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Far Eastern Agriculture

US$15.00 (UK£9.00)

VOLUME 36 ISSUE 3 2019

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How to control
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Poultry:
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Feed & Grain Buyers' Guide 2019

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ANIMAL FARMING

19 – 21 September 2019

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Cover Image : Adobe Stock

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Printed by: Buxton Press
Printed in: June 2019
Far Eastern Agriculture
(ISSN 0266-8025)

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Vietnam witnesses 18 per cent rise in tra fish exports to ASEAN

VIETNAM HAS GAINED around US$55.2mn from exporting tra fish to other members of the Association of Southeast Asian Nations (ASEAN) in the first quarter of 2019, marking an 18 per cent increase on a year-on-year basis.

According to the Vietnam Tra Fish Association, the export turnovers of the country's shark catfish shipped to Malaysia, the Philippines and Thailand increased by 70.9 per cent, 40.6 per cent and 6.5 per cent respectively.

As reported in the *Xinhuanet*, Vietnam has set the goal to achieve US$2.4bn from exporting tra fish by the end of 2019, which has increased from US$2.3bn in 2018.

Vietnam seeks to regulate tra fish output and improve quality of the fish by preventing illegal aquaculture practices.

The source further reported that the country gained US$549.4mn from exporting tra fish to the USA in 2018, up 59.5 per cent against 2017, and US$243.9mn from shipping the fish to the European Union, up 20.2 per cent.

The country's Mekong Delta is aiming to regulate tra fish output and improve the quality of the fish by preventing illegal aquaculture practices. Vietnam is further monitoring the use of antibiotics in fish farming, the source added.

Vaccine for African Swine Fever

WILD BOAR CAN be immunised against African Swine Fever (ASF) by a new vaccine delivered to the animals in their food, according to a study published in Frontiers in Veterinary Science.

The study provides evidence that this immunity can be passed on via contact with immunised individuals, but further studies are needed to examine exactly how this occurs, as well as the safety of repeated administration.

"ASF is of enormous concern to the pig industry," said Dr Jose Angel Barasona, a researcher at the VISAVET Health Surveillance Centre and co-author of this research.

"Our study demonstrates the effectiveness of the first oral vaccine against this disease on Eurasian wild boar. Overall, we demonstrate that oral immunisation of wild boar conferred 92 per cent protection against a highly pathogenic strain of African Swine Fever, which is currently circulating in Asia and Europe."

Infected animals can suffer terribly. Symptoms include high fever, depression, loss of appetite, vomiting, diarrhoea, abortion in pregnant sows, as well as redness of skin on the ears, abdomen and legs.

ASF affects more than 55 countries in three continents, including China, which contains around half of the world's pig population.

ASF affects more than 55 countries in three continents, including China, which contains nearly half of the world's pig population. It is highly contagious and can be spread via contaminated feed and pork products, as well as shoes, clothes, vehicles, knives and equipment. Transmission can also occur by the movement of infected livestock and across wild boar populations. It is this latter form of infection that Barasona and his colleagues hope to prevent.

Iris wins Sustenir Agriculture business

IRIS HAS WON a competitive pitch for Sustenir Agriculture, a Singapore-based sustainable farm in the business of food and farming innovations in Asia.

Iris will be responsible for managing Sustenir Agriculture's brand strategy, creative execution and product innovation. Iris will also help Sustenir Agriculture expand into Hong Kong when it launches later this year.

Sustenir Agriculture aims to bring "impossible crops in impossible places" by producing non-native plants locally through hydroponic and controlled environment agriculture (CEA) methods, to reduce the ecological footprint that comes from transport and food waste.

Having expanded their Singapore operations, Sustenir Agriculture aims to launch urban farms across Asia. The company's produce includes Singapore-grown kale, lettuce, arugula and basil. In 2018, Sustenir Agriculture grew Singapore's first-ever home-grown strawberries.

Sustenir Agriculture was seeking a one-stop shop as its agency-of-record in April 2019 and Iris was awarded following a five-way pitch.

Sustenir produces Singapore-grown kale, lettuce, arugula and basil.

Call for ideas to tackle irrigation water loss

The initiative aims to encourage new ideas to solve issues in sugar, as well as in global agriculture.

AB SUGAR, IN partnership with WaterAid and the Centre for Industrial Sustainability at the University of Cambridge, has launched a first-of-its kind Innovate Irrigation Challenge, seeking to generate new ideas to reduce water losses from irrigation in sugar.

The Innovate Irrigation Challenge aims to bring together people from across the globe to share their ideas on how to solve the challenge of water loss in agriculture. All entries are to be submitted in a 48-hour period during 19-20 June 2019 online. A panel of judges will select a winner, who will have the opportunity to work with AB Sugar and its partners to test the viability of their idea in the field.

Katharine Teague, head of advocacy at AB Sugar, said, "We are all witnessing the ever-increasing pressure on water resources. We see this day in and day out in our businesses across the world – which is why we have already signalled our global commitment to reduce our end-to-end supply chain water and CO_2 footprints by 30 per cent by 2030."

"Our ambition with this challenge is to encourage idea generation that could help solve one of the trickiest issues not only in sugar, but also in global agriculture as a whole," Teague added.

Virginia Newton-Lewis, senior policy analyst at WaterAid, commented, "A staggering 844mn people in the world don't have access to clean water close to home and there is the real risk that climate change could threaten scarce water resources, so it's vital that we explore ways to boost the amount of water available for people who need it most."

New mobile app helps farmers in Philippines

A NEW ANDROID application RiceUp has significantly increased the income of Philippines' farmers by eliminating the middleman who used to take the lion's share of their income.

The app has been developed by the students of Brigham Young University (BYU), Hawaii.

As reported in the HawaiiNewsNow, by using RiceUp, the income of Philippines' farmers can increase from US$71 per month to US$500 per month, BYU-Hawaii student Eli Clark said.

A group of 40 students worked on the plan including planting farming schools in the Philippines to train the farmers' business skills and financial literacy, said the source.

After the successful implementation of the technique in the Philippines, the BYU-Hawaii team is now working with farmers in Cambodia.

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12-14
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12-16
Manila Foods and Beverages Expo
Manila, Philippines
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JULY

3-5
Indo Livestock 2019
Surabaya, Indonesia
www.indolivestock.com

4-6
AASE 2019
Kathmandu, Nepal
www.4hnepal.org.np

AUGUST

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ICAAA 2019
Jeju island, South Korea
www.icaaa.org

27-28
African Farming's 2nd Edition Agribusiness Summit
Abuja, Nigeria
www.agroinvestmentsummit.com

28-30
INAGRITECH 2019
Jakarta, Indonesia
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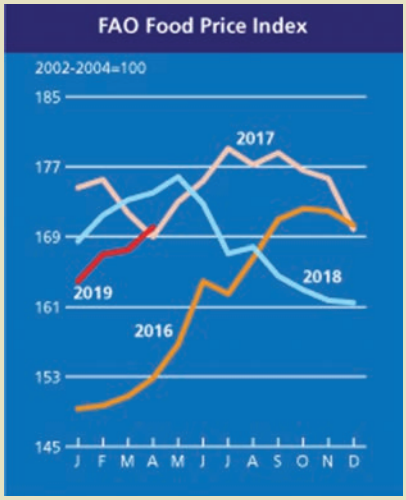
FOOD OUTLOOK

THE FAO FOOD Price Index (FFPI) rose in April 2019 to around 170 points, 1.5 per cent higher than in March and marking its highest value since June 2018. At this level, the FFPI would still remain 2.3 per cent below its level in the corresponding month last year. Except for the sub-index for cereals, all the other sub-indices firmed in April, led by dairy and meat, and to a lesser extent vegetable oils and sugar.

