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## May/June 2023 African and Food Processing

## **Rice processing** Boosting West African rice

self-sufficiency

**Poultry** Adopting antibiotic-free poultry systems



Foliar feeding Africa's vegetable crops



IFTEX Nairobi preview. p4



## **GRAIN STORAGE AND HANDLING SOLUTIONS FOR AFRICA'S FARMERS**

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Image credit: Adobe Stock



There are various strategies in place to ensure that Nigeria's dairy production remains strong.



Hermetic bags are the most preferred grain storage technology among smallscale producers.

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#### Farming Calendar 2023

JUNE			
06-08	IFTEX 2023 https://hppexhibitions.com/iftex/	NAIROBI	
08-10	agrofood Ethiopia https://www.agrofood-ethiopia.com/	ADDIS ABABA	
15-17	Agritec Africa NAIRO https://www.agritecafrica.com/		
SEPTE	MBER		
15-16	Naivasha Horticultural Fair https://www.naivashahortifair.com/	NAIVASHA	
15-17	TANZFOOD https://www.tanzfood.com/	ARUSHA	
осто	DBER		
17-19	agrofood West Africa https://www.agrofood-westafrica.com/	ABIDJAN	
NOVE	EMBER		
12-18	AGRITECHNICA https://www.agritechnica.com/en/	HANOVER	
20-22	VIV MEA https://www.vivmea.nl/	ABU DHABI	
21-23	agrofood Ghana https://www.agrofood-ghana.com/	ACCRA	

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

#### IFTEX set to open soon



THE 2023 EDITION of the Kenyan International Flower Trade Exhibition IFTEX will take place in less than a month, as the industry prepares to highlight its latest developments in the industry. There are several new growers on board this year, as well as brokers who export flowers from growers that do not export directly.

For buyers, this is a great opportunity to source Kenyan-grown flowers from even more growers. One of the goals this year has been to attract more (smaller) growers to exhibit in the fair. With almost 150 exhibitors to date, there are more than 60 flower growers.

The list of pre-registered international flower buyers is also growing strong, promising another successful edition of IFTEX.

The exhibition will be held at the Oshwal Convention Centre in Nairobi, Kenya, and take place from 6-8 June.

#### The fifth edition of agrofood Ethiopia to return in June

THE AGROFOOD ETHIOPIA 2023 exhibition, a three-day event that aims to bring together local and international companies, investors, and decision-makers in the agriculture, food processing, and packaging sectors, will take place in Addis Ababa, Ethiopia, from 8-10 June 2023.

The exhibition will provide a platform for companies to showcase their products, services, and technologies. A wide range of topics will be covered, such as agriculture, food processing, packaging, and hospitality. Apart from this, the event will see discussions on agribusiness and investment opportunities in Ethiopia.

The conference will provide a forum for industry experts, policymakers, and investors to discuss the latest trends, challenges, and opportunities in the Ethiopian agriculture and food processing sectors. The conference will cover topics such as investment opportunities, value chain development, sustainable agriculture, and food safety.

In addition to the conference and exhibition, the event will also feature workshops,



The event will feature workshops.

presentations, and discussions on various topics related to agriculture, food processing, and packaging. Participants will have the opportunity to network with other industry professionals and explore potential business partnerships and collaborations.

The agrofood Ethiopia 2023 exhibition

promises to be an exciting event for companies and individuals involved in the agriculture, food processing, and packaging sectors. The event offers a unique opportunity to showcase products and services, learn about industry trends and developments, and network with other industry professionals.





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MADE IN INDIA

#### Agritech Africa 2023 to tap the nation's huge agricultural potential

THE UPCOMING EDITION of Agritec Africa, International Exhibition and Conference on Agriculture Technology will be held in Nairobi, Kenya during 15-17 June 2023. Africa has huge potential for agricultural growth, thanks to ample amount of land and water resources. Yet, land and agricultural productivity are found to be one of the lowest in the world.

In Africa, the agricultural industry witnesses 65% labour force. The sector accounts for 32% of GDP of Africa. Africa requires attention on following three core areas for Higher and Sustained growth:

- Facilitating agricultural markets and trade
- Improving agricultural productivity
- Investing in public infrastructure for agricultural growth.

Agriculture sector contributed 34.15 % in the total GDP of Kenya in year 2019. The sector directly influences overall economic performance through its contribution to GDP. Periods of high economic growth rates have been synonymous with increased agricultural growth. Several untapped crops cultivation in Kenya affect African economy - tea, coffee, sugar, horticulture, floriculture, cotton, Macadamia nuts, etc.

Presence of R&D centres, agricultural infrastructure, agricultural universities, government support, initiative by NGOs and other associations has made Kenya a unique choice for such a international exhibition on agriculture technologies.



In Africa, the agricultural industry witnesses 65% labour force.

Although farming is the most important economic sector in Kenya, less than 8% of the land is used for crop and feed production and less than 20% is suitable for cultivation.

Kenya is a leading producer of tea and coffee, as well as third leading exporter of fresh produce, such as cabbage, onions and mangoes. Small farms grow corn and also produce potatoes, beans and peas.

#### Visitors eyeing latest products at TANZFOOD 2023

TANZEOOD IS AN international B2B and Consumer Trade Fair for the Tanzania Food & Agriculture industry. Under the motto 'Improving agriculture. Improving lives,' more than 150 exhibitors from Tanzania and Kenya are presenting and selling their products from 15-17 September 2023 at the 20,000 sg m large Magereza Ground in Arusha. The three-day event is divided into the B2B days (Friday and Saturday) and the Consumer days (Saturday and Sunday). Businesspersons can network and source new products in a casual professional environment, while consumers and families

are welcome to discover, study and taste the latest food products on the market. TANZFOOD is an annual event for both the food industry and consumers, organised by the expo experts from KILIFAIR Promotions - Moshi/Tanzania.

Sectors such as catering, hospitality and education, packing and production, as well as associations and government will be represented as well. The visitors include farmers and food processors, garden centres and flower dealers, supermarkets and shops, hotel and restaurant managers, F&B managers, the coffee and barista

industry, the tourism and hospitality industry, wholesalers and distributors, import and export companies, food and agricultural consultants and of course consumers and families.

Some of the sponsors of the event include KILIFAIR, CRDB Bank, CocaCola, azam, Taha, Harsho Group, Hanspaul, NMB and Bakhresa Group to name a few.

The event will host exhibition across various categories such as agriculture and machinery, baking and pastries, bank and financial institutions, beer, wine and spirits, beverages and juices, catering, hospitality and education, coffee and tea products, dairy and fresh products, fruits, vegetables and vegan products, government and associations, meat and seafood specialties, organic products and flowers, packing and production.

There will be visitors and industry players from a huge and diverse range of sectors who will be attending the event. Visitors are also welcome to bring along their kids and families during the weekend.

TANZFOOD also provides opportunities to diverse speakers from around the world to conduct educational and informative seminars during the event to present their organisations, products or messages.

Moreover, all visitors are ensured worldwide standards of COVID-19 precaution measures on the ground. Complimentary masks and sanitizers will be provided for all exhibitors and visitors, and handwashing stations will be placed throughout the ground.



three-day event is divided into B2B and Consumer days

#### Embracing agritech solutions for a more resilient agricultural sector



Standard Bank will highlight OneFarm Share, powered by AgFinTech Hello Choice at its exhibition.

A SHOWCASE OF the newest trends and technologies is the Standard Bank's promise to Nampo visitors at the 55th annual presentation of the Harvest Day, taking place from 16 - 19 May 2023.

Since its inception, Nampo has been a leader in showcasing agricultural innovation and providing a one-stop platform to agricultural enthusiasts, and the sector more broadly, in South Africa. The South African agricultural sector is matured and highly diversified, having shown resilience during the COVID-19 pandemic, and has demonstrated positive performance for four consecutive seasons.

With the South African agricultural industry being export-oriented, agricultural exports were up for the third consecutive year in 2022. This can mainly be attributed to the favourable production conditions and higher commodity prices. In value terms, South African exports increased by 4% year-on-year, reaching US\$12.8bn in 2022.

Considering the bottlenecks currently plaguing the sector, such as the unrelenting loadshedding, losses were more than offset by a bumper field crop harvest, attractive field crop prices and the expansion of exports in 2022.

"Appreciating that the sector is cyclical, and currently facing numerous challenges, it is indeed encouraging to note that good growth was achieved over the past four seasons. However, in the same breath, it is critical that farmers prepare for the cyclical downturn by having risk-mitigating solutions in place and adopting new technologies," says Nico Groenewald, Standard Bank's head of agribusiness SA.

The integration of innovation and digitisation in agriculture presents major opportunities for the sector. These Agritech solutions can significantly boost access to finance for agricultural inputs across the value chain, and drive an increase in production capacity and returns. The adoption and implementation of Agritech, coupled with innovative ways of doing agribusiness, are bolstered by fast-occurring climate change, which is increasingly becoming a greater threat to agricultural production.

This year, Standard Bank will highlight OneFarm Share, an integrated Agritech platform powered by AgFinTech Hello Choice, at its exhibition. The bank's partnership with AgFinTech provides a digital solution where emerging and smallholder and commercial farmers can sell or donate their produce into new markets.

Nikki Neumann, executive head of agribusiness platforms and innovation at Standard Bank, says the initiative is focused on reducing food waste on farms and at fresh produce markets, accelerating small commercial farmer development and reducing food insecurity.

#### US government pledges US\$12mn towards youth agribusiness in Tanzania

THE UNITED STATES Government has pledged US\$12mn to support Tanzanian youth in starting, operating, and financing agricultural businesses on the mainland and in Zanzibar. The announcement was made by US Ambassador to Tanzania Michael A. Battle and the USAID/Tanzania Mission director V Kate Somvongsiri at launch events for the Feed the Future (FtF) – Private Sector Strengthening Activity (PSSA) in Zanzibar and Dodoma.

"For over six decades, the United States has cherished its partnership with Tanzania," said US Ambassador Battle during the PSSA launch in Zanzibar on 5 May. "The US Government remains committed to our partnership to generate new job opportunities, improve access to financing, and advise on establishing an enabling environment where entrepreneurs and the private sector can invest and prosper in Tanzania's future."

In addition to helping youth in Tanzania get business loans, teaching them important business skills, and helping them find customers, PSSA is also working to ensure fair and equitable administration of the government's business regulations to support young entrepreneurs. Targeting Tanzania's SAGCOT regions of Iringa, Mbeya, Morogoro, and the Unguja and Pemba regions of Zanzibar, PSSA will award grants on an open, competitive basis to private sector associations, organisations, and lead firms working to improve the business enabling environment and expand economic opportunities for youth. Overall, PSSA aims to reach 30,000 youth, enhance business support services for 6,000 youth-led enterprises, offer financial services to over 3,000 young people, and establish 10 new policies to stimulate economic opportunities for youth and facilitate expansion into new markets.

