

African Farming

and Food Processing

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Poultry

Getting the best possible start for chicks

Tractor power

Latest developments

Grain storage

What's in store for cereal grain?



The Massey Ferguson 4708 is designed mainly for Africa. See page 28.





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CHRISTOPH SCHÜRZ
Area Sales Manager
+43 664 80380 2632
christoph.schuerz@poettinger.at

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Image: tukkata

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Image: Bentall Rowlands

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Managing Editor: Zsa Tebbit

Editorial and Design team: Bob Adams, Prashanth AP, Sindhuja Balaji, Hiriyti Bairu, Andrew Croft, Thomas Davies, Ranganath GS, Tom Michael, Rhonita Patnaik, Prasad Shankarappa, Lee Telot, Louise Waters and Ben Watts

Publisher: Nick Fordham

Publishing Director: Pallavi Pandey

Magazine Sales Manager: Richard Rozelaar
Tel: +44 (0) 20 7834 7676, Fax: +44 (0) 20 7973 0076
email: richard.rozelaar@alaincharles.com

Country	Representative	Telephone	Fax	Email
China	Ying Mathieson	(86) 10 8472 1899	(86) 10 8472 1900	ying.mathieson@alaincharles.com
India	Tanmay Mishra	(91) 80 65333361	(91) 80 40600791	tanmay.mishra@alaincharles.com
Nigeria	Bola Olowo	(234) 8034349299		bola.olowo@alaincharles.com
Singapore	Tan Kay Hui	(65) 9790 6090	(65) 6280 2823	tankayhui@tankayhuimedia.com
UAE	Camilla Capece	(971) 4 4489260	(971) 4 4489261	camilla.capece@alaincharles.com
USA	Michael Tomashefsky	(1) 203 226 2882	(1) 203 226 7447	michael.tomashefsky@alaincharles.com

Head Office:
Alain Charles Publishing Ltd
University House
11-13 Lower Grosvenor Place
London SW1W 0EX, United Kingdom
Telephone: +44 (0) 20 7834 7676
Fax: +44 (0) 20 7973 0076
E-mail: post@alaincharles.com

Production: Charlie Burns, Priyanka Chakraborty, Nikitha Jain, Nathanielle Kumar, Donatella Moranelli, and Sophia White E-mail: production@alaincharles.com


Subscriptions: circulation@alaincharles.com

Chairman: Derek Fordham

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Middle East Regional Office:
Alain Charles Middle East FZ-LLC
Office 215, Loft 2A
PO Box 502207
Dubai Media City, UAE
Telephone: +971 4 448 9260
Fax: +971 4 448 9261
E-mail: post@alaincharles.com



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Farming Calendar 2015

MAY

28-30 AGRENA 2015 CAIRO
www.agrena.net

JUNE

3-5 IFTEX 2015 NAIROBI
www.iftex.org

9-11 FIAAP/VICTAM/GRAPAS International 2015 COLOGNE
www.victam.com

17-19 Agritec Africa NAIROBI
www.agritecafrica.com

23-25 AVI AFRICA 2015 JOHANNESBURG
www.sapoultry.co.za

JULY

2-3 Aviana 2015 NAIROBI
www.avianaafrica.com

28-29 1st International Research Conference on African Honeybee and Indigenous Knowledge Systems BINDURA
www.zegu.ac.zw

SEPTEMBER

8-10 Agra-Innovate East Africa NAIROBI
www.agra-innovate.com

23-25 African Dairy Conference NAIROBI
www.dairyafrika.com

7-11 WVPA World Congress CAPE TOWN
www.wvpa.net

OCTOBER

14-16 PALS Africa 2015 KUMASI
www.10times.com/pals-africa

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

VICTAM's international showpiece anniversary

2015 IS A special year for the organisers of FIAAP, VICTAM & GRAPAS International 2015 as it is their 50th year. Now all together in Cologne from 9-11 June, the three events will be under one roof at the Kölnmesse to comprise what is now the world's largest dedicated animal feed and grain processing event.

Over 250 exhibitors from all over the world will come together at the events to display the latest technology and developments for the production of animal feeds, flour milling, grain processing and biomass pelleting.

Each exhibition has its own exhibitor profile; they are as follows:

FIAAP: Specialist ingredients and additives that are used within the formulation of feeds for animals.

VICTAM: Technology, equipment and systems for the production of animal feeds. Now also the technology used in the production of biomass pellets.

GRAPAS: Flour milling, grain processing equipment and technology.

In addition to the exhibition, there will also be a series of technical conferences that will be going on during the shows. These are as follows:

Tuesday 9 June:

- The FIAAP Conference;
- Aquafeed Horizons; and
- Biomass & biomass pelleting

Wednesday 10 June:

- Pefood Forum Europe 2015;
- Feed Safety Assurance certificate

Thursday 11 June:

- The IFF Feed Conference - Organised by IFF Research Institute of Feed Technology, Germany;
- Global Milling Conference with GRAPAS International 2015.

Victam International will also organise a number of different activities for visitors attending the FIAAP, VICTAM & GRAPAS exhibitions.

Conferences and workshops on F&B technologies at AB7

AFRICA'S BIG SEVEN (AB7) 2015 will be hosting numerous conferences and workshops focusing on the latest food and beverage production technologies available from around the world, and the new business opportunities these provide to producers in Africa. AB7 takes place from 21-23 June 2015 at Gallagher Convention Centre, Midrand.

"Africa's middle-class has grown to 34 per cent of the continent's nearly one-billion people, and as its standard of living escalates, its choice of food and beverage products evolves too," said John Thomson of Exhibition Management Services, organisers of AB7. "There is a growing demand for fruit juices across Africa year-on-year, and manufacturers will need to upgrade their technologies. Well-known Italian exhibition organiser Fiere di Parma will be presenting a workshop on the role of technology in the increasing consumption of juices worldwide."

Upper- and middle-class Kenyans have begun buying products that provide health benefits, such as fresh juice. Nigerians are also



F&B Buyers from Africa target Africa's Big Seven Expo.

becoming more health conscious as juice manufacturers continue to market their products intensely. Compounded consumer demand for juice in Nigeria is expected to grow at nine per cent each year. Cameroon grows a wide variety of fruits that are used to produce juices; Cameroon's annual market for juice beverages is expected to grow by 10 per cent this year.

"The workshop covering juice consumption and the role of technology will provide useful information to business owners on new

developments and techniques for juices and purée processing, packaging and new products, and how these create opportunities for growth," said Giacomo Rotunno, managing director of Senaf Promo Export, Italian export advisors and organisers of the event.

"The food packaging and bottling workshop will focus on safety and sustainability of packaging technologies and materials complying with the new expectations of the food industry," added Rotunno.

The latest research on strategies and technologies for sustainable processing and enhanced consumer satisfaction will be covered in a workshop titled 'New instruments to enhance safety, sustainability and efficiency in the dairy industry'.

The FoodTech Conference, titled "A Spotlight on Food Manufacturing and Marketing in Africa", focuses on the development and growth of Africa's food industry, and takes place at Gallagher Convention Centre on 22 June 2015.

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Agrikexpo 2015 fixes new dates

THE ANNUAL AGRICULTURE/FOOD exhibition (AGRIKEXPO) will now take place on 5-7 November 2015 at the Eko Convention Centre in Lagos. According to Alabi Dele, project manager of the organising company, it is important for exhibitors to meet with the decision makers and a wide array of visitors from across the region for better time and money value. There is a renewed drive for commercial-scale agricultural practice with the attendant need for a renewed approach away from the labour-intensive practice.

With more than 84mn ha of arable land, abundant sunshine, over 160mn people, cheap labour and a renewed zeal towards agriculture, Nigeria is clearly headed for an agricultural boom. Its vast fertile lands call for the deployment of modern technology for commercial scale productivity and Governments are willing to lend support in partnership with the private sector. Indeed the opportunities for agri-business activities are clearly enormous. Agrikexpo has continued to grow in profile as West Africa's largest agricultural event

and is partnered by the Federal Ministry of Agriculture & Rural Development, Nigeria Agribusiness Group (NABG), and several farmer associations. Endorsed by the EU, the event is set to run concurrently with the 2015 edition of the European Union Conference, themed on agriculture, and several export-oriented seminars. According to Paulette Van Trier, economic functionary at the EU, it will be a great opportunity to engage the largest gathering of top end attendees in West Africa agricultural business.

Improving African agriculture

ALTHOUGH SUB-SAHARAN AFRICA has the potential to become an agriculture powerhouse, crop yields for much of the region are a small fraction of those in the rest of the world.

Agronomists say the continent needs to drastically increase its agriculture productivity, and recommend a range of options – from high-yield seeds to fertiliser to improved infrastructure – to spur an agricultural revolution on the continent.

The region's economic development may depend on such a revolution, experts say, but it will require strong support from individual African governments.

Roughly 65 per cent of sub-Saharan Africa's population relies on subsistence farming. The typical farmer, however, has no fertiliser, no



Farming a rice field in Kartiak, Senegal. Little government support is provided to the farmers so, they must farm to subsist. Image: africa924

high-yield seeds, no irrigation, and no medication for his/her animals.

Cereal yields for sub-Saharan African farmers have declined or stagnated since the 1970s, according to the World Bank. In the late 1960s, most sub-Saharan countries were net food exporters. This is not the case today.

Experts blame several factors for the region's poor agricultural performance over the past three decades or so. First, sub-Saharan Africa's challenging environmental conditions make agriculture production difficult, particularly for small-scale farmers. Soil quality is poor in many areas, droughts are frequent, and infrastructure for transporting goods to market is limited. The diversity of the region's agroecologies – from soil to climate to type of crop produced – also complicates matters.

Added to these natural hurdles is the fact that foreign aid to the sector has declined significantly over the past few decades. In the recent past, there has been a clear shift away from productive sectors like agriculture, infrastructure and trade towards social sectors such as health, education, and governance.

The answer to the slow growth of the agricultural sector in Africa lies in the region's governments devoting enough funding to agriculture. It is disheartening to note that most countries still fall short of the CAADP 'prescription' of allocating at least 10 per cent of national budgets to agriculture.

Governments should strive to raise the productivity of smallholder farmers as the avenue to sustainable agricultural growth. Research and development in the breeding of new varieties of crops that are higher yielding and locally adapted should be encouraged.

Then Africa will be in a better position to feed itself and produce surplus for export. This is long overdue! It should be realised sooner than later.

Nawa Mutumweno

Antibiotics in livestock usage

INCREASED USE OF antimicrobial drugs in livestock systems will adversely affect poor farmers in developing countries, researchers at the Nairobi based International Livestock Research Institute (ILRI) have warned.

A recently released scientific paper published in the Proceedings of the National Academy of Science (PNAS) shows that global trends in antimicrobial consumption is expected to rise by 67 per cent between 2010 and 2030.

While researchers acknowledge that antibiotics are necessary in livestock systems to meet the growing demand for meat, milk and eggs, widespread use may contribute to growing microbe resistance.

Additionally, residues of these drugs used in certain livestock systems may harm consumers of eggs, meat and milk.

Researchers warn of the dangers of the increased use of

antibiotics in livestock systems. "Their effectiveness — and the lives of millions of people around the world — are now in danger due to the increasing global problem of antibiotic resistance, which is being driven by antibiotic consumption," noted Ramanan Laxminarayan, a senior research scholar at Princeton University and director at the Center for Disease Dynamics, Economics & Policy, in Washington DC.

Poor farmers in developing countries, while contributing little to the overall problem, will bear the brunt of excessive drug usage.

"Small-scale livestock keepers in developing countries are unlikely to be major contributors to the problem. However, they are likely to suffer a disproportionately high share of the adverse effects of high microbial use in farm animals," said Tim Robinson of the International Livestock Research Institute (ILRI). *Mwangi Mumero*

New approach for control of Gumboro disease

THE GUMBORO DISEASE, which is produced by the Infectious Bursal Disease Virus (IBDV), is one of the most recognised, studied and problematic diseases affecting poultry producers worldwide. Its control is classically done by a combination of vaccination and biosecurity procedures. Many times producers want to be protected against the negative consequences of the infection (mortality, immunodepression), but tend to forget the importance of preventing the challenge risk for the coming flocks, which will ensure the control in a long-term approach; a correct control strategy should consider both protection and prevention.

Recent scientific evidence, initially found by Ceva's researchers, which are starting to be endorsed by the scientific community, have shown that some vaccines such as Transmune, can give both the desired properties for protection and prevention. Thus making a big difference and giving producers the ultimate solution for Gumboro disease control, resulting in better



performances and more profits.

As the IBD virus is strongly resistant to environmental conditions and also to cleaning and disinfection procedures, it can survive for a very long period of time. Normally all poultry houses are contaminated before the chicks are placed inside.

Once the chickens become susceptible to the infection, the virus replicates in its target organ (Bursa of Fabricius) being subsequently shed in exponential quantities to the poultry litter, putting the coming flocks on pressure cycle after cycle.

The scientific studies have proven that the most efficacious way to stop this cycle of reinfection is by blocking the infection of the Bursas of Fabricius; in this way the Gumboro virus (no matter the strain) cannot replicate and consequently will not be shed. In other words, by blocking the infection of the bursa, the flocks will be protected and the challenge risk will be prevented.

Banana, avocado and citrus - boosting African exports

BANANA, AVOCADO AND citrus farmers in Africa will now be able to export their produce to lucrative markets in Europe, the Middle East and South Africa, thanks to new research. "Previously, banana, citrus and avocado from many African countries were banned by several importing countries due to the presence of an invasive Asian fruit fly, known as *Bactrocera invadens*," explained Dr Sunday Ekesi, a scientist with icipe. "Our studies have now convinced countries such as South Africa, Italy, Portugal, Spain and the Netherlands to remove their quarantine restrictions for banana, citrus and avocado from Côte d'Ivoire, Ghana, Kenya, Uganda, Mozambique,

Tanzania and Senegal."

icipe and collaborating organisations conducted the research on banana in Kenya and Mozambique, to assess the infestation of *B. invadens* on the Cavendish dwarf variety during different ripening stages. Dr Ekesi noted that the findings, published in the *Journal of Applied Entomology*, showed mature green Cavendish dwarf banana to be a non-host stage of *B. invadens*, and should therefore not be subjected to quarantine restrictions. However, the researchers recommend that banana bunches with precociously ripened fingers and other damages be carefully inspected before



export, as such damage could facilitate attack by *B. invadens*.

