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African Farming and Food Processing

July/August 2015

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Switching to maize
reaps rewards

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in poultry

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Maize - Kenyan farmers reap rewards of switching to maize.

Sound structures remain at the root of successful grain storage. Image: Bentall Rowlands.

Throughout Africa the BC5060 small baler is easily the most popular New Holland model.

African Farming and Food Processing

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Farming Calendar 2015

SEPTEMBER

21-22	Palm Oil Africa *www.cmtevents.com*	ACCRA
23-25	African Dairy Conference *www.dairyafrica.com*	NAIROBI
24-25	Taking Fertilizer Supply to Scale *www.afap-partnership.org*	LUSAKA
7-11	WVPA World Congress *www.wvpa.net/congress*	CAPE TOWN

OCTOBER

8-9	4th Commercial Farm Africa *www.cmtevents.com*	LUSAKA
14-16	PALS Africa 2015 *www.10times.com/pals-africa*	KUMASI

NOVEMBER

5-7	AGRIKEXPO 2015 *www.agrikexpo.com*	LAGOS
17-18	The Commercial UAV Show Africa 2015 *www.terrapinn.com*	JOHANNESBURG
24-25	Global African Investment Summit *www.tgais.com*	LONDON
24-26	DAWAJINE 2015 *www.dawajine.com*	CASABLANCA
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26-27	Africa Agri Forum *www.i-conferences.org*	ABIDJAN
27-30	3rd Addis Agrofood *www.addis-agrofood.com*	ADDIS ABABA

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

GFIA Africa calling for local innovations

THE GLOBAL FORUM for Innovations in Agriculture (GFIA Africa) has launched the Call for Innovations for the regional Africa edition of GFIA, to be held from 1-2 December 2015 in Durban.

GFIA Africa forms part of the world's most influential series of events for the future of sustainable agriculture. It connects key private and public sector decision-makers from across the agriculture spectrum with innovators to demonstrate how game-changing technologies can impact agriculture and ultimately help feed the world.

GFI is held annually in Abu Dhabi, with the support of over 40 international partners, and welcomes 4,500 visitors from 85 countries each year. Now GFIA organiser Turret Media, in association with local partner, Montgomery Africa (Pty) Ltd, will replicate this global event when it launches the regional Africa edition of GFIA at the Durban Exhibition Centre, in KwaZulu-Natal, from 1-2 December 2015.

The GFIA Call for Innovations is an invitation for innovators to showcase their game-changing technology at GFIA Africa to a highly relevant and captive audience.

"This opportunity is aimed at any companies, NGOs, academic institutions, farmers or individuals that have created an innovation, technology, or service that can improve farm productivity and support agricultural development in Africa," said Mark Beaumont, GFIA project director. "We are looking for innovations from all disciplines, backgrounds and perspectives, including private companies, entrepreneurs, not-for-profits, universities and research centres."

GFIA provides an opportunity for innovators to collaborate with governmental, commercial, academic and non-profit partners. From new ideas to firmly established projects, hi tech or low tech - if it challenges conventional methods and has the potential to improve productivity, save water, protect the environment or mitigate climate change - GFIA want to hear from you.

GFIA Africa is comprised of a two-day conference and exhibition. It brings together food producers, policy-makers, investors, ministerial buyers, NGOs, research organisations, resellers, agents, innovators and other industry leaders.

GFIA Africa is supported by The Department of Agriculture, The KZN Convention Bureau, AGRA, CTA, NEPAD, CAADP, ICRAF, FANRPAN, FARA, SACAU, PAFO and NAFU.

FIAAP VICTAM & GRAPAS International 2015 - the general verdict: a great show

GLOBAL INDUSTRY EXECUTIVES from the animal feed, flour and rice milling, grain processing and biomass pelleting industries visited the 2015 edition of the renowned FIAAP/VICTAM/GRAPAS International exhibition and conferences. Thousands of visitors came through the doors of the KoelnMesse exhibition centre from as far away as Australia and every continent was represented. There were even official parties from Japan, PRC, Thailand, Turkey and Russia.

The exhibitors, of which there were 276, were busy with serious trade enquiries and discussions, many lasting a long time. There was much to see for the trade professionals and also a wide range of new products that were launched at the show.

During the three days of the show, there were the following conferences: the FIAAP Conference, Aquafeed Horizons, AEBIOM Pellet Workshop, Petfood Forum Europe 2015, GMP+International Feed Safety Assurance certificate, the IFF Feed Conference and the Global Milling Conference with GRAPAS International 2015.

Additionally Victam arranged for free tours to the Vitelia feed mill and the newly opened Feed Design Lab in the Netherlands. These proved very popular with the visitors.

Henk van de Bunt, the general manager of Victam International announced that Victam, in conjunction with some of its conference organisers, will shortly be launching a new venture. It will organise a series of industry conferences at a venue near Cologne in early summer of 2017. There will also be an additional area where companies will be able to showcase table-top exhibits.

Major focus on agriculture at AB7

AGRICULTURE IS THE world's biggest source of fresh food products, most of which also form the basis for countless derivative foods and by-products – wheat for bread, pasta and cereals, corn for staple foods and snacks, potatoes for chips and vodka, olives for oil, cocoa and sugar for chocolates and candy, grapes for juices and wines – consumer products taken for granted on store shelves yet indispensable to daily life. Africa's Big Seven (AB7), the biggest food and beverage expo on the continent, hosted many large international agricultural suppliers and manufacturers at this year's event in June.

"There are over 300 exhibitors participating in AB7 this year, solely focused on showcasing foods, beverages, ingredients and condiments, as well as food industry services, machinery, equipment and related IT systems," said John Thomson of Exhibition Management Services, organisers of the show. "Poland, Estonia, Lithuania and the Ukraine are just a few of the many countries showcasing a vast array of agricultural products at the show."

Polfruits Sp, a fruit and vegetable supplier from Poland, is looking to expand its existing markets in Africa and was at AB7 for the first time, displaying apples, pears, strawberries, raspberries and blueberries.

"We have a presence in North Africa and are now investigating the possibility of conducting business trade in other regions of the continent," said managing director Paweł Stankiewicz.

South African organic farming co-operative Danrose Farms was at AB7. It specialises in organic and hydroponic farming of poultry, fruit and vegetables, including brinjals, butternuts, green beans, okra, mustard, spinach, green peppers, sweet potatoes and cucumbers. It also has 20,000 mango trees, two hectares of guava trees, a chicken house and piggery.

Zampalm pioneers Zambia's first palm oil plantation

ZAMPALM IN MPIKA is Zambia's first ever palm plantation. The plantation boasts 2,800 ha of palm plants, which, when harvested, will produce crude palm oil that is the basic ingredient in most vegetable oils on the market in Zambia.

Zampalm plantation manager Trusted Mwiinga.

The locally produced palm oil will enable the government to cut back on crude palm oil imports which currently stand at over US$70mn annually.

With its first nursery was set up 20 km away from the main plantation site, near Chief Kopa's palace, Zampalm was keen to get the community involved from the very start.

"This was something new and on a scale that has never been done in the area before, so there were concerns on the part of the local community. However, with the help of Chief Kopa, we were able to communicate what was happening," said Trusted Mwiinga, who has been in the agriculture sector for over 25 years and has worked on the project from its inception by Zambeef Products in 2009 as Zampalm's plantation manager.

Getting the plantation up and running was no easy task with little infrastructure in place and a site that was cut off from the rest of Zambia, so management had its work cut out and only after overcoming the initial setbacks was the project truly able to move forward.

Indigenous vegetables make a comeback

INDIGENOUS VEGETABLES ARE now in vogue. Just a few years ago, many plates in Nairobi's restaurants were filled with staples, cabbage and kale. Now, African nightshade, amaranth, cowpea leaves and other traditional vegetables are readily available in stores and restaurants. Areas planted with indigenous greens rose by 25 per cent in Kenya between 2011 and 2013.

This June, Nature featured the rise of Africa's super vegetables and the work done by organisations such as the World Vegetable Center (AVRDC), the World Agroforestry Centre, Bioversity International and Kenyan universities, to bring nutritious indigenous vegetables into local people's diets.

Bioversity International scientist Raymond Vodouhe also highlights the potential of domesticating wild vegetables as a way to make these nutritious plants more accessible when food is scarce, and preserve them as a food source for communities in the face of increasing deforestation.

Long overlooked in parts of Africa, indigenous greens are now capturing attention for their nutritional and environmental benefits.

AGRA builds stronger links with Mozambique and Tanzania

AGRA RECENTLY SIGNED Memoranda of Understanding with the governments of Mozambique and Tanzania as part of its efforts to build stronger relationships in transforming African agriculture.

These agreements formalise AGRA's relationship with these governments and spell out agricultural priorities to be pursued with AGRA's support. According to AGRA president, Dr Agnes Kalibata, the MOUs will enable AGRA to work more closely with the governments in growing smallholder agriculture.

"Through these agreements we will have the resources and capabilities to do even more: not just funding but sharing technical know-how," Dr Kalibata said.

During the agreement signing, the permanent secretary in Tanzania's Ministry of Agriculture, Food Security and Co-operatives, Mrs Sophia Kaduma said the formalisation would bring greater gains for food security and make farming more profitable for small-scale farmers.

"AGRA has been a committed partner in helping us as a country to enhance agriculture development. The Memorandum of Understanding will take the partnership to a new level," she said.

Almost US$95mn has been invested in projects across both countries; with AGRA's efforts helping over one million farmers in Mozambique access improved seed varieties, while in Tanzania, investments have seen 20 new seed varieties released, which are being utilised by about 1.4mn farmers.

"These agreements show our commitment to work with governments and partners to ensure that smallholder farmers in Africa have the same choices available to farmers elsewhere in the world to successfully grow and sell their food," Dr Kalibata said.

Case IH appointed new distributor in Zimbabwe

CASE IH HAS appointed Univern Enterprises (Pvt) Ltd as its official distributor in Zimbabwe. The new dealership was officially celebrated during the annual Case IH distributor meeting for Africa and the Middle East recently held in Austria.

"We are very excited about this collaboration," said Jason Smith, of Univern Enterprises, a Southern region trading company. "We are taking the market by storm, reintroducing the Case IH brand in Zimbabwe. With its advanced farming technologies and equipment solutions, we intend to drive substantial changes and evolution in the country's farming methods."

Through its partnership with Univern Enterprises, Case IH is selling the all-purpose JX and JXT Series tractors, the renowned Farmall and Maxxum Series, and the high-horsepower PumaTM and MagnumTM Series tractors. The offering also includes the industry-leading Axial-Flow combine harvesters, sprayers, seed drill and tillage equipment.

"The JXT and JX Series are well-suited for Zimbabwean small farmers looking for robust, maneuverable, highly versatile tractors," said Smith. "But corporate farms are developing quite quickly in the country and we are ready to support them with high horsepower tractors, best-in-class Axial-Flow combine harvesters, which are extremely appreciated for their reliability and efficiency, and a full line-up of precision farming solutions."

Case IH JX tractor

African agriculture and climate change[1]

AS WITH MUCH of the information around climate change[2], there is uncertainty with regard to the level and consequences of the impact on African agriculture. Interestingly, the message is not completely negative. While it is true that there are a number of potentially negative consequences, as we approach 2100 (considered below), among the positive aspects are anticipated extended growing seasons in Ethiopia and Southern Africa as a result of increased temperatures and changes in rainfall patterns. In addition the livestock sector could receive a boost from temperature increases which would be favourable to greater herd sizes.

It should be recognised, however, that the Intergovernmental Panel on Climate Change's (IPCC) extensive review of the impacts of climate change on African agriculture identifies a number of challenges that the sector will face over the ensuing decades (see: www.ipcc.ch).

The IPCC estimates that Africa will be the continent most vulnerable to climate change globally, due to the multiple stresses of poor existing infrastructure, poverty and perceived governance challenges. Projections on crop yields forecast a possible drop of up to 50 per cent, and revenue predictions indicate a fall of as much as 90 per cent by 2100. Much of this impact is anticipated to be caused by periods of prolonged droughts and/or floods during El-Nino events. Arid and semi-arid land could expand in coverage by 60-80mn ha. Variations in temperature and precipitation are anticipated to cause increases in crop pests and diseases in addition to altered soil fertility.

Agriculture is one of the most prominent themes in the international climate change negotiations, and the African Group of Negotiators is a dynamic participant in discussions on the future shape of the climate change legal regime, from 2020. The effectiveness of this regime in responding to climate change and providing assistance to those who are most likely to be negatively impacted will have direct consequences for the entire African continent.

Andrew Gilder, senior associate, ENSafrica/Environmental

1. *Some of the information in this article is drawn from a FAO pamphlet entitled Climate change in Africa: The threat to agriculture.*
2. *The term: "environmental change" might be more useful as a concept than "climate change" because the consequences of a changing climate are, fundamentally, environmental consequences. For agriculture, evolving environmental conditions means that the certainties upon which production has hitherto been based, e.g., seasonal cycles, will become increasingly less certain, requiring revisions being made to agricultural methods and the locations for growing specific crops.*

IFTEX lived up to expectations

THE 4TH EDITION of the Kenyan-based flower exhibition IFTEX ended with good results for all participating companies. Although fewer international flower buyers attended the show, the quality of visitors was high resulting in a good overall outcome, according to exhibitors. 223 exhibiting companies and 2,778 participants attended the three day fair, held in Nairobi at the beginning of June.

The quality as well as the number of varieties of displayed flowers was astonishing, bringing the trade fair again to a higher level. National and international visitors walked the show for three days in a row and filled the aisles daily from 10:00 am in the morning until closing time of the show at 6:00 pm. Even on the last day it was a full house until in the late afternoon. In short, IFTEX once more proved to be one of world's leading flower trade shows.

The 5th edition of IFTEX will take place from 8-10 June 2016.

Investing in infrastructure critical to advancing food security in Zambia

DUPONT PIONEER, ONE of the world's leading agricultural businesses, has opened a new seed warehouse and office facility in Zambia that will increase maize storage capacity and meet farmer demand for both local and export markets such as Kenya, Tanzania and other markets in Africa.

