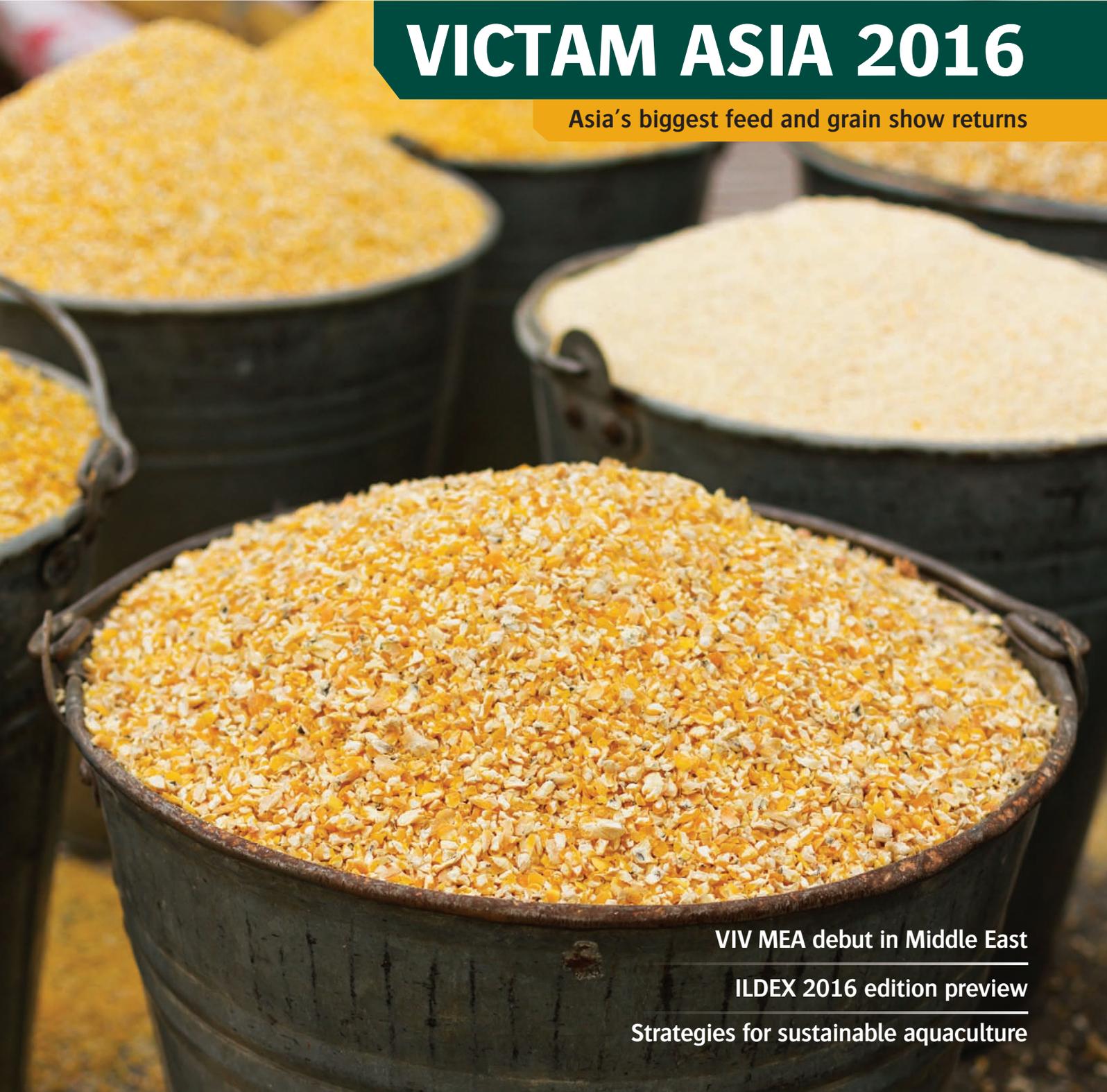


# **Far Eastern** **Agriculture**

## **VICTAM ASIA 2016**

Asia's biggest feed and grain show returns



VIV MEA debut in Middle East

ILDEX 2016 edition preview

Strategies for sustainable aquaculture

### **Copper protection for 'Eye of the Dragon'**



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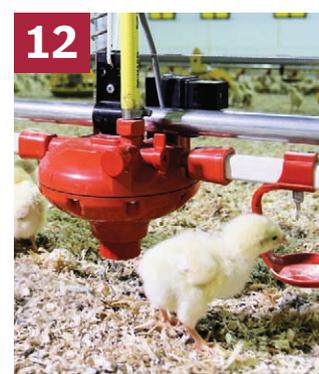
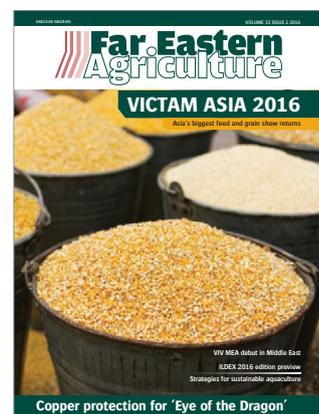


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Drinker management - a bird's eye view



Improved performance from tuned tractors

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# Far Eastern Agriculture

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**Chairman:** Derek Fordham

**Printed by:** Times Printers Private Limited

**Printed in:** March 2016  
 Far Eastern Agriculture  
 (ISSN 0266-8025)

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## Evonik begins basic engineering for additional methionine plant in Singapore

EVONIK HAS STARTED basic engineering for the construction of a second world-scale production plant for the amino acid DL-methionine in Singapore. The plant complex, with a projected annual production capacity of 150,000 metric tonnes, is expected to come on stream in 2019. The Evonik committees have now approved the basic engineering.

The decision is based on the continuing increase in the demand for sustainable animal nutrition. "We have supported the strong market growth of DL-methionine over the years by timely and needs-driven expansion of our production capacities, and we plan to continue doing this," according to Klaus Engel, chairman of executive board of Evonik. The specialty chemicals group markets DL-methionine under the MetAMINO® brand name.

The new complex will be constructed next to Evonik's existing methionine plant on Jurong Island, Singapore, which was commissioned in late 2014.



Evonik chemical plant

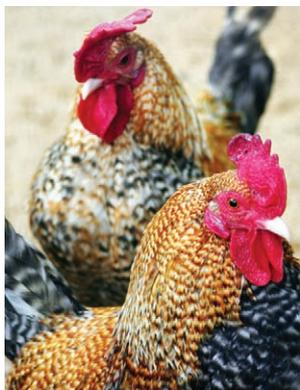
## Canned tuna producer Thai Union to tap China for long-term growth

THE WORLD'S LARGEST canned tuna producer, Thai Union, has announced that it aims for further acquisitions and will focus more on China, the Middle East and Southeast Asia to help it achieve a revenue target of US\$8bn a year by 2020.

This year it expects sales to rise by 15-20 per cent to US\$4bn to US\$5bn as it books more revenues from recently acquired Rugen Fisch AG in Germany, Wai Yat Paco Lee, deputy general manager for investor relations. Over the next five years, Thai Union aims to earn US\$1.2bn from new businesses, including US\$600mn in sales in China and new markets, Lee said.

It plans to launch food services, new value-added seafood products and online shopping, he said, adding the company's food business had not been affected by the economic slowdown in China.

The company also aims to increase annual revenue from existing operations by US\$1.7bn within five years, add US\$1.4bn from new acquisitions, and US\$1.2bn from new areas of business, he added.



## Malaysia's CAB Cakaran aims to increase poultry production capacity by 50 per cent

MALAYSIA'S INTEGRATED POULTRY producer CAB Cakaran Corp Bhd has issued a letter of intent to acquire Farm's Best Food Industries Sdn Bhd for US\$19.3mn, Sinmah Breeders Sdn Bhd for US\$21.3mn and Sinmah Livestocks Sdn Bhd for US\$17.9mn, making up a total US\$56.8mn investment.

In a filing to Bursa Malaysia, CAB Cakaran said that the proposed acquisitions involved the additional 301.43 acres of broiler farms and approximately 200.22 acres of breeder farms as well as other poultry facilities and equipment.

A binding contract has yet to be signed on the deal.

"The acquisition is capable of increasing our broiler production capacity by an extra 2.11mn to 2.33mn birds per month. The higher production volume will help us achieve economies of scale, which will in turn improve cost efficiency and improve our profit margin in the medium- and long-term," the company added.

It said the proposed acquisitions were key steps to enhance the company's competitiveness and market penetration in the local and regional poultry industry.

## Alltech appoints new Asia-Pacific technical team coordinator

ALLTECH HAS APPOINTED Octavio Eckhardt to the role of technical team coordinator, Asia-Pacific, based in Bangkok.

Matthew Smith, Alltech vice-president, said, "We are pleased to have Octavio on our team. He is an exceptional candidate with a long track record and I am confident he will lead our technical team in providing outstanding support to our customers."



Octavio Eckhardt

Eckhardt graduated as a veterinarian from the University of São Paulo, Brazil in 2006 and joined the Brazilian group Perdigão (now Brasil Foods – BRF), one of the world's largest swine and poultry integrators. As Alltech Asia-Pacific technical team coordinator, Eckhardt will further develop the company's team of technical advisors and network of consultants, providing technical support to customers across the region. "I am delighted to be part of Alltech and bring my expertise in different markets to our customers across the Asia-Pacific region," said Eckhardt. "With a team of specialists in key segments of animal production, we aim to bring additional value to our clients. Our team's primary goal is to ensure that Alltech's research and solutions are applied for the benefit and profit of customers across the Asia-Pacific food production chain."

