In a recent development, the Government of India through a statement in the Parliament said that a prior approval from state is needed before an applicant can go to GEAC for field trials of Bt Brinjal. We expressed our disappointment on the decision as with this move, it will further complicate the already cumbersome process of conducting field trials of transgenic crops in India. It is not possible for the states to review the data and make decision. GM crops undergo rigorous safety assessment and conducting scientific research trials is a crucial part of this safety assessment. The proposed process further puts a question mark for science to progress in agricultural biotechnology let alone commercialization and will lead to complete stoppage of GM research in India.

Mr Ram Kaundinya, Director General of Federation of Seed Industry of India expressed his views through his op-ed 'Don't let GM technology die'. Mr Kaundinya writes that the only GM crop approved so far, Bt cotton, has been a success. Although activists claim that it is a failure, data show that Bt cotton has helped double the yields, boost cotton production three-fold and made India the largest producer of cotton and the second largest exporter. Also, the use of pesticides for bollworm control has more than halved, which underscores the success of the technology.

India has produced other GM technologies that haven't gone commercial yet. Bt Brinjal was approved by then GEAC in 2009 but the commercialization was put on political leadership. For reasons not based on science, a moratorium was imposed on Bt Brinjal by the Environment Minister in 2010. In 2013, Bangladesh introduced the same Bt Brinjal and the results have been noteworthy. When GM Mustard came out of Delhi University in 2017, it answered all the objections that opponents of the technology used for blocking Bt Brinjal. Developed by an Indian university, it is a technology for increasing the yield of the oilseed crop and reduce the bloating edible oil imports.

Now, Bt Brinjal has come out from IARI, a national research institute. While it is time to test the IARI technology, the activists want the field trials to be stopped. Similar to GM Mustard, this technology is completely indigenous and has been licensed to an Indian company. The Government should make sure that GM field trials are carried out in the research farms of

ICAR centres or in the agriculture universities in different States so that there is complete control on them. There should be no need for NOC from States.

Sowing seeds of doubt in people's minds is enough to block a technology that can help crores of farmers. This is reflected in the unfulfilled demand for HT Cotton. Labour costs have shot up and availability has dwindled. Also, farmers problems with weed management must be understood. Future GM traits can help save water, reduce fertiliser consumption, improve nutrition and improve yields. All these possible benefits are being given up.

India's regulatory system is robust, and at par with the best in the world and the Government funds significant amount on biotech research in health and agriculture annually. The Government has to believe in the science it is funding and in the robustness of our regulatory system. Both the Central and State government need to act firmly and decisively. Ambiguity has caused enough damage and dried up investments. Time to have a clear strategy for the benefit of farmers.

The entire op-ed can be accessed through the hyperlink above. We have also covered news around several important developments on agriculture across India, globally and in the area of research. We hope you find the newsletter a good read!

Shivendra Bajaj
Executive Director
Federation of Seed Industry of India-Alliance for Agri Innovation

News from India and Around the World

Breeders developing doubly resistant brinjal varieties

(Dhaka Tribune)

Bt brinjal, a genetically modified eggplant variety, was developed to fight fruit and shoot borer (FSB) that used to cause colossal crop loss in Bangladesh's brinjal fields but not anymore. Now, riding on the huge success of Bangladesh's fastest expanding biotech crop, breeders are working on developing two new eggplant varieties capable to withstand FSB and bacterial wilt. Together with FSB, the bacterial wilt causes substantial crop loss in brinjal, second most consumed vegetable in Bangladesh after potato. Dr Yousuf Akhond, a chief scientific officer of Bangladesh Agricultural Research Institute (Bari) who heads the institution's biotechnology division, told Dhaka Tribune recently that by working on two previously released brinjal varieties – Bari Begun-10 and Bari Begun-11 – they are now developing varieties, expected to withstand bacterial wilt. Once success comes Bari's way, brinjal breeders hope farmers in Bangladesh would get varieties of eggplants, which would effectively withstand both FSB and bacterial wilt.

Health Canada looking for input on gene editing guidelines

(News Optimist)

From now until May 24, 2021, Health Canada is calling for public consultation on new guidelines for plant breeding innovation. Health Canada has proposed guidelines and regulations to allow for foods

produced through gene-editing to be included in the 2006 Guidelines for the Safety Assessment of Novel Foods. According to Erin Gowriluk, Executive Director of the Grain Growers of Canada (GGC), plant breeding techniques have been advancing around the world, but Canada's regulatory guidance has not been able to keep up. She notes that Health Canada's proposal is a step in the right direction.

