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Serving the world of business

Cobb China appoints new Asia Pacific sales manager

LEI WANG HAS been appointed the new sales manager for the company's Asia Pacific operations. According to the company, Wang will be selling parent stock from the new Chinese grandparent operation as part of the sales and technical team.

After graduating from the Yang Zhou University, Wang began his career as a poultry technical representative. Having worked and travelled with farmers extensively, Wang is considered an asset by Cobb China who can understand customer needs and develop business in the region.

Hubbard conducts forum on premium broiler products

BROILER BREEDING STOCK company Hubbard conducted its first Premium Forum that focused on boiler products and markets, at Breukelen, near Utrecht in the Netherlands.

Hubbard's first forum on broiler products held in the Netherlands

There were 106 attendees from 18 different countries at the forum, the end of which officials said would be the first of a series of meetings that would be held across Europe. Hubbard gathered its main customers of 'premium chickens' in Europe to get to know each other better, exchange views on Hubbard's R&D for premium products and to share technical and practical information from the field. It allowed the participants to increase their knowledge about Hubbard's Premium product range, the growing differentiation of the broiler markets in the EU and how to get the best performance and optimal results for this growing market segment.

NZ professor wins dairy food award

NEW ZEALAND-BASED Indian origin food scientist Dr. Harjinder Singh has been conferred the *International Dairy Foods Association Award* by the American Dairy Science Association for dairy food processing.

Singh, who was recently named head of Massey University's Institute of Food Science and Technology, is the first from outside of North America to receive this award.

"Food Science is one of the most exciting scientific fields to work in. We have so many challenges ahead of us from sustainability through to obesity, growing nutritional demands and an ever growing world population," said Singh.

"This recognition reflects our innovative and sustained dairy foods research activities at Massey over the last 25 years. Our programmes are characterised by excellent science combined with relevance to industry needs," he added.

According to Singh, there are a host of challenges such as obesity and nutritional demands, that need to be addressed. The award was created to recognise individuals whose research findings have allowed dairy food processors to develop new products and improve the quality, safety and processing efficiency of dairy foods, said Massey University in a statement.

JAPFA to open new hatchery in Indonesia

PT JAPFA COMFEED is set to open a new hatchery in Kronjo, Tangerang in West Java, Indonesia, which will be equipped with SmartPro single stage incubation.

With 12 SmartSetPro setters, 12 SmartHatchPro hatchers and a full climate control system, the new hatchery will incorporate Adaptive Metabolic Feedback (AMF) to fine-tune incubation environments to the needs of growing embryos and Energy Saving Modules (ESM) to reduce energy consumption.

A SmartCenter hatchery information system will monitor and record every incubation cycle and Pas Reform will also provide hatchery management training, with ongoing service and technical support.

As one of the largest agri-food businesses in Indonesia, Japfa's Poultry Division is one of the most vertically integrated operations in the country. With ambitions to make new inroads into value added and consumer branded foods, food safety is an important concern for the company.

Provimi strengthens Asia Pacific poultry business

CARGILL'S PROVIMI HAS appointed Ricardo Ito as the regional poultry technology application lead, while Ines Rodrigues has joined as regional technology lead for poultry.

The new appointments are to enhance and support Cargill's Asia Pacific business. Ito, who is a veterinary medicine graduate, will lead the technology deployment and application initiatives in the region. He will be responsible for building and strengthening regional poultry species' capabilities. Meanwhile, Rodrigues will work towards enhancing Provimi's commercial growth in poultry solutions and services, for which he will work with the Global Cargill Provimi Technology team and the Regional Application team.

Biomin launches aquaculture centre in Vietnam

AUSTRIA-BASED ANIMAL health and nutrition company Biomin has opened a new aquaculture centre for applied nutrition at Vietnam's Nong Lam University.

Located in Ho Chi Minh city, the new research centre spans 900 sqm and is expected to drive research and development in the field of applied nutrition, stated Biomin.

Through the new centre, nutrition and feed formulation, gut health and immune modultion, and waste management and feed safety will be explored and effective solutions to issues in these areas will be provided, added the company.

"The wider benefit is to build the academic and research pipeline in Vietnam, by creating undergraduate research opportunities and mentorship for local students," said Biomin Asia Pacific managing director Jan Vanbrabant.

Research will be centered on several important species within the marine and freshwater categories such as catfish, tilapia, sea bass and shrimp. For better and improved results, Biomin will collaborate closely with Nong Lam University in research and development activities, coordinated by the Biomin Research Center in Tulln, Austria, and the technical staff at the facility.

The research facilities are equipped with five different cutting-edge recirculating systems and two challenge rooms. A feed formulation lab for preparation of test diets, including a lab scale feed extruder that will allow testing of different ingredients and solutions under conditions similar to those found in the aquaculture industry to conduct high-level science. The facility is a testament to the dedication of Biomin to the aquaculture industry, said the company.

EVENTS 2015

SEPTEMBER			
9-12	**Korea International Livestock Expo**	Daegu, South Korea	www.kistock.co.kr/kor/sub/main.php
15-18	**SPACE 2015**	Rennes, France	www.uk.space.fr
17-19	**SIMA ASEAN**	Bangkok, Thailand	www.sima-asean.com
19-21	**Swine Expo**	Xiamen, China	www.swineexpo.com/html/?pid=74
21-23	**Livestock Asia 2015**	Kuala Lumpur, Malaysia	www.livestockasia.com
OCTOBER			
8-10	**ILDEX Indonesia 2015**	Jakarta, Indonesia	www.ildex.com/indonesia/indo-visitor.html
10-12	**4th Poultry and Dairy Fest**	Lucknow, India	www.dairyfest.in
11-14	**4th Leman China Swine Conference/ 2015 World Swine Industry Expo**	Nanjing, China	www.lemanchina.umn.edu
15-17	**International Farming Technology Expo**	Jakarta, Indonesia	www.farmingtechnology-expo.com/web
20-23	**Aquaculture Europe**	Rotterdam, The Netherlands	www.easonline.org
NOVEMBER			
8-14	**Agritechnica 2015**	Hanover, Germany	www.agritechnica.com
18-20	**2nd Dairy Asia Pacific Summit 2015**	Singapore	www.duxes-events.com/dairyap2
24-26	**Agra Innovate Nigeria**	Lagos, Nigeria	www.agra-innovate.com/nigeria
26-28	**Agri Livestock Myanmar**	Yangon, Myanmar	www.agrilivestock.net
DECEMBER			
8-10	**Agra Innovate East Africa**	Nairobi, Kenya	www.agra-innovate.com/eastafrica

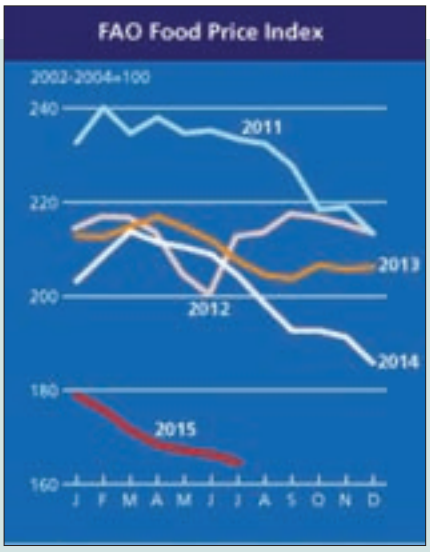
Food Outlook

WITH AN AVERAGE price index* of 164.6 points in July 2015, down 1.7 points (1.0 percent) from June and almost 40 points (19.4 per cent) less than in July 2014, the index has reached its lowest monthly value since September 2009

Last month's decline reflected sharp drops in the prices of dairy products and vegetable oils, which more than offset some increases in the prices of sugar and cereals. Meat prices held steady. The FAO cereal price index averaged 166.5 points in July, up 3.3 points (2.0 per cent) from June, but still 18.7 points (10.1 per cent) below July last year. For the second consecutive month, strong wheat and maize quotations kept the cereal index rising, while rice prices fell. Unfavourable weather in North America and Europe caused a surge in international prices of wheat and major coarse grains during the first half of July, much of which was eroded in the second half as weather prospects improved. Rice prices remained on a falling trend, reflecting intense exporter competition for markets amid weak import demand. The FAO vegetable oil price index averaged 147.6 points in July, nearly nine points (5.5 per cent) below June and its lowest value since July 2009. The recent slide was primarily driven by developments in the palm and soy oil markets. International palm oil quotations eased on increased production in Southeast Asia, combined with slower exports, especially from Malaysia. Soy oil prices weakened further, on ample export availabilities in South America and a favourable outlook for global supply in 2015/16. Continued weakness in crude oil prices also weighed on the vegetable oil complex. The FAO dairy price index averaged 149.1 points in July, down 11.5 points (7.2 per cent) from June. Prices for dairy commodities declined across the board, with milk powders being most affected, followed by cheese and butter. Subdued import demand from China, the Middle East and North Africa caused prices to fall. Additionally, some manufacturers in New Zealand reduced prices in an attempt to trim inventories prior to the closure of the financial year, at the end of July. EU milk production is currently running above its level of a year ago, resulting in good availability of products for export.

The FAO meat price index* averaged 174.1 points in July, nearly unchanged from June. International prices of bovine meat moved up, offsetting a decline for pigmeat and ovine meat, while poultry quotations remained stable. Prices of beef from Australia, in particular, rose, supported by stronger import demand from the USA, Japan and South Korea amongst others. Muted domestic demand for pigmeat in some EU member states caused quotations to fall, with export prices following suit.

The FAO sugar price index averaged 181.2 points in July, up 4.4 points (2.5 per cent) from June 2015. The increase was largely due to reports of less than ideal harvesting conditions in the main sugar producing region of Brazil.



FAO Food Price Index

Also, so far into the season, a large share of the Brazilian sugarcane harvest is reportedly being diverted for the production of ethanol instead of sugar. The recent gain in sugar prices was contained by a slide in the Brazilian currency against the US dollar, together with expectations of ample supplies in the main sugar producing and exporting regions.

** Unlike for other commodity groups, most prices utilized in the calculation of the FAO meat price index are not available when the FAO food price index is computed and published; therefore, the value of the meat price index for the most recent months is derived from a mixture of projected and observed prices. This can, at times, require significant revisions in the final value of the FAO meat price index which could in turn influence the value of the FAO food price index.*

Thai tapioca exports look promising

THAILAND'S TAPIOCA EXPORTS remain promising this year, despite the country's tepid export performance and overall low farm prices, said Thai Tapioca Products Factory Association president Niyom Julaseree.

Tapioca is extracted from the root of cassava

Tapioca is a key ingredient in consumable items and non-consumable ones such as gasohol. The product's global demand went up almost up by 10 per cent per year in recent times. Shipment value expected to grow by 10 per cent this year. Until April 2015, product shipments grew by 8.6 per cent YoY to 4.38mn tonnes, with value rising by six per cent to US$3bn. Julaseree felt that Thailand's overall tapioca product exports could fetch US$122mn this year, up by 10.3 per cent from 2014. Last year, Thailand shipped 11mn tonnes of tapioca products, up 15.3 per cent. Tapioca chips prices are expected to range from 0.20 to 0.21 cents per kg. With China taking 85 per cent of Thai tapioca shipments, Asian export markets will remain crucial for Thai tapioca products due to low transport costs.

