

# Far Eastern Agriculture

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## Preventing coffee leaf rust with fungicide spraying

### Livestock:

Smart tech driving dairy business

### Poultry processing:

Improved guidelines

### Robotic technology

for efficient harvesting



VIV Qingdao 2019 preview – p8

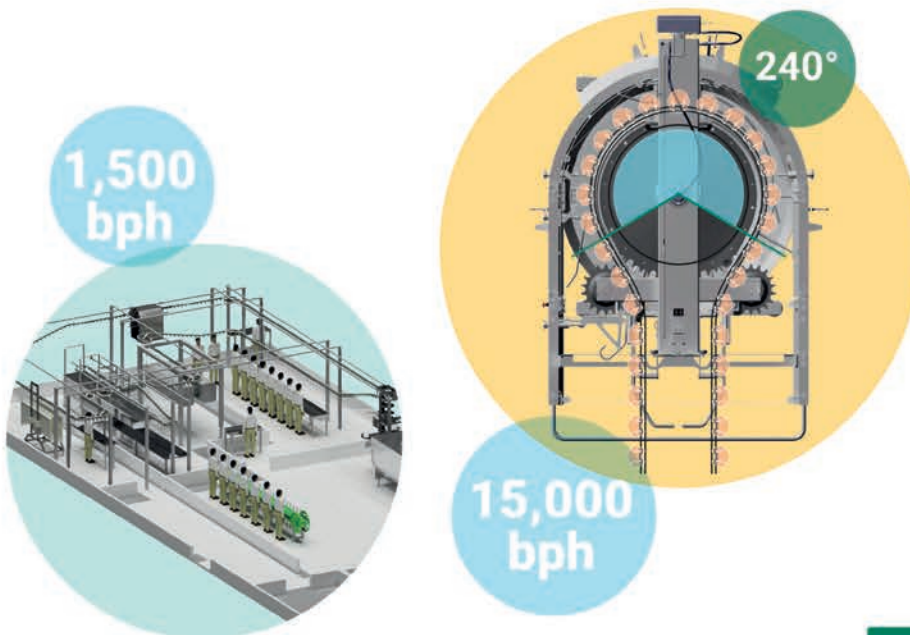
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# Far Eastern Agriculture



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## EU tariffs hurt 500,000 Cambodian rice farmers

CAMBODIAN FARMERS FACE serious economic disruption due to the tariffs imposed by the European Union (EU) on Cambodian rice, according to the Cambodian Rice Federation (CRF).

In January, the EU imposed tariffs for three years on rice from Cambodia and Myanmar to protect the EU producers. Cambodia exported around 93,000 tonnes of rice to the EU in the first six months of 2019, almost half the amount that was exported during the same period in 2018.

"This has been acutely felt by most of the 500,000 families in Cambodia who eke out a living farming jasmine and fragrant long grain rice, in spite of the fact that these varieties are geographically specific and do not compete directly with products grown in the EU," the CRF said in a statement.

Further to this, EU is considering the withdrawal of its 'Everything But Arms' (EBA) programme that allows goods from Cambodia and other developing nations to enter the EU free of duties and tariffs. "EU legislators are threatening to end the arrangement to press for policy reforms in Cambodia. A political thrashing could lead to a virtual thrashing of an industry and a way of life," CRF stated.

The CRF appeals to the EU to save the livelihoods of half a million families.



*Cambodia is rapidly expanding cultivation under sustainable rice platform (SRP) standards.*

Cambodian Prime Minister Hun Sen has assured that China would help Cambodia in this situation. Further to this, according to data from the Secretariat of One Window Service for Rice Export Formality, a joint private-government working group, rice exports to China have risen 66 per cent in the first half of 2019 to 118,401 tonnes.

## Chinese feed producer builds first overseas pig farm in Vietnam

CHINA'S FEED PRODUCER New Hope Liuhe, the agribusiness subsidiary of New Hope Group, has constructed a pig farm in Vietnam, a move that is seen to drive potential demand growth in the regional Asian market that is damaged by the African Swine Fever (ASF) outbreak.

As reported in *Reuters*, the pig farm is located in the Binh Phuoc province, which produces 300,000 pigs annually. This pig farm, New Hope Liuhe's first overseas initiative, is one of three that the company invested in recently in the Southeast Asian nation.

According to the source, the farm will start to obtain pigs in November, and eventually have an inventory of 13,500 Hypor-breed sows produced by Holland's Hendrix Genetics.

In line with the biosecurity approach, the pig farm in Binh Phuoc has been equipped with multi-layered sanitisation and disinfection systems and animal waste treatment facilities worth US\$3mn. Additionally, New Hope Liuhe is



*Vietnam is implementing strict biosecurity measures in the pig farms.*

planning to build a feed mill on this farm to supply animal meals and eliminate the risk of exposing feed to viruses during transportation, the source further added.

## Rainforest Alliance pledges support in combating Amazon wildfires

IN RESPONSE TO the surge of forest fires in the Brazilian Amazon, the Rainforest Alliance is mobilising its broad network of partners to fight the ongoing destruction of this precious ecosystem.

Following a staggering increase in fires this year, with flames and smoke captured on both NASA and NOAA satellites from space, it is clear the world must stand together to stop ongoing threats to the Amazon, which is vital to the world's climate stability.

The Rainforest Alliance is working to leverage its relationships in the public and private sectors to pressure the Brazilian government to reinstate the environmental enforcement that is essential to defending the Amazon against illegal logging, destructive slash-and-burn agriculture and other existential threats.

In addition, the Rainforest Alliance has pledged to redirect 100 per cent of the funds donated in response to the social media alert to frontline groups in the Brazilian Amazon, including the Brazil chapter of its indigenous federation partner COICA and sustainable agriculture partner IMAFLORA; as well as the Instituto Socioambiental and Imazon, both Brazilian NGOs working to defend the Amazon and advance indigenous rights.

Henriette Walz, deforestation lead for the Rainforest Alliance, said, "We need continued collaborative effort from governments, companies and consumers to send a message. We know the links between climate change, deforestation, and human welfare are there. We need to keep moving towards more sustainable agriculture and land management system and reap the many benefits such a system would provide."



*Businesses, NGOs, civil societies and governments must work toward protecting the Amazon.*



## Myanmar and Italy collaborate on irrigation and mechanised agriculture boost



*Myanmar has taken many initiatives to promote the awareness of modern farming techniques.*

MYANMAR AND ITALY have signed two agreements to cooperate in water management and mechanised farming sectors. The agreements were signed by deputy minister for agriculture, livestock and irrigation Hla Kyaw and the Italian ambassador to Myanmar Alessandra Schiavo.

Under the terms of the agreements, the countries will jointly set up two technological centres in the Sagaing Region and in the Mandalay Region, which will focus on improving local training and developing Myanmar's agricultural mechanisation. Italy will provide technical assistance to establish these centres.

The initiative is in line with Italy's bilateral commitment to support Myanmar in its efforts to move from subsistence

farming to market-oriented and export-oriented farming methodologies. To boost the country's agribusiness sector, Myanmar has taken many initiatives to promote the awareness of modern farming techniques.