"Zambia could emerge as the breadbasket for southern Africa, provided an enabling agricultural environment is fostered," said Worede Woldemariam, East and South Central Africa senior business manager of DuPont Pioneer. "Our aim is to improve farmer productivity and profitability while providing a foundation for farming as a sustainable livelihood that meets the needs of people today and future generations."

The country currently has an average maize yield of about 2.4 metric tons per hectare, which is slightly above the average two metric tons per hectare of maize yields in Africa. Zambia produces excellent seed quality, and the new facility will ensure world class quality standards are maintained in the region.

The latest investment is part of ongoing efforts by DuPont Pioneer to invest in resources and infrastructure in Africa.

New Ethiopian livestock plan

Small-scale poultry production in Ethiopia. Image: International Livestock Research Institute/Flickr.com

A NEW FIVE-YEAR livestock master plan, which aims at lifting 2.36mn Ethiopians out of poverty, has been developed.

Expected to cost less than US$400mn over the five-year period, the plan has been jointly developed by the International Livestock Research Institute (ILRI) and the Ethiopian Government through the Ministry of Agriculture (MOA).

Approximately 70 per cent of rural households possess cattle, sheep and goats, making livestock a critical aspect of the local economy.

The plan, which was recently presented by Barry Shapiro, a research scientist at ILRI to the MOA officials in Addis Ababa, reveals the comprehensive livestock master plan (LMP) and its benefits.

First, the plan suggests investment in crossbred dairy cows that would produce a surplus of milk production over domestic demand by 47 per cent. This will enhance national security, industrial output and national earnings.

It is also expected that increased production of red meat and milk on family farms will improve earnings among pastoralists and agro-pastoralists.

Family farms will also move to market-oriented commercial operations.

While immediate benefits will be realised in rural households, urban dwellers will benefit through lower food prices and the achievement of food security at household, sectorial and national levels.

Secondly, Ethiopia will need to transform the poultry sector to reduce the gaps between national meat production and consumption.

Red meat consumers will also need to change their tastes from beef to chicken to increase the share of chicken consumption from the current five per cent to 27 per cent by 2030.

For the master plan to be fully implemented, the government will be required to invest in genetic selection, artificial insemination, rehabilitation of range and pasture lands, and also veterinary service provision. Other areas requiring investment will be health and quality regulation.

The development of the master plan brought together experts in diverse fields such as climate change resilience and food security.

The LMP project development process was funded by the Bill & Melinda Gates Foundation.

It brought together experts from Ethiopia's MOA, FAO, IGAD and Ethiopia Veterinary Association, among other professional bodies.

While the Ethiopian government has prioritised agricultural transformation over the last 20 years, there has not been any tangible roadmap until now.

Mwangi Mumero

New approach for control of Gumboro disease

WE WOULD LIKE to apologise for the omission of the writer for this article, that appeared in the May/June edition of African Farming, on page 7.

It was by Dr Reza Bentaleb - DVM, poultry business unit manager - Intertropical Africa – Ceva Sante Animale.

Of the various available vaccines, IBD Immune-complex vaccine - Transmune - is the only one that stops reinfection and protects against all virus strains.

Transmune gives a complete protection against any type of field virus and prevents the virus challenge flock after flock. It can be given with a single dose administered in ovo (in the egg), or subcutaneous injection.

Big meat enterprise planned in Rwanda

THE RWANDAN GOVERNMENT is planning a project spread over 4,500,000 sq m aimed chiefly at beef production on a sustainable commercial basis.The proposed project is in line with the country's goal of agricultural transformation, moving the Rwandan livestock sector from a largely subsistence status to a more market-oriented one.

In an interview with East African Business Week, Tony Nsanganira, Rwanda's state minister for agriculture said, "The key output will be the growth of quality meat production for local consumption and for export."

The project will also have "value addition activities including meat production, hides and skins and leather goods manufacturing for local and export markets" that will be critical for viability of the project, he added.

The government is in talks with various private investors, both local and foreign, who are interested in the project, and will start work on it as soon as it reaches agreements with investors. As of now, Bugesera District in Eastern Province is being prepared and the government is creating infrastructure such as roads.

There is a growing demand for quality meat in Rwanda, triggered by an increasing number of expatriates and tourists and also by an evolving middle class with increased spending capacity.

The minister elaborated that the maximum number of animals that can be kept at the site in an environmentally friendly way is about 70,000 bovines or 98,000 smaller animals like goats. The project, when fully operational, will provide employment to both skilled and unskilled labour, and will also improve prices for cattle and goat farmers who will have direct access to the market. At the same time, increased beef supply in the market is also likely to bring down beef prices for consumers.

Tea payment cashless solution

THE KENYA TEA Development Agency (KTDA) has partnered with mobile services firm Safaricom to roll out a cashless payment solution to all its 66 affiliated tea factories across the country. Over 560,000 tea smallholder farmers deliver their produce to these factories.

The agency, which has been using the Factory Door Sales (FDS) channel to transact over Ksh1bn (US$11mn), will now receive payment using the Safaricom mobile money solution M-Pesa to carry out its business. All payments for tea sold at the factory doors will now be made through M-Pesa – reducing inherent cash handling risks and boosting accountability. Already 54 factories have started collecting revenues through the M-Pesa platform with the remaining 12 expected to go live in the coming months.

"The cashless solution will translate into better revenue management which will in turn lead to increased returns for our factories," observed Lerionka Tiampati, KTDA CEO during the recent function to launch the solution held at Kangaita Tea Factories in Kirinyaga County.

For Safaricom, the move comes at a time when the company is diversifying its M-Pesa utility from the person-to-person payments to corporate solutions. "This initiative will transform the entire payment cycle for farmers and KTDA factories. The M-Pesa platform makes it possible to handle more transactions per second and which integrates easily with the existing payment channels," said Bob Collymore, Safaricom's CEO.

Tea Farming in Kenya. Image: Softkenya.com

Mwangi Mumero

Africa's agriculture sector is viewed as central to the continent's development trajectory, with its ability to provide sustainable employment and incomes, to feed a growing population and reduce imports. Stephen Williams reports.

Investment for a growth industry

AT A MAJOR conference held in London last October, investment opportunities in a range of economic sectors were discussed. The Global Africa Investment Summit attracted a number of expert presenters who discussed various aspects of investing in the continent.

Dr Edward George, who heads research at Ecobank, moderated the agricultural component of the conference. His presentation ran through Africa's current agriculture outlook, which included the assertion that Africa grows most of the food its population eats; that roots and tubers are the key staples, traded and consumed across the region; and sub-Saharan Africa produces large volumes of maize, sorghum, rice and millet.

The demand for private equity funding for agriculture is huge.

However, his presentation also stated that SSA's imports of staple foods totaled US$234bn between 2002 and 2012, with rice consumption dominating food imports. Forty per cent of rice that is consumed across Africa is imported, and imports account for 60 per cent of SSA's wheat and flour consumption.

However, cash crops including sugar, nuts, cocoa, palm oil, coffee and tea are also widely produced, much of it for export, by African farmers. For example, nearly 6,000,000 metric tonnes (MT) of sugar was produced by Africa in 2012, about 2,500,000MT by South Africa alone, and a further 400,000MT by its regional neighbour Mozambique.

No wonder international investors are so interested in the African agriculture sector. By 2014, the year that the African Union dedicated as "the Year of Agriculture", over 50 private equity investors were believed to have taken a stake in the sector, and over half of them were solely focused on agriculture.

Small and medium sized enterprises account for as much as 90 per cent of African businesses, and agriculture is no different, with millions of small-scale enterprises representing the majority of producers. "The demand for private equity funding for agriculture is huge," said Bian Frimpong, managing partner of Databank Agrifund Manager, a Mauritian-registered pan-African focused private equity group with specialty interest in agriculture and food production value chains.


A new road helps revive a flagging agricultural sector. Image: UN.

He added that his company, an affiliate of Databank Group – a full-house investment banking and brokerage firm with over 20 years experience in Africa, headquartered in Accra, Ghana – has, since 2012, reviewed over 500 business plans and has over US$100mn in the investment pipeline.

Huge plans of the DR Congo

But that is as nothing compared to the plans of the DR Congo, John Ulimwengu, the DR Congo's prime minister's special adviser on agriculture since 2012, explained to the Global Africa Investment Summit. It has a US$6bn National Agriculture Investment Plan 2012-2020, specifically to provide an alternative to food imports. It is understood that US$2.5bn has already been raised.

Essentially the plan is to confront the challenges that are currently being faced by Congolese farmers. These challenges include poor networks that link producers to consumers, from farm to fork, (including very weak transport infrastructure), and limited agricultural services and access to inputs.

The irony is that, given its vast land resources and favourable water supply, the DR Congo's natural agricultural potential is immense, but the potential of the sector is handicapped by what has been described by the World Bank as one of the most dilapidated transport systems in the developing world. This constrains agricultural and rural development.

Proposed infrastructure to aid market access

Ulimwengu described to this magazine how proposed infrastructure investments would affect market access, and how market access would in turn affect agricultural production and household wealth.

As well as roads giving access to cities, his findings suggest that increasing investment in ports in the DR Congo should be a priority in the infrastructure investment portfolio.

"Much of the advice I present to the prime minister, Augustin Matata Ponyo, is derived from the work that we do at the International Food Policy Research Institute in Kinshasa. Since 2009, we have had a small programme in DR Congo strengthening the capacity for policy analysis."

"At the time we used to report the results to the then Minister of Finance, who became the Prime Minister in 2012. So, when he became the prime minister he sent a request to my assistant to come and see how we can help the country design a proper agriculture transformation programme."

"It's basically going from subsistence agriculture to the more, let's say conventional, agriculture that involves many things. So, that's my role at the prime minister's office. The priority is to ensure that the DR Congo can attain food security."

And there is very real urgency over this issue, for as Ulimwengu told the Global Africa Investment Summit, last year the DR Congo spent US$1.5bn on food imports. Food imports grew five-fold between 2001 and 2010.

This has huge fiscal consequences, but as Ulimwengu told *African Farming*, there are other equally important ramifications: "The country is one of the most affected by malnutrition. The most recent data says that 73 per cent of our children are malnourished.

"So, that is becoming a big problem both politically and socially in terms of development, because if your children are not well fed then they lose their cognitive capacity, which means that in the next 10-20 years you have adults that may not be able to sustain our development fully. I think that is what the government, and both the prime minister and the president, understand, and they want to fix this as fast as they can."

"The government wants us to develop a sector that can generate enough income to create jobs, income to reduce poverty, income to open access to food for the population."

Special agricultural zones

To achieve these highly desirable objectives, the government has given the green light to develop a pilot zone, covering 75,000ha and the first of 20 special agricultural zones to be eventually established.

The vision is to develop three interlinking components – large commercial farms of an average 1,000ha; smallholder farms clustered around these large farms; and the establishment of agricultural co-operatives to create access to inputs (seeds, fertilisers etc) as well as agro-processing enterprises.

John Ulimwengu, the DRC's prime minister's special adviser on agriculture.

Preparing the soil for rice. Image: FAO

The priority is to ensure that the DR Congo can attain food security.

The key objective is to allow the Congolese population to consume food that is grown within the country, and stimulate the economy.

"As I mentioned to the conference," Ulmwengu explained, "the country has been growing at a high economic growth rate, but it is mainly driven by the mining sector."

"The thing is, even if we keep that growth trend for the next 10-20 years, it will not have a substantial impact on poverty reduction, food insecurity and employment if agriculture, which employs 70 per cent of the Congolese, is not revived and transformed."

Cash crops for export

But beyond these aims, Ulimwengu has plans to develop cash crops for export. "This is actually the next phase of the programme, after establishing food security, to revive export crops including cocoa, palm oil, tea and coffee. Once, the country was among the leading exporters of these commodities but something happened in the 1973 nationalisation plan – Zaireanisation, where farms were taken from private foreigners to be given to private Congolese citizens. Unfortunately, it didn't work out and across the country we have, I think, more than 3,000 commercial farms with those export crops, which have been abandoned. Now, we are in the process of assessing and reviewing each of the farms to see what the government can do."

Clearly, what is very important for the DR Congo's agricultural sector is to develop the infrastructure to get products to market and inputs to farmers. Road infrastructure was neglected for a long time by previous administrations, but Ulimwengu says that there is now a vision going forward.

"It's amazing because the government completed a short term infrastructure plan in just a couple of months that will see, in the next three years, an infrastructure programme, to include roads, railways, waterways, ports, and energy around those businesses. This is infrastructure to support agricultural production and agriculture transformation. This makes sense."

But between now and the completion of the infrastructure programme that will usher in the possibility of developing export cash crops, Ulimwengu has a clear mandate to foster increased food security.

He wants to see a boost in the production of maize, which has been languishing somewhat in comparison to other regions. He lists maize, rice and soybeans as the three main crops to focus on. "We spend a lot on importing these."

But it is cassava that Ulimwengu says is a key staple crop. "Across the country wherever you go you find cassava. Some eat the root, some eat the leaves. It is a diverse crop."

But once food security is attained, and the DR Congo starts to look at cash crops, the name of the game will be, rather than exporting raw commodities, to add value.

"The vision is to be able to control the whole time machine in the country and to produce a finer product, that's the vision.

"Which means that we will export roast coffee, packaged tea, and whatever else global food markets are seeking, and mabye not export the grain. We aim to meet demand with Congolese agricultural products."

