algorithms and Bühler experts help millers to optimise the mill's parameters. With it, customers achieve higher profits and lower production costs thanks to innovations in intelligent process optimisation. Kubex T is designed for high-capacity pelleting. Customers will use up to 20 per cent less energy compared to conventional pellet mills, benefit from high produc-

tion capacities of up to 80 tonnes per hour, and a customer-driven design, all of which are the result of extensive Bühler research and development in cooperation with leading feed millers.

Bühler LumoVision: data-driven grain sorting technology for feed and food

The company's latest sorting technology for the feed industry is LumoVision developed in partnership with Microsoft. It minimises toxic contamination in maize and improves yield, by identifying and removing cancer-causing, aflatoxin-infected grains.

This advancement can eliminate up to 90 per cent of contaminated maize. "Advances in digital technology, together with our sorting, food, and feed safety expertise, make this an unrivalled system that contributes to solving a major global security challenge," says Matt Kelly, managing director of Digital Technologies at Bühler. **B**



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Advanced technology in agricultural machinery, is leading to sustainability, efficiency.

Volvo Penta-powered electric terminal tractor



Image Credit: Volvo Penta

WITH AN AIM to provide electrified power solutions by 2021, Volvo Penta has presented an emission-free terminal tractor featuring a Volvo Penta electric driveline at TOC Europe 2019 in Rotterdam, running from 18-20 June

"We strive for sustainable power solutions not only from an environmental standpoint but also from an economic one," said Peter Granqvist, chief technical officer of Volvo Penta.

"We are seeing that certain electric applications are reaching a point where they are providing a lower total cost of ownership than diesel engines. Material handling is a promising segment for electrification due to its high machine utilisation and greater accessibility to charging. We, therefore, decided to create a proof of concept for this segment in order to implement market feedback into our development."

Volvo Penta converted the terminal tractor to fully electric using the electromobility technology from Volvo's bus and truck applications.

Close collaboration with OEMs and operators

By fitting and optimising an electric driveline for a proven terminal tractor, Volvo Penta has gained a deeper understanding of both the

"The Stage V engine range is a competitive solution, bringing value to OEMs and operators in the material handling segment," said Granqvist.

challenges and opportunities in the installation process, which is paramount when designing driveline solutions for OEMs.

Granqvist commented, "With deep application knowledge, our solutions will be fit for purpose and adapted to customer needs. We take a full systems supplier approach, using our global aftermarket service network to take responsibility for the full system installation. This is how we will help our customers in the transition towards new, clean technology solutions."

Volvo Penta is leveraging the benefits of its proven technology and competence in the field of electromobility, combined with a deep understanding of customer applications and needs. Earlier this year, it was announced that Volvo Penta will develop the electric driveline in Austrian manufacturer Rosenbauer's first industrialised electric fire truck. The strategic partnership with one of the world's top manufacturers of fire-service vehicles followed the announcement that Volvo Penta is providing the propulsion system to Gothenburg's all-electric ferry. Both projects demonstrate

important steps in the company's journey to offer electrified power solutions.

A competitive Stage V solution

Volvo Penta has highlighted its Stage V diesel engine range at TOC. A Stage V D8 engine together with the EATS solution will be displayed at the stand.

"The Stage V engine range is a competitive solution, bringing value to OEMs and operators in the material handling segment," said Granqvist.

"The range is optimised for customers' needs and offers ease of installation, operation and maintenance. Fuel consumption is reduced by up to five per cent across the range (compared to the Stage IV engines). Passive regeneration has also been maximised, removing the need for stand-still regeneration."

The company's engine programme comprises diesel and gasoline engines with power outputs of between ten and 1000 hp. Volvo Penta is part of the Volvo Group, manufacturers of heavy trucks, buses and construction equipment.

Volvo Penta's engine range is built to be versatile and their low weight, compact designs, easy installation and optional equipment packages make them suitable for numerous machine and equipment applications in a variety of industries.

Volvo Penta has a track record of working with industrial equipment manufacturers and users of off-road machinery and equipment across virtually every application. From small leisure crafts to supply vessels and river transports, Volvo Penta supplies comprehensive power and propulsion solutions. **E**

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Smart farming with 'AI at the edge'

CAMBRIDGE CONSULTANTS HAS announced to bring artificial intelligence (AI) to the edge of the network, using low-cost, low-power devices to perform complex machine learning tasks.

