



For a sustained improvement in agricultural productivity and socio-economic development, experts are of the view that new plant breeding technologies (NBTs) such as genome editing holds the key. CRISPR-Cas, a crop genome technique is widely being hailed by scientists for its rapidly increasing agricultural applications in major cereals such as rice, wheat, and maize and other food security crops such as banana and cassava. Because of its lower cost, genome editing can be used for staple crops that play an important role for supporting the poor population, farmers and for managing healthy diets. It can further help improving the local fruits and vegetables. Other plant breeding techniques such as Rapid generation advance (RGA) and single-seed descent can also minimize crop life cycle for research on breeding, selection, and fixing of useful genes.

Another advantage of this technique is that being nearly identical to the conventional crops, it can lower the costs of the regulatory procedures, fast-track innovation and adoption, make improved seeds affordable for farmers and increase competition in the seed industry. To fully exploit the potential that NBTs hold, a multipronged approach is required in technological development, awareness, acceptance and adoption. To support each and every strata of people and their sustainable development, a renewed effort and strategy is essential and adoption of genome-edited crops is crucial to achieve this.

In this newsletter we have highlighted some of these techniques which are widely being discussed at the global platform. Specially in EU, where scientific experts, researchers and students are raising their voices to revoke the directive where the regulations which governs genetically modified organisms (GMOs) are now applied to mutagenesis-based NBTs. Experts are of the view that the EU is missing out on these innovative techniques because of disproportionately burdensome authorisation requirements as per the directive. We hope the different news that we have brought together from India and global in this newsletter, will be useful and a good read.



Shivendra Bajaj
Executive Director
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News in India

[How geographical indication can boost agriculture exports](#)

(The Financial Express)

An initiative India should take is branding agri-products through steps such as geographical indication (GI), especially for organically produced commodities that would realise higher returns in global markets. Establishing effective agricultural brands can help farmers gain a competitive advantage in 'buyer-driven' global markets.

[No proven health, environment impact, government not to ban herbicide Glyphosate](#)

(The Financial Express)

The government is unlikely to put a ban on the controversial herbicide Glyphosate as there is no proven record to establish its effects on health or environment, an official source said. The demand to restrict the herbicide, largely used in tea and now HT Bt cotton, has been made by activists alleging it to be a carcinogenic, citing a 2015 study of International Agency for Research on Cancer (IARC).

[Policymakers may have to focus on rewards & incentives to scale up farmers and industry: Experts](#)

(The Economic Times)

For farmers to now pursue sustainable farming one needs to find new ways of using technology that is tailor made to suit the smaller landholdings. Micro and drip irrigation must replace the current method of flooding which is also eroding the land of its nutrients. New farm policies must be drafted so as to empower farmers to improve their yields and double their incomes, while maintaining the natural habitat of their land. Their partner stakeholder, the agrochemicals and seeds industry must feel incentivised so as to offer world class, products. Ratings on products will infuse competition among companies.

[Government to soon launch farmer-friendly crop insurance scheme: Narendra Singh Tomar](#)

(The Economic Times)

Agriculture minister, Shri Narendra Singh Tomar said that the government is set to launch a more farmer-friendly crop insurance scheme to maximise benefits under the Pradhan Mantri Fasal Bima Yojana (PMFBY). He further said that the Centre is expecting feedback and suggestions from states this month, after which the scheme will be suitably modified. The government is evaluating making this scheme voluntary for farmers while introducing a risk-pooling system wherein government will have more control right from deciding the premium to fixing payouts.

[Study lists alternatives to straw burning](#)

(The Hindu Business Line)

According to a study published in the journal, Science, lakhs of farmers in Punjab and Haryana who currently burn the rice crop residue to prepare their fields for growing winter wheat crop can make up to 10 to 20 per cent profits if they adopt no-till practices for cultivating wheat. These alternative farming practices could also cut greenhouse gas emission from on-farm activities by as much as 78 per cent and help lower air pollution in the North Indian cities. The scientists compared the costs and benefits of 10 different land preparation and sowing practices for rice-wheat cropping practised in 80 per cent of 4.1 million hectares of the Indo-Gangetic plains. The direct seeding of wheat into unploughed soil and shredded rice residues was the best option; it raises farmers' profits through higher yields and savings in labour, fuel, and machinery costs.