During the launch of PSSA in Dodoma on 11 May, Somvongsiri said, "Feed the Future Tanzania Private Sector Strengthening Activity prioritises investing in youth. By working together with private sector associations and aligning with the Ministry of Agriculture's Building a Better Tomorrow, we can support the implementation of policies that help youth overcome barriers to their economic empowerment. PSSA can only achieve its goals in partnership with the Tanzanian government and private sector partners across the country."



Overall, PSSA aims to reach 30,000 youth.

The Deputy Permanent Secretary, Hussein Omari, Ministry of Agriculture officiating at the event in Dodoma commented, "I see opportunities for collaboration between PSSA and our Building a Better Tomorrow: Youth Initiative for Agribusiness programme. The Government of Tanzania is fully committed to working with this activity to support youth in the private sector and promote local and international investment."

#### Agri-EPI to identify challenges facing farming in Morocco

AGRI-EPI, A PRECISION farming specialist, has signed a memorandum of understanding with Pôle Digital de l'Agriculture at SIAM, Morocco's international agriculture exhibition.

The parties will identify the challenges facing farming in Morocco and align potential UK agri-innovations and collaborations to resolve them; facilitate mutual market access for agri-tech testing and provision; and pursue research and development opportunities.

"The scope for the UK and Morocco to address critical challenges for sustainable food production is enormous, and we are looking forward greatly to working with our colleagues at the Pôle Digital," commented Agri-EPI international business development manager, Jane Lycett.

### Nigerian minister prioritises hygiene standards to combat bird flu

MOHAMMAD MAHMOOD ABUBAKAR, Nigeria's Minister of Agriculture and Rural Development, has called on development partners and poultry farmers to practice a no vaccination policy but instead embrace basic hygiene in their fight against Highly Pathogenic Avian Influenza, otherwise known as 'bird flu'.

With the disease depleting the poultry population across the country, the Minister suggested it could be controlled in properly managed hygienically and that a no vaccination would save the country money.

Abubakar recalled that following the resurgence of the disease in 2014, poultry farmers called for the reconsideration of the no vaccination policy, stressing that the calls have resurfaced once again for the same reason.

#### BERTI releases stalks shredder LAND/P BioG

BERTI HAS ADDED the LAND/P  ${\rm BioG}$  to its agricultural range in an effort to unlock the next frontier for renewable energy.

#### Recommended for shredding and recovering agricultural byproduct, the Land/P BioG makes it possible to cut, mulch and swath crop residues in a single operation. The recovery of the agricultural by-product, in addition to being used for energy purposes, can ensure a number of positive effects on crops and soil such as an active reduction of pests, reduced disease and mould in subsequent crops and improved nutrient management.

- The LAND/P BioG comprises of the following standard equipment: • **Bigger rear roller with scraper:** thanks to its shape and size,
- it supports the machine in all conditions, including wet grounds
  LED headlights: these are integrated into the frame, ensuring durability and maximum visibility



The Land/P BioG makes it possible to cut, mulch and swath crop residues in a single operation.

- Support feet for parking: these allow the machine to be stored in the transport position, while taking up as little space as possible
- Full automatic belts adjuster: this guarantees maximum available power and greatly reduces maintenance
- **Conveyor belt:** consists of interchangeable modules that serve to convey mulched material sideways and form a swath.

The machine operates by cutting plant residue entering the front of the machine which is then deposited onto the conveyor belt at the rear of the machine. The belt conveys the entire mulched material to the left side, discharging it onto the ground, while at the same time forming a swath facilitating easy pickup. The mulched material is then collected using a loader and transported to a collection area where it is combined with other harvested plant residue.

The field residue is fed into the fermenter where it undergoes various processes such as dosing, defibrillation mixing and pumping. In the fermenter of the biogas plant, the field residues of the bacteria are broken down and transformed into biomethane.

Thanks to its own patents, BioG GmbH, a modern Austrian company specialising in the conception, design and construction of industrial biogas plants, is able to build plants with very high efficiency and use the most diverse organic materials. Each plant is kept under control at all times, even remotely, thanks to sensors and software specially designed and developed by BIOG, to guarantee customers the best assistance and safety.

BERTI's long experience in the field of manufacturing mulchers combined with BioG's experience in the field of producing biomass plants in a conscious manner has led to the creation of the LAND/P series BioG model.

#### Syngenta collaborates with Biotalys to develop sustainable agriculture solutions

SYNGENTA CROP PROTECTION and Biotalys have announced a collaboration to research, develop and commercialise new biocontrol solutions to manage key pests in a broad variety of crops.

The new solution will be based on Biotalys' AGROBODY technology and will offer a new mode of action to broaden farmers' access to novel technologies that counter the threat of pest resistance and advance sustainable agriculture. Syngenta will collaborate on a research programme with Biotalys, an agricultural technology company focused on proteinbased biocontrol solutions, to leverage its AGROBODY technology platform for Syngenta's specific insect targets.

"Syngenta is a leader in bringing farmers cutting edge technologies that improve the sustainability of agriculture, and we are excited to work closely with Biotalys as part of our agricultural innovation ecosystem," said Camilla Corsi, head of crop protection research at Syngenta Crop Protection.

"By combining our proven research and

development capabilities with the breakthrough protein-based innovations of the Biotalys AGROBODY platform, we are determined to play a pivotal role in addressing critical farmer needs around the globe."

This new partnership allows Biotalys to accelerate the development and global commercialisation of innovative crop protection solutions and cement its biocontrol innovation leadership by leveraging the expansive network and capabilities of a global agriculture business.

#### Black Sea Grain Deal requires renewal to limit global food security shock, says IRC

THE LOOMING EXPIRATION of the Black Sea Grain Deal risks further food market instability at a time of record food insecurity, warns the International Rescue Committee (IRC).

With 349 million people across 79 countries estimated to experience acute food insecurity this year, the Black Sea grain deal must be extended. The Black Sea Grain Initiative has been a critical step to restarting shipments of Ukrainian and Russian grain, which represents as much as 90% of imports for countries in East Africa going through a food security crisis. As of May 2023, more than 29 million tonnes of grain and other foodstuffs have been exported from Ukraine. According to the FAO, the severe export shortfall from Ukraine and the Russian Federation, as well as the lack of affordable fertilisers will cause a spike in the number of undernourished people, close to 19 million in 2023.

The IRC calls for an extension of the Black Sea Grain Initiative and expanding its coverage to more Ukrainian ports. This will help reduce pressure on food prices and limit speculation on grain futures. It is important to ensure that food exported through this mechanism reaches the countries most in need - in East Africa and elsewhere.

The extension of the Black Sea Grain Deal is critical for the Ukrainian farmers, too, as they are still facing difficulties selling their grain due to disruptions in logistics chains, and blockage of seaports. Some Ukrainians who the IRC spoke to admit that while they are striving to cultivate their lands despite active hostilities, storing food in some regions has become extremely difficult due the disruptive impact of the war on the power supply. Limited access, logistical challenges and increased transportation costs are also resulting in crops being thrown away.

"Shortages of food in the system and lack of affordable fertiliser continues to push up prices, making it difficult for families in countries like



Somalia to predict if they will be able to afford a meal the next day. Agricultural production is in decline - farmers in Ukraine are struggling to keep their harvests alive amidst active shelling, while climate change is killing crops in other parts of the world that need them most," said Shashwat Saraf, East Africa Emergency Director at the IRC.

He further added that the expiration of the Black Sea Grain Initiative was likely to trigger increased levels of hunger and malnutrition, spelling further disaster for East Africa. "Constructive extension of the grain deal means bringing in more food into the global system and as a result, helping to lower soaring costs and to maintain market stability. Supply chains must be opened and uninterrupted to ensure grain can get to the countries that need it most."

#### FAO's Hand-in-Hand Initiative accelerates investments in Zimbabwe's agro-food systems

THE BEGINNING OF May 2023 saw more than 150 stakeholders in the agriculture sector including senior government officials, private sector actors, farmer organisations, financial institutions, development partners and UN agencies gathered in Harare to attend the Agriculture and Food Systems Investment Forum.

The forum themed 'Accelerating Investments in Zimbabwe's Agro-Food Systems' facilitated investment match-making, while also linking investors with the identified investment opportunities. During the event, the minister delivered one of the key outcomes from the technical and diagnostics work supported by the FAO, that is, the Provincial Agriculture Investment Plans (PAIPs).

Launched in 2019, the HiHi is an FAO flagship programme that supports the implementation of country-led and country-owned



The three-day forum offered opportunities for Zimbabwe's 10 provinces to present their plans.

programmes to accelerate agrifood systems transformations with the goal of eradicating poverty, ending hunger and malnutrition and reducing inequalities. It uses advanced geospatial, statistical modelling and analytics, as well as a robust partnership-building approach to accelerate the market-based transformation of agrifood systems.

The three-day forum offered opportunities for Zimbabwe's 10 provinces to present their agriculture investment plans and priorities.

Minister Anxious Masuka officially opened the forum acknowledging the importance of the HiHi while also challenging the country to use the forum as a strategic platform to reflect on their progress in developing and implementing their investment plans. The FAO invited other southern African countries who are at different stages of implementing the HiHi to facilitate learning and experience sharing for wider adoption and implementation at regional level.

Acknowledging the collective objective to defeat poverty, hunger and malnutrition, the forum seeks to take advantage and foster strategic public-private sector partnerships to develop collective agrifood systems transformation strategies in Zimbabwe.

The forum was held as a follow up to the first one held in May 2022, with the objective to deepen consultations and enhance partnerships, define priorities and targeted investments for agrifood systems transformation in Zimbabwe. Led by the agriculture minister, Zimbabwe successfully participated in, and presented investment cases at the first HiHi Investment Forum in Rome in October 2022, which generated a lot interest from potential investors.

Through different sessions ranging from a review of the national policy environment to presentations on processes, partnerships and results to date, highlights of investment opportunities and provincial investment plans, the forum is expected to come up with a sustainable national agrifood systems transformation Investment Roadmap.



Huge power outages across South Africa are proving how integral proper utilisation of electric equipment is to a thriving poultry sector.

## The importance of electrifying the poultry sector

HE RAPID DEVELOPMENT of the poultry industry can be equated to the advancement of technical and scientific research in conjunction with the proper utilisation of the electrical equipment that is required in fowl production. Studies have found that efficient use of electrical equipment reduces the physical hardship on poultry equipment in relation to large material flow from feed, water, lighting and other electrical comportments in the poultry process. Electrical equipment also plays a large role in the egg handling as it allows farmers to transfer and handle large volumes of eggs at a time as well as providing ideal temperatures and environments for incubation.

Secondary emergency plants, hatcheries, brooders, heaters, feeding and water equipment, waste removal systems and many other pieces are equipment are electrical and require careful maintenance for continued use on the poultry farms.

But the benefits posed by electrical machines in the poultry industry may be at risk. South Africa has experienced significant blackouts since December 2022, with farmers experiencing up to 10 hours per day without electricity. Eskom, South Africa's stateowned power company, has predicted that the rolling power outages will continue until at least 2024 in order to prevent a full power grid collapse.