'AI at the edge' is set to enable AI to solve many of the real-world challenges, out in the field. The approach is demonstrated by Fafaza, a precision crop spraying technology that performs plant recognition and individual treatment in real time.

Precision agriculture means harnessing technology to optimise production. It relies on precise granular data at the individual plant level, on the scale of large industrial farms, supporting everything from weed identification to crop health and yield estimation. This understanding can inform real-time actions, for example, the application of herbicide to an individual weed. This is the challenge that Fafaza addresses: deploying AI 'at the edge,' on the back of a moving tractor and without the need for connectivity.

Fafaza is designed to spot broadleaved weeds amongst the grass and to treat individual target leaves with herbicide. The system identifies, classifies and applies treatment in real time while moving at tractor speed. The Cambridge Consultants team chose this tough 'green on green' challenge to demonstrate the potential of state-of-the-art machine vision and AI.



AI is poised to solve many of the real-world challenges.

Image Credit: Adobe Stock

Although AI techniques have been able to achieve plant recognition for a number of years, the challenge has been in moving from powerful specialist platforms with delayed processing of data, to processing and acting in real time: this is 'AI at the edge'. To be technically practical, a system must be fast enough to distinguish and identify plants using ambient light and to apply treatment while the plant is still in view. To be commercially viable, a system must be rugged and affordable.

Fafaza has been developed to run on off-the-shelf components, including a low-cost camera that can capture images at around 20 frames per second and an AI platform that costs less than US\$100. Major processor vendors continue to invest heavily in devices that can run AI inference algorithms, bringing costs down further. These developments are opening up new areas for real-time AI processing in the field, without the need to rely on a communications infrastructure or the cloud.

Stubble cultivation for arable farming

PÖTTINGER HAS UNVEILED SYNKRO stubble cultivators and TERRADISC compact disc harrows for modern stubble cultivation.

Farmers are recommended to carry out stubble cultivation right after the harvest. This saves precious water, which is necessary for weeds and volunteer seeds to germinate. Shallow incorporation of the volunteer seeds (cereals, oilseed rape and weeds) into the upper soil layer (approximately five cm) with combined consolidation creates ideal conditions for rapid germination.

Pöttinger SYNKRO stubble cultivators and TERRADISC compact disc harrows are ideally suited for modern stubble cultivation.

Without stubble cultivation, water is extracted from the soil by the capillary effect like smoke up a chimney. Water losses can reach 10 to 15 litres per sq m. By incorporating straw into the top layer of soil, the straw starts to degrade. In addition, the soil surface is protected

against further drying out. Mechanical weed control is also regaining importance. Multiple cultivation passes create several waves of germination so weeds can be controlled mechanically - a sustainable solution.

Machines with discs or tines are available for efficient stubble cultivation. TERRADISC compact disc harrows are low draft and ensure reliable cutting through of harvest residues without clogging. The ideal working depth starts at three to four cm and can be adjusted according to the volume of straw. Even on hard and dry soils, the TERRADISC can be used without any problems. Thanks to their solid construction and the aggressively set concave discs, Pöttinger compact disc harrows enter the soil perfectly.

The two or three row SYNKRO stubble cultivators are an alternative to the compact disc harrow. SYNKRO stubble cultivators are designed for a superior mixing effect, regardless of whether you

prefer very shallow or deeper cultivation. Being able to adjust the height and angle of the wings ensures optimum soil penetration and perfect working results. The high working quality of the stubble cultivator ensures reliable penetration even in very dry conditions and excellent mixing in of harvest residues.

For stubble cultivation, Pöttinger recommends the knife ring or CONOROLL rear rollers, which optimally consolidate the mixture of soil and straw. Thanks to the standardised mountings, other rollers - rotapack, cage roller, double bar cage roller or pack ring roller - can be added quickly and easily to the SYNKRO or TERRADISC.

With the TEGOSEM catch crop sowing unit you can combine soil cultivation and sowing a catch crop in a single pass. That is how you can save time and costs. The TEGOSEM can be combined with PÖTTINGER TERRADISC disc harrows as well as with SYNKRO stubble cultivators.

Digital technology and satellite imagery are being employed to help farmers overcome challenges.