Mistrust of science will cripple culture
(Daily Monitor)
Our long delay to take advantage of technologies aimed at improvements proven to overcome farming challenges such as drought stress, pest and disease epidemics, and malnutrition, could be the major drawback crippling the progress towards national economic development.

Uganda is merely watching as other countries embrace technologies such as biotechnology that are transforming agriculture and earning them huge economic benefits.
Our government through the National Agricultural Research Organisation (Naro) is conducting research aimed at overcoming pests and diseases that are wiping out crops such as banana, cassava, sweet potato, Irish potato among others.

Scottish innovation centre awards more than £11 million in biotech funding
(Insider)
The Industrial Biotechnology Innovation Centre (IBioIC) has committed more than £11m in funding towards future green biotechnology skills since its creation in 2014. The Glasgow-based centre has awarded 15 new grants to fund PhD projects at biotechnology companies. It has now awarded the final tranche of the £11m commitment it received from the Scottish Government three years ago. The IBioIC and the UK-wide Biotechnology and Biological Sciences Research Council (BBSRC) awarded a combined package of £2.8m to a range of start-ups, small to medium-sized enterprises (SMEs) and large companies. The funding will enable research projects to employ the skills of PhD students over a four-year study programme.

Gene editing could help Kenya's valuable tea crop retain its competitive edge
(GLP)
enome editing may help protect Kenya's most important cash crop — tea grown in the country's prime highlands — from the ravages of climate change.
The crop is facing a near-century of sweeping climatic changes that could diminish its competitive savor. But a leading African scientist has proposed using the tools of biotechnology to build in climate resiliency and help maintain the signature flavor that gives Kenyan tea an edge in the international market.

Don't let GM technology die
(The Hindu Business Line)
Activists and those with vested interests are blocking the technology that will help farmers. Different governments, at the Centre and in States have been influenced by ideologies and activism against scientific progress in agriculture and against farmer interests. The announcement by the Environment Minister in the Rajya Sabha that trials of field crops need recommendations of States is the final nail in the coffin. The only GM crop approved so far, Bt cotton, has been a success. Although activists claim that it is a failure, data show that Bt cotton has helped double the yields, boost cotton production three-fold and make India the largest producer of cotton and the second largest exporter. Also, the use of pesticides for bollworm control has more than halved, which underscores the success of the technology.

You've had the GM jab, so what's wrong with GM food?
(The Times)
After decades of concern about the risks of genetic modification, the success of the Covid-19 vaccines should prompt a rethink on 'Frankenfoods'. By the end of July nearly every adult in Britain will have been offered a vaccination against Covid-19. Most of us will have lined up to receive our ticket out of the coronavirus nightmare. The vast majority of us are happy to have this genetically engineered product injected into our arms. Yet, when it comes to genetically modified food, it is a different story.

For decades, politicians and scientists have tried to persuade Britons that GM food would boost yields, lower prices and improve food security — to little avail.

While COVID held our attention in a vice grip, 2020 brought some major crop biotech breakthroughs
(GLP)
This month marked one year since the COVID-19 pandemic turned life upside down around the world. The anniversary wasn't exactly a celebratory milestone, but it has prompted many of us to reflect deeply on the events — and lack thereof — of the past 12 months. The one-year mark also sparked endless think pieces about our "lost year" and our changed perception of time. But through it all, the world kept spinning and progress marched on. This was particularly true in the realm of agricultural biotechnology, which recorded some significant breakthroughs while the pandemic held our attention in a vice grip.

Farmers to get Bt maize seed by short rain season - researcher
(The Star)
Farmers seeking to reap the benefits of pest-resistant genetically modified maize can start planting a new variety by August. Researchers on Bt maize have finalised the national performance trials and sent six varieties to the plant health inspectorate for evaluation. The varieties promise resistance to deadly stem borer and army worm which devastate maize crop across the country. Bt Maize principal investigator James Karanja said if the approval is granted by August, then farmers could get the seeds before the short rain season. "Out of the six maize varieties that we submitted for evaluation at the NPT, we hope there will be one or two that will perform well and show that it is tolerant to the fall army worm and the stem borer," Karanja said.