The FAO Cereal Price Index averaged 160 points in April, down 2.8 per cent from March and five per cent below its April 2018 value. The sub-index fell for the fourth consecutive month, pressured by large export availabilities and slowing trade. Among the cereals, wheat prices fell the most in April, influenced by prospects for a strong rebound in the 2019 production, amid large exportable supplies.

The FAO Vegetable Oil Price Index averaged 128.7 points in April, up 0.9 per cent from the previous month. The rise mainly reflects slight increases in palm and soybean oil values. International palm oil price quotations rebounded somewhat on rising global import demand, combined with inventory drawdowns in major exporting countries. Soyoil prices, on the other hand, notched up, underpinned primarily by robust domestic demand in the USA stemming from both the biodiesel and food sectors.



The FAO Dairy Price Index averaged 215 points in April, up 5.2 per cent from March, representing the fourth consecutive month of increase. In April, international price quotations for butter, whole milk powder (WMP) and cheese rose, as global import demand continued to be robust in anticipation of a further tightening in export availabilities from Oceania with dry weather conditions reinforcing the seasonal milk production drop. By contrast, skim milk powder (SMP) prices slipped for a second consecutive month from the February high, underpinned by continued slowdown in demand.

The FAO Meat Price Index averaged just over 169 points in April, up three per cent from March, with month-on-month price quotation increases registered for pig and bovine meats and, more moderately, for poultry and ovine meats. International price quotations of pig meat rose sharply due to a surge in import demand in Asia, primarily in China, caused by a sharp fall in the country's pig meat production associated with the rapid spread of the African Swine Fever (ASF). Bovine, poultry and ovine meat prices all firmed reflecting an overall tightening of global meat markets.

The FAO Sugar Price Index averaged 181.7 points in April 2019, up almost 0.8 per cent from March. The latest rise in international sugar prices was largely driven by firmer crude oil prices. Stronger energy prices lend support to international sugar prices by affecting Brazilian sugar exports to the world market, as higher energy prices encourage producers to process sugarcane into ethanol for local sale.

China's Urban Tea set for overseas expansion

CHINESE SPECIALTY TEA and baked goods retailer Urban Tea Inc has announced strategic plan to open its first store in the USA, aiming to expand businesses in the North American market.

In line with implementing its overseas expansion plans, the company is further set to explore the Southeast Asian market.

Image credit: Adobe Stock

The goal is to promote the Chinese-style tea culture in a global market.

Kan Lu, chief financial officer of Urban Tea, said that the company aims to promote the Chinese-style tea culture and 'Freshly made, low-calorie' healthy eating concept across the globe.

Bangladesh bans fishing for 65 days

BANGLADESH HAS IMPOSED a ban on fishing off its coastal areas from 20 May to 23 July 2019.

Image credit: Water Alternatives/Flickr

Every year Bangladesh imposes a weeks-long ban on the fishing of national fish Hilsa.

Ashraf Ali Khan Khasru, minister of fisheries and livestock, said that the ban aims to boost depleted fish reserves in the country. The coastal guard and navy will be guarding the Bay of Bengal region to enforce the ban.

Responding to the needs of the fishing communities who rely greatly on fishing for livelihood, the Bangladeshi government has announced to provide monthly rations to affected fishers.

Every year Bangladesh imposes a weeks-long ban on the fishing of national fish Hilsa. According to WorldFish data, the total Hilsa catch increased by 28 per cent, from 387,211 mt to 496,417 mt in 2015 and 2016 harvest seasons due to similar bans.

Healthy diets vital for progress in Lao PDR

THE UN FOOD and Agriculture Organization (FAO) and the World Food Programme (WFP) have concluded a joint visit to the Lao People's Democratic Republic (Lao PDR) with a call for greater investment in nutrition.

FAO director-general José Graziano da Silva and WFP executive director David Beasley made the three-day visit, together with the International Fund for Agricultural Development (IFAD)'s sub-regional director Thomas Rath, to raise awareness about the importance of integrated food systems to improve food and nutrition security.

As malnutrition remains an obstacle to the country's aim of becoming a middle-income country, access to healthy and diversified diets is vital to improving nutrition.

The delegation visited several sites in the country's northern Oudomxay Province which is part of a joint food security and nutrition programme, Agriculture for Nutrition, which benefits around 400 villages in four northern provinces.

The programme is being implemented to help boost nutrition in rural areas, in a joint collaboration between FAO, IFAD and WFP and with the government of Lao PDR and other partners.

Under the programme, FAO is working with farmers to increase their incomes from livestock so they can afford more nutritious food for their families. This is alongside FAO's work to encourage rice farmers to raise fish in their rice paddies to provide both extra income and a nutritious source of protein.


Image credit: Adobe Stock

The WFP, FAO and IFAD aim to create a better future for schoolchildren, farmers and rural families throughout the country.

FAO's Farmer Field Schools further help family farmers increase productivity for better food and nutrition security.

The delegation further visited Ban Bor school in Xay District that is taking part in the nationwide school meals programme that encourages healthier diets for children. Under the programme, nutritious meals are provided by WFP to 140,000 schoolchildren in 1,450 schools to enhance learning and health. Communities are supported to establish and manage school vegetable gardens that ensure fresh, local produce is available for the school meals and also teach children about nutrition.

Animal farming technologies in focus at EuroTier China

EUROTIER CHINA, ONE of the leading trade fairs for animal production in all segments such as dairy, cattle, poultry, sheep and fish, is set to be held at Qingdao International Convention and Exhibition Centre, Qingdao, China, from 19-21 September 2019.

The show is expected to provide an ideal 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 DLG International GmbH, in partnership with National Animal Husbandry Service (NAHS), the event sets the platform to address the challenge of ever-rising levels of local meat consumption.

According to 2017 DLG-Agrifuture Insights, pork is set to remain China's favourite meat in the years to come, accounting for around 60 per cent of all meat consumption, followed by poultry, beef and veal, mutton and lamb. China is the world's largest milk importer and now the fourth-largest producer of dairy and dairy-based products. The number of breeding farms nearly doubled from the between 2000 and 2012 due to the heavy investment programmes of the Chinese central and local governments. According to the market research, one in three farmers surveyed intend to invest in their business in the next 12 months.

The event aims to further address China's high demand for new technology and solutions including modernisation of existing facilities, improving animal health, reducing emissions and increasing feeding efficiency.


Image credit: Adobe Stock

The event will focus on cutting-edge animal farming technologies and solutions.