China to import more than a sixth of the world´s sorghum

CHINA IS EXPECTED to import more than a sixth of the world's sorghum, according to market intelligence firm CCM.

China Customs said that the country imported more than a million tonnes of sorghum in May alone and that imports have risen every month since February. CCM has predicted that China will import more than ten million tonnes of sorghum in 2015.

The spike in demand is being driven mainly by China's feed industry, which is turning to sorghum as a cheaper substitute for corn. More than 80 per cent of sorghum imported to China is used to produce feed, according to China's Ministry of Commerce.

Sorghum's chief advantage lies in its relative cheapness. At an average price of just US$284 per tonne, sorghum represents an attractive alternative for Chinese manufacturers. Though its lower nutritional value and tendency to cause constipation make sorghum unsuitable to completely replace corn, insiders in China's feed industry said Chinese manufacturers will typically choose sorghum over corn if the price difference exceeds US$24.5-US$32.7 per tonne. With the price difference currently more than triple that figure and no import quota for sorghum currently in place in China, it is possible that imports could rise even further in the coming months.

India likely to become largest feed market in years to come

THE ANIMAL FEED industry in India is growing at a CAGR of eight per cent and is expected to be worth US$30bn by 2020, according to a report by Yes Bank. The report, called *Indian Feed Industry – Revitalising Nutritional Security Knowledge*, puts the current value of the animal feed industry in the country at US$15bn. It also said that India's potential feed requirement stands at around 96mn tonnes while only 20.3mn tonnes were produced during 2012-13.

The feed demand from broiler sector will grow at a rate of eight per cent while demand for layers feed will grow by five to six per cent in the next five years, said the report. It went on to say that the poultry sector (broiler and layers) currently consumes 12.4mn tonnes and will grow to 22mn tonnes over the same time period of five years.

With this growth rate, India will soon become the largest feed market in the coming years. The feed industry requirements that are met with the compound feed are only 11 per cent, 14 per cent for aqua feed and 55 per cent for poultry feed.

The poultry sector will consume 22mn tonnes of feed by 2020, said the report from Yes Bank

Nitin Puri, president and national head of food and agribusiness research management at Yes Bank, who was lead author for the report, said that there is a huge scope for growth in the sector as the industry becomes more organised. He also said that the feed sector is taking new initiatives from feed production to storage, which includes silage, green fodder hydroponics and bypassing protein feed.

With multinational companies eyeing the lucrative Indian markets, the animal feed industry in India will have to increase its capacities, keeping in mind quality issues, to leverage the growing demand for compound feed, said the report.

Philippines focusing on meat exports

A new poultry dressing plant will be built at the cost of US$2.6mn

THE PHILIPPINES IS building two new publicly-funded meat processing plants with the aim to help increase meat exports from the country. This was announced by President Benigno Aquino III who also said that both the facilities will be completed and operational before the end of 2015.

One of the two meat processing units is a poultry dressing plant which will be built in Bamban in Tarlac province at the cost of more than US$2.6mn. The other unit is a slaughterhouse being built in Tanauan in Batangas province, and it will cost about US$3.3mn. President Aquino said that the units will help the country maximise the benefits of its eligibility as a meat exporter.

According to Aquino, the government has put a lot of emphasis on food safety so that the country can access more export markets. He said that the fact that The Philippines has been free of avian influenza since 2005 and foot-and-mouth disease since 2010 gives it a major advantage over most other countries in the region when it comes to exporting meat.

"The goal now is not only to maintain these standards but also to ensure that our livestock sector continues to grow," said the president.

Vietnam enhancing aquaculture productivity

Prawn production in Vietnam went up by more than 20 per cent from 2013 to 2014

VIETNAM HAS BEEN applying new measures and techniques to enhance productivity and quality of shrimp and fish farming. Through June 2015, the shrimp farming area has increased to 540,000 ha. Around only an eighth of the total area was used for growing whiteleg shrimp while the remaining 87 per cent of the area was used for black tiger shrimp.

Whiteleg shrimp accounted for 57 per cent of total production and the black tiger shrimp made up the remaining 43 per cent. Total shrimp production in 2014 reached 658,000 metric tonnes, 120,000 metric tonnes more than 2013.

In 2014, tilapia was cultured in 16,000 ha and 410,000 cu/m of cages, with average yield of over six metric tonnes per hectare. Tilapia and red tilapia production reached 125,000 metric tonnes, up 25 per cent from 2013. This year, tilapia is being farmed both in the north and the south.

Philippines making fisheries sustainable

THE PHILIPPINES, THROUGH the Department of Agriculture under the Bureau of Fisheries and Aquatic Resources, has been taking measures to ensure that fishing in the country's waters becomes sustainable, and that all forms of fishery resource use provide equitable benefits to stakeholders.

The department has engaged fisheries stakeholders to craft and implement policies and programs for the sustainable use and management of aquatic resources, so that these could continue to provide a stable supply of food, livelihood and ecological services. The bureau has also enforced four closed fishing seasons, from 2011 to 2015, which have led to the resurgence of tamban and galunggong, attracting more tuna that feed on them.

The country is also trying to implement its fishery laws more stringently now, upping the number of enforcers from four in 2010 to almost 200 now.

With the ongoing reforms, the EU has lifted its 'yellow card' warning for seafood coming from The Philippines. This would mean a greater market potential for Philippine fish exports to the EU and rest of the international market. The country's fishery exports rose from US$634mn in 2010 to more than US$1.15bn in 2013.

China pork imports to increase significantly in 2015-16

CHINA'S PORK IMPORTS are expected to expand significantly this year and next, mainly propelled by the culling of the country's hog herd.

According to Rabobank animal protein analyst Albert Vernooji, the next question is when the Chinese import growth will begin and how much volume would there be. Rabobank released their Q3 perspective on Global Pork Markets.

The agri-bank also stated that China's imports will expand second half of 2015 and into 2016. Currently, China's market hog inventory is 57mn lower than two years ago – down two million head a week. China's sow inventory is down 10.3mn from two years ago. China's market hog price is now US$1.25 US live weight a pound, whereas Mid-April it was 85 cents a pound US; the increase amounting to US$100 per head.

Lesser hogs and sows with increasing hog prices show decreased supply and high demand, paving the way for USA exports to China. As the world's leading consumer of pork, China imports more pork than any other country. In the past four years, USA has shipped, on an average, four pounds of every market-weight hog to China. USA

USA is keen to export pork to China this year

National Pork Board CEO Chris Hodges said, "Since the start of this year, we have been focused on bringing our new strategic plan to life."

Indonesia could increase beef import quota after drastic cut

INDONESIA MIGHT INCREASE its beef import quota by the end of this quarter after an evaluation of the supplies, said the country trade minister Rachmat Gobel.

The development follows the decision made by the country to import only 50,000 cattle in Q3 2015- a fifth of what was imported in the earlier quarters, shocking several cattle farmers especially in Australia. The country largely relies on the Indonesian market, and suppliers were left in a lurch as there was an excess of 150,000 cattle for export for which they were struggling to find buyers.

The Southeast Asian nation's decision to cut down on beef exports has also led to an increase in prices of beef, revealed farmers, citing political sensitivity between Australia and Indonesia as a possible reason for the decision to reduce imports.

Gobel, however, has not revealed yet when a decision on the quota would be taken.

Indonesia imported 97,747 live cattle, or 98 percent of Q1 2015 quota of 100,000. It issued permits to import 250,000 cattle in Q2 2015 and then added 29,000 head in anticipation of the annual rise in beef demand during the Islamic fasting months in June and July.

SIMA ASEAN 2015 to showcase the best of agricultural machinery

INTERNATIONAL TRADE SHOW organiser for agricultural suppliers SIMA and Thailand's trade show organiser IMPACT will host the SIMA ASEAN show from 17-19 September 2015 at Halls 1 and 2 of the Impact Exhibition Center in Bangkok.

The ASEAN region is experiencing a dynamic expansion in agriculture, fuelled by growing mechanisation of agricultural practices. Akkapol Senanarong, director of Agricultural Engineering Research Institute (AERI)'s department of agriculture, Ministry of Agriculture and Cooperatives said, "The Ministry of Agriculture and Cooperatives has been working continuously to drive the development of agro-industries in Thailand; promote the production of agricultural products and food efficiency; and create value-added agricultural products in accordance with market requirements. SIMA ASEAN Thailand 2015 can be a platform for technology, information and knowledge to promote agricultural development and productivity that can maintain Thailand's position in the global market."

SIMA ASEAN is expected to feature the latest agricultural equipment from around the world, which aim to serve Thailand's, and at large, ASEAN's growing agricultural industry. Products including inputs, traction, soil working equipment, plant treatment, harvesting, irrigation, storage, breeding equipment, spare parts, new technologies and first food proceses will be seen at the show. AWETA, BASF, BKT, Forges de Niaux, John Deere, Kubota, Kuhn, Manitou, Monosem, New Holland, Vredestein and Yanmar have already registered for the show, said organisers.

The show will be held in Bangkok's Impact Center

Buyers, suppliers, manufacturers, importers, exporters, farmers, and agriculture experts will get a chance to network. In addition, several innovations related to the growth and development of regional crops will also be showcased. Conferences on topical farming issues will provide farmers and breeders on the ASEAN region with better crop development, added the organisers.

To learn more about the companies showcasing at SIMA ASEAN, please turn to page 26

Livestock Asia to return in newer, bigger avatar

LIVESTOCK ASIA, ASIA'S international feed, livestock and meat industry biennial show will return to Malaysia at the Kuala Lumpur Convention Centre from 21-23 September 2015.

With the upcoming economic integration of ASEAN economies, the theme for the eighth edition of Livestock Asia is 'Feeding AEC's Future'. The show is expected to attract more than 7,000 trade visitors and delegates representing integrators, veterinarians, livestock farmers, feed millers, wholesalers, retailers, food processors, importers and distributors. More than 300 companies from 30 countries have signed up to participate in the show as exhibitors.

ASIA MEATEC 2015 Expo & Forum

Livestock Asia 2015 is expanding to include the first edition of ASIA MEATEC 2015 Expo & Forum, a co-located event that will focus specifically on the needs of the meat industry. ASIA MEATEC will feature everything about meat, from production to processing and packaging, with an intensive showcase of knowledge and application of meat production being shared by renowned experts in the global meat sector.

Halal Ingredients Asia 2015

Halal Ingredients Asia 2015 is another new component added to Livestock Asia. As the name suggests, it seeks to boost interest and participation from leading ingredients manufacturers, regulators, certification agencies, regional and local manufacturers, and solution providers to discuss key updates and shape the business of halal food and personal care in Asia.

WVPA-WPSA (Malaysia Branch) Scientific Conference

Livestock Asia 2015 is being held in conjunction with the second WVPA-WPSA (Malaysia Branch) Scientific Conference with the theme of 'Enhancing Innovation in Poultry Health and Production'. The conference is a platform to bring together industry experts and practitioners from universities, research institutes and industries in sharing of innovative knowledge and technologies, to foster future collaborations in poultry production, nutrition and health.