## Golden Agri gets more transparent with supply in Indonesia

PALM OIL GIANT Golden Agri-Resources (GAR) has announced that all the palm oil it processes in Indonesia can now be traced back to the mill where it was produced, a move which the company said will help promote sustainable practices among its suppliers. The Singapore-listed company, which has a market value of US\$2.9bn, said that for all the palm oil processed in its Indonesian facilities such as refineries and kernel crushing plants, it knew exactly which of its 489 mills supplied the oil. The company embarked on this supply chain mapping exercise in March 2014 in an effort to raise transparency in an industry where supply chains are often opaque and complex. The data, along is available on its 'sustainability dashboard'.

Anita Neville, vice-president for corporate communications and external affairs, GAR, said, "Gaining visibility on our supply chain enables us to ensure that our supply chain is operating in line with our sustainability commitments."

Last year, the company bought seven million tonnes of crude palm oil and palm kernel oil from its suppliers, which include both independent and GAR-owned mills.

# Events 2016

## MARCH

13-15	<b>Agra ME</b>	Dubai, UAE	<a href="http://www.agramiddleeast.com">www.agramiddleeast.com</a>
16-17	<b>SugarTech Indonesia</b>	Surabaya, Indonesia	<a href="http://www.sugarindo.com">www.sugarindo.com</a>
17-19	<b>Dairy and Poultry Expo</b>	Bashundhara, Bangladesh	<a href="http://www.limraexpo.com/events/dairypoultry">www.limraexpo.com/events/dairypoultry</a>
23-25	<b>ILDEX Vietnam</b>	Ho Chi Minh City, Vietnam	<a href="http://www.imexmanagement.com">www.imexmanagement.com</a>
29-31	<b>FIAAP/VICTAM/GRAPAS 2016</b>	Bangkok, Thailand	<a href="http://www.victam.com">www.victam.com</a>
29-1 April	<b>JIExpo Kemayoran</b>	Jakarta, Indonesia	<a href="http://www.jiexpo.com">www.jiexpo.com</a>

## APRIL

3-7	<b>Biomasa Brno</b>	Brno, Czech Republic	<a href="http://www.bvv.cz">www.bvv.cz</a>
13-15	<b>Agfopex Nigeria</b>	Lagos, Nigeria	<a href="http://www.agfopexnigeriafair.com">www.agfopexnigeriafair.com</a>
19-21	<b>CIMAE</b>	Beijing, China	<a href="http://www.cimae.com.cn">www.cimae.com.cn</a>
20-22	<b>INPALME Medan</b>	Jakarta, Indonesia	<a href="http://www.palmoilexhibition.com">www.palmoilexhibition.com</a>
29-1 May	<b>BEA</b>	Bern, Switzerland	<a href="http://www.bernexpo.ch">www.bernexpo.ch</a>

## MAY

30-2 Jun	<b>Iran Agro Tehran</b>	Tehran, Iran	<a href="http://www.iran-agro.com">www.iran-agro.com</a>
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## JUNE

7-11	<b>Belagro</b>	Minsk, Belarus	<a href="http://www.minskexpo.com">www.minskexpo.com</a>
8-11	<b>Agro Kiev</b>	Kiev, Ukraine	<a href="http://www.agro-expo.com">www.agro-expo.com</a>
15-17	<b>Agritec Africa</b>	Nairobi, Kenya	<a href="http://www.agritecafrica.com">www.agritecafrica.com</a>
18-22	<b>Food Taipei</b>	Taipei, Taiwan	<a href="http://www.foodtaipei.com.tw">www.foodtaipei.com.tw</a>

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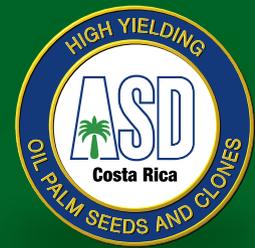
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## Food Outlook

THE FAO FOOD price index averaged 150.2 points in February 2016, nearly unchanged from January, but 25.6 points (14.5 per cent) below February 2015. The most outstanding development last month was a surge in vegetable oil quotations, which, along with a small recovery in meat prices, more than offset declining cereal, sugar and dairy prices.

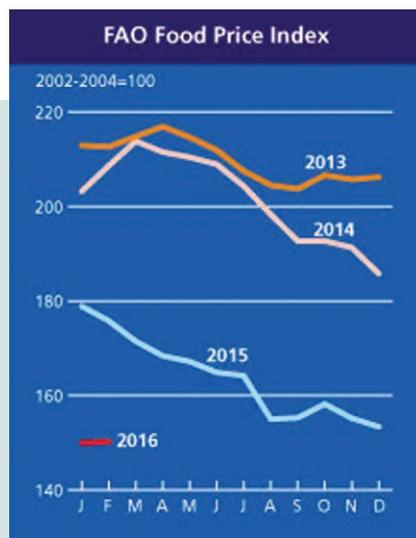
The FAO cereal price index averaged 148.3 points in February, marginally down from January and 13.7 per cent less than one year ago. Among the major cereals, wheat prices fell most, subsiding 1.5 per cent, influenced by slow trade activity and expectations of continued large export supplies for the remainder of the marketing season. Maize quotations were only marginally lower, sustained by large purchases by a number of countries. On the other hand, rice prices firmed slightly compared to last month, underpinned by stronger Japonica rice quotations.

The FAO vegetable oil price index averaged 150.3 points in February, up as much as 11.2 points (or eight per cent) from January and the highest value since June 2015. The upswing was led by palm oil, which appreciated by 13 per cent on reports

of falling inventories in Southeast Asia, combined with poor prospects for production in the coming months. Soy oil prices also firmed, on the expectation that poor supplies of palm and other vegetable oils would boost global demand for soy oil.

The FAO dairy price index averaged 142 points in February, down 3.1 points (2.1 per cent) from January. Lacklustre import demand, especially by China, and ample availability of supplies for export resulted in milk product prices falling across the board. Additionally, some importers limited purchases for stocks replenishment, as the market was perceived as being well-supplied for immediate and short-term needs. This sentiment was re-enforced by a rise in sales of SMP to intervention stocks in the EU.

The FAO meat price index averaged 148.2 points in February, up marginally from its January revised value. For the different categories of meat, prices for bovine meat and pigmeat rose, whereas those of poultry and ovine meat fell. Bovine meat quotations moved higher, on the basis of constricted supplies in both Australia and the USA, while EU pigmeat prices continued to be underpinned by the opening of aid to private storage. Sheepmeat prices dipped for the



fourth consecutive month, a reflection of seasonally peaking supplies from Oceania. Finally, the poultry industry continued to benefit from lower feed prices, a factor that has contributed to quotations falling each month since June last year.

The FAO sugar price index averaged 187.1 points in February, down 12.3 points (6.2 per cent) from January, marking the second consecutive monthly decline after four months of steady rises. The decrease mainly mirrored better than expected crop conditions in Brazil, the world's leading sugar producer and exporter. Prospects for a larger world sugar production decline than earlier anticipated did not reverse the price fall, amid comfortable global sugar inventories.

## Indonesia to import 200,000 cattle to control inflation

THE INDONESIAN GOVERNMENT is preparing to import cattle in Q1 2016 in an effort to keep inflation within its three to five per cent target, according to Darmin Nasution, coordinating minister for economic affairs.

The government has decided on a quota of 600,000 head of cattle, or 238,000 tonnes of beef, Darmin revealed. "The plan is to bring in 200,000 head in Q1 and 150,000 in Q2. For the Q3 and Q4, import will depend on developments in the previous quarters," he explained.

According to some reports, the government is steering clear of quarterly permits and will instead, allocate permits every four months.

Australian Livestock Exporters Council (ALEC) CEO Alison Penfold said, "This is a step forward from quarterly permits and that is certainly progress. Ultimately what we have been pushing for is for the annual numbers to be announced several months before the start of the permit year. That gives us an opportunity to plan the logistics around the export year to Indonesia."

Indonesia's annual beef consumption stands at about 675,000



The trade capacity to supply the cattle order between now and April depends largely on rainfall

tonnes, while local farmers can only produce 416,000 tonnes of beef.

However, Australian federal minister for agriculture Barnaby Joyce said that the Indonesian government is expected to import 600,000 heads this year.

"Our live cattle trade is a big contributor to the economies of both nations, as well as the livelihoods and well-being of Indonesians and Australians. Australia's relationship with Indonesia in the live cattle export industry is becoming stronger by the day. This is a win-win situation for both those in Indonesia who value add and for farmers in Australia who it

supports," Joyce added.

However, the trade capacity to supply this order between now and April depends largely on rainfall. "Given that there was a huge monsoon trough, access to cattle is restricted and supply, challenging," noted Stuart Kemp, Northern Territory Livestock Exporters' Association chief executive.

## Efforts of organic shrimp farmers to preserve mangroves

SHRIMP FARMERS IN Vietnam have become more aware of organic production techniques and the need to preserve mangrove forests in their areas following three years of the Mangroves and Markets Project (MAM) being in effect.