These blackouts are posing a threat to poultry farmers as they have been left to struggle with low production levels, processing

#### While the up-front costs associated with solar projects can be a large deterrent, research has shown that it may prove financially beneficial in the long-term.

backlogs and minimal space for chicks, leading to a mass culling of more than 10 million in a matter of weeks.

Farmers worry that if the blackouts continue at the current rate, the country could potentially be left to face a long-term food security threat. It has been reported that if the fall in production carries on, South Africa is likely to face a poultry shortage, accompanied by an increased unemployment rate of 33%. The outages also effect the quality of the product, putting the entire foodchain at risk.

Theo Boshoff, CEO of South Africa's Agricultural Business Chamber, said, "It's right up and down the value chain. If you think about primary agriculture; irrigation especially during this time it's peak summer. The cold chain is absolutely critical so that's where the biggest risk lies of course to ensure quality and safety."

#### The saving grace of solar

In light of the looming energy crisis that threatens the country, it has been reported that farmers have begun to turn to more renewable sources, in particular small-scale solar, in a bid to save their livelihoods.

One example is Johannesburg-based food producer Tiger Foods, which announced it would install solar power at four of its manufacturing sites, and will look ahead to producing 65% of its electricity consumption through renewable sources by 2023.

This may prove to be the way forward, and last year, researchers at the University of Arkansas developed a tool which allowed farmers to determine whether solar power is the right alternative source for them.

Yi Liang, associate professor of biological and agricultural engineering at the University of Arkansas, and a researcher in the Centre of Excellence for Poultry Science, conducted a solar energy research experiment in 2021 on a poultry production operation

mage Credit: Adobe Stocl

and found it offered savings of more than 90% of the farms annual electricity rate.

While the up-front costs associated with social projects can be a large deterrent, research has shown that it may prove finically beneficial in the long-term.

This data led to researchers developing the Poultry Solar Assessment tool to help farmers assess whether solar is a feasible option for their farms. The tool is a spreadsheet-based software that analyses investment in solar panels specifically targeted at poultry producers and lenders who want to judge investment feasibility by looking at the past 12 months' worth of electricity bills.

Liang and Walter Bottje, a poultry science physiologist, hosted an educational programme last year to debut the software.

"Adding solar technology is a way to lower the cost of production and displace fossil fuel associated with electricity generation with a renewable resource – sunshine," Michael Popp, professor of agricultural economics and agribusiness, Arkansas Agricultural Experiment Station, said during the event.

#### Secondary power

Alternatively, if it isn't feasible to implement solar power on certain farms, a standby power generator is a necessity. It is an integral secondary power source, given the extent of the power outages

Maintaining the life of livestock and ensuring they are kept in the best conditions possible relies heavily on utilising electric machinery to its highest potential.



A lack of power generation can leffect the entire food chain, resulting in dangerous public health outbreaks if not treated correctly.

occurring across the country and the continent as a whole, should be implemented in any farm housing livestock. The only equipment required for a standby electric power generator service is an alternator to produce the alternative current, an engine to power the alternator, and a transfer switch.

Maintaining the life of the livestock and ensuring they are kept in the best conditions possible relies heavily on utilising electric machinery to its highest potential, and in situations such as power outages across South Africa, alternative measures, whether they be a second generator for backup electric power, or taking advantage of the surplus resource of solar that the continent boasts, can make the difference between a thriving poultry business, or a floundering one.

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As antibiotic drug resistance continues to pose a global threat to both humans and animals, sustainable antibiotic-free poultry systems are increasingly being adopted.

## Embracing antibiotic-free poultry systems

ITH BRILLIANT ADVANCES in technology and genetics, poultry production has been booming over the past few decades. As a result of intensive production however, there has been a rise in incidence of poultry diseases.

Coccidiosis, caused by Protozoa parasites, has so far been one of the most common diseases to affect poultry. Affected birds experience a range of symptoms ranging from intestinal lesions and subclinical infections to death in severe cases. Moreover, this disease is highly contagious, and spreads through infected feces and contact, making it hard to manage. In the broiler industry, coccidiosis results in huge losses caused by poor weight income, poor feed conversion and reduced egg production. In addition to this, it also encourages the onset of other epidemic disorders such mycoplasmosis and colibacillosis.



#### Coccidiostat usage in poultry production

Antiprotozoal agents called coccidiostats, that act on coccidia parasites are commonly administered to chickens as a means of controlling the disease. They work by inhibiting reproduction and retarding the development of the parasite in a host cell. Coccidiostats are added to poultry feed at authorised levels, while keeping a check on the prescribed hygiene requirements. They can be grouped in two major classes: polyether ionophore antibiotics,



which include monensin, lasalocid, maduramycin, narasin, salinomycin, and semduramycin, and nonpolyether ionophores, often referred as synthetic compounds or chemicals. Out of these, ionophores or a combination of ionophores and synthetic coccidiostats are most preferred.

lonophores promote weight gain in poultry and work by targeting gram positive bacteria such as Clostridium perfringens Type A, which causes the Eimeria infection. This is a severe intestinal infection, generally considered a predisposing factor for necrotic enteritis. A further advantage of ionophore coccidiostats is that some of these compounds, like salinomycin, significantly reduce water intake. This has a positive influence on litter quality, improving bird welfare as related to the occurrence of foot pad dermatitis.

#### Ionophores promote weight gain in poultry and work by targeting gram positive bacteria such as Clostridium perfringens Type A, which causes the Eimeria infection.

#### **Rise of antimicrobial drug resistance**

Despite these advantages however, coccidiostats come with one major drawback – drug resistance. According to the World Health Organisation (WHO), drug resistance is defined as the ability of a parasite strain to survive and/or multiply despite the administration and absorption of a drug in doses equal to or higher than those usually recommended, but within the limits of tolerance of the subject.

Drug resistance in coccidia can generally be complete. However, relative resistance to anticoccidial drugs is characterised by the fact that increasing doses tolerated by the host will still show efficacy. This is true in the case of ionophores. It is also a common phenomenon for Eimeria to develop resistance against coccidiostats. Moreover, drugs with a similar mode of action, such as ionophores, are likely to induce a similar mechanism of resistance in Eimeria spp., a phenomenon called cross-resistance. Also, since ionophore coccidiostats are not used in human medicine, they are generally considered safe in regard to antibiotic resistance to bacteria. Recent



evidence suggests that enterococci isolated from poultry fed with narasin, monensin and salinomycin may develop resistance to these drugs. In some cases, ionophore use may co-select for resistance to vancomycin, a critical antibiotic used in human medicine. However, further research is required to clearly establish the contribution of ionophores to antimicrobial resistance in bacteria.

#### **Need for coccidiostat alternatives**

Antimicrobial resistance poses a global threat to both humans and animals. In poultry production, the development of resistance in



chickens can result in massive losses. Therefore, various alternatives such as vaccines, prebiotics, probiotics, organic acids and phytogenics are being used to combat coccidiosis.

In order to reduce the build up of resistance against coccidiostats, attenuated vaccines and coccidiostats are alternately applied in different rotations. Other less commonly used techniques include shuttle and switch programmes. Shuttle programmes involve shifting from one coccidiostat to another within the same rotation, while switch programmes use combinations of ionophore and synthetic coccidiostat, or a so called 'switch' (the change of coccidiostat from one rotation to the other).

Furthermore, it is also important to note that not only coccidiosis but also bacterial pathogens, such as Clostridium perfringens and dysbiosis need to be addressed in broiler production. While vaccines solve the problem of coccidiosis, they don't help tackle bacteria-related intestinal disorders. Studies have shown that some products providing probiotics, prebiotics and organic acids improved performance, while some phytogenic feed additives improved feed conversion and showed growth inhibiting effect on Clostridium perfringens. However, the ionophore narasin which was used as positive control in the experiment proved to be superior to all of the investigated products.

#### Alltech introduces gut health solutions to support antibiotic-free (ABF) poultry production

Alltech, a global leader in the agriculture industry believes that gut health is the foundation for performance and profitability in animal production. In an effort to go antibiotic-free, Alltech has introduced three gut health solutions:

• Seed, Feed, Weed (SFW) Programme: Managing the microbial composition in the intestine is an important requirement for optimising animal performance in low antibiotic or antibiotic-free environments. This is achieved in three ways. Firstly, the intestine of the animal is seeded with favourable microorganisms soon after birth or hatch. Secondly, in order to ensure efficient absorption of nutrients, the capacity of favourable organisms in the small intestine is enhanced, such that they colonise the existing microbial community. This will help the villi to flourish, thereby boosting nutrient absorption. Lastly, a type-1 fimbria blocker is used to prevent the replication and attachment of harmful pathogenic microbes to the gut lining, thereby boosting immunity and reducing disease recovery time.



While vaccines solve the problem of coccidiosis, they do not help tackle bacteria-related intestinal disorders.

- Antibiotic Reduction Programme: This programme is aimed at assisting farmers with cutting down prophylactic and metaphylactic antibiotic usage on farms, by instead shifting their focus to gut health. Producers are guided by a team of experts from the Alltech Gut Health platform, comprising mainly of industry consultants, nutritionists and veterinarians, who help producers develop a bespoke action plan.
- Antibiotic-Free Programme: This programme aims to make a complete transition to an antibiotic-free operation, by improving gut health and utilising holistic nutrition and management practices across all stages of production. An action plan is created and progress is tracked by taking into account targets such as nutrition, enteric pathogen control, water quality, housing management, biosecurity and animal health.

## Phytomolecules-based solutions can have a positive impact on gut health and contribute to sustainable ABF broiler production.

#### **Challenges of ABF poultry production**

While eliminating the use of antibiotics, production systems change drastically. Therefore, ABF systems often encounter numerous challenges:

- Limited treatment options make it increasingly difficult to treat and manage poultry diseases.
- Higher risk of morbidity and mortality since more feed is required to produce the same amount.
- Absence of growth promoting antibiotics increases the length of the production cycle, resulting in the requirement of more time to reach the desired weight.
- Higher production costs due to increased labour and resources required for disease management and prevention.

#### Phytomolecules seen as promising tools for antibiotic reduction

Despite the numerous challenges that ABF systems often encounter, achieving sustainability is possible and requires a holistic approach. For example, adopting phytomolecules-based solutions can have a positive impact on intestinal health and contribute to sustainable ABF broiler production.

Phytomolecules are compounds that certain plants produce to ward off pathogens such as moulds, yeast and bacteria. Phytomolecules contribute to sustainable ABF broiler production in the following ways:

- They boost the production and activity of digestive enzymes, thereby enhancing digestion and improving performance.
- They prevent the overgrowth of pathogens in the gastrointestinal tract and are effective against diseases such as dysbacteriosis and necrotic enteritis. In some cases, they also work well against antibiotic-resistant pathogens.
- They alleviate the flow of bacteria and their toxins from the gut lumen into the bloodstream, thus preventing a leaky gut.
- •They suppress the metabolism of pro-inflammatory prostaglandins and act as antioxidants.