The event, to be held from 21 to 23 September, is introducing new components

Malaysian Livestock Industry Awards

The eighth Malaysian Livestock Industry Awards, like its previous editions, is meant to honour players and brands at the forefront of the livestock industry in Malaysia. Awards will be given out in four different categories — industry leadership; use of technology; health and safety; and marketing and promotions.

Indo Livestock 2015 pushes for animal protein consumption

THE 10TH EDITION of Indo Livestock 2015 Expo & Forum was held in Grand City Convex in Surabaya, Indonesia from 29-31 July.

More than 300 exhibitors from 36 countries participated in the three-day event that focuses on livestock, dairy, feed and fisheries industries in Indonesia. Hosted by the Directorate General of Livestock and Animal Health which comes under Indonesia's Ministry of Agriculture, the event was attended by more than 10,000 visitors that included buyers and decision makers from businesses across Asia.

Seminars and presentations

Other than the exhibitor stalls, there were various seminars, workshops and talks throughout the three days of the event to keep visitors engaged. Organised by various organisations including the Directorate General of Livestock and Animal Helath, industry associations and private companies, they covered a range of topics from food safety to animal health and use of data to improve breeding.

A particularly interesting seminar organised by the directorate was titled 'Feed Safety for Food Safety'. It was held with the aim of spreading public awareness about the effects of animal feed on the food people eat.

There was also an area dedicated to presentation of technical products. More than 1,100 visitors attended demonstrations of about 55 products from 20 companies.

A noteworthy talk on the theme of promoting the consumption of animal proteins was given by Dr. AT Soelih Estoepangesti of Airlangga University. It was followed by a cooking class where participants were taught to incorporate animal proteins from various sources in their cooking.

A cooking class to promote animal protein was held at the venue

Indo Livestock Services Awards 2015

The awards serve as a form of appreciation from the livestock community toward local governments which show high levels of commitment to the development of the livestock industry. This year, the award was won by Sinjai Regency and Malang Regency for their respective regions, while Tabanan Regency and Pasuruan Regency were both awarded the second place in their regions.

Asia's leading animal feed processing show set to return next year

THAILAND WILL HOST the 25th edition of VICTAM at the Bangkok International Trade Exhibition Centre (BITEC) from 29-31 March 2016.

VICTAM Asia is Asia Pacific's largest exhibition of equipment, technology and ancillary systems required for the production of feed for animals, aquafeed and dry petfood and biomass pellet production, said the organisers.

The organisers are hosting the leading animal feed processing show in Bangkok again, after the earlier edition held in 2014 was a success. There were more than 6,000 industry executives from South and Southeast Asia that attended the show.

VICTAM Asia will be supported by the Thai Ministry of Agriculture & Co-Operatives, Thai Department of Livestock Development, Thai Rice Exporters Association, Thai Chamber of Commerce, Thailand Convention & Exhibition Bureau, Thai Department of Fisheries, Thai Feed Mill Association, Thai Petfood Association, Thai Rice Milling Association and Thai Rice Packers Association.

Organisers said there were more than 6,000 industry executives from South and Southeast Asia that attended the show in 2014

Organisers also emphasised on the co-located shows FIAAP Asia 2016 and GRAPAS Asia 2016. FIAAP Asia 2016 is the only specialist exhibition and conference for the ingredients, additives and formulation of feeds for animals, aquafeed and dry petfood for the expanding Asia Pacific markets. This show directly relates with VICTAM Asia 2016 as it profiles animal feed production equipment and technology.

GRAPAS Asia 2016 is the only trade show in the Asia Pacific region for rice and flour milling systems, grain processing, storage, preservation and distribution, industrial noodle and pasta production, the manufacture of breakfast cereals and extruded snacks. Animal feeds require grains as a base for their production – this shows the synergy between the three shows and why GRAPAS Asia is co-located with VICTAM Asia.

In addition to the three main shows, visitors can expect a host of forums and conferences that will highlight the latest developments in the field of agribusiness. Petfood Forum Asia 2016, the Aquafeed Horizons Asia 2016, GRAPAS & Global Milling Conference Asia 2016, the 2nd ASEAN Feed & Rice Symposium and GMP+ are a few of the special conferences attendees can look forward to. A series of technical seminars will be organised by the exhibitors with a wide range of subjects.

The Federation of ASEAN Feed Milling Associations, which was formed in 2014, will convene again next year, where members will discuss and help determine future policies and objectives, in addition to looking at trading and financial implications of the impending ASEAN Free Trade Zone.

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For better, healthier eggs

Eggs for incubation should be free of cracks, which can easily be detected using egg candling procedures

The hatchability of eggs should be determined before placing them in incubators, and following standardised methods for the same is important

PRIOR TO SETTING eggs in the incubator, established criteria are used for selecting the best eggs to ensure maximum hatchability. The criteria used include freshness, size and shape, colour and quality of the shell.

If you are using your own eggs, collected and marked on a daily basis, you will know exactly how fresh they are. However, if eggs are bought in from outside, you could confirm what you have been told by the vendor, by using your own testing procedures.

Measuring the depth of the air sac is a non-destructive way of assessing egg freshness. A gauge that measures in millimetre is held over the blunt end of the egg while light is shone through it to measure the depth of the air sac. Eggs in top condition (class 'A' or 'AA') should have an air sac not more than six mm in height.

Assessment of the egg albumen is a useful but 'destructive' method, which may be 'profitably' used on a small sample taken from of a much larger number of eggs. Egg albumen is composed of three layers – thin and watery inner and outer layers separated by a central layer of thicker, more viscous material with a jelly-like consistency. The latter provides a protective cushion and acts as a shock absorber; the inner layer allows the yolk and blastoderm to rotate freely to ensure good contact with food and oxygen; and the outer layer permits efficient gaseous exchange.

When a fresh egg is broken onto a plane (horizontal) surface the different layers of albumen are easily identified because the egg stands rigid and well away from the surface. On the other hand, an old egg spreads out flat across the surface and the layers become indistinguishable from each other. This is because the proportion of thin albumen increases with age of egg – a trend that is exacerbated in the tropics.

Egg selection for incubation

Eggs selected for incubation should be free from any breakage including hairline cracks, which are most accurately detected using egg candling procedures. An egg candler is a simple home-made gadget comprising a wooden box enclosing a source of illumination (*e.g.* a light bulb) and with a hole of suitable shape and dimension at which the egg is held.

Optimum size of egg for incubation is within the medium size range for its specific type. Thus, for chicken eggs, this corresponds to a range of 53-63g (55g is ideal). Very small should be discarded for incubation purposes because they could lack yolk in an acceptable condition. They are commonly called 'wind' eggs. Exceptions are the inherently, and naturally, small eggs of *bantam* breeds. Even eggs that are just 10 per cent less than the ideal weight may have too small a yolk with insufficient concentrations of nutrients and minerals to carry development through to hatching.

The case against large eggs is less clear. The poultry farmer may be selectively breeding to obtain layers of large eggs but this has to be weighed against the greater chance of 'double yolks' in large eggs. Indeed, eggs just 10 per cent heavier than the ideal 55g weight have a high incidence of double yolks. Double yolks cause two chicks to develop together and fuse with fatal deformities. Be that as it may.

farmers wishing to incubate large eggs can always check for 'double yolks' by candling.

Visual assessment of size is sufficient for incubation selection, although weighing has the advantage of allowing the farmer to monitor weight loss during incubation and therefore, determine whether humidity levels are optimum. Normal weight loss for mainstream poultry eggs during incubation is about 12 per cent.

Selection of the right shape of egg is also important for success because it determines the location and shape of the air sac. Eggs that are too rounded may have a displaced air sac that prevents the chick from breathing while it is breaking out of the shell. Similarly, elongated eggs with straight sides should be not be used for incubation.

Shell quality is another important factor that determines suitability for incubation. Eggshell texture should be smooth and the surface devoid of chalkiness, blemishes and ridges, all of which indicate inadequate nutrition and/or stress in the laying hen. Ridges and thin areas are also indicative of old age and even infections in the layer.

Breed of bird largely determines eggshell colour. For instance, white eggs from Leghorns, brown eggs from Rhode Island Reds and dark speckled eggs from breeds such as Welsummer. The amount and distribution of a substance called *ooporphyrin* determines the concentration and pattern of surface pigmentation on the egg.

On a practical note, eggs with dark-coloured shells are more difficult to candle. Candling is the procedure in which eggs are held up to a strong light to identify defects. In addition to discarding those with cracks poultry producers should also discard those with blood spots, meat spots and defective (broken) *chalazae*.

Age of layer has a marked effect on egg fertility and hatchability. Pullets into their first month of laying are not suitable for producing eggs for incubation because they yield a large proportion of eggs with double yolks. The ideal age of layer is the second six months of its first year of laying or one which is into its second year. Birds older than this will start to produce an increasing proportion of infertile eggs or ones in which hatching fails because the chick is unsuccessful in breaking out.

Health and nutrition of the layer is clearly important to obtain strong fertile eggs but there are specific diseases, which can be carried into the egg and therefore, on to the hatching chick. For instance, hens with infectious bronchitis produce eggs with deformed shells while those carrying the bacterium *Salmonella pullorum* in their ovaries pass it onto the chicks, which suffer from bacillary white diarrhoea in the first few weeks after hatching.

Similarly *omphalatis* (mushy chick disease – the chick becomes necrotic in the egg) caused by *staphylococcus* bacteria; chronic respiratory disease and leucosis can all be passed on in this way. Incidence of these and other diseases is lessened by washing eggs destined for incubation in a suitable egg sanitiser.

Egg cleaning and washing

Opinions differ over the benefits and safety of cleaning and washing eggs that will be set for incubation. Dirt, soil and faeces will harbour disease-causing organisms that will clearly thrive and multiply in the favourable conditions of the incubator. Dirty eggs can be brushed clean using a small dry brush or sandpaper to remove visible physical contamination and a sharp knife or scalpel to scrape off hard thick mud and soil.

Eggs must be washed if microscopic bacteria and other microbes are to be removed. Use an egg sanitiser dissolved or mixed in warm water at the strength stipulated on the product label. The importance of warm water (35°C) is that it draws the bacteria away from the pores in the eggshell. Conversely, if the water used is at a lower temperature than the egg, the opposite occurs and bacteria are drawn into the egg. Replace the washing solution regularly if you are washing large numbers of eggs.

Eggs with darker shells are harder to candle

After washing, the eggs should be taken out, wiped with a clean kitchen scourer and left on kitchen paper/towels to dry. Alternatively, they can be left to drain and dry on plastic inserts that are designed for varying egg size and for slotting into the incubator trays. Some experts believe in as little cleaning as possible, citing a link between, scraping, cleaning and washing and loss in hatchability.