EuroTier China offers 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. It gives access to advanced technological know-how, developments on international agricultural markets and provides structures for networking with international experts and transferring important knowledge. The programme and information are tailored to the specific challenges of the farming world in the region.

Additionally, international and national experts will be presenting and discussing major issues of animal farming concerning the special needs of the Chinese market. A hosted buyer programme will allow more efficient networking at the show.

Capitalising on business opportunities in Indonesia

INDONESIA IS THE largest country in Southeast Asia with a labour force of 265mn people. Around 70 per cent of the population is involved in the livestock, feed and fisheries industry.

The population of broiler chickens during the 2013-2017 period was predicted to increase by 3.28 per cent per year on average and in the next year 5.54 per cent. While the production of broiler eggs is set to increase in the next five years, the average consumption will increase by 4.18 per cent per year.

To address this trend, the 14th Indonesia's livestock and feed industry expo and forum – Indo Livestock 2019 will be held from 3-5 July 2019 at Jakarta Convention Centre.

Organised by PT Napindo Media Ashatama, the event will gather governments, integrators, manufacturers, farmers, veterinarians, feed millers, food processors, research institutes and industry experts across the region to discuss new technologies, build partnerships, attract investment and get updated on current developments of Asia's livestock sector.

The event will focus on integrators, poultry and layer, drugs and animal health, dairy processing, agricultural, fisheries, farmers, fishermen, food processors, trade associations, consultants, importers, distributors and traders, who will gather to source the latest products.

Image credit: Adobe Stock

The event will explore numerous feed manufacturing solutions.

Cutting-edge livestock technologies

According to the experts, livestock businesses in Indonesia are encouraged to take advantage of technological advances to increase protein consumption. Agricultural economist Bayu Krisnamurthi said that businesses must be able to take advantage of big data if they want to catch up with industry 4.0.

Cutting-edge livestock technologies and solutions will be presented by 310 exhibitors from 33 countries.

The technical presentation programme during Indo Livestock 2019 will cover:

- Info Terkini Newcastle Disease (ND) and Pengendaliannya
- Natural growth promoter
- Environmental sampling for livestock farming applications
- Yeast culture as the most comprehensive gastrointestinal nutrition to improve multi-species animal health
- Ultra-hermetic technology: Storage solutions for sustainable feed mill and livestock industries
- Milk cooling by bulk milk coolers and milk cans coolers

In addition, the event will focus on free technical product presentation sessions. These sessions are specially designed to provide depth knowledge on some of the innovative solutions on show.

> **"This event is set to establish and create collaborative networks among researchers and educational institutes, building cooperation from the private sector and government agencies."**

Exhibitors will cover the areas of air equipment, animal feed, antibiotics, aqua extrusion, bag closing machines (sew), bag filling machines, biological fertilisers, biotechnology, broiler and layer cages, broiler breeder and layer, broiler breeder, raising equipment, broiler equipment, chicken battery cage, chicken cage and frame, equipment, chicken meal, dairy equipment, dairy products, diagnostic kit, egg and egg products, egg grading, egg handling equipment, egg packaging, electrical fencing, embryos, energy feed, feed antimold (mould inhibitor), feed antioxidant, feed ingredient, feed manufacturing, fish farming, fish feed additives, fish meal/oil, fish processing, food packaging, hatchery automation, hatchery vaccination, heating and light, heating systems, herbal products for animals, high pressure pumps and accessories, livestock equipment, livestock farming, livestock industry, livestock transport, pig breeding, poultry breeding, poultry breeding and hatchery, poultry drinking system, poultry equipment, publishers, refrigerated trucks, refrigeration, rendering, seafood processing, security systems, stalls, equipped or unassembled, warning systems, waste processing equipment, waste water treatment systems, wheat flour, winch motors, x-ray equipment and others. ■

Global poultry driven by Asian growth

There is an increase in the consumption of animal-based products in the emerging countries due to the rapid urbanisation.

POULTRY PLAYS A crucial role in Asia-Pacific's fastest growing agriculture sector to achieve food security, higher incomes and famers' welfare. The Asian dairy and animal protein industry is often seen to add significant value to the trend, showing a robust market outlook for poultry products worldwide.

The global blood meal market is estimated to be valued at US$1.8bn in 2019 and is projected to reach US$2.1bn by 2025, recording a CAGR of three per cent, according to ResearchAndMarkets' analysis.

The market is driven by factors such as an increase in the consumption of animal-based products, particularly in the emerging countries of the Asia-Pacific and South America due to the increasing urbanisation.

Robust growth in Asia-Pacific

The Asia Pacific region is projected to be the fastest-growing market during the forecast period. The region is witnessing a significant growth due to the rapid growth in population, urbanisation and expansion of the middle-class population, with the increasing demand for animal food products.

Countries such as China and Vietnam are among the largest consumers of meat products such as pork. China is projected to be a major revenue pocket in the blood meal market in the coming years. These factors are projected to increase the number of slaughters, thus creating opportunities for blood meal manufacturers.

Based on source, the poultry blood segment is estimated to account for the largest share in the blood meal market in 2019. Poultry blood is the most preferred raw material that is used to produce blood meal due to its high amino acid content, particularly Lysine.

Image credit: Adobe Stock

Food remains a prominent end-use industry for pre-made pouch packaging.

Based on application, the poultry feed segment is estimated to account for the largest share in the blood meal market in 2019. The demand for poultry products is on the rise in developing countries of the Middle East and Africa as well as Brazil and China. This has led to an increase in the number of slaughtering in the poultry industry generating blood, thus increasing the production for blood meal in the past few years.

Feed mycotoxin binders and modifiers – strong growth in poultry and aquafeed sectors

The global feed mycotoxin binders and modifiers market size is projected to grow from US$2.5bn in 2019 to US$3bn by 2025, at a CAGR of 3.6 per cent, revealed ResearchAndMarkets.

The market in Asia Pacific is projected to be the fastest-growing, due to large livestock population and their increasing growth rate.

Furthermore, increasing government regulation to control mycotoxin level in feed, due to rising concerns over food safety is expected to drive the market. Additionally, there has been an increase in the production as well as consumption of meat products in the region, particularly of chicken and pork that is expected to fuel the feed mycotoxin binders and modifiers market in the Asia-Pacific region.

In pre-made pouch packaging too

Food remains a prominent end-use industry for pre-made pouch packaging, whereas packaging of fruits and vegetables, meat, poultry and seafood, bakery and confectionery, ready-to-eat meals, dairy products and pet food use pre-made pouch packaging owing to their lightweight and easy-to-carry nature.

According to the global market research firm Future Market Insights (FMI), in 2019, South Asia and East Asia cumulatively are expected to account for around one-third of the global pre-made pouch packaging market.

Among all Asian countries, Japan has been one of the early adopters of pouches, owing to urbanisation and fast-paced lifestyle. The country represents around one-fifth of the East Asian pre-made pouch packaging market and is projected to expand its existing value by the end of 2029.

China is estimated to be prominent in the Asian pre-made pouch packaging market and account for more than 70 per cent of the East Asian market, owing to the growing population and consumption of packaged food. ■

Increasing egg production in layers

With the rapid growth rate of global commercial eggs market, it is important for the poultry farmers to understand flock production capabilities to accelerate egg production.