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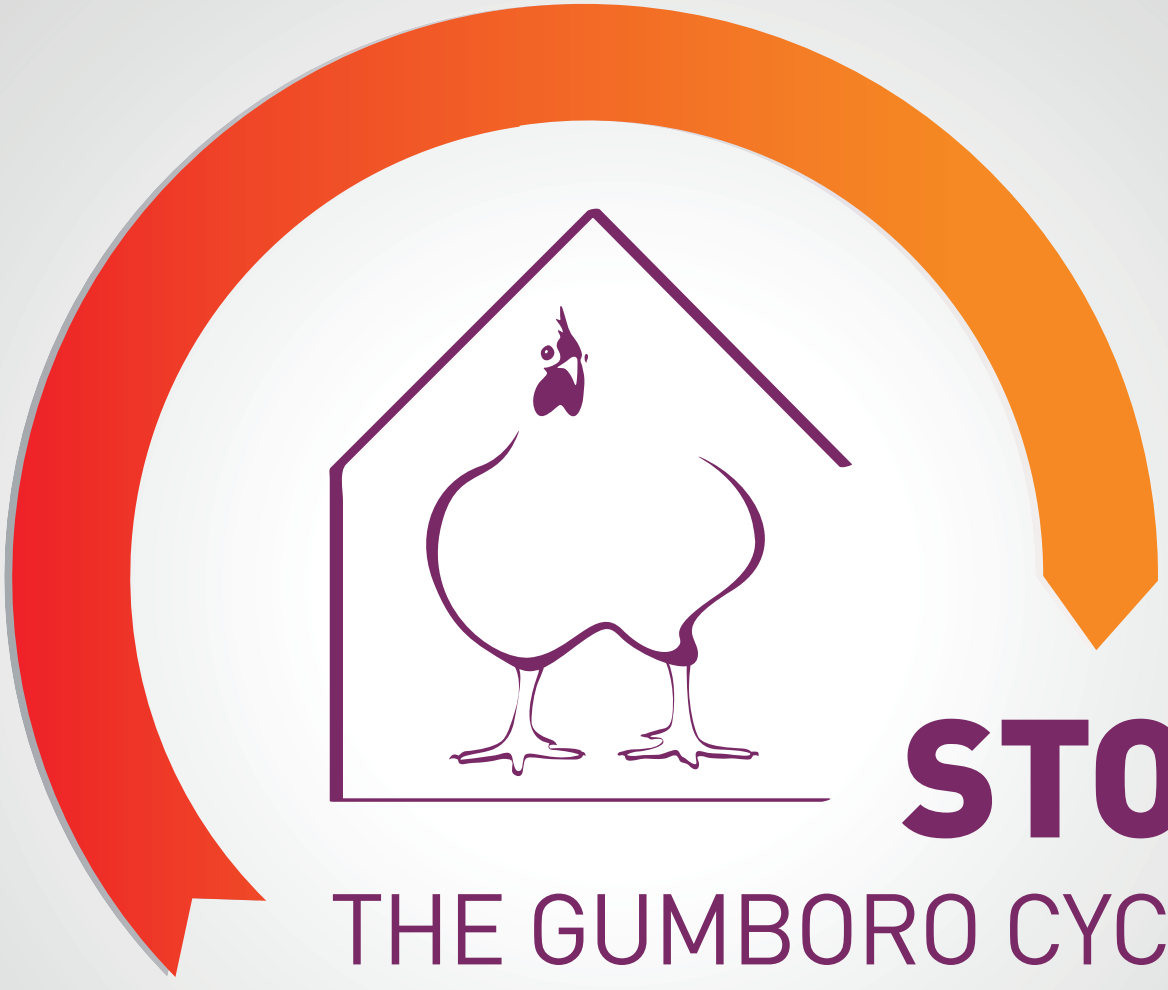

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Poultry feed availability and nutrition in developing countries. Velmurugu Ravindran* discusses the major developments towards achieving the goal of precision feeding.

Advances in poultry nutrition

NUTRITIONAL RESEARCH IN poultry has centred on issues related to identifying barriers to effective digestion and utilisation of nutrients, and on approaches for improving feed utilisation. Poultry nutritionists have increasingly combined their expertise with that of specialists in other biological sciences, including immunology, microbiology, histology and molecular biology.

Although broilers and layers are highly efficient in converting feed to food products, they still excrete significant amounts of unutilised nutrients.

There is therefore considerable room for improving the efficiency of feed conversion to animal products. Much of the inefficiency results from the presence of undesirable components and the indigestibility of nutrients in the feed.

Although broilers and layers are highly efficient in converting feed to food products, they still excrete significant amounts of unutilised nutrients.

Recent advances in poultry nutrition have focussed on three main aspects: i) developing an understanding of nutrient metabolism and nutrient requirements; ii) determining the supply and availability of nutrients in feed ingredients; and iii) formulating least-cost diets that bring nutrient requirements and nutrient supply together effectively. The overall aim is precision feeding to lower costs and maximise economic efficiency. Fine-tuning diets so that they more closely match the requirements of the birds, helps to optimise the efficiency of nutrient utilisation.

Defining nutrient requirements

Defining nutrient needs is challenging because they are influenced by several factors and are subject to constant change. The factors influencing nutrient requirements are of two main types: bird-related ones, such as genetics, sex, and type and stage of production; and external ones, such as thermal environment, stress and husbandry conditions. Precision in defining requirements requires accuracy in both areas.

Great advances in the definition of nutrient requirements for various classes of poultry have been made possible largely by the increasing uniformity of genotypes, housing and husbandry practices throughout the poultry industry.

Defining requirements for the ten essential amino acids has been made easier by acceptance of the ideal protein concept. As for other nutrients, the requirements for amino acids are influenced by various factors, including genetics, sex, physiological status, environment and health status. However, most changes in amino acid requirements do not lead to changes in the relative proportion of the different amino acids. Thus actual changes in amino acid requirements can be expressed in relation to a balanced protein or ideal protein. The ideal protein concept uses lysine as the reference amino acid, and the requirements for other essential amino acids are set as percentages (or ratios) of the lysine requirement.

The principal role of feed ingredients is to provide the nutrients that the bird digests and utilises for productive functions. Poultry farmer feeding chickens. Image: FAO.

Poultry producers are continually looking for opportunities that allow more flexibility in both the types and the levels of feed ingredients for use in feed formulations. Such opportunities are becoming increasingly frequent because of advances in nutrient analysis and feed evaluation techniques.

The principal role of feed ingredients is to provide the nutrients that the bird digests and utilises for productive functions. Currently, considerable data are available on the ability of raw materials to supply these nutrients.

However, a degree of variability is inherent to each raw material, and this places pressure on precise feed formulations. Data on variation (or matrices) are available for the main feed ingredients and are applied in feed formulation programmes to achieve better precision. A related development is the availability of rapid tests, such as near-infrared reflectance analysis, to predict gross nutrient composition and assess the variability in ingredient supplies on an ongoing basis.

It is recognised that not all the nutrients in ingredients are available for production purposes, and a portion is excreted undigested or not utilised. As feed evaluation techniques develop, data have been accumulating on the availability of nutrients for poultry, especially of amino acids and phosphorus.

The use of digestible amino acid content is particularly relevant in developing countries, where highly digestible conventional ingredients are not available and diet formulations may include ingredients of low digestibility. Formulating diets based on digestible amino acids makes it possible to increase the range of ingredients that can be used and the inclusion levels of alternative ingredients in poultry diets. This improves the precision of formulation, may lower feed costs, and ensures more predictable bird performance.

Better feed formulation

Once the nutritional needs are defined, the next step is to match these needs with combinations of ingredients and supplements. The object of formulation is to derive a balanced diet that provides appropriate quantities of biologically available nutrients. For commercial producers, a further objective is to formulate a balanced diet at least cost.

A related development is the use of growth models to simulate feed intake and production parameters under given husbandry conditions. Such models are effective tools for: i) comparing actual versus potential performance, which can indicate the extent of management or health problems in a flock; and ii) providing economic analysis of alternative feeding regimens. Several

commercial growth models are available for predicting the production performance of both meat chickens and laying hens. However, because of the extreme complexity of biological responses, the models are only as good as the data used to establish them.

There is a need for accurate and detailed information and data from a variety of production systems to enable the development of robust models that can provide accurate prediction of performance.

Progress in biotechnology during the past two decades has provided new opportunities for enhancing the productivity and efficiency of animals through improved nutrition. Biotechnologies have a vast range of applications in animal nutrition. Some of these are already in use (see table) while others are known to have potential but are not yet commercially applied because of technical limitations and public concerns.

Examples of biotechnological applications that are widely used in animal nutrition

Application	Aim(s) of the technology
1. New ingredients	To produce microbial proteins as new feed sources for animal feeding (eg, single-cell protein, yeast protein)
2. Designer ingredients	To enhance nutrition (eg, high-oil maize, high-methionine lupins) or reduce the level of anti-nutritive components in common feed ingredients (eg, low-phytate maize)
3. Feed additives:	
a) Antimicrobials	To suppress the growth of harmful bacteria and promote the establishment of a desirable gut flora balance (eg, antibiotics)
b) Crystalline amino acids	To increase the dietary supply of specific amino acids and improve the protein balance in diet formulations
c) Feed enzymes	To improve the availability of nutrients (energy, amino acids, phosphorus, etc.) in feed ingredients by reducing the negative effects of anti-nutritive components (eg, microbial phytases acting on phytate, xylanases acting on arabinoxylans in wheat)
4. Gut ecosystem enhancers:	
a) Probiotics	To promote the establishment of a desirable gut ecosystem through the proliferation of beneficial species (eg, direct-fed microbials)
b) Prebiotics	To exclude harmful organisms competitively, to promote the establishment of a desirable gut ecosystem (eg, mannan oligosaccharides)

Feed processing

Today, after their ingredients have been mixed, most poultry feeds undergo some form of processing, which involves a wide range of thermal treatments including extrusion, expansion, conditioning and pelleting. Most of the feed used in the production of broilers is fed in pelleted or crumbled form, which enhances the economics of production by improving feed efficiency and growth performance. These improvements are attributed to decreased feed wastage, higher nutrient density, reduced selective feeding, decreased time and energy spent on eating, destruction of pathogenic organisms, and thermal modification of starch and protein. Introduction of pellet feeds is a notable feature in countries seeking to improve the production efficiency of the poultry sector.

The current recommendations for poultry list the nutrient requirements for only selected growth periods; the three periods of up to three weeks, three to six weeks, and six to eight weeks are considered for meat chickens. In practice, however, grow-out periods can range from four to ten weeks of age, depending on local market needs. Recognising that changes in nutrient needs are more dynamic than these general recommendations, the commercial poultry industry is increasingly using phase-feeding systems to maximise performance and increase profit margins. Dietary protein and amino acid specifications are usually decreased in a progression of different feeds that satisfy changing requirements and economics.

Typical feeding programmes over a five- to seven-week production cycle now include four to five feeds, such as pre-starter, starter, grower and finisher; or pre-starter, starter, grower, finisher and withdrawal. The withdrawal diets often fed during the last seven to ten days of growth involve removal of certain pharmaceutical additives and reduction of protein/amino acids. In recent years, they have also involved the reduction of certain vitamins and trace minerals, and energy.

Whole grain feeding

Another recent development has been the feeding of whole grains (wheat or barley) along with a balanced concentrate feed. The benefits of whole grain feeding include better performance, reduced feed processing costs and improved flock health.

The usual method of whole grain feeding is to blend 10 to 25 per cent of the weight of the feed on top of the feed in delivery trucks or at the poultry house.

Sustainable poultry feeding

Not long ago, the main objective of formulating feeds was to supply nutrients (nutrient input). Today there is much public concern about what comes out of the bird (nutrient output). Animal agriculture, including the commercial poultry sector, is clearly releasing excess nutrients into the environment, and must assume responsibility for its impact on the environment, especially on water quality. Without question, the poultry industry must achieve the goal of sustainability, as environmental concerns have a major influence on its future growth and expansion. From a nutrition point of view, the most obvious strategy is to feed birds to match their requirements (precision feeding) and to improve the efficiency of birds' nutrient utilisation, which will reduce the nutrient load in manure.

** Velmurugu Ravindran, Monogastric Research Centre, Institute of Food, Nutrition and Human Health, Massey University, Palmerston North, New Zealand*

Morocco's turkey production approaches 10mn head

MOROCCO'S PRODUCTION OF turkey poults rose by almost 16 per cent in 2014 to stand at 9,995,767, according to the country's directorate of production development.

Over the last decade, turkey poult production in Morocco has risen twenty-fold. In 2004, Morocco produced only 482,620 turkey poults. Output has increased in seven out of the last 10 years, and figures from the first quarter of this year suggest that expansion is continuing.

Despite this increase, the country still needs to import close to three million poults annually. While the sector may have grown significantly, it remains small when compared with Morocco's broiler production.

AFGRI sells poultry business to focus on grain

AFGRI, A LEADING South African agricultural solutions and industrial foods company, together with the Public Investment Corporation (PIC) has sold AFGRI Poultry and AFGRI's Kinross Animal Feeds Mill to AFPO Consortium Proprietary Limited (AFPO), a black economic empowerment consortium led by Matome Maponya Investments. PIC funded the acquisition.

AFGRI Poultry has been renamed Daybreak Farms, and is now owned 54 per cent by AFPO Consortium; 36 per cent by the PIC on behalf of its clients, and 10 per cent by employees and management.

Chris Venter, CEO of AFGRI, said: "AFGRI's strategic vision is to drive food security across Africa. Our focus is to enhance AFGRI's position in the grain value chain, and this transaction is another step toward that."

He went on to elaborate that the divestiture is in line with a strategic decision to concentrate efforts on its core grain businesses and position the company for growth. "From a financial perspective the transaction enables AFGRI to reduce its gearing levels, fund priority businesses and reduce overall debt," Venter said.

"AFGRI's remaining foods and processing businesses are well aligned to grain commodities."

Zimbabwe's poultry industry shows good growth in Q1

THE POULTRY INDUSTRY in Zimbabwe grew by 22 per cent in Q1 2015, having produced 17mn broiler day-old chicks.

Solomon Zawe, chairman of the Zimbabwe Poultry Association, expressed optimism about continuing growth through the second half of the year as well. "The market is looking good. We are quite happy with the fact that the government will import maize from Zambia and that will reduce our production costs in the sense that maize would be cheaper." He added that the industry was aiming to produce more than 70mn day-old chicks this year, compared to about 60mn day-old chicks produced last year.

Zawe also pointed to some macroeconomic concerns, saying that the industry was projecting a slower 10 to 15 per cent growth in the second half of the year due to a liquidity crisis and the country's dormant economy.

Zimbabwe has a combined hatching capacity of 76mn day-old chicks per annum but over the years, cheap imported chickens have flooded the local market, edging out local producers. Most imports come from South Africa and Brazil. To protect the indigenous producers of chickens, the government had imposed an import duty on chickens in 2012, but it has had little effect on imports whose quantity remains quite high.

The poultry industry in Zimbabwe has transformed from being predominated by large, high-tech operations to including a large number of small production units now. This segment, including indigenous producers in communal areas and in urban backyards, is driving the new poultry industry in the country.