“Local farmers in the southernmost province of Ca Mau have been able to significantly increase their income. They now have higher productivity and prices for their organic shrimp, and get paid for environmental services,” stated Nguyen Thi Bich Thuy, project manager, during a meeting held in Ho Chi Minh City in February this year.

According to Thi Bich Thuy, the aim of the project is to use local shrimp farming systems to generate more revenue while also preserving the mangrove forests. This will enhance profitability and sustainability and at the same time improve coastal resilience to climate change.

The project is taking place at the Nhung Mien and Dat Mui Protected Forests in Ngoc Hien District in Ca Mau Province with 5,300 households on an area of 24,000ha.



Shrimp farming systems are expected to increase incomes of farmers in Vietnam

Households have been given training in managing household waste and forest protection, and have also been shown how to farm without the need for industrial foods or chemicals. This is so that they could be given NaturLand certification and, as a result, charge five to 10 per cent more per kilogramme of shrimp.

## Vietnam, Philippines use Danish pig farming techniques

THE DANISH PIG farming model is being implemented in Vietnam and the Philippines following the signing of the first contracts by Danish Farm Concept to supply investors in both countries with new turnkey pig production facilities.

Investors have sought advice and support about supplying the fast-growing markets of Southeast Asia and China with high quality, locally produced pork from Denmark, as the country is recognised for a production average over 30 weaned piglets per sow.

“Southeast Asian markets have traditionally relied on small-scale farmers to supply the meat they need. But, with consumer demand in rapid growth, such farms are incapable of producing enough pork of the right quality,” said Bjarne Kornbek Pedersen, who came up with the Danish Farm Concept and is also the director of one of the participating companies, Danish Farm Design.

Danish Farm Concept noted that it can provide investors with support in various areas of pig farming.

Pedersen added, “Danish Farm Concept offers a holistic package. Our expertise ranges over robust and environmentally friendly farm designs; genetics for high productivity and top quality breeding animals; biosecurity, nutrition and health; education programmes and pig farm management.

“Our member companies can provide advice, expertise and training and deliver the equipment and technology for a highly efficient operation.”

The professional pig production facilities for Vietnam and the Philippines would be adapted to local demands and conditions.

When fully operational, both will supply safe food to consumers and deliver good returns to investors, according to Danish Farm Design.

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AWILA Workshops Germany



The delegates will be addressed by speakers on a number of subjects related to the feed industry

# FIAAP/VICTAM/GRAPAS – Asia’s largest feed and grain show is back

The show will showcase multiple conferences intended to benefit visitors and exhibitors in Bangkok from 29-31 March

**T**HE THREE CO-LOCATED events, at Bangkok International Trade & Exhibition Center (BITEC) this year, will focus on animal feed, rice and grain processing and bring together the major players in the related industries from around the world.

The FIAAP show, which profiles animal feed ingredients and nutrition, has many local companies and well-known international suppliers such as Biomin, DSM, Kemin, Sopropeche, Tyson, Special Nutrients, Arm & Hammer, Olmix, SPF Diana, Dr. Eckel, Cargill, among many others.

The international industry suppliers will also be represented at the feed processing exhibition VICTAM.

Visitors will see large stands displaying the latest technologies and products from Buhler,

Famsun, ZCME, Ottevanger, Andritz, van Aarsen, Wenger, CPM, Extru-Tech, Amandus Kahl, Dinnissen and Geelen, besides others.

The list of exhibitors at the GRAPAS trade show, which specialises in rice milling, flour milling and grain processing, includes major international companies displaying their latest technology. Satake, Buhler, Alapala, Brock, Cimbria, Kay Jay Rolls, Foss, Rueter, Petkus, Cimbria, Altuntas, Chief will be some of the exhibitors present.

There is a lot to see over the three days of the show. Aside from the specialist ingredients and processing technology, there are also many stands displaying the latest auxiliary systems and machines. This includes bagging machines and bags, silos, conveyor systems, specialist formulation programs, elevators,

dryers and de-humidifiers, elevators, buckets, and many more pieces of equipment necessary to a mill or processing plant.

The event will be packed with a series of conferences and technical seminars concerning the relevant industries. We have listed out the major conferences here for a sneak peak into what is in store at the event.

## Aquafeed Horizons Asia 2016

The ninth Aquafeed Horizons conference ‘Advances in Processing & Formulation’ will deal with the continuing growth of aquaculture which, in turn, is driving demand for quality aquafeed. The industry is said to be at a crossroads — it must find ways to sustain growth. One way is to improve the quality of existing ingredients, another to increase the available nutrients in feed; another is to find alternative protein and carbohydrate sources.

The conference will look at these approaches and at feeding for health. In

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recognition of the importance of processing solutions to the overall mix, production technology will also be addressed.

### GRAPAS Conference Asia 2016

For the fourth time, GRAPAS Asia exhibition will host a milling conference focused on rice, flour and other food milling topics plus storage and transportation. The 2016 GRAPAS Conference program has been separated into three distinctive sections — the first covering food milling, the second flour milling and rice milling. While the presentations are not exclusive to the core principles associated with each sector, they are about related areas that delegates will find useful to learn about.

GMP+ International: 'Challenges & practical cases of a GMP+ Feed Safety Management system implementation'. This is specifically intended for QM-managers of feed companies and feed consultants. The workshop aims to further explain specific requirements of the GMP+ Feed Safety Assurance (GMP+ FSA) module and the challenges Asian companies face during the implementation in practice. Participants to this workshop will be invited to share their own, company specific cases, which will be treated during the workshop. Implementing a GMP+ Feed Safety Management system, in particular for countries in Asia has been identified as being challenging.

### FIAAP Animal Nutrition Conference 2016

FIAAP exhibitions and conferences cover the ingredients and additives used within the formulation of animal feeds and are attended by senior executives from all over the world. The conference is geared toward the interests of nutritionists, feed formulators and feed manufacturers. Presented by WATT Global Media, the seventh FIAAP Animal Nutrition Conference will take place on Day 1.

The Feed Ingredient and Additives (FIAAP) International Conferences are unique educational events serving the global feed industry. They deliver the opportunity to learn



The three co-located events will focus on animal feed, rice and grain processing

the latest research and innovative information with a focus on practical application and profitability from leading, recognised industry experts.

In addition, FIAAP conferences are the ideal opportunity for feed professionals from around the world to network, exchange ideas and do business with one another and with leading industry suppliers.

### ASEAN Feed & Rice Symposium

Safety, security & sustainability will be high on the agenda at this seminar. Members of the International Feed Industry Federation (IFIF), ADM Asia-Pacific Trading Pte. Ltd. and the FAO will address an audience which will comprise VIPs, invited presidents and secretary generals of the ASEAN Feed & Rice Associations together with their members and registered visitors to the shows.

The purpose of this Symposium is to inform the audience of the trading and financial impact of the ASEAN Free Trade Zone when it comes into force as well as looking at the increasingly important subjects of 'food/feed safety, security and sustainability'.

### Petfood Forum Asia 2016

Petfood Forum Asia aims to provide the visitors with an opportunity to socialise and network with industry peers from throughout Southeast Asia and to meet those hard to reach prospects, have project update meetings on

site with customers and meet new leads through networking events. This food manufacturing industry event will allow everyone to visit suppliers belonging to ingredients, additive and formulation solutions, processing and packaging equipments, flexible packaging solutions, co-packing solutions and services and consulting and additional services, all in one location. With countries in Asia such as Thailand, India and China among the fastest growing pet care markets globally, and Japan ranking as the fourth-largest pet care market worldwide, the region is expected to continue to have an increasing impact on the petfood and pet care industries.

### Biomass Pellets Asia 2016

This conference will delve into why biomass pellets are emerging as an attractive alternative fuel for power generators in South East Asia, and what feedstock and technologies can be used for biomass pellet production. Biomass Pellets Asia will gather some of the region's leading market observers and enablers to bring delegates up to date on existing, expanding and emerging biomass pellet markets in the region, the policies shaping and driving them and further provide a direct insight into the technologies used to make biomass projects happen. This one day conference will offer comprehensive insight and networking opportunities for those wishing to explore biomass and pellet opportunities. □

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rapeseed etc. at long centre distances, requiring straight running and reliability with high safety factors.

Muller Beltex supplies components for the bulk handling and process industry worldwide along with a range of components and spare parts for bucket elevators.

The company also offers a full service in providing 'free of charge' capacity calculations and engineered economical design recommendations for upgrading



existing bucket elevators or constructing new bucket elevators.

# VIV MEA makes its debut, exceeds expectations

Held in Abu Dhabi for the first time, the premier livestock event brought together the poultry, dairy and aquaculture industries from the Middle East and Africa to Turkey, Iran and countries of south-central Asia

**T**HE INAUGURAL EDITION of VIV MEA far exceeded expectations as the new regional trade fair from VIV worldwide to serve the poultry, dairy and aquaculture industries from the Middle East and Africa to Turkey, Iran and the countries of South-Central Asia.

Held in the UAE capital of Abu Dhabi from 15-17 February 2016, the event recorded an audited total of 6,336 visits by people from 109 countries to meet exhibitors from more than 279 companies at the Abu Dhabi National Exhibition Centre.