A HEN'S LAYING SYSTEM relates to the reproductive system. A hen's body begins forming an egg shortly after the previous egg is laid and it takes around 26 hours for an egg to form fully. So, a hen will lay later and later each day.

It is important to note that hens in a flock do not lay on exactly the same day. The length of time that a flock will produce eggs also varies. Many home flocks produce eggs on and off for three to four years. Each year, the level of egg production is lower than the previous year. Also, egg size increases and shell quality decreases each year.

The number of eggs from a flock and the number of years a flock will produce eggs depend on several factors such as breed, management of pullets prior to lay, light management, nutrition management, space allowances and etc.

Breed

The commercial white Leghorn chicken breed is used in large egg production complexes and lays white-shelled eggs. Dual-purpose breeds, such as Plymouth Rocks and Rhode Island Reds, lay eggs with light brown shells. Maran hens lay eggs with dark, chocolate-coloured shells. The South American Araucana breed lays eggs with light blue shells. 'Easter Egger' hens are produces by crossing Araucanas with other breeds. They lay eggs with light blue, green or pink shells.

Some breeding companies have developed commercial layers for brown-shelled egg production, with some bred specifically for pasture poultry production.

Pullet management

It is important to manage pullets correctly, especially in the areas of nutrition and light management. Correct management will affect the level and quality of egg production once the birds start laying.

If the pullets come into production too early, they may have problems with prolapse, which can cause health problems across the flock. Also, the hens may lay smaller eggs throughout the production cycle.

While raising pullets from day-old chicks, the farmer needs to brood the chicks likewise other type of chick. For future laying flocks, light management is important from brooding through all laying periods.

Light management for year-round production

Chickens are called long-season breeders, meaning that they come into production as days become longer. Typically, day-old chicks are kept on 23-24 hours of light per day for the first few days to make sure that they are able to find food and water, especially water. After that time period, the farmer should reduce the number of hours of light per day.

While raising the birds indoors, they need around eight hours of light per day. When the pullets are ready to start laying, the farmer need to increase the light exposure until they are exposed to about 14 hours of light per day. This exposure should stimulate the flock to come into lay. To keep the flock in lay year-round, the need is to maintain a schedule of at least 14 hours of light per day. The farmer can increase the amount of light to 16 hours per day late in the egg production cycle to help keep the flock in production.

Image credit: Adobe Stock

Chickens are called long-season breeders, meaning that they come into production as days become longer.

Nutrition

Chickens of any type and age require a complete and balanced diet. Feed mills assemble the available ingredients in combinations that provide all the nutrients needed by a flock in one package.

It is important to feed the specific feed tailored for the type of and age of the chickens. Meat-maker type diet should not be used to growing pullets or laying hens as it will not meet their nutritional needs. The diet of a laying hen is high in calcium, which is needed for the production of eggshells. This level of calcium, however, is harmful to non-laying chickens.

Identification of laying hens

For some breeds, laying hens have large, bright red combs and wattles. For other breeds, the combs and wattles are in normal colour during the laying period but fade after the laying period.

For hens with yellow pigment in the skin such as Rhode Island Reds and Plymouth Rocks, the level of pigmentation is a good indication of where the hens are in the production cycle. Hens lose the yellow pigment in a specific order. The colour fades first from the vent and then the face (beak, eye ring, and earlobe); and then the feet (shanks, toes, and hock).

An additional method for identifying laying hens involves evaluating the level of fat in the abdomen and the abdominal capacity as measured by the distances between the pubic bones and the tip of the keel or breast bone (abdominal depth). ■

Published with kind permission from extension publication, written by Dr Jacquie Jacob, University of Kentucky, entitled "Raising Chickens for Egg Production." Read the full article here: articles.extension.org/pages/71004/raising-chickens-for-egg-production

Bacterial blight and leaf streak diseases of rice

Bacterial blight of rice is particularly prevalent in Asia but the bacterial disease can be found virtually anywhere in the rice growing world.

Image credit: Dr Terry Mabbett

Copper-containing fungicides have been emerging as a successful method to control bacterial diseases in rice farming. Dr Terry Mabbett speaks.

RICE DISEASES CAUSED by bacterial plant pathogens are difficult to diagnose and are much harder than fungal diseases to manage, mainly because there are fewer chemical control options. The wide range of rice diseases caused by fungal pathogens is managed by a correspondingly broad spectrum of fungicides. However, the only fungicides having complementary anti-bacterial activity are the copper-containing fungicides which have been successfully used to control bacterial diseases in rice.

> **"Bacterial blight is most damaging in the early growth stages and the affected areas quickly enlarge and turn yellow within just a few days that is commonly called 'pale yellow leaf'."**

Bacterial pathogens spread rapidly in moist, humid conditions so it should be no surprise that paddy rice, whether rain-fed or irrigated, is 'blighted' by bacterial disease. The two most important and damaging bacterial diseases of rice are bacterial blight caused by *Xanthomonas oryzae pv. oryzae* and bacterial leaf streak caused by *Xanthomonas oryzae pv. oryzicola*. Both diseases are found on crops throughout most of the rice-growing world including Asia where infection rates are inherently high. Crop losses up to 50 per cent and 20 per cent, respectively, have been recorded for bacterial blight and bacterial leaf streak of rice.

Bacterial blight (*Xanthomonas oryzae pv. oryzae*)

Bacterial blight is most damaging in the early growth stages with young plants wilting, drying up and dying in a condition called 'Kresek.' On older plants, the disease begins as water-soaked stripes serval cm below the tip or along the leaf margin. Affected areas quickly enlarge and become chlorotic (turn yellow) within just a few days and commonly called 'pale yellow leaf.'

The host range of *Xanthomonas oryzae pv. oryzae* includes a large number of wild grasses and sedges which makes the disease all the

more difficult to manage in rice crops. These alternative host plant species include *Leersia oryzoides* (rice cutgrass), *Zizania latifolia* (Manchurian wild rice), *Leptochloa chinensis* (Asian sprangletop) and *Cyperus rotundus* (nutgrass or nutsedge).

Persistence and spread

The pathogen survives and persists on rice stubble and weed hosts, entering young rice plants through leaf stomata and hydathodes, cracks at the base of the leaf sheaths and any wounds or abrasions.

Irrigated and rain-fed lowland rice is frequently affected by this disease. Heavy rain accompanied by strong winds is a significant factor in disease spread and facilitates infection through wounds and abrasions caused by inclement weather conditions. Bacterial exudate oozing from the lesions falls into the irrigation water to spread disease into neighbouring fields. High temperature (25°C to 30°C) and high relative humidity (more than 70 per cent) combine to accelerate infection, disease development and spread.

