



Agri Innovation Post

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The UN Food Systems Summit (UNFSS) is just a week away and it is crucial for India and countries worldwide to understand the priorities laid out by the world leaders. Crucial because, India is a country which ranks high on malnutrition and stunting given the rise in population. In UNFSS, India is focused on Action Track 4—Advance Equitable Livelihoods. In a previously held National Dialogue for UNFSS in India, the Interdepartmental group discussed on strategising for the elimination of poverty and zero hunger, nutrition security and health for all, raising incomes across food value chains, and ensuring economic, social and environment sustainability.

To meet the UN's goal of zero hunger by 2030 and to transform food systems in India and globally, agriculture biotechnology is an important tool. Evidences from countries like Bangladesh, Africa show that it has immensely benefitted farmers. Therefore, more opportunities must be created for farmers to access new innovations to meet the challenge of feeding 811 million people worldwide.

Population rise, limited land for producing crops are the challenges which will forever remain. In order to support the majority of small holder farmers in India, enriching staple food with minerals and vitamins like rice with vitamin A, will go a long way in ensuring that the population is getting the adequate nutrition and farmers, the right remuneration.

As per a report by the PG Economics, with the adoption of GM crops between 1996 and 2018, an additional 824 million tonnes of food, feed and fiber has been produced worldwide. Farmers earned an extra US\$225 billion in income by growing GM crops during that same period, while reducing the use of agricultural pesticides by 8.6 percent, resulting in a 19 percent cut in associated environmental impacts. The technology also helped reduce carbon emissions equal to taking 15.3 million cars off the road. Because GM crops increase yields, if they had not been available during that time some 24.2 million extra hectares of land would have been destroyed to make way for the same amount of crop production.

The UNFSS 2021 acknowledges that consumer groups are an important stakeholder in this fight. Therefore, this group has the responsibility to undersand and spread awareness on the benefits of nutrient rich food and should actively take part in adopting them. Agriculture

biotechnology is just a value addition to get the best product out of the existing crops which can benefit the farmers, people and the planet.

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

[India fields technology to boost farmers' crop yields](#)

(The Economic Times)

India's farm sector is increasingly embracing technology at various levels and industry is coveting the huge potential for tech-driven interventions that can possibly change agriculture landscape two decades from now. Besides mechanisation of farming, technology penetration in the Indian agriculture sector is happening at multiple levels: policy interventions, digital innovations and biotechnology.

[Prudent Regulation, National Registry Sought For Gene-Edited Products](#)

(Successful Farming)

With gene-edited products nearing the marketplace, six major consumer and conservation groups called on Wednesday for "effective, science-based government regulation" of the sector, including a national registry of gene-edited plants and animals. By contrast, they said, the USDA has "substantially deregulated gene-edited plants and proposed a similarly minimal oversight system for gene-edited animals." Government risk-based oversight of gene editing and a public registry of gene-edited products in use in food, agriculture, and the environment were two of the six principles proposed by the groups for stewardship of the technology. "As representatives of nongovernmental organizations, we recognize the potential societal benefits of gene-editing technologies while acknowledging their risks," said the groups in an article in the journal Nature Biotechnology. "However, we contend that the United States has inadequate regulatory oversight to address concerns presented by biotechnology."

[Benefits of recombinant proteins produced through DNA technology](#)

(Times Square Chronicles)

The launch of recombinant proteins in the 1970s gave an impetus to the industry of biotechnology. Nowadays, biotechnology agencies are trying to use these proteins for various treatments and benefits. The primary purpose of the latest technique is to separate DNA from an organism's genome and replace it with a hybrid DNA into any other organism like bacteria. There are multiple benefits of this protein.

[Biotechnology is key to meeting UN's goal of zero hunger worldwide by 2030](#)

(GLP)

Agricultural biotechnology is a crucial tool for transforming global food systems to meet the United Nation's goal of ensuring zero hunger by 2030, say some scientists, academics and civil society representatives. Evidence abounds that biotechnology has had a positive overall impact on agriculture in the areas where it has been employed, they say. If adopted more widely across the globe, it could be instrumental in meeting the UN's Sustainable Development Goal (SDG) 2, which aims to end world hunger, boost nutrition and support agricultural sustainability within the next nine years. "GMO technology is working for farmers," observed Arif Hossain, CEO of Farming Future Bangladesh. He cited the six-fold increase in income that farmers in Bangladesh have earned as a result of growing Bt eggplant, an important food crop genetically modified to resist the destructive fruit and shoot borer pest without the application of insecticides.