Global animal nutrition company, EW Nutrition has conducted three feeding studies to evaluate the effect of phytomolecules on poultry performance. The objective of these studies was to evaluate the dose dependent efficacy and tolerance of EW Nutrition's phytogenic premix, Activo for broilers, laying hens and coccidiosis vaccinated broilers.

In the first study, the trial group was provided a diet supplemented with 100 mg/kg of Activo, containing standardised quantities of specific phytomolecules. When compared with the control group, broilers that received this phytogenic diet showed significant weight



gain during the starter period. In addition to this, a significant improvement in feed conversion ratio (FCR) was noticed during the growing period, which resulted in an overall improvement in FCR of 3%. Moreover, a 1.000 mg/kg supplementation showed a significant improvement in FCR of 6% throughout the feeding period. When fed up to 10,000 Activo per Kg of feed, hematological parameters were observed to be well within the reference range of healthy birds.

Improving consumer awareness regarding the nutritional benefits of ABF products and the detrimental effects of antibiotic-based products, will help boost product demand and production.

In the second study which was carried out on laying hens, 100 mg/kg of Activo was provided to the birds. When compared with the control group, improved laying performance, egg mass and weight, along with reduced FCR was observed. When fed up to 5.000 mg Activo per Kg of feed, hematological parameters were observed to be well within the reference range of healthy birds. In the third study, which was carried out on broilers that were vaccinated for coccidiosis, a clear dose response for both body gain and feed efficiency was observed. Birds that were fed higher quantities of phytogenic premix showed better performance. Moreover, the group that was supplemented with 200g of Activo per US ton of feed showed similar performance when compared with the positive control group supplemented with AGP.

#### Future of consumption and production of ABF poultry meat

Studies have shown that antibiotic-free poultry meat and other products are scarcely used among households. This comes down to a number of factors such as unfamiliarity and lack of awareness regarding the nutritional benefits of ABF products. In addition to this, low-level ABF consumption is also a result of supply centre shortages and increased cost of products. Since consumption, demand and production are interrelated, improving consumer awareness regarding the various health benefits of ABF products as well as the detrimental effects of antibiotic-based products, will automatically increase product demand, thereby boosting production. Furthermore, bringing down the cost of ABF products and encouraging targeted distribution of sales centres will largely help improve sales and consumption.



West Africa's rapidly growing dairy industry is set to face new opportunities as well as some challenges which could hinder its progress.



HE WEST AFRICA dairy market is a rapidly growing industry, driven by factors such as rising demand for milk and milk products, increasing urbanisation, and changing consumer preferences. The dairy market in West Africa is currently dominated by Ghana, Nigeria, and Côte d'Ivoire, with Ghana leading the market due to rising demand for milk and milk products, particularly in the cheese segment.

Nigeria is second with a strong market share owing to the availability of different cheese flavours. Côte d'Ivoire is third due to rapid urbanisation and rising disposable incomes in the country. Other countries include Togo, Benin, Burkina Faso, and the rest of West Africa.

A report by Data Bridge provides detailed analysis of the market for each country, including factors impacting the market and changes in regulations. Data points such as sales, demographics, regulatory acts, and import-export tariffs are used

#### "One of the major challenges facing the dairy industry in Nigeria is inadequate infrastructure."

to forecast market scenarios. The report also considers the challenges faced by West Africa brands in the face of local and domestic competition, as well as the impact of sales channels on forecast analysis.

Major players operating in the West Africa dairy market include Arla Foods, Nestle, Chi Limited, PZ Cussons, FrieslandCampina C.V., Promasidor, and Clovers S.A. (Pty) Ltd, among others. The report includes detailed analysis of each competitor, including company overview, financials, revenue generated, market potential, investment in research and development, new market initiatives, production sites and facilities, product launch and trials, and patents.

Many companies are initiating expansions worldwide, such as Fair Cape Dairies launching a solar farm in March 2021 to increase milk processing and production in the African region. Collaborations, joint ventures, and other strategies are also enhancing company footprints in the dairy market and contributing to overall market growth.

#### **Challenges Nigeria faces:**

Infrastructure: One of the major challenges facing the dairy industry in Nigeria is inadequate infrastructure. The lack of proper infrastructure, such as good roads, storage facilities, and processing plants, has hindered the growth and development of the sector. For example, the poor state of roads in rural areas makes it difficult for farmers to transport their products to the market, resulting in significant losses. In addition to this, inadequate storage facilities have led to post-harvest losses, reducing the profitability of dairy farming.

Access to Credit: Another significant challenge faced by dairy farmers in Nigeria is the lack of access to credit. Many farmers lack the necessary funds to purchase the inputs they need to boost their productivity, such as improved breeds of cattle, veterinary services, and dairy equipment. The lack of access to credit is due, in part, to the high interest rates charged by financial institutions, which makes borrowing expensive and unaffordable for many farmers. As a result, many farmers have to rely on personal savings or informal sources of credit, which can be unreliable and expensive.

Low Productivity: Low productivity is another challenge facing dairy farming in Nigeria. Many dairy farmers still rely on traditional and outdated farming practices, resulting in low yields and poor-quality milk. The low productivity is partly due to the lack of access to improved breeds of cattle and inadequate veterinary services. Moreover, many farmers lack the necessary knowledge and skills to implement modern farming practices, such as improved feeding and breeding techniques, that could help boost their productivity. Improving productivity is critical to the growth and profitability of the dairy industry in Nigeria.

Marketing and Distribution: Marketing and distribution are also major challenges facing dairy farmers in Nigeria. The lack of organised marketing systems and distribution networks has made it difficult for farmers to find markets for their products. Because of this, many farmers are forced to sell their products to middlemen at low prices, reducing their profits. Furthermore, the lack of proper packaging and labelling of dairy products has limited their marketability and contributed to their low demand.

#### Strategies in place to help:

To help address the issues surrounding dairy farming, there are several initiatives and programmes aimed at improving productivity and profitability of dairy farming in Nigeria. For example, the National Livestock Transformation Plan (NLTP) is an initiative led by the Nigerian government aimed at transforming the country's livestock sector, including dairy farming. The NLTP is designed to improve animal health, promote better feeding practices, and increase access to markets for dairy farmers.

To achieve these objectives, the NLTP focuses on providing training and support to dairy farmers in areas such as herd management, animal nutrition, and disease control. It also aims to promote the use of improved breeds and genetics to enhance the quality and productivity of dairy cows. In addition, the NLTP seeks to create an enabling environment for dairy farmers by improving access to water, land, and other resources required for dairy farming.

To further support dairy farmers, the NLTP encourages the establishment of milk collection centres (MCCs), processing facilities, and other value chain infrastructure to improve access to markets and increase profitability. The initiative also seeks to promote private sector investment in the dairy industry through various incentives, including tax breaks and access to credit.

On the topic of MCCs, these have been established in various parts of Nigeria to collect and process raw milk from dairy farmers. The MCCs provide farmers with a reliable market for their milk and help to improve the quality and safety of milk for consumers.

Also aiding the dairy industry in Nigeria, is the International Fund for Agricultural Development (IFAD) Value Chain Development Programme (VCDP). The VCDP is aimed at improving the productivity and profitability of smallholder farmers in Nigeria, including dairy farmers. The programme provides support for improved farming practices, access to finance, and market linkages.

On top of that, The Commercial Agriculture Credit Scheme (CACS) is a government-led initiative aimed at providing credit to farmers and agribusinesses in Nigeria. The initiative was launched in 2009 as part of the government's efforts to promote commercial agriculture and food security in the country. The CACS is managed by the Central Bank of Nigeria (CBN) and provides loans to farmers and agribusinesses at low-interest rates to help them invest in their businesses and improve their productivity.

"To help address the issues surrounding dairy farming, there are several initiatives and programmes aimed at improving productivity and profitability of dairy farming in Nigeria."



There are strategies in place to ensure Nigeria's dairy production remains strong.

The CACS provides financing for the development of agricultural infrastructure, including irrigation facilities, processing plants, storage facilities, and transportation. The scheme also provides support for the production of high-yield crops, livestock farming, and aquaculture. The scheme is available to farmers and agribusinesses engaged in various agricultural activities, including crop production, livestock farming, and agro-processing.

The CACS loans are available through participating commercial banks and are guaranteed by the Federal Government of Nigeria. The interest rates on the loans are relatively low and are typically between 5% and 9% per annum, making them more accessible to farmers and agribusinesses.



Further developments extend towards Arla Foods, a European dairy cooperative, and the Nigerian government, where the two parties have renewed their successful partnership by signing an MoU. The signing took place at the Arla Innovation Centre in Aarhus, where representatives from both parties agreed to continue their efforts to further develop the Nigerian dairy sector.

The new five-year agreement builds on the foundation of previous years and commits to promoting cooperative business structures among nomadic herders, providing training and knowledge-sharing opportunities, continuing product development, focusing on sustainability, and creating employment and better livelihoods for local dairy farmers. Leading the Federal Ministry of Agriculture and Rural Development delegation was Dr Ernest A. Umakhihe along with a representative from Arla Foods.

"The Nigerian dairy sector has great potential and the combination of an entrepreneurial Nigerian mind set, a growing economy and our dairy farming expertise makes this a fruitful partnership for everyone involved. Being able to support the current demand with our products while at the same time contributing to the development of the local sector in a sustainable way is both practical and meaningful, and I am very happy that we have signed a new agreement," said senior director and head of Arla Nigeria, Peder Pedersen.

Nestle also have stepped in to offer their aid with the project titled 'National Livestock Transformation Plan' (NLTP). This is a government-led initiative aimed at promoting sustainable livestock farming practices across Nigeria. The plan is focused on improving the productivity of the livestock sector while also addressing the security and economic challenges associated with pastoralist activities in the country.

The NLTP seeks to develop ranches and grazing reserves of more than 1,000 ha in order to provide a conducive environment for livestock production. This will not only improve the health and well-being of the animals, but it will also lead to an increase in the quality and quantity of livestock products such as meat, milk, and eggs.

The key objectives of the NLTP include promoting sedentary livestock farming, increasing the productivity of the livestock sector, and reducing conflicts between farmers and pastoralists. The project also aims to create job opportunities for youth and women in the livestock industry, and to improve the livelihoods of smallholder farmers and pastoralists.

In order to achieve these objectives, the NLTP has a number of components such as improving animal genetics, promoting the



use of modern animal husbandry practices, and providing training and capacity building for stakeholders in the livestock industry. The project also includes the development of infrastructure such as water supply systems, veterinary clinics, and feed mills, in order to support the livestock industry.

#### Nigeria's future:

Concerning the future of Nigerian livestock up to 2050, a report by the Food and Agriculture Organisation of the United Nations (FAO), the four major factors which will affect this are population, which is expected to rise 109% to 400mn; urbanisation, which will increase 197% to 280mn; climate change, where temperatures will be higher than today; and technology, which certainly will have an effect on the way livestock management is conducted. These are all regarded as the 'known' factors of the market.

In terms of the 'unknowns', the FAO reports that "Peace and stability, the role of Regional Economic Communities, the market size of artificial meat and the use of drones for the provision of livestock services are examples of unpredictable factors that will shape the future." Depending on varying states of the governance system in Nigeria in 2050, the cattle scenario would be affected according to four different scenarios.