Management and control

- Use rice varieties bred for resistance to bacterial leaf blight
- Cultural control which includes avoiding application of excess nitrogen fertiliser, ensuring shallow water levels in rice nursery beds and provision of good field drainage especially during periods of flooding.
- Plough in rice stubble and straw after harvest and keep rice fields free of alternative weed hosts.
- Allowing fallow fields to dry out will suppress residual bacteria in soil and on rice plant debris
- Spray application of copper-containing fungicides has been widely used in a prophylactic capacity to protect plants from infection

Bacterial Leaf Streak (*Xanthomonas oryzae pv. oryzicola*)

Translucent streaks appearing between the leaf veins are the classic, initial foliar symptoms of bacterial leaf streak. Under moist, humid conditions yellowish-coloured droplets of bacterial ooze appear on the lesions and come to resemble 'beads' as the plant surface dries out. All wild species of the genus *Oryza* (rice) are susceptible to infection and these plants will serve as important reservoirs of inoculum.

> **"Bacterial leaf streak occurs on rain-fed and irrigated rice in lowland paddy cultivations as well as in rain-fed, upland rice farming systems."**

Persistence and spread

Persistence of the pathogen is primarily on infected rice seed and straw but the bacteria may also survive in irrigation water. Bacteria enter rice leaves through stomata and leaf abrasions to establish an infection and multiply in the leaf parenchyma tissue. Optimum conditions for infection, disease development and spread are high rainfall and humidity (80 per cent plus) and temperatures above 80°C. Yield losses approaching 20 per cent are not unusual under conditions which favour infection and disease development.

Spread of bacteria occurs when fluid exudates from leaf lesions are disseminated by the splashing effect of raindrops on the leaf surface, by windblown water droplets, by leaf-to-leaf contact and via contaminated irrigation water. Bacterial leaf streak occurs on rain-fed and irrigated rice in lowland paddy cultivations but also in rain-fed, upland rice farming systems. The disease is seed-borne and infected rice seed, along with contaminated irrigation water supplies, is the main vehicle for introduction of this pathogen into previously disease-free fields.

Management and control

- Plant rice varieties resistant to bacterial leaf streak
- Remove weed hosts and plough in rice stubble and straw, rice ratoons and volunteer seedlings all of which can be a source of infection for the following crop

Image credit: Dr Terry Mabbett

Ensure rice fields are free of weeds and especially wild grasses and sedges (shown here in flower), which are alternative hosts for the bacterial blight pathogen.

- Provide all essential nutrients in well-balanced fertiliser applications
- Ensure good drainage of rice fields and nurseries
- Allow fallow fields to dry out to kill any bacteria in the soil and on plant residues
- Hot water treatment of rice seed may kill this seed-borne pathogen. Temperature of the water used is critical – high enough to destroy the pathogen but not so high that rice seed embryos are damaged and killed
- Copper-based 'fungicides' including fixed copper compounds like cuprous oxide are used in a preventative capacity to protect rice crops from this bacterial disease. They are typically applied as foliar sprays to protect rice plants and leaves from infection. In cases of severe infection when yield may be affected, a copper-based fungicide applied as a foliar spray at the 'heading' stage can be effective in controlling the disease and minimising loss of grain yield

Copper at the centre – past and present

There is a long history of copper fungicide use to control disease in rice with Bordeaux Mixture (contains copper sulphate) first used against the rice blast fungus disease over 100 years ago (1914) in Japan. Reports suggest Bordeaux Mixture was first used around the same time against bacterial blight and also in Japan.

Sustained use of copper fungicide to control bacterial disease in rice over the last 50 years was somewhat sidelined by widespread use of antibiotics as foliar sprays in some East Asian countries and seen as a more effective means of control. However, use of antibiotics in this way is now firmly recognised as a highly 'dangerous game' by contributing to the development of antibiotic resistance in bacterial populations. There are clear and serious implications when the bacteria concerned are livestock and human pathogens, and especially so if the antibiotics used to spray rice fields possess the same chemistry and mode of action as those routinely used in human medicine.

> **"Spraying should be carried out during dry conditions when the leaves are no longer wet from previous rainfall and are not likely to experience rainfall during or soon after spray application."**

There has been a resurgence of interest in use of copper fungicides to control bacterial disease in rice and especially bacterial leaf streak. Foliar sprays of fixed copper fungicide like cuprous oxide are recognised as a useful means of preventative control provided applications are made quite early in the crop cycle and no later than 40 to 50 days after sowing. Attempts to control bacterial leaf streak with copper fungicides, or for that matter any prophylactic product, after this stage of growth and development is essentially a waste of time. This is because the bacterial pathogen has become firmly established in the leaf tissue and therefore escapes the preventative action of the copper fungicide on the leaf surface.

Spraying should be carried out during dry conditions when the leaves are no longer wet from previous rainfall and are not likely to experience rainfall during or soon after spray application. This will minimise weathering pressure on the copper fungicide deposit, thereby maximising its longevity on the leaf surface at levels which

Rice fields should be well drained to avoid prolonged 'waterlogged' conditions which are favourable for bacterial pathogens causing disease in rice.

Image credit: Dr Terry Mabbett

are adequate for extended protection of the leaves.

Current focus is on cuprous oxide applied as a custom-designed solid formulation and adhering to the rice seed to form a protective 'seed dressing.' *Xanthomonas oryzae pv. oryzicola* (bacterial leaf-streak) is a seed-borne pathogen which is killed by the copper-containing seed dressing as it [the pathogen] attempts to infect rice seedlings during germination. ■

No-till tractors are on the move

Trantor International aims to tailor new tractor concepts for farm transportation, recognising the requirements of the new zero-tillage farming system.

Around 65 per cent of the world is directed to dryland agriculture and CA is more easily implemented in drylands.

Image credit: Adobe Stock

CONSERVATION AGRICULTURE (CA) practice, which involves direct seeding and zero-tillage with no ploughing at all, is a new holistic agricultural system that promotes permanent soil cover maintenance, minimum soil disturbance and diversification of plant species.

As 'zero-tillage' and 'direct drilling' are major CA agronomic practices, to farm without disturbing the soil through tillage, innovative mechanisation plays a crucial role in maintaining the soil texture and permanent soil cover.

More than 160mn ha are currently cultivated using CA methods. The majority of these are found in North and South America and Australia. This figure is continuing to grow, as the cost of farm inputs, low productivity and high fuel-costs rise. When farmers use CA, the number of field operations is reduced, a saving in fuel occurs and less fertiliser is needed. One of the main benefits, however, is in the lowering of labour costs.

Recognising the benefits of CA systems, the UN Food and Agriculture Organization (FAO) is promoting CA practices across the globe, which in turn, opens up the urge for customised design and changes in farm tractors for a sustainable farming. According to the industry experts, availability of right equipment is the major constraint for adopting CA. To convince farmers about the successful adoption of CA systems, the only way is to promote and provide suitable equipment that will do the best seed placement while minimising soil disturbance.

Surging demand for farm tractors

The demand and use of tractors are always up, as they play an integral role in mechanised agriculture. With cutting-edge technological applications and launch of unconventional designs as per with the customised needs of the farmers, there is a surge in farm tractors' demand throughout the globe. Global tractor market registered sales of more than 1.73mn units in 2017 and the figure is forecast to reach 2.33mn tractor units by 2023, according to TechSci Research.

The worldwide tractor market is in excess of two million units per year and 32mn tractors are being used daily. India manufactures 700,000 and Turkey makes 70,000 per annum. The USA and European markets are 200,000 and 165,000 per annum respectively.