A cold disinfection treatment for *B. invadens* in citrus and avocado fruits has also been developed, enabling growers in sub-Saharan African countries infested by *B. invadens* to export avocado and citrus.

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Investors sought for Ghana's fish farming industry

THE NETHERLANDS EMBASSY in Ghana is recommending that its government takes steps to increase local feed production to aid the growth and economic potential of the fish farming industry in Ghana.

A recent study on the aquaculture sector in Ghana found that there is great potential for the tilapia farming industry. However, there is only one local fish feed manufacturer. Most

fish feed is imported, which increases production costs.

"I think there is definitely an opportunity to invest in a local production plant for fish feed because there are only one or two plants that produce fish feed," said Thierry Van Helden, First Secretary at the Netherlands Embassy in Ghana.

The Netherlands Embassy is trying to lure

investors from its country to explore opportunities in Ghana's aquaculture sector.

"We want to stimulate Dutch companies to invest in the aquaculture sector in Ghana and to increase trade in that area so we can modernise and professionalise the sector to a higher level," Van Helden added.

The aquaculture sector contributes three per cent Ghana's annual gross domestic product.

East Coast Fever vaccine technique

A NEW TECHNIQUE to tackle the cattle killer East Coast Fever may be in sight, according to a study conducted by the Nairobi-based International Livestock Research Institute (ILRI) in collaboration with the University of Edinburgh.

Vaccines made from milder parasites may protect livestock against the severe disease, according to the findings published in *Science Advances*. The paper is titled: *Co-infections determine patterns of mortality in a population exposed to parasite infection*.

East Coast Fever kills one million cattle annually claiming over US\$300mn in loss for poor livestock herders in East and Central Africa.

The disease is caused by the tick-transmitted *Theileria purva* protozoa. In western Kenya, calves are routinely exposed to *T purva* as well as the less harmful *Theileria mutans*.

Researchers now note that co-infection with the lesser parasite was associated with an impressive 89 per cent reduction in deaths from East Coast Fever.

"Our results suggest seeking a simple vaccine that could protect cows from East Coast fever by innoculating them with a related, but far less harmful parasite," said lead author Mark Woolhouse, from the University of Edinburgh.

The researchers say that these findings explain why European cattle raised in the same regions as the indigenous Zebu cattle succumb quickly to *T purva* infections.

Since European cattle are managed in ways that reduce tick infections, there is a reduced chance of attack from less harmful parasites.

Currently, the only existing vaccine is made by grinding up ticks that carry the *T purva* parasite. This technique is expensive to produce and deliver, and it induces an infection in cattle that must



Infection and treatment with ECF vaccine. Image: ILVAC

be treated with costly antibiotics, according to the ILRI.

"East Coast fever is a major burden for millions of poor people in Africa whose existence depends on healthy cattle. If we could provide a cheaper approach, it would greatly reduce poverty," said Phil Toye, a researcher with the ILRI.

The findings suggest that 'fighting fire with fire' is a strategy that might work against a range of parasitic diseases.

Researchers now believe that a similar process might be at work in malaria, where infection with the less harmful *Plasmodium vivax* parasite may protect people from the *Plasmodium falciparum* parasite that kills almost 600,000 people each year.

Malaria is caused by a single-celled parasite, *Plasmodium*, although more than one species of *Plasmodium* can cause malaria. The deadliest species is *Plasmodium falciparum*, whereas *Plasmodium vivax* is more widespread, but causes less severe disease.

Mwangi Mumbo

Zambian dairy farmers to benefit from Loan-A-Cow credit facility

SMALL-SCALE AND EMERGENT farmers around Zambia are set to benefit from an innovative credit facility that allows them to access financing for their cows without need to provide collateral.

The 'Loan-A-Cow' facility, which emanates from a partnership between the Zambia National Farmers' Union (ZNFU) and Zambia National Commercial Bank (Zanaco), was launched in August 2014 at Chaloshi Farms in Chisamba, central Zambia.

Loan-A-Cow enables small-scale farmers and emergent farmers to access financing for the acquisition of dairy cows. The small-scale farmers can access funding as a co-operative, while emergent farmers can access it as individuals. With this facility, the lending bank, Zanaco, will not require conventional

collateral such as title to land. Instead, the animals purchased will be used as collateral and the loans will be financed by proceeds from milk production.

So far, 253 in-calf dairy heifers have been imported from South Africa and 318 farmers from seven co-operatives have benefitted from the loan scheme, according to the Dairy Association of Zambia (DAZ) chairperson, Mirriam Mbazima.

Additional applications for the procurement of 447 in-calf heifers are currently being processed for seven other co-operatives.

If successful, this loan scheme could boost the country's milk production, which has been increasing over the past five years. Milk production in Zambia has grown from 128mn litres per annum in 2005 to 452mn litres in

2013, although local consumption still remains low at 35 litres per capita.

The Ministry of Agriculture and Livestock has put in place modalities to ensure that the animals imported into the country pose minimum risk to the national herd and are also of high genetic quality that will improve the country's productive levels.

According to ZNFU second vice-president, Graham Rae, the scheme has also brought on board several private sector partners, among them leading dairy processors who will provide small and medium-scale dairy farmers under the scheme with off-take market opportunities.

However, he noted that potential challenges that could hinder the financing scheme from achieving its intended results should be addressed.

Nawa Mutumweno

Overcoming the odds with vivast FX

NAVAGRO, A LEADING manufacturer of agricultural speciality products, is launching vivast FX, an innovative proprietary elicitor and advanced plant growth enhancer, as well as other lines of products in Africa and the Middle East after having been successful in markets in India, Latin America and the Caribbean. Navagro is in talks with leading distributors in African and Middle East markets.

The resistance of plants to diseases is mainly related to genetics and environment. However, the ability of the plant to express its genetic resistance to a particular disease is affected by mineral nutrition.

Navagro's vivast FX is a product with the innovative concept of elicitation of resistance genes in plants against diseases. The product induces the physiological pathway for closure of stomata during water stress and help in drought tolerance by actively reducing the transpiration loss. vivast FX has been developed based on enzymatic polymerisation technology, with specific KD of polysaccharides which release fortified nutrients to the plants with maximum efficiency and the added advantage of delivering the nutrients to the right spot. It activates pathogenesis resistance (PR)



proteins, chitinase & β 1-3 glucanase. vivast FX has also been proved to increase the mineral uptake, decrease the rate of fallen fruits by 15.25 per cent and increase the size and quality of the fruits. The product has also proved to increase the overall quality and yield of vegetable and fruits. Vegetable and fruit crops applied with vivast FX have shown remarkable resistance against fungal, viral and bacterial disease. The product is recommended for foliar, drip, sprinkler and seed treatment applications.

vivast FX also has a proprietary formula in it to increase the flowering, fruit and grain setting and increasing the overall quality and yield, and thus provide better profitability. It has been proved to protect tomato, cucumber, pea, melon, strawberry, lettuce and pearl millet against powdery and downy mildews as well as other diseases, and also it has been one of the best choice for the greenhouse crops, organic farming, and products of high export value.

Navagro has a wide range of products, such as plant growth promoters, bio-stimulants, advanced formulation of combinational generics for crop protection.



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Roxell develops CE-approved Quad heater

THE INTRODUCTION OF the CE-approved range of the Quad-Glow heater is an important step in the product development strategy of Roxell.

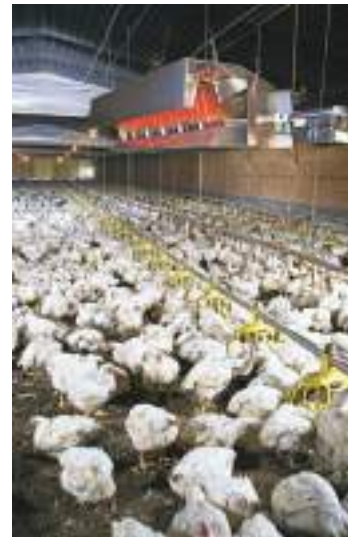
According to Michael Osterman, product manager at Roxell, fuel costs are the biggest costs for the poultry business. "Energy costs have doubled in recent years, and that's hitting poultry producers hard. In order to meet the specific requirements of the poultry farmers, Roxell developed a Quad-Glow heater, based on more than 80 years of experience in agricultural heating equipment."

This Quad-Glow heater has a broad range of high performing, fuel saving models accommodating most commonly used gas combinations. The heating system uses fuel more efficiently by converting more of the thermal capacity of the gas to infrared heat and transferring more of that heat to the floor.

The Quad-Glow can have as much as 25 per cent fuel savings over traditional brooders or space heaters.

Also the litter is dryer in Quad houses due to heating of a greater floor area, thereby lowering humidity and ammonia levels, giving better bird development and more profit, while saving fuel by not heating the exhaust air.

The new Quad-Glow has a 'Quadrangular' heat pattern that is more closely shaped to the rectangular form of a poultry house.



Stationary production plant to feed more than 10,000 cattle daily

AMBAR FEED MILLS is the largest and most advanced feed mill in Israel. It has two production plants and its annual production in animal feed is about one million tons.

In 2010 Ambar signed a contract with the Tatoma group to build a stationary production plant for total mixed rations. The plant was found to have made savings of up to 10 per cent in raw materials and since then two further extensions have been made to produce 10,000 daily rations.

The plant is the result of Tatoma's experience in the design, construction and commissioning of "Total Mixed Ration" type feeding systems for ruminant livestock both in trailed and self-propelled machinery.

The operation is based on ratios programmed into the automatic system for plant control, requiring only two people to operate it. The total cycle time of a mixture is between 10 and 15 minutes, depending on the composition and amounts of the ration.



The early rearing period, the brooding period, is one of the most critical stages in a young bird's life be it a chicken, turkey, duck or any other commercially reared bird.

Getting the best possible start for chicks



Temperature for young birds is very important, as is fresh air.

THE FIRST CRITICAL stage is to ensure the quality of the chicks when they arrive at the farm, which is the responsibility of the supplier hatchery, through the correct management of the breeding stocks and the hygiene during the hatching process. After this stage it is up to the farm to maximise the genetic potentials of the stock to be reared.

Many factors impact on the quality of the birds reared, such as management, nutrition and hygiene. The house should have been well cleaned, disinfected and rested, to give a sanitary break, before introducing the new litter. Depending on the heating system, whole house or spot heating, the house and litter should be warmed the day before the chicks are due to arrive. This also gives time for the water

It is critical that the birds are able to consume both the energy and protein to enable these systems to develop with no limitations.

to reach ambient temperature before the chicks arrive. Temperature for young birds is very important, as is fresh air, so it is important to ensure that there is minimal ventilation in the house to remove dust, humidity and to ensure a constant supply of oxygen for the birds.

Water essential

Water is the most important nutrient for any animal and one of the greatest problems with chicks is dehydration. Depending on the journey time from the hatchery, it is often beneficial to allow the chicks to drink first on arrival and then introduce the feed once they have all had time to rehydrate. This also gives the chicks a chance to learn where the drinkers are placed in their own individual locality.

Feed quality is also very important in establishing a fast growth. All birds are naturally seed eaters, and as such are used to eating feed in a particulate form. Therefore it is always advisable to give a crumbled, or very small, pelleted feed during the first phase of the diets, ensuring that there is a minimum of fine particles as these may reduce overall feed consumption, and hence growth.

First week critical

The first week is a critical time as it is during this time that the intestine undergoes a very rapid development along with other systems such as the immune system. It is therefore important that the birds are able to consume both the energy and protein to enable these systems to develop with no limitations. The consequences of not achieving this will be felt throughout the life of the bird. In order to aid this development, day length is usually extended during the first week to 23 hours, so that chicks can eat and drink whenever they want. This light programme will then be gradually reduced, depending on the type of bird in question, to meet their requirements.

In nature, once the chicks hatch, many of their requirements are provided by the mother, through taking them to feed and water or to provide heat whenever the chicks get cold. Another important factor is that during this time the immune system will be developed through acquired immunity by being in constant contact with the mother; thereby being in contact with many bacteria which can be both beneficial and harmful.

Hygiene is paramount

With modern poultry practices hygiene is paramount and all care is taken to ensure the cleanliness of the hatching eggs and the hatchery process itself. Equally, the housing the chicks are brought to should be of a high level of cleanliness so the normal exposure to bacteria is severely limited. However a balanced bacterial colonisation of the intestinal tract is essential for the well being of the bird and also to improve feed efficiency.

The vast majority of the bacteria in the intestine of any animal are either beneficial or neutral to the bird's well being, and only a very small proportion of the total bacteria are pathogens. Many of the bacteria play an important role in the prevention of the establishment of pathogenic bacteria through competitive exclusion, specific bactericide excretion or by changing the acidity of the varying regions of the intestine; thereby discouraging replication or preventing colonisation of pathogens. Therefore the early establishment of these beneficial bacteria in the bird's intestine results in improved performance in growth, feed efficiency and also some forms of disease protection.



Maintaining good management practice is essential in order to achieve a successful rear of the flock, like these healthy week-old chickens.

However, as already said, modern poultry practises include a great deal of effort to reduce the bacterial challenges the chicks face prior to arrival at the farm. Therefore a way to introduce beneficial bacteria to the birds, in a controlled way, can help in the rapid establishment of a beneficial gut micro flora and this can be achieved through the use of probiotic

products during the first days of a chick's life. Probiotics were first developed in the 1970's to combat a virulent Salmonella infection in broiler flocks in Finland.

Since this time probiotic products have developed further with the production of single strain products or multi species products, using specific bacteria through precise fermentation methods to ensure

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quality of product. The origin of the varying strains of bacteria can be varied and may not have originated from poultry.