With selection eggs for setting in the incubator finally made only eggs of the same size, shape and from the same species should be incubated together and at the same time to ensure uniformity of hatch. □

– By Dr Terry Mabbett

Recycling heat in poultry barns to increase energy efficiency

A NEW WAY to recycle heat to make poultry barn heating more efficient has been developed by a researcher at the University of Missouri. Shawn Xu, an associate research professor at the university's College of Engineering, has built a waste heat recovery system that captures about 60 per cent of the exiting warm air to pre-warm the incoming air. This means that heaters will have to spend less energy and use less propane to heat the air in the barn.

"I realised, there's a strong ventilation in the barn, and that heating continues for 24 hours," Xu said. "The inside of the barn is 26-33°C. If you stand in front of the fan, that's warm air coming out of the barn. I said, 'Why don't we use that?'"

Along with his brother and research associate Tingsheng Xu whom he credits for prototyping and field testing the system, Xu developed a waste heat recovery system to make heating of poultry barns more even, more efficient, and perhaps most importantly, more cost effective by driving down the amount of propane required to heat the barns in the winter. Depending on the type of bird and the birds' ages, barns typically are kept anywhere from 18-33°C degrees round the year.

Xu compared two broiler barns in which eight heat recovery units were installed with two barns that had conventional heating systems. After two years, his data showed propane savings of between 45 and 50 per cent using the waste heat recovery units, with variations based on weather patterns and operations.

Xu said his system saves up to 50 per cent of barn heating costs

Xu is also set to receive a grant from USDA to study his preliminary hypothesis that the waste heat recovery system improves the air quality in the barns by lowering the amount of carbon dioxide, ammonia and moisture, as well as helping create bigger and healthier birds overall.

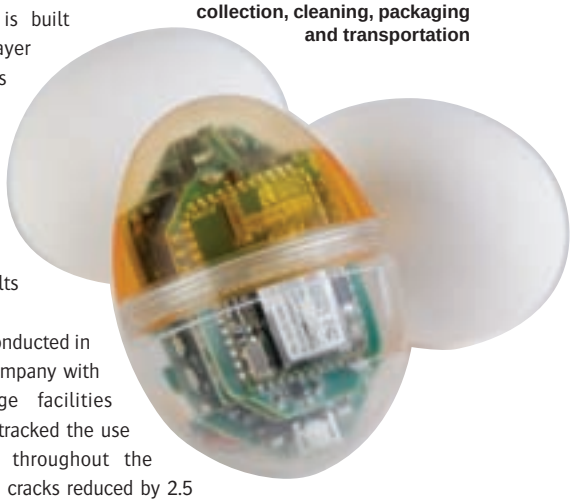
"We have a strong reason to believe that in the future, we can use this system to improve the mortality rate," Mr Xu said. "Still, we just have a few barns under observation, so the next grant should help us to verify those numbers."

A cracker of a deal for eggs

TEN PER CENT of eggs from hen houses are lost by producers, before they reach their commercial destination. Losses could occur during collection, while cleaning, packing and transporting. However, maintaining the integrity of the eggshell is essential for maximising production and profitability. Masitek's CracklessEgg wireless sensor system is a state-of-the-art technology that's easy to use and provides real time data to reduce cracks and damage in the egg handling process. The CracklessEgg systems is designed to point the exact location of damage in the laying and packaging processes, immediately quantifying the corrective action taken to improve efficiencies and profitability. Customers using CracklessEgg have reported an improvement of up to 10 per cent in quality rates.

Masitek's application can improve egg quality without hiring additional resources

Eggs could get cracked during collection, cleaning, packaging and transportation



The CracklessEgg is built for all hatcheries, layer and grading operations that are looking to improve quality without the need to hire additional resources. The device is user-friendly, and diagnosis and results are easy to interpret.

In a recent study conducted in Europe, a large egg company with barn and free range facilities housing 1.5mn layers tracked the use of the CracklessEgg throughout the farms, following which cracks reduced by 2.5 per cent on less than 10 per cent overall cracking; there was reduced wastage across all ages of flocks and an improvement in hygiene as well.

The return on investment was less than two days, adding US$40,000 per week to the profitability of the business. This study is supported by similar findings in other companies across the table egg and broiler hatching egg sectors. An egg shell is the carrier of valuable contents and first line of defence against potentially harmful bacteria. Keeping the shell intact is the key to healthy broods, safer eggs, and better bottom line profits.

Making animal vaccines safer

ANIMAL VACCINES COULD benefit from the work of two Purdue University researchers who are testing biomaterial made from sweet corn to make vaccines safer.

Harm HogenEsch, a professor in the university's College of Veterinary Medicine, and Yuan Yao, an associate professor in the College of Agriculture, are developing biomaterial from a non-genetically modified variety of sweet corn to use as an adjuvant in animal vaccines. Adjuvants are substances that are added to vaccines to stimulate an immune response and improve the performance of vaccines.

HogenEsch said, "The conventionally used oil emulsions and aluminium are poorly biodegradable and can induce a long-lasting inflammatory response at the injection site. Especially for food animals, that's an issue,"

Yao said the adjuvant biomaterial research is being conducted on a naturally occurring variety of corn. "The base material from which the biomaterial is made is nano-size and quickly digestible like a starch. Our research with small animals shows that these specifically designed biomaterial particulates act as an adjuvant by stimulating the interactions with immune cells," he added.

Genetically modified yeast as feed

Yeast with genetic changes combines protein with enzymes

NEW GENETIC RESEARCH being conducted at Queensland University of Technology (QUT), in collaboration with Scottish biotech company Ingenza Limited, aims to provide a nutritional boost to livestock and reduce costs for graziers and farmers.

Robert Speight of QUT said that the project will use a gene editing method that involves making precise and targeted changes to the genome of living cells. He gave the example of an 'advantaged' yeast that combines the additional protein requirement with enzyme supplements to help digestion and improve nutrient uptake in livestock.

He added that extending the range of enzymes would widen the potential implications and applications of this technology. "By developing an enhanced feed for livestock, it will reduce costs and improve on-farm profitability."

Better housing, improved quality

Ensuring cleanliness and hygiene in a pig pen is essential for their well-being and consequently, quality of produce

Photograph: casinozack/Shutterstock

The proper maintenance and upkeep of pigs is crucial to ensure high quality produce

CREATING A SAFE, comfortable and well-equipped housing area for pigs is essential to keep up their quality and health. Pigs mostly need to be well protected from extreme temperature and sunburn, in addition to being kept in hygenic conditions. Pig farming is done extensively in China and Southeast Asia, though its not a popular concept in tropical regions.

In several countries, pigs are not housed in appropriate conditions. FAO officials have stated that fenced paddocks with shade and water are ideal for pigs, where they are protected from the direct sun (excessive heat could cause sunstroke, especially in white skinned pigs). In addition to being housed in shaded areas, pigs should also be given supplementary feed. These are basic measures that can help reduce mortality rate, and improve reproductive performance as well as quality of meat. In addition, there are companies that specialise in providing specific and improvised solutions to ensure that hogs are housed in a safe, clean and hygenic manner.

One of the leading pig housing equipment solution provider is Big Dutchman. The Dutch company has to its credit several innovations in the field of pig housing. The computer-controlled dry feeding system DryExactpro is one such, which allows feed to be dispensed on the basis of volume and weight. With the rise in automatic feeding systems for hogs, dry feeding methods are gaining popularity in Asian nations. Tunnel ventilation systems, pig climate control systems as well as a dosing system called EasySlider are products that have a thriving market.

Recently, Big Dutchman launched the EasySlider, which allows easy feed management and enables efficient cleaning of pig pens.

The MagixX-Pig+ and the Helixx and Magixx exhaust air treatment systems have been conceptualised by the company to limit the emissions from pig houses such as ammonia and mitigate odour as well.

Ensuring cleanliness and hygiene on pig farms isn't an easy task. While some farms may be better enabled to use technology-centric solutions to keep the areas clean, there may be others that prefer to work on the same requirement in a conventional manner. One such task is bedding down pig pens, which basically involves creating a dry area for pigs to live in by spreading straw evenly. Earlier, bedding down could take upto a day but Spread-a-Bale's hydraulic machine distributes straw by throwing it across the pen in an even and methodical manner. Since bedding down is an important, but labour-intensive process, farmers have experienced fatigue. Spread-a-bale mitigates the possibility of fatigue, and even saves up to 20 per cent straw.

US-based Farmtek, which specialises in agricultural products and livestock solutions, has conceptualised the ClearSpan™ Pony Wall Buildings. These buildings allow natural light to flow into barns, thereby providing a stress-free, healthy environment for both livestock and workers. Pony Wall Buildings are intended for use on wood posts or on a foundation wall. With a triple-galvanised steel tubing, the structure comes with a white sheet that will keep the building cool in summer and warm in winter. Though the Pony Wall Buildings are sold without end panels, they could be equipped with ends, roll-up sides and be insulated with TekFoil Reflective Insulation, also provided by FarmTek.

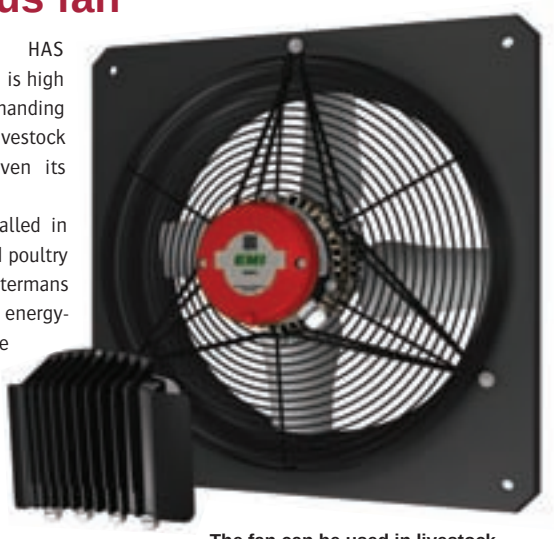
Several animal husbandry organisations elucidate methods to ensure adequate maintenance of pigs, which in turn can guarantee good quality meat. By ensuring protection from heat, cold, disease (especially through stagnant water), and special steps to enable the care of pregnant pigs could go a long way in keeping up quality of the produce. ☐

Vostermans Ventilation's energy efficient ECplus fan

VOSTERMANS VENTILATION HAS introduced the ECplus fan, which is high on energy savings. Under demanding operating conditions in the livestock industry, the product has proven its reliability, stated the company.

The ECplus fan can be installed in existing, as well as new pork and poultry houses. For existing houses, Vostermans Ventilation offers also additional energy-saving solutions such as the Intelligent Fan Drive and the Frelink-4f.

The fan can achieve high energy savings by further optimising the motors and impellers. By merging the fan with the control unit, the ECplus is calibrated for the motor-impeller configuration.



The fan can be used in livestock houses

Lower motor temperatures also result in more energy savings and also extends the lifespan of the fan. Recent tests of the ECplus at the French research institute IFIP show energy savings exceeding 80 per cent, compared to traditional fan systems.

The customer and industry feedback on the product has been uplifting, stated the company. The product can be installed easily and is low-maintenance as well.

Reducing heat stress in cows

HEAT AND HUMIDITY can make dairy cows uneasy. The thermo-neutral zone for such cows ranges from just above zero to 22 deg C. A rise in temperatures coupled with humidity could begin to change the basal metabolism and metabolic rate in cows, affecting milk yield and reproduction.