Researchers discover how to improve zinc content in plants
(Horti Daily)
More than 2 billion people worldwide suffer from malnutrition. Not because they are getting too few calories, but because their food contains insufficient essential minerals like zinc and iron - the phenomenon of 'hidden hunger'. Together with colleagues from Denmark and Portugal, researchers from Wageningen University & Research have discovered how plants recognise that they are not absorbing enough zinc, and how they can improve the zinc intake by plants. The first experiments with this led to a 50% increase in the zinc content of seeds. This discovery can make an important contribution to solving the 'hidden hunger' phenomenon in the world.

USDA Definitions Around Biotechnology Need Some Crucial Updating
(Slate)
Policymakers had known for years that the U.S. regulation of crop biotechnology was out of date, and by 2016, discussions were already underway to revamp the legal texts. But changes weren't made early enough to avoid the mushroom situation. The USDA has since updated its regulation in great detail to effectively handle gene editing. But unfortunately, the United States remains ill-equipped to make decisions about certain classes of emerging crop biotechnologies before they hit the market. If legal definitions of agricultural biotechnology don't keep up with these advances, we will repeatedly encounter regulatory ambiguity that delays assessment of valuable technology and degrades public trust.

Nations comply with FSSAI regulations on GM food imports
(Mint)
On 21 August 2020, the Food Safety and Standards Authority of India (FSSAI) issued an order requiring a "non-GM origin and GM-free certificate", issued by the competent national authority of the exporting country, to accompany all imports of 24 listed food products to India, to become effective beginning 1 January. The date was later revised to 1 March. The tolerance limit for accidental presence of GM is 1% of the imported food crop consignments. The regulation does not apply to processed food at present. Countries such as Chile, New Zealand, South Africa, and Italy have started issuing non-GM certificates, while Turkey, Poland, Iran, Serbia, and Brazil have also agreed to comply with the regulation, according to an FSSAI official who spoke under condition of anonymity. "The US and Argentina have proposed some models for the certification, which we are studying," the official said.

Discovery is key to creating heat-tolerant crops

(UC Riverside)

By 2050 global warming could reduce crop yields by one-third. UC Riverside researchers have identified a gene that could put the genie back in the bottle. Warmer temperatures signal to plants that summer is coming. Anticipating less water, they flower early then lack the energy to produce more seeds, so crop yields are lower. This is problematic as the world's population is expected to balloon to 10 billion, with much less food to eat. "We need plants that can endure warmer temperatures, have a longer time to flower and a longer growth period," said UCR botany and plant sciences professor Meng Chen. "But, to be able to modify plants' temperature responses, you first have to understand how they work. So, that's why identifying this gene that enables heat response is so important."

Trials of Bt brinjal, other transgenic crops made difficult; seed industry body calls it 'regressive'

(Business Today)

"We are disappointed by the Ministry of Environment, Forest and Climate Change's regressive decision to not go ahead with the Bt Brinjal field trials or any other GM crop trials without considering the recommendations from States and UTs. This further complicates the already cumbersome process of conducting field trials of transgenic crops in India. As per the regulatory process, the Genetic Engineering Appraisal Committee (GEAC) reviews the data submitted along with the application to conduct field trials and is the only body by law to review the safety of the submitted data and grant final approval of field trials. It is not possible for the states to review the data and make decision. GM crops undergo rigorous safety assessment and conducting scientific research trials is a crucial part of this safety assessment. The proposed process further puts a question mark for science to progress in agricultural biotechnology let alone commercialisation and will lead to complete stoppage of GM research in India," Dr Shivendra Bajaj, Executive Director, FSII said.

New Research

Advanced domestication: harnessing the precision of gene editing in crop breeding

(Wiley)

There is an urgent need to develop crop varieties which tolerate adverse growth conditions while requiring fewer inputs. Plant breeding is critical to global food security and, while it has benefited from modern technologies, it remains constrained by a lack of valuable genetic diversity, linkage drag, and an effective way to combine multiple favorable alleles for complex traits. CRISPR/Cas technology has transformed genome editing across biological systems and promises to transform agriculture with its high precision, ease of design, multiplexing ability and low cost.