PoultryStar is a multi species probiotic, which is a combination of five species/strains of bacteria – all of which originate from the intestine of healthy chickens. This gives the advantage of taking bacteria from specific areas of the chicken's intestine, which should result in a more rapid colonisation throughout the entire intestinal tract. Produced in a water-soluble and a micro-encapsulated form for either drinking water or processed feed application, PoultryStar is suitable for administration to day-old chicks to rapidly develop a healthy intestinal micro-flora.

Application of the water soluble product can be through the drinking water for the first three days of life. Alternatively, on the first day chicks can be sprayed with the probiotics solution either in the hatchery before shipping, or on arrival at the farm before placement. This can be followed up with further three-day treatments at the time of feed changes or during times of stress. The micro-encapsulated form can be included in the Starter and Grower rations and beyond to develop and maintain the healthy intestinal micro-flora.

Rigorous testing of PoultryStar has shown significant improvements in growth

Rigorous testing of PoultryStar has shown significant improvements in growth rate and feed efficiency in broiler chicks.

rate and feed efficiency in broiler chicks and improvements in the Productivity Index. With today's demand to reduce antibiotics in poultry, meat production performances have been shown to equal or better some standard AGP's currently in use in countries where they are still permitted. The increase in Clostridium infections in poultry remains a serious concern and independently published tests with PoultryStar have shown a reduction in Necrotic Enteritis infections and an altering of the onset of Gangrenous Dermatitis in broilers or the reduction of the colonisation of Salmonella Enteritidis in the intestines.

In conclusion: The first week of a bird's life is probably its most important time and the need to maintain good management

practices are paramount to achieving a successful rear of the flock. However, a rapid establishment of a healthy intestinal micro-flora through administration of probiotics will further improve performances and potentially reduce the incidence of gastro-intestinal diseases. **B** *Biomim*



Hygiene is paramount and all care should be taken to ensure the cleanliness of the hatching eggs and the hatchery process itself. Image: WilleeCole Photography.



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Zambeef hatches a new business

THE POULTRY INDUSTRY in Zambia is set to enter a new era of growth following placement of the first broiler parent stock at Zambeef's new multi-million dollar Zamhatch enterprise in Mpongwe.

Zamhatch is a joint venture between Zambeef and South Africa's largest chicken producer, Rainbow Chicken. The operation will provide high quality day-old chicks to Zambian farmers through Zambeef's extensive network of outlets countrywide by the middle of this year.

"Zambeef is putting its money where its mouth is and will be relying on the Zamhatch day-old chicks to supply Zamchick, our broiler rearing division" said Zambeef's joint chief executive officer Francis Grogan.

Poultry farmers will have a reliable and consistent source of day-old chicks that will enable them to optimise yields and profitability to help form the basis of flourishing businesses.

Mr Grogan said: "One of the reasons why Zambeef founded Zamhatch was to provide high-quality broiler chicks to Zambia's poultry farmers. Zambeef has always supported Zambian businesses and we want to see Zambian farmers succeed."

The operation will also provide strong business opportunities for the farmers, who will be able to buy quality day-old chicks at competitive prices from Zambeef outlets and distributors throughout the country. Poultry feed from Zambeef's Novatek stockfeed division will

be offered for sale with the chicks, providing a one-stop shop for poultry entrepreneurs.

Zamhatch is expected to generate additional employment, both in the Mpongwe area and at Zambeef's poultry operations in Chisamba, as well as indirect employment through distributors.

Mr Grogan said: "The establishment of Zamhatch is in line with the group's strategic integrated business model, aimed at reducing risk and earnings volatility and capturing margin throughout the value chain."

Chicken and egg production accounted for around nine per cent of Zambeef's revenue in the financial year ending 30 September 2014. It produced 6.2mn broilers and 40mn eggs in 2014.

Turkey, the perfect protein

DURING THE LAST two decades, the turkey industry in western countries has become a fully integrated industry with a diversified product line that competes with other protein products on a year-round basis.

Turkey production started in early 2000 in several North African countries such as Morocco, Algeria, Tunisia and Egypt, as well as in Syria. They began by importing turkey poults from Europe and about one million poults were brought into the region in 2002. Now these countries are producing about 80 per cent of the nearly 30mn turkey

poults in the region today. This increase is due to the fact that the public is now familiar with turkey meat's texture, taste, health, value and reasonable cost compared to red meat.

Turkey production and genetic selection is as advanced as chicken and other animal species. Turkey is a delicious source of lean protein available in a variety of cuts and products in many countries around the world. It adapts to all cooking methods from stovetop to oven to grill, and its delicate flavor is easily seasoned. So turkey complements the flavour profiles of many cuisines.

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Poultry is a important part of the animal food market and production is increasing to satisfy public demand worldwide. Therefore, it becomes necessary to maintain absolute hygiene and strict control at different stages of processing to produce a safe and wholesome chicken product.

Safe work practices in poultry processing

HEALTHY CHICKENS READY for processing harbour a tremendous amount and variety of bacteria. These bacteria are present on the surfaces of feet, feathers, skin and also in the intestines. During processing, a high proportion of these organisms will be removed, but further contamination can occur at any stage of the processing operation.

The procedure for converting a live, healthy bird into a safe and wholesome poultry product provides many opportunities for micro-organisms to colonise on the surface of the carcass. During the various processing operations, opportunities exist for the contamination of the carcasses from the environment, the process in the plant itself, contamination via knives, equipment, the hands of workers and also by cross-contamination from carcass to carcass.

Poultry processing has a number of unique features which make control of microbial contamination more difficult than the processing of any other conventional meat animal. Among them is the rapid rate of processing in some processing plants, a condition which favours the spread of micro-organisms.

The carcass must be kept whole throughout the process and the viscera have to be removed rapidly through a small opening in the abdomen without breakage, to minimise contamination of the carcass with intestinal organisms. After defeathering, the skin provides a complex surface with many holes which are capable of trapping bacteria. The micro-organisms are widely distributed over the carcasses under normal circumstances and are spread over the skin during scalding and defeathering and on the inner and outer surfaces during evisceration and further processing.

Efforts should be made to prevent the build-up of contamination peaks during processing. Rinsing of the carcasses, especially during defeathering and evisceration is therefore of great importance. Spoilage bacteria grow mainly on the skin surfaces, in the feather follicles and on cut muscle surfaces under the skin.

The important microbiological changes take place on the surfaces of the carcasses.

The nature and rate of attachment of the micro-organisms depends upon several factors including the bacteria involved and their concentration and also the conditions under which attachment occurs, namely, pH, temperature and contact-time.

The skin serves as a barrier to micro-organisms that might otherwise contaminate the underlying muscle and therefore the deep muscles are normally free of bacteria. The few bacteria found in the deep muscle are of types that can only multiply slowly or not at all at low temperatures. The important microbiological changes take place on the surfaces of the carcasses.

It appears that some parts of the carcass are more favourable than others for bacterial growth, depending on the type of muscle and pH. Studies conducted over the last few years show that the sites most heavily contaminated are the neck skin and less frequently on the back and the area around the vent. Fewer organisms are found around the breast, legs and under the wings. ¹⁸







The rapid rate of processing in some processing plants favours the spread of micro-organisms.

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Dairy farmers in East Africa are getting to learn about a fresh new approach to agricultural extension: the volunteer farmer trainer model.

Volunteer farmers transforming East Africa's dairy sector

THE APPROACH, A farmer-to-farmer exchange of knowledge and skills, has been applied with great success within the East Africa Dairy Development (EADD) project, a multifaceted partnership funded by the Bill & Melinda Gates Foundation active in Kenya, Uganda and Rwanda. EADD aims to double the incomes of 179,000 dairy farmers through improved dairy production and marketing. Volunteer farmer trainers help diffuse the knowledge on dairy production they receive from extension workers throughout the community.

"The success of the volunteer farmer trainer approach is changing the way we think about agricultural extension. Here, the farmers themselves are the principal agents of change in their communities, with extension workers serving as facilitators," said Steven Franzel, head of the Global Research Project on Markets and Value Chains at the World Agroforestry Centre (ICRAF).

A new policy brief on the volunteer farmer trainer model as applied within the EADD project says that by June 2012, at least 2,676 volunteer farmer trainers - a third of them women - were helping dairy farmers in Kenya, Uganda and Rwanda raise their productivity and incomes.

The volunteer trainer approach is cost-effective and has been shown to produce real gains in productivity and income.

Most training is practical

Most of the training on better dairy production is practical and happens on demonstration plots maintained on volunteer farmer trainers' land. As trainees embrace improved dairy farming methods (eg, on better livestock feed crops, grasses, legumes, trees and shrubs, feed formulation and conservation methods), the volunteers pay them neighbourly visits to look at their progress and answer questions. Because volunteer farmer trainers are resident in the community, they understand the local culture and conditions and use the local language and expressions; this helps with communication and builds trust. On average, each volunteer farmer trainer reaches five villages outside of their own, travelling mostly on foot and covering up to seven kilometres a day.

"Seeing other farmers in the community improve their productivity as a result of my training gives me satisfaction. It makes me feel good," Agatha Buuri from Mweiga, Kieni West District in Kenya, told Evelyn Kiptot, a social scientist with ICRAF involved in the EADD project. Kiptot is also the lead author of the new policy brief.

Esther Wamucii Wambugu, another volunteer farmer trainer in Mweiga, said results were her source of inspiration, too.

Active dairy farmers in their own right, volunteer farmer trainers find their work brings them early access to knowledge and technology, which they can apply on their own farms. Their links with agricultural extension and project teams provide them an



The volunteer trainer approach has produced impressive results under the EADD project.

avenue to sell fodder seeds and seedlings they have grown to fellow farmers. They may also provide services such as baling and cutting of feed crops at a fee.


The volunteer farmer approach complements rather than substitutes regular extension run by government, NGOs or the private sector, Franzel emphasised. "Indeed, it is through these traditional avenues that volunteers receive technical support and training about innovations in the dairy sector. The volunteers also rely on qualified extension staff to address problems and questions they cannot handle on their own." Furthermore, he added, the model is unsuitable for complex or high-risk practices that need specialised skills, such as animal health.

Many challenges

The policy brief discusses some of the challenges volunteer farmer trainers face. In sparsely populated areas, for instance, the long distances volunteers have to travel from one homestead to another is a hindrance. But with the commitment of the project and volunteers themselves, few of these challenges have proved insurmountable.

The approach has produced impressive results under the EADD project. By 2012, farmers involved in EADD-affiliated projects were selling up to 304,000 litres a day through chilling plants, a 102 per cent increase from 2009. Researchers were also encouraged to find volunteer farmer trainers involved in another project actively supporting fellow farmers three years after that project had ended, pointing to the sustainability of the system.

"The volunteer trainer approach amplifies the reach of dairy-sector extension and is inclusive of men, women and the poor. It is cost-effective and has been shown to produce real gains in productivity and income," said Franzel.

"We developed the policy brief to support policy decisions that will recognise and mainstream the volunteer farmer trainer approach, so it can spread further and raise the incomes and improve the livelihoods of more farmers in rural areas." 

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Solidaridad's Sustainable West Africa Palm Oil Programme (SWAPP) launched its incubator and access to finance initiative in Accra last year, to provide support and access to risk capital to help develop the oil palm sector.

Will sustainable palm oil surge exclude small farmers?

AMONG GHANA'S SMALL-SCALE farmers, there's a saying that if your cocoa crop fails, you may as well go back and tend your oil palm.

That's because oil palm is more resistant to pests and diseases, and provides a regular harvest throughout the year - as long as it is looked after properly, which is rare, according to Rosemary Addico who runs a programme supporting farmers.

Her organisation, Solidarid, is working to get hundreds of Ghanaian small-scale farmers certified by the Roundtable on Sustainable Palm Oil (RSPO), which Addico hopes will boost their yields and profits. To achieve this, they must first be brought together in groups of between 25 and 100 growers.

"If they are not in groups, we can't train them and no one wants to invest in them. This way, they get better prices for their crops and higher incomes," Addico said.

Many individual farmers who grow the fruit that makes palm oil - which is used in fuel and consumer goods from cereals to cosmetics worldwide - produce only around half the industry average of oil per hectare.

That is because of inferior-quality seeds and poor management of their trees. Yet they still supply around 35 to 40 per cent of palm oil globally.

As a growing number of multinational companies scrutinise their supply chains and commit to using only palm oil produced in a way that does not clear forests for new plantations or exploit workers, small-scale growers who cannot provide the right guarantees

could lose out, experts fear.

That has sparked interest in helping them improve their methods and boost their harvests.

Growth potential

Biswaranjan Sen, Unilever's vice president for chemicals procurement, calculates that if the world's 4.5mn small growers doubled their harvests to four tonnes of oil per hectare, they alone could meet the projected increase in global demand for palm oil, from 60mn tonnes a year today to 78mn by 2020.

"The benefits would be that, technically speaking, you don't need fresh land and therefore the whole tussle about deforestation versus development goes away," he told Reuters.

Small-scale growers would earn more from the same amount of land, giving their families a better quality of life, he added.

"The challenge is that a lot of this has to do with getting the right agricultural practices to the smallholders - in many cases, helping them to replant," he noted.

Sen, who also co-chairs the RSPO board, said Unilever is

seeking to partner with governments in palm oil-producing nations, donor agencies, non-profit groups and plantation companies to develop a system that enables poor farmers to replace their palms with higher-yielding varieties.

"The problem is it takes three to four years for new trees to produce fruit and six to seven years before they reach full output," Sen said.

"There has to be a way of funding this, to sustain the smallholder over the next four to six years so they can see the benefits," he added.

Jan Maarten Dros, co-ordinator of Solidaridad's international palm oil programme, said upfront investment is needed because small-scale farmers lack the capital and assets to swap their old trees for new, and keep going financially until they mature.

"There are a lot of barriers to overcome," he said.

One problem for major palm-oil producers is that the mills where the palm fruit is processed into oil do not have contractual relationships with small growers.

That gives the companies running the mills little incentive to invest in helping farmers produce more.

Given the fragmented nature of the industry, the best solution may be to have companies come together with growers and authorities across a region and jointly agree to promote practices that will support small-scale farmers, said Solidaridad's Dros.