Nutriad's additive Nutri-Ferm Prime, a direct-fed microbial product based on two different strains of fungal extracts and two strains of yeast cultures, has been tested in vitro and in vivo, and is effective in reducing the impact of heat on production and reproduction efficiency in cows.

Nutriad ruminant manager Hassan Taweel said, "Because heat stress affects rumen, endocrine and metabolic function, additives that act at rumen and metabolic levels can be employed to alleviate heat stress." Nutriad's additive has improved the growth rate of major bacterial and fungal species in the rumen (on average 20 per cent increase in growth rate and 17 per cent decline in doubling time). Addition of Nutri-Ferm Prime to the ration improves rumen microbial fermentation and increases microbial protein synthesis and fibre digestion.

There is a rampant fear of the streptococcus bacterium affecting cultured tilapia

Renewed tilapia farming in Malaysia

Image source: Lapon Pinta/Shutterstock

Scientists at Universiti Sains Malaysia, as well as other think tanks and organisations, have recommended ways to promote sustainable tilapia farming in Malaysia

TILAPIA IS A key resource for the country's freshwater fish needs. According to the FAO, Nile tilapia accounts for 44.7 per cent of the total freshwater aquaculture production in Malaysia, followed by catfish and carps.

However, despite rapid growth in the sector and a high potential for tilapia fish farming, there are certain challenges such as poor development of the fish, high mortality and losses due to disease and low economic return are common in tilapia farms.

In order to boost the sector, the fisheries department in Malaysia began a breeding programme in 2002 to develop genetically-improved farm tilapia (GIFT). Scientists at Universiti Sains Malaysia, the National Prawn Fry Production and Research Centre, and the World Fish Centre have examined the performance of the strain's growth performance, and how genetic selection affected harvest weight over a 10-year period. They found a significant genetic improvement in harvest weight in the GIFT population and said that the strain was a valuable genetic resource for the aquaculture industry.

In addition, the scientists have also recommended the implementation of a systematic approach to brood stock management and dissemination to ensure the effective use and sustainability of the strain.

However, genetic improvement is only one way to provide an impetus to fish farming in Malaysia. There still remains the need to mitigate economic losses due to *streptococcus* – a gram positive bacterium that has caused considerable mortality in cultured fish stocks worldwide. It has been estimated that streptococcus caused a loss amounting to nearly US$250mn in 2008 alone, and there have been outbreaks across Malaysia, stated the Universiti Putra Malaysia.

In order to remedy the effects of the bacteria, scientists at the university and the Fisheries Research Institute have reviewed recent research to analyse potential control and prevention measures for streptococcal infection in cultured tilapia. They recommended the establishment of tilapia fish farms in sites with moderate rates of water flow, such as upstream in rivers and in irrigation canals, stating that juvenile tilapia fish (used for fish farming) must come from disease-free hatcheries.

They also suggested that stock densities in fish farms be monitored and modified as fish sizes increase. Water quality should be continuously monitored, while antibiotics and vaccination regimes should be introduced.

Sustainable tilapia farming isn't an entirely uncommon concept in the Southeast Asian country. In June 2014, WWF Malaysia organised a visit to Lake Temengor, in Perak, as part of the Sustainable Seafood Festival (SSF). Fifteen Malaysian seafood retailers, distributors, restaurant owners and chefs were taught sustainable methods of tilapia farming. According to Aquaculture Stewardship Council (ASC) CEO Chris Ninnes, it was important that retailers and seafood producers engage at the grassroot level and encourage the supply chain to commit to responsible seafood sourcing. ☐

Tackling illegal fishing

A GROWING NUMBER of countries are ratifying an international agreement to combat illegal fishing, Illegal, unreported and unregulated (IUU) fishing takes away billions of dollars from the global economy, but its impact also undermines efforts toward sustainable fishing, which upsets fish stocks around the world and affects food security as well.

More than 10 per cent of the global output is from illicit fishing

In 2009, FAO urged its member countries to adopt the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. It needs ratification from 25 countries to come into force, and 12 members have already done so, with two more expected to join soon.

'Port state measures' refer to steps taken to detect illegal fishing when ships come to port. The agreement promotes collaboration between fishermen, port authorities, coast guards and navies to strengthen inspections and control procedures at ports and on vessels.

Counting aquatic organisms made easy

ONE OF THE PROBLEMS in aquaculture is keeping a track of the number of animals in production when they are still not adults, due to the small size of many species. The inherent difficulty of counting small aquatic animals with a reasonable degree of accuracy may soon become a thing of the past, bringing relief to the aquaculture community.

Canada-based technology company XpertSea has built XperCount, a device that uses the company's patented technology, merging optics and machine vision to count, size and image millions of small aquatic organisms within seconds, effectively doing away with traditional labour-intensive methods such as hand counting.

The device can count specimens in up to 10 litres of water within 10 seconds and has accuracy of up to 95 per cent. Other than saving time, the accuracy can also help producers reduce costs on both labour and feed.

The company has also developed a number of custom applications for counting eggs, nauplii, larvae, post-larvae and juveniles for a wide variety of aquatic species, from shrimp, crab and lobster to echinoderms and all the industry's most farmed fish species, as well as live feed and microalgae.

Customers also have the option of using the company's cloud service that will store their measurements and provide them customised reports.

The XperCount device and its data platform are scheduled for an international commercial release later this year.

Reducing seafood fraud by improving traceability in the supply chain

THE MARINE STEWARDSHIP Council (MSC) is exploring new ways for additional protection from seafood fraud in its supply chain. Over the past two years, MSC has been piloting a new traceability tool, the MSC Online Transaction Solution, and is seeking feedback from industry stakeholders to shape its continued development.

The tool is pioneering because there is currently no online system available that can securely handle and verify information of seafood supply chain transactions on a global scale. MSC's solution verifies seafood sales and purchases made by processing, distribution and retail companies as it moves through the increasingly complex global supply chain.

The online verification tool has been tested in seven European and 15 Chinese companies since being developed in 2012. As of now, MSC plans to roll out the tool to over 3,000 supply chain companies handling certified products in over 34,000 sites globally. These companies already hold an MSC Chain of Custody certificate, which is another standard of certification issued by MSC.

DNA testing shows that 99 per cent of MSC labelled products are correctly labelled, demonstrating the integrity of the current system. MSC is seeking to evolve its tools and systems in order to ensure a traceable supply chain for seafood.

MSC is seeking to evolve its tools and systems in order to ensure that its Chain of Custody standard continues to lead the industry in ensuring a traceable supply chain for seafood. The Online Transaction Solution is a step in that direction, and as a complementary system to the Chain of Custody standard, it is meant to be a more scalable monitoring mechanism.

Titia Sjenitzer, senior product integrity manager at MSC said that "more scalable monitoring mechanisms are required to ensure the MSC's system remains efficient and effective."

"We took part in trialling the MSC Online Transaction Solution and felt it is an important addition to our business. The tool provides us with added confidence that our brand and products are running through a secure and genuine supply chain handling only certified seafood," said Alex Olsen of A. Espersen A/S, an MSC certified processing company in Denmark.

The public consultation is open until 18 September 2015. Seafood industry members can share insights by taking part in the online consultation. This is the second and final opportunity for industry partners to offer their expertise, and help shape an effective tool that would meet current and future industry demands.

If the pilot proves successful, the new tool will be implemented across the full programme by 2018. It will verify seafood sales and purchases transaction information, such as volume, species, invoice number and transaction date, to reduce the risk of non-sustainable products being labelled and sold as certified.

The importance of copper in rice growth

There is a resurgence in interest and application of cuprous oxide to rice as a micronutrient and as a fungicide/bactericide to control a range of highly damaging diseases (Image source: Dr. Terry Mabbett)

COPPER AS A micronutrient is intrinsic to proper growth and development of chlorophyll-containing plants, and is unrivalled in pesticide activity spectrum, being effective against fungal and bacterial pathogens, lower green plants such as algae and even some invertebrate animal pests like snails and slugs.

Copper is best known as the active constituent of fixed copper fungicides that are routinely sprayed on tropical tree crops for the control of fungal pathogens (e.g. Hemileia vastatrix that causes coffee leaf rust and Mycosphaerella sp that cause sigatoka diseases of banana) and fungus-like pathogens (e.g. Phytophthora palmivora which causes pod rot of cocoa).

Copper use has a rich history in cereal crops, especially in lowland irrigated (paddy) rice. There has been a resurgence of interest in copper-containing products both for the nutrition and protection of rice, with an accompanying renaissance in use

History of copper as fungicide

The discovery of copper as a fungicide is credited to a Frenchman, Pierre-Marie-Alexis Millardet, a professor of botany at the University of Bordeaux in France. In 1885, Millardet had made a thick gelatinous precipitate by mixing soluble blue copper sulphate with slaked lime (calcium hydroxide) to spray on his grapevines that would stop thieves from stealing grapes. Whether he was successful in this is unclear, but application of the mixture inadvertently controlled the infestation of a fungus-like pathogen called Plasmopara viticola that was causing downy mildew disease. His concoction was subsequently commercialised as 'Bordeaux mixture' and it sowed the seeds of modern fungicide technology and contemporary chemical disease control of crop plant diseases.

Another event of a similar nature had taken place almost 80 years ago, also in France. In the spring of 1807, Professor Isaac-Bénédict Prévost sowed some wheat seed in a copper basket through the winter. To his amazement, the resulting wheat plants were free of the disease called bunt which is caused by a seed-borne fungal pathogen called Tilletia caries.

Copper on the surface of the basket had corroded (oxidised) to form a natural green powdery deposit called verdigris (oxychlorides of copper), which adhered to the seeds and killed the seed-borne fungus responsible for bunt. In this case, the cereal was wheat but the same thing would have happened even if it was rice seeds in the basket instead of wheat.

Though dwarfed by Millardet's discovery 80 years later, Prévost's finding is significant on two counts. The early post-Millardet use of copper on a commercial scale, whether as a fertiliser or a fungicide, essentially relied on the use of highly soluble copper sulphate as crystals of blue hydrated copper sulphate (CuSO4.5H2O), or alternatively, the sparingly soluble Bordeaux mixture from which the active copper is released much more gradually.

Either way, the net result in the availability of copper ions in the environmental is not ideal. The use of highly soluble blue copper sulphate in a stand-alone capacity provides a 'transitory' effect because the copper sulphate is rapidly washed off the plant and into the soil. Bordeaux mixture provides a more suitable copper release profile but use of an alkali (calcium hydroxide) in the preparation is not ideal. Crop phytotoxicity accompanied the early use of copper, whether as stand-

alone copper sulphate or as Bordeaux mixture.

By accidentally displaying the fungicidal property of naturally formed copper oxychloride, Prévost had inadvertently laid the groundwork for development and use of fixed copper compounds (e.g. copper oxychloride, cupric hydroxide and cuprous oxide) that would come much later. Owing to their sparingly soluble properties, these copper compounds provide superior efficacy without accompanying crop phytotoxicity. Cuprous oxide contains over 80 per cent of elemental copper (on a molecular weight basis) and is therefore the most potentially potent of fixed copper compounds.