Enhancing livelihoods of Ghana's smallholder cocoa farmers

THE INNOVATIONS OF the winners of the international Ag-Tech Developer Challenge, by Rainforest Alliance announced in July 2019, will be further developed and piloted with cocoa farmers in Ghana.

Indian company CropIn won the first prize and received an investment of US\$112712.80 to further develop its future-ready farming solution CocoaSense.

The Dutch team of 20tree.ai won the second prize and an investment of US\$84534.60 for the Farm Development Plan and innovative solutions.

The Ag-Tech Developer Challenge is part of SAT4Farming, a consortium of the Rainforest Alliance, Grameen Foundation, Touton, Satelligence, Waterwatch Projects and the University of Ghana. With this programme, they support cocoa farmers

aiming at increasing their profitability and sustainability. Through remote sensing and AI technologies, data insights can be gathered much more quickly, cheaply and precisely — for a larger number of farmers. The overarching objective is to triple the average yields of Ghanaian cocoa farmers' to 1500kg per year through innovations in farming.

Speaking about the partnership with Rainforest Alliance under the SAT4Farming programme, Krishna Kumar, founder and CEO of CropIn, commented, "We will provide the technological know-how to co-develop a digital platform that aims to enhance the livelihoods of smallholder cocoa farmers in Ghana. This allows them to manage and monitor in a more accurate, affordable and scalable manner. This is a strategic partnership and allows us to enhance CropIn's visibility

in the African region."

Anniek Schouten and Indra den Bakker, founders of the Dutch 20tree.ai, noted, "Our drive for taking up the challenge was the opportunity to contribute to improving the sustainability of cocoa production and having a positive impact on the livelihoods of local communities together with partners such as the Rainforest Alliance."

Daan de Vries, chief innovation and technology officer at Rainforest Alliance, said, "Their solutions will be very valuable to

strengthen our value proposition for small farmers. At Rainforest Alliance, we drive sustainability transformation across millions of hectares globally, with a special focus on commodity sectors with large environmental, economic and social challenges."

Around 50 organisations took part in the challenge submitting innovative remote-sensing data products to bolster digital work and generate data insights that benefit the cocoa farmers the Alliance works with on a global scale. **E**

Through remote sensing and AI technologies, data insights can be gathered much more quickly, cheaply and precisely, for a larger number of farmers.

Image Credit: Rainforest Alliance



Innovative remote-sensing data products aim to benefit the cocoa farmers



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Support for Ghana cocoa farmers

THE GHANA COCOA Board (COCOBOD) is adopting a new policy to provide support services, farming products and inputs to the cocoa. The provision of products and services through cooperatives is to ensure that adequate quantities of all products are allocated to farmers at all times and that such allocations are brought promptly to the farmers themselves upon their request.

The chief executive of COCOBOD Joseph Boahen Aidoo said this on the occasion of the launch of cocoa farmer cooperatives in Ghana. farmers through their registered cooperatives.

So far, a total of more than 5000 farmer associations and groups with a total membership of 146,864 have been formed nationwide," said Aidoo.

Africa's small-scale fisheries critical to food security

THE INTERNATIONAL EXPERTS at Murdoch University's second Blue Economy Symposium in Tunis, emphasised the need to support Africa's small-scale fisheries with greater research and investment.

Industry, NGO, government and academic representatives attended the symposium as part of the Africa Blue Economy Forum (ABEF) 2019 and Murdoch University's Third Commission, a research investigation focusing on issues of public concern to Africa.

Fish accounts for more than one-fifth of the protein intake of Africans south of the Sahara and provides a livelihood to millions of people.

Dr Jeremy Prince, an adjunct professor, Murdoch University, said, "The collective value of the small-scale fisheries of Africa was too big to ignore."

"It is critical that we stabilise and rebuild these fisheries to ensure both food security and the future of the blue economy," he added.

Discussions at the Tunis symposium provided a strong emphasis was placed on the need to highlight clear and innovative actions to effect the lasting transformation of the blue economy in Africa.

It focused on highlighting many issues such as increasing investment to allow fishing communities to be more involved in the co-management of fisheries and directly engaging with fishing communities to collect and share relevant data regarding the state and economic value of small-scale coastal fisheries.

Murdoch's Third Commission stressed the need of more significant research attention, bolder policy innovation, faster implementation on the ground, enhanced political leadership and the conceptualisation and roll out of innovative research solutions.

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