Alessandra Schiavo declared that Myanmar has the full potential to achieve sustained agricultural growth as the country is surrounded by some of the fastest-growing food markets on a global scale.

Additionally, as reported by *Eleven Media Group*, the Ministry of Agriculture, Livestock and Irrigation is discussing a plan to promote technical cooperation to develop the farming sector between Myanmar and India. The countries discussed the utilisation of technologies as well as opening of animal health and management courses.

## China to get new design and manufacturing centre

SWISS TECHNOLOGY COMPANY for plant and equipment Bühler Group and Premier Tech from Canada have announced that they are to build a design and manufacturing centre in China.

Bühler brings its know-how of manufacturing and supply chain management as well as its digital solutions in China, whereas Premier Tech contributes with its packaging expertise and technological knowledge in this field. This strategic cooperation is set to develop automated, food-safe and accurate bagging and palletising solutions.

The strategic cooperation is expected to allow Bühler to provide better turnkey projects with competitive packaging solutions from China while continuing to deliver high-end products such as Bühler's bagging station Maia from its manufacturing network in Europe.

This strategic cooperation is planned to result in a joint venture for design and manufacturing during 2020, with Bühler focusing on sales of turnkey plants around the world and Premier Tech on packaging systems in China.

## EVENTS 2019

### SEPTEMBER

18-20

**ILDEX Indonesia 2019**

Jakarta, Indonesia

[www.ildex-indonesia.com](http://www.ildex-indonesia.com)

19-21

**EuroTier China**

QIEC, Qingdao, China

[www.eurotierchina.com](http://www.eurotierchina.com)

19-21

**VIV Qingdao 2019**

Qingdao, China

[www.vivchina.nl/en](http://www.vivchina.nl/en)

26-28

**Agri Malaysia**

Selangor, Malaysia

[agrimalaysia.com/en](http://agrimalaysia.com/en)

### OCTOBER

26-27

**ICABS**

Tokyo, Japan

[www.iser.co/Conference2019/Japan/10/ICABS](http://www.iser.co/Conference2019/Japan/10/ICABS)

30-31

**Irrigation, Water Resources and Drainage Engineering**

Sydney, Australia

[www.irrigation-water-engineering.engineeringconferences.com](http://www.irrigation-water-engineering.engineeringconferences.com)

### NOVEMBER

21-25

**Krishithon**

Maharashtra, India

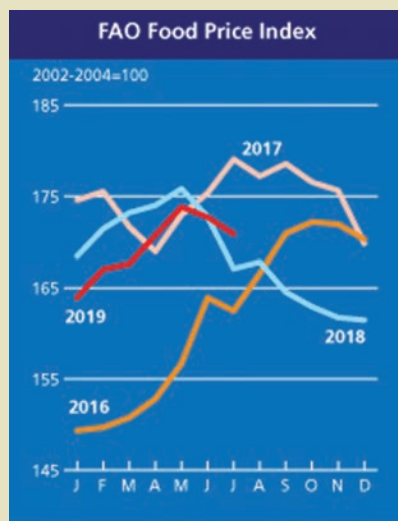
[krishithon.com](http://krishithon.com)

## FOOD OUTLOOK

THE FAO FOOD Price Index (FFPI) averaged 170.9 points in July 2019, down 1.1 per cent from June but 2.3 per cent higher than in July 2018. The month-on-month decline was the result of lower prices for some cereals, dairy products and sugar, which more than offset somewhat firmer prices for meat and oils.

The FAO Cereal Price Index averaged 168.6 points in July, down 2.7 per cent from June but 4.1 per cent above its level in the corresponding month last year. The decline in July was driven by lower wheat and maize prices. In wheat markets, despite downward adjustments to production prospects in several countries, large export supplies and continued expectations of record world production this year weighed on international prices.

The FAO Vegetable Oil Price Index averaged 126.5 points in July, up 0.8 per cent from the previous month but still 11 per cent below last year's corresponding level. Overall, firmer soy and sunflower oil prices more than offset a further drop in palm oil values. The concurrence of seasonal production rises in Southeast Asia and sluggish global import demand continued weighing on palm oil prices. On the other hand, soybean prices appreciated almost in tandem with rising soybean



values while low crush volumes in the USA also contributed to the increase.

The FAO Meat Price Index averaged 176.2 points in July, up 0.6 per cent from its slightly revised value for June and registering the sixth moderate month-on-month price increase. At this level, the index value stands at nearly 10 per cent above that of January 2019, but almost 17 per cent below its peak in August 2014. In July, price quotations for ovine meat rose further, boosted by strong import demand from Asia amid supplies from Oceania

retreating from their seasonal highs. Asia's robust import demand for bovine meat also contributed to further gains in bovine prices. However, quotations for pigmeat were down slightly after four months of continued increases, reflecting larger export availabilities from Brazil and the USA.

The FAO Dairy Price Index averaged 193.5 points in July, down 2.9 per cent from June, representing the second consecutive month of decline. At this level, the index value is around six per cent above that of January 2019 but almost three per cent below the corresponding month last year. In July, quotations for butter declined the most, followed by cheese and whole milk powder (WMP). By contrast, Skim Milk Powder (SMP) prices recovered, supported by firmer buying interest from the Middle East and Asia.

The FAO Sugar Price Index averaged 182.2 points in July, down 0.6 per cent from June 2019, mainly on expectations for higher sugarcane yields in India, the world's largest sugar producer, following above average rainfalls in the main sugar producing regions. New estimates are pointing to smaller sugar production in Brazil's Centre-South through June also provided some support.

## New dosing and weighing systems for animal feed industry

KNOWLEDGE, SERVICE AND excel – these are the three pillars on which KSE Process Technology has built up its business for more than 40 years. By continuously monitoring these core values, KSE has become the leading supplier of dosing and weighing systems, automation solutions and services for producers of powders and granulates in the animal feed and related industries.

KSE provides solutions including separate dosing and weighing systems and advice on the factory layout, thus building a completely new production facility.

With her partners, KSE can provide a total package for the powder and granulates processing industry. This includes three groups of products and services such as machinery, automation and service provision, within which it offers ALFRA dosing and weighing systems and PROMAS automation software.

In recent decades, the animal feed industry has made giant steps forward in automation. At the same time, the business has globalised and consolidated, meaning competition has become fiercer. Like all industries, there is constant pressure to reduce costs without compromising quality.



KSE meets these challenges with tailor-made systems and solutions that not only satisfy current production needs but can also be cost-effectively upgraded as the business grows. It is a deliberate choice to become a specialist in the animal feed industry.

## Global animal husbandry professionals meet at EuroTier China

IN THE THRIVING livestock market of China, pork is set to account for around 60 per cent of all meat consumption, followed by poultry, beef, veal, mutton and lamb. According to DLG's market research, one in three farmers surveyed intend to invest in their business in the next 12 months.

The challenges of the region require a high demand for new technology and solutions in sectors including food quality and safety; modernisation of existing facilities; improving animal health; reducing emissions and increasing feeding efficiency.