Copper as a micronutrient in rice

The extent to which copper is used as part of overall fertiliser application depends on copper content in the soil and the inherent responsiveness of a particular crop to application of copper.

Copper is held strongly by organic matter in soil due to absorption of copper by humic and fulvic acids in high peat soils. Exchangeable copper is held very tightly on clay mineral fractions but leaching may be high from very sandy soils. Over-liming of acid soils may cause increased amounts of copper to be complexed by the organic matter fraction, or the copper may be adsorbed and occluded by hydroxides and oxides in the clay mineral fraction, and both these scenarios may reduce copper available for crops.

For these reasons, a wide range of soils can exhibit low copper availability status. They include soils with high levels of organic matter (histosols, podzols and humic volcanic ash soils), lateritic, highly weathered soils (such as utisols and oxisols), soils derived from marine sediments (limestone) and generally calcareous (alkaline reaction) soils, as well as those of a distinctly sandy composition. Cereals are prominent amongst the crops which are most responsive to applications of copper.

Copper as a contemporary micronutrient

Copper is often applied alongside at least one other micronutrient. All micronutrients are important but depending on the crop, some are deemed to be more important than others. In the case of rice, that micronutrient is zinc and it can be applied with copper as a single product.

One such product is Verno FG (Cu30 + Zn30; 30% each of elemental copper and zinc) from Nordox, the original manufacturer of cuprous oxide as an agricultural fungicide. Verno FG is a foliar fertiliser containing micronised particles of oxides and carbonates as water dispersible granules. The particles adhere strongly to the surface of the leaves and other aerial parts of the rice plant to provide a reservoir of slow release copper and zinc.

This leaves copper and zinc ions always 'ready and available' at the key stages of growth and development when these micronutrients are required by roots and stems. For rice, the product is used at rates of between 200-400 g/ha, applied by foliar spray at the beginning of rice stem elongation (Zadoks growth stage 30-32) or 25 days after transplanting.

Copper deficiency symptoms in rice

Foliar symptoms of copper deficiency in rice may include:

- Yellowing (chlorotic) streaks on each side of the mid rib (centrally located main vein)
- Leaf tips with dark brown necrotic lesions
- Glaucous (blue-green) and chlorotic (yellowing) colouration at the leaf tips
- Distinctive rolling of the new leaves (Newly-formed leaves do not unroll. The upper portion has a needle-like appearance while the lower portion appears normal)
- Reduced tillering

Water snails are within the activity spectrum of divalent copper ion. Photo shows snail eggs laid on rice stem above the water line (Image source: Dr. Terry Mabbett)

Cereals including rice may also experience 'sub-clinical' copper deficiency with yields depressed by 20 per cent or more without plants showing any obvious visible symptoms. Sub-clinical copper deficiency is easily confused with drought or fungal infections. This type of deficiency has been shown to cause anther abnormality with accompanying

reduced male fertility, caused by excessive accumulation of the natural plant growth regulator called auxin. Pollen availability is reduced and spikelets become sterile with unfilled grains.

Reasons for this become clear when the key functions of copper as a micronutrient are considered. The most high profile and best understood of these is copper as a co-factor for the enzyme polyphenol oxidase. Sub-clinical copper deficiencies inhibit the action of polyphenol to cause accumulations of phenolic compounds. This, in turn, inhibits another enzyme called auxin oxidase which causes excess amounts of auxin, resulting in anther abnormality.

Copper in rice disease control

Crop nutrition and plant health are often closely linked and integrated, as seen in the subtle effect of copper as a plant protection agent when applied as a micronutrient. Copper ions are known to elicit the production of low molecular mass secondary metabolites called phytoalexins, whose anti-microbial activity and ability to prevent and pre-empt leaf infection by fungal plant pathogens is well established.

This does not diminish direct control of fungal and bacterial pathogens of rice by fixed copper compounds. Early use of copper as a foliar fungicide and bactericide to control key diseases like rice blast (Magnaporthe sp), bacterial leaf blight (Xanthomonas oryzae pv. oryzae) and bacterial leaf streak (Xanthomonas oryzae pv. oryzicola) was overshadowed by the focus on and preoccupation with organo-mercurial fungicides and antibiotics. Neither proved satisfactory from the safety point of view, whether related to operators, consumers or the environment.

There is a resurgent interest and a renaissance in the use of cuprous oxide as seed dressing or foliar spray for the control of these key pathogens/diseases and other rice diseases such as sheath blight

The slow release of fixed copper fungicides like cuprous oxide is especially important for the wet environments in which lowland rice thrives (Image source: Dr. Terry Mabbett)

(Rhizoctonia solani), a fungal infection increasingly significant in all rice growing countries.

Multiplicity of copper use does not end at the foliar stage because the pesticide potential of copper extends to other plant and animal groups. These include water moulds/oomycota (Achyla and Pythium), green algae and molluscs (snails and slugs), all of which thrive in the 'aquatic' environment of lowland paddy rice. □

– Dr. Terry Mabbett

Vanodine's protection against Fusarium

Specialised disinfectants can prevent transmission of plant pathogens. (Image source: Unsplash/Pixabay)

VANODINE'S EFFICACY EXTENDS to Fusarium Wilt and many other pathogens and the product is available and is now protecting southeast Asian banana plantations from the spread of such diseases.

The protection of plant and fruit species from pests, insects and fungi through the use of pesiticides is well-known, however the use of environmentally safer and more specialised disinfectants to prevent transmission of plant pathogens is perhaps much less known as one of the key methods used against the spread of plant disease.

In the early 1970s, the spread of MOKO'S disease across the banana plantations in central and Latin America was brought under control though the introduction of Vanodine disinfectant. Regular disinfection of the tools, handling and crating equipment, coupled with vehicle and Improved plantation biosecurity programmes together brought control to a pathogen, which previously had a commercially devastating impact on the crops.

Vietnam could export lychee to Australia and USA

VIETNAM, WHICH MAJORLY exports lychee to China, is now looking at other nations to send its produce to. While China is one of the largest markets for Vietnam with a 60 per cent share, political tension between the two nations could force Vietnam to consider markets such as Australia and USA.

Though the political tensions haven't had a major impact on the entire export market, certain products such as lychee have taken a hit, stated Vietnamese reports. Traders have said that despite having a bumper crop, there were no Chinese buyers in 2014.

This year, while several traders are choosing to remain loyal to China, others have begun considering reliable trading partners such as USA and Australia. So far, only 35 tonnes have been exported to the two countries but it is considered significant enough by the market leaders.

Specifically, Australia appears to be a potentially lucrative market for Vietnam as it is quicker to fly the lychee consignments to Melbourne, than sending the produce from the north of Australia to the south by truck, said Australian traders.

Traditionally a major coffee, rice and catfish exporter, Vietnam is now focusing on exporting lychee after major exporters such as China, Thailand and India. The fruit crop is mostly consumed in Vietnam domestically, but exports are growing – they went up from US$622mn in 2011 to more than US$1.4bn in 2014, according to official figures.

The Vietnamese government is targeting a ten-fold increase over the coming years, with crops like longan, dragon fruit and lychee being given priority.

According to Nguyen Van Tuat, vice-president of the Academy of Agricultural Sciences at Vietnam, opening up newer markets will also reduce the country's reliance on China and make it economically active.

How thermal fogging machines helps in plantations

THE MOST COMMON way of acting against pests and diseases in crops is the use of motorised knapsack sprayers, which spray upwards of 600 litres of the spraying mixture per hectare. The tank capacity of a typical backpack sprayer is 10 litres, which needs 60 refills for treating just one hectare.

An alternative is the use of thermal fogging machines which require a fogging mixture quantity of only three to six litres per hectare. Compared to sprayers, foggers create much bigger quantities of smaller droplets. Because of the 'natural' distribution of fog, it is a suitable method to treat large areas.

The time needed to fog one hectare is inversely proportional to the size of the fogging machine used. Swingtec GmbH provides three different options:

- Portable SWINGFOG SN 50: approximately 9-18 minutes (using 1.0 mm nozzle with an output of 20.5 litres per hour)
- Medium-sized SWINGFOG SN 81: approximately 5-9 minutes (using 1.4 mm nozzle with an output of 39 litres per hour)
- Truck-mountable SWINGFOG SN 101: approximately 3-5 minutes (using 1.7 mm nozzle with an output of 69 litres per hour)

Time spent on transport and preparation of the carrier is also an important factor, as is the amount of carrier required. Using the portable SWINGFOG SN 50, treating one hectare with five litres of fog mixture in 15 minutes requires approximately half a litre of petrol, compared to approximately nine litres of fuel required to apply 600 litres of spray mixture with a backpack sprayer.

Fogging leads to substantial savings on carrier cost, especially if diesel or kerosene is used as the carrier. In case the carrier is water, fogging leads to considerable saving of the natural resource which can then be used for other purposes, such as irrigation. Using water as a carrier instead of any oil is also less polluting.

Fogging should be done before sunrise for the fog to settle slowly and stay low

When using water as a carrier, SWINGFOG has a patented high-performance fogging tube option which produces a droplet spectrum that almost matches an oil-based fog. When applying water with the normal fogging tube, droplets of more than 100 µm are also produced and they fall on the ground directly in front of the device, being totally ineffective.

It should be kept in mind that the distribution of fog mainly follows wind and thermal conditions. For instance, a light breeze can be used for extending the range of the fog cloud. In case of plantations of bushes and low plants where the fog should stay low and settle down slowly, application should be made before sunrise. In case the plantation consists of trees with canopies which the fog should reach, the fogging should be performed during the late afternoon when the thermal draft will drive the fog upwards.

CropLife Asia works with farmers, retailers and extension personnel to advocate the use of responsible crop care methods

(Image source: ittipon/Shutterstock)

Crop care made responsible

Crop protection stewardship can go a long way in helping farmers, consumers and food processing companies, explains Raghavan Sampathkumar

CULTIVATION PRACTICES – RIGHT from seed to protecting crops from pests and diseases – can have major effects across the food chain. For example, pests and diseases, when not managed properly, may result in economic loss and also affect nutritional qualities of the produce, thereby impacting the livelihoods of the farmers. Good quality seeds along with better technologies, safer and high performance inputs (fertilisers and pesticides) when used correctly could enhance crop productivity and food quality, leading to better incomes for farmers and reducing harmful effects on the ecosystem.

Crop protection stewardship is a holistic product life-cycle approach whereby benefits of crop care products are maximised through responsible and judicious use, while risks are minimised through educating the users against indiscriminate and incorrect usage.

The concept of crop protection has a wide range of benefits. Farmers, by controlling the use of pesticide to necessary amounts, are mitigating unnecessary expenditure, crop losses, development of resistance in pests and presence of excessive residues in the final produce.

On the other hand, safe and good quality raw materials are the most essential requirements for a profitable animal feed sector and it would be a huge challenge if the raw materials do not meet the mandatory quality standards. Food quality particularly, presence of chemical residues beyond permissible limits and contamination in the farm produce affect both food and feed industries alike. While human health concerns become a hot topic, in the livestock sector, meat production and quality are greatly affected. Most of these quality issues in feed raw materials can be addressed appropriately if farmers learn and adopt good agricultural practices including, use of inputs like pesticides judiciously and responsibly.