VIV worldwide manager Ruwan Berculo from organiser VNU Exhibitions said, "When we announced the launch of VIV MEA we said we expected the first show to have approximately 200 exhibitors from all parts of the world, presenting their products and services to about 4,000 of the region's top decision-makers and buyers. We have been proved right about the global origins of the exhibiting companies and about the high quality of the visitors, but the size of the attendance has been much more than we could ask for an event making its debut. This also shows in the high preliminary satisfactory rates: visitors score VIV MEA 2016 with a 7.8 and exhibitors rate the show with an eight.

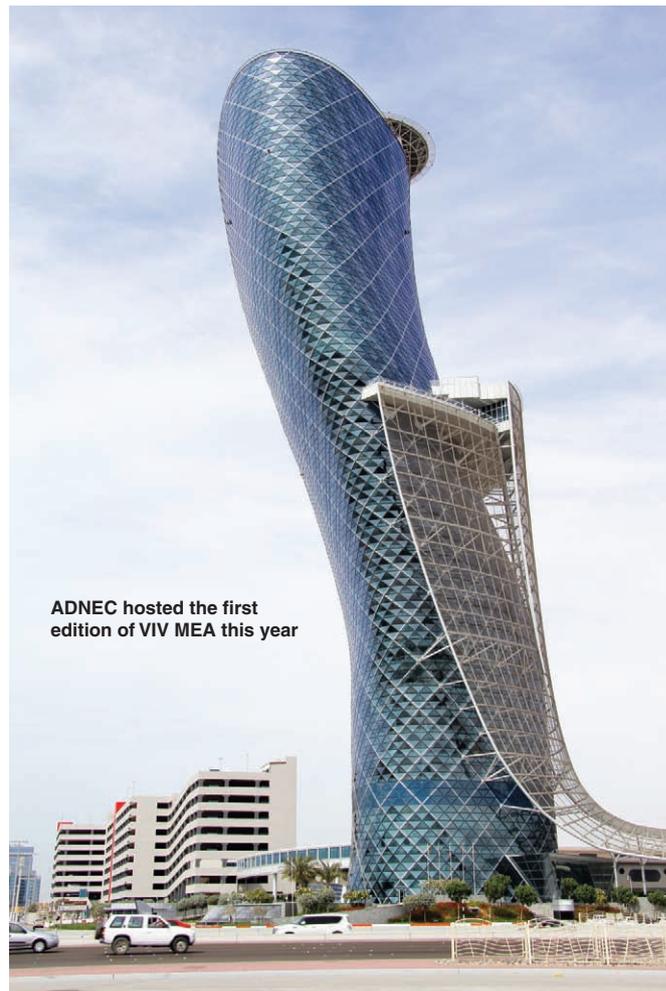
"Despite the political instability and turbulence in some areas of the Middle East and the current economic uncertainties in the region caused by low oil prices, the leading food producers have demonstrated by their attendance in Abu Dhabi that they remain determined to look ahead and inform themselves about the latest innovative and advanced techniques from around the world."

## International participation

Approximately 80 per cent of visitors came from outside the UAE, Berculo revealed. They represented an excellent spread of countries covering the Middle East, considerable parts of Africa and locations in and around India. Numbers from individual countries in the northern areas of the African continent were especially strong for places such as Egypt, Sudan and Nigeria. Of course, many other visitors arrived at the UAE venue for the show from the neighbouring Gulf states and Saudi Arabia.

"Almost all of the countries in the Middle East and North Africa already hold their own local show on agriculture or animal production, yet VIV MEA 2016 has managed to attract business leaders from throughout the region because of its special mix of global suppliers, innovation and information," Ruwan Berculo commented.

"The success of our show was helped further by having an accompanying conference programme of a considerably higher quality than would be found normally at more local events. It gained, too, from being co-located at the ADNEC exhibition centre with the Global Forum for Innovations in Agriculture (GFIA). Visitors from both sides took the opportunity to look at the co-located events, as a way of adding even more value to their time spent in Abu Dhabi. These visits are in addition



ADNEC hosted the first edition of VIV MEA this year

to the 6,336 original VIV MEA visits," Berculo added.

He revealed that another positive aspect for the first VIV MEA has been that its timing has coincided with the recent opening of more flexible international trading relationships with Iran. He added that the show was visited by several hundred Iranian poultry and feed producers who confirmed that the new business environment means they will want to invest and grow.

## Future strategy

VIV MEA delivered fully on its promise to be a niche animal proteins event for all industry leaders with a strong emphasis on poultry meat and eggs, but also offering an extended coverage into dairy milk production and aquatic farming. Visitors and exhibitors have already suggested how future editions of the event might be enlarged, such as by having an increased focus on the added-value downstream areas of further processing, marketing, branding and product safety.

"VIV MEA returns in early February of 2018," Berculo confirmed.

"As a consequence, we now have an excellent show to alternate with VIV Asia in Bangkok as a regional hub platform taking place every two years." □

# ILDEX Vietnam set to boost livestock industry

The leading exhibition for the livestock industry will take place from 23-25 March 2016 at the Saigon Exhibition and Convention Center (SECC) in Ho Chi Minh City

**T**HE 6TH EDITION of ILDEX Vietnam is geared up for a record-breaking year as a result of the strong support from the international livestock industry.

The event has attracted an all-time high of 180 exhibitors from 29 countries, with trade visitors from many sectors of the industry, including poultry, cattle, dairy and aquaculture, expected to be in attendance.

Returning to ILDEX Vietnam in March 2016 are global brands such as AGCO Corporation, Biomin, Big Dutchman and De Heus. They will be alongside first-time exhibitors, such as Gartech Equipment from India and Yemmak Pellet Mills from Turkey, which complete the supply chain.

With high numbers of exhibitors from Europe, the USA and Asia, the event will feature a USA Pavilion for the first time, led by Amlan, U.S. Livestock Genetics Export, Big Chemical, and Ceresco Nutrition.

Highlights of the ILDEX conference programme include the Federation of Asian Veterinary Associations (FAVA) Aquatic Symposium on 24 March, which will focus on innovative technology for the fisheries industry; and the ICC Brazil seminar on 'A competitive approach to immune modulation in poultry and swine nutrition'. There will also be a VIV Asia Interactive Essay Program Masterclass on 23 March, covering value creation in swine production and processing.

Dr Desianto Budi Utomo, vice-president for government and liaison, Charoen Pokphand, said, "This ILDEX provides poultry stakeholders with hope and new options of presenting the exchange of business information and technology updates."

Jan Cortenbach, chief technical officer, De Heus added, "The importance for new professionals is not to focus only on nutritional aspects, but also on farm management, hygiene, disease prevention, breeding, barn design, etc., because these are areas, where we can still make a lot of progress to improve feed efficiency. In the future we have to be careful with our limited resources." □



The FAVA Aquatic Symposium will focus on innovative technologies for the fisheries industry (Photo: Jamesbox/Shutterstock)

For further information about ILDEX Vietnam 2016, please visit [www.ildex-vietnam.com](http://www.ildex-vietnam.com).



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## Global poultry industry expected to revive soon, study suggests

THE MARGIN OUTLOOK for the global poultry industry is gradually improving after challenging conditions including a significant oversupply issue in Q4 2015, a recent report from Rabobank stated.

There are already visible signs of recovery including increasing demand and lower supply growth in key regions like the USA, China, Thailand and Europe. There is also some vital price support to be expected from the recovering red meat markets.

### Asian poultry supply a big factor

According to the report, the biggest factor to watch for this year is Asian supply, given that the restrictions on breeding stock will reduce production — primarily in China, and also in Thailand and South Korea — in the second half of 2016.

Rabobank's animal protein senior analyst, Nan-Dirk Mulder, suggested this will have a strong short-term



The poultry prices freefall has now stabilised (Photo: Elena Larina/Shutterstock)

local and global market impact and will lead to local tight market conditions, increased Chinese imports and pressured Thai exports.

### Effects of avian influenza

Global poultry meat trade are also expected to remain highly affected by avian influenza (AI) and FX

volatility. Prices for the main traded poultry cuts have dropped - by 20 per cent for breast meat, whole birds and processed, and up to 50 per cent for leg quarters. This freefall has now stabilised and will gradually recover in 2016, although AI outbreaks in key export markets are a wild card.

Although the global outlook for

feed costs is for corn and soybean to be range-bound at current levels, big differences exist between regions, depending on FX and local crop harvest conditions. Regions like India and South Africa are hit by adverse crop conditions, while Brazil and Russia feel the impact of negative FX impacts; in Brazil, this means a more than 30 per cent increase in feed costs compared to last year.

### New players in poultry market

Brazil and Thailand are the big winners in trade in the short term, but changes are in the pipeline for newcomers like Malaysia, Russia and Ukraine who are currently being approved for exports to key import markets.

In the case of breeding, there will be a mixture of more local breeding programmes (China and Russia) and inter-nationalisation among GPS suppliers worldwide.

## Drinker management — a bird's eye view

WATER MANAGEMENT IS very important for a healthy bird and the ratio of water to feed intake can be a good source of information of the bird's health. Proper drinker management is, therefore, the key.

When drinking water is provided to the birds and there is water wastage, the water will end up in the litter instead of being delivered to the birds. Producers will then lose profit due to lower flock performance during production time as well as through increased operating costs.

Effective water usage can be achieved by simply checking for and eliminating the three most common problems in the house — nipple drinker leakage by improper cleaning, improper drinking line height adjustment and improper drinking line pressure adjustment.