EuroTier, one of the world's leading trade fairs for animal production, is bringing its global platform in Qingdao International Expo Centre (QIEC) from 19-21 September. The show is set to provide a platform for agricultural businesses to enter a growing livestock market and take advantage of the opportunity to help shape the future of animal production in China.

Organised by the German Agricultural Society (DLG), EuroTier China provides the entire range of products and services for animal husbandry professionals – from technology, services and genetics to farm inputs and other upstream and downstream areas. Important topics to be discussed include:

- The 1st Animal Health and Food Safety Alliance Congress
- China Livestock Manure Alliance Annual Conference
- The 1st China Livestock Breeding Summit
- EuroTier China Feed and Animal Nutrition Conference



Image credit: DLG

*Joint press conference by NAHS and DLG for EuroTier China.*

- EuroTier China Dairy Conference
- EuroTier Biogas Conference

The exhibition programme will focus on animal breeding; feed storage and production; animal housing and shed construction; climate and environmental technology; milking and cooling technology; processing and marketing; veterinary medicine; livestock environment protection; equipment and accessories; renewable energy and others.

Attendees at EuroTier China can profit from conferences, seminars and forums curated by prominent governmental organisations and animal farming associations. This includes strategic partner for EuroTier China, the National Animal Husbandry Services China (NAHS), the Ministry of Rural Affairs and Agriculture, China Biogas Society, China Dairy and many more.

*For more details, please visit [www.eurotierchina.com](http://www.eurotierchina.com)*

## Driving the future of Indonesia's livestock business

THE FOURTH EDITION of ILDEX Indonesia will be held from 18-20 September 2019 at Indonesia Convention Exhibition (ICE), Jakarta, Indonesia, focusing on a range of livestock health, housing, feed and ingredients, breeding and genetics solutions.

Organised by VNU Exhibitions Asia Pacific Co, Ltd, a joint venture between Jaarbeurs from the Netherlands and TCC Exhibition and Convention Centre from Thailand, ILDEX will display high technology used in manufacturing and production farms, with an extensive range of local and international brands which offer new technology, innovation and equipment for livestock farm.

Around 250 companies from 30 countries will be showcasing their technologies and innovations while launching new products during the show. More than 200 buyers from South-east Asia will participate at ILDEX Indonesia.

Indonesia has emerged as a large market in Asia in which foreign players hope to expand their business with the participation of local companies.

Other visitor profiles include: cattle, poultry and dairy farmers; people in the aquaculture, agribusiness, agrochemical, distributor, wholesale, and import and export businesses; nutritionists, veterinarians and other professionals and post-graduates who will drive the future of the livestock business. Visitors will be able to expand and build connections with professionals from leading local and international companies such as Big Dutchman, Behn Meyer, Buhler, CJ, DSM, Evonik, Famsun, Gemlang group, Japfa Comfeed Indonesia, Jeko, KSP Equipment, Linco, Marel, Moba, Nabel,



Image credit: VNU Exhibitions Asia Pacific Co, Ltd

*The event will showcase livestock products to the visitors.*

Petersime, Pokphand, Romindo and more.

At this edition, there will be three international pavilions for China, South Korea and The Netherlands together with the FoodTech Indonesia pavilion.

### Waste management and ILDEX Animal Live Show

Another feature at this edition of ILDEX is waste management. New technology will be presented and knowledge will be shared on how to manage waste in livestock farms and how to create new business strategies for livestock production.

The 'ILDEX Animal Live Show' will present a variety of live animals from local farms including cattle, sheep, chicken and duck. The aim is to display the quality of local production and to encourage international buyers.

*For more information, please visit [www.ildex-indonesia.com](http://www.ildex-indonesia.com)*



# Connecting with global animal protein industry leaders



The year 2019 celebrates a new beginning for VIV. From this year onwards, VIV will be held in China annually in response to local industry demand.

**VIV QINGDAO 2019** will be held from 19-21 September at the Qingdao Cosmopolitan Exposition (China, Shandong province), filling halls S1 to S5, with an exhibition area of 50,000 sq m.

Organised by VNU Exhibitions Asia Ltd, the joint venture of the VIV worldwide organiser VNU Exhibitions Europe, the expo will involve more than 600 exhibitors and it is expected to attract more than 30,000 visits including more than 200 industry leaders along with 150 global media outlets.

The core exhibition concept of 'From-Feed-to-Food' will be explored in more than 20 international seminars that will analyse the Chinese industry as well as discuss effective solutions to combat current issues in the global animal husbandry.

## China's lucrative animal protein industry

Shandong province is an important area for the animal protein production, with excellent development prospects. Meat, eggs and dairy products in this province represent about 10 per cent of China's total production of animal proteins and more than 40 per cent of all exports nationally by gross volume.

The degree of Qingdao's animal large scale production is higher than the China's national average, especially in swine, poultry and cattle. The city's output throughout the whole animal industry chain was worth US\$11.33bn in 2017. Additionally, Qingdao promotes efficient farming with 2,425 large scale farms including 45 national scale farms, 91 province scale farms, 41 modern farms and 98 farming communities.

With regards to waste disposal, around 94

*The event is expected to attract more than 30,000 visits including more than 200 industry leaders along with 150 global media outlets.*



Image credit: VNU Exhibitions Asia Ltd

per cent of Qingdao's farms have adopted modern equipment for manure management. As sustainability is a major theme, 16 sustainable towns and 160 sustainable farms are operating within the province.

## An extensive focus on global market trends

VIV Qingdao 2019 will be working together with government organisations, industry associations, experts and media partners to present detailed and informative content on current industrial development across China and global market trends.

Major conferences will focus on various aspects such as swine, poultry meat, eggs, dairy and aquaculture. These include The Third China Swine Science Conference and Exhibition 2019; The Third World Conference on Farm Animal Welfare; VIV Qingdao International Summit 2019 and

The Second Farm and Food Integration Seminar 2019.

In addition to the four conferences, VIV Qingdao is partnering with the local Qingdao Administration to present a concurrent exhibition, Asia Agro Food Expo (AAFEX 2019), at the same time and location as VIV Qingdao. AAFEX 2019 is a comprehensive platform which covers three sectors such as planting, agriculture products and food processing. It further highlights Horti China and the China Food Tech Expo.

Covering 100,000 sq m of exhibition ground, the combination of AAFEX and VIV Qingdao is set to provide more opportunities to present the concept of 'planting and breeding' and set a brand new stage for VIV shows in China to realise the extension and integration of resources within the wider industry chain, from-feed-to-food.

VIV Qingdao 2019 will present a top-level platform for industry professionals from all over the world to share the latest information and technological developments in the industry. With more than 600 participating exhibitors, the core concept of feed-to-food will be covered, ranging from categories such as animal feed to ecological waste treatment equipment.

**The event will provide an international trading platform for innovation, trade and business interaction under the umbrella of agriculture and food."**



**InnovAction: Presenting the latest in the industry**

Launched for the first time at VIV Qingdao 2019, InnovAction is a comprehensive service for international pavilions and individual exhibitors to present the latest products, technologies and solutions to the market, to link visitors in a unique way. Around 50 enterprises have been selected to present at VIV Qingdao 2019, with a final vote taking place before the expo to decide which product stands at the forefront of the industry.