The chemicals produced by fungi can also lead to serious illness in animals, which eventually can affect milk or meat productivity.

Cause and effect of mycotoxins in poultry

DEGRADATION OF POULTRY feed by microbes is a constant threat but some fungal moulds add an extra even more dangerous dimension to poultry health and nutrition as toxic chemicals called mycotoxins.

These 'signature' chemicals are produced by specific fungal moulds that may grow on feed and feed materials. They negatively impact on all types of livestock but some are particularly poisonous to poultry. They are toxic in minute amounts (ppm and ppb) and can be transferred into the human food chain via poultry meat and eggs. All types of poultry are affected as are consumers of contaminated poultry products.

Chickens, turkeys, ducks, geese, quail and pheasants are all susceptible to mycotoxicosis and especially when caused by the aflatoxins, trichothecenes, ochratoxin A and some of the fusario-toxins. Consequences for avian body metabolism and poultry health are wide-ranging, potentially serious and may include immuno-suppressive, carcinogenic and mutagenic (genotoxic) effects.

Chickens, turkeys, ducks, geese, quail and pheasants are all susceptible to mycotoxicosis.

Mycotoxin contamination is widespread and prevalent in the tropics and mycotoxicosis is regarded as the single most serious constraint on poultry production in hot, wet and humid climates.

Aflatoxin is a group of four naturally occurring chemicals (Aflatoxin B1, B2, G1 and G2) produced by Aspergillus flavus and A parsiticus. These are widespread and serious fungal contaminants of tropical and sub-tropical crop commodities and notably maize, groundnut and dried coconut. Aflatoxin depresses growth of broilers at extremely low concentrations (much less than 1 ppm) and aflatoxin B1 is the most toxic of the four.

Ochratoxin A, which is produced mainly by Aspergillus ochraceus in the tropics and several species of Penicillium in temperate climate, is a common contaminant of cereal grains and mouldy groundnuts. This potent poison exhibits extreme pathogenicity to chickens at concentrations as low as 0.3ppm.

DON (deoxynivalenol) and T-2 produced by Fusarium fungi are two of the most damaging chemicals within the large trichothecene group of mycotoxins. Fusarium graminearum and F sporotrichioides, the main producers of DON and T-2 respectively, are closely associated with leaf and ear diseases of cereal crops and the subsequent contamination of harvested grains including wheat, barley, oats and rye. Dietary concentrations of T-2 in excess of 3.0ppm cause feed refusal through irritation of the mucosa of the mouth and oesophagus.

Zearalenone, which is the most important and best understood of the so-called Fusario-toxins, is produced by F roseum and is often found together with DON in contaminated grain. Zearalenone mimics the female hormone oestrogen and is mostly a problem in pigs. But it can be used as a 'biological marker' for other Fusario-toxins found in grain and which target poultry. These include Fusarochromanone produced by F equiseti and causing skeletal problems in poultry due to calcium and phosphorous imbalance.

An important but highly underrated aspect of animal health is the wide-scale, diverse, but mostly hidden impact of mycotoxins.

Mycotoxin production

Mycotoxin-producing fungi rely on a window of opportunity created by available moisture in feed material and favourably high ambient temperature and humidity.

Mycotoxins cannot be avoided, only managed. Focus and emphasis is on depriving these mould fungi of the conditions necessary for growth and mycotoxin production, and as far upstream as possible.

The 'seeds' of mycotoxin synthesis are often 'sown' well before the feed bin or poultry feeder by plant pathogens like Fusarium which cause disease in the leaf, stem and ear of small grain cereals such as wheat and barley. Grain farmers can minimise the incidence and level of mycotoxin production by following good agronomic practices that maximise crop resistance and minimise fungal disease. Efficient harvesting and proper cleaning, drying and storage of grain is vital to maintain mycotoxin contamination at an absolute minimum.

It is important to maintain the equilibrium moisture content of the stored cereal grain. For example, at 70 per cent relative humidity the equilibrium moisture content is 140g/kg for shelled corn, 136 g/kg for soft winter wheat and 135 g/kg for barley. At levels above these the grain may start to show spoilage due to mould activity. For copra, the key is rapid drying of fresh coconut from its 50-55 per cent moisture level down to six to seven per cent using an optimum temperature over a 72-hour period.

Some poultry farming systems are acutely prone to the effects of specific mycotoxins. This is due to a combination of the high susceptibility of the type of poultry and proneness to contamination of the feed material used.

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Aflatoxicosis in ducks is the prime example. Comparative studies show ducklings and turkey poults are the most sensitive of all commercial poultry to aflatoxin. Ducks are much more sensitive to aflatoxin than are chickens. Of the crop commodities used as poultry feed, groundnut and copra are among the most susceptible to aflatoxin contamination. As a precaution feed materials containing groundnut should never be offered to ducks. Aflatoxin poisoning in ducks is particularly prevalent in the coconut producing nations of southeast Asia where copra cake or meal remaining after coconut oil extraction is commonly used in the feed rations offered to ducks.

Many effects of high concentrations of mycotoxins are well known - like skin lesions and high mortality for instance.

Poultry mycotoxicosis

Use of superior breeds and best practice management continues to improve feed conversion, live-weight gain and meat and egg production, but these potential gains are often constrained by feed-borne mycotoxins.

Most poultry mycotoxicoses are caused by continual low intake of toxin over an extended period of time. Typical chronic symptoms are poor feed conversion efficiency, reduced growth and sub-optimal production. However, these symptoms may also be due to nutritional imbalance, heat stress and pest/parasite infestation.

Poor feed conversion efficiency and sub optimal poultry production in the absence of these factors normally indicates mycotoxin contamination of feed, but there are specific indicators too. Ingestion of higher concentrations of mycotoxin leads to acute clinical symptoms associated with specific vital organs, the immune system and other aspects of avian physiology. Mortality is often high. Accurate identification of mycotoxin poisoning in poultry flocks requires a wide consideration including evaluation of flock history, clinical and post-mortem examination, histopathological and serological investigation and feed analyses.

Aflatoxins are potent liver poisons causing severe economic loss in all types of poultry. Associated clinical symptoms include anorexia, decreased feed efficiency, reduced weight gains and egg production, haemorrhage, embryotoxicity and increased susceptibility to environmental stress and microbial infection. Aflatoxicosis is recognised by specific histopathological changes to the birds' hepatic system (liver and associated organs). Tissue lesions specifically indicating aflatoxicosis are atrophy of the liver tissue with fatty infiltration and bile duct proliferation and fibrosis.

Ochratoxin A primarily targets the kidneys and urinary system, but may also damage the liver at high concentration. Birds show classic 'wet droppings' symptoms caused by diuresis; broiler growth rate is depressed and affected flocks are anaemic. Ochratoxicosis is implicated in decreased skeletal density leading to a condition called 'field rickets'.

Birds contract infections because of impaired acquired immunity or reduced native resistance.

The T-2 toxin damages tissues and organs by hitting at the very heart of cell metabolism. It causes primary inhibition of protein synthesis and has a secondary effect on DNA and RNA synthesis and cell division. T-2 effects show up in tissues and organs where cells are actively dividing, such as the lining of the gastrointestinal tract, the skin and blood. T-2 mycotoxin poisoning is confirmed by post-mortem examination showing oral lesions. Birds affected by T-2 mycotoxin suffer retarded growth, abnormal feathering, anaemia and oral lesions, the latter decreasing feed intake to reduce live-weight gain, egg production and shell quality.

Immune response

Aflatoxins, Ochratoxin A and T-2 mycotoxins are all immuno-suppressive to poultry. Affected flocks become more susceptible to primary viral respiratory infection and secondary infection by opportunistic bacterial pathogens. Birds contract infections because of impaired acquired immunity or reduced native resistance.

The bursa of Fabricus, thymus and spleen, and to a lesser extent the cecal tonsils and bone marrow, contribute to humoral and cellular immunity. The cell-mediated immune response is controlled by T-cells originating in the thymus. The humoral immune response, by production of antibodies or immunogloblulin (mainly IgM and IgA), is controlled by the B-cells from the bursa of Fabricus and bone marrow.

Aflatoxins are the most immuno-suppressive of all the mycotoxins. They depress both cell-mediated and humoral immune responses to lower the overall defence mechanism of the bird. T-cells are more susceptible to aflatoxin than are B-cells. Thus, low level ingestion of aflatoxin affects the cell-mediated response, while higher levels begin to depress immunoglobulin production and anitbody response. Aflatoxins decrease the activity of phagocytes directly and indirectly by impairing the action of a heat-stable serum-factor responsible for their activity. Aflatoxin lowers activity of 'Complement' which is a serum constituent produced by the liver.

Tricothecenes, as a group, are the second most important of the immuno-suppressive mycotoxins, although the effect of T-2 on its own is equal that of any single aflatoxin. T-2 primarily affects the cell-mediated response through direct effect on bone marrow, spleen, lymph nodes, thymus and intestinal mucosa where it damages actively dividing cells. Ochratoxin A impairs both cell-mediated and humoral responses by atrophy of the thymus and reduced circulation of immunoglobulin and phagocytes.

Dr Terry Mabbett

Some effects of aflatoxin on the immune system

- Reduction in phagocytosis by macrophages
- Reduction in delayed cutaneous hypersensitivity
- Reduction in IgG and IgA concentration in serum
- Reduction in 'Complement' activity
- Reduction in bactericidal activity of serum

World experts agree improved crop varieties need to go hand in hand with eco-friendly farming systems, accordings to the FAO.

Maize, rice, wheat farming must become more sustainable

CEREAL-BASED FARMING systems must join the transition to sustainable agriculture if they are to meet unprecedented demand for maize, rice and wheat. That was one of the key messages to emerge from a meeting recently held by FAO and attended by leading crop production specialists.

FAO estimates that over the next 35 years farmers will need to increase the annual production of maize, rice and wheat to three billion tonnes, or half a billion tonnes more than 2013's record combined harvests.

They will need to do that with less water, fossil fuel and agrochemicals, on farmland that has been widely degraded by decades of intensive crop production, and in the face of droughts, new pest and disease threats, and extreme weather events provoked by climate change.

Recent research showed that using conservation agriculture in such fields produced a 39 per cent yield. A maize field in Zimbabwe.

Over the next 35 years farmers will need to increase the annual production of maize, rice and wheat to three billion tonnes.

Eco-friendly agriculture

Experts at the meeting said that the challenge could only be met with eco-friendly agriculture that achieves higher productivity while conserving natural resources, adapting to climate change, and delivering economic benefits to the world's 500mn small-scale family farms.

The meeting focused on maize, rice and wheat because those three crops are fundamental to world food security, providing 50 per cent of humanity's dietary energy supply. Cereals are also increasingly vulnerable: climate trends since 1980 have reduced the annual global maize harvest by an estimated 23mn tonnes and the wheat harvest by 33mn tonnes. Green Revolution cereal yield increases, once averaging a spectacular three per cent a year, have fallen to around one per cent since 2000.

In Asia, the degradation of soils and the buildup of toxins in intensive paddy systems have raised concerns that the slowdown in yield growth reflects a deteriorating crop-growing environment.

The FAO meeting agreed that agriculture can no longer rely on input-intensive agriculture to increase crop production. Improved varieties of maize, rice and wheat must go hand in hand with what FAO calls "Save and Grow" farming systems that keep soil healthy, integrate crop, tree and animal production, use water far more efficiently, and protect crops with integrated pest management.

Examples of ecosystem-based farming

Papers presented at the meeting provided an inventory of proven ecosystem-based farming technologies and practices, including:

- The elimination of soil tillage on wheat land in central Morocco cut water runoff volume by 30 per cent and sediment loss by 70 per cent, leading to increased water holding capacity that boosts crop productivity in drier seasons.
- In Zimbabwe, conservation agriculture has helped smallholder farmers produce up to eight times more maize per hectare than the national average.
- Farmers in Zambia grow an acacia tree, Faidherbia albida, near maize fields and use its nitrogen-rich leaves as natural fertiliser and a protective mulch during the rainy season, resulting in a threefold increase in yields
- In China, planting genetically diverse rice varieties in the same field has cut fungal disease incidence so significantly, compared to monocropped rice, that many farmers were able to stop spraying fungicide
- In southern India, site-specific nutrient management, which matches nitrogen inputs to plants' real needs, has reduced fertiliser applications and costs, while increasing wheat yields by 40 per cent.

The challenge facing policymakers is to accelerate the adoption of "Save and Grow" farming systems. One clear need flagged by the meeting was greater support to smallholder farmers in adapting ecosystem-based farming practices to local conditions, which will require the revision of national policies, considerable upgrading of extension services and approaches that reduce the transaction costs of knowledge sharing, such as farmers' field schools.

The FAO forum was attended by 50 crop production specialists from AfricaRice, CIMMYT, FAO, ICARDA, IWMI, IRRI, and agricultural development institutions in Asia and Latin America. Their findings will be presented in a policymakers'guide, Save and Grow: Maize, rice and wheat to be published this year (2015).

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With the use of modern agricultural production methods, Kenyan farmers are increasingly benefiting from growing maize.

Kenyan farmers reap rewards of switching to maize

THE KANO PLAINS, in Kenya's western Nyanza Province, are well known for rice production, but after years of poor prices and competition from imports, farmers are gradually switching to more profitable crops such as maize.

"I am happy because when you look at my maize farm, you can see my family can forget hunger for the next year," said Jack Osoro, who grew rice for more than 20 years before making the switch to maize. "The harvests will be good and I can eat and sell some to pay school fees for my children."

He added: "As years passed and the government neglected rice farmers, we became poorer than even those who didn't till their farms, because it was expensive to buy farm inputs and we lost everything to rich middlemen."

At her two hectare farm, Emily Ominde is harvesting millet; she has already harvested 28 50-kg bags of maize. Ominde still grows rice, but has increased her income by growing other crops during non-rice planting months.

"You can't plant rice throughout the season, so I decided, instead of leaving my farm idle, I would plant maize and millet on it as I waited for another rice planting season," she said. "By the time I finish harvesting my maize and millet, I will have about 40 bags of both, and now I can keep half to feed my family and sell the rest to cater for other needs."

Farming maize in Kenya. Photo: Hailey Tucker/One Acre Fund.