[Majority of urea manufacturing plants in country lack safety measures: Study](#)

(The New Indian Express)

According to a study conducted by the Centre for Science and Environment (CSE), a majority of urea manufacturing plants in the country lag in safety compliance and environmental performance as per international standards. Under its Green Rating Project (GRP), the study found that despite 87% of urea plants (20 out of 23 plants) obtaining safety certifications of Occupational Health and Safety Assessment Series (OHSAS) 18001, gas leakages and explosions remain a concern at the plants, located in the vicinity of villages and towns. Out of the plants assessed in the study, 12 plants received directions or show cause and even closure notices — for water and air pollution or solid waste

mismanagement. The 18-month-long study rated the fertiliser sector on more than 50 parameters. The rating covered all the 28 operational plants in the country.

[Chief Ministers' Panel on Agriculture, states talk genetically modified crops in 'restricted spaces'](#)

(The Economic Times)

The Chief Ministers' Panel on Agriculture is deliberating with other state governments on whether to permit genetically modified (GM) crops in the country 'in restricted spaces'. The move may take time as some state governments have opposed the introduction of GM crops. The panel has, however, decided to bring in major changes in the Essential Commodities Act (ECA) to remove the stock limits to ensure that a rise in crop prices is not hindered by the imposition of ECA.

[Agriculture start-ups boom as farmers turn tech-savvy](#)

(The new Indian Express)

Indian agriculture-tech start-ups have turned out to be a preferable sector by investors in recent times, with the sector receiving more than USD 248 million in funding over the first six months of this year, registering a 300 per cent growth compared to the same period last year. With numbers growing at the rate of 25 per cent year-on-year, India currently has more than 450 start-ups in the agri-tech sector, according to a report unveiled by NASSCOM.

[Farm lending process needs an overhaul: SBI chief](#)

(The Hindu Business Line)

State Bank of India Chairman, Mr Rajnish Kumar said that the present model of agricultural lending in the country was not viable and needs an overhaul. He further said that the high level of non-performing assets (NPA) in farm sector is an issue and fragmented landholdings are making agricultural lending unviable. However, FPOs or Farmer Producer Organisations can help dealing with the problem of landholding.

News Around the World

[South Australia seeks to lift ban on mainland GM crops, Kangaroo Island to remain GM-free](#)

(ABC News)

South Australia has announced its intention to be the last mainland state to lift its GM moratorium, however, Kangaroo Island will remain GM-free. The moratorium, introduced by Labor in 2003, was due to extend until 2025 but the Liberal Government planned to overturn that. The decision to lift the 16-year ban was made following an independent review by Emeritus Professor Kym Anderson earlier this year. Professor Anderson estimated the cost of the moratorium to SA's grain industry was about \$33 million since 2004 for canola alone.

[A systems approach to global agriculture could solve food insecurity](#)

(Greenbiz)

A more decentralized approach toward the agriculture value chain will help ensure that the supply meets growing demand requirements, while encouraging equitable participation among suppliers, regardless of geography. A system approach not only will promote agricultural biodiversity and market participation, but also will enhance nutritional — and quite possibly societal — security. The global agriculture industry needs to adopt a decentralized approach built upon a systems foundation to evolve and meet societal needs in the coming decades.

[Australia urgently needs real sustainable agriculture policy](#)

(The Conversation)

Australia has made a global commitment to sustainable agriculture, an endeavour seen as increasingly crucial to ending world poverty, halting biodiversity loss, and combating climate change. To honour the international obligations and respond to growing sustainability markets, Australia urgently needs a contemporary definition of sustainable agriculture, including agreed on-farm metrics.