Finding a long-term answer to smallholders' problems involves demonstrating good growing and harvesting practices on plots in the field, and providing them with better seeds and tools. It also means training them in business skills so they can keep their books and plan for the next 25 years, Dros said.

Low prices, smarter game?

As the level of industry commitment to sustainable palm oil has soared, however, palm oil prices have sunk alongside crude oil.

This may benefit forests as big producers put plantation expansion plans on hold. But it raises the question of whether they will be prepared to invest in smallholders as their profits are squeezed.

Still, in an era when "the idea that they can rush off and clear more forest is anathema to their customers", companies will need to find a smarter way to move ahead, said Scott Poynton, founder and executive director of The Forest Trust.

Helping small growers harvest more from their land is no longer a philanthropic choice. As [companies] they strive to meet promises to supply deforestation-free palm oil, "there is a real business case for it", Poynton said. **E**



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IPM is now widely used as an effective and sustainable method of pest control and management in many regions of Africa. Domestic, regional and international IPM programmes are many. Tim Guest reports.

Using mother nature in pest control

ACCORDING TO THE UN's Food and Agriculture Organisation (FAO), "Integrated Pest Management (IPM) is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimise the use of pesticides."

In detail it defines IPM as meaning "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce, or minimise, risks to human health and the environment." IPM emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

An environment-friendly approach to dealing with pest problems is the underlying premise of IPPM.

Preferred approach to crop protection

The FAO itself promotes IPM as the "preferred approach to crop protection". It regards IPM as a foundation stone for both sustainable intensification of crop production and for reducing risks from the use of pesticides, and has its own umbrella IPM programme currently comprising three regional programmes in Asia, Near East and West Africa, as well as several stand-alone national projects, to which it facilitates collaboration among ongoing national IPM programmes and provides assistance in capacity building and policy reform.

In West Africa, the FAO's IPM initiative and scope is called the Integrated Production and Pest Management Programme (IPPM), which is a practical education-based approach to teaching farmers about the threats of overuse of pesticides and other farming challenges, in the field. It has been running for some 14 years, with many field schools currently teaching IPM in seven West African countries; Benin, Burkina Faso, Guinea, Mali,



A farmer trained in IPPM. Image: FAO/Olivier Asselin.

Mauritania, Niger and Senegal, and some 30 sub-Saharan nations, overall, employing a farmer field-school (FFS) approach.

An environment-friendly approach

An environment-friendly approach to dealing with pest problems is the underlying premise of IPPM; introducing beneficial predator insects, using natural bio-pesticides, or adopting cropping practices that ensure that plants are healthy and resistant when pests attack, are just some of the methods employed. So far, the programme has trained more than 180,000 farmers in West Africa, as well as over 2,000 trainers from a variety of organisations including NGOs, giving them the ability to adopt an approach that is relatively simple and can rely, for the most part, on locally available materials.

With new-found understanding and recognition of problems at the earliest stage, farmers can then decide on a best response and apply it without delay.

One of the major points to the IPPM programme is raising the awareness of farmers and associated stakeholders to the best and 'worst' agricultural practices, so that through such things as having a new understanding as to the risks and/or benefits of any particular pesticide practices and what low-toxicity alternatives are available, the best choices can be made.

In several local and regional institutions,

universities and government departments, local laboratories have developed a capacity for improving the environmental monitoring of toxic chemicals in food and water supplies as a result of pesticide use, highlighting the dangers and impressing on the need for non-chemical alternatives.

Indeed, FFS programmes were initially developed to reduce toxic pesticide use through IPM, which is why training focuses on conserving and enhancing beneficial insect populations.

And while such agri-systems as irrigated rice typically have few insect-related problems, thereby negating the need for insecticide use in West Africa, instances of farmers being unaware of IPM basics and, as a result, laying themselves open to commercial pressures to use pesticides, have been recorded.

Conversely, cotton and vegetable crops have typically relied on high volumes of insecticides and different highly toxic chemicals in their production, which makes FFS training for these farmers much more acutely important to help them find less toxic approaches for the control of insect pests.

Today, however, soil fertility management is also a key part of West Africa's FFS ecosystem and an emphasis has been placed on increasing the use of organic agricultural practices and on establishing improved nursery seed beds and transplanting techniques for rice and other systems. A survey, highlighted by the FAO,

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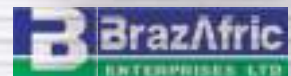


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of 150 post-FFS vegetable farmers in Burkina Faso, had the respondents rank what they saw as the top three benefits resulting from the FFS programme in which they were involved. First, was the development of proper seed beds and nurseries; second, were their newly-learned skills for building and using compost; and third came the making of local, natural pesticides from plant extracts.

Push-pull in IPM

As African Farming reported last year, push-pull strategies for IPM have been pioneered and are actively being researched by the Rothampsted Research institute in the UK in co-operation with establishments like the International Centre for Insect Ecology and Physiology in Nairobi. Together, they have progressed and identified some of the most complex biological, biochemical and behavioural interactions and relationships that can now be used to effectively help increase food production and yields, while at the same time reducing the use of man-made pesticides harmful to both the environment (non-target plants and animals) and humans.

One of the team’s papers summed up push-pull perfectly: “Push-pull strategies involve the behavioural manipulation of insect pests and their natural enemies via the integration of stimuli that act to make the protected resource unattractive or unsuitable to the pests (push) while luring them toward an attractive source (pull) from where the pests are subsequently removed. The push and pull components are generally non-toxic.

In a rare example, we see work in Africa showing the way for Northern, high-input agriculture.



IPPM focal point checking on cabbage crop. Image: FAO/Olivier Asselin.

Therefore, the strategies are usually integrated with methods for population reduction, preferably biological control. The strategy is a useful tool for integrated pest management programmes reducing pesticide input.”

A paper published last year and co-authored by Khan, Midega, Pittchar, Murage, Birkett, Bruce and Rothampsted’s John Pickett, *Achieving food security for one million sub-Saharan African poor through push-pull innovation by 2020*, discusses push-pull through the intercropping of cereal crops with a forage legume, desmodium, and planting Napier grass as a border crop. Desmodium repels stemborer moths (push), and attracts their natural enemies, while Napier grass attracts them (pull). Desmodium also suppresses striga weed, thereby negating the need for pesticide use - Mother Nature at her cleverest.

Developed world footnote - learning from Africa

The developed world has an important lesson to learn from Africa’s advances in IPM. If one

considers the impact of insecticides in developed regions on vital pollinators, such as the honey bee versus Neonicotinoids, it surely makes sense to explore alternative, IPM-based methods of pest control - and Africa is setting an example.

Encapsulating what latest push-pull advances mean, not only for IPM in Africa but for a future IPM approach in the developed world, Rothampsted’s Professor John A Pickett, CBE, DSc, FRS, told African Farming that: “Besides the immense and rapidly growing benefits of this work in creating sustainable food production amongst some of the poorest sub-Saharan African small holder farmers, the work demonstrates the generic value of deploying semiochemicals and other natural products released by plants to solve constraints on agricultural production sustainably. Thereby, in a rare example, we see work in Africa showing the way for Northern, high-input agriculture; but whereas the tools in Africa are companion plants, in the North these will most probably need to be GM.” **E**

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Dr Terry Mabbett looks at prerequisites for successful cereal grain storage

What's in store for cereal grain?

THAT WE RELY on cereal grain for staple food and cannot survive without it is a far-reaching but not an exaggerated statement. Wheat, rice and maize account for the bulk of human food, and barley is a major raw material in the production of beer and other beverages. Other cereals such as sorghum and millet are regionally important as food in dry areas such as the African Sahel. Elsewhere in regions like North America the bulk of sorghum goes into animal feed.

The pre-eminent position of cereal grain as an internationally marketed commodity is essentially down to the relative ease in handling and shipment and a capacity for long duration storage, compared with other food staples such as Irish potato, sweet potato, yam and cassava.

Prerequisites for successful cereal grain storage include harvesting at suitable grain moisture levels under congenial weather conditions, grain cleaning and grain drying if required. This complete programme of post-harvest preparation will achieve



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

an optimum moisture level for grain going into store. Also essential is provision of the right conditions of temperature and relative humidity throughout the holding period and which will allow grain to be stored without significant deterioration for up to five years.



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

Attention is always focussed on food grains (cereals used directly for human food) but increasing amounts of grain, home-grown and imported, are now used to feed livestock. The hazards and risks threatening food grain in store – insects, fungal moulds, spores and mycotoxins, rodents and birds and human pathogenic bacteria – are equally important for grain earmarked for animal feed.

The physical and chemical deterioration of grain in store and consequent loss of palatability and nutritive value affects livestock in much the same way as humans. And microbes like Salmonella and mycotoxins, including aflatoxins, can be transmitted from livestock to human consumers of meat, dairy products and eggs in the food chain.

Attention is always focussed on food grains but increasing amounts of grain are now used to feed livestock.

Care and attention in transit and store

Indeed feed grain often requires more care and attention in transit and store than food grain. There are increasingly large volumes of maize and wheat imported into Africa from temperate producing areas. Top quality grain of the right type will always be sold by preference on the international food grain market to gain top price premiums. However, grain of inherently poorer quality or nominally high quality grain harvested under less than ideal conditions (high grain moisture and during prolonged wet weather conditions) may have to be sold as feed grain at a consequentially lower price.

This, coupled with the inherent environmental problems associated with shipping grain from temperate countries into tropical Africa, with changing and contrasting temperature and humidity, means that the highest pressures placed on grain managers to maintain these commodities in sound condition invariably falls on feed grain.

Increased production of animal protein is a priority for Africa, but many countries are unable to produce enough cereal as food

grain, let alone set aside any quantity for animal feed. So when fluidity in foreign exchange allows, cereals for feed grain are imported from big surplus-producing countries like the United States, Canada, France, Argentina and Australia. Maize accounts for over 50 per cent of total world cereal usage in feed and wheat 15 per cent. By far the largest proportion of world barley and sorghum production finds its way into livestock feed.

What's in store for cereal grain?

Threats to cereal grain in store and during shipment are broadly divided into physical deterioration and chemical change causing downgrades in palatability and nutritive value. And a wide range of biological threats, including rodents, birds, insects and pathogenic microbes that may directly or indirectly cause disease and poisoning in both livestock and humans.

Auto-oxidation: Oxidation is the most destructive chemical process in cereal grain. The wide range of uncontrolled oxidation reactions occurring cereal grain is collectively called 'auto-oxidation'. These chemical reactions may change, re-arrange and destroy nutritionally important molecules leading to rancidity and oxidative stress. This in turn impacts on both food and feed quality. Palatability, feed acceptance, intake and therefore animal health and livestock performance are all compromised. Auto-oxidation of the lipid (fat and oil) components in feed impacts greatly on feed quality and in turn adversely affects nutritive value, colour, taste, aroma and texture.

Moulds and mycotoxins: There is no practical way of ensuring cereal grains completely avoid and escape the activities of fungi and moulds. The spores, via which they disseminate, infect cereal plants in the field and harvested grain in store and are literally everywhere. Some of these fungi, and especially the *Fusarium* species causing panicle and ear blights and rots of growing maize, wheat and barley plants in the field, manufacture extremely toxic chemicals called mycotoxins. The same goes for certain species of *Penicillium* and *Aspergillus* storage fungi and surface moulds. They invade, colonise and grow on the grain in store, or finished feed in the mill, especially if they are allowed to survive on grain debris in the store or feed mix remaining in bins and machinery.

Insects and mites: A large number of different insects attack stored grain, the majority of which are Coleoptera – beetles and weevils – or larvae of Lepidoptera (moths). Both moulds and insects respond positively as the temperature rises, as long as it does not exceed the threshold at which living cells are killed and enzyme proteins are denatured (lose their functional shape). Insects generally operate more 'comfortably' at higher temperatures than do surface moulds and populations will increase rapidly in areas of

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the grain bulk where mould has taken hold. These are the so-called 'hot spots' of the grain heap or bulk, registering higher temperatures and moist conditions generated by the preceding fungal activity of the surface mould. Some species of grain storage insect may be brought into store on insufficiently cleaned grain, but most hold over in stores on grain debris from the previous load.

Pathogenic bacteria: Food and feed grain and finished feed is well known as a potential source of pathogenic bacteria including Salmonella, Campylobacter, Clostridia, E. coli and Yersinia. For most pathogens the low moisture availability in well-dried grain and formulated feed is a deterrent to active infection, but some bacteria like Salmonella and Clostridia are able to survive in very dry conditions. And they therefore pose considerable threat of infection to livestock, the grain store and feed mill workers and eventually consumers of meat and eggs that have may become infected.

In fact the Salmonella bacterium is often used as an indicator microbe for any potential pathogenic infection in food and feed grain and finished feed, because it is able to survive ultra-dry conditions. If Salmonella is not present then it is reasonable to assume the consignment of food and feed grain or finished feed is free from infection in general. Grain becomes at real risk of carrying active populations of pathogenic bacteria when rodents and birds are able to enter and live in the store and contaminate the grain by contact and via urine, faeces, saliva and other body fluids.

Interactions: Grain spoilage is physical and chemical in nature although the direct cause is biological and the consequence of the feeding activity and growth of microbes (mould fungi and bacteria) now able to utilise the grain as a substrate because of its high moisture content. At 25°C and a relative humidity of 70 per cent the equilibrium moisture contents for most types of grain fall into the 130-140 g/kg range (13-14 per cent). Beyond these levels grain commodities begin to deteriorate due primarily to mould activity. And if relative humidity is raised by 20 per cent to 90 per cent the equilibrium moisture level grain shoots up to around 180-200 g/kg, and mould growth 'runs riot' (see Table 1).


Table 1. Equilibrium moisture levels (g/kg) for mainstream cereal grains

Relative Humidity (%)				
Cereal grain	Temperature (C)	50	70	90
Barley	25	108*	135*	195*
Maize	25	112	140	196
Sorghum	25	110	138	188
Wheat	25	109	136	197

*Equilibrium moisture level of grain as g/kg and equivalent to per cent moisture level. Grain moistures that are in equilibrium with 70 per cent RH are shown in bold type. These are levels beyond which most stored grain begins to show microbial spoilage and damage.