Trantor International Limited (TIL)

Recognising the fundamental needs of the CA methods, British-owned Trantor International Limited (TIL) is working closely with FAO, InnovateUK and ECAF in the design and development of a wide range of transportation and no-tillage farming systems to achieve increased productivity.

Graham Edwards, chairman and co-founder of TIL, said that the tractor of the future has to work within a different set of parameters. The future for the farmers of the world is very different from the past and now a completely different system is required for sustainable farming practices.

> **"Asia-Pacific is a large market for zero-tillage system as the growth in size of ploughing tractor volumes has increased dramatically over the last 20 years."**

According to Trantor, a tractor that is designed for CA needs to efficiently carry out the range of duties required in it including seed drilling, fertiliser spreading, chemical spraying (herbicides, pesticides and fungicides), harvesting and transporting the crop.

TIL in Asia

The Trantor tractor concept is a high-speed transport tractor designed for crop transportation and the no-till farming system, which is suitable for the Asian fields, as the governments in the Asia-Pacific region are focussing on the twin problems of food production and job creation by boosting farming output.

Apart from the international expansion, the company's range of zero-tillage farm tractors is expanding its footprint in Asian markets such as Australia, India and Malaysia, to gain worldwide experience of farming and, therefore, how to design and develop relevant and different farm tractors for countries, with the help of FAO and EACF to the new CA farming system.

In India, TIL has settled on the combination of TATA vehicles and ACMA (India) automotive components, with an aim to work on the developments of the Trantor concept. One of the recent prototypes is a 185 HP Javelin (Series 3) Trantor and is a big, high H.P. transport-first tractor. It is lighter and has a bigger load platform than many of the existing machineries in the markets. ■

APEJ remains most lucrative for agricultural sprayer sales

As farming is one of the most prominent occupations in most economies in the Asia-Pacific region, Asia Pacific excluding Japan (APEJ) remains the leading market for agricultural sprayers.

Drone technology is encouraging market players to launch next-gen aerial sprayers.

THE GLOBAL AGRICULTURAL sprayer sales are expected to surpass three million units by 2020 and the sales in Asia Pacific excluding Japan (APEJ) to close in on 1.3 million units by 2020, according to a study by Fact.MR, Dublin-based global market intelligence company.

As the agriculture sector significantly contributes to the GDP of Asian countries, prospects remain bullish for sales of high-tech farming machinery in the region. APEJ is expected to account for more than 43 per cent of the global agricultural sprayers sales by 2020, noted the study.

According to the study, leading manufacturers are adopting cognitive technologies to meet growing end-user requirements for more efficient, productive and precise agricultural machines.

As noted by the World Government Summit, more than 75mn IoT-integrated agricultural equipment and machinery will be sold by 2020. The shift in end-user preferences for modern farming techniques and equipment has led to an upsurge in the sales of next-generation agricultural machinery, in turn influencing growth of the agricultural sprayers market.

Leading players in the agricultural sprayers market are vying for opportunities in APEJ, to capitalise on increased demand. As products of the local manufacturers in the region are inferior to those of their international competitors in terms of technology and specialisation, opportunities remain robust for the latter in APEJ.

"Leading international companies in the agricultural sprayers market are focusing on strategic partnership with local manufacturers, to meet the burgeoning demand for customised, sustainable and technologically-advanced agricultural sprayers," Fact.MR commented.

> **"Local APEJ companies are partnering with international firms to create customised, sustainable and technologically-advanced agricultural sprayers."**

Promising prospects for China and India

According to the study, the agricultural sprayers market in APEJ will benefit from favourable government policies that prompt the shift from traditional, labour-intensive farming practices to a more mechanised approach.

"Gains from agricultural sprayer sales in China and India will remain promising, with major developmental programmes taken by the governments in these countries that drive demand for agricultural machinery to improve productivity," the sturdy emphasised.

Governing organisations in China and India are offering subsidies and loans to farmers, encouraging the adoption of modern farming practices that involve advanced equipment and machinery.

Tractor-mounted sprayers

As the operational flexibility of tractor-mounted agricultural sprayers enables end-users to carry out both pest control processes and fertilisation processes using single equipment, preference for the tractor-mounted agricultural sprayer over the self-propelled category is increasing globally.

Tractor-mounted sprayers are becoming a popular choice, not only among small-scale farmers, but also among large-scale end-users. In fact, large operators, who previously opted for self-propelled sprayers are making a move towards the tractor-mounted variants, as the latter facilitates large-scale farming operations. ■

Improving nutritional qualities of animal feed

Biotechnology and nanotechnology applications in animal nutrition offer many opportunities for increasing high-quality production.


Image credit: Adobe Stock

Animal feed plays the most important part of the food chain, ensuring quality livestock products such as milk, meat and eggs.

THE TOTAL VALUE of animal feed was approximately US$6.10bn in the past year and the global animal feed market is expected to reach 20.97 kilo tonnes by 2025, from 16.95 kilo tonnes in 2017, growing at a CAGR of 2.7 per cent, according to Data Bridge Market Research (DBMR), the global market research firm.

This rapid development in livestock feed resources is in response to increasing human population, urbanisation, income growth, production system efficiency and environmental sustainability.

DBMR research has further pointed out that the global food industry is seen to face the challenge of feeding more than nine billion people by 2050, which is going to offer an opportunity for the animal feed industry, as the consumers are demanding more protein-enriched food, especially in developing countries.

Added to this, a paper by Grace Opadoyin Tona entitled *Current and Future Improvements in Livestock Nutrition and Feed Resources, (available from http://dx.doi.org/10.5772/intechopen.73088)* has revealed that as the world population is expected to increase from six to around 8.3bn in 2030 at an average growth rate of 1.1 per cent per year, it is essential to be prepared to produce sufficient food for the increased population based on locally available feed resources.

To meet the increasing global demand for livestock products such as milk, meat and eggs, animal nutrition and feed resources play a cardinal role to ensure the optimisation of feed efficiency and higher productivity.

Biotechnology for increased production

Modern biotechnology applications have the potential to provide new opportunities for achieving enhanced livestock productivity in a way that alleviates poverty, improve food security and nutrition and promote sustainable use of natural resources, stressed Opadoyin Tona in the paper.

Microbial proteins such as single-cell protein, multicellular (yeast protein) aim to serve as new feed sources in the form of microbial proteins for livestock feeding. Genetically-engineered (GE) forage crops such as low phytate maize and high-oil maize aim to reduce the levels of antinutrients in forages and other feedstuffs.

Feed additives may be added to the livestock diet to enhance the effectiveness of nutrients. A number of feed additives employed in livestock nutrition are crystalline amino acids (methionine, iysine, threonine, tryptophan), antioxidants (butylated hydroxy toluene (BHT), butylated hydroxyl anisole (BHA), ethoxyquin), antifungals (aflatoxin) and antibiotics (avilamycin, virginiamycin, zinc bacitracin, avoparcin, tylosin, spiramycin). They play a vital role in improving protein utilisation, preventing auto-oxidation of fats and oils in the diet, controlling mould growth in feed and eliminating harmful bacterial species in the gut.