Next-generation crop engineering

(Nature)

The basic principle of crop breeding is to first discover and then select for variants with desired traits. While selection is relatively easy, discovery is more challenging. Conventional breeding for domestication and crop improvement have unquestionably revolutionized agriculture and our society. But to further explore the potential of agriculture to feed an ever-growing population, larger crop diversity needs to be unlocked. The gene editing and RNA viral transfection technologies developed over recent years allow precise engineering of desirable variants with unprecedentedly high efficiency and resolution, greatly expanding the range of variations available and reducing our reliance on naturally existing mutations. CRISPR–Cas breeding is more efficient than mutation breeding because mutagenesis is targeted to genes known to control desirable traits. Moreover, transgene-free plants can be easily obtained by transiently expressing CRISPR proteins or by segregating out constitutively expressed CRISPR. Gene-edited crops could thus avoid regulations against the cultivation of GMOs.

Researchers extract oil from plant leaves

(The Western Producer)

Vegetable oil has major health benefits, and depending on the type, has the ability to lower cholesterol levels and decrease risks of cardiovascular disease. Oil is traditionally pulled from fruit and seeds. Now,

researchers at the University of Missouri-Columbia have found a way to extract oil from leaves. They do so by boosting the production of triacylglycerol, the primary component of vegetable oil. The technique could allow farmers to harvest substantial amounts of oil from plants with large leaves such as sorghum and soybeans.

Factors Affecting Participation in Contract Farming of Smallholder Cavendish Banana Farmers in the Philippines

(Springer)

This paper aimed to examine the factors that affect the decision of farmers to contract or sell in spot market and explore which arrangement yields better profit. Data collected from 187 respondents were analyzed using a probit regression model. Results show that education, farming experience, and credit/financial support significantly affect contract farming participation. The results highlighted the importance of technical skills and knowledge, and financial support in making decisions such as contract participation. Results also show that contract farmers earn higher profits than non-contract farmers which may imply contract farming to be better.

Native plants for greening Mediterranean agroecosystems

(Nature)

In the upcoming United Nations Decade on Ecosystem Restoration, a global challenge for scientists and practitioners will be to develop a well-functioning seed production sector on the basis of a sound species-selection process. To balance crop production with biodiversity functions in Mediterranean woody crops, agroecological practices suggest the need to move towards the establishment of herbaceous ground covers. However, establishing such plants requires a supply of suitable native seeds, which is currently unavailable. Here, we present a comprehensive process for selecting regionally adapted species that also emphasizes considerations for seed production.

Australia to assist Bangladesh in boosting agriculture research

(Dhaka Tribune)

The Australian Centre for International Agricultural Research (ACIAR) has launched a new strategy with Bangladesh outlining key agricultural research priorities for the coming decade. The Bangladesh Collaboration Strategy 2021-2030 was launched on Wednesday virtually and will underpin future research partnerships between Australia and Bangladesh, said a press release. Australia's High Commissioner to Bangladesh, Jeremy Bruer said that the new strategy would further strengthen the partnership between the two countries. "ACIAR's expertise in agricultural research for development contributes to Bangladesh's sustainable economic growth, supports rural livelihoods and enhances regional stability," said the high commissioner.

Breeders developing doubly resistant brinjal varieties

(Dhaka Tribune)

Bt brinjal, a genetically modified eggplant variety, was developed to fight fruit and shoot borer (FSB) that used to cause colossal crop loss in Bangladesh's brinjal fields but not anymore. Now, riding on the huge success of Bangladesh's fastest expanding biotech crop, breeders are working on developing two new eggplant varieties capable to withstand FSB and bacterial wilt. Together with FSB, the bacterial wilt causes substantial crop loss in brinjal, second most consumed vegetable in Bangladesh after potato. Dr Yousuf Akhond, a chief scientific officer of Bangladesh Agricultural Research Institute (Bari) who heads the institution's biotechnology division, told Dhaka Tribune recently that by working on two previously released brinjal varieties – Bari Begun-10 and Bari Begun-11 – they are now developing varieties, expected to withstand bacterial wilt. Once success comes Bari's way, brinjal breeders hope farmers in Bangladesh would get varieties of eggplants, which would effectively withstand both FSB and bacterial wilt. Till date, Bangladesh is only country in South Asia to release GM food crop while some of its neighbours i.e., India, Pakistan have long been cultivating Bt cotton, a cash crop.

***