[Planting the Seeds for Dramatic Changes in Agriculture](#)

(Washington Monthly)

The benefits of vertical farming is that it allows one to produce more crops from the same square footage of growing area. For instance, 1 acre of an indoor area offers equivalent production to at least

4-6 acres of outdoor capacity, while using 70-95 percent less water than traditional farming. Hydroponic cultivation — the growing of plants without soil — is a science as ancient as the fabled Hanging Gardens of Babylon and as modern as a future NASA mission to Mars. It has even played a role in feeding U.S. troops since World War II.

[Five ways UK farmers are tackling climate change](#)

(BBC News)

Agriculture is currently responsible for about 9% of the UK's greenhouse gas emissions, mostly from methane. The National Farmers' Union (NFU), which represents 55,000 UK farmers, has set a target of net-zero emissions in British farming by 2040. Few new and surprising changes are taking place in UK farms. They are using robots to cut the energy used in cultivation by 90%, using drones to map fields where data is fed to precision machinery to target areas that need work, planting more trees, keeping livestock outside for longer and cutting methane emissions by feeding additives that reduce methane production in the animal's gut.

[Kenya to promote use of technology in agriculture to boost food security](#)

(Xinhuanet)

The Government of Kenya will put in place conducive policies and regulatory frameworks to enhance uptake of Information and Communication Technology services especially among small-scale farmers. In order to enhance the productivity of the agricultural sector, the government will soon begin the registration of farmers. A database will enable agricultural authorities to provide targeted fertilizer subsidies through electronic vouchers and technology will ensure information symmetry among all players in the agricultural value chain.

[Petition launched to change EU's stance on gene editing](#)

(Farmers Weekly)

A petition has been launched urging Brussels to address outdated legislation on plant breeding, to enable Europe to benefit from new techniques such as gene editing. Grow Scientific Progress (GSP) is a group of master's-level students from eight EU countries who want the EU to distinguish between new plant-breeding techniques (NPBTs) and genetic modification. The European Court of Justice ruled in the summer of 2018 that gene editing should be subject to the same regulatory framework as genetic modification.

[Growing scientific progress](#)

(The Parliament Magazine)

New breeding techniques (NBTs) have opened the door for more precise, targeted and predictable outcomes. Plants can now be optimised with NBTs to resist emerging pests and droughts, to require less nutrients, or to yield safer and more nutritious food. Moreover, most crops developed using mutagenesis-based NBTs are indistinguishable from crops with natural genetic changes. The EU has been missing out on these innovative techniques because of disproportionately burdensome authorisation requirements established in Directive 2001/18/EC which governs genetically modified organisms (GMOs) and now applies to mutagenesis-based NBTs as well. For almost two decades, this directive does not take into account the invention of NBTs ten years ago nor the scientific progress made in safety assessment.

[Organic food movement 'shoots itself in the foot' by rejecting CRISPR gene editing](#)

(Genetic Literacy Project)

The organic food movement has declared its strong opposition to new plant breeding techniques (NBTs) such as CRISPR-Cas9 gene editing, arguing they are unnatural and potentially harmful to the environment and human health. This opposition to the latest advances in plant breeding illustrates the organic movement's disdain for mainstream science and its precautionary mindset about agriculture. While most organic food producers view rejection of technology as a way to set their "natural" products apart from the conventional alternatives, they have miscalculated the importance of plant breeding advances and may put themselves at a severe competitive disadvantage as a result. NBTs are beginning to radically improve food production, yielding products that appeal to both consumers and farmers. This feat cannot be replicated by organic growing practices.