Competition from importers

Kenya imports three-quarters of its rice from Asian countries such as Pakistan under preferential tax terms; rice imports from these countries incur a 35 per cent tax, compared with 75 per cent levied on other agricultural imports.

In June 2011, the Kenyan Finance Minister extended the special tax relief on rice imports from Pakistan and Egypt to 2012.

"The cost of production of local rice is high, thus, automatically, it becomes expensive, and people would rather pick foreign rice from Asian countries which enjoy tax relief and are hence cheaper," said Auma Osolo, a lecturer at the department of agriculture at western Kenya's Maseno University. "When people don't buy your product, the incentive to produce more disappears."

According to the Ministry of Agriculture, local production of rice stands at 50,000mt per year, while annual consumption is 350,000mt. Pakistan alone exports 200,000mt of rice to Kenya annually.

The potential of maize

According to Osoro, who heads a local farmers' co-operative, more than three-quarters of the 519 farmers involved in the region's Ahero Irrigation Scheme - originally mainly farming rice - have switched to maize. The scheme covers 874 ha, which, according to Ministry of Agriculture officials, can generate enough maize to feed about 250,000 people.

"Rice failed to cushion us from hunger, but today when you look at what we expect to get from maize farming, we can say, if we continue, then hunger will be history for us, and not only here, but in other parts of the country too."

According to senior government officials in Nyanza, the farmers can, if they use modern methods including fertilisers, irrigation and certified seeds, produce an average of 70,000 bags of maize each harvesting season.

"When you have such a large number of farmers using modern agricultural production methods like irrigation and use of fertilisers, then you expect each farmer to produce an average of 30 bags of maize per acre [0.4ha]. From this calculation, what these farmers produce is enough to feed their families and immediate neighbours, through the sale of some of this produce, until the next harvesting season," said Joash Owiro, the Nyanza provincial director of agriculture.

"Our problem as a country has been over-reliance on rain-fed agriculture, but farmers in such irrigation schemes have an advantage because they have water year round and can produce throughout the year, and not only maize and rice... many other crops," he said.

By forming co-operatives, the farmers in Kano have been able to negotiate lower rates for inputs such as seeds and fertilisers.

James Ratemo, a government agricultural extension officer, moves from farm to farm on a rickety motorcycle, teaching farmers how best to preserve their produce; he says without improving their knowledge, they may not put their good harvests to optimal use.

"When farmers get good harvests like this, excitement sets in and many of them end up

selling all the produce, and they are left with nothing to eat," he said.

For farmers, there has never been a better time to sell maize: prices in the country have now risen about threefold. A 90kg bag of the produce is going for an average of US$31 in Nairobi, Mombasa and Kisumu, giving farmers good profit.

But farmers say the government could do even better by removing the tax-free status of maize; the farmers argue that if those incentives were used to encourage local farmers to grow more maize, the national staple, the country could rely more on local production at a reasonable cost.

By forming co-operatives, the farmers in Kano have been able to negotiate lower rates for inputs such as seeds and fertilisers.

Maize remains the staple food in Kenya. Photo: Guy Oliver/IRIN.

Caution urged

"What the government needs to do now is to provide incentives in terms of good prices for farmers like those in Kano, who have received good harvest, and buy the crop to give to those in need as well as to beef up the strategic grain reserves," said Osolo.

"Measures must also be put in place by, for example, putting a cap on how many bags a farmer can sell so that they don't sell everything and remain hungry, and in the process, sustain the cycle of hunger," he added.

The government is also dissuading farmers from sub-dividing land into tiny parcels, which means much smaller profits after harvest season.

"As certain areas continue to realise good harvests, the government will use that to cushion those areas that have been adversely affected by drought," said Wilson Songa, agriculture secretary at the Ministry of Agriculture. B

This article was originally published by IRIN.

Bean programme

THE EAST AFRICAN Grain Council (EAGC) is recruiting over 100,000 legume farmers in Kenya to fulfil a growing demand in India, which requires four million tonnes in imports which EAGC wants to tap into.

Under the *Support India Trade and Investment Programme*, EAGC will get financial and technical support as well as a reduction in tariffs for the next three years. All the grains exports to India will be duty free. EAGC is working with the International Trade Centre to support farmers producing and exporting to the huge market that is India.

India needs a variety of legumes that comprise dry beans, cowpeas, pigeon peas and green grams. India is chief consumer and importer of legumes in the world.

"We plan to train over 100,000 farmers on the latest technology to increase their legume yields in order to meet a ready market in India," observed Gerald Masila, EAGC executive director, adding that this will boost productivity per acre.

Mwangi Mumero

Of all the crop commodities used in animal feed maize, groundnut and copra are the most susceptible to aflatoxin contamination. Dr Terry Mabbett looks into this problem.

Aflatoxin in groundnut and copra feed

AFLATOXINS ARE SECONDARY metabolites synthesised by the opportunistic mould fungi Aspergillus flavus, A. parisiticus and A. nomius growing on poorly managed crops. They may appear before or at harvest, during crop drying, curing and processing and while the commodity is in storage and transit. Aflatoxins are acutely and chronically acting poisons targeting liver cells and are able to cause cancers in this vital organ at 'trace' concentration. Aspergillus flavus is also a fungal pathogen of poultry responsible for aspergillosis in chickens and turkeys.

Aspergillus fungi are primarily post-harvest and storage fungi and do not normally contaminate crops before harvest, but conditions such as drought stress and insect damage may allow growth of toxigenic Aspergilli and production of aflatoxin in the field prior to harvest. The presence of aflatoxigenic moulds on crops does not automatically mean aflatoxins are present, and their high chemical stability means aflatoxins may be present on stored crops at toxic levels long after the fungi have been destroyed or removed. Ideal conditions for growth of Aspergillus and toxin production are an equilibrium relative humidity of 80-85 per cent, equilibrium moisture content of 17 per cent and temperature within the 24-35°C range.

Aflatoxins comprise a large group of heterocyclic (ringed) coumarin-type chemical compounds, but only Aflatoxin B1 and B2 and G1 and G2 (names originally assigned due to blue and green fluorescence under ultra violet light) have been detected as natural contaminants of animal feed and feed materials. Aflatoxin B1 is the most widespread and most potent of the four (Table 1).

Table 1. Acute toxicities of aflatoxins in one day old ducklings

Aflatoxin	B1	B2	G1	G4
LD50 (mg/kg body weight)	0.36	0.78	1.70	2.45

From: K. Jewers, 1987

Sound structures remain at the root of successful grain storage. Image: Bentall Rowlands.

Sensitivity to aflatoxin differs between the type and age of animal.

Others compounds, including aflatoxin M1 and M2, P1 and P2 and aflatoxicol, occur as products of animal or microbial metabolism. Livestock ingesting even minute amounts of aflatoxin in contaminated feed suffer sickness, disease and mortality and they may transfer the contamination and toxicity down the food chain to human consumers in meat, eggs and dairy products.

Cereal grain is the most widely grown, traded and feed-formulated crop commodity and as such receives most attention in relation to aflatoxin contamination. But others like groundnut and copra are widely used in animal feed and are of crucial economic importance to countries in Asia and Africa. Of all the crop commodities used in animal feed maize, groundnut and copra are the most susceptible to aflatoxin contamination.

Feed grain traders in Africa are clearly alert to the aflatoxin content of imported maize (corn) but are equally concerned for the aflatoxin status of exported groundnut meal and copra cake. Given the ultra-tight restrictions on aflatoxin levels in feed materials imposed by major importing countries and trading blocs they have every reason to be concerned.

Sensitivity to aflatoxin differs between the type and age of animal with juveniles and males generally more sensitive. Poultry are vulnerable with ducks considerably more susceptible than chickens (Table 2). Maximum allowable aflatoxin levels may vary between type of feed material (eg, groundnut or copra), its nature (eg, groundnut pods, kernel, groundnut meal or finished feed) as well as livestock destination for feed (eg, ducklings or broiler chickens). Regulation levels may therefore vary but are generally tight at around 20 ppb or less.

Table 2. Single dose oral LD50 for aflatoxin B1 in various species

Species	Duckling	Chick	Pig	Sheep	Rabbit
LD50 (mg/kg body weight)	0.34-0.56	6.5-16.5	0.62	2.0	0.3-0.5

From: D.S.P. Patterson, 1973

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Groundnut

Aflatoxin contamination and toxicity first came to light after the 1960 outbreak of so-called 'Turkey X' disease which caused the deaths over 100,000 turkey poults in the United Kingdom. A similar condition quickly followed in ducks and pheasants with the common factor identified as aflatoxin contamination of groundnut meal imported from Brazil. Aflatoxin poisoning from Brazilian groundnut meal was subsequently seen in cattle, pigs, sheep and chickens. Groundnut meal from other origins including East and West Africa was subsequently shown to be contaminated with aflatoxin.

Aflatoxin contamination of groundnuts can occur before harvest, during harvest and field drying or during transportation and storage. Pre-disposition of groundnuts in Mali (West Africa) to aflatoxin contamination during the pre-harvest period, and especially during drought conditions, have been mitigated by the use of disease resistant cultivars and the application of lime, crop residues and farmyard manure to growing crops. Delays in harvesting, poor drying techniques (especially sun drying in the field with groundnuts covered by haulms) and kernel moisture levels exceeding 10 per cent have all contributed to increased aflatoxin contamination at one time or another.

End-of-season moisture stress in groundnut crops for periods exceeding 20 days, mean soil temperatures of 28-31°C in pod zones, pod damage by termites, borers or nematodes and plant death due to fungal disease have been identified by ICRISAT (Andhra Pradesh in India) as triggers for aflatoxin contamination in pre-harvest groundnuts. Things to guard against during and after harvest are lifting over-mature crops, mechanical damage to pods during lifting, stacking the harvest when pod moisture level exceeds 10 per cent, stacking haulms carrying small or immature pods, gleaning pods from the soil after harvest and allowing pods to be re-wetted.

Aflatoxin contamination of groundnuts is a big potential problem. Groundnut cake which is widely used as livestock feed has recorded aflatoxin at exceptionally high levels of 3300 µg/kg (3300 ppb). Groundnut haulms are specifically fed to dairy cows and if haulms containing small pods are used reduced milk yields and aflatoxin M1 contamination of milk ensue. Cattle fed with aflatoxin-contaminated pods suffer from diarrhoea and ephemeral fever.

Copra

Copra meal (cake), the by-product of oil expulsion from dried coconut kernel (copra), is a valuable livestock feed commodity. Coconut and copra production is concentrated in a handful of countries including Philippines and Indonesia which together account for over half world production. Aflatoxin poses a continual threat to export of copra-based feed materials into major international markets as well to local livestock production in which copra meal is widely used. Much evidence for aflatoxin contamination and poisoning in farm animals has arisen in South East Asian poultry where large populations of ultra-sensitive ducks and widespread use of copra-based feeds with high susceptibility to aflatoxin contamination come together.

Surveys by the Research Institute of Animal Health in Indonesia on a wide range of imported and locally-grown materials destined for the feed industry showed copra to be second only to maize, in extent and level of aflatoxin contamination. Over 90 per cent of incoming copra meal samples at some feed mills were contaminated and almost 60 per cent tested in excess of 20 ppb. Mean aflatoxin level in copra meal was 67 ppb of which one third was accounted for by aflatoxin B1.

Unless aflatoxin contamination of copra meal is rigidly controlled the commodity will remain under threat of losing important dairy cattle feed markets around the world.

Unless aflatoxin contamination of copra meal is rigidly controlled the commodity will remain under threat of losing important dairy cattle feed markets around the world. Copra meal is highly valued in the dairy industry for raising the milk yield of lactating cows and enhancing the butterfat content of milk. But use of copra meal as an ingredient in blending dairy cattle feed is compromised by aflatoxin contamination and especially aflatoxin B1. Aflatoxin M1 which is the hydroxylated metabolite of aflatoxin B1 appears not only in the milk but also in manufactured dairy products including yoghurt, cheese and butter. Even worse situations may occur when export rejects flow back on to the local market and are used to feed livestock, thus compromising the health of local people consuming the milk and meat.

Nowhere is this taken more seriously than in the Philippines; one of the biggest exporters of copra meal in the world. The Food and Nutrition Institute with headquarters in Manila has developed an aflatoxin test kit for copra millers, copra meal exporters, feed compounders and exporters. The institute claims the kit is a reliable aflatoxin detector at three action levels:

- 20 ppb and below for straight feeds
- 20-50 ppb for feed compounding
- 50 ppb for non-feed use

The kit can be used with samples of copra or copra meal with detection limits of 10 ppb and 20 ppb respectively.

Key to excluding aflatoxin from copra is rapid drying to reduce the 50-55 per cent moisture level of fresh coconut 'meat' to six to seven per cent over a 72-hour period, followed by storage in a well-ventilated place with a relative humidity no higher than 75 per cent. With this achieved, the offending Aspergillus mould is deprived of the conditions which are necessary for growth and aflatoxin production.

Sorghum is an important food grain in dryland Africa. Elsewhere it is primarily grown for feed. Image: Omex.

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Aviana Kenya 2015 provided a platform to exhibit innovative technologies and identify distribution channels in the Africa region, and also established a large business forum for suppliers and distributors. Mwangi Mumero reports from Nairobi.

AVIANA provides gateway to investment opportunities

IN A COUNTRY with a fast growing poultry industry, Kenya's demand for chicken feed, drugs and other services has been on the rise. It is estimated that the country has 32mn chickens – with 80 per cent of these being indigenous and the rest exotic.

Annually, the poultry industry produces at least 20 tonnes of poultry meat worth US$40mn and 1.3bn eggs valued at US$115mn.

According to the Kenya Poultry Farmers Association (KEPOFA), at least six million commercial hybrids are currently being reared in the country.

Demand for poultry products has surged domestically and even in the regional East African and Comesa markets.

Urbanisation and a growing middle class have boosted the demand for eggs and poultry meat, spurring the fortunes of the sub-sector.

Demand for poultry products has surged domestically and even in the regional East African and Comesa markets.

Poultry industry provides huge benefits

Over 21mn Kenyans - out of a population of 45mn - reap huge economic and nutritional benefits from the poultry industry.

Other birds reared in the country include ducks, geese, turkeys, ostriches and pigeons.