[Why India is not self-sufficient in oilseed production](#)

(The Hindu BusinessLine)

The Centre's decision to allow the import of 1.2 million tonnes (MT) of crushed and de-oiled genetically modified (GM) soya cake or soyameal has landed Maharashtra's soya producers in trouble. Maharashtra, along with Madhya Pradesh, is one of the leading soya producing States. Together, these States contribute an estimated 89 per cent of the total production in India. Market experts draw attention to the fact that recently India exported about 19 lakh tonne soyameal to other countries. This soyameal was non-GM and hence was in demand in the world market. However, India's poultry sector faced a shortage of soyameal and the government decided to import GM soya cake. The result was immediate.

[Lessons from the on-going drought](#)

(Daily Monitor)

According to the Food and Agriculture Organisation (FAO 2016) fluctuations in climate patterns have a negative impact on crop production globally with further effects on hikes in commodity prices as a result of climate extremes in key producing regions. The long drought we are going through nowadays can be described as a climate extreme. Most people who harvested and stored rainwater have empty tanks now. Many natural water streams are dwindling. Where large sources of water exist, majority of our farmers cannot afford to pump water to their farms. The harvests for food crops such as beans, maize, and groundnuts were poor because the rains suddenly stopped in mid-May this year. Flowering and fruition of Robusta coffee did not go well due to failed rains.

[These super crops can save us from climate disaster](#)

(Wired)

Farming has a major food waste problem. Approximately 40 per cent of the food produced globally goes uneaten every year, and much of this wastage occurs even before the food leaves the farm. In fact, it's estimated that 7.2 per cent of all food harvested in the UK is wasted at the primary production stage as a result of several factors – disease, bad weather, cosmetic imperfections and more. To this end, scientists are deploying a new weapon in the fight against food waste: gene editing. They hope that the technology can help develop next-generation crops that are more resistant to pests and diseases, sustain less damage during transportation and storage, or have a longer shelf life – essentially quasi-imperishable produce. The technology is lucrative, with estimates suggesting that the global gene-editing market could be worth \$8.71 billion by 2026.

[Blue Farm Chips](#)

(Shepherd)

Blue corn is commonly grown in the Southwest. Hughes says it was brought to Mexico from South America by the Aztecs and Incas, and it's more nutrient dense. Blue corn crops differ from other varieties in that it has lower disease resistance and takes longer to mature—a challenge when attempting to grow it in colder, wetter climates with a shorter growing season. Hughes studied agriculture at the University of Wyoming in Laramie and is well versed in the history of seed stock, propagation and hybridization. He always bred his own corn. He acquired some blue corn, and with the help of agronomist Bob Tracey, they did hybrid experiments and even took their seed to Chile during a three-year refining process to create a blue corn species that could grow successfully in Wisconsin. To prevent his 300-acre blue corn crop from being tainted by pollen drift from neighboring

farmers that use pesticides or grow genetically modified organisms (GM) crops, Hughes' fields are closer to town and away from other fields, yet isolated so he can control the genetics.

[Zimbabwe: 'Sekuru' Robertson Planted Unique Breed of Crop Experts](#)

(All Africa)

The scientific community was extremely saddened to hear about the death of eminent biologist and crop expert -- Dr Alexander Ian Robertson in August this year. Dr Robertson, who devoted his scientific career to teaching plant physiology and molecular biology at the University of Zimbabwe for years before he ventured to run a business -- Agri-Biotech, died of cardiac failure at the age of 82. He played a prominent role in the development of disease-free, drought-resistant, high-yielding varieties of traditional crops such as cassava and sweet potatoes. Many of his peers and students he mentored hailed Dr Robertson's intellect, enthusiasm and passion for his work. All this, they said, made him an exceptional scientist. Scientists both here at home and abroad all hailed him for the huge contributions he made to the understanding of plant biology and how it could be harnessed to increase crop output and yields. The Zimbabwe Plant Breeders Association (ZPBA), a grouping of professional plant breeders both inside and outside the country, said it learnt with "great shock and pain, the passing on of a great legend in science, the iconic Dr Ian Robertson."