**The Hosted Buyer Programme: A door to opportunities**

To better serve the needs of exhibitors and potential visiting buyers, VIV Qingdao 2019 presents the Hosted Buyer Programme. It will provide an opportunity to learn from industrial pioneers and meet future business partners through tailored group tours. Those who are eligible for the Hosted Buyers Programme can enjoy free refreshments, deluxe hotel accommodation



Image credit: VNU Exhibitions Asia Ltd

*Spotlight will be on a wide array of latest developments in planting, agriculture products and food processing technologies.*

and a range of other benefits.

Through the cooperation with domestic and overseas partners, media channels and self-initiation from the general public, several international feed and farming buyer groups as well as domestic farming tours consisting of domestic farming professions have been confirmed. There have been

positive responses from the international buyer groups from countries and regions including Thailand, Korea, Iran, Vietnam, Africa, India, Pakistan, the Philippines and Russia. ■

*For more details on VIV Qingdao 2019, please visit [www.vivchina.nl](http://www.vivchina.nl)*

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# Robotic technology to transform harvesting



Smart robotic solution in agricultural futuristic robot automation.

**Agriculture faces an emerging challenge in the decrease in farmworkers that has reduced agricultural productivity and lowered the food self-sufficiency ratio. Harvesting robots can be a solution to these problems.**

**A** **S FARM LABOUR** is one of the major issues and cost-centre in agriculture, the use of technology is seen to significantly eliminate labour costs. This is particularly seen in the harvesting robotics market, which is getting popular in many countries to tackle rising labour cost and increase farm profitability.

Harvesting robotics are applied in several agricultural aspects including horticultural sector, greenhouse urban agriculture as well as harvesting of strawberries, tomatoes, barley, peppers, lettuce, grapes, apples and other agricultural produce.

Modern farming is way more complicated than conventional farming methods. Besides the right use of pesticides, herbicides and fertilisers, the final harvesting timing is crucial, relying on a fully data-driven approach to understand the state of the crop. Addressing this, the use of robotic applications can be very important as they provide timely surveillance of the field, accurate evaluation of crop yield, final harvesting time as well as autonomous harvesting.

## Harvesting robots for pepper

In an EU project, researchers of

Wageningen UR and international colleagues developed a prototype of a harvesting robot for peppers. The robot searches for the fruits, takes 3D pictures of them, assesses their colour and shape and harvests those that fit the requirements.

The sweet pepper harvesting robot has been developed within the EU project “Clever Robots for Crops” (CROPS). The CROPS robotic platform will be capable of site-specific spraying (targets spray towards foliage and selective targets) and selective harvesting of fruit (detects the fruit, determines its ripeness, moves towards the fruit, grasps it and softly detaches it).

## Strawberries, barley, wheat, grapes and apples

In line with the Industrial Revolution 4.0, especially in agriculture, robotics is being used in many agricultural produces. Companies such as Agrobot and Harvest Croo have developed robotics solution for

the picking of strawberries.

The “Hands Free Hectare” project by the researchers at Harper Adams University and agricultural company Precision Decisions harvested crops such as spring barley and winter wheat using autonomous vehicles and drones in rural England.

Robotics has been used in wine grape harvesting as well. The French Pellenc is one of the wine and grape machine makers that aim to provide sustainable mechanical harvesting solutions for grapes. The Israeli company FFRobotics has developed technology to provide robotics solutions in apple harvesting.

The University of Plymouth is bringing researchers together with producers in Cornwall to create robots which could potentially work alongside their existing workforces and ensure any availability gaps are filled. The Automated Brassica harvest in Cornwall (ABC) project aims to develop technology to help with the cauliflower harvest as well as other fieldwork operations.

## Tomato harvesting robots becoming popular in Japan

As the country's elderly population is rapidly increasing, Japanese agriculture presently faces a decrease in farmworkers. According to Panasonic Corporation's report, whereas the number of people engaged in Japan's agriculture was 3,353,000 in 2005, it dropped to

**“The ability of robots to lighten the harvesting workload is a major advantage.”**



2,606,000 in 2010 and 1,922,000 in 2016.

Therefore, agricultural high-tech is a viable solution to these problems and so, AI-driven harvesting robots are gathering attention.

Panasonic Corporation has deployed a harvesting robot at an advanced farm in Japan. The farm contains three glass greenhouses covering five hectares and cultivating several types of tomatoes. Robots are harvesting a portion of these tomatoes for verification, thus aiming to increase productivity and improve functions.

Masataka Nakamura, who manages the farm, said, "Japanese agriculture will never see a bright future unless it can resolve the

**Many farms are adopting robots for harvesting work, which accounts for 20 per cent of all agricultural work."**



Image credit: Adobe Stock

*Farmer using smart farm automation robot arm assistant image processing to harvest strawberry.*

problem of a lack of labour. The ability of robots to lighten the harvesting workload is a major advantage. The time spent on harvesting is at least 20 per cent of the entire agricultural workload. Around 160,000 man-hours are spent each year working inside our greenhouses and 35,000-36,000 hours of this is spent in harvesting. We can automate this by using

harvesting robots."

Ryo Toshima, manager of the development section, robotics promotion room, production technology, Panasonic Corporation, is in charge and visits the farm regularly to analyse the present status and further improve the functions while exchanging opinions with the people working there. ■

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# Coffee leaf rust — made in Africa — but developed in Asia

Image credit: Trond Kristiansen at Nordox

*Arabica coffee (Coffea arabica) foliage freshly sprayed with cuprous oxide fungicide.*

Dr Terry Mabbett reports on the effectiveness of copper-based fungicides in protecting coffee against leaf rust disease.

**C**OFFEE ORIGINATED IN Africa as an understorey shrub in the East African Highlands and where the leaf rust fungus *Hemileia vastatrix* appears to have co-evolved with the genus *Coffea*. Despite its African origins, coffee was first grown on a commercial estate scale in Asia, South Asia to be precise with Ceylon (modern-day Sri Lanka) leading the way. However, the life of Ceylon's thriving coffee industry was cruelly cut short towards the end of the 19<sup>th</sup> century when coffee leaf rust disease exploded into epidemic proportions and made the economic production of coffee beans impossible.

In 1869, the Reverend H. J. Berkeley and his assistant Broome, reporting in the *Gardeners' Chronicle*, described a fungus they had found associated with leaf rust disease on some dried coffee leaves which had been sent from Ceylon (now Sri Lanka). They assigned the scientific name *Hemileia vastatrix* and the fungus was classified by mycologists as Class (Basidiomycetes), Order (Uredinales) and Family (Pucciniaceae).

**Classic symptoms from which the name 'rust' arises are orange and rust-like powdery pustules containing spores."**

Classic symptoms from which the name 'rust' arises are orange and rust-like powdery pustules containing spores. These lesions develop rapidly inside the leaf erupting through stomatal pores on the lower leaf surface. They contain large numbers of asexually produced propagules (spores) called urediniospores which spread infection and disease to other leaves and plants, mostly by wind and rain splashes but also through biological agents such as insects. The resultant effect is a rapid reduction in the photosynthetic potential of foliar canopies and premature fall of the evergreen coffee leaves to cause significant reductions in yield.