Preservation of feed grain and feed

Preservation of cereal grain is a long-term continual process starting in the field and not ending until high quality grain has been accepted and used. Failure to provide congenial growing conditions and crop care leads to sub-standard yields of poor quality grain.

- Treat seed grains with fungicide seed dressing to protect against seed-borne and soil-borne fungal pathogens that invade the growing plants and eventually infect and contaminate the panicles and kernels.
- Carry out a well-timed and balanced irrigation schedule, fertiliser programme and schedule of fungicide spray application for leaf and panicle disease control.
- Only harvest when grain moisture level allows and never harvest during wet conditions
- Clean all harvested grain to remove the chaff and all debris including stalks and leaves because specific insects and fungal pathogens can be carried into store on such extraneous cereal plant material
- Harvested crops should not be placed in store unless the grain moisture level is below the established and accepted maximum for that crop, and above which there is risk and danger of surface mould activity (see Table 1)
- If harvested grain has an excessive moisture level then reduce accordingly by drying to the appropriate and acceptable level before placing in store.
- Maintain temperature and humidity of the store at levels that will not compromise grain moisture level
- If stored feed grain is especially susceptible to surface moulds and mycotoxin generation, because it was insufficiently dried or storage conditions are sub optimal, then treat the grain with a mould inhibitor like propionic acid or one of its salts (eg, calcium propionate). This will not only inhibit surface mould activity but should give significant control of pathogenic bacteria like Salmonella which may be present
- Maintain a sound exclusion and management programme for rodents and birds. Mice (*Mus sp*) are well known carriers of Salmonella and various species of rat are established carriers of Yersinia. Birds carry and transmit E.coli.
- Carry out a constant integrated pest management programme for storage insect pests like Sitophilus weevils and Tribolium beetles using insect traps for pest monitoring
- Always carry out a thorough grain store cleaning programme and finish up with a terminal disinfection by fogging between each consignment of grain coming into and out of the same store. 



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Four-wheel drive version of a new 4700 Global Series tractor working on the AGCO demonstration farm in Zambia.

Tractor power

Mike Williams reports on some of the latest developments in tractors.

THE POPULAR POWER output for new tractors sold in Africa is from 60 to about 130hp, a power range that covers many of the specialist fruit and vineyard models as well as the general purpose agricultural tractors.

This is also the power sector covered by the Global Series tractor range announced recently by Massey Ferguson. The new tractors are based on a clean-sheet design aimed at meeting the growing demand for a simple workhorse tractor for markets throughout the world. Production will be at factories in China, Brazil and Turkey, which will be operated by Massey Ferguson and will meet the same engineering standards as the existing MF factories in Europe and the United States.

AGCO, the Massey Ferguson parent company, is investing US\$350mn in the Global Series tractor project, and the complete range will be phased in over a five-year period starting last year when the 82hp MF4708 tractor was announced. The 4708 tractor is designed mainly for Africa and production of additional Global Series models started earlier this year at a new Massey Ferguson factory in China.

The complete range will include semi-platform and full cab versions with mechanical gearbox type transmissions. Two and four-wheel drive versions will be available and the power units will be from the existing AGCO range with mechanically operated controls.

A range designed for vineyards

Another of the new arrivals in the under-100hp sector last year was the T3F series from New Holland, a range of tractors designed for vineyards, fruit and intensive

The 4708 tractor [from Massey Ferguson] is designed mainly for Africa.

vegetable and ornamental crop production. There are four models, all powered by three-cylinder FPT engines covering the 50 to 72hp sector. The tractors are compact, with the top models weighing only 2.2 tonnes with an overall width of 1.35m, and the turning radius is only 3.4m to offer good manoeuvrability. The maximum lift capacity is 2,277kg and the transmission options are a 12F/12R gearbox or a 20F/20R version including creeper gears. .

New Holland has one of the most comprehensive tractor ranges with the top model powered by a 669hp engine, but the general purpose models at around 100hp

are in the T4 series tractors powered by a 3.4 litre four-cylinder turbo engine made by FPT. There are five models with power outputs between 75 and 114hp, offered with a wide choice of 30 and 40kph transmission options and with 3,884kg lift capacity on the rear linkage. A front linkage plus p-t-o is available at extra cost with 1,670kg capacity.

In the popular power sector John Deere offers the 6 series tractors with power outputs from 100 to 170hp and a big choice of specification levels and equipment options. At the top of the 6 series are the five 6M Utility models powered by either four or six-cylinder engines from 105 to 170hp and available with four transmission choices and 30 or 40kph road speeds. The options list includes John Deere's front axle suspension system to give a smoother ride and improved stability over rough ground, and the top three models



A JCB Fastrac 3000 series tractor pulling a train of sugar cane trailers in Malawi.

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from 140hp upwards are also available in a special rowcrop version.

Also available in John Deere's 6 series are the 100 and 110hp 6B models providing a simple, no-frills specification with platform and cab options. There are three 6D series models with 4.5 litre turbocharged engines which are also intercooled on the top two models. Power outputs are 100, 110 and 125hp, the gearbox has nine speeds forwards and in reverse and a dual-speed p-to is standard equipment.

Africa an important market

African countries are an important market for ArmaTrac tractors made by the Erkunt group in Turkey. ArmaTrac specialises in the small and medium horsepower sector of the market and uses British-made Perkins engines plus transmissions from the ZF company in Germany and Carraro of Italy. Power outputs are in the 50 to 110hp range and the specifications include two and four-wheel drive versions, cab and platform options and both 12 and 16-speed transmissions are available.

The popular two-wheel drive ArmaTrac 702 and the four-wheel drive 704 version are powered by a 73hp engine linked to a 12F/12R gearbox that provides a 37.7kph top speed and the specification includes a 2800kg maximum lift capacity on the rear linkage.

The Landini tractor range includes high horsepower models, but the smaller Rex and 4 series tractors are a popular choice in some African countries because they are suitable for orchard and vineyard work. The current Rex models, which feature a number of detail improvements, cover the 68 to 110hp sector using three and four-cylinder Perkins engines. The standard transmission is a mechanical gearbox with 15 speeds forwards and in reverse, and the lift capacity on the linkage is 2600kg, increasing to



The new T3F tractor range from New Holland is expected to be a popular choice for fruit farms and vineyards in Africa.

3250kg for Rex GT models.

Landini also offers the Landforce series tractors designed for non-European markets. They have power outputs from 112 to 158hp and are available in platform and cab versions with transmission choices starting with a 12F/12R gearbox and including a 54F/18R version on some of the top models. Maximum capacity on the rear linkage ranges from 4500 to 8400kg.

A speciality of Argo Tractors, the company that makes the Landini, McCormick and Valpadana ranges, is tractors with articulated or pivot steering plus four-wheel drive through equal diameter front and rear wheels. Most models also feature a reversible steering position allowing the operator to control the tractor while driving in reverse. The pivot steering system allows good manoeuvrability, which makes this type of

A speciality of Argo Tractors is tractors with articulated or pivot steering plus four-wheel drive through equal diameter front and rear wheels.

tractor suitable for working in vineyards and in confined spaces where vegetable and ornamental crops are grown. The Landini tractors have engine power from 25 to 95hp, cab and platform versions are available and top models have a 40kph top speed

Farmall revived

Case IH revived the Farmall name – one of the tractor industry's most prestigious brand names – when they introduced a new range of smaller utility models, and the current Farmall tractors cover power outputs from 45 to 140hp. The base models are the Farmall A series powered by four-cylinder Shibaura or FPT engines producing 45 to 75hp, and the two smaller models have 8F/8R gearboxes, with 8F/2R on the 65 and 75hp models. Two and four-wheel drive versions are available and lift capacities on the rear linkage are from 830 to 1340kg depending on the model.

The other Farmall models are all available with either a roll-over structure or a cab, and they include the 100A series, a four-model range with power outputs from 110 to 140hp. The five Farmall C series models have a higher specification including an optional 24-speed gearbox transmission.

A 35hp Landini Rex tractor working on a South African fruit farm.



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There are six Talos series models with power outputs below 100hp.

Plenty of choice from Claas

Claas offers plenty of choice in the popular power range, including six models in the Talos range. All the Talos tractors are powered by four-cylinder engines, including two 100 series models with 47 and 55hp rated power output, and the Talos 200 series offers outputs from 71 to 95hp. The standard transmissions have 16 speeds forwards and reverse and a 30 kph top speed for the 100 series tractors, increasing to 20F/20R gearboxes and a 40 kph maximum for the 200 series. The 200 series specification also has a 60 l/min hydraulic flow and 3100kg rear linkage lift capacity compared with 36 l/min and 2200kg lift for the 100 series. Cab and platform options are available and the specification includes a three-speed p-t-o.

The four Axos 300 series models from Claas offer outputs from 74 to 100hp from four-cylinder Perkins engines, which are all turbocharged while the top two models also have intercooling. There is a choice of transmission options with slow-speed creeper gears available as an option. Cabs are standard, but there is a choice of a standard version plus a special low roof version for working where height is restricted. Four-wheel drive is standard with a 55 deg steering angle.

SAME Deutz-Fahr is one of the world's leading manufacturers of tractors and farm machinery, and African countries are an important market with more than 30 distributors selling the SAME and Deutz-Fahr brands. The full range of tractors includes power outputs from 50 to 440hp, but the biggest selling models in the African continent are the Explorer Special series under the SAME brand name and Deutz-Fahr's Agrofarm C tractors. Both are designed as general purpose tractors with a specification that includes two and four-wheel drive versions and 1000 series four-cylinder SDF engines with outputs from 75 to 100hp.

The SAME and Deutz-Fahr ranges also include special tractors which are a popular choice for orchard, vineyard and plantation work in African countries. The SAME models are the Frutteto3 Natural and the Deutz-Fahr special models in the Agropius F Keyline series. A full synchromesh transmission is standard in all models, and power outputs are from 50 to 75hp using the SDF 1000 series engines.

Recent successes from India

Although India is a relatively recent arrival in the tractor industry, production has expanded rapidly and the Escorts Group is

one of the country's leading manufacturers, exporting to 62 different countries, 26 of them in Africa. Recent successes include the Indian tractor industry's biggest order, valued at US\$40mn to supply tractors to Tanzania, and 800 tractors have been delivered to Nigeria.

Escorts builds 16 tractor models under four brand names. The Escorts Economy range covers the 25 to 35hp sector, the Powertrac tractors are described as the Value range and have outputs from 34 to 55hp, the Farmtrac models from 35 to 110hp are the Premium range and Ferrari By Farmtrac is a 26hp special tractor for orchards and vineyards. The recently announced Farmtrac Heritage tractor, designed specifically to meet African farming requirements, is said to be the most fuel-efficient tractor in its class and is also tough enough to stand up to haulage work on rural roads.

The JCB Fastrac tractors are not represented in the big-selling 60 to 130hp category, but they are designed as high output four-wheel drive tractors that can handle a full range of field work but are also designed for high speed haulage. The 3000 series Fastracs, which cover the biggest selling models in Africa, have an 80kph top speed which is matched by the stopping power of a truck type ABS braking system on both the front and rear wheels, and there is also a front and rear suspension to provide increased stability and driver comfort when the tractor is used for transport work.

Most of the JCB Fastracs on African farms are used for haulage, and particularly for moving bulky crop material such as sugar cane for processing, and at other times they can earn their keep doing general field work. Fastrac 3000 series tractors have 7.4 litre AGCO engines with outputs from 195hp upwards, and the power is delivered through a 24-speed semi-powershift transmission. **E**

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Agritech Expo offered a fantastic opportunity for small-scale and commercial farmers to network with each other and conduct business with some of the world's leading suppliers to the agricultural industry. Nawa Mutumweno reports.

2015 Agritech expo a resounding success

ZAMBIA NATIONAL FARMERS' Union (ZNFU)'s vision for agriculture dovetails with that of the nation which is "to be the breadbasket of the region." When the region thinks of food, it should think of Zambia.

Being surrounded by eight countries, a potential market for agricultural produce, bodes well for Zambia which prides itself as the only country in the region that is self-sufficient in wheat production. It is, therefore, important to strengthen such comparative advantage and make the country relevant in the region in as far as agriculture is concerned.

The Agritech Expo, now in its second year, was held at GART Centre in Chisamba, central Zambia, from 16-18 April 2015.

Like last year, the event attracted all major agricultural stakeholders from small-scale, emerging, large-scale farmers to corporate farmers and agribusiness firms, industry stakeholders, VIPs and media. It built on last year's successes, making it an event that farmers and other agribusiness players will always look forward to. More than 11,700 visitors, 100 exhibitors, both local and international and 150 members of the press 'descended' on the premises.

"Agritech has blossomed into Zambia's leading outdoor agricultural event and has proven itself not only as a networking platform, but a unique and targeted business one, where actual sales happen. Never before have we had sales of over a million US dollars at an agricultural show. This only goes to show the huge business potential associated with the Agritech Expo," ZNFU president, Dr Evelyn Nguleka enthused.

The event boasts of an exhibition space of over 33,000 sq m in order to cater for an expanded irrigation zone, an increased number of crop trials/demos, a new sprayer arena of 1,400 sq m, livestock sale arena, equipment display arena, VIP business arena, and the new Zambian agro SME village.

One significant feature of this year's event was the extension from two to three days, highlighting the growing interest in the expo and the opportunities that abound thereof.

In her reflections of the event, Dr Nguleka



The event attracted all major agricultural stakeholders from small-scale, emerging, large-scale farmers to corporate farmers and agribusiness firms, industry stakeholders, VIPs and media.

said it was heartening to host high-profile personalities at the expo such as President Lungu, Vice-President Inonge Wina, who officially opened the event, the Zambian and German agriculture ministers and many other dignitaries and experts in the sector.

"The President's visit was a very significant boost, as it gave the much-needed political buy-in, especially going forward. It is gratifying to note that the Expo had support from farmers, agribusiness firms and policy makers," she said.

Agritech has blossomed into Zambia's leading outdoor agricultural event.

According to a statement issued after the event, Dr Nguleka said the union will continue supporting programmes in the agricultural sector that aim at enhancing food security and better yields.