### Flushing the drinking lines

When a drinking system is new or cleaned and maintained properly, leakage is unlikely. It does not, however, take long before biofilms and contaminants build up in the drinking lines. These can ultimately cause your drinking nipples to not function properly. The use of ground water with organic material content increases the risk of biofilm formation. Regular drinking system flushing and cleaning is vital for proper functioning. To check when flushing is needed, a special dirty water detector is available. This detector monitors biofilm in the drinker lines and emits a signal when the drinking line needs to be flushed. Special temperature sensors are also available which send out signals when the water is too warm. With the proper drinking systems, flushing can occur automatically and effort free.

### Proper drinking line height

Having the drinker lines too high or too low affects the birds' water intake as well as water wastage. Should a week pass without making any height adjustment, the drinker can be as much as several centimeters below the birds' optimal drinking height, which will have a negative effect on the bird as well as



Proper water management is economical (Photo: Impex Barneveld)

causing water wastage. When you wait until the bird has grown several centimeters, it can cause stress for the bird when adapting to the new height. Adjusting the drinking lines on a daily basis with small increments is therefore the most efficient and productive manner.

### Proper drinking line pressure

The line pressure needs to be adjusted often throughout the growth period. When birds age, the pressure should ideally be increased. However, too high pressure contributes to water wastage and nipple leakage. In addition, higher pressure can prevent some nipples from shutting off properly. Too little pressure, however, will inadequately supply water to the birds farther away from the regulator.

With proper drinking equipment, the water pressure throughout the drinking line can be monitored at all times and correct adjustments can be easily carried out. Adjusting the water pressure once weekly is sufficient for most breeds.

Proper water management is economical. With the proper drinking equipment and relatively little time and effort, the flock will be healthy with optimal growth. Prevention of water wastage gives more profit.

## Avian flu: Chicken and geese culled in Taiwan farms

MORE THAN 12,000 chicken and geese have been culled at two poultry farms in central and southern Taiwan, after health officials confirmed outbreaks of avian flu at both properties.

Changua County animal disease center director, Tung Meng-chih confirmed that 10,000 chickens were culled at a farm in Dacheng Township after a high percentage were found to have contracted H5N2 Type B avian flu. Meanwhile, at a goose farm in the Liuying District, 2,443 geese were destroyed after testing positive for the H5 strain of the virus.

As a precaution, officials also disinfected two more poultry farms located in a one kilometre radius of the Dacheng goose farm. The area will be closely monitored for three months to ensure the virus does not spread to other properties.

Both infected farms were enclosed and not considered vulnerable to infection by contact with wild birds. Experts have, therefore, inferred that the infection was brought in from outside.

Tainan animal health and protection office director, Lee Chao-chuan, advised that control over the entry of people, animals and biological matter into farms is essential for preventing infections. He urged farmers not to rush to introduce goslings to their farms before they have been sanitised since there has been a rush among goose farmers to introduce more goslings due to the high market price for goose meat, following a cold winter that felled many geese with avian flu. The Changua County cases make up the fifth avian flu outbreak in Taiwan this year, and the first since the Lunar New Year.

## New H5 poultry vaccine developed in USA

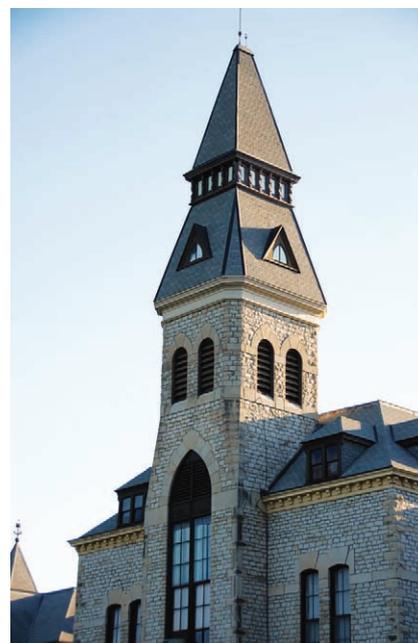
RESEARCHERS AT KANSAS State University (KSU) have developed a new H5 poultry vaccine, claiming that it can protect chickens and turkeys from H5N1, H5N8 and H5N2 strains of avian flu.

The vaccine uses a live virus and, according to Professor Jurgen Richt, professor of veterinary medicine and director of the US Homeland Security's Center of Excellence, it may be possible to introduce it into the air or water supply for mass vaccination of birds.

Additionally, researchers from KSU have said that it may be possible for the vaccine to be given to chicken embryos in eggs, which would automatically vaccinate them from the multiple flu strains.

The new vaccine protects against Newcastle disease virus, another pathogen that is deadly to poultry. This was achieved by inserting part of the H5 protein into a Newcastle virus vaccine.

While some US producers are wary of vaccinating birds, fearing loss of export business, Joel Brandenburger, president of the US National Turkey Federation, said that "the world recognises science has changed and that vaccines can be used effectively".



Kansas State University

## Police raid illegal poultry feed operations in Indian city

POULTRY FARMERS AND feed manufacturers have been caught in a rice smuggling scandal in Hyderabad, India. Police have issued a statement declaring that they have arrested a gang for illegally producing poultry feed made from rice smuggled from the public distribution system (PDS). The feed is mixed with cheap flour, procured from corrupt flour mill owners and sold to farmers in the region.

In the latest raid, a ration shop dealer, two poultry farmers and a flour mill owner were arrested. Police also seized 300 bags of PDS rice, rice flour and wheat after raiding a premises in Kulsumpura.

An earlier raid in nearby Cyberabad netted more poultry feed made with PDS rice. In that case, the rice was mixed with sand and husk in an attempt to duplicate high quality poultry feed on a mass scale.

Police allege that a manufacturing unit in Pahadi Shereef was selling the illegal feed to poultry farms across the state at a discount for six months before the raid and subsequent arrests.

As well as being smuggled to make illegal poultry feed, there have also been cases of PDS rice being smuggled and used to make beer. According to the police, around 600 tonnes of the heavily subsidised PDS rice is stolen in the region every month and sold in national and international markets, resulting in enormous financial losses for the exchequer.



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## Saudi Arabian firm advises on global sustainable, profitable aquaculture

AQUACULTURE HAS THE potential to make a massive contribution for the increased demand for aquatic food, but aqua-farmers will have to meet great challenges to be sustainable and profitable. This was the advice from Ahmed Bin Rashid Al Balla, CEO of Saudi Arabia-based National Aquaculture Group when he addressed the Global Forum for Innovations in Agriculture (GFIA) conference in Abu Dhabi last month.

In his presentation, he outlined the benefits of aquaculture farming, such as economic and environmental sustainability, reduced pressure on marine farming, catering to local demand with native species and controlled production costs.

His advice for the industry included avoiding shortcuts, paying attention to scientific advice and forming public/private committees to foster an environment of cooperation in the industry.

Marketing is also important, according to Al Balla. He advised producers not to be greedy, to be transparent and to have a clear marketing strategy in place.

In terms of diversification, he said, “Don’t put all your eggs in one basket. Diversity of species, type and farming systems are all helpful in creating successful aquaculture ventures.

“Protect your business by protecting the environment.” He added that regional and international cooperation, water quality and effluent management, and managed biodiversity are all important when it comes to meeting the objective.

On a social level, Al Balla said that aquaculture projects have the potential to assist with academic and vocational education, foster



A productive fish farm in Penang Malaysia (Photo: US AID/Flickr)

positive relationships with local communities, develop a knowledge-based economy, and improve living standards.

Al Balla also advocated to increase the use of renewable energy on aquaculture projects, in particular. He noted that the industry will also benefit from aquaculture operators embracing credible, internationally recognised certification for quality control, food safety, environmental management and sustainability.

## GAA and Vietnam firm sign MoU to boost availability of four-star BAP shrimp

IN AN EFFORT to encourage the availability of four-star Best Aquaculture Practices (BAP) shrimp, the Global Aquaculture Alliance (GAA) has inked a memorandum of understanding (MoU) with Vietnam’s National Fish & Seafood and Minh Phu Seafood Corporation in which approximately 800 shrimp farms in the country will be encouraged to attain BAP certification. National Fish & Seafood committed to provide the education, support and funding necessary for the farms, which are operated by Minh Phu, to enroll in GAA’s iBAP improvement

programme and take steps necessary to apply for BAP certification as groups or an integrated operating module (IOM).

Upon enrolling in iBAP, the farms will have 12 months to attain BAP certification. National Fish & Seafood also pledged to market the shrimp from the farms that earn and retain BAP certification. Likewise, GAA committed to providing the education and support necessary for National Fish & Seafood and Minh Phu to manage the project.

“We are delighted to announce our partnership

with the GAA and Minh Phu on such a forward-thinking, innovative project to certify hundreds of small-scale shrimp farmers while preserving the sensitive, and extremely vulnerable, mangrove environment,” said Jeff Sedacca, president of National Fish & Seafood’s shrimp division, adding, “Third-party certification of this progressive farming model will open the doors to international markets, further incentivising governments, private sector and NGOs to work together to strengthen sustainable aquaculture.”

“This is a very important milestone for the BAP programme,” said Peter Redmond, BAP’s V-P of market development. “This announcement further demonstrates our commitment to making third-party certification available to the majority of aquaculture constituents.”