CropLife Asia works with farmers, retailers, extension personnel and several NGOs to advocate the use of adopting Integrated Pest Management (IPM), Responsible Use and Safe Storage and Integrated Resistance Management (IRM) under the gamut of Good Agricultural Practices (GAP). These initiatives continue to successfully demonstrate enormous benefits – both tangible and intangible – to all the stakeholders of the food value chain including farmers, agri-input supply chain, food processors and consumers.

Depending on the stakeholders, these efforts are focusing on various aspects including helping farmers realise higher net returns with significant savings in input costs, conforming to the Maximum Residue Limit (MRL) for exports, enable and inspire to adopt IPM principles, use personal protective equipments while handling chemicals, eliminating unnecessary use of pesticides, improved personal health and overall reduction in environmental pollution and possible public health hazards.

To date, the company has provided hands-on training to farmers in Malaysia, Sri Lanka and Bangladesh through multi-stakeholder initiatives. In Thailand, CropLife Asia along with Mahidol University are focusing on safe handling of pesticides and spray applicators. In Bangladesh, Taiwan and China, the issues of counterfeits and illegal products have been tackled through campaigns

Through such initiatives farmers increased crop productivity resulting in increased incomes and profits while minimising the impacts on the ecosystem and also contributing to improving overall rural livelihoods. ☐

- The writer is the Stewardship Director at CropLife Asia, Singapore

Sabah could produce 100 per cent CSPO by 2025

MALAYSIAN STATE SABAH, which produces 12 per cent of the global palm oil, is aiming to make only Certified Sustainable Palm Oil (CSPO) by 2025.

The proposal will be presented to the Sabah state government for consideration and to weigh the costs and benefits of such an outcome. Certification in accordance with an internationally recognised standard such as that of the Roundtable on Sustainable Palm Oil (RSPO), will see palm oil and all palm derivatives in Sabah produced in a legal, ecologically sustainable and socially acceptable manner.

The move is expected to provide new long-term opportunities to the state producers to access premium markets worldwide and enhance local manufacturing. Earlier this year, challenges faced by smallholders and independent farmers were highlighted by the key members of the palm oil industry in Sabah. The smallholders find it difficult to secure international standard certification.

Sabah is now laying the groundwork to asses all possibilities, by bringing together all stakeholders – government, industry, civil society and communities – to coalesce and collaborate around a set of principles and criteria that promote best practices, greater efficiency and transparency.

The Malaysian state's forestry department director Datuk Sam Mannan said as a responsible government, looking at the horizon and considering the significance of palm oil income to the state, Sabah needs to strategise accordingly. The Sabah Forestry Department indirectly owns about 100,000 ha of planted oil palm plantations.

India could sequence wheat genome in three years

INDIA HAS SET a three-year target to sequence the wheat genome and procure better quality variety, the Indian Council of Agricultural Research (ICAR) has said.

So far, the sequenced genome is a blueprint-only and not the complete genome. A French group that started sequencing before 2005 has been successful in doing so for one chromosome, said ICAR. Until now, sequencing of the whole wheat genome has been partially successful.

The wheat variety is expected to withstand high temperatures as they have been collected from the Middle East by various explorers. Citing the impending effect of global warming on farming, ICAR officials added, "Climate change leads to rise in global mean temperature resulting in droughts, flooding, and altered land behaviour. Besides, high temperature during seed-sowing periods adversely affects the production."

Part of genomes responsible for high growth of seeds and lesser water consumption has been identified by studying a hybrid of the drought-resistant C-306 and a green revolution variety W-711. According to the ICAR, the wheat reproduction pace could be almost doubled once the genome sequencing is identified. By the identifying the DNAs regulating various traits a new variety of wheat can be developed in five to seven years as compared to 10-15, it said. In addition to wheat, paddy and tomato crops have also been considered for genome sequencing, resulting in the arrival of new paddy seeds.

Several machinery innovations could be useful to Southeast Asia's paddy fields

Mechanising the way to the future

Image source: smereka/Shutterstock

Ahead of SIMA ASEAN 2015, here are some of the leading machinery manufacturers and their signature solutions for the Southeast Asian markets

AGRICULTURE MECHANISATION HAS become the need of the hour, according to farmers, researchers and machinery investors. The trend being witnessed across the Asia Pacific indicates a steady growth in demand for agricultural machinery, specifically threshers, harvesters, tillers, balers, rotavators and rice transplanters. Machinery manufacturers appear to be placing their bets on the Asia Pacific region, which is touted to be the fastest growing region and is expected to reach its full potential by 2022. Specifically, maximum growth is expected from China and India. However, comparitively smaller economies such as Vietnam and Thailand, which are more agriculture-intensive, also hold a lot of potential for machinery.

Thailand a major hub for agriculture machinery

At the upcoming SIMA ASEAN show, visitors can fully explore the markets for machinery and equipment. Major exhibitors include John Deere, Siam Kubota, Manitou Group, Minsk Tractor Works, Supertech Bio-Organic Marketing, AC High Technology (Ancoo), Chokchai Agricultural Machinery, Echo and Sakpattanakarnkaset – all of whom have a major presence in Thailand. With 40 per cent of its land dedicated to agricultural cultivation, Thailand is an upcoming agriculture hub in Southeast Asia, stated the organisers. The country grows rice, sugarcane, corn, cassava, palm nuts and a range of fruits and vegetables. With continuing investment in the equipment sector, analysts have stated that agriculture will become modernised very soon.

John Deere

The company, being the platinum sponsor for SIMA ASEAN, is bound to attract a lot of visitors. John Deere has a range of specialised equipment for Thailand's robust agriculture sector, which include tractors and forage harvesters. Specifically, tractors series 5000 and 6000 are popular, and their various models are successful across Thailand. They have a variety of features including a torque reserve of up to 25 per cent, independent Theodore speed RPM, transmission type collar shift and 4-stroke 3-cylinder engines with direct injection.

Siam Kubota

A joint venture between Japan's Kubota Corporation and Siam Cement Group, Siam Kubota Corporation Co., was established in 2010. Thailand's farmers have greatly benefited from the company's range of tractors, implements, combine harvesters, transplanters, excavators, riding and power tillers as well as diesel engines. Beyond Thailand, the company has expanded to Cambodia, Laos, Myanmar, India and Vietnam – becoming a force to reckon among ASEAN nations. Siam Kubota, also a platinum sponsor for the show, has a range of tractors include B Series (weed removal, hormone spraying, plowing, mixing and land levelling), L Series (paddy and dry fields, gardening). The M Series tractors, for heavier operations, are enabled with more powerful engines and efficient transmission systems. Among the transplanters, Kubota offers walk-behind transplanters, riding transplanters and semi-automatic transplanters.

Manitou Group

Bringing to the emerging markets a diverse range of farming and machinery is the Manitou Group. Livestock, mixed farming, market gardening, poultry and plant nurseries are sectors that Manitou can supply equipment for. Specifically, telehandlers cater to farmyard applications in a significant way. The MLT-X 735 120 PS, 625 75 H, 627 20", 627 20" C, 627 24", 735 TLSU and the 735 120 LSU are all relevant applications for various farming methods, with a focus on minimising additional movements especially in restricted spaces such as barns and farms.

AC High Technology (Ancoo)

The Thailand-based company specialises in providing solutions for grains and seeds. AC High Technology is the world's largest manufacturer of colour sorters, with a 70 per cent market share in China. With rice being a major produce in Thailand, the company's rice colour sorter appears significant in the country as well as for ASEAN nations. The rice colour sorter is available in three types – elite, performance and standard. From weeding out glass fragments and discoloured rice grains to detecting a wide range of rice varieties, the company's rice sorter is one which is in demand.

Charoen Pokphand Engineering Co. Ltd

The company primarily deals with rice mill machinery, with an emphasis on innovation. Popular products include circular sieves, sieve cleaners, triangle grille, conveyors, nutcrackers, sander white, rice polishing machines and colour sorters.

Agriculture machinery and sustainable development

Ahead of SIMA ASEAN, industry leaders have highlighted the significance of developing the machinery sector in a sustainable, economical and viable manner. Cane, sugar and cassava are economic crops that could be developed efficiently, by introducing technology, reducing overall labour and reducing costs. Narong Sakulsirirat, vice-president of Thai Machinery Association said, "All of Thailand's important crops need machinery but we don't have enough basic machinery such as lathe, milling, drilling and processing handlers. These machines are the real key. Therefore, if we don't develop this situation seriously, we will be far behind other countries. The government doesn't have enough budget to support the machinery sector. Also for the private sector, we are trying to form them as a group to cooperate and fix this issue."

Through SIMA ASEAN, investors and machinery manufacturers could greatly benefit by understanding each others needs and working accordingly. Organisers believe the show would be a good platform for Thai farmers to learn more about what brands have to offer to them keeping in mind budget, efficiency and finally, productivity. ☐

- SIMA ASEAN 2015 will take place at the Impact Exhibition Center, Bangkok from 17-19 September 2015

Machinery sector set for fast growth

THE GLOBAL AGRICULTURE and farm machinery market will be worth US$281.61bn by 2022, according to a new market report published by Transparency Market Research. The report, called *Agriculture and Farm Machinery Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2015 – 2022,* said that the market for the sector was valued at US$144.1bn in 2014, and is set to grow at a CAGR of 8.7 per cent for the next seven years.

The report listed increasing mechanisation of agriculture, technological innovations and the provision of subsidies on agricultural machinery by governments of various countries to improve farm production as key factors that are driving the global agriculture and farm machinery market. Increasing demand for food, driven by the rising global population, is also expected to stimulate the sector's growth in the coming years. Higher income for farmers in many countries around the world is also expected to be a contributing factor, the report said.

The technological advancements in the design of tractors to improve output efficiency are expected to fuel the demand for farm tractors in the field. Some advancements in manufacturing tractors are incorporation of GPS tracking device and telemetry for tracking the exact location of tractors in the farm lands. In 2014, farm tractors were the most dominant product segment within the overall market, accounting for more than one-third of the global farm machinery market.

Rising demand for farm tractors and harvesting machinery is expected to spur the overall market growth. Both those machines are used for multiple purposes such as tilling, ploughing, harrowing and planting. The growth of harvesting machinery is most prominent in the Asia Pacific region where the demand from China and India is high. The rising population in these countries is creating an increasing demand for food production.

Looking at further regional break up, Europe, Asia Pacific and North America were the main consumers of the global agriculture and farm machinery output in 2014, with Europe leading the market with around 36 per cent share.

The growth of farm machinery was significantly lower in the Middle East and Africa regions. However, Latin America is expected to grow considerably in the next few years. Currently, Brazil holds the maximum share in the agriculture and farm machinery market in the region.

The sub-segments of plowing and cultivating machinery, and planting and fertilising machinery are also expected to register moderate growth.