"As the only business-to-business platform in the sector, Agritech Expo once again drew thousands of small-scale farmers as well as owners of commercial enterprises, to engage and conduct business with some of the world's leading

suppliers to the agricultural industry. From crop trials and machinery demonstrations, the event serviced the needs of the entire agriculture-value chain in Zambia and its neighbours," she elaborated.

Access to latest technology information

The expo offered a grand opportunity for farmers to access the latest technology information to improve their production capacity and to become more competitive. Local agriculture experts were also on hand to advise farmers on financial issues specific to the agricultural sector.

The expo also offered a range of free, practical workshops to assist farmers in the use of the latest technologies to improve their productive capacity and to become more competitive. Panel discussions and question and answer sessions focused on the following industry topics:

- Farm mechanisation development for small, emergent and commercial farmers
- Irrigation development for small, medium and commercial farmers
- Financing the agri-industry
- Commodity market development
- Crop management and legume production
- Livestock

“The most discussed topic was access to the right technologies and mechanisation, as well as access to finance. It tells us that these are the most immediate needs among farmers in Zambia,” Dr Nguleka explained.

One of the exhibitors at the event was AFGRI, which offers a mechanisation solution to farmers. The firm has since partnered with John Deere Financial, Zanaco Bank and ZNFU to put a co-operation agreement in place, whereby smallholder farmers will be able to obtain finance at very competitive interest rates, thus enhancing their farming operations and financial well-being.

Bread basket of the region?

“With mechanisation and proper farming techniques, the yields of cash crops such as soya beans and sunflower can be vastly improved. Zambia has the necessary resources to become the bread basket of the region,” AFGRI executive country manager, Wayne Wild said.

BASF, a silver sponsor of the Agritech, is the world’s leading chemical company with customers and production sites in more than 170 countries worldwide. In Zambia, the company implemented the ‘Lima Chuma’ (‘Cultivating Prosperity’) project to provide smallholder farmers with the skills, technical know-how, and input which is needed to enable the farmer to achieve significantly higher yields. During the first phase of the programme, over 25,000 farmers were trained in Southern Province of Zambia with a target to reach more than 100,000 smallholders in the next five years.

“Today, the average maize yield for the smallholders here in Zambia is a little below two tonnes/ha. We are convinced that with appropriate skills, technical know-how, and input, yields of up to five tonnes/ha can easily be achieved,” said Eike Hupe, area manager, Southern Africa, BASF.

Cropserve Zambia Ltd managing director, Makarand Sorte, identified the major challenge affecting Zambian agriculture as lack of diversity in the sector with the majority of farming and Government interventions concentrated on one crop – maize. He argued that it is high time special attention is paid to neglected crops in order to enhance the viability of the sector.

Zanaco Bank challenged stakeholders to partner and help solve some of the main challenges besetting the sector which encompass “poor agronomic practices, leading to very low yields; no market linkages for smallholder farmers and lack of Government intervention in marketing; poor infrastructure in the rural areas – roads, electricity; lack of security (titled land) to enable farmers borrow; and lack of financing



From crop trials and machinery demonstrations, the event serviced the needs of the entire agriculture-value chain in Zambia and its neighbours..

for Capex and working capital purposes.”

Some of the financial institutions that are supporting agriculture in Zambia that exhibited at the expo are: FNB Zambia, which has a value chain financing that supports the entire farming business system, offering financing at both the input and output level; Stanbic Bank, who are committed to the development of agriculture and to adding value to the farming business through a wide range of specialised products and services, including the support of the bank’s agricultural advisors and business managers; Barclays Bank, which accords the agricultural sector access to financing and dedicated team support to help grow agribusinesses to the next levels; and Zanaco Bank, which has a very elaborate agribusiness unit that is offering solutions to grow the sector, especially at smallholder level.

The banks understand that the agricultural industry is important to Zambia’s economic sustainability and provides farmers with access to the latest information, trends and studies about the industry and offers innovative solutions that can contribute to effective and efficient farming decision-making.

The international companies present at the expo acknowledged that Zambia is a key market in sub-Saharan Africa due to the active agriculture industry in the country which is two-fold: a well-developed commercial agricultural sector that relies on high technology equipment to improve their business efficiency and an emerging agricultural sector that is developing fast and is a key market for the latest technology and equipment to improve yields and profitability.

Investment needed

Zambia’s agricultural sector is beckoning for investment, with the country’s vast arable land; abundant water supplies with about 40 per cent of the regional (SADC) resource being in Zambia; favourable climatic conditions; availability of workforce; central location in the region which opens doors to export opportunities;

and a conducive investment environment anchored on immense government support.

As Antois van der Westhuizen, head of retail at John Deere Financial rightfully observed: “The potential exists to make Zambia a food basket for the region. There are signs of excellence with the latest technology being employed and mechanisation being used as a method of increasing efficiency and yield. Financing solutions should be flexible and made to fit the needs of the farmers while still maintaining proper risk management principals. In order to accomplish this we need to break away from traditional lending products and be more innovative.”

Indeed AgritechExpo is Zambia’s only agricultural trade expo that showcases world-class farming technologies, agribusiness innovations and a business-to-business network and transactions platform designed to inspire the future of the country’s agriculture. Its key partners include the Golden Valley Agricultural Research Trust (GART), an autonomous and self-sustaining public-private partnership; Musika, a Zambian non-profit company that works to stimulate private sector investment in the smallholder market; and United States Agency for International Development (USAID)’s Southern Africa Trade Hub, a five-year US government-funded programme designed to increase international competitiveness, intra-regional trade and food security in southern Africa.

It is organised by ZNFU, the apex farmers association in Zambia, promoting the interest of more than 600,000 farmers through Spintelligent, a South-African-based specialist provider of face-to-face business platforms, integrated digital media and industry publications for the emerging markets of sub-Saharan Africa.

According to Dr Nguleka, “the next event is planned to be even better. A number of new surprises are lined up but they will be communicated as the event nears.” The dates for the next Agritech Expo are 14-16 April 2016 at the same venue.” **E**

Devised for industrialised farms, precision agriculture now has the potential to increase the yields of smallholder farmers.

From agribusiness to subsistence: high-tech tools available for all

PRECISION AGRICULTURE IS closely associated with technology and its application to large-scale farms in developed countries. GPS-equipped sensors on tractors, for example, enable farmers to measure and respond to soil variability across vast tracts of land, and dispense the right amounts of fertiliser and water exactly where it's needed.

For many years, this was widely seen as irrelevant to small-scale farmers in developing countries. How much variability can there be on a two hectare plot? And how could poor farmers afford the technology? But there's a growing body of research now to support the idea that small-scale farmers can benefit from precision agriculture. One of the reasons for this is greater awareness of how much variability can exist in even the tiniest plot of land.

Raj Khosla, professor of precision agriculture at Colorado State University, confirmed this in a 2012 study of how the nitrogen in the soil of seven farms in China ranging from 1.5 to seven hectares in size correlated with wheat yields.

"We saw the same scale of variability that I would see here in Colorado," he said. "There was variability of 1.5 tonnes of wheat per hectare to five tonnes, with strong spatial correlation. Where yields were higher, plants were removing more nutrients. We've seen variability on less than a third of a hectare of land."

About 500mn small-scale farms provide more than 80 per cent of the food consumed in large parts of the developing world, and these farmers and their families also make up most of the world's undernourished people. If precision agriculture is relevant to small farms, the next question is how to transfer it to that context.

The technology which has driven precision agriculture in the global north is becoming more widely accessible. For example, a new handheld device known as the GreenSeeker, developed by Trimble, can be used to measure the health and nitrogen status of plants, enabling farmers to make more precise assessments of fertiliser requirements.

"The GreenSeeker is based on the relationship between the light reflectance in the red and near infrared spectrum of a plant, and the nitrogen status of that plant," said Bruno Gérard, director of the Global Conservation Agriculture Program at the International Maize and Wheat Improvement Center (CIMMYT).

"It is now used by extension services in the Yaqui valley in Mexico to recommend nitrogen application on wheat. In other parts of the world such as Ethiopia and South Asia, CIMMYT scientists are also evaluating the use of GreenSeeker. Better use of nitrogen fertiliser not only increases profitability but also reduces groundwater pollution."

The GreenSeeker costs about US\$500, making it relatively affordable though still expensive for many small-scale farmers. Khosla suggested enterprising farmers may find ways round this once they see the potential benefits.

Small-scale farmers can benefit from precision agriculture.



Sorghum and millets can benefit from a precision-farming technique called microdosing, where small, affordable quantities of fertilizer are applied with the seed at planting time. Image: ICRISAT.

Precision levelling

In Uttar Pradesh, India, Tata Chemicals carried out a trial with a farmer on his two-acre plot to see how precision levelling improved his spring wheat yields under flood irrigation. Traditionally, farmers in that region use a wooden plank hooked to an ox to level fields, an imperfect technique that leaves water unevenly distributed.

"A small precision leveller tractor with GPS was used to level half of the land," said Khosla. "The traditionally levelled field yielded 800kg, while the precision levelled field produced 2.25 tonnes, almost 300 per cent more. That farmer then applied for a microfinance loan to buy his own precision leveller, and is charging a fee to neighbouring farms to level them."

Micro dosing can increase yields

At the same time, precision agriculture does not necessarily depend on technology. For the past decade, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has been promoting micro-dosing of fertiliser to resource-poor farmers in sub-Saharan Africa. This means using only eight to ten kg of nitrogen per hectare,

approximately a fifth of the recommended application rates, but applying it precisely to the roots three to four weeks after planting.

There is no technology involved. In Niger, farmers commonly use Coca-Cola bottle caps to measure the dose. But the precision means farmers get good results, even using much less than the recommended amount.

"The basis for the micro-dosing rate was that resource-poor farmers are likely to adopt lower rates because they are more affordable," said Kizito Mazvimavi, head of ICRISAT's impact assessment office. "Although higher rates are known to give higher yields, the marginal returns to investment when using lower fertiliser rates are much better."

In Zimbabwe, ICRISAT has recorded yield increases of 30-50 per cent among farmers adopting the technique. With evidence that precision agriculture techniques can work, the challenge is creating appropriate enabling environments to encourage take-up.

In a low-tech setting this may depend on knowledge transfer, which ICRISAT has done by training extension workers and NGOs, and by providing factsheets to farmers. ICRISAT has also persuaded the Zimbabwe Fertiliser Company to supply products in smaller 10kg formats. Other support mechanisms, such as microfinance services, might also encourage more farmers to invest in low or medium-cost technologies.

The basis for the micro-dosing rate was that resource-poor farmers are likely to adopt lower rates because they are more affordable.



Trimble GreenSeeker RT200 Nitrogen Application System.

It may seem a big leap from precision agriculture's roots in large-scale, highly-resourced farms to the opposite end of the spectrum, but researchers and development actors increasingly recognise that the ideas are highly transferable.

"We've already proven that it is scale-independent," said Khosla. "So it's about replicating the same principles: using the right inputs, the right timing, in the right amount, and employing techniques and human labour together to make that happen in small-scale environments." ¹



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Technology for farming used to imply harvesting and production machinery; telecommunications was barely mentioned. Today, however, ways are being found to unite the strengths of cellular but satellite and fixed communications to the benefit of farming across Africa. Vaughan O'Grady reports.

Herding in space!

IN 1995 MOST people in Africa did not own a phone or possibly even have access to one. Twenty years later penetration of mobile communications across the entire continent is estimated at well over 60 per cent (individual countries can be much higher) and rising. Meanwhile broadband Internet has reached a number of countries thanks to undersea cables. And satellite communication, possibly thanks to all this competition, is more affordable and reliable than ever before.

Not only is access to electronic communications becoming wider and cheaper but it can clearly boost farming efficiency. The most obvious example is the basic phone call. A farmer can find out in advance if a customer needs a crop or (slaughtered or live) animal. There's no need to risk oversupply and waste or to spend money on an unnecessary journey.

But if that sounds good, how about comprehensive data on weather patterns, soil and vegetation health collected by satellite and sent to your phone? This NASA-inspired project could allow farmers and food distributors to determine quickly which regions will have crop surpluses they can purchase to sell at central markets. When distributors can buy excess food, it is suggested, it can encourage farmers to grow more in good years, knowing there is a market.

Clearly the importance of satellite should not be underestimated.

Linking satellite and cellular

Bringing satellite and cellular together for farmers is a particularly promising approach. Certainly rural and remote communications are now being targeted by new technology such as much smaller radio access nodes (that is, cellular base stations or 'small cells') supported by satellite to transport (or 'backhaul') signals across vast distances. Indeed the industry organisation known as Small Cell Forum recently devoted a series of study papers to the drive to bring cellular communications to rural and remote areas.



Animal tracking device From FindMySheep uses Globalstar's chipset. Image: M2M News Daily.

Clearly the importance of satellite, even as other forms of communication take hold in Africa, should not be underestimated. As collaborative Information and Communication Technologies (ICT) group the Commonwealth Telecommunications Organisation puts it in a recent report (The Socio-Economic Impact of Broadband in sub-Saharan Africa: The Satellite Advantage): "Unlike submarine cables or terrestrial fibre optic networks, satellite bandwidth can be delivered to any location in Africa. Every square inch of the continent is covered with satellite bandwidth."

Costs coming down

In addition more satellites are being launched and new capacity is becoming available, bringing down costs. Allied with cheaper and more widely available cellular communications, this is already having a major effect on African businesses — including agricultural businesses.

One interesting development, about to go live across Africa, comes from satellite communications giant Globalstar. At the recent Global Forum for Innovations in Agriculture in Abu Dhabi, it demonstrated the fruits of its collaboration with a Norwegian company, a joint venture called FindMyAnimal, involving satellite tracking

using specially designed animal collars. These collars are already being used to track more than 12,000 valuable sheep and cattle in Norway, and to monitor cattle in Brazil and endangered species in North Africa.

FindMyAnimal's collar connects with Globalstar's satellite network to help farmers find animals that are close to the edge of a designated area or have escaped. The reason that this is news right now is that Globalstar's recent launch of a satellite gateway in Gaborone dramatically increases the company's coverage across sub-Saharan Africa and, by extension, the opportunities for the system.