With the rising demand for eggs and meat, farmers are now seeking better technologies and practices to boost production and cut cost in their enterprises.

Thousands of farmers, feed manufacturers, drug manufacturers, consultants, poultry production students and lecturers attended the recently held Aviana Kenya Expo at Nairobi's Kenyatta International Conference Centre (KICC).

Exhibitors drawn from all over the world presented the latest technologies in drug manufacturing, feed additives, hatchery technologies, egg and meat packaging and marketing among other new ideas in the global poultry industry.

Dr. Reza Bentaleb of Ceva Santé Animale (right) at their stand at the Aviana Kenya Expo.

Some exhibition participants exchange notes.

Experts in various aspects of livestock production also made presentations on disease control, bio-security, hatchery management, vaccines and vaccinations, rabbit and camel health and production among other areas.

Exhibitors from all over the world

The 50 exhibitors came from Kenya, France, China, Germany, South Africa, Israel and Denmark. Others were from Canada, India, Spain, Hungary, Jordan, Mauritius, Egypt, Belgium and Holland.

"We are here to showcase our expertise on new vaccines for poultry and specifically on [vaccines] against Gumboro disease. Our vaccines have been successfully used in Kenya in the last few years," observed Dr. Reza Bentaleb, speaking to *African Farming at the Ceva stand at Aviana Kenya Expo.*

Dr. Bentaleb is a poultry business unit manager for intertropical Africa with Ceva Santé Animale, a French animal welfare products firm, with a presence in 42 countries and working across 110 nations globally.

According to Dr. Bentaleb, the company is involved in trypanocidal drug production, dairy reproduction products and poultry vaccines among other products.

"We are the global market leader in poultry vaccine production and our presence at the Aviana Kenya is aimed at widening our relationships with partners across the country. Our Gumboro vaccines - used mainly at the hatchery level - save farmers time and cost, thus improving overall performance of their poultry enterprises," Dr. Bentaleb explained.

Ceva also produces vaccines for the control of Marek's, New Castle and Bronchitis diseases

Other European companies showcasing their products at the exhibition included Big Dutchman and Evonik, both from Germany; CID lines (Belgium), Pas Reform (Holland) and Ovejero Group (Spain) among 15 others.

While Ceva Santé Animale has been in the Kenyan market for the last 20 years, other companies from the global poultry industry were using the exhibition to seek partners in the country and within the larger East African market for the first time.

Newcomers to Kenya

"This is our first time showcasing our products to the Kenyan market. Although we have close ties with North Africa, we are now seeking agents in Kenya and East Africa," said Dr Abdel Monem Sharaf, a director with Dar Al Dawa Vet & Agri Industrial, a Jordanian company involved in the production of a wide range of livestock drugs.

Established over 20 years ago, the company is well established in Eastern Europe, Russia and the Middle East markets and is seeking a foothold in sub-Saharan Africa, to complement its presence in Algeria, Tunisia and Sudan

While many large Chinese companies have invested heavily in African markets in the construction and energy sector, few have ventured into other sectors.

"We are dealers in feed additives such as enzymes and phytase needed to boost feed conversion ratios and improve livestock performance. We are exhibiting for the first time in Kenya and we are eager to get clients for our wide range of products," said Charlie Chou, technical manager with Beijing Smile Feed & Tech Company.

The company, based in the Chinese capital, has already expanded its footprint to cover South Africa, Egypt and Nigeria.

"We hope to get a distributor to sell our products to feed millers. We also sell our products to big poultry producers," added Chou, noting that the company controls 40 per cent of the phytase market in China.

Other companies from Asia exhibiting at the expo included Sanaa Laboratories (Pakistan) and Vinayak Ingredients (India) among 10 others.

Livestock feeds constitute 80-90 per cent of total production costs in poultry enterprises, according to Kenya's National Farmers' Information Service (Nafis), a government agriculture network.

Hundreds of poultry farmers thronged the show, making inquiries mainly on feeds, additives and vaccines.

A need to educate farmers

"There is a need to educate farmers who can, in turn, demand strict feed formulation by manufacturers. Quality of feed has a direct correlation to the level of production among livestock animals," said business manager Larry Wambugu, of Orkila (Africa), a company with a presence in 21 African countries.

Chinese exhibitor Charlie Chou (right) and a colleague at their Beijing Smile Feeds & Tech Company stand.

Some of the items on show.

The company deals with feed additives as well as components used in yoghurt and sausage making, according to Wambugu, whose firm has operated in the Kenyan market for the last four years.

Another company, Sigma Supplies Limited, a business that deals with dressed chicken, day old chicks, table eggs, hatching eggs, poultry equipment and animal feeds was among the 10 Kenyan companies at the expo.

Other contributors

But it was not just companies exhibiting at Aviana Kenya. Livestock associations and non-profit organisations also had a chance to exchange ideas on their roles with farmers and other stakeholders.

"With a membership of 8,000 poultry farmers in Kenya, we have helped articulate issues affecting farmers mainly in the high cost of production, competition from imports and boosted education on all aspects of poultry production," noted Doreen Kendi Njoka, of KEPOFA.

The association has also been able to organise education tours, exchange visits and field days for members.

"Disseminating information through publications and manuals to members helps to educate farmers on emerging issues. We also link farmers with relevant development partners and networks," said Njoka.

As the primary target of the exhibition, hundreds of poultry farmers thronged the show, making inquiries mainly on feeds, additives and vaccines.

"As a smallholder poultry farmer in Kiambu County, my interest is on technologies that can help reduce death among chicks. I am also eager to learn about the feed additives that will boost weight gain in broilers to reduce feed intake and wastage," said Wanjiku Mwaura, a poultry farmer who currently has 400 layers and 500 broilers in her homestead, under the deep litter system.

According to Professor Alexander Kahi, a leading Kenyan researcher in indigenous chickens, access to better services, feeds and markets will boost profits in poultry enterprises.

"Rural farmers also need to be allowed to access different markets from supermarkets to fast food outlets while being protected from exploitation by brokers and middlemen," said Professor Kahi, who is currently leading the European Union- (EU-) funded Smallholder Indigenous Chicken Improvement Programme (InCIP).

This is a collaborative project conducted by Wageningen University, Netherlands, Egerton University, Kenya and the University of Malawi, southern Africa.

Understanding soil texture is a key factor for successful crop production. Nicole Alvarez, Senninger Irrigation, discusses.

Two reasons to focus on soil when selecting a sprinkler

SOIL TEXTURE IS crucial when determining what crops grow best in a field and how farmers should manage their land. It's particularly important if crops need irrigation. Soil and water compatibility is extremely important to irrigated land. Water that is not applied at a rate and intensity compatible with a farm's soil texture will have adverse effects on the chemical and physical properties of the soil.

That is why putting the focus on soil is key to irrigation management and selecting the right equipment for the job. While there are various considerations when selecting a sprinkler system, there are two big reasons to prioritise soil texture: it will let you know what flow rate (application rate) you need and how much water you can drop on your soil without damaging it.

Water infiltrates soil's pores at varying rates depending on texture.

Understanding infiltration rates

A good understanding of a field's soil texture will help irrigators determine the length and frequency of irrigation events.

Water infiltrates soil's pores at varying rates depending on texture. For example, water infiltrates through dense, clay soils around one to five mm/hr while sandy soils can absorb water at 30 mm/hr. This means that a water layer of 30mm on the soil surface will take one hour to infiltrate sandy soil. However, this amount of water will take much longer to infiltrate clay soils. With more than five mm/hr, runoff, soil sealing and salinity issues are likely to occur due to poor drainage and pooling on the soil surface.

As a rule of thumb, farmers irrigating sandy soils need to irrigate more often for shorter intervals. Irrigating sandy soil for too long will waste water due to deep percolations and wash nutrients beneath the root zone. Clay soils require long and infrequent irrigation while loam soils are somewhere in between.

Focus on application rate

The application rate of a sprinkler system must match the intake rate of the least porous soil in a field. If the application rate exceeds the soil intake rate, water will run off the field or relocate within the field, resulting in over and under watered areas.

i-Wob with Senninger's new thermoplastic Magnum Weight.

i-Wob installed on Senninger's 125° double goosenecks. Double goosenecks spread out the sprinkler's application pattern.

Matching sprinkler application rates to the soil intake rate can be difficult though. The rate at which water infiltrates into soil is complex. First, the intake rate varies with time, being higher when water is first applied and decreasing as the soil obtains more moisture.

Application rate and crop variety

Application rate also varies depending on the crop growing. For example, corn may need 7.0 mm of water per day during ear formation no matter the soil type. Growers irrigating sandy soils will probably need to apply 1,499 l/hr (6.6 GPM) for every acre irrigated to keep the crop healthy.

In contrast, growers irrigating silt-loam soil may only need to apply 1,113 l/hr (4.9 GPM) for every acre. If the corn is rotated with dry beans later on though, then growers will need sprinklers than can be adjusted to apply 1,612 l/hr (7.1 GPM) for every acre irrigated over sandy soils.

Just taking into account crop needs alone is risky when irrigating, and could result in lesser yields or poor crop development.

Don't forget application intensity

Before choosing a sprinkler system based on flow rate alone, it is important to think about the sprinkler's wetted pattern and how the water is applied over the soil surface.

As water droplets are distributed onto the soil, the structure and infiltration rate of the soil becomes altered. To keep soil close to its pre-irrigation state, growers need to distribute water over the largest area of instantaneous coverage possible and with low application intensity.

Although larger droplets are desirable to combat wind-drift, droplets that are too large have a higher kinetic energy. This can cause surface sealing and lead to erosion or inefficient irrigation on tighter soils. In general, tighter soils benefit from smaller droplets while looser soils can accept larger droplets. Sprinklers with customisable deflectors and a wide range of nozzles, like the Senninger i-Wob, are well suited for various soil textures due to the variety of droplet sizes available. The droplet size can be tailored to the needs of the soil and the flow rate can be adjusted for specific crop and climatic needs.

Thomas Meyer from Swingtec GmbH discusses the advantages of thermal fogging in different plantations.

Advantages of fogging in plantations

BAGWORMS (METISA PLANA) and fireworms (Setothosea Asigna) in oil palm plantations, coconut leaf moths (Artona catoxantha) in coconut trees, Black Sigatoka in bananas and white flies in tomato and chili pepper plantations: only a small share out of the vast variety of different pests and diseases that cause a lot of damage and losses in agriculture.

Still the most common way of acting against these pests and diseases is the use of motorised knapsack sprayers, which means an application quantity of spraying mixture of 600 l/ha and even more. A typical backpack sprayer has a solution tank with a capacity of 10 litres which must then be refilled 60 times for treating just one hectare.

An alternative to spraying is the use of a thermal fogging machine which will require only a fogging mixture quantity of 10 l/ha due to the much bigger quantity of smaller droplets created by a fogger compared to a sprayer. Also, a treatment with a thermal fogger will require approximately 10 per cent of the time the treatment takes with a sprayer. Because of the "natural" fog distribution, it is possible to fog large areas, whereas with backpack sprayers only a much smaller area can be treated.

Looking at different sizes of fogging machines, the required time of treatment by fogging of one hectare with three to six litres of fogging mixture will decrease:

- **Portable Swingfog SN 50:** approximately 9-18 minutes (using nozzle 1.0 with an output of 20.5 l/h)
- **Medium-sized Swingfog SN 81:** approximately 5-9 minutes (using nozzle 1.4 with an output of 39 l/h), eg, mounted on a Quad
- **Truck-mountable Swingfog SN 101:** approximately 3-5 minutes (using nozzle 1.7 with an output of 69 l/h)

This means that compared with conventional spraying, 90 per cent of the working time and more can be saved with a Swingfog thermal fog generator. Apart from the aspect of the application time, the time for the transport and the preparation of the carrier also plays an important role, and also a rational use of energy is closely coupled with lower amounts of carrier material required when fogging. Treating the same area of one hectare, with the application of five litres fog mixture in 15 minutes, only approximately half a litre of petrol is required with the portable Swingfog SN 50, whereas with a backpack sprayer approximately nine litres of fuel are required to apply 600 litres of spraying mixture.

Fogging before sunrise in a chili pepper plantation.

Fogging also provides for a saving of 98 per cent of the carrier compared to spraying. In cases where the carrier is diesel or kerosene, the fogging is a much more cost-effective solution. In cases where the carrier is water, there is also a considerable saving of this precious natural resource as it can then be used for other purposes, eg, for irrigation. Besides, using water as a carrier will be consistent with today's environmental requirements of avoiding pollution.

Because of the "natural" fog distribution, it is possible to fog large areas.

Swingfog SN 101 in a banana plantation.

When using water as a carrier, for the Swingfog there is a patented high-performance fogging tube available which can produce a droplet spectrum with water-based fog solutions that almost matches that of an oil-based fog. When applying water with a normal fogging tube of a thermal fogger, it is important to know that the droplet spectrum is much broader and droplets of even over 100 μm are produced which fall on the ground directly in front of the device and are therefore ineffective.

Finally, it should be considered that the distribution of the fog mainly follows wind and thermal conditions. A light breeze can be used for extending the range of the fog cloud. In the case of plantations consisting of bushes and low plants where the fog should stay low and settle down slowly, the application should be made before sunrise. In cases where the plantation consists of trees with canopies which the fog should reach, the fogging should be performed during the late afternoon when the thermal will drive the fog upwards.

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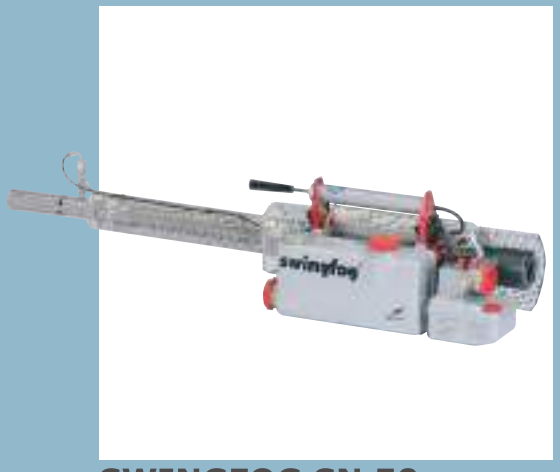

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Although sales of big round and square bales is increasing, on many farms small bales that can be handled manually are still the popular choice. Michael Williams reports.