> **"Probiotic supplements are found to increase feed intake and to influence performance of ruminants"**

In monogastrics feeding

Poultry feeding: According to the paper, nonnutritive feed additives such as the enzymes xylanases, β-glucanases and phytates are used to overcome antinutritional effects in some grains and to improve overall nutrient availability and feed value. BHT, BHA and ethoxyquin are used in poultry feeds to prevent auto-oxidation of fats and oils in poultry diets. Aflatoxins are added to poultry feed ingredients such as grains, groundnut cake and cottonseed cake to control fungi growth in feed and to bind and reduce the negative effects of mycotoxins.
Pig feeding: Maize cob, a by-product of a major cereal grown worldwide, has the potential to be used as a pig feed ingredient. Supplemental microbial phytase improves calcium and phosphorus utilisation in the growing swine fed soybean meal-based diets.
Fish feeding: In host fish, probiotics result immunostimulants, improved disease resistance, reduced stress response and improved gastrointestinal morphology. Direct benefits to the fish farmers and

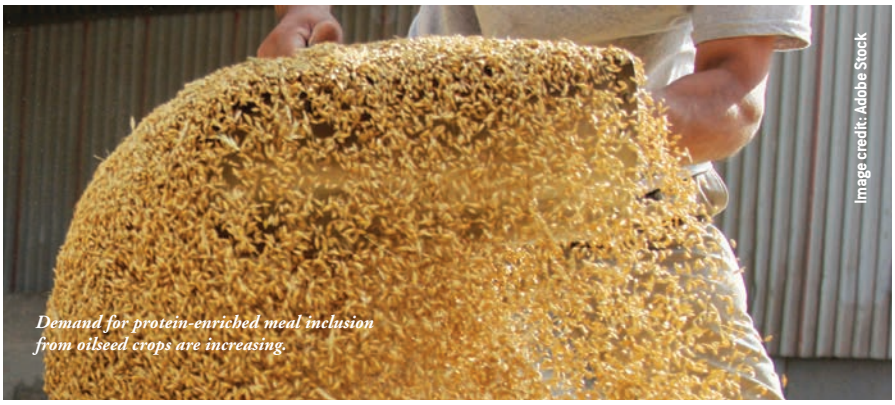


Image credit: Adobe Stock

Demand for protein-enriched meal inclusion from oilseed crops are increasing.

consumers include improved fish appetite, growth performance, feed utilisation, improvement of carcass quality, flesh quality and reduced malformations.

In ruminant feeding

Probiotic live cells with different beneficial characteristics have a wide range of benefits to young ruminants. These include enhanced development of the rumen microflora, improved digestion and nitrogen flow toward lower digestive tract and improved meat and milk production during the adult stage of the ruminant.

The probiotic that enhanced immunoglobulin level may have more positive effect on growth performance, production, and ability to resist diseases. Some examples of probiotics suggested were those containing *Lactobacillus plantarum* and *Aspergillus oryzae*. The addition of probiotics containing yeast in a supplemental diet enhanced growth performance and the immune response of Zandi lambs.

Nanotechnology in animal nutrition and feeding

The application of nanotechnology in animal production is new because production in livestock industry has been centred on the use of antibiotics as growth promoters.

Nanoparticles may present a feasible alternative to antibiotics and may help bar pathogens from entering animal production sites. Copper is regularly added to feeds for its ability to promote animal growth and performance, in addition to its antimicrobial properties.

According to the paper, nanoform copper could better improve piglet energy and crude fat digestion through the augmentation of lipase and phospholipase A activity in the small intestine compared to a basal diet supplemented with copper sulfate ($CuSo_4$). ■

New Holland Agriculture extends T6 tractor range with six-cylinder models

NEW HOLLAND AGRICULTURE has widened the T6 range with three new six-cylinder models such as the T6.180 Auto Command and the T6.180 Dynamic Command. The T6.160 Electro Command was presented to the public for the first time at the SIMA exhibition.

The new engine aims to feature an optimised EGR-free combustion for efficient operation, coupled with an HI-eSCR after-treatment system to comply with Stage IV (Tier 4B) emissions standards.

Due to the six-cylinder engine, the T6.180 is set to deliver up to 12 per cent higher torque than four-cylinder models, with low-end end torque that significantly helps in pulling away performance and improve engine lugging in transport and field applications. The six-cylinder engine delivers maximum torque of 740Nm at 1500rpm, compared to the 700Nm of the four-cylinder.

In addition, the larger displacement of the new engine results in more effective engine braking in downhill operation and transport, with 50 per cent higher brake capability compared to that of the four-cylinder engine. The exhaust brake option aims to increase engine braking by a further 24 per cent.

Image credit: New Holland Agriculture

The T6 Auto Command and Dynamic Command models further aim to communicate and control the tractor's PTO, hitch, EHR control, steering and speed. For example, hitched to a New Holland round baler with IntelliBale, the baler can stop the tractor when a bale is formed, eject the bale and close the tailgate.

New 'Grasshopper' provides cane farmers a choice

THAILAND'S SAMART KASET Yont has unveiled 'Grasshopper,' a tractor-based cane cutter and layer system, to increase productivity and profitability among farmers.

The new 'Grasshopper' has a system which aims to hold, support and guide the stalk into the chopper blade ensuring a clean cut and improved ratoon. Through a series of renewable belts, the system lays the cut stems on the ground behind the machine as it moves forward leaving a uniform stream of cut cane ready to be collected.

Speaking about the high demand of mechanised cane cutting solutions, the company explained, "Young people are either not willing or not able to take on the hard physical work of cutting cane by hand. Although many farmers have the chance to enlist contractors using mechanical harvesters on an 'ad hoc' basis, this limits flexibility and can lead to delay in bringing a crop from the field."

The 'Grasshopper' aims to reduce human labour, providing a superior cut product for farmers to sell and providing farmers with the independence to decide when and where they cut their cane, noted the company.

Image credit: Samart Kaset Yont

The 'Grasshopper' is set to be operated with a 40hp tractor and is seen to work effectively on machines up to 100hp with no adverse effect.

Samart Kaset Yont said that the cut cane can be clamped neatly from the ground by a tractor or cane loader. The wear parts of the machine are easy and economical to replace. The 'Grasshopper' is set to be operated with a 40hp tractor and is seen to work effectively on machines up to 100hp with no adverse effect.

Apart from this, Samart Kaset Yont provides a range of machines with an aim to help sugarcane operators boost output with reduced cost. The range comprises two principle designs such as the SM-200 and the SM-200 Giant. Both are available with power options between 165 kW and 190 kW.

The SM-200 standard is a track-based machine. The SM-200 Giant is based on a half-track design aimed principally at planned, prepared plantations where long unrestricted operation with open headland is available.

Srinual Leethirananon, operations director at Samart Kaset Yont, said, "Reduction of the noise and vibration being transferred to the operator is just part of a much larger programme."

She continued, "Internationally, customers expect a higher standard, not just in comfort but in all facets of the machine design. As we compete more and more on the international stage, we will be providing European standards in all main aspects of our products."