In the 'Nigeira Arise' scenario, the Nigerian government efficiently manages the country with scarce resources and respects the rule of law. Urbanisation has increased, but poor infrastructure causes problems with traffic and access to public services. Poverty is high, but programmes targeting the poor exist, and the livestock

"The Nigerian dairy sector has great potential and the combination of a entrepreneurial mind set." sector is unable to satisfy demand, making Nigeria a major importer of livestock products.

With the 'Nigeria Jaga Jaga' scenario, the rule of law is ignored, politics unstable, citizens' safety at risk, and there is low democratic participation. In this scenario, livestock degrade grasslands, harm biodiversity and public health due to zoonoses and anti-microbial resistance. The total cattle herd would be expected to decline to 11.7mn, with 85% being kept in the pastoral production system.

The third governance system is called 'Gliding Eagle', and much akin to its name, the system is the most positive of the four. In this scenario, the country has good governance and a thriving economy. The livestock sector is sustainable, providing affordable and healthy food with minimal negative effects on the environment and public health. The national cattle herd would double to 37mn, with the commercial sector expanding to one-third being kept in this production system (compared to 1% in 2016).

Finally, 'Predatory Eagle' refers to a scenario in which the country has a booming economy, though only enjoyed by a small group due to disparity. The livestock sector would be split in two, with large corporations which over-exploit natural resources, and millions of poorer smallholders who tend to less productive animals. Under this system, total cattle production decreases by 7%, although cattle in the agro-pastoral and commercial systems would see a slight increase. However, the products would be largely sold to the wealthy elite in major towns.

All systems come with their pros and cons. Although Gliding Eagle appears as the ideal situation, some of the challenges posed results from the environmental implications of increased dependency on livestock farming, such as soil and water. Regardless, it is important to find an ideal balance.

#### Africa resolves to eliminate PPR by 2030

ON 21 MAY, the inauguration of the PanAfrican Secretariat for Peste des Petits Ruminants (PPR) Eradication in Africa is scheduled to occur in Paris, France. The establishment of the Secretariat is indicative of Africa's resolve to eliminate PPR and will serve as a mechanism for orchestrating PPR eradication efforts across the African continent by the year 2030.

This Declaration calls upon the African Union, RECs, member states, and partners to renew and strengthen their commitments towards eradicating PPR, emphasising the need to prevent the persistence of the disease in Africa. The inauguration of the PPR Secretariat will take place during the 90th General Session of the World Organisation for Animal Health, which will be held from 21-25 May 2023.

Furthermore, the fourth session of the Specialised Technical Committee (STC) on Agricultural Rural Development Water and Environment (ARDWE) issued a reccomendation on December 2021, urging the African Union Commission, AUDA-NEPAD, RECs and member states, with the support of FAO, WOAH and other stakeholders to expedite their eneavours in mobilising resources for a programme that is coordinated at the continental level.

The involvement of Africa in the General Session of the World Assembly of Delegates holds significant importance in tackling the obstacles encountered by the animal resources sector on the continent. The meeting presents a chance for African nations to interact with the international community and acquire knowledge on optimal approaches to animal health and trade. The upcoming session will offer an opportunity to deliberate on the trade of animals and animal products, as well as trade-sensitive and zoonotic diseases, all of which exert a considerable influence on the animal resources sector in Africa. Through active engagement in the meeting, Africa will have the opportunity to share its unique experiences and challenges with the international community, thereby making a valuable contribution to the advancement of global animal health and trade standards.

#### Zoetis receives grant to improve livestock health in Africa

IN MARCH 2023, Zoetis announced that the company received a grant worth US\$15.3mn from the Bill and Melinda Gates foundation to further the development and integration of livestock solutions to advance veterinary and care

services to



diagnostic Zoetis is expanding its ALPHA initiative wth hel from a US\$15mn grant.

livestock health and productivity in sub-Saharan Africa.

improve

The grant will enable Zoetis to expand its original African Livestock Productivity and Health Advancement (ALPHA) initiative to include aquaculture in addition to cattle, poultry, and swine, in an additional seven countries in sub-Saharan Africa. The new, five-year ALPHA Plus initiative aims to improve animal health and food security in some of the most rapidly developing regions in the world. This new funding will accelerate access to veterinary products and services and diagnostic tools to increase the productivity of smallholder farms, with a particular focus on supporting female farmers. Through the initiative, Zoetis also will explore opportunities to accelerate and increase fish production in Lake Victoria and Lake Volta. Over the course of the five-year programme, Zoetis seeks to build on the progress and key learnings from the initial ALPHA initiative to deliver a long-term sustainable business model and animal health infrastructure for livestock farmers in the wider sub-Saharan Africa region.

#### IFAD launches new initiative to lower agricultural methane emissions

#### WITH SHARP REDUCTIONS in methane emissions key to

keeping global warming below 1.5 °C, the International Fund for Agricultural Development (IFAD) is launching a new initiative to help developing countries lower methane emissions from agricultural and small-scale farming.

The new programme, which was announced on 8 May at the AIM Climate Summit, will receive US\$3mn in support from the Global Methane Hub and US\$1mn in support from the US State Department. The IFAD initiative will support the preparation of a guidebook to help countries integrate methane emission reductions in their Nationally Determined Contribution (NDC) and mainstream methane reduction in their national planning, budgeting, and public investments procedures. It will also advance a pipeline of bankable that interventions pioneer methane reduction in the agricul-



Approximately 42% of methane emissions come from the agriculture sector, primarily originating from livestock.

tural sector and food systems.

IFAD will begin by providing technical assistance to 15 countries to support integrating methane reductions in their updated NDC for submissions to the United Nations Framework Convention on Climate Change in 2025. The fund will also assist these countries to design projects and blended finance solutions, to reduce methane emissions in agriculture and food systems.

The initiative will further help highlight the multiple advantages of a variety of solutions to reduce methane emissions. For example, approaches that introduce better feed, also promote animal health and husbandry. Specific techniques to use less water to grow rice, or using improved rice varieties that reduce the time between planting and harvesting, can also lead to increased rice production.

#### UNMISS hands over water to Aweil communities

THE UNITED NATIONS Mission in South Sudan (UNMISS), as part of its Quick Impact Projects (QIPs) programme, has recently drilled a solar-powered borehole in Pau-Adhot in Aweil west.

The initiative aims to mitigate the longstanding conflict between herders from both sides of this densely populated area of Northern Bahr El Ghazal state, due to a lack of availability of portable, uncontaminated water sources in the region. UNMISS head of field office, Ataklti Hailu cautioned that the project was important and needed to be cared for.

Through projects like these, UNMISS aims to benefit maximum number of people, while reducing potential conflicts.

Dr. Terry Mabbett in conversation with Dr. Ben Odunlami, technical sales manager for Africa at Omex Agrifluids, discusses solutions to efficiently boost growth and development of vegetable crops.



OVERING THE NUTRITIONAL needs of vegetable crops is a difficult task because the 'word' (vegetable) can often mean 'all things to all men' and often covering a list of crops seemingly 'without an end'. The list is long when you consider mainstream vegetable crops, but essentially unmanageable if you try to include all the 'local' vegetable crops grown throughout the climatically and culturally diverse continent of Africa.

For the purposes of this article, the term 'vegetable' covers classic salad crops (e.g. tomato, cucumber, capsicum pepper), vegetable fruits such aubergines, okra, green beans and garden peas, green-leaf vegetables (cabbage, spinach, cabbage), bulb crops (onions, garlic) and potato (Solanum tuberosum), harvestable portion of which is a stem tuber.

Foliar feeding is the only realistic and practical way of fulfilling the needs of vegetables but, even using this most versatile mode of crop fertilisation has its complications. Vegetable crops were traditionally grown as rain-fed outdoor crops but just as likely now to be grown under irrigation or under some form of protection including environmentally-controlled greenhouse production.

Vegetables like cucurbits (cucumber, courgette, pumpkin and melon) and fresh legumes (green beans and garden peas) are generally direct-seeded into the field or taken as seedlings from nursery beds and transplanted as is the case for tomato, capsicum and aubergine. Some may experience major developmental and physiological events like flowering, pollination, fertilisation and fruit set, where the harvested part is the fruit and/or seed, while others like lettuce and head cabbage simply require a sustained spurt of leaf growth. For others it may be fruit-fill (aubergine), bulb bulk-up (onion and garlic) or tuber set (Irish (Solanum) potato).

#### "Foliar feeding is the only realistic and practical way of fulfilling the needs of vegetables, but even using this most versatile mode of crop fertilisation has its complications."

With such a wide range of plant growth and development patterns, agronomic practices and farming systems, feeding and fertiliser clearly cannot be a 'one size fits all' situation. That said there are many common threads that can be brought together to make the foliar feeding of vegetable crops a more meaningful and well-adjusted component of crop agronomy.

And that is why I travelled to Kings Lynn in Eastern England where Omex Agrifluids, a world leading company in the development, marketing and application of soluble fertilizer products for the widest range of vegetable crops, has its headquarters. With this kind of expertise and experience, Omex clearly has the capacity to place some order and clarity concerning vegetable crops. I spoke with Ben Odunlami who is the technical sales manager for Africa at Omex Agrifluids.

As with most crops, we are talking about a cycle starting with seed germination and ending with harvest. So, seed germination and subsequent seedling establishment is the best place to start, and clearly the stage when food and nutrients stored in the seed are exhausted and the seedling has to rely on photosynthesis within its newly-formed green leaves. This is an impossible task without fast formation of a secure root system to anchor the plant and absorb water and soluble nutrients from the soil. Also, given the vagaries of climate, weather, and their effect of soil conditions (from drought to soil saturation), together with potential pest and disease attack, then germinating seedlings clearly need a helping hand to establish. A similar situation exists for transplanted crops where seedlings 'pulled' from nursery beds are essentially shorn of the root hair 'complement', and which must be renewed quickly after the seedling plants suffering from 'transplant shock' are planted out in the field or greenhouse.

#### A boost from Bio 20

I asked Ben Odunlami if Omex had a secret for success in these very earliest stages of plant growth and development irrespective of the crop, how it grows and develops and the agronomy and farming system employed.

"Our answer for vegetable crops and growers is Omex Bio 20", said Ben. "Omex Bio 20 is a highly concentrated emulsion providing a full profile of essential plant nutrients including the macronutrients (NPK), meso-nutrients (e.g. Ca and Mg) and all the micronutrients (trace elements), and mostly in EDTA form, but also something extra and indeed extra special." I asked Ben about this special extra component and how it improves plant seedling growth and development.

"Omex Bio 20 contains an organic component sourced from a marine alga (seaweed) to give the product a biostimulatory dimension to ensure young plants can utilise the full range of essential nutrients furnished by this soluble nutrient product.



Omex Bio 20 provides an essential boost for crops at the seedling stage like the cucumber shown here.