Baler progress

A Krone Comprima round baler equipped with the EasyFlow cam-free pick-up reel.

WORKING WITH LARGE bales, both round and square, requires mechanical handling using a telescopic loader or a loader attachment on a tractor. This is the most efficient system for farms or industrial processes using large amounts of baled crop material, but for small and medium farm requirements the traditional small sized bales can offer the most cost effective handling system.

As well as being light enough to carry, there are other reasons for the popularity of small conventional bales. They are more convenient to use where small amounts of feed or bedding straw are needed, and another attraction is that the balers have a low power requirement with most models suiting tractors in the 45 to 65hp range.

Claas has one of the most comprehensive baler ranges available

Modest power requirement

The modest power requirement is one of the main reasons for the popularity of the Markant baler in the Claas range. There are two versions, the Markant 55 needing 45hp plus while the recommendation for the 65 model is at least 60hp. Both Markants make bales with a 46cm x 36cm cross-section, but the 65 model specification includes a 1.85-metre wide pick-up reel instead of 1.65 metres for the 55 baler and there are other differences including a bigger twine box on the 65. As well as working with small tractors, the popularity of Markant models is also helped by the simple design with features such as manual adjustment of the pick-up reel height with hydraulic control offered as an option.

Claas has one of the most comprehensive baler ranges available, but the Markant is easily their top selling baler in Africa, with Morocco their biggest market in North Africa. There is also an increasing demand for big square balers from the six-model Claas Quadrant range, which includes a 120cm x 100cm bale size for the top model, but demand for round balers remains small apart from increasing sales in the South African market.

About 70 per cent of New Holland balers sold throughout Africa are BC series small bale models. The other 30 per cent are mainly fixed diameter round balers plus small numbers of variable chamber models and big square balers. The BC series models are the BC5060 plus the higher specification BC5070 with a 2.0-metre wide pick-up instead of 1.8 metres. Both have a 46cm x 36cm bale chamber with the length of the bale adjustable between 31 and 132cm, and minimum power requirements are 45 and 60hp. The BC5060 is easily the most popular model, with the BC5070 baler restricted mainly to the South African market.

Recent design improvements for New Holland Roll-Belt series variable chamber round balers are said to increase output by up to 20 per cent. Most of the increase is achieved by fitting a new pick-up reel and feed mechanism, and a drop-floor feature has been introduced on the latest version to simplify blockage clearance. The round baler range also includes the BR6080 and the higher specification BR6090 version.

The John Deere range includes two small bale models, the 359 and the 459 both sharing the same 46cm x 35cm cross section. The 359 has a more basic specification and is available in all markets, while the 459 for users with a more demanding work load is sold only in South Africa. The specification differences start at the pick-up which is 1.75 metres wide on the 359, increasing to 1.98 metres on the 459 model, but both versions have six tine bars to achieve more efficient crop collection. There is also a difference in the plunger speed, which is 92 strokes per minute for the 359, increasing to 100 strokes on the 459 to achieve a density increase, and the 459 also has a larger twine box capacity. Power recommendations at the p-t-o are 47 and 61hp respectively.

Different approach from MF

While most small square balers are based on the traditional design with the pick-up reel offset to the side, Massey Ferguson took a different approach by placing the reel in-line at the front of the baler. The new design, using the same layout as big square and round balers, is said to offer a number of advantages including reduced overall width for road travel, and the straight-through route for crop material is also said to improve crop flow and reduce the risk of blockages. The in-line design was first used on their MF 1839 baler, which has been updated and is now called the MF 1840. The design changes include an extended bale chamber to improve the bale shape and density, the redesigned pick-up auger gives more even crop feed and a bigger twine box reduces the need for refill stops.

Emergence of new markets

One of the factors behind the small but increasing demand for big square balers in some African countries is the emergence of new markets, according to Massey Ferguson. An example is the demand for baled livestock fodder such as lucerne and

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grass crops for large, intensive dairy and beef units in the Middle East, and countries such as Egypt, South Africa and Sudan are helping to meet the demand. Some of the balers used for this export trade are from Massey Ferguson's MF 2200 series and the recently introduced OptiForm extended bale chamber on some models is helping to boost handling and transport efficiency by adding 20 per cent to the bale weight.

Another potential big bale market is using residues from crops such as sugar cane to generate electricity and big, high density bales will be essential for this specialised market, says Massey Ferguson.

Krone has pioneered a number of new baler design features including the first pick-up reels designed to operate without a cam track. Called the EasyFlow pick-up, the cam-free design improves reliability by needing 60 per cent fewer working parts, and it also allows faster reel speeds to achieve more efficient crop collection. The EasyFlow pick-up is standard equipment on most models in the Krone round and big square baler ranges.

A more recent innovation is the three-way choice of fixed, semi-variable and fully variable chamber versions of the Krone Comprima round baler. The fixed chamber model makes 1.25-metre diameter bales, the diameter can be adjusted in 50mm stages on the semi-variable version and there is a choice of maximum bale diameters up to 2.05 metres for the fully variable model. All three versions have a 2.15-metre wide EasyFlow cam-free pick-up.

Drop-floor technology

One of the recent developments in the round baler market is a big increase in the number of manufacturers offering drop-floor technology. A drop-floor makes it easier to prevent and clear blockages by temporarily increasing the aperture where the crop material travels into the bale chamber. Clearing a blockage manually can be difficult and time-consuming, and working speeds are often increased when the operator can rely on a drop-floor to deal with problems.

Massey Ferguson's MF 1840 small baler has the pick-up reel in line with the bale chamber.

One of the factors behind the small but increasing demand for big square balers in some African countries is the emergence of new markets.

Vicon offers a drop-floor on all fixed and variable chamber round balers including the latest RV series variable models. The two RV balers have 1.65 and 2.00-metre maximum bale diameters and feature improved twine and net wrapping plus a new density control system, and both are equipped with a 2.2-metre pick-up reel with five tine bars. The Vicon RF3325 fixed diameter model makes 1.25-metre diameter bales which are formed with 17 ribbed rollers, and the options list includes a crop chopping unit with 14 or 25 knives.

The company that originally introduced the drop-floor feature was Lely. They have been fitting their Flexcontrol system for about 15 years, providing two control stages starting with a flexible floor section that responds to pressure and can prevent a blockage forming, while the hydraulically operated second stage provides a back-up to release material that has created a blockage. Flexcontrol is standard equipment on most models in Lely's current baler range and as well as dealing with blockages, it can also reduce damage risks by releasing large objects such as a lump of wood picked up in the swath.

Lely has also announced a new development that could significantly increase round baler work rates in the future. Called the CB concept, it is a new type of round baler that Lely has developed in a joint programme with the Vermeer company in America, and the result is a continuous baling process that avoids the need to stop while each completed bale is ejected from the chamber. The CB concept baler was demonstrated for the first time in 1914, and Lely has predicted that the production version will be available within two or three years offering potential work rates of 110 to 130 bales per hour. B

Throughout Africa the BC5060 small baler is easily the most popular New Holland model.

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Challenger GSI MASSEY FERGUSON VALTRA

Bobcat has recently launched new compact telescopic handlers, specifically for the agricultural market. *African Farming* went to Pontchâteau to see them in action.

A new level of performance in Bobcat's telehandler portfolio

BOBCAT'S MANUFACTURING FACILITY in Pontchâteau, France, has produced over 80,000 telescopic handlers over five decades. A quarter of that production run has emerged from the plant since it was acquired by Ingersoll-Rand, now a Doosan subsidiary company, in 2000. 1,500 units are forecast to be sold during 2015, a 20 per cent increase over 2014. According to Norbert Donaberger, VP telescopic business, eight machines a day are built at the site with just one shift.

Eighty-five per cent of Pontchâteau's telehandlers have been made for customers in Europe, the Middle East and Africa (EMEA). Just over half the machines are sold to agricultural operators, with the remaining telehandlers going to construction companies.

Until recently, Bobcat has been noticeably quiet in the agricultural telehandler market, instead concentrating its efforts on the construction side of things.

However, growth in agricultural telehandler sales has caused the company's ears to prick.

"Over the last 15 years, the agricultural market has been on the rise, while the construction industry has been sinking," explained Olivier Traccucci, global product manager.

Bobcat's new compact telescopic handler TLI358.

This range of telescopic handlers is designed to excel in the most demanding agricultural applications.

New portfolio of products

There is a new portfolio of products emerging from Pontchâteau - the TL358 and the TL358+. These are mostly used in poultry and small livestock farms.

The TL360 and TL470 brought in the new era – the Bobcat TL range of telescopic handlers designed to excel in the most demanding agricultural applications. And now the TL358 and TL358+/TL358+Agri machines carry it on.

The TL358, TL358+ and TL358+ Agri are very compact machines, thanks to the narrow frame design with a width of only 2.1 metres compared to 2.3 metres in the TL360/TL470 models. Combined with a height of just 2.1 metres, they provide exceptional performance, comfort and visibility for machines of their size. They are also short machines, only 4.5 metres long with an optimised 2.8 metres wheel base for enhanced stability and a short turning radius of just 3.77 metres.

As well as their compactness, another important attribute of the new TL358, TL358+ and TL358+ Agri telehandlers is their versatility, with two different machine overall heights offering compactness where it is required and top performance at all times. The cab can be mounted in two ways – in a low position that results in the very low 2.1-metre height or a higher position to optimise visibility for the operator from the cab.

Incorporating Bobcat's long experience and dedication to constant improvement, these versatile machines combine proven principles with innovative design, state-of-the-art technologies, and a commitment to meeting the ever-growing demands of your working day.

Agri models get a reverse fan as standard, as well as pneumatic seat, ag tyres, hydraulic braking and extra auxiliary features.

In terms of lift capacity, the TL358 can lift 2,600 kg with a maximum height of 5,800 mm while the TL358+ can lift 3,000 kg to 5,800 mm. The larger TL470HF, which Bobcat believes will appeal to larger farmers and contractors, lifts 3,500 kg with a maximum lift height of 6,957 mm.

The working environment in these machines is both comfortable and well-equipped, with features such as a large digital display, refinements to the joystick, and a semi-automatic wheel alignment empowering the customer or operator to produce higher quality work than before.

Cab visibility has been increased for the new telehandlers, as a consequence of a new box-welded frame design - the large machine has no rear pillar so there is perfect visability.

Box-welded main frame

The main frame is box welded from 8 mm plate steel to handle rough terrain conditions and frequent use, while the bottom of the machine is plated to protect vital components such as the transmission. The rear lights are also protected, and are fully integrated into the counterweight.

Bobcat has opted for Perkins Tier 3 engines for African markets.

There is no downtime for regeneration, a big factor for this sort of product as most are run at low revs, according to Bobcat.

It is also a maintenance-free system and there is no extra fuel burn required, the company says.

The MF 35 brings farm mechanisation firmly within reach of emerging agricultural enterprises.

Massey Ferguson announces 'People's Tractor' in Kenya

MASSEY FERGUSON, A worldwide brand of AGCO, is launching a tractor for the Kenya market which will provide emerging farmers and new-start agricultural contractors with the important first step in farm mechanisation.

"Straightforward, dependable and affordable, the 36hp MF 35 is truly the 'People's Tractor'," said Richard Markwell, VP and managing director Massey Ferguson Europe/Africa/Middle East. "This well-proven model offers exactly the right specification and technical features for Kenya's emerging farm enterprises. It brings mechanisation to a new generation of farmers, farm workers and entrepreneurs. It is the ideal, multi-purpose machine particularly for first-time tractor owners and operators who are ambitious to develop their businesses and transform their families' livelihoods. For those who thought that a tractor straight from the showroom was out of reach, then think again because the MF 35 could be the perfect solution."

Sales, parts, training and service support are being handled by Massey Ferguson's highly-experienced national distributor, FMD, which has a nationwide network of outlets and mobile service teams. A special package of implements to complement the MF 35 tractor is also under development to include a choice of cultivation, planting and transport equipment.

With strong Massey Ferguson heritage, this latest MF 35 is based on the renowned machine, with the same model number, which cemented its reputation in Africa and around the world over many years. Key features include a rugged 36hp engine, six-forward/two-reverse speed mechanical gearbox and hard-wearing robust construction. Easy-to-use and maintain, the MF 35 is highly flexible. It is equally at home in cultivation, planting, transport or yard duties, working across a wide range of farm sectors including arable, livestock and horticulture, flower, tea and coffee production – making Kenya the ideal market. The tractor's compact size means it is exceptionally manoeuvrable on smaller plots of land, while its rear three-point hitch boasts maximum lift capacity of 1,100 kg enables the use of a wide variety of implements – ranging from transport boxes and mowers, to ploughs and cultivators.

The MF 35 tractor - straightforward, dependable, affordable.

The launch of the MF 35 is part of AGCO's commitment under the Grow Africa initiatives of the World Economic Forum.

"Massey Ferguson is committed to providing high-quality machinery to suit all types of farm operations," added Richard Markwell. "Our tractors and equipment are an integral part of the agricultural landscape in Kenya and our famous Triple Triangle brand is trusted and well-respected amongst the farming community. Mechanisation brings more efficient and timely in-field operation, leading to productive, sustainable and profitable farming. The MF 35 goes right to the heart of grassroots agriculture. It is a very versatile and cost-effective tool, which has the potential to inspire and motivate more people to turn to the land as a springboard to greater prosperity." Ⓔ

Kepler Weber has introduced a new product called Kikapu especially for the smallholder farmers in the eastern and southern African markets.

New grain storage option for small farmers

GRAIN STORAGE IS often an issue overlooked by the small holder farmers in Africa, yet many times the problems of food shortages, low prices and marked access could be addressed if an efficient solution for this situation was available.

This season a new solution is available – Kepler Weber, a Brazilian manufacturer of grain storage solutions, is introducing a new product called Kikapu in the eastern and southern African markets.

Food shortages have often been related solely to grain productivity problems and therefore many times the solution offered for the problem will involve productivity increments using a broad spectrum of available technologies; also, those technologies often produce the expected result, but even then the problem of food shortages remain. This happens because the problem then moves from the production side to the grain preservation and market access questions.