Minh Phu, in a statement, added, “Minh Phu is pleased to work with National Fish and GAA to help preserve and certify hundreds of mangrove farms. We are committed to ensuring the livelihoods of Vietnam’s farmers and the integrity of the ecosystem through market incentives that will sustain the environment. Minh Phu supports the sustainable growth of aquaculture and must take steps to ensure our native mangrove forests will be preserved for generations to come providing jobs and natural resources to nourish our communities.”



Key markets for Vietnamese shrimp include the USA, Japan, the EU, China, South Korea, Canada, Australia, ASEAN and Switzerland (Photo: Kamomeen/Shutterstock)

## Mongolian government appeals for aid to farmers

THE MONGOLIAN GOVERNMENT has appealed for international aid to assist its rural economy in the wake of a weather phenomenon known as a *dzud*. This usually occurs when a summer drought is followed by heavy snowfall. This makes already depleted pastures inaccessible for livestock. Officials have released a statement declaring that snow has covered more than 70 per cent of the country and livestock losses have reached at least 125,000.

According to the government statement, 98 districts are experiencing the effects of *dzud*, while 113 districts are close to reaching this state. The situation has been exacerbated by evening temperatures plummeting to -39°C. The Information and Research Institute of Meteorology, Hydrology and Environment has estimated that nearly one million people could lose most of their livestock and face starvation.

Mongolia's Ministry of Foreign Affairs has estimated that around US\$4.4mn is required to fund hay, fodder and vaccines to keep livestock alive, as well as emergency vehicles, food, medicine and winter clothing. However, the government has not yet declared a state of emergency, which is required before some international aid agencies will provide emergency funding.

The Asian Development Bank (ADB) has set aside US\$3mn to help Mongolia with the disaster response and they expect total aid from agencies around the world to total around US\$10mn, but this funding will not be forthcoming state of emergency is declared by the government.

A state of emergency was last declared in Mongolia in 2010 during another *dzud*, when livestock was dying at a rate of 250,000 animals every week.

Officials have attributed the increase in *dzuds* in recent years to climate change caused by global greenhouse gas emissions and overgrazing. Around



Harsh winter conditions have impacted on Mongolian farmers  
(Photo: Trees I/Flickr)

half of Mongolia's 3.1mn people rely on livestock production for their livelihoods and if the *dzud* conditions worsen, an increase in unemployment and an additional strain on the country's social welfare services is predicted.

Sheep and goats are the most common livestock in Mongolia and each one is worth around US\$30 to farmers. *Dzud* conditions are causing the spread of the Gobi Desert and the impact on livestock has led to prices of meat, dairy and animal skins to fall. The worsened weather conditions are also causing the loss of camels, which are worth around US\$600 each, and horses, each worth around US\$200, according to estimates from the ADB.

### Maintaining dairy margins

WITH PRESSURE ON a dairy farmer to maintain profitability, it is vital that the livestock not only has healthy appetite but more importantly that the feed digested is fully utilised. This will help ensure improve productivity, fertility, milk production, overall health and well-being and ultimately profitability. Once thought of as a 'luxury feed', modern dairy farmers now recognise that mineral blocks are a vital and simple low-cost method of helping to achieve maximum profits.

UK-based Tithebarn Ltd and Vietnam's Ruby Company Ltd have been marketing Rockies to livestock farmers in the Asian country for the last 10 years. Rockies are mineralised salt blocks that the cattle can readily lick and in doing so will intake vital and essential major minerals and trace elements. Last year, Ruby Company successfully marketed over 1,000 tonnes of Rockies to local farmers. This means that on any given day over 100,000 cows are licking and benefiting from this essential part of the daily diet, the company said.

Aside from the mineral and protein supplements, Tithebarn also supplies a wide range of animal health products and forage enhancers that help farmers increase the value and yield of the stock. The services vary from forage and mineral analysis to computerised ration calculation.



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# Copper protection for the 'Eye of the Dragon'

Longan (*Dimocarpus longan*) is one of a number of tropical and sub-tropical trees bearing sweet, succulent fruits. All are members of the *Sapindaceae* or soapberry family

**S**OAPBERRIES INCLUDE MANILKARA zapota (*sapodilla*), *Nephelium lappaceum* (*rambutan*) and *Litchi chinensis* (litchi or lychee). The last is the closest to the longan in botany and morphology and therefore the most easily confused. Litchi fruit (2.5 to 3.8cm in diameter) are borne in loose terminal clusters and have a yellow/pink/red rough and leathery skin. Pulp or aril is white, firm and translucent. Longan fruits are slightly smaller (2.2 to 3.6cm in diameter) and borne in tight clusters of rounded fruit with smooth and pliable leathery skins enclosing a similarly white and translucent aril. At maturity fruit skin colour ranges from tan to light brown. By then, the skin is brittle and bark-like and, therefore, easy to crack and peel off from the aril.

*Dimocarpus longan* is a medium-sized, evergreen tree reaching six to seven metres in height. The dark green leaves are covered with thick wax cuticle to give the upper leaf surface a distinct gloss or shine.

Longan trees are intolerant of frost, prefer free draining sandy soils, dislike poorly drained soils and are intolerant of water-logged soils which can kill the trees within four to five days. However, unlike litchi they will tolerate exposed and windy sites but not saline soils near the coast. They require a cool and dry frost-free winter for good flower set followed by a warm summer with moist soil conditions to ensure maximum fruit production.

Longan is now grown in sub-tropical areas of North America such as Florida and in Queensland, Australia, but is still very much an East Asian fruit, widely and intensively grown in the northern areas of Thailand and Vietnam, in Laos, Cambodia, and Taiwan, but most at home within its native distribution across southern China.

The Chinese call the longan 'Eye of the Dragon' because of its appearance; the jet black shiny seed seen through the translucent aril closely resembles an eyeball.



The tan-coloured fruits are borne in large tight clusters (Photo: Omex)

## Diseases and their control

Disease spectrum of longan and litchi is somewhat similar. Longan is not troubled by a single major disease but is attacked by a wide range of wood, leaf, flower and fruit infecting pathogens which collectively cause significant economic losses for this exotic and high value sub-tropical Asian fruit.

Longan is susceptible to infection by a wide range of true fungal pathogens and fungus-like pathogens (e.g. *Phytophthora*). This makes the broad spectrum activity of copper containing fungicides, especially cuprous oxide, the most active of the fixed copper fungicides, the most appropriate choice.

## Diseases in the tree nursery

Foot rot caused by the *Fusarium* fungal pathogens is widely reported from Florida and Queensland, Australia, and southern China where nursery losses from this disease regularly reach 10 per cent. *Pythium* species and *Rhizoctonia solani* which are the classic damping off and foot rot pathogens of a wide range of tree seedlings have been reported in litchi. The use of broad-spectrum action copper fungicides such as cuprous oxide and applied as a drench is an established and proven choice for controlling the equally wide range of pathogens which cause these damping off and foot rot diseases of nursery trees.

## Foliar diseases

Phomopsis leaf blight caused by *Phomopsis guiyuan* and *Phomopsis longanae* is widely reported in southern China along with a similar looking leaf blight caused by *Cladosporium oxysporum*. Infected and dead leaves which are the principal sources of fungal inoculum

should be removed.

Systemic fungicides like benomyl and thiophanate methyl are recommended. However, in addition to a high risk of fungicide resistance development there is the ever present threat of algal spot through not using copper containing fungicides. For this reason growers are advised to 'play safe' and use the broad spectrum protectant action of cuprous oxide which will also control algal spot.

## Phytophthora on leaves and fruit

Foliar blight and fruit rot caused by *Phytophthora palmivora* can be a significant problem for longans grown in northern Thailand, especially where fruit set occurs in the 'off season' when cool weather follows on from two to three days of rainfall. Trees in northern Vietnam are also at risk of infection.

Young shoots, panicles and fruit are the worst affected parts of the tree. Range of symptoms includes a dark necrosis on young shoots, brown coloured blight of the inflorescences, distinctive brown lesions on the fruit and premature drop of both flowers and fruit.

Systemic actives such as metalaxyl from the acyl alanine group of fungicides were recommended and used. However, with the onset of widespread resistance in *Phytophthora* pathogen populations to this mode of fungicide action growers of longan and many other tree crops have resorted to the use of cuprous oxide and other broad spectrum action protectant copper-based fungicides.

## Algal spots

Algal spot (*Cephaleuros virescens*) is a problem wherever longan is grown and especially so in wet climates. Copper

fungicides like cuprous oxide have the unique ability to control algae, lichens and bacteria as well as true fungi and fungus-like pathogens such as *Phytophthora*.

Leaf lesions are roughly circular, raised and greyish-green in colour but eventually become orange red following the production of rust-coloured microscopic spores. The algal pathogen may also move onto the branches causing the wood to split and branches to die if they are girdled by the disease.

Algal spot has both parasitic and epiphytic effects on the tree. Pruning the trees to improve air circulation helps, but at the end of the day it is only the protectant action of copper based fungicides like cuprous oxide that will control algal spot.

### Diseases of the wood

A number of wood-infecting fungi attack longan and may prove serious, if not fatal, if the infection girdles a main branch or the tree trunk. They include pink limb blight or pink disease caused by *Erythricium salmonicolor* and *Phytophthora* stem rot caused by *Phytophthora palmivora*, as well as a canker disease of the terminal branches and trunk caused by fungal pathogens such as



**Longan is now grown in many different sub-tropical regions of the world but remains an exotic fruit of the Far East (Photo: Omex)**

*Botryosphaeria* and *Phomopsis*. Control recommendations include physical removal of diseased parts by pruning and/or canker scraping followed by application of water-based cuprous oxide canker paint.