#### "Omex Bio 20 contains an organic component sourced from seaweed, giving the product a biostimulatory dimension to ensure young plants can utilise the full range of essential nutrients."

Applications of Omex Bio 20 variously made by spraying or watering will enhance root biomass and aerial growth, thereby maximising access and utilisation of nutrients, whether supplied by the product or sourced from the soil." said Ben Odunlami.

Omex Bio 20 is not just for seedling plants but can be profitably extended into the first weeks of crop growth and development, so I asked Odunlami for several examples which illustrate how Omex Bio 20 is used. They include:

- **Potatoes:** 1 to 2 applications by foliar spraying early in the crop. Rate: 2.0 to 3.0 | Omex Bio 20/ha or 400 ml Omex Bio 20/100 | of spray.
- Salad crop vegetables (e.g. tomato and capsicum pepper): 2 to 4 applications once the transplants are established in the field. Rate: 2.0 to 2.5 | Omex Bio 20/ha or 200 ml Omex Bio /100 | spray

Omex Bio 20 continues to be trialled on a wide range of vegetables in a number of African countries.

#### Omex K41 and potassium the gatekeeper

Potassium is required in significant amounts for normal plant growth and development. Failure to supply sufficient quantities of the nutrient can have severe consequences, because potassium is intricately and integrally involved in plant water relations and



metabolism. Not for nothing is potassium called the 'gatekeeper'. Potassium has a major controlling effect on stomatal movement, transport of sugars from the leaf and with a major part to play in photosynthesis. Omex K41 comprising nitrogen (3.00% w/v), magnesium (2.50% w/v), sulphur (7.30% w/v) and potassium at a 'whopping' 41.00% w/v is the vegetable growers' answer to keeping vegetable crops well supplied with potassium. Crops like the cucurbits may suffer magnesium deficiency following treatment with potassium. Omex K41 sidesteps this nutritional imbalance by furnishing potassium and magnesium at the same time.

#### **Crop specific treatments include:**

- Cucumber: Rate 3.0-5.0 | of Omex K41/ha or 300 500 ml/100 l, with 2-3 applications beginning at full bloom
- Tomato and capsicum pepper: Rate 3.0-5.0 l/ha or 300 500 ml/100 l, with 2-3 applications from fruit set to fruit colour
- Potato: Rate 3.0-5.0 l/ha or 300-500 ml/100 l with 2-3 applications from flowering to tuber set to bulk up the potato stem tubers

#### Omex Zynergy – a twin micronutrient intervention

Nutrient needs sometimes require a specific intervention, and so is the case with Omex Zynergy, an exciting new product providing a twin micronutrient intervention using zinc and copper. Omex Zynergy is a unique complex of copper (2.66% w/v) and zinc (4.72% w/v) with sulphur at 9.10% w/v for good measure.

Though only required in trace amounts this pair of metallic micronutrients has far reaching effects on plant metabolism. Zinc is involved in the formation and activation of the plant hormones responsible for proper root development and as such especially important in the early stages of crop growth. And playing an equally important role later on in the crop cycle in structure and functioning of the plant integumentary system and thereby affecting

Image Credit: Dr. Terry Mabbett



#### "Suppression of potato blight was a significant benefit of using Omex Zynergy in crop protection and crop nutrition programmes."

skin elasticity, wound healing and by implication prevention of infection and disease suppression.

Copper has an equally wide range of functions and effect. The copper ion is essential for photosynthesis, binding of cells that support tissue structure and as such governing the strength and resilience of stems and the development new stem and root tissue. But the role of this micronutrient does not stop there. Copper acts as a co-factor by activating a number of enzymes integrally involved in the synthesis of carbohydrates and proteins. Last but not least, copper complexes with phenolic compounds which play a crucial role in prevention and suppression of infection by microbial pathogens.

I asked Ben Odunlami how this relatively new product from Omex is performing in the field. "Omex Zynergy is one of our newer products" said Ben "and is currently used to improve plant health, enhance plant tolerance to abiotic stress (e.g. drought) and remedy nutrient deficiency as appropriate. Omex Zynergy has been formulated so that copper and zinc are freely available to the plant. Research carried out by Omex in cooperation with universities and independent trials organisations show Omex Zynergy provides an effective complement to crop protection programmes, and particularly where rust and downy mildew diseases are a problem on a wide range of crops. Suppression of potato blight was a significant benefit of including Omex Zynergy in crop protection and crop nutrition programmes. Inclusion of Omex Zynergy in the trials programme gave a 14.5% increase in yield which translated into 30:1 return on investment. "Omex Zynergy is currently used on a wide range of vegetable crops including potato, legumes, brassicas, lettuce and other salad leaves," says Ben Odunlami.

#### Specific crop situations where Omex Zynergy is used include:

- Root crop vegetables e.g. carrots. Start applications at the 3-4 true leaf stage and repeat after 10-14 days. Rate is 1.0 l Omex Zynergy/ha
- Legumes including green beans, garden peas, sugar snap peas and mangetout: apply pre-flowering with repeat sprays at 10-14 day intervals. Rate is 0.5-1.0 | Omex Zynergy/ha
- **Potatoes** starting at tuber initiation with repeat sprays at 10-14 days interval. Tank mixing with potato blight fungicides if required. Rate is 0.5 | Omex Zynergy/ha
- Salad crop vegetables outdoor and greenhouse production;



CROPS

start 7-10 days after planting; repeat at 10-14 day intervals. Rate is 0.5-1.0 I Omex Zynergy/ha. Use the lower rate on lettuce and other salad leaves.

#### **Calcium for strength and resilience**

Tissue strength and plant resilience is an important factor for vegetable producers because a whole range crops are potentially prone to tissue and organ defects in the run up to crop maturation and harvest. "Omex is acutely aware of this risk which revolves around calcium delivering tissue strength and integrity and that's why we have developed a range of calcium-orientated products to supply soluble calcium; also phosphite ions to 'enable' entry and movement within the plant.

"Calcium is the key component of calcium pectate in the middle lamella which cements cells to form tissues," says Ben. Shortfalls in soluble, plant-available calcium negatively affect cell division, compromise tissue strength and integrity while impairing cell wall permeability. Increasing available calcium extends the storage life of fruits and suppresses the development of physiologically-based tissue breakdown syndromes including bitter pit of fruit and internal browning of stem tubers.

#### "A calcium-centred programme combining Omex CalMax Gold at flowering and Omex CalMax during post-fruit set period provides a uniquely effective package."

#### Key products in the 'resilience range' of Omex products' are:

**Omex CalMax:** a fully water soluble fluid emulsion supplying a high concentration of soluble calcium (22.5% w/v) alongside magnesium and a full complement of micronutrients.

Omex CalMax Gold: for growers who want a 'gold star' treatment. This product contains the same full complement of nutrients with an even higher level of calcium (24% w/v) with selected amino acids (9% w/V) for enhancing fruit set.

Applications made during the flowering period allow the amino acids to stimulate the chemical pathways which control and contribute to fruit set and fruit yield. A calcium-centred programme combining Omex CalMax Gold at flowering and Omex CalMax during the post-fruit set period provides a uniquely effective package that will correct any calcium deficiency, enhance fruit set and fruit yield, and help to improve fruit firmness, storability, fruit finish and colour.

#### Examples of specific crop treatments using Omex CalMax Gold are:

- Tomato, cucumber, Aubergine and beans: 3 applications at bud break, full flower and petal fall to improve fruit set and yield.
- Lettuce, endive and cabbage: Apply to overcome symptoms of stress which may be caused by high temperature, lack of moisture, pests and diseases or inadequate overall plant nutrition. First application made at 6-7 leaf stage and weekly thereafter.

Omex CalMaxB: contains calcium 22.50% w/v, boron 1.53% w/v plus chelated micronutrients, nitrogen and magnesium. A unique soluble nutrient product for crops which need calcium and boron the latter being the least known and least understood of the micronutrients, but essential nevertheless. Like calcium, boron possesses a tissue strengthening role through involvement in the transport of soluble sugars across cell walls and in the synthesis of cell wall material. Boron also has a significant bearing on pollination specifically through pollen production and pollen grain viability, and therefore with significant influence on yield where the harvested commodity is the fruit and/or seed.



Tomato vines loaded with ripe plum tomatoes and the rewards from foliar feeding.

I closed by asking Ben about the sort of crop quality problems brought about by inadequate soluble calcium. "Perhaps the most well-known and almost certainly the most important is blossom end rot of salad crops including tomato, capsicum pepper and cucurbits," said Ben. Blossom end rot starts out as a purely physiological problem of the fruit and is related to poor calcium plant nutrition. But graduates in severity through invasion of the damaged fruit tissue by various plant pathogenic microbes. The most frequent and damaging are the fungus-like Phytophthora pathogens and Pseudomonas solancearum, a plant pathogenic bacterium with a very broad crop host range.

Dr. Ben Odunlami additionally lists tip burn in lettuce, cabbage and cauliflower, brown head in broccoli, black heart in celery and internal brown spot of Irish potato as physiological conditions caused by inadequate calcium nutrition.



Precision planting technologies along with efficient fertiliser management techniques are increasingly being adopted in modern farming to boost crop production.

## Producing more with less: the recipe for a sustainable future



ITH THE GLOBAL population expected to hit the 10 billion mark by 2050, there arises a dire need for farmers to boost crop production by 60-70% on today's arable land.

The high rate of technological advancements and emergence of artificial intelligence (AI) in the recent years have helped bring in sustainable agritech solutions to tackle world hunger and ensure a resilient future. Robots and agricultural drones have began automating activities that require more time and labour, with crop planting being one such example. In addition to this, several precision farming techniques are also being adopted.

This year, global agricultural machinery company, John Deere, during its CES 2023 keynote address, introduced ExactShot, a new robotic seed planter capable of saving time, money and fertiliser. What makes this new technology so unique is its ability to produce 'more with less'. For instance, rather than applying a continuous flow of fertiliser to the entire row of seeds, the ExactShot technology combines the use of starter fertilisers and precision planting technologies to accurately place the fertiliser onto seeds just as they are being planted in the soil.

The technology comprises of 54 modular electrified robots with 56V and sensors to register when each individual seed is in the process of going into the soil. As this occurs, a robot will spray only the amount of fertiliser needed – about 0.2 ml – directly onto the seed at the exact moment as it goes into the ground. This allows farmers to reduce the amount of starter fertiliser needed during planting by more than 60%. Moreover, ExactShot has the ability to save several million gallons of starter fertiliser annually. It also prevents wasted fertiliser from encouraging weed growth or increasing the risk of running off the field into a waterway.

During the recently held John Deere Tech Summit in Austin, Nancy Post, vice president of John Deere's Embedded Software and Solutions spoke about ExactShot's incredible ability to precisely plant a whopping 6,600 seeds in mere three seconds.

#### ExactShot combines the use of starter fertilisers and precision planting technologies to accurately place the fertiliser onto seeds just as they are being planted in the soil.

#### **Rising popularity of precision planting**

Precision planting is a series of technologies and hardware that has a plethora of advantages and is increasingly being adopted in modern farming. Precision planting tools are often added to existing tractors, combines and other farm equipments, thus providing farmers with precise information regarding the seeds planted.