[How can CRISPR technology improve plant breeding?](#)

(European Scientist)

A new comprehensive review paper published on 15 July in *Nature plants* explores how scientists can use CRISPR to enhance traditional plant breeding techniques with the goal of ensuring global food security. They have highlighted the currently untapped potential of CRISPR technology for plant science, suggesting that CRISPR could significantly accelerate plant breeding and germplasm development (the genetic material, seeds, and tissues used to cultivate crops) in the future. The new comprehensive review emphasises the potential benefits — beyond basic gene editing — that CRISPR can offer in plant breeding. The technology has been used in many different ways in animals and humans that could also be applied to important food crops such as rice, wheat, and corn or maize. However, as per the authors, similar studies in crops are lagging.

[Smartphone app could help banana growers spot major diseases before they strike](#)

(Genetic Literacy Project)

A new smartphone tool developed for banana farmers scans plants for signs of five major diseases and one common pest. In testing in Colombia, the Democratic Republic of the Congo, India, Benin, China, and Uganda, the tool provided a 90 percent successful detection rate. This work is a step towards creating a satellite-powered, globally connected network to control disease and pest outbreaks.

New Research

[Installing solar panels on agricultural lands maximizes their efficiency](#)

(Science Daily)

A study published in the journal *Scientific Reports*, finds that if less than 1% of agricultural land was converted to solar panels, it would be sufficient to fulfil global electric energy demand. The concept of co-developing the same area of land for both solar photovoltaic power and conventional agriculture is known as agrivoltaics.

[Subsidies are key to better fertiliser access, study shows](#)

(Scidev Net)

In an article reviewing scientific evidence, the team presented a strategy to manage global fertiliser use while minimising nitrogen pollution — a common side effect. They note that it will be essential to increase access to fertilisers in developing countries in order to provide more food for a growing population. The researchers highlight intergovernmental cooperation and incentives for companies to provide cheap, high-quality fertilisers as essential measures to tackle poor soils and food shortages.

[UK university to research solar-powered cold chains for Indian agriculture](#)

(PV Magazine)

The International Solar Alliance (ISA) has partnered with the University of Birmingham to promote the use of solar and solar-hybrid energy powered cold chains and cooling systems among farmers in 'sun-rich' countries. While Birmingham is the research partner on ISA's Solar Cooling Initiative (I-SCI) for agriculture use, India's National Centre for Cold-chain Development (NCCD) will provide domain expertise and knowledge support to the project. The two organisations will explore opportunities to drive forward ISA's agenda to research, plan and deliver such technologies in ISA member countries located between the Tropics of Cancer and Capricorn—such as India, Egypt and Brazil.

[Plants could give us new treatments for cancer, HIV and other diseases if we had better 'pharming' regulations](#)

(Genetic Literacy Project)

In 2003 the USDA's Animal and Plant Health Inspection Service set out highly detailed guidelines for how and where pharmaceutical companies could plant their crops and store their equipment. This ended most entrepreneurial interest in pharming. In 2010 the biotech company Ventria Bioscience nonetheless approached the FDA for recognition that two human proteins, lysozyme and lactoferrin, synthesized in genetically engineered rice, are "generally recognized as safe"—a regulatory term of art. They were intended to be added to oral rehydration solution to treat diarrheal diseases. Studies had shown that the proteins shortened the duration of illness and reduced the probability of future illnesses. Ventria received no response from the FDA and the product was never marketed for use.

Radars and robots: Can technology turn honeybees into more efficient pollinators?

(Genetic Literacy Project)

Concerns about overall bee health, led researchers to consider whether technology can play a part in pollination. For some researchers, that means looking into whether technology can replace bees. Harvard researchers have created RoboBees, insect-sized flying robots, and about a year ago, they found ways for the robots to fly untethered from power supplies. Numerous researchers are seeking ways to use tiny drones for means of artificial pollination. Walmart filed a patent for a system for “pollinating crops by unmanned vehicles.”