Corry Brennan, Globalstar's simplex regional sales manager for EMEA, explains the origins of the service. "In the north of Norway the grazing of the sheep is not traditional: no paddock, field or fenced field," he explains. "They're literally let out onto the mountains. Knowing where they are becomes paramount in terms of trying to manage the herd." Hence the service founded by Halvor Mjoen, who comes from a farming family and has an interest in IT services. In Norway it's called FindMySheep.

Brennan explains: "When the collars are being configured, you can use GPS coordinates to create a square or rectangular four-sided notional fence." This is geo-

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The package is tailored to suit the farmer's needs.

fencing — or “building a fence without the need to build a physical fence,” as he puts it.

The collar signals the animal's position at pre-set intervals. However, if the animal escapes past the virtual fence you can ‘ask’ the collar to send out alerts with new GPS co-ordinates every few minutes until the animal is found.

Globalstar is integral to the system because the chipset that's embedded in the collar “sends a signal skywards to one of our 32 operational satellites. That signal will bounce off the satellite and be returned to an earth station — a gateway — and then delivered out via our private network and on to the farmer's server.”

The signal can be delivered through a normal laptop or computer interface or else by an app available on a smartphone, depending on whether a farm has access to fixed or only to cellular. This can show individual information, maps or views of the herd.

Alternatively, a farmer can just ask for text message alerts. “The package is tailored to suit the farmer's needs,” Brennan explains. “For large industrial-type farms you would obviously have somebody whose full-time position may be to monitor the herd virtually. A smaller farmer would probably use smartphone app access. The business model works to scale,” he adds. “Halvor can offer it to the guy with 200 head of sheep as well as the guy who's got 5,000 head.”


But that's not all. Over time, the FindMyAnimal system can also provide



Over time, the FindMyAnimal system can provide useful information based on tracking and analysis of patterns of where the animals that produced the best quality meat were grazing.

useful information based on tracking and analysis of patterns of where the animals that produced the best quality meat were grazing. The result could be invaluable information and insight that can be used to determine the best grazing areas for future seasons.

And in the next few months we may hear of it more often as Globalstar's service extends to the whole of Africa and

the company extends licensing for this technology in the region. But the proving ground exists in Norway — with 12,000 units to date — and the need and the concept should easily translate to Africa. As Brennan puts it: “With this particular animal tracking product you're talking about large swathes of unfenced land. Africa is a model for that.” 

Useful links:

agra-alliance.org

artes.esa.int/news/satellites-improving-lives-rural-africa

eu.globalstar.com/en/index.php?refer=International_Africa

ict4ag.org/en/scf.io/en/by_use_case/Rural_Remote.php

www.cto.int

www.findmysheep.com/en

www.innovationsinagriculture.com

www.itnewsafrica.com/2013/11/top-10-mobile-agriculture-applications/

www.nasa.gov/content/goddard/to-bring-satellite-data-to-african-agriculture/#.VPBLSym99UQ

www.smallcellforum.org

Focus on ICT for education in rural Africa

HIGH-LEVEL PRESENTATIONS AT eLearning Africa, Africa's leading conference on technology for development and education, will focus on the role ICTs are playing in transforming the continent's rural economies by improving access to information and training.

More than 70 per cent of African workers are employed in farming and the role ICTs can play in boosting agricultural growth has been identified by the African Union as a key factor in making a reality of its 2063 Vision of a “transformed continent.”

The subject has been described as “critical” by African political leaders and will be one of the matters under discussion at a roundtable meeting for education and technology ministers at the conference.

eLearning Africa will provide a showcase of a series of presentations about new training-based solutions to some of the most enduring challenges facing Africa's farming and rural communities. Presenters include:

- Willis Ndeda Ochilo of CABI, a leading agricultural entomologist, who will explain how CABI's ‘Plantwise’ initiative, which organises weekly plant clinics supported by an online database with access to international expertise, is helping to improve the productivity of agricultural crops.
- Ghanaian Albert Yeboah Obeng of Foresight Generation Club,

who will discuss the contribution new initiatives, such as online farmer association meetings and agricultural e-commerce, can make not only to economic growth but to more environmentally sensitive farming practices and the development of resilience to the effects of climate change.

- Creesen Naicker of the MRP Foundation (a part of the Global Literacy Project), who will demonstrate the free, tablet-based learning platforms his organisation has been providing to disadvantaged rural populations in parts of South Africa, such as Kwa Zulu Natal.
- Nathan Castillo of the University of Pennsylvania will show the effect on struggling learners in rural areas of South Africa of providing culturally contextualised, high-quality digital content in local languages through the ‘Bridges to the Future Initiative.’

“If proven successful,” says Castillo, “the programme will be scaled up to other low performing provinces and then throughout the entire country as a means of improving the quality of early literacy learning that takes place in the most marginalised environments.”

eLearning Africa, 10th International Conference on ICT for Development, Education and Training is being held 20-22 May in the African Union Headquarters, Addis Ababa.

Corrugated steel storage silos from Frame

FRAME IS ONE of Europe's largest manufacturers of corrugated steel storage silos. The FP flat bottom range of silos is now available with models from 3.64 up to 32.0 metres diameter and capacities from 50 to up to 20,000 tonnes. The FC range of 45° hopper bottom silos are manufactured with diameters up to 12.73 metres. All silos can be manufactured to ASAE, DIN and Eurocode standards, depending on the client's specific requirements. Standard sidewall & roof sheet galvanising is 450 g/sq m, which is heavier than many other manufacturers, with the option of 600 g/sq m now available at a slightly higher price.

Frame's in-house, computer based quotation and design facilities enable the company to respond very promptly to meet client's specific requirements.

With its ISO 9001:2008 and 3834-2 Quality Management Certification recently issued and it's highly efficient automated manufacturing facilities, Frame is able to supply either a single silo or a complete storage facility at competitive prices & within realistic lead times.

A full range of accessories, including aeration and temperature sensing systems together with catwalks, access ladders and platforms as well as sweep augers are produced in the modern Frame manufacturing facilities in Italy.

The Frame range of silos is suited to both the agricultural and commercial markets, and silos have recently been supplied to a number of countries in Africa, including Uganda, Rwanda, Tanzania, Nigeria, Burundi, Cameroon and Senegal.



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Hand pumps are vital tools in rural communities, but their use is poorly regulated in most African countries.

Technology for handling water

OF THE 35 sub-Saharan African countries, 20 do not have formal pump standardisation policies. Handpumps - human-powered pumps, including pedal-powered pumps - are a particular point of concern. More than 180mn people out of the 930mn in sub-Saharan Africa depend on handpumps for water, with around one million handpumps installed and 60,000 more being added to that figure annually.

Zambia's loose recommendations and possibly unexamined preference for a certain model of pump exemplifies one of the downsides of informal handpump standardisation. Standardising a region's pumps can improve the supply of spare parts and the availability of people who know how to fix and operate the machine. A good policy can also dictate the best model of pump for different regional conditions.

"Based on many of the reports and evaluations I've read, I think it would be helpful to have more structure to the wild, wild west of rural water-point installation," said Susan Davis, who heads the international water and sanitation consultation firm Improve International. Ms Davis added that, in many countries, "organisations operate independently of each other and the government, and are ignorant of contextual settings", and that 40 per cent of organisations surveyed by the Rural Water Supply Network for its 2015 report on pump standardisation were ignorant of the need for standards.

Standards for technologies

Jess MacArthur, a water sanitation and hygiene technical advisor for iDE, argues that countries that rely heavily on handpumps should consider adopting a policy of standardisation. That said, strict rules can stifle innovation, and any country-wide policy should account for new technology that improves on what we have today.

One way to create a policy that allows for invention is to charge the government with endorsing pump models. If the tactic works smoothly, proven designs will



Hand water pump. Image: Scleroid.

proliferate and new designs can go up for testing with the potential for endorsement. Another viable route, according to Ms Davis is to persuade governments to "encourage organisations who facilitate sustained basic or above water service levels to continue or scale up work in their country", and to have governments ask organisations who cannot demonstrate this ability to cease operations. She noted, "This would allow more flexibility and innovation in technology, approaches to installation and service delivery, financing, etc."

So, engineers should work with policy makers to examine the research, conduct tests and identify the right pumps to use. Support for such an approach is available. For example, the Technology Applicability Framework (TAF) is a tool that can help evaluate the suitability of existing pumps and new designs proposed for endorsement. TAF provides a neutral approach for investigation of water, sanitation, and hygiene (WASH) technological innovation through an objective examination of criteria in a number of key dimensions:

- Technology performance.
- Market potential and scalability.
- Institutional support.

- Innovation and planning.
- Sustainability of service provision.
- Potential and process uptake of new technologies.

TAF comprises a screening assessment that does an initial assessment of the need for that technology in the context in which it is going to be applied and identify any show-stoppers. Those that pass this then undergo a more thorough assessment that uses 18 scoring sheets based on these six sustainability indicators for three distinct perspectives: the user, the producer/implementer, and the regulator/investor.

Making it work

Davis advised that there is one more issue to consider in the push for standardisation. While technology guidelines that are based on performance, not on someone's opinion or a good marketing campaign, are helpful, installing the pump is not the end of the story.

"There is so much more to lasting services than the handpump, and much of it has to do with what happens after the pump is installed," Davis said.

Types of handpump and utilisation differ markedly. Handpumps are frequently



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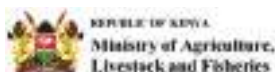
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installed on hand-dug wells and boreholes in rural areas. Most pumps are positive displacement pumps and have reciprocating pistons or plungers. Household pumps are typically low-cost lifting devices on shallow dug wells offering sufficient and sustainable sources for small communities or single households. Village pumps cater to small communities of up to about 1,000 inhabitants, and take the form of constructed, hand-dug wells, and tend to be equipped with simple but reliable and low-maintenance direct-action handpumps.

Most handpumps are reciprocating pumps, whereby water is lifted by a piston

that is raised and lowered inside a cylinder that has a footvalve. The piston is moved by a rod connected directly to a T-handle or a lever handle - and some pump types feature a flywheel with a crankshaft to create the reciprocating movement of the piston. Reciprocating handpump types include suction pumps, direct action pumps, and lever action pumps.

Other handpump types include rotary handpumps and diaphragm pumps.

Some reciprocating pumps use a circular action mechanism to drive the pistons. Arguably, they should be categorised as rotary, but are not. The most commonly used rotary handpumps

are the rope pump and the progressive cavity pump. However, the progressive cavity pump is difficult to maintain.

Another type of pump is the diaphragm pump, which features a flexible diaphragm, which is expanded and contracted to displace water. Diaphragm pumps are easy to install, because there are no heavy mechanical parts. They tend to be corrosion-resistant because they have plastic hoses rather than metallic rising mains. However, diaphragm pumps need high-quality rubber diaphragms, which are expensive, and they are relatively inefficient because of the energy needed to expand the diaphragm on every stroke. **E**

Case IH offers solutions for the sugar cane industry

THE AFRICA SUGAR Outlook Conference, held in April in Nairobi, has confirmed itself as the largest annual sugar industry gathering in Africa. Co-hosted by the Kenya Sugar Directorate, it welcomed hundreds of participants and key speakers, including government representatives, international experts, senior decision makers and industry leaders from Africa, the Middle East, Europe, Brazil, and Australia. The event explored future opportunities for the African sugar market, discussed new trade and financing strategies, and shared best practices and latest innovations in sugar production.

As the originator of sugar cane harvesting technology and a world leader in sugar cane harvesting solutions, Case IH confirmed itself as Gold Sponsor of the event for the fifth year in a row. The company, in collaboration with its distributor in East Africa, Toyota TUSHO, displayed four units outside the main conference hall.

Patrice Loiseleur, Case IH international agriculture projects and corporate farming manager, took part in the conference proceedings with a presentation of the full Case offering for sugar cane production. The

focus was on the multipurpose Puma CVT Series tractors, which are the ideal solution for cultivation and road haulage, and on the key advantages of Case IH Austoft 8000 Series of sugar cane harvesters. Loiseleur also highlighted the importance of the first class and dedicated service support offered to customers by Case IH and its network.

At the end of the three day conference, the company organised a special "side event" for the representatives of corporate customers and large agro-industrial farms operating in the sugar cane and bio-ethanol sectors in Africa and the Middle East.

Drawing on over 50 years of experience in this sector, the company offers the most advanced and reliable sugar cane harvesters available in the market, the Austoft 8000 Series. These machines are the industry's highest capacity sugar cane harvesters and ideally suited for the most demanding productivity and performance needs. In addition, the company offers the Austoft 4000 Series, specifically designed for small up to medium sized landholdings or big plantations with reduced row spacing.

The Case IH offering was complemented

by a full range of equipment for sugar cane operations, including the renowned Steiger, Magnum and Puma Series of high horsepower tractors, self-propelled sprayers, tillage and seeding complexes, balers and other attachments, and a line-up of precision farming solutions.

Green Fuel is a long-standing Case IH customer and operates the first large-scale ethanol producing factory in Africa. Based in Zimbabwe, it produces anhydrous ethanol from sugarcane to supply the country and beyond with a clean, efficient, and renewable fuel source.

"At Green Fuel, we invest in the latest technologies to ensure that sustainable practices are used in the cultivation of sugar cane and associated products such as ethanol and electricity generation," said Conrad Rautenbach, general manager of Green Fuel.

To harvest and transport about 4,000 tons of sugarcane per day, the company relies on Case IH. Green Fuel's fleet encompasses ten Austoft 8000 sugar harvesters, 20 Magnum 310 tractors, four Puma 140 tractors and 20 JX95 tractors. "We use the Magnum tractors during harvesting operations and for scraping in land development while the Puma tractors are the ideal equipment in fertilisation and cultivation activities," added Rautenbach. The JX tractors are used for transport and other general farm operations.

"With these machines, we have prepared about 10,000 ha of new land and harvest over a million tons of sugar cane a year," further highlighted Rautenbach.

Having a full range of specific equipment for sugar cane production was a key decision factor in choosing Case IH for Green Fuel, as well as the availability of a wide product offering, precision farming solutions and strong after-sales support. "What we appreciate the most is the quality and reliability of Case IH units, even in the harsh African environment in which we operate," concluded Rautenbach.