Horsch LLC's Maestro SX L, comprising of 24 rows on 30-inch spacing, is another example of a simplified high speed precision planter. The chassis is designed for large carrying capacity of liquid fertiliser and seed. The planter also consists of an integrated liquid system that is complete from tank to in-furrow placement. Seed in the bulk tank is conveyed to the row through the pneumatic MTS system and that air flow is also used for metering functions.

It is noteworthy to mention that although precision planting technologies and starter fertilisers are highly efficient when used individually, a combination of the two is what makes these innovations a recipe for a sustainable and self-sufficient future.



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West African countries are aiming to reduce their dependence on rice imports.

In West Africa, companies such as Bühler Group are working to support the government's efforts to boost rice production and processing.

### **Raising the bar for rice**

EST AFRICA'S LOCAL rice production only covers about 60% of the regional demand, while rice is the most consumed grain in the area. The region increasingly relies on imports as the increase in production is not able to keep pace with the sharp increase in rice consumption.

By achieving rice self-sufficiency, West African countries can reduce their dependence on imports, increase food security, and boost their economies by creating jobs in the agriculture sector.

To achieve this, the region needs to increase investment into agricultural research and development, improve irrigation systems, provide farmers with access to credit and training, and promote the use of high-yielding rice varieties.

Additionally, it can help to stabilise food prices and reduce the risk of food shortages during times of crisis.

#### **Countries leading the way**

Nigeria has made significant progress in increasing rice production and reducing imports. The government has implemented policies such as providing subsidies for inputs and equipment, and has also invested in irrigation infrastructure, to support rice farmers.

Senegal has achieved rice self-sufficiency and is now a net exporter of the crop. The country has invested in irrigation systems, improved seed varieties, and provided support to smallholder farmers to increase rice production.

Burkina Faso has also made significant progress in increasing rice production and reducing its dependence on imports. The government has invested in irrigation infrastructure and provided

#### By achieving rice self-sufficiency, West African countries can reduce their dependence on imports, increase food security, and boost their economies by creating jobs in the agriculture sector.

support to farmers to improve productivity.

Mali has received continued support from the government through investments in irrigation systems and to improve yields.

Other regions in West Africa are also working towards achieving self-sufficiency in rice production.

It is imperative that partners working across the agricultural value chain are organised to provide innovations to farmers. The number of public and private sector organisations with shared objectives to improve the sector are on the rise.

#### **Creating synergies**

Bühler is a major player in the development of West Africa's rice production and processing. The global Swiss family business has had a presence in Nigeria for more than 50 years and has established itself as the key technology provider in the Nigerian government's efforts to enhance rice production and processing to meet international standards.

In August 2022, Bühler Nigeria hosted its first customer experience day with the theme: 'Thriving through Collaboration.' Bühler Nigeria managing director, Manuel Murrenhoff's keynote address on the topic 'Africa on the Rise – Feeding the Continent of Possibilities' identified Bühler Nigeria's support for the country in its quest for food security, including the construction of a grain processing innovation centre in Kano. "By supporting food producers in Nigeria with technical solutions and a full spectrum of services, we are helping Nigeria to gain food independence and improve food security," said Murrenhoff.

In Nigeria, the current drive to invest in rice mills across the country, spearheaded by the government, is supported by solutions from Bühler Nigeria. A project initiated in 2017 includes the acquisition of a rice mill in Imota, as well as eight smaller mills funded by the federal government. Currently, one of the eight mills has been commissioned.

The Nigerian government's partnership with Bühler is illustrated

by the fully automated Imota rice mill, inaugurated by Muhammadu Buhari, president of the Federal Republic of Nigeria, in January this year. "Known to be the largest rice production facility in sub-Saharan Africa, and with an annual production of about 2.5 million 50 kg bags, it is set to revolutionise the rice industry in the country," said lyore Amadasun, sales and channel business manager, Bühler Nigeria. "At full production capacity, it will reduce the price of rice, increase local capacity and ultimately improve Nigeria's trade balance."

Bühler embraces its corporate responsibility to contribute to providing young, talented Nigerians a promising future within their home country. Bühler's biggest leverage for this is employment combined with training and education. By investing in education and training, Bühler aims to give the Nigerian youth the tools they need to succeed in life and reach their full potential.

A great example is the cooperation between Bühler Nigeria and Swiss authorities started in January 2023 to expand the trainee and intern development programme at Bühler's offices in Lagos and Kano.

"The project aims to support young Nigerians in their education, enhance their professional capacities and technical skills as service engineers and commercial employees through high-quality training," said Nicolas Lang, ambassador of Switzerland to Nigeria, Chad, Niger, and ECOWAS.

#### Through investment in new technology, partnerships, innovations and education, Buhler Nigeria continues its journey of sustainability.

Through investment in new technology, partnerships, innovation and education, Bühler Nigeria continues its journey of sustainability.

The company recently announced the launch of the next generation of its TAS grain cleaning system, the TAS LAAC. Cleaning is an essential part of any operation, as clean raw material is vital for any food and feed production process, ensuring safety and high quality of the product. The updated version of the TAS cleaning system is now available to customers worldwide.

"Not many would expect much potential in improving or even revolutionising a technology that has reliably met customers' needs for decades. However, we have built on past success, optimised our existing cleaner solution, and introduced new groundbreaking features. With the new system in place, operators can manage machinery more easily, efficiently, and profitably with all the



CASL rice mill by Bühler, in Senegal.

required functionality at their fingertips – even via mobile devices," explained Manfred Dess, product manager for TAS cleaners at Bühler.

Senegal has a per capita rice consumption of about 72 kg a year – on par with many Asian countries.

Bühler's international team made it possible for Compagnie Agricole de Saint-Louis du Sénégal (CASL), a French agricultural company to set up West Africa's first end-to-end industrial rice processing facility in Senegal. The facility is spread over 2,700 ha, with a capability of producing up to 45,000 mt of white rice per year.

#### **Pathways to progress**

Numerous technological advancements and coordination between stakeholders have been implemented in West Africa over the last decade. Public and private investment in upgraded processing facilities, contract farming schemes and vertical integration have all played a role in increasing the productivity of the sector. The policymakers at national and regional levels are constantly revisiting opportunities and challenges, and refining strategies and policies. The Coalition of African Rice Development (CARD) Phase 2 aims at doubling rice production in sub-Saharan Africa from 28 million tonnes in 2019 to 56 million tonnes by 2030 (CARD, 2019).

Considering the real threats of climate change as well as the challenges of the local rice market, the West African countries seem to be making significant progress towards reducing their dependence on food imports.

Through reliable food processing technology, organisations such as Bühler continue to show commitment towards supporting the government's goals of self-sufficiency in rice production, food and nutrition security, employment creation and production of surplus for export.



Hermetic storage technology reduces both on-farm and off-farm storage losses, while also being natural and pesticide free, thus making it one of the preferred storage systems in sub-Saharan Africa.

## Saying 'no' to postharvest losses



MAJORITY OF AFRICAN countries struggle with postharvest losses that have significant implications for food security, economic growth, and environmental degradation.

According to the Food and Agriculture Organisation of the United Nations (FAO), postharvest losses amount to nearly US\$2.6tn annually, including US\$700bn of environmental costs and US\$900bn of social costs.

Although postharvest losses can occur during various functional processes from farm to market, lack of appropriate storage

Postharvest losses amount to nearly US\$2.6tn annually, with lack of appropriate storage technologies being one of the biggest reasons for losses in Africa. technologies is one of the biggest reasons for losses in Africa. Postharvest losses are generally considered a loss of volume harvested and can be characterised as a deterioration of the grain condition. This can in turn result in a loss of nutritional value, monetary value and access to particular markets.

#### Types of grain storage technologies

There are a variety of efficient grain storage technologies that can help combat postharvest losses. One of the most basic ones include traditional storage structures such as graneries and mud bins. These are made from locally available materials, and have been used for centuries in various regions of Africa. Nowadays, improved storage facilities which include plastic-lined baskets, metal or plastic drums, and warehouse storage facilities are being used to address the limitations of traditional storage structures. Areas that have high humidity levels often harness solar energy to dry grains prior to storing them in airtight containers. Harvested grains are also subjected to a variety of chemical and mechanical treatments to kill pests and remove excess moisture from grains before storage. Common examples include the use of pestiside-based chemical treatments as well as mechanical drying methods such as fans and heaters.

#### Prevalence of hermetic storage systems in sub-Saharan Africa

Apart from the aforementioned grain storage systems, one of the most suitable ones, especially in sub-Saharan Africa is Hermetic storage. This technology has been proven to help reduce on-farm and off-farm storage losses. Moreover, it is an alternate pesticide-free method that uses natural respiration processes along with air-tight containers to eliminate insects and molds by depriving them of oxygen. Depending on the size of the storage structure, oxygen levels can drop to less than 10% within a short period of time. Effectively altering the ambient environment within the containers will hence prevent pests from thriving.

Hermetic principles can either be applied to hard containers such as metal silos or flexible materials such as bags. There are a wide variety of hermetic storage systems used in sub-Saharan Africa. One variety known as the Purdue Improved Crop Storage (PICS) bag has been widely adopted in the region, particularly for maize and cowpea storage. Plastic-lined woven bag is another hermetic bag variety that is relatively cheap and capable of being reused multiple times. It is made of woven polypropylene material with a plastic lining. Similar to this, is the grain cocoon bag which is relatively cost effective and is primarily made of plastic sheets that are sealed around a pile of grain. Metal silos on the other hand, are relatively huge structures made of galvanised steel or aluminium sheets that are capable of storing large quantities of grain.

Choosing the ideal hermatic storage system depends on a number of factors. The first, most important factor is cost. An analysis of alternative maize storage technologies carried out in Kenya shows that a common insecticide treatment method would cost approximately US\$30/ton, while a hermetic bag would cost approximately US\$52/ton. On the other hand, a 0.36 ton metal silo will cost approximately US\$316/ton. As the capacity of the metal silo increases, although the overall cost goes up, economy of scale drives the unit costs down. Smallholder farmers however, cannot afford even the smallest metal silos, which is why hermetic silos often do not appeal to small-scale producers.

#### Hermetic bags considered most favourable

From a direct cost perspective, hermetic bags appear to be more attractive to small-scale producers for on-farm storage than hermetic silos. Besides cost, other socioeconomic factors also highlight the reason for this preference. Firstly, regions that are frequently prone to natural disasters and prevalent to conflict find hermetic bags to be more convenient, given their added benefit of mobility. Secondly, hermetic bags allow farmers to keep their grain well concealed, thus safeguarding it against potential theft. Lastly, bags allow farmers to preserve their surplus grain for future consumption or sale.

A study published in January 2023 evaluated the effectiveness of different hermetic storage bags to keep insect pests and mycotoxin levels in check in yellow maize. The ZeroFly Hermetic (ZFH) and Purdue Improved Crop Storage (PICS) bags were compared with standard polypropylene (PP) bags in storehouses at three poultry farms in Dormaa Ahenkro, Ghana.