Soybeans can get more nitrogen from the atmosphere

(Ag Daily)

Plant breeders could theoretically increase soybean crop yields if they could control the number of nodules on plant roots since they are responsible for fixing atmospheric nitrogen. Jianxin Ma, a professor in Purdue University’s Department of Agronomy, and colleagues report a potential method for increasing nodule formation based on discoveries tied to the RNA in rhizobia, soil-borne bacteria essential to root nodule formation. They describe how rhizobia hijack soybean genes that would otherwise suppress nodule formation. The findings offer scientists genetic targets for new soybean lines that could get even more of their necessary nitrogen from the atmosphere.

Zero-Waste Plants Being Developed

(ISAAA)

Large proportions of crops are discarded during or after harvest, including plant parts containing proteins, fats, and fiber. Professor Luisa Trindade, professor at the Department of Plant Sciences at Wageningen University and Research (WUR) wants to change this. Trindade wants to increase the value of crop residues and is currently working on fiber crops, including miscanthus. Her research group has developed eight potential new hybrid varieties of miscanthus which have been planted in 10 different locations in Europe. Miscanthus has interesting properties such as high biomass yields and high CO2 capture which promotes soil quality.

Upcoming Events

Regional Expert Consultation on Gene Editing in Agriculture and its Regulations

Date: 10-11 October, 2019 | Venue: International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad, India

The Regional Expert Consultation is organized by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Asia-Pacific Association of Agricultural Research Institutions (APAARI), Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB), Federation of Seed Industry of India (FSII), Alliance for Agri Innovation (AAI) and Research Program on Grain Legumes and Dryland Cereals.

The objective of the Expert Consultation is to:

- Highlight the innovations through gene editing and their impact in the agricultural sector
- Review the status of global regulatory policies around gene editing and particularly in the Asia-Pacific region
- Provide a platform to promote adoption of science-based predictable policies for regulating gene edited crops and breeds. Discuss the impact of regulatory hurdles, delays, associated high cost on technology adoption and communication strategies for enabling policies on plant and animal breeding innovations

It is expected that the Expert Consultation will bring forth:

- Record opinions and inputs from public and private sector regarding the regulatory framework in relation to gene edited products
- A white paper on recommendations for science-based regulatory policies and recommend the best regulatory path forward for India, considering its unique status and influence in the region, and other countries of Asia-Pacific region

Participation will include researchers, representatives of various public institutions & private sector; policy makers & scientists from member countries of Asia-Pacific Association of Agricultural Research Institutions (APAARI); CGIAR centres; Department of Biotechnology, Ministry of Agriculture & Farmers' Welfare, Ministry of Health and Family Welfare, Ministry of Environment, Forest and Climate Change. Recognized diverse set of experts will be invited to make presentations and participate in panel discussion.



APSA

In association with

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Asian Solanaceous Round Table III

the Sheraton Grand Bangalore at Brigade Gateway
22 – 25 October 2019

The program includes current updates, covering everything from breeding to market trends in Solanaceous crops.

The theme of main sessions are as follows:

- The modern breeding technologies for diseases and pest resistance
- Quality traits and disease resistance
- Modern production technology
- Post-harvest technology (processing and value addition)
- Market trends
- Possible collaboration with research institutes

On 25 October 2019, the field visit is hosted by the Indian Institute of Horticultural Research, Bangalore

Registration fee

• APSA member companies	: 180 USD per person
• Non-member	: 200 USD per person
• Government officials	: 100 USD per person
• Students	: 50 USD per person
• Booth Exhibitor	: 75 USD per person
• Big booth (3m X 3m)	: 500 USD
• Small booth (2m X 2m)	: 300 USD

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For more information, please contact Ms. Kunaporn Phuntunil
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FSII is associating with The Asia & Pacific Seed Association (APSA) for the Asian Solanaceous Roundtable III at Bengaluru. The event will take place between 22-25 October 2019, at the Sheraton Grand, Bengaluru. We encourage you to start registering and share your learnings and success stories at the event.