### Witches' Broom disease

Witches' Broom, which affects both inflorescences and leaves, is reported as a serious disease in China, Thailand and Vietnam. The inflorescences become deformed and shed their flowers prematurely resulting in the characteristic broom-like panicles and which gives this disease its name. Fruit yield is greatly reduced as a result.

Affected leaves are discoloured, blistered and deformed by their stunted growth. There is much contention over causes of witches' broom disease. Both phytoplasmas (mycoplasma type organisms) and viruses have both been implicated. A copper containing fungicide may suppress phytoplasmas but will have no effect on viruses.

### Longan decline

A debilitating tree condition called 'Longan Decline' has been a serious problem in Northern Thailand for a number of years. There is a strong association between this condition and nematode (microscopic roundworm) infestations of the tree's root system and is apparently aggravated by two extremes of soil moisture status – i.e. soil saturation through poor drainage and weather related drought. Affected trees will produce flowers but only small low quality fruit will develop. Longan trees in decline are very susceptible to epiphytic growth of algae and lichens for which a foliar spray of copper containing fungicide such as cuprous oxide is the answer. □

— By Dr Terry Mabbett

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# Epidemiology of blister blight disease on tea

*Exobasidium vexans* is one of the relatively few Basidiomycete fungi, apart from the rust fungi, that attack the leaves and green shoots of crop plants

**D**ESPITE BEING A disease of just one host species (tea), and essentially with a single mode of dissemination and spread, blister blight disease caused by the Basidiomycete fungus *Exobasidium vexans* can be a killer for tea (*Camellia sinensis*). It spreads via airborne basidiospores produced on blister-like lesions on the undersides of infected tea leaves.

Four inter-related factors underpin the damage caused to unprotected tea crops by *Exobasidium vexans*:

- Flushes of new shoot and leaf growth on the evergreen tea bushes stimulated by regular leaf picking (harvesting) and periodic 'deep' pruning. Germinating basidiospores target and infect this young, tender foliar growth.
- The fungus thrives during the humid conditions and prolonged periods of leaf surface wetness experienced by tea crops grown at high elevation in the tropics, and especially during the monsoon

season on the Indian sub-continent and in Southeast Asia which are the hubs of world tea production.

- Blister blight of tea is a short-cycle disease. This three-way combination of abundant new foliar growth and favourable conditions for an inherently short-cycle disease allows multiple cycles with a correspondingly rapid build-up and spread of disease.
- Blister blight affects the young, tender leaves and shoots, which are the very parts picked and processed into the highest quality black and green commercial teas.

Blister blight is capable of inflicting heavy yield losses on tea crops. Estimations made in the 1940s and early 1950s, before the widespread adoption of fixed copper fungicides to control blister blight disease, showed that

unprotected tea in Sri Lanka suffered losses of up to 33 per cent, between 20 to 25 per cent in Indonesia.

Diseased leaves may also affect the quality of the finished tea product due to biochemical changes in the cells that determine the chemical composition and profile of the harvested leaves, and therefore the taste and aroma of processed tea.

## Epidemiology of the pathogen and disease

Blister blight of tea is a multiple-cycle disease with a short duration period from infection to sporulation (spore production). Following spore germination occurring within 24 hours of the basidiospore landing on the leaf surface, the entire life-cycle can be completed in just 11 days (it may extend for up to 28 days). Distinct developmental stages mark the life cycle and their duration. Infection of the leaf by a germinating spore is achieved by the formation of an appressorium and associated infection peg exerting high pressure for direct penetration through the leaf cuticle that covers the epidermis. Following leaf infection, fungal hyphae grow in between the cells prior to formation of the hymenium (spore producing fungal tissue) just below the epidermis on the upper surface of the leaf.

Paraphyses (hair-like structures) and basidia (spore bearing structures) proceed to develop, forcing the epidermis

upwards into a blister which subsequently ruptures. These necrotic areas then form prominent lesions (blisters) on the under-surfaces of the tea leaves.

Tea leaves affected by blister blight disease are distorted, folded and irregularly rolled due to the presence of necrotic areas (lesions) on the midrib (main vein) and along the leaf margins. These dead areas of tissue create tensions within the leaf as it tries to grow normally causing uneven leaf expansion and therefore a marked distortion in leaf shape.

Young and tender green stems (shoots) are also affected by this disease. Infection of these plant parts first appears as a pale yellow spot gradually elongating and girdling the whole stem and becoming slightly swollen at this point. The fungus grows deeply into the soft tissues of young and tender stems causing leaves and buds above the point of infection to wither, become necrotic and die. Ultimately the stem bends over and breaks off at the affected point.

Conditions required for fungal infection, sporulation, spore liberation and dispersal are favourable during the south and Southeast Asian monsoon season which occurs at some point from June to December, the exact timing depending on the location. Extensive foliar flushing at this time, and therefore offering abundant host plant material (new soft and tender leaf and shoot growth) for infection and disease development, adds to disease severity.

Spore dispersal exhibits diurnal (24-hour day) and seasonal periodicity which is closely related to changes in relative humidity of the atmosphere.



(Left to right) Three advancing stages in the development of the blister blight disease lesions on tea leaves (Photo: Trond Kristiansen/Nordox)



**Tea plantation in Indonesia being sprayed with fungicide after leaf picking (Photo: Trond Kristiansen/Nordox)**

Basidiospores of *Exobasidium vexans* readily germinate on the tea leaf surface if a required minimum relative humidity level of 50 per cent prevails. Prolonged leaf surface wetness also assists spore germination which occurs more readily when the leaf surface is covered by a continuous thin film of moisture rather than by discrete droplets of water.

Relative humidity also has a strong influence on spore formation, generation and liberation, with 83 per cent being the minimum level required.

So dependent is this fungal pathogen on free water and high humidity that even after spore germination has begun a subsequent drop in relative humidity to below 80 per cent will curtail growth of the germ tube and prevent leaf infection.

Moderate attacks of blister blight recorded when relative humidity averages 83 per cent for five consecutive days with a period of 10 to 14 days will invariably worsen into severe attacks when these humid conditions extend over a 20- to 24-day period.

Just a few hours of direct sunlight is sufficient to kill the basidiospores of *Exobasidium vexans*. Blister blight disease will generally not develop when more than 4 hours of sunshine occur within a single day. The UV-B radiation component of sunlight is considered to be the most damaging to basidiospores.

The incidence and severity of blister blight disease of tea is directly related to relative humidity and inversely related to sunlight so that the disease decreases in direct proportion to increasing hours of sunshine.

However, the critical sunshine limit for containing the disease is

five consecutive days with an average of three hours of morning sunshine, and below this relatively low figure blister blight disease will become severe.

### Management and control

Tea plantation owners should ideally adopt an integrated programme within which chemical control using fungicides will generally play a critically important part. While the airborne movement of basidiospores is by far the most important means of disease dissemination, the pathogen can be transferred on vegetative planting material. This means any imported tea planting material should be closely examined for symptoms of disease and quarantined under conditions of low light and high humidity to encourage any latent infection to show up as active disease.

Other cultural control measures include removal of shade trees in tea plantations and first suggested for tea in Indonesia more than 50 years ago. However, subsequent research in southern India showed complete tree removal was not necessary. Instead, simple regulation of shade by pollarding the branches of shade trees was sufficient to reduce the level of disease.

Adequate weed control to reduce humidity within the canopy is also important, while changes in plucking (leaf picking), lane cutting and the careful choice of planting material all help in the cultural management blister blight disease.

Host resistance to infection and tea plant tolerance to blister blight disease are under investigation as is the use of naturally occurring, beneficial

microorganisms on the leaf surface (phylloplane fungi and bacteria) as biological control. However, at the end of the day, blister blight disease of tea can only be adequately controlled using a programme of fungicide sprays.

Best results have always been obtained by spraying contact protectant fungicides to form weatherproof deposits on the leaf surface to protect the foliage against infection by germinating basidiospores. Cuprous oxide now formulated in modern delivery systems offers tea growers the best level of protection against blister blight disease.

Tea growers in Indonesia currently spray cuprous oxide fungicide as Nordox 50 WP (wetttable powder with 50 per cent metallic copper equivalent) at a rate 170-200 g/ha or Nordox 75 WG (water dispersible granule with 75 per cent metallic copper equivalent) at a rate of 130 g/ha

after each harvest of the young leaves and shoots.

Tea estates also experience problems with a wide range of epiphytes that grow on the woody stems and branches and which like blister blight disease are encouraged by high humidity within the canopy. These include lichens, algae, mosses, liverworts and ferns. Copper containing fungicides like cuprous oxide will control epiphytic growth due to the broad spectrum action of the divalent copper ion. Tea can be kept clean of epiphytes by applying sprays of Nordox 75 WG at a rate of 5kg/ha after deep pruning of the bushes, and critically before the new tea shoots begin to appear after deep pruning. Manual removal of epiphytes from tea bushes is an alternative option but this procedure is very costly and substantially less effective. □

— By Dr Terry Mabbett



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## Improved performance from tuned tractors

A UK-BASED SPECIALIST automotive tuning company has developed tuning boxes for agricultural vehicles and they are available for sale on the international market. TDI-Tuning has published results of testing on its products, which were obtained using Sigma Dynamometer-based testing. The results show how a Massey Ferguson tractor's power, torque and reserve all benefit from being fitted with a bespoke tuning box.