Results indicated that ZFH and PICS bags were more efficient in protecting yellow maize from insect pests, than PP bags. Moreover,



Low cost, ease of mobility and other socioeconomic factors make hermetic bags the most preferred grain storage technology among smallscale producers.

they also helped maintain alfatoxin and fumonisin levels within recommended thresholds. When compared with each other, ZFH bags were found to offer additional protection to maize, over PICS bags. This is because the deltamethrin incorporated in the yarns of the outer layer of ZFH bags served as a barrier to infestation from outside. Furthermore, insect-damaged kernels were found to be significantly higher in PP bags, which also showed greater levels of insect infestation, when compared to ZFH and PICS bags. As a result, PP bags had undergone a weight loss of approximately 30% towards the end of a six-month storage period, in comparison to only 0.23% observed in hermatic bags.

Therefore, poultry farmers, maize aggregators, and other stakeholders have been encouraged to employ hermetic storage bags to store maize as a means of preserving its quality for food and feed.

#### Kenyan scientists develop new rodent repellent hermetic bag

With nearly half of Kenya's grain losses accounting to pests and rodents in storage, scientist Paddy Likhayo, of the department of entomology from the Kenya Agricultural and Livestock Research Organisation (Karlo) has recently developed an innovative rodent repellent hermetic bag to address the issue of rodent-related grain damage.

Rodent repellent hermetic bags will contain a chemically designed plastic liner within the bag which will be detected by rodents, urging them to move away, instead of damaging it.



In regard to warding off rodents, the researcher mentioned that they were currently working with the private sector to develop a chemically designed plastic liner within the bag which will be detected by rodents, urging them to move away from the bag instead of damaging it. According to a report by The Star, Likhayo stated that out of the 100 bags that were supplied, 60% of them repelled rodents and showed no signs of damage. However, damage was only observed in those bags that were generally used by farmers and had no rodent repelling properties.

Regarding availability and affordability, the researcher mentioned that these rodent repellent hermetic bags would be available in the market in the next couple of months and have a higher price in comparison to normal hermetic bags. He further clarified that this price rise would however be well within the

farmers' budget. The bags would be accessible to farmers in agrovets that are working closely with the private sector to help with bag distribution.

#### Four pillars of good storage practice

Some of the basic requirements for good grain storage are:

- Quality of the Itis adways important to ensure that the crop being brought into the store is in good condition. This is because a drop in quality often causes grains to become more susceptible to insect damage than good quality whole grains.
- Store condit Stores need to be designed in such a manner that they provide adequate protection against rodents, birds, and domestic animals such as poultry. Roofs above these stores should also provide sufficient shade during the day, since frequent changes in temperature can cause condensation, resulting in the development of moisture and mould. Moreover, the location of the store also matters. For example, stores should be made theft proof and not be located near trees or areas that are prone to natural disasters such as flooding and high winds.

Irrespective of the type of storage technology used, weekly inspections need to be conducted to determine the quality of grain that is entering the store.



- Store hygieneMaintaining good store hygeine is most important when it comes to preventing insect and rodent infestations. Livestock should be placed away from the store and their droppings cleaned immediately. Empty storage containers need to be cleaned, while second-hand sacks should be dipped in boiling water and dried in the sun to kill pests. Grain sacks also need to be stored separately, depending upon their age. As a preventive measure, it is also important to sprinkle insecticide on the inside walls and floor of the structure.
- Maintaining store and crop condition throughout stor periodPest attacks are often unpredictable. Therefore, it is important to take early action by inspecting both the store and the produce on a regular basis. Regular insect infestations require treatment with Actellic. In case of maize, spraying with insecticide works, but shelling cobs and mixing with Actellic dust works better. Moreover, weekly inspections need to be conducted to determine the quality of grain that is entering the store. This is because insects may be brought in with the produce, which might have become infested in the field during harvesting or drying. The store may also have harboured infestation from the previous season.

Therefore, by adopting efficient storage practices, and utilising hermetic storage technologies, small-scale producers can effectively combat pests and rodents, thereby lowering postharvest losses, while largely contributing to economic growth and food security.



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Artificial Intelligence and Machine Learning can revolutionise poultry farming by tapping into areas beyond human reach.

### **Easy route to achieving food security**

EW-GENERATION POULTRY FARMERS have come a long way from the traditional way of farming. They seek smart solutions to the challenges of operational obstacles, disease spreading and high costs, among other things. That is when the role of Artificial Intelligence (AI) and Machine Learning (ML) in farming becomes prominent.

Al technologies can let farmers regulate the environmental conditions of their poultry houses, such as temperate light or humidity. In terms of disease management and control, Al can pick up the slightest changes on poultry behaviour and let farmers know if there is anything to be alarmed of. In fact, these technologies have now advanced to such an extent that it can decode something as minute as voice fluctuations in chicken, which often suggests the onset of diseases. Using smart sensors can help catch significant data that would otherwise elude the naked eye.

Africa's major source of animal protein is drawn from chicken and eggs. While that is the case, only 4% of the world's chicken poultry products can be attributed to the nation, which is not enought to meet the rising rates of consumption.

The African Union High-Level Panel on Emerging Technologies (APET) emphasises on the necessity of innovation and technological capacity to tackle poultry-linked challenges. Such advancement needs to be directed at upgrading the overall infrasructure of the industry, right from breeding and hatching, through to production, processing and consumption.

#### APET emphasises the necessity of innovation and technological capacity to tackle poultrylinked challenges.

APET suggests the use of automatic water dispensers, robotics and automated feeders as the most relevant technologies in the African poultry context. Robots can revolutionise the meat production process by seamlessly separating the chicken meat from bones.

Remote sensing technologies can collect



AI and ML makes the decision-making processes 10 times easy.

data to the t when it comes to weight measurements or monitoring chicken uniformity. Farmers can refer to video and audio files to get a better understanding of the flock's health and behaviour and further utilise image recognition software. This, in turn, can help farmers plan cost-effective nutritional diets for chickens.

Al and ML makes the decision-making process 10 times easier than it would have been manually. ML combines all the mediums of data — photographic, video and audio — to come up with novel solutions for operations.

For instance, a digital tool called the ChickTrack generates awareness on various animal husbandry practices that are backed by science. It can precisely detect chickens, even in congested scenarios. The tool's algorithm makes this possible by picking up the minor, individualistic details of each bird in the flock, which is next to impossible if tried manually. The device can track birds even if out of shor or in dimly lit areas. Every bird is brought under the purview of a unique code, which helps locate it even when it is beyond the camera's field of vision. This enables correct counting without duplication, especially while large flocks are involved, with birds moving around freely.

Also, Al can utilise machine vision to assess eggs and identify flaws such as cracking and even internal blood spots. This gives farmers a clear idea of the eggs' fertility quotient right while incubation. By the fifth day of incubation, the machine can give an accurate prediction by nearly 98%.

Poultry production can undergo digital advancement in flock breeds, feeds, healthcare, and marketing innovation. This will have a positive impact on meat and layer breeds through cheap or semi-automated local hatcheries for raising chicks for one to 21 days to improve delivery while reducing mortality.

Furthermore, the full-time containment within poultry houses can offer lighting, continuous water supply, and efficient utilisation of feed. Since feeds constitute a bigger share of poultry raising, an intensified production can enhance affordable feeds at different meat and egg production stages.

A microbiome assessment platform called Galleon help customers determine how the gut microbe of their flock is related to the birds' nutrition and health, and one's management practices.

Another platform named Birdoo, on the other hand, leverages disruptive technologies to build world class insights from the

#### **TECHNOLOGY**

poultry industry, starting from hatchery to harvest.

In 2021, a smart farming solutions start up called Omniolytics, along with IBM, had developed a new approach that used Internet of Things (IoT) technologies. This would collect data on the environmental conditions of production facilities and dayto-day management activities. Apart from that, it could analyse processes of poultry to improve animal health and mitigate losses.

#### Poultry production can undergo digital advancement in flock breeds, feeds, healthcare, and marketing innovation.

"Local farmers have to be enabled to be globally competitive and the best way to do that is through technology. IBM Cloud and Al ensures we have a platform to help farmers across South Africa use precision agriculture to enhance the efficiency of their production. We're introducing solutions to the market which help improve feed conversion ratios, mortality and growth rates and benchmarking practices across their



Disruptive tech can build world class insights on the poultry industry, starting from hatchery to harvest.

production facilities. This will ensure accurate future predictions across the value chain and make poultry farming more sustainable," said Omniolytics founder, Michael Samson.

"By improving access to IBM's Cloud and Al technologies and increasing the adoption of a range of digital solutions as we incubate and supporting start-ups – we've set out to not only support local demand, but also ensure our entrepreneurs become globally competitive," said Craig Holmes, technology leader, IBM Southern Africa.

Only aiming for technological efficiency and innovation in production can match the high demand for quality chicken meat and egg in Africa. That requires strong investment drives, policies and regulations. Such dynamic steps can lead Africa to the path of nutrition and food security.





#### Agri-EPI Centre signs MoU with Morocco

AGRI-EPI, A COMPANY specialising in precision farming, signed a memorandum of understanding (MOU) with the agency, Pôle Digital de l'Agriculture, at SIAM, Morocco's international agriculture exhibition, which took place from 2-7 May 2023 in Meknes. The United Kingdom was a guest of honour at the exhibition.

The MOU commits both parties to work together to identify the main challenges facing farming in Morocco and align potential UK agri-innovations and collaborations to resolve them. The parties will facilitate mutual market access for agri-tech testing and provision, and identify opportunities for research and development, including on-farm trials.

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#### New Holland's LNG tractor wins Green Good Design Award

NEW HOLLAND AGRICULTURE, a global brand of CNH Industrial, has been awarded a 2023 Green Good Design Award for its T7 Methane Power LNG (Liquefied Natural Gas) prototype tractor.

The awards are organised by the Chicago Athenaeum: Museum of Architecture and Design and The European Centre for Architecture Art Design and Urban Studies. This special GREEN edition of GOOD DESIGN highlights important work that spearheads fully sustainable design, from new international products and buildings to construction and planning projects.

The new T7 prototype furthers the company's leadership position in the quest for viable alternative fuels. This new LNG system provides four times the fuel storage of its T6 model, the world's first commercialised compressed natural gas tractor, which more than doubles the autonomy and creates more value for our customers.

New Holland Agriculture partnered with Bennamann, a UKbased expert whose multi-patented approach converts fugitive methane to clean biofuel – helping support an energy independent and sustainable farm system. When the T7 prototype is integrated within this process, an operation's overall carbon footprint can be 'better than zero.

Blending style, function and sustainability, the prototype features an all-new exterior with remodelled hood and state-of-the-art lighting. Inside the cab, the operator will benefit from a range of improvements: a full-length skydome roof for enhanced visibility, the innovative SideWinder Ultra armrest for greater comfort, a larger IntelliView 12-inch touchscreen, and ergonomically shaped seats.

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