Coffee leaf rust affects the two main commercial coffee species — *Coffea arabica* (Arabica coffee) which thrives in cooler upland environments of southeast Asian countries such as Indonesia, and *Coffea canephora* (robusta coffee) which is better suited to hotter and more humid lowland conditions and currently grown on a huge scale in Vietnam.

## Spread of coffee growing and leaf rust disease

Coffee cultivation started to spread throughout the world centuries ago with the rust disease naturally and logically following in its wake, but considerably later. You might expect the first leaf rust epidemic to occur within the coffee plant's native African range. However, large scale, intensive coffee-growing did not begin in East African countries such as Kenya and Uganda, or Cameroon in West Africa, until the 20<sup>th</sup> century and ironically long after coffee was being grown on a commercial scale on the Indian Sub-Continent and in South-East Asia.

In fact, coffee leaf rust first erupted in epidemic proportions on the south Asian island of Ceylon where coffee was already being



grown on a large and intensive scale in the second half of the nineteenth century. Leaf rust hit Ceylon's coffee estates with a vengeance destroying the industry by 1890 and forcing estate owners to grow tea instead. But not before valuable information was discovered on the use of protectant fungicides to protect the coffee from leaf rust.

Fungicidal activity of copper-containing compounds had already been established in the south of France for control of downy mildew of grapes but the coffee leaf rust epidemic in Ceylon was the event which secured a place for spray application of copper fungicide and is still practiced worldwide today. The Ceylon epidemic became too severe and deep-seated to be controlled by fungicide spraying but nevertheless, copper fungicide would subsequently be used to routinely manage leaf rust on coffee by foliar spraying around the world. Coffee leaf rust never went away although until recently, it was kept in check and below economic threshold levels by using rust-resistant coffee varieties and fungicide spraying.

**“The lesions develop rapidly inside the leaf erupting through stomatal pores on the abaxial (lower) leaf surface.”**

#### Leaf rust hits Latin American coffee

Coffee leaf rust did not arrive in Latin America until the 1970s after which fungicide spraying and use of rust-resistant coffee varieties were generally sufficient to manage the disease. That was until ten years ago when leaf rust started to surge in a number of major coffee-growing countries including Colombia in South America and Costa Rica and Guatemala in Central America. Coffee leaf rust continues to damage crops in these countries with epidemics caused by a range of factors causing infection and spread of the disease.

The reasons for the latest upsurge in disease are climate and weather-related issues. These, together with rapid and massive increases in infection potential and disease pressure, overwhelm any resistance to leaf rust and poor economic conditions for coffee production prevailing at the time.

According to Latin American scientists, a common factor in the relatively recent Colombian (2008-2011) and Central American (2012-2013) epidemics was a reduction in the diurnal thermal amplitude, with higher minimum/lower maximum temperatures of +0.1°C/-0.5°C (average) during 2008-2011, compared to a low coffee rust incidence period in 1991-1994 in Chinchiná, Colombia. And +0.9°C/-1.2°C (average) in the high coffee leaf rust year of 2012 compared with the prevailing climate in Guatemala. They have claimed that the climate and weather-related phenomena have likely decreased the latency (inactive) period of the disease and said that these epidemics should be considered as a warning because they are triggered and enhanced by weather conditions consistent with climate change.

But the story does not end there. Coffee varieties cultivated in South and Central America were developed with resilience to infection by the coffee leaf rust fungal pathogen. However, the sheer size of the spore load created during these epidemics would have been more than enough to break down any varietal resistance to leaf rust disease. Furthermore, the epidemics occurred when coffee prices were inherently low with correspondingly low profitability levels for



Image credit: Dr Terry Mabbett

*Robusta coffee (Coffee canephora) can cope with higher temperatures and humidity in the lowland tropics.*

farmers leading to suboptimal coffee management (including relaxation in routine spraying with fungicides) and which resulted in increased plant vulnerability to pests and diseases, including coffee leaf rust.

There are a number of lessons to be learned from these recent developments in Latin America, even for estates across Asia with



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Image credit: Trond Kristiansen at Nordox

*A close up view of the orange-coloured, rust-like powdery pustules on the underside of the coffee leaf.*

centuries of experience of growing and producing coffee. These include the need for continual breeding of rust-resistant coffee varieties and the maintenance of routine fungicide applications to protect coffee against rust disease.

#### Copper fungicides

Considering that they were first developed almost 150 years ago, it is amazing that copper-based fungicides are still used today to protect coffee against leaf rust disease. And all the more so when you count up the number of other fungicides developed much later, but which have already disappeared from the market due to loss of efficacy against leaf rust disease and/or concerns about safety to spray operators, coffee consumers and the environment.

The active principle in all copper-based fungicides is the divalent copper ion ( $\text{Cu}^{2+}$ ) which protects the leaves against infection by germinating fungal spores. Copper fungicides are purely protective in action, remaining as a deposit and residue on the leaf surface to intercept and kill landing spores as they begin to germinate. As such copper fungicides must be routinely applied and possess high tenacity (adhesion to the leaf surface) to withstand weathering and wash off by frequently prolonged and intense rainfall conditions experienced

by coffee growing in the wet and humid tropics.

#### Major reasons for using copper fungicides include:

- Broad spectrum of activity which controls other coffee diseases
- Broad spectrum of activity which essentially prevents pathogen populations from becoming resistant to the action of copper ions
- Copper fungicide deposits are inherently tenacious and resistant to weather in the face of a fierce rainfall
- Copper fungicide sprays have a 'tonic' effect on coffee due to the additional role of copper as an essential plant micronutrient
- Copper fungicides are universally approved for use in countries where coffee is grown and countries which import green coffee or factory processed coffee, including roasted coffee beans and soluble (instant) coffee.

#### Which one to use?

There are several particulates, fixed copper fungicides on the market. 'Fixed' describes the sparingly soluble nature of the fungicide with the active copper being 'secured' (fixed) in the molecule and 'particulate' the nature of the formulation as a water-dispersible granule or a wettable powder.

The three mainstream copper fungicides in use are cuprous oxide, cupric hydroxide and copper oxychloride. The molecular weight of cuprous oxide [ $\text{Cu}_2\text{O}$ ] is 143.00 with 127.00 (88 per cent) of this accounted for by the mass of two copper atoms. The equivalent figure for cupric hydroxide [ $\text{Cu}(\text{OH})_2$ ] is 63.5/97.5 (65 per cent) and for copper oxychloride [ $3\text{Cu}(\text{OH})_2 \cdot \text{CuCl}_2$ ] is 381.00/696.00 (55 per cent), respectively. Therefore, on a 'gram for gram' basis, cuprous oxide contains 20-25 per cent more potential fungicide capability than cupric hydroxide or copper oxychloride. ■

**“The active principle in all copper-based fungicides is the divalent copper ion ( $\text{Cu}^{2+}$ ) which protects the leaves against infection by germinating fungal spores.”**



# End-to-end poultry meat processing

Commercial poultry processors have adopted new meat processing technologies to increase efficiency while ensuring food quality.