New Holland to launch environment-friendly tractor

BOTH THE FINANCIAL cost and the environmental impact of running tractors on farms may come down significantly in the near future, with New Holland testing a new tractor that runs on methane. The T6.140 methane-powered tractor from the agriculture machinery manufacturer is currently being tested on a farm in Italy.

The T6.140 packs all the features of a standard tractor and is equipped with a four cylinder, three litre engine produced by FPT Industrial, and develops a maximum power of 135 hp and 620 Nm torque.

The compressed methane is stored in nine tanks. The 50 kg capacity delivers approximately half a day of autonomy during normal operation, and an auxiliary 15 litre fuel tank provides a backup in case of need. Seamless integration of the tanks in the design allows the tractor to maintain the same appearance and operational ground clearance as standard models.

The tractor has been designed to have the same ground clearance and look as standard models (Photo: New Holland)

Methane propulsion technology offers numerous environmental advantages including emissions 80 per cent lower than a standard diesel engine. The tractor's three-way catalyst ensures Tier 4B compliance on its own, without the need for additional after-treatment systems. When using bio-methane, the machine's carbon impact is virtually zero, and cost savings between 25 and 40 per cent can be achieved when compared with conventional fuels.

All farms generate biomass, or organic waste, which can be processed to produce bio-methane. Using that methane as fuel for tractors helps make farms more self-sufficient and sustainable.

New Holland will unveil a prototype of the T6.140 methane-powered tractor at Agritechnica later this year. Commercial production of the tractor is expected to start in about five years.

Reducing loss of maize harvest due to corn shatter

The Operation Harvest Sweep kits are available for most popular models of corn headers

THE OPERATION HARVEST Sweep system from Leading Edge Industries replaces the existing deck plates and gathering chains in corn headers with parts that have been engineered to fight corn shatter loss. According to figures from the company, the system has been shown to reduce shatter loss by as much as 80 to 85 per cent, which goes a long way in boosting farmers' harvest output.

Shawn Gengerke, CEO of Leading Edge Industries, said, "Corn header loss from shatter has been a problem since the beginning. Anyone who has experience harvesting corn has seen it." Talking of the increased importance of efficiency in the present tough economic environment, he added, "Farmers are forced to be more efficient, every bushel counts even more. Corn varieties are bred to dry down faster every year, to help save us drying costs, but it is causing a logistical problem. Even with starting harvest at higher moistures and running more equipment we can't get it in fast enough."

The Operation Harvest Sweep kits are available for most popular models of corn headers. Each kit contains deck plates, gathering chains, impact pads and hardware for one row unit. The deck plates are lipped in order to retain those shattered kernels instead of letting them fall to the ground. The gathering chains also sweep to bring the shattered kernels from the deck plates to the auger. And the chains have impact pads that are gentler on the corn.

Another common issue faced by maize growers is that of volunteer corn, and this system can help address that problem as well. With less corn falling to the ground, the company says farmers may also see less volunteer corn in whatever rotation crop they plant. That can be a boost to the bottom line by reducing herbicide needs and protecting crop nutrients for the intended crop.

"As for the volunteer corn, as all farmers know, the more header loss you have, the more corn that geminates the following year. If we can save 80 to 85 percent of that loss, this has a direct percentage effect in what's in the field to germinate," said Gengerke.

Annual Buyers' Guide

Section One - Listings by categories **Section Two -** List of suppliers **Section Three -** Contact details of agents in Asia
PLEASE MENTION FAR EASTERN AGRICULTURE WHEN CONTACTING YOUR SUPPLIERS

Section One

Cattle

Exports
Henke-Sass, Wolf GmbH

Feed
Ayurvet Ltd.
Leiber GmbH

Health Products
Anpario PLC
Ayurvet Ltd.
Eurofeed Technologies S.p.A.
Henke-Sass, Wolf GmbH
Kiotechagil
Meriden Animal Health
Optivite

Milking Equipment
MIK INTERNATIONAL

Ventilation & Control Equipment
Termotecnica Pericoli S.r.l.

Veterinary Equipment
Henke-Sass, Wolf GmbH

Watering Equipment
Impex Barneveld b.v

Chemicals

Bio-Pesticides
Ayurvet Ltd.

Herbicides
Ayurvet Ltd.

Minerals
Avitech Nutrition Pvt. Ltd.
Eurofeed Technologies S.p.A.

Miticides
Ayurvet Ltd.

Crops

Harvesters
AGCO Ltd.

Horticultural Equipment
Swingtec GmbH

Integrated Pest Management
Swingtec GmbH

Processing, Oil Palm
AGCO Ltd.

Sprayers, Hand
GOIZPER GROUP - Goizper Spraying Business

Sprayers, Knapsack
GOIZPER GROUP - Goizper Spraying Business

Sprayers, Rotary Atomizer
GOIZPER GROUP - Goizper Spraying Business

Sprayers, ULV
GOIZPER GROUP - Goizper Spraying Business
Impex Barneveld b.v
Swingtec GmbH

Spraying Accessories
GOIZPER GROUP - Goizper Spraying Business

Tillage
AGCO Ltd.

Tractors
AGCO Ltd.

Feed

Additives
Anpario PLC
Avitech Nutrition Pvt. Ltd.
Ayurvet Ltd.
Eurofeed Technologies S.p.A.
Kiotechagil
Meriden Animal Health
Optivite
Unipoint AG

Aquaculture
Ayurvet Ltd.
Eurofeed Technologies S.p.A.
Leiber GmbH

Concentrates
Eurofeed Technologies S.p.A.

Feed mills
Awila Anlagenbau GmbH
DSL Systems Ltd.

Grinding/Pelleting/Cooling
Awila Anlagenbau GmbH

Mixing
Awila Anlagenbau GmbH

Pharmaceuticals
Ayurvet Ltd.

Premixes
Avitech Nutrition Pvt. Ltd.
Ayurvet Ltd.
Eurofeed Technologies S.p.A.

Soya Protein
Eurofeed Technologies S.p.A.
HAMLET PROTEIN AS

Supplements
Ayurvet Ltd.
Eurofeed Technologies S.p.A.

Vitamins
Avitech Nutrition Pvt. Ltd.
Eurofeed Technologies S.p.A.

Other

Analytical Services
Avitech Nutrition Pvt. Ltd.

Animal Health
Ayurvet Ltd.
Eurofeed Technologies S.p.A.
Henke-Sass, Wolf GmbH
Leiber GmbH

Computerization
DSL Systems Ltd.
Hotraco Agri b.v

Evaporative Cooling
Termotecnica Pericoli S.r.l.

Fogging Equipment
Swingtec GmbH

Goat Farming
MIK INTERNATIONAL

Laboratory Equipment
Henke-Sass, Wolf GmbH

Mould Inhibitors
Ayurvet Ltd.
Eurofeed Technologies S.p.A.

Production Control
DSL Systems Ltd.
MASITEK Instruments Inc.

Sheep Farming
MIK INTERNATIONAL

Silos
Awila Anlagenbau GmbH

Sugar Cane Technology
AGCO Ltd.

Ventilation
Hotraco Agri b.v
Termotecnica Pericoli S.r.l.

Veterinary Instruments
Henke-Sass, Wolf GmbH

Water
Impex Barneveld b.v

Weighing Equipment
DSL Systems Ltd.

Pigs

Breeding Equipment
Technical Systems

Exports
Henke-Sass, Wolf GmbH

Feed
Ayurvet Ltd.
Leiber GmbH

Feeding Systems
Big Dutchman International GmbH
MIK INTERNATIONAL
Schauer Agrotronic GmbH
Technical Systems

Flooring
MIK INTERNATIONAL

Health Products
Anpario PLC
Ayurvet Ltd.
Eurofeed Technologies S.p.A.
Henke-Sass, Wolf GmbH
Kiotechagil
Meriden Animal Health
Optivite

Housing
Big Dutchman International GmbH

Medicators
Impex Barneveld b.v

Pest Control
Ayurvet Ltd.
Swingtec GmbH

Ventilation & Control Equipment
Hotraco Agri b.v
Termotecnica Pericoli S.r.l.

Veterinary Equipment
Henke-Sass, Wolf GmbH

Watering Equipment
Impex Barneveld b.v
Lubing Maschinenfabrik GmbH & Co. KG

Poultry

Broiler Suppliers
Cobb Asia-Pacific
Technical Systems

Cages
Big Dutchman International GmbH
Technical Systems

Drinking Equipment
Big Dutchman International GmbH
Impex Barneveld b.v
Lubing Maschinenfabrik GmbH & Co. KG

Egg Grading and Packing
MASITEK Instruments Inc.

Egg Handling
Hotraco Agri b.v
Lubing Maschinenfabrik GmbH & Co. KG
MASITEK Instruments Inc.

Evisceration, Portioning
Marel Stork Poultry Processing

Feed
Ayurvet Ltd.
Leiber GmbH

Feeders
Big Dutchman International GmbH
Impex Barneveld b.v
Technical Systems

Flooring
Lubing Maschinenfabrik GmbH & Co. KG

Health Products
Anpario PLC
Ayurvet Ltd.
Henke-Sass, Wolf GmbH
Kiotechagil
Meriden Animal Health
Optivite

Medicators
Impex Barneveld b.v
Lubing Maschinenfabrik GmbH & Co. KG

Nest Pads
Impex Barneveld b.v

Poultry Genetics
Cobb Asia-Pacific

Poultry Stock
Cobb Asia-Pacific

Processing
Marel Stork Poultry Processing

Slaughtering Equipment
Marel Stork Poultry Processing

Ventilation & Control Equipment
Hotraco Agri b.v
Termotecnica Pericoli S.r.l.

Veterinary Equipment
Henke-Sass, Wolf GmbH

Section Two

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AGCO is the parent company of Massey Ferguson, Fendt, Valtra, Challenger tractors in Far East region. AGCO is also the parent company for GSI Grain Storage systems.

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Avitech Nutrition Pvt. Ltd. is a leader in the field of animal nutrition sector in India. Avitech is a leading premix producer and supplier of specialized feed additives. Avitech's laboratory is ISO 17025 certified and it is leading provider of analytical services to India's feed industry.
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Planning, design and erection of turn-key feed mills, grain silo plants, mineral and vitamin premixing and dosing systems, pasteurising systems, biofuel processing equipment. Production of intakes, conveyor-systems, storage systems, mills, mixers, presses, coolers, conditioners and control systems.

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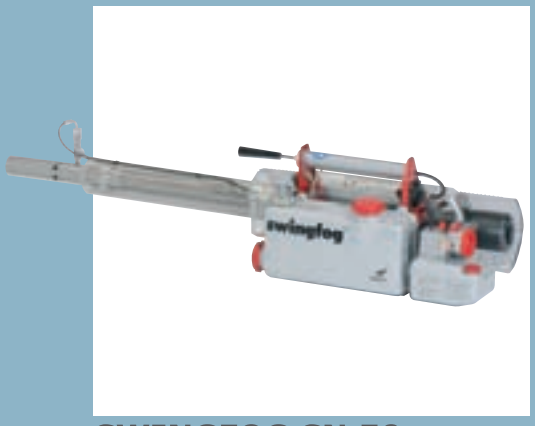

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