With a single Case IH sugar harvester, Green Fuel are able to cut approximately 1,000 tons per day of green cane.



Celebrating 50 years of Sparex

SPAREX, A GLOBAL wholesaler of spare parts and accessories for tractors and agricultural machinery, is celebrating 50 years of successful business. Sparex has recently invested in quality control management, warehousing and upgraded logistical capabilities in the UK, France and Germany. A Technical Centre of excellence has been built in the UK ensuring that both new product development and quality management remain at the heart of Sparex. Significant investments have also been made in the e-commerce capabilities. Sparex operates 23 ecommerce websites around the world giving customers access to thousands of parts at the touch of a button, latest stock and pricing information, and a fast and easy way to order online.

The company is now a multinational business with a turnover of US\$130mn providing spare parts for agricultural machinery in over 100 countries. But what is making Sparex so successful? Jeremy Burgess, managing director of Sparex said, "It's a combination of experience and expertise." There are 500 Sparex employees in the world, 130 of them being sales and technical specialists. "I think the main reason why Sparex is so successful, is our global thinking," added Burgess. "Unlike some of our competitors, we cover not only local areas, but the whole world, starting in the UK, and reaching out as far as Africa, the Middle East and even the Far East. When customers who are further away order a particular part, Sparex distribution partners are the key to the great success of the company. They know exactly what the farmers in their country need."

"Sparex South Africa now has a warehouse of 2,100 sq m in Durban and another warehouse in Stellenbosch, we have grown our staff to 25 and have steadily grown the business to be a major player in the agricultural tractor spares business in South Africa and beyond into Africa. We pride ourselves on quality product and staff to back this up," said Neil Larter, managing director of Sparex South Africa.

Valmont's BaseStation3 provides total farm control

THE NEW BASESTATION3 from Valmont Irrigation is said to be the most innovative irrigation management product on the market, pushing monitoring and control technology to the next level.



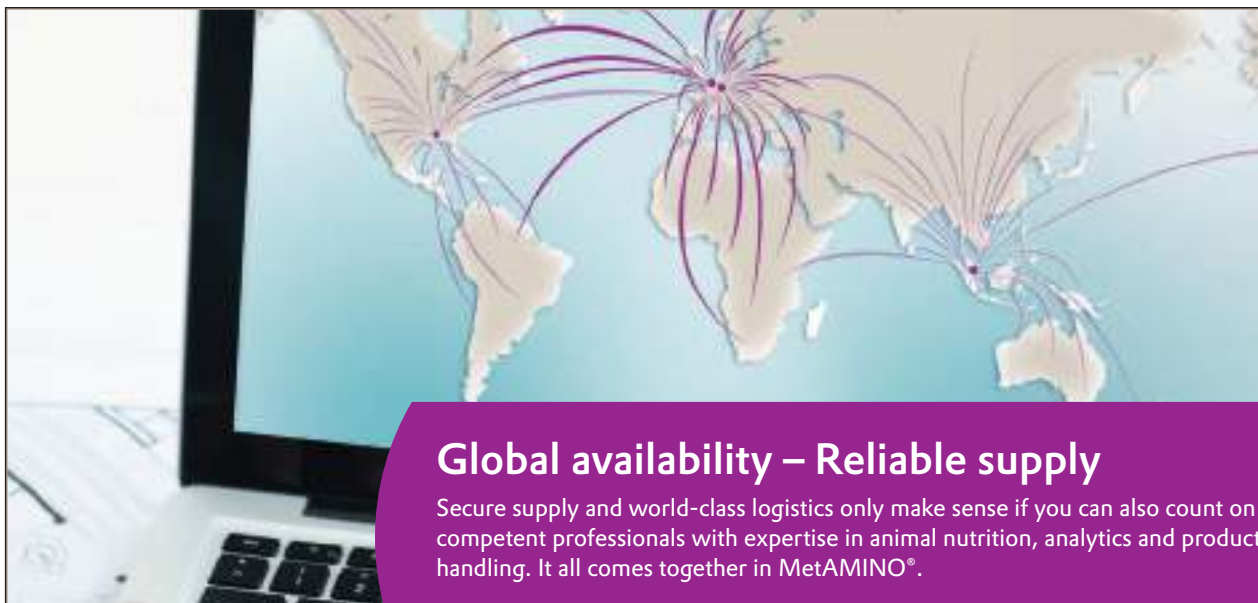
Valmont's BaseStation3, seen here on a smartphone.

The English version of BaseStation3 is now available around the world, and additional languages will be introduced throughout the year.

With BaseStation3, growers can manage their irrigation equipment from a computer, laptop, tablet or smartphone – using native iOS (iPhone, iPad) or Android apps – for total control of their operations. They can try the app by downloading it from their app store and clicking on the demo button. Growers can choose an internet-connected or stand-alone installation, and select a communication link using data radio, Internet Protocol or a combination of technologies – a choice no one else offers. Another BaseStation3 exclusive is that a typical installation does not require any recurring fees.

BaseStation3 allows for multiple, simultaneous users and provides tiered levels of access and security. Farm managers can designate who can access or control each piece of equipment, from centre pivots and linears to pumps and generator sets.

BaseStation3 is intuitive and easy to use. It provides instant at-a-glance status updates and quick notifications if a field approaches cautionary status range for soil moisture. It also enables informed irrigation decisions based on the amount of moisture in the crop root zones.



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Ruth Kinoti, general manager, Shalem Investments, was the winner of the EMRC-Rabobank Project Incubator Award (PIA) 2015. She talks to EMRC about how participating in the process has impacted her and her business.

Shalem Investments wins PIA 2015

SHALEM INVESTMENTS FROM Kenya is currently working with over 9,000 small scale sorghum producers in Kenya to gain access to markets and increase their collective production. The company has bought grain from 7,200 farmers so far in 2015, with a total tonnage this year of over 5,000 metric tons.

Why did you decide to join the AgriBusiness Forum 2015 and apply for the EMRC-Rabobank Project Incubator Award?

I felt it was a relevant opportunity for me both on a personal and on a business level. When I read over the conditions to apply for the Project Incubator Award I realised that I met all the criteria, and importantly the most significant criteria: adding value to farmers.

I joined the AgriBusiness Forum for several key reasons:

- To learn what I thought I would be able to achieve not only from the speakers but from the other participants, benefiting from their experiences as farmers and investors.
- Evaluating my own business. By meeting others and speaking about my business I could see how people reacted to it and would be able to get feedback.
- Sharing know-how and experience. Sharing for me is an essential component to make sure your business grows. We work in a sector with so many people. We all need to understand what others are doing and how they are themselves achieving their own success. Through this we can get many insights and lessons.
- Understanding financiers. I went because I knew there would be many financiers and I could listen to them, understand their perspective and get ideas from them.

You received a US\$10,000 cash prize as the PIA winner. What will you do with the money? How do you think it can transform your company?

Well, the money will go to the most essential need – providing finance to the farmers I work with.

From the money I received I will give 500,000 (US\$7,000) Kenyan Shillings as small credit guarantee to a loans bank, which will enable the farmers I work with to

access loans for their inputs. With this money they will be able to buy from input suppliers the necessary products, such as fertilisers, to farm appropriately.

This will be a pilot system which I hope succeeds so we can then roll it out further.

The rest of the money will allow me to fill small gaps in my actual business, such as buying some weighing scales or a computer, which will help me significantly on a daily level.

You spent three days attending the AgriBusiness Forum 2015 in Kinshasa. What did you gain in participating in this EMRC forum, and how important is such a networking event for the likes of business people such as yourself?

The interaction I had was wonderful and really lifted my spirits and boosted me in ways that I never thought could be possible.

I realised that, by being present and speaking openly about what I do, I could gauge the reaction of other participants and partners and sponsors concerning my business. And through this I realised that what I am doing back home in Kenya is important. I received recognition for my work. I felt boosted like I have rarely felt before, which I think as a business person, is the most important component to push your business to the next level.

My time in Kinshasa made me realise that the work I am doing is important, that people care and understand my vision, which I have worked so hard to achieve back home in Kenya. This, for me, is huge in terms of confidence boosting and will allow me to fight even more to grow my business and help the farmers I work with.

As a Kenyan woman representing small scale farmers, what is still required at the local, national and regional level in order to develop your business?

Well there is a lot to say about these different issues, but in short I believe that:

- At the local level I think it is so important to focus on capacity building. Farmers need to be given the skills to develop so that they can really achieve something with their farms.




Ruth Kinoti, general manager of Shalem Investments.

- At the national level I would like to see more done to increase access to inputs, to see fairer and affordable prices at the market level and also to increase access to markets for small farmers. This is something that the government can change by introducing the right policies and creating stable programmes within the country that can transform these key policy areas.
- At the regional level, I think what is needed is interaction which will give farmers access to wider markets. We must understand what neighbouring countries are doing in the same sector as ours and vice-versa. We need to increase the value addition of farmers, and to do this farmers need to be able to sell their produce to more markets.

Winning the PIA will most probably impact your business for the coming years. What encouragement and words of advice would you give to those thinking of applying for the next EMRC-Rabobank Project Incubator Award?

I would definitely recommend this. It does so much for you both on a personal and a business level.

I would tell everyone who is working in agriculture and is having an impact in their community that this is a perfect way to get to know your own business better, to be amongst your peers and to gain exposure and, most importantly, feedback. And of course, you meet potential investors. There is a perfect mix of people at the forum, especially for someone who has a vision for their business.

This award will be a massive turning point for me both personally and professionally. I can't thank Rabobank Foundation enough, and of course the entire EMRC Team. 

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VIV Asia 2015 registers high visitor and exhibitor ratings.

VIV Asia 2015 - a meeting place for professionals

ASIAS LEADING INTERNATIONAL feed-to-meat exhibition VIV Asia witnessed leaders in the agriculture, livestock and fisheries industries participate in the three-day show held at the Bangkok International Trade Exhibition Centre (BITEC) from 11-13 March 2015.

Show manager Ruwan Berculo said: "VIV Asia 2015 has exceeded our expectations. We wanted it to be a show that was relevant to everyone in Asia and also to the milk, aquaculture, meat and egg businesses as well as its established theme of feed to meat. This was most definitely achieved, and at the same time the show has been bigger again."

According to Berculo, visitors rated the show 8 out of 10, while exhibitors gave it 8.5 out of 10.

Official show statistics said that there were more than 38,000 visitors at BITEC for the three-day show. There were more than 800 exhibitors from 120 countries spread across seven halls. Specifically, there were business leaders from animal protein companies from every single Asian country, said show organisers VNU Exhibitions. Major exhibitors included Jansen Poultry Equipment, Biomin, Big Dutchman, Andritz Feed and Biofuel, DSM and Hellmann Poultry Equipment, among others.

According to the organisers, the top 20 countries at the show were Thailand, India, Vietnam, The Philippines, China, Malaysia, Indonesia, Bangladesh, South Korea, Pakistan, Taiwan, Sri Lanka, Myanmar, Japan, Singapore, The Netherlands, Australia, Egypt, USA and Cambodia, with 21,723 visitors. The highest number of visitors were from Thailand. Several attendees were of the opinion that the show was bigger than the earlier edition held in 2013 and that Thailand was fast gearing up to be a competent entity as a global meat export centre.

Crowds drawn to conferences and seminars

VIV Asia 2015 also saw several conferences being held over the course of three days — notable ones being the Aquatic Asia Conference, Biogas Conference, Dairy Tech Conference, Pork Production Summit



Zoetis is the world's largest producer of medicine and vaccinations for pets and livestock, and their stand drew huge crowds.

The biogas conference was considered a great success and organisers are rooting to bring back the event for the next edition of the show.

and Pet Health and Nutrition Conference. There were a total of 3,496 attendees, and presentations were made by companies such as Aviagen, Biomin Singapore, Hamlet Protein, Bayer Thai, ADDCON Asia as well as government agencies and educational institutions.

The biogas conference was considered a great success and organisers are rooting to bring back the event for the next edition of the show. The Special Event Aquatic and Dairy Tech conferences were also well-received.

Poultry remains key focus

The significance of poultry was highlighted at the show, with the major growth in Asian attendance originating from countries that have a strong interest in producing chickens and eggs. The egg industry, in particular, received a boost by the decision made by the International Egg Commission (IEC) to hold its Asian leadership forum in Bangkok. The two-day forum attracted 110 industry leaders, and organisers want to repeat the IEC event alongside VIV Asia 2017.

The pork production industry also received a fillip at VIV Asia 2015. Its

regional appeal gained traction and 40 per cent of visitors involved in farming reported having pig-producing interests.


Aquatic Asia

Aside from the expected line up of exhibitors, VIV Asia 2015 also witnessed participation from the aquaculture industry. The Aquatic Pavilion featured companies that developed innovative products for the sustainable farming of fish and shrimp. There were also conferences held on various topics such as feed, ingredients, additives, health management and advanced technology to boost the industry. Some of the exhibitors included INVE Asia, Leiber, Biomax, Cargill and Seapromega.

Pavilions

The show had a truly international feel to it as there were several country pavilions. The Netherlands was the official partner country of the event. There were two Dutch pavilions, a Dutch Innovation seminar and several networking events. The seminar was supported by the Dutch Poultry Centre. In addition, the Mayor of the City of Rotterdam Ahmed Aboutaleb opened the seminar and made a guided tour on the exhibition floor where he visited a number of Dutch exhibitors.

There was a strong show of support from the USA, Taiwan, Italy, France and China.

The next edition of VIV Asia will be held in 2017, but organisers are already gearing up for VIV MEA 2016, which will be held in Abu Dhabi from 16-18 February. 

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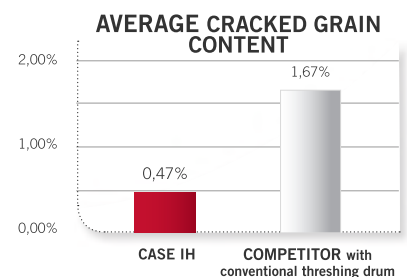
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