*The primary poultry processing aims to ensure that the products are fit for the intended purpose after they have been slaughtered and dressed.*

Image credit: Adobe Stock

**G**IVEN A RAPID increase in the global population, which is predominantly urbanised, the supply of sustainable, healthy, safe and high-protein food is seen as one of the defining challenges in the coming decades. In line with this, the global poultry industry is constantly seeking ways to stay cost-efficient by

reducing production cost per bird without compromising the birds' wellbeing, product quality and food safety.

This is the reason why poultry processors are moving to ever-higher volumes and to do so, they are embracing high-speed meat processing technologies to increase efficiency with reduced production cost.

A paper by the Ministry for Primary Industries, New Zealand Government, entitled *Operational Code: Processing of Poultry*, has provided a detailed guideline about the poultry processing techniques including design, construction and essential services; repairs and maintenance; cleaning and sanitation and related supporting systems in the primary and secondary processing of poultry.

## Guidelines to primary processing of poultry

According to the paper, the primary poultry processing techniques aim to ensure that poultry material and products are fit for the intended purpose after it has been slaughtered and dressed and meets the requirements.

**Handling and processing:** Traceability between all parts of the poultry material must be maintained until the post-mortem examination is completed. Dressing must be carried out hygienically

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and in a way that manages the actual and potential distribution and proliferation of contaminants.

**Slaughter:** Slaughter must be carried out without unnecessary delay and in a way that manages the distribution and proliferation of contaminants. Slaughter must only be performed at a rate at which bodies of animals can be accepted for dressing.

**Bleeding and scalding:** Bleeding should be effectively completed before scalding to reduce the organic matter entering the scald and the number of red birds. There should be at least 750 ml of water added to the scald tank per carcass. Operators should document the scalding temperature that they use to achieve effective feather removal and minimise pathogen proliferation.

**Defeathering:** Collection and removal of feathers from the defeathering and scalding areas should be carried out at a frequency and in a manner that minimises build-up of feathers and contamination of the product or processing area.

**Skinning:** Hygienic techniques should be used during skinning. If multiple operations are carried out on the same carcass by the same operator, the operations posing the least risk of contamination should be performed first. Head pulling equipment should be designed and adjusted to minimise blockage through the build-up of heads and head contact with the rest of the carcass after removal.

**Evisceration:** Mechanical evisceration equipment should be adjusted to suit the particular size of carcass to minimise damage to carcasses; damage to the alimentary tract and other internal organs; incomplete removal of the alimentary tract and other internal organs and spillage from the alimentary tract and other internal organs onto the carcass.

**Inside/Outside Wash (Final carcass rinse):** After evisceration, all carcasses should be rinsed with running potable water with at least 0.5 litres per bird or an approved processing aid to remove any remaining visible contamination before undergoing any chilling regime.

**Primary chilling and immersion chilling:** Carcasses should be chilled using immersion and/or air chilling systems to minimise microbial proliferation and handled in a manner to minimise microbial contaminants. Immersion and air chilling systems should deliver the product at 10°C or less before the product leaves primary processing.

#### Guidelines to secondary processing of poultry

**Whole birds:** Whole birds should be received after the completion of

primary chilling at a temperature of 10°C or less. Where this is not the case, the operator must complete the chilling process as quickly as possible.

**Maturing or ageing:** The temperature of the maturing room and product should minimise the growth of pathogenic and spoilage organisms throughout the maturing process.

**Mechanically separated meat (MSM):** The temperatures of bones, carcasses or portions that are intended to be processed using mechanical separation methods must be chilled to or maintained below 10°C and mechanically separated within five hours of boning; chilled to 4°C and mechanically separated within 72 hours of boning; chilled to -2°C and mechanically separated within 120 hours of boning or immediately placed in a freezer and frozen within 48 hours of boning.

The mechanically separated animal product must be used as an ingredient directly after the separation process; immediately cooled to a maximum temperature of 4°C and used for further processing within 48 hours or immediately frozen.

**Shelf-life:** Shelf-life validation trials should be conducted at temperatures that can be reasonably achieved in the distribution and retail system and in the customer's home. Operators should verify the shelf-life of each product on an ongoing basis such as by implementing a rolling testing scheme that includes all products types. ■

## Temperature Control during Processing

- Product should be brought into the processing room progressively as needed, and removed to the chiller or freezer immediately after processing, to maintain chill product temperatures.
- If the temperature of the raw poultry exceeds 10°C, poultry should be processed immediately or immediate action should be taken to reduce this temperature.
- If the raw meat processing area is operating at ambient temperatures the poultry should be held in the processing area for no more than one hour.

*The information on poultry processing is sourced from the Ministry for Primary Industries website. The Ministry for Primary Industries in New Zealand does not endorse any brand of automated solutions for poultry processing.*



*Fish farms in Chanthaburi, Thailand.*


# Improving fish farm yields

Image credit: Adobe Stock

Increasing health and environmental concerns have pushed producers to introduce more sustainable fish farm management practices.

**A**QUACULTURE SYSTEMS RANGE from extensive to intensive depending on the stocking density of the culture organisms, the level of inputs and the degree of farm management.

In the Asia-Pacific region, major culture species include diverse freshwater and marine species such as high-value shrimps, molluscs, seaweeds, with carps and seaweeds dominating production, mussels and oysters, red seaweeds etc. Major culture practices include fish ponds, fish pens and fish cages, floating rafts, lines and stakes for molluscs and seaweeds, hanging lines for mussels and pearl oysters, offshore cages for salmon, pond culture for shrimps, tilapia, catfish and milkfish and freshwater pens for crayfish.

## Aquaculture practices

According to the UN Food and Agriculture Organisation (FAO), extensive systems use low stocking densities (e.g., 5,000-10,000 shrimp postlarvae (PL)/ha/crop) and no supplemental feeding, although fertilisation may be done to stimulate the growth and production of natural food in the water.

Semi-intensive systems use densities higher than extensive systems (e.g., 50,000-100,000 shrimp PL/ha/crop) and use supplementary feeding. Intensive culture uses very high densities of culture organism (e.g., 200,000-300,000 shrimp PL/ha/crop) and is dependent on artificial and formulated feeds.

Semi-intensive and intensive culture systems are managed by the application of inputs (mainly feeds, fertilisers, lime and pesticides) and the manipulation of the

environment, primarily by way of water management through the use of pumps and aerators. Feeding of the stock is done at regular intervals during the day.

“In intensive shrimp culture, the computed daily feed ration is given in equal doses from as low as three to as high as six times a day. Water change is effected daily, with approximately 10-15 per cent of the water in the pond replenished by the entry of new water in semi-intensive shrimp ponds,” FAO noted.

According to FAO, production ranges from a minimum of 1.5 tonnes/ha/crop from semi-intensive shrimp culture to 10 tonnes/ha/crop from intensive shrimp culture.

## Integrated fish farming

In many Asian countries such as China, Nepal, Thailand, Malaysia and Indonesia, freshwater fish culture is integrated with the farming of crops, mainly rice and vegetables, and animals (usually pigs, ducks and chickens).