For testing, the tractor was connected to a chassis dynamometer by the PTO shaft. This enabled the tractor's power and torque to be measured before fitting the tuning box for comparative testing.

The back-to-back testing procedure showed an increase in available power and torque. Untuned, the tractor recorded 1,508 Nm of torque and rated power was 115.9 PS. Once the tuning box was fitted, torque increased to 1,918 Nm and power to 147.7 PS. The tuning boxes are compatible with diesel particulate filters and emission reduction systems as fitted on agricultural vehicles.

All TDI-Tuning work is reversible and if a



tuning box is removed from a tractor, there are no lasting effects on the engine. Graeme King, TDI-Tuning's principal said the tests "measure and demonstrate the effectiveness of our latest state-of-the-art tuning box."

"There can be no doubt that our bespoke software improves and enhances agricultural

vehicles' power and torque, enabling many intensive harvesting applications to be performed in higher, more fuel-efficient gears," he said.

"Our tuning boxes make a real, tangible difference to the economy of any given vehicle, resulting in lower costs to the farmer."

## CASE IH launches robust, all-terrain planter at National Farm Machinery Show in USA

CASE IH HAS introduced the 2000 Series Early Riser planter at the National Farm Machinery Show in Louisville, Kentucky. The planter is designed for modern seed types, treatments, populations and conditions, and can be customised to suit different soil types, terrain, fertiliser and chemical application needs, and different crop residue

management practices. Additionally, adjustments can be made to the planter without the need for tools, resulting in ease of operation and simpler maintenance.

The Early Riser features cast iron components and an electrically driven low-maintenance metering system. It also features a 26-inch toolbar clearance, a 60 per cent

increase in vertical row-unit travel from previous models, and it can accommodate uneven terrain without sacrificing consistent seed depth, even at speeds of up to 10mph.

The 2000 Series is the highest tier in Case IH's four-tier range of planters, with the four levels differing in price, available customisation options and factory-readiness. With the 2000 Series, customisation options include the trademarked Advanced Seed Delivery system which allows for more accurate seed delivery and placement from the meter to the furrow.

"It was all based on direct customer feedback and field testing," said Tony McClelland, Case IH planter marketing manager of the development process, adding, "We made sure the planter is not only extremely accurate, it's also robust enough to deliver precise placement across all terrains, crop types and speeds for faster, more uniform emergence."

"The Early Riser planter family set the agronomic standard by providing the industry's only flat-bottom seed trench, leading to earlier, more uniform emergence and higher yields. Building on this legacy, we're excited to give producers the opportunity to work with their trusted Case IH dealers to customise their existing, new or future planter with the right amount of technology to meet their needs."



The 2000 Series is the highest tier in Case IH's four-tier range of planters

## Knapsack sprayers updated

THE NEWEST KNAPSACK sprayer from Matabi, the Evolution Super, has been developed with demanding users in mind. It comes in 16- and 20-litre versions and can be adapted for use on many different types of crops to increase yield and improve spraying quality.

The main features of the Evolution Super range are sturdiness, user-friendliness, comfort and accuracy.

With critical parts made of durable materials, the Evolution Super features a fibreglass lance, stainless steel handle, and a polypropylene concentric pressure chamber. The fibreglass lance is non-oxidising and resists the bends and blows that can occur during spraying.

The nozzles are made of polycetal, a special plastic, which is more durable than brass nozzles and equally as durable as stainless steel nozzles.

It is easy to use and does not have any screws or loose parts. It can be repaired without using tools and spare parts are available globally. The denser locking washer adds to the user-friendliness of the product as this prevents leaks on the user's back.

A graduated side visor means the sprayer is easy to fill accurately and the user can view the emptying progress.

Comfort is essential when using a knapsack sprayer, particularly one with a large capacity. While the biggest Evolution Super model has a tank size of 21.5 litres, it is still a lightweight device with a net weight of 3.7kg. The padded straps are adjustable and do not have any uncomfortable hooks. It is also a stable sprayer for easy, comfortable use on rough terrain.

Accuracy is vital when spraying crops – to assist with this, the Evolution Super comes with useful standard accessories such as a pressure regulator to optimise applications. This saves water and user effort and reduces wear and tear on the parts.

A constant pressure of 45 pounds is maintained throughout the crop treatment process, and it also comes with a deactivation and depressurisation function.

The four-hole nozzle has a flow rate of one litre per minute. This results in excellent coverage and greater penetration into foliage. The four empty cones are intertwined to form a full cone for faster wetting, producing a mist with very fine droplets. This has the dual advantages of increasing the impact on the foliar area and reducing product waste.

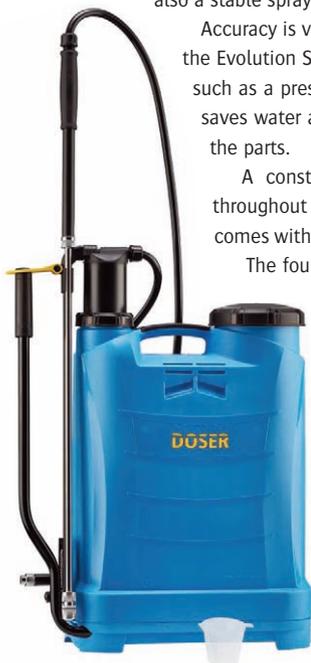
Five nozzles come as standard with the Evolution Super and they comply with the ISO 10625 Standard.

Additionally, the Evolution Doser model has a 20-litre capacity and has been designed by Goizper to apply liquids in a uniform, measured manner.

This helps farmers carry out crop treatments effectively and with minimal environmental impact. It can be used on a wide variety of crops, including fruits, vegetables, coffee, bananas, oil palm and tobacco.

The Doser model has eight fixed positions between 10 and 75ml, the flexibility of a manual tool for targeted treatments, a translucent level indicator and it empties completely so there is no residue left in the chamber after a treatment is completed. It also features an ergonomic design for enhanced user comfort.

There is also an extensive range of accessories available with the Doser model. The conversion kit adjusts the type of spray and there are also accessories to adapt the Doser to different crop heights, with a lance that can be adjusted from 0.3m to 0.85m.



The new Evolution models make crop spraying more efficient

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# Realising the potential of community-based forestry

The FAO has called upon governments to help community-based forestry regimes to reach their full potential

**C**OMMUNITY-BASED FORESTRY HAS demonstrated that it has the potential to be a potent vehicle for promoting sustainable forest management, according to a new report by the Food and Agriculture Organization (FAO) of the United Nations.

The report suggests that community-based forestry also has the potential to reduce poverty and generate jobs and income for rural communities. The FAO says, however, that for the sector to realise its potential it will require “greater support by governments” through policy reforms and other measures.

A number of community-based forestry regimes have demonstrated their promise for sustainable development, despite continuing to perform below their potential. The approach enabled local communities partners, along with governments, to take the lead in making land-use decisions and manage forestry resources that many depend upon for their livelihoods.

Close to a third of the world's forest area is now estimated to be under some form of community-based management, according to the report named *Forty years of community based forestry: A review of extent and effectiveness*. In many cases, however, while the policies already exist for the decentralisation and devolution of rights and responsibilities to communities, the right conditions may not yet be in place for them to fully exercise their rights.

Among the actions recommended by the report that will help to make community-based forestry more effective are providing communities with secure forest tenure, improving regulatory frameworks, and transferring relevant skills and technology. It also recommends increasing access to markets and knowledge of market mechanisms to communities and smallholders in order to help in the commercialisation of forest products.

Eva Müller, director of the FAO's Forestry Policy and Resources Division, comments, “Indigenous peoples, local communities and family smallholders stand ready to maintain and restore forests, respond to climate change, conserve biodiversity and sustain livelihoods on a vast scale. What is missing in most cases is the political will to make it happen. Political leaders and policy makers should open the door to unleash the potential of hundreds of millions of people to manage the forests on which the whole world depends for a better and sustainable future.”

A selection of successful community-based forestry around the world are mentioned within the report including a study in four eastern hill districts in Nepal. This example demonstrated that denuded hills had been regenerated and the condition of forests improved substantially following the introduction of community forestry. The result of the programme was that the total number of trees increased by more than 50 per cent per hectare, while the overall area of forests grew by close to 30 per cent over a 15-year period.

Other successful examples cited in the report include studies carried out in Mexico, Cameroon and the Gambia. In the 25 years since community-based forestry was introduced in the Gambia, the forest area within the country has increased by more than 10 per cent.

The report was revealed at Asia-Pacific Forestry Week, which ran from 22-26 February 2016 in the Clark Freeport Zone, Pampanga, the Philippines. The event was co-organised by FAO and the Asia-Pacific Forestry Commission (APFC) in partnership with the Department of Environment and Natural Resources (DENR) of the Philippines, bringing forestry leaders, policy makers and industry experts from 30 countries together to discuss the most pressing issues for forestry and its role in advancing sustainable development in the Asia-Pacific region. ■

Almost a third of the world's forest area is believed to be under some variation of community-based management (Photo: Artush)

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