FEED AND GRAIN BUYERS' GUIDE 2019

Section One - Supplier 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 01

Additives and raw materials

Amino Acids
Eurofeed Technologies S.p.A

Antibiotics & Anticoccidials
Eurofeed Technologies S.p.A

Feed Enzymes
Eurofeed Technologies S.p.A

Fats & Oils
Eurofeed Technologies S.p.A

Industrial Co-Products
Unipoint AG

Mold & Mycotoxin Control Products
Ayurvet Ltd.
Eurofeed Technologies S.p.A
Unipoint AG

Minerals
Eurofeed Technologies S.p.A
Unipoint AG

Microbial & Fermentation Products
Eurofeed Technologies S.p.A

Phytogenic Feed Additives
Ayurvet Ltd.
Eurofeed Technologies S.p.A

Premixes
Ayurvet Ltd.
Eurofeed Technologies S.p.A
Unipoint AG

Protein Products
Eurofeed Technologies S.p.A

Specialty Ingredients
Eurofeed Technologies S.p.A

Vitamins
Eurofeed Technologies S.p.A

Machinery and equipment

Coolers
Almex b.v

Conditioners
Almex b.v

Cookers
Almex b.v

Dryers
Almex b.v

Expanders
Almex b.v

Extruders
Almex b.v

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Safety and environment

Biosecurity, Cleaning & Sanitation Products
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Section 02

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You are kindly invited to visit www.almex.nl for more information.

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Eurofeed Technologies S.p.A

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Eurofeed Technologies Spa is that produces in Italy and trades feed additives all over the world. We're GMP + Certified. Eurofeed' portfolio includes: Acidifiers, Antimicrobials, Antioxidants, Aromas, Energising, Enzymes, Growth Promoter, Herbam Line, Mold-Inhibitors, Mycotoxin Binders, Natural Diarrhoea Prevention, Nucleotides, Organic Trace Elements, Pellet Binders, Sanitizing, Vegetable Protein Concentrates and Vitamins.

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Section 03

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The need for sustainable cooling


Image credit: Adobe Stock

Cold-chains enhance economic wealth, cash flow and security for farmers.

Technology can help to tackle sustainable cooling challenge facing the wider world, according to a report launched at the Clean Cooling Congress.

SMARTPHONE TECHNOLOGY IS expected to help Indian farmers to make better business decisions to tackle sustainable cooling challenge facing India and the wider world, according to a report.

The report was launched at the two-day Clean Cooling Congress, which opened in London on 24 April, hosted by University of Birmingham with the World Bank Group and the UK Department of Business Energy & Industrial Strategy (BEIS) and Mission Innovation.

The recommendation is part of a four-point 'roadmap' developed by experts at the University of Birmingham working with the Shakti Sustainable Energy Foundation and MP Ensystems to uncover the cooling needs of farmers in the states of Haryana, Punjab, Maharashtra and Karnataka.

> **"Effective refrigeration is essential to preserve food and medicine, while air conditioning is crucial to sustainable urbanisation and human productivity and makes much of the world safe to live in."**

Four major actions in 'Promoting Clean and Energy Efficient Cold-Chains in India' are:

- Promoting new business models that involve the communities taking charge of their own cooling needs
- Establishing 'Living Labs' in rural communities where new technology can be tested
- Providing training to enable people in the food industry to use new technology
- Creating a new framework for delivering IT-based cold chain solutions; particularly IT-based services to manage harvesting and logistics, and selling surplus cooling capacity

Effective refrigeration is essential to preserve food and medicine. It underpins industries and economic growth, while air conditioning is crucial to sustainable urbanisation and human productivity and

makes much of the world safe to live in.

Toby Peters, professor in Clean Cold Economy at the University of Birmingham, commented, "We must build capacity whilst demonstrating the efficiency of new technology that people will be able to use easily and affordably."

The problems in India are acute, where up to 50 per cent of food is lost post-harvest because of lack of cold chain. The report highlights that around four per cent of products that would benefit from a cold-chain actually does so, compared with around 70 per cent in the UK.

Pawanexh Kohli, CEO at National Centre for Cold-chain Development and Visiting Professor at the University of Birmingham, noted, "Cold-chains enhance economic wealth, cash flow and security for farmers and improve food quality, safety and value to the customer, but they must achieve this with minimum environmental impact."

Importance of sustainable cooling

Krishan Dhawan, CEO at Shakti Sustainable Energy Foundation, said, "Cold chains are expected to grow rapidly in the next couple of years. Under a business-as-usual scenario, most cold chains will run on diesel and adopt carbon intensive cooling and refrigeration technologies. The way forward is for India is the transition to cleaner and more efficient cold chains, in order to tackle climate change and to achieve wider socioeconomic benefits."

> **"In India, up to 50 per cent of food is lost post-harvest because of lack of cold chain."**

Mahesh Patankar of MP Ensystems and senior advisor with the regulatory assistance project commented, "Cold-chain infrastructure and business models need to be grounded within the communities – providing them the solutions to enhance their livelihood while catering to a country's nutritional requirements. Enhanced IoT and Blockchain techniques proposed by the research team are designed to bring substantial benefits to those who need it the most."

With populations and incomes growing, urbanisation continuing and climate change causing rising temperatures, the world will need to provide far more cooling. By 2050, it is estimated that 19 pieces of cooling equipment, such as room-size AC units, refrigerators and industrial size chillers, will be deployed every second. Despite this massive increase in cooling provision, access to cooling for all people that need it will still not be a reality, and the poorest in many hot countries will feel the impact.

How the world meets this challenge and provides cooling services to a growing middle class and to the vulnerable poor in the coming decades will have important ramifications for the climate. Without innovations and targeted interventions, the energy demand for cooling could increase more than five times by 2050 – and fast growing direct and indirect GHG emissions associated with cooling equipment can easily outpace all the attempts to reach the goals of the Paris Agreement and halt global warming.

According to the organiser, access to cooling is not a luxury. It's about fresh food, safe medicines and protection from heat for populations in a warming world. It is vital for economic productivity, by allowing workers, farmers and students to work in comfortable optimised environments.


Image credit: Adobe Stock

Effective refrigeration is essential to preserve food and medicine.

Meeting global cooling need without overheating the planet

The UK Department of Business Energy and Industrial Strategy (BEIS), the World Bank and University of Birmingham organised an in-depth international congress to support the World Bank and partners in developing a multi-sectoral roadmap to provide sustainable cooling in urban and rural areas.

The goal is to work together to set the world on an accelerated course towards access to affordable and sustainable cooling solutions for all who need them.

The initiative aims to deliver a sustainable solution: for industry to achieve faster market entry and growth; governments to achieve lowered energy consumption and greenhouse gas emissions and consumers to be benefitted from access to improved cooling services at accessible lifecycle costs.

Focal points during the event:

- Intervention options for rural and urban communities
- System level thinking and change – what does it mean and how can we adopt it
- Delivering sustainable cooling – policy and funding dimensions
- Overview of innovation and research – what is happening and what gaps need filling

The delegates heard about UK government's activities and initiatives on cooling internationally as well as the new Cooling for All Secretariat, launched by Sustainable Energy for All last month in Rwanda, and the Global Cooling Prize Team led by the Rocky Mountain Institute, the Government of India and Mission Innovation. ■

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