African farmers will have access to the techniques that ensure grain availability anywhere else in the world.

Guaranteeing access to good storage

The best way to address this question is by guaranteeing access to good storage to the farmer with good productivity.

The Kilapu's aeration system.

The new Kikapu.

And again, as on the productivity side, there are technologies already developed that can easily deal with this question. The remaining problem, however, is that those technologies today are focused on the developed world production areas – always much larger than the African average farming area – and therefore the products available do not match the sizes and costs supported by African farmers, or they end up being improvised versions of the best available solution.

Addressing the problem

Now, for the first time, the solution for this question has been properly addressed by Kepler Weber, a company with 90 years of history in the grain storage market, that has developed a product christened Kikapu – the swahilli word for basket – to represent the connection of this new product to the African reality.

The solar panel on the Kilapu.

The product is a metallic silo in a small version for 6.12 metric tons or approximately 61 bags of 100 kg of product to be stored in bulk as in the traditional European solutions and the material used for the construction of this silo, galvanised steel, is exactly the same used on large scale solutions. This guarantees a lifespan of 30 years or more depending on the maintenance given to the product. But yet that is not all. Other features have been added especially for the small farmer, such as: manual loading and offloading systems, in opposition to the expensive and energy consuming mechanical systems used on traditional solutions, and, more important, the product also features an grain aeration system that is powered by a solar panel that will ensure grain preservation for short to medium terms, just enough for the farmer to guarantee that the product reaching the market is in good quality, and all at a fair and affordable price.

Now, for the first time, African farmers will have access to the techniques that ensure grain availability anywhere else in the world and all adapted to the African market where financial resources are in short supply and special demands have to be met. Kepler Weber is reaching the eastern African markets on a partnership with Brazafric and details for the products can be accessed at their market sites.

Eng. Ismael Rodrigo Schneider – international sales analyst of Kepler Weber
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Biofuel plants are ideally-suited to agroeconomies, and increasingly in demand

The right crop in the right place

CORN, WHEAT AND rapeseed can be used to produce biofuels, such as bioethanol and biodiesel. According to recent findings by environmental scientists at Radboud University in The Netherlands, the location of the agricultural lands used to grow these biofuel crops has a major impact on the greenhouse gas emission they ultimately produce. A study endorsing this conclusion was published by Nature Climate Change in May 2015.

To increase production of biofuels from crops, such as corn and wheat, natural areas need to make way for agricultural land. The initial result of this is an increase in greenhouse gas emission. Using a global model, Pieter Elshout and fellow environmental scientists at Radboud University have demonstrated how long it takes for the advantages that biofuels offer over fossil fuels to earn a return on this initial emission. On the global scale, the average payback time for greenhouse gases is nineteen years.

Grains such as corn can be turned into ethanol.

To increase production of biofuels from crops, such as corn and wheat, natural areas need to make way for agricultural land.

From Western Europe to the tropics

Elshout, a PhD candidate at Radboud University, explained, "Nineteen years sounds like a long time, but in farming terms, it's not all that long. Furthermore, that figure is a global average. In Western Europe, that period is considerably shorter, sometimes spanning just a few years. In the tropics, however, it can extend past a hundred years."

While extensive crop farming reduces greenhouse gas emission, it also yields smaller crops for producing biofuels. Extensive farming in Zimbabwe.

The model demonstrates that the location of biofuel crops has a significant impact on greenhouse gas emission - more so than does the type of crop or crop management (such as the amount of fertilisers and irrigation used).

A global-scale model

Elshout commented, "Our model is the first that offers a global, spatially-explicit overview of biogenic gas emission resulting from crops used to produce biofuels. In developing this model, our calculations of the durations of payback times took account of the entire production chain for fossil fuels and biofuels with the accompanying greenhouse emissions."

This global model is applicable to first-generation biofuels. These include bioethanol from corn, wheat and sugar cane, as well as biodiesel from soybeans and rapeseed.

These results will contribute an angle of nuance to the current debate on biofuels in the Netherlands. In a follow-up study on biofuel crop farming, Elshout and his colleagues hope to investigate the payback times related to the impact on biodiversity.

Kirloskar Brothers Limited discusses the story behind its successful business relationships with Egypt and Senegal.

Partnering for progress in Africa: KBL Pumps

In Egypt, a pump is called "Kirloskar"

EGYPT IS ASSOCIATED with its famed pyramids and dusty deserts. However, leading Indian pumps and valves manufacturer Kirloskar Brothers Limited (KBL) has successfully managed to change that image in the last five decades. In 2014, KBL told *African Farming and Food Processing* that the company is committed to a long-term engagement with Egypt, as the region's enormous potential remains unexplored. The company proposed using energy-efficient technologies to manage water resources. As a result, more than 100,000 Kirloskar pump-sets have been installed along the Nile and are responsible for ensuring irrigation for 150,000 *feddans* of land. (A *feddan* is equivalent to 1.038 acres and is a commonly used unit of area in Egypt.

KBL received its first big order from the General Authority for Rehabilitation Project and Agricultural Development (GARPAD) under the Ministry of Agriculture in Egypt. This order involved the supply, erection and commissioning of four pumping stations in the South Quaroon. This order was followed by pumping stations in Umm El Reish and Sedmant el Gabal. However, its real breakthrough came with an order for the supply of 3,145 booster pumping units for sprinkler irrigation and supply of electromechanical equipment for nine pumping stations in West Noubaria in Lower Egypt. The project, which was financed by the Abu Dhabi Fund for Arab Economic Development, reclaimed 57,000 *feddans* of desert land.

Over time, KBL bagged orders from Egypt's Mechanical and Electrical Department (MED). "The friendship between India and Egypt is rooted in our shared history and Kirloskar's pumps are a part of that history now," said Mostafa A Abu-Zeid, chairman of MED.

One of the notable installations of KBL was the supply of 14 horizontal pump-sets for five pumping stations in Der El Mimoun in Upper Egypt, funded by the Islamic Development Bank. Among other projects, KBL assisted the MED with the turnkey contract for the building and supply of equipment for Benban and Rozaikat pumping stations. This installation remains noteworthy as it involved civil works, local as well as foreign supplies. Despite the Arab Spring of 2011, KBL manage to deliver the project in time.

Grande Digue pumping station in Senegal.

After half a century of a successful business relationship, KBL has formally inaugurated two large pumping stations this year for the Toshka Project, owned by the Al Rajhi Agricultural Co.

KBL is committed to the growth and prosperity of Egypt and will always want to remain the chosen *Partner in Progress*.

The Senegal story

The relationship between the West African nation of Senegal and KBL began in the year 2005. At the *CII-Exim Bank Conclave on India Africa Project Partnership*, KBL showcased a range of its pumps to more than 25 African nations. Following the meeting at the Conclave, KBL was invited to visit Senegal to understand their agriculture, and consequently, their irrigation needs. At the time, Senegal was running a huge rice import bill and President SE Maitre Abdoulaye Wade recommended irrigation development as a way out of the crisis.

Against this backdrop, KBL visited several rice cultivation farms, collecting data on rainfall patterns, crop patterns, irrigation potential and pump specifications. Specifically, KBL cited lack of irrigation equipment as a major problem in the North Valley of Senegal. While there was abundant availability of water, there was no way to redirect the flow of water to the paddy fields. In addition, the majority of surface water was too salty to be used for irrigation, so tapping underground water was the only viable option.

The Senegal government aimed to double rice yields from 100,000 tonnes to 500,000 tonnes by improving irrigation. KBL signed a contract with the Senegalese Ministry of Agriculture to supply 2,394 diesel engine pump sets, 20 drip irrigation systems and accessories such as pipes, trolleys, hoses, pontoons and valves in 2006.

Phase 2 of the programme to enhance Senegal's irrigation facilities witnessed KBL sending large vertical turbines, end suction pump sets with agricultural equipment comprising rice mills, vibro-destoners, groundnut decorticators, chippers, shredders and grinding mills. This equipment is helping irrigate more than 150,000 hectares of land and has resulted in savings of US$350mn for Senegal.

Bentall Rowlnds redesigns Polygon storage hoppers

BENTALL ROWLANDS' CONTINUED commitment to serving customer requirements has culminated in the redesign of the Polygon range of feed silos. This range now comes with the same world-renowned high-build quality provided in the company's larger industrial silo supplies, such as Z600 galvanisation as standard improving its capability to withstand the harshest environments. The redesign is based on the latest available technology using the most recent advancements in raw materials.

The Polygon range comes in a variety of sizes from four to 39 cu m capacity, with cone angles of 45° and 67° to accommodate storage of different materials. It has a four inch fill pipe, six inch exhaust and the industry standard 450mm outlet. Options to discharge from the side of the silo are also available. Additional features include see-through hopper access doors, sight glasses, bagging off chutes, access and roof ladders complete with cage, weigh cell compatible feet.

The new Polygon is available in a high lift variant and can be mounted on a drive-through gantry for lorry loading.

The design team have considered all client's requirements, from planning issues to aesthetics of new developments, to client's purchase and supply conveniences. The Polygon can be supplied in a range of colours and is supplied as complete units in the UK and in kit form for erection in overseas markets. A full range of centre-less auger systems in 75mm, 90mm and 130mm is offered to complement this new and enviable range of silos.

www.bentallrowlands.com

Special machines for special plantations

Rail transporter for coconut picking.

PINEAPPLES, COCONUTS AND bananas aren't easy fruit to pick. Hansa-TMP, based in Modena, Italy, has developed a line of Ecotractors specialised in picking up the crop and maintenance of these special plantations. The small equipment has been designed and tested to operate in narrow spaces and in difficult environmental conditions.

Ecotractors on wheels or trucked are designed to be ergonomic and robust tractors and they are used in banana and pineapple plantations. Indeed this equipment is multifunctional; functions include fruit picking and storing, cleaning and lifting. These tractors are equipped with hydrostatic transmission manufactured by Hansa-TMP in their mechatronic research centre where the highest expertise is available for the customers.

Rail transporters for coconut picking are equipped with a close loop axial piston pump TPV 1000. These models of rail transporters are suitable for plantations in steep areas where it is difficult and dangerous for the operators to walk through.

The real innovation is that Hansa-TMP ecotractors are custom made: requests from the purchasers are taken into consideration during the designing and manufacturing phase to create equipment suitable for every kind of plantation.

Custom made doesn't mean expensive, states Hansa-TMP, who says that Ecotractors are "very affordable". Hansa-TMP collaborates with local partners for the assembly and start up of the tractors.

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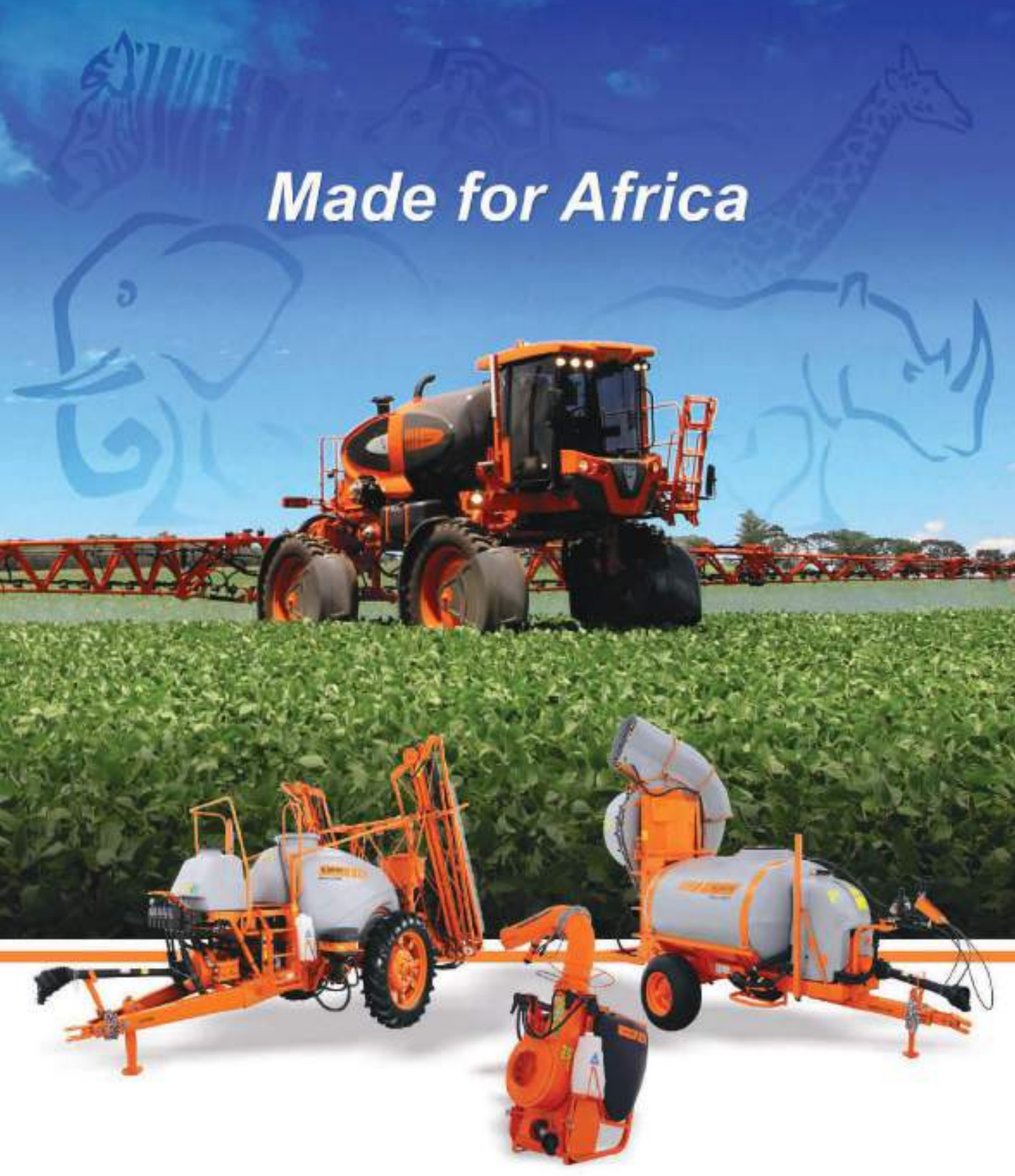

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