FAO explained that this leads to a greater overall efficiency of the farming system as wastes, by-products or one component are used as inputs in another. For example, poultry or pig manure can be used to fertilize the fish pond and the vegetable garden and the waste vegetables can be fed to the fish and the pigs.

## Pen and cage culture

Pen and cage culture involve the rearing of fish within fixed or floating net enclosures supported by frameworks made of bamboo, wood or metal and set in sheltered, shallow portions of lakes, bays, rivers and estuaries.

Yields from pen and cage culture are generally high, with or without supplemental feeding depending on the natural productivity of the water body.

There are around 10 species of fish which are commercially cultured in cages and pens in temperate and tropical waters. These include tilapias (*S. mossambicus* and *S. niloticus*); carps (Chinese, Indian and common varieties); milkfish; snakeheads and catfishes; marble goby and salmonids (rainbow trout, salmon). Marine species include grouper, sea bass, mullet, snapper and milkfish.

## Open water fish farming

Open ocean aquaculture, also known as offshore aquaculture, is getting as popular as mariculture or marine farming where fish farms are located in deeper and less sheltered waters, where ocean currents are stronger.

Open water fish farming is increasingly popular because of an increased area for expansion; great water quality, fewer user conflicts; wider dispersion of fish feed and nutrients etc.

As stated by the maritime classification society DNV GL, the development and knowledge-building are needed in several fields for the available deeper water opportunities to be realised.

“There is a truly massive, unused potential for producing healthy marine proteins in a sustainable way,” said Ingunn Midttun Godal, global manager, food and beverage, DNV GL.

“Part of what makes this attainable now is the digital transformation taking place in the food industry in general. Digital technologies are making new concepts attractive and possible also in aquaculture onshore, near the shore and offshore,” Godal further added. ■

# Smart tech a boon to dairy farming worldwide

With huge investment influx in the global dairy sector, implementing state-of-the-art techniques can have a major impact on milking efficiency and the comfort of cows and milkers.

**D**UE TO RAPID urbanisation and the rise of modern trade, global dairy market is hugely benefitting as supermarkets and independent grocers play an important role in supplying fresh milk. Product freshness becomes the focal point in dairy market growth, providing nutritious products as health awareness is gaining momentum for the consumers worldwide.

To ensure the freshness and nutritive qualities in the dairy products, especially milk, automation technologies such as milking parlours, use of robotics and sophisticated software are changing the way farmers produce milk, achieving far-reaching benefits including improved production, milk quality, lifestyle and animal welfare.

An article published by DairyNZ, the industry organisation representing New Zealand dairy farmers (*For more information, please visit [dairynz.co.nz](http://dairynz.co.nz)*), demonstrated the emergence of state-of-the-art technological advancements in dairy farming to improve efficiency and profitability while ensuring quality production.

## Market insight – Asia-Pacific

The Asia-Pacific Dairy Market is expected to reach US\$210bn by 2023, witnessing a robust CAGR during the forecast period, according to Mordor Intelligence, a market research firm.

China is projected to be the most significant market for dairy, primarily driven by increased consumption of dairy products. India and Indonesia are the top growing markets in the region driven by increased population. Rising demand for



*Automatic milking system completes the whole milking process without direct human assistance.*

Image credit: Adobe Stock

fresh milk, western dairy products as natural snacks, fermented dairy products such as yoghurt and sour milk, and product and packaging innovation are driving the region's dairy market growth.

## Cutting-edge dairy farming technologies

According to DairyNZ, new technologies reshaping the global dairy business include automatic feeding systems, electronic ID, drafting systems, robotic milking, automated mastitis detection (AMD) and automated heat detection (AHD).

**Automatic feeding systems:** Dairy shed feeding systems are designed to deliver concentrated feed during milking to supplement cows' pasture-based diet. These systems have low labour requirements and provide flexibility in the type, quantity and timing of feed that can be included in a farm system. They can be designed to provide different feed

allocations to individual cows.

**Electronic ID:** Electronic identification (EID) systems consist of a transponder, a reader and a data processing unit. Coded signals are sent by radio frequency or infrared light between the components of the system. DairyNZ noted that EID systems can be linked to dairy management software which can collect information from milk metering systems and walk-over weighers, providing ease of management and information for decision making.

**Drafting system:** The accurate drafting of cows into groups is an integral part of herd management on farms. It can be a frustrating and time-consuming process if the system is not well designed.

Accurate drafting is important as herd sizes expand. Automatic drafting system identifies cows selected for drafting and then drafts them as required, with as little disruption to cow flow as possible. The drafting system must also provide an easy-to-use interface to select cows for drafting so that the cows are not distracted by milker activity.

**Robotic milking:** According to DairyNZ, an automatic milking system (AMS) or robotic milking completes the whole milking process without the direct

**Use of robotics and other technological innovations are reducing human labour while attaining quality production."**



assistance of milking staff. It consists of a milking stall or crate with a robotic arm that attaches the teat cups to each cow without human intervention, an electronic identification system and a milking machine. Milk is diverted to separate tanks if requested by the operator using the software settings, otherwise, it enters the bulk or temporarily a buffer tank.

**AMD and AHD:** AMD systems use in-line sensors to monitor milk from individual cows during milking for indicators of mastitis. While they provide a technology-based approach to identifying mastitis 'suspect cows,' farmers still need to inspect the alerted cows to confirm clinical mastitis (CM) and determine appropriate actions.

AHD uses technology to help with the manual task of identifying cycling cows. The technology can be used for identifying pre-mating heats, cows that need to be submitted for artificial insemination in the mating period and those that aborted and resumed cycling later.



Image credit: Adobe Stock

*Many farms are set to incorporate dairy farming technologies within next few years.*

#### Improved profitability and high-quality milk

Speaking to *Milkproduction.com*, Dr Jeffrey Bewley, assistant professor at the University of Kentucky and expert in precision dairy farming, said, "New automated technologies have the potential to change the way we manage cows. We will now be able to understand each cow's condition in a way that we previously might have only dreamed of. The potential to catch cows in the heat with limited human observation or pharmaceutical intervention is the most

exciting prospect economically."

According to Bewley, many progressive farms are set to incorporate precision dairy farming technologies into their daily management within the next 10 years.

However, stressing on the need to maintain sustainability in the production, Bewley added that the technology needs to be an economical investment. Technologies should be easy-to-use, reliable and come from companies that put a high priority on customer service. ■



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*Asia is seen to become a major global production and supply hub of medical cannabis.*

# Medicinal cannabis gains momentum in Asia

Image credit: Adobe Stock

The Asian Cannabis Report by Prohibition Partners, founded in 2017 with a mission to open up the international cannabis industry through reliable data and intelligence, has analysed many commercial and entrepreneurial opportunities in the cannabis industry in Asia.

**H**OME TO AROUND 4.5 billion inhabitants and the fastest growing economy for the next decade, Asia is the world's most populous region. The cannabis plant, thought to be one of the earliest plants cultivated in the region, grows widely across Asia and is deeply rooted in some of the region's ancient medical practices.