August 2019

International Agriculture & Horti Expo

Date: August 1-3, 2019

Venue: New Delhi, India

Milan International Conference on Agricultural, Biological and Environmental Sciences (MABES)

Date: August 5-7, 2019

Venue: Milan, Italy

International Agriculture Innovation Conference (IAIC)

Date: August 8, 2019

Venue: Oulu, Finland

International Conference on Plant & Soil Science (ICPSS)

Date: August 9, 2019

Venue: Taipei, Taiwan

International Conference on Agricultural and Food Sciences (ICAFS)

Date: August 12-13, 2019

Venue: Pattaya, Thailand

International Congress and Expo on Agriculture & Horticulture

Date: August 12-13, 2019

Venue: Prague, Czech Republic

International Conference on Environment, Agriculture Biology and Natural Sciences (EABNS)

Date: August 14-16, 2019

Venue: Bangkok, Thailand

International Conference on Agriculture & Horticulture

Date: August 15-16, 2019

Venue: Rome, Italy

International Conference on Inventions and Innovations for Sustainable Agriculture (ICIISA)

Date: August 15-17, 2019

Venue: Bangkok, Thailand

September 2019

International Conference on Agriculture, forestry, Biotechnology and Food Science

Date: September 01, 2019

Venue: Vishakhapatnam, India

Bordeaux - France International Conference on Agricultural, Environmental and Medical Sciences

Date: September 04-05, 2019

Venue: Bordeaux, France

Plants, People, Planet Symposium

Date: September 04-05, 2019

Venue: Richmond, UK

International Symposium on Buckwheat

Date: September 03-06, 2019

Venue: Shillong, India

Asian Pacific Weed Science Society Conference

Date: September 03-06, 2019

Venue: Kuching, Malaysia

Congress of Agrarian Economy

Date: September 04-06, 2019

Venue: Lugo, Spain

Agri-business Conference

Date: September 05-06, 2019

Venue: Lincoln, USA

International Conference on Agriculture, Biological and Environmental Sciences

Date: September 05-07, 2019

Venue: Paris, France

International Conference on Agricultural and Food Sciences

Date: September 17-18, 2019

Venue: Istanbul, Turkey

European Conference on Crop Diversification

Date: September 18-21, 2019

Venue: Budapest, Hungary

International Conference on Agricultural and Biological Science

Date: September 23-24, 2019

Venue: Miami, USA

October 2019

Summit on Advancing the Agriculture Economy Through Innovation

Date: September 30-October 01, 2019

Venue: Colorado State University, Fort Collins, USA

Africa Fertilizer Agribusiness Conference

Date: October 01-03, 2019

Venue: CTICC (Cape Town International Convention Centre), Cape Town, South Africa

Conference on Suppliers and Buyers of Fresh Fruits Vegetables and Flowers

Date: October 03, 2019

Venue: MCC Mazurkas Conference Centre & Hotel, Ożarów Mazowiecki, Poland

International Conference on Climate Change, Global Warming, Agriculture and Pollution Control

Date: October 03-04, 2019

Venue: YHA Oxford, Oxford, UK

Agribusiness Conference

Date: October 04, 2019

Venue: The StateView Hotel, Autograph Collection, Raleigh, USA

International Conference on Sustainable Agriculture and Environment

Date: October 03-05, 2019

Venue: Selçuk Turizim Fakültesi Uygulama Oteli, Bağrıkurt Köyü, Turkey

African Grain Trade Summit

Date: October 03-05, 2019

Venue: Mombasa, Kenya

International Conference on Research of Agricultural and Food Technologies

Date: October 03-05, 2019

Venue: Mombasa, Kenya

International Conference on Food and Agricultural Engineering

Date: October 04-05, 2019

Venue: GLAD Mapo, 109, South Korea

International Scientific Agriculture Symposium Agrosym

Date: October 03-06, 2019

Venue: Hotel Termag, Jahorina, Bosnia & Herzegovina

Global Summit on Plant Science

Date: October 07-08, 2019

Venue: Hotel Silken Puerta Madrid, Madrid, Spain