Medicinal and recreational cannabis remain illegal in the majority of Asian countries. However, there is a significant shift underway towards its legalisation in many Asian nations.

With a number of Asian countries in East and Southeast Asia already taking steps to decriminalise medical cannabis, the region is thought to be on course to become a major global production and supply hub. Thailand, Singapore and China are all pursuing research into the healthcare applications of cannabis. Elsewhere, Malaysia, historically recognised as having some of the most severe penalties worldwide for cannabis possession, trafficking and use, has shown a recent shift in official attitudes.

## Across Asian nations

Cannabis has long held a place in traditional medicines across Asia. Large amounts of hemp are grown commercially in China, India, Nepal, South Korea and Thailand.

India has a growing number of agricultural training programmes and practices across the farming communities that are committed to spreading knowledge

about hemp with the aim for all cultivated hemp to contain less than 0.3 per cent tetrahydrocannabinol (THC).

China's hemp production is thriving in the Yunnan and Heilongjiang provinces, accounting for about half of the world's legal commercial croplands, according to the National Bureau of Statistics.

Therefore, the use of hemp for non-consumable items such as fibre, textiles, rope and netting indicates the potential for a booming industry, which could provide ancillary jobs and taxes throughout the region.

## Commercial opportunities

According to Prohibition Partners, China's medicinal cannabis market is forecast to reach US\$4,381mn by 2024. Some of the local and foreign companies most active in this sector include Yunnan Industrial Cannabis Sativa Co, Zhang Hongq, Dongguan Deheng Beverage & Food Co, Yunnan Industrial Cannabis Co, Harbin Pharmaceutical Co, Yunnan Hansu Biotechnology Co and Yunnan Shaoxing Jincheng Yama.

By 2024, the medical cannabis market is forecast to reach US\$4,381mn (China), US\$89.1mn (India), US\$794.6mn (Japan), US\$9.8mn (Malaysia), US\$210.7mn (South Korea), US\$237.2mn (Thailand), US\$67.8mn (Vietnam), according to Prohibition Partners.

Glenn Davies, Group CEO, CannAcubed, said, "China is experiencing the start of a cannabis boom across many industries as businesses of many sectors are

realising the potential. But this is forcing the government to ensure policy and regulation are tightened and the eco-system is protected. You can't just say 'I'm now in cannabis,' you have to have substance and tangibility to the business."

## Company activities

The steps taken by a number of Asian companies in pursuit of research into the health-related uses of medical cannabis and hemp-derived cannabidiol (CBD) have put the region on course to potentially become a major production and supply hub.

Shares of Asia Cannabis Corp, an international agri-technology company focusing on the planting, growing and harvesting of new and valuable strains of hemp and related crops in South Asia, began trading on the Canadian Securities Exchange in January 2019.

The CEO of Singapore-based CannAcubed, Glenn Davies, announced that the company is working with China's state-owned health fund to build an industrial hemp park in Yunnan province, with 100,000 ha of land.

In September 2018, Elixinol Global Limited (Australia) increased its ownership in Elixinol Japan to 50.5 per cent at a cost of US\$2.2mn. The funds provided working capital to scale Elixinol Japan for anticipated growth in the Japanese market for hemp-derived CBD, food products and skincare.

In April 2019, Australian medical cannabis grower THC Global formed a partnership with Malaysian biotech company Heleogenics. THC Global's main aim is to liaise with the Malaysian government and push for the legalisation of medical cannabis, as well as the development of new policy frameworks and legislation. ■



## Spotlight on agricultural machinery and plant production solution

AGRITECHNICA, THE INTERNATIONAL trade fair for agricultural machinery, will be held in Hanover, Germany from 10-16 November 2019, featuring farming machinery and plant production solutions.

Organised by DLG Service GmbH, around 2,800 exhibitors are looking forward to presenting their products and services to international agricultural professionals.

According to the organiser, cropping farmers worldwide face similar problems as they target cost-effective production while moving to more sustainable systems. Agritechnica 2019 aims to unveil a range of new solutions to meet these challenges. Additionally, farmers, companies and organisations from agricultural regions around the world will be able to exchange knowledge and experience and network with each other.

This year's guiding theme "Global farming – local responsibility" is set to provide an opportunity to gather know-how about sustainable production. In addition, major topics to be discussed include preventing soil losses, improving crop protection sustainably, managing scarce water sources, reducing post-harvest losses and so forth.

### Major highlights for 2019

- The International Farmers' Day will be launched this year, focusing on the two farming nations France and the UK.
- The Young Farmers day on 14 November aims to provide a technical programme with room for information and discussion.



Image credit: DLG

*Farmers, companies and organisations from agricultural regions around the world will be able to exchange knowledge and expand networks.*

- The conference will hold an 'International Dealer and Service Provider Centre' covering the various service providers for the trade.
- In the 'Team Workshop Live' platform, the visitors can look at the agricultural machinery and equipment at close range and get to interact with the young workshop team directly.
- Innovation Award Agritechnica will recognise new concepts and applications which give rise to a new process or mark a substantial improvement to an existing process in agriculture.

## New AFS Connect Magnum 400 tractor from Case IH

AS THE DEMAND and workload of producers continue to grow, Case IH is expanding the AFS Connect Magnum series tractor line up with a 400 horsepower model.

Combining advanced farming systems (AFS) technology with increased power, the AFS Connect Magnum 400 aims to provide producers with the freedom to adjust, manage, monitor and transfer data. The model features a redesigned cab, AFS Vision Pro operating system, AFS Pro 1200 display and automated brake assisted steering.



Image credit: Case IH

*The AFS Connect Magnum 400 will be available in summer 2020.*

Jay Barth, high-horsepower marketing manager at Case IH, said, "The goal of infusing AFS Connect with a 400 horsepower Magnum is to help improve producers' workflow, productivity and efficiency for those demanding jobs that require additional power."

The model is expected to allow producers to precisely manage their farm, fleet and data from a desktop or mobile device while securely transferring data to and from the cloud. Users can log in to AFS Connect to view current field operations, fleet information and agronomic data, remotely keeping an eye on their operation. Farm owners and managers can share selected agronomic data – down to the field level – with third-party partners of their choosing.


### Increased horsepower drives productivity

According to Case IH, the driving force behind the AFS Connect Magnum 400 is the upgraded 21-by-five transmission, 21 speeds forward and five reverse. Redesigned

to handle additional power to the ground, the transmission aims to allow for constant 435 peak horsepower to the ground with 10 per cent power growth in wheeled and Rowtrac configurations.

Additional features to improve visibility include extra storage compartments, multiple cup holders, numerous charging and data ports, a telescoping steering wheel and full-glass door with no centre pillar. Barth noted, "This tractor was specifically designed for producers who have a limited amount of time to get their crops in the field."

An LED grill headlight option and 360-degree egress lighting are installed to assist in night-time operations. Telescoping mirrors are adjustable from the cab, and four camera feeds can be viewed on the AFS Pro 1200 display, with two cameras standard on the cab configuration. The goal is to improve visibility day and night. Additional improvements include a semi-active cab suspension option, breakaway-style marker lights and tire pressure monitoring sensors.



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