[Gene Editing has limitless potential to reduce malnutrition - Global Food Expert](#)

(Modern Ghana)

Gene editing is a tool with unlimited potential to help reduce malnutrition globally, said Dr. Lawrence Haddad, executive director of the Global Alliance for Improved Nutrition (GAIN). The world needs the technology because billions of people are struggling to access the nutritious meals required to stay healthy, Haddad said. The leader of GAIN, a Switzerland-based foundation launched by the United Nations in 2002 to reduce malnutrition worldwide, made his remarks during an Alliance for Science-hosted Food Systems Summit independent dialogue. Haddad also chairs the upcoming Summit's Action Track 1, which is charged with ensuring access to safe and nutritious food. "The potentials seem limitless in terms of what can be done with gene editing and CRISPR... it's going to take brave, bold activist governments to make that a reality," Haddad said.

[Growing food security challenges in Africa opening regulatory doors, softening opposition to game changing CRISPR crop editing](#)

(GLP)

Experts from the International Institute of Tropical Agriculture (IITA) are now keen to extinguish a lingering assumption that genetic modification, and gene editing, are more or less the same thing, or are closely related. Leena Tripathi, the Director of East Africa Hub at IITA, insists that genome editing, which is fast gaining popularity, should not be regulated by governments the same way genetic modification (GM) is. A world that struggles to be food secure, where climate change seems to be on course to exacerbating the food insecurity problem, is grappling for solutions. "Nearly a billion people are going hungry in the world," says Dr Tripathi. With the world expected to host 10 billion people by 2050, serious efforts are needed to increase food production using limited resources.

[UK Government Gives Green Light to Genome-Edited Wheat Trial](#)

(The Financial)

For years, the New York Times attacked crop biotechnology on the grounds that it was a corporate ploy hatched by Monsanto to take over the food supply. GMOs, the argument went, were designed to hook farmers on Monsanto's patented seeds and pesticides while failing to deliver higher crop yields. In one memorable instance, Times reporter Eric Lipton accused high-profile scientists of helping Big Ag paint its products in a more positive light. Things may be changing, though. The paper recently published an excellent essay, Learning to Love G.M.O.s, by University of California, Berkeley, journalism professor Jennifer Kahn. Kahn offered a balanced analysis of the years-long debate over genetically engineered crops, appropriately summarizing the science while considering the reasonable questions consumers had about these misunderstood plants.

[Gene editing has 'limitless potential' to reduce malnutrition, says global food expert](#)

(Alliance for Science)

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[Climate Change: How Innovative Plant Breeding Can Help Feed The World, Nurture The Planet](#)

(IB Times)

Mere weeks from now, commitments made at a United Nations Food Systems Summit in New York will help determine whether we can feed the world while also mitigating climate change. World leaders will convene to tackle the most pressing challenge of our time: How to nourish a rapidly growing global population in a way that is safe and sustainable. To lay the groundwork for this landmark event, scientists, government ministers, environmental advocates, and farmers recently gathered at a preparatory Pre-Summit in Rome. There, the leader of the U.S. delegation — Deputy Secretary of Agriculture Jewel Bronaugh — spoke to the multilateral priority of "leading with science and innovation."

[Kenya opens the door to GMO cultivation](#)

(GLP)

On December 19, 2019, the Kenyan government approved the cultivation of GMO cotton after five years of field trials and in March of 2020, commercialization began. Kenya joined a growing list of African countries that cultivate GMO crops. These countries include South Africa (cotton, corn and soybeans), Nigeria (cotton and cowpeas), Eswatini — formerly Swaziland — (cotton), Sudan (cotton), Malawi (cotton) and Ethiopia (cotton). Other countries in Africa appear to be on the verge of sanctioning the growing of GMO crops. Ghana and Burkina Faso, for example, have conducted confined field tests of GMO cowpeas and there are expectations their governments will soon approve full-scale commercialization of the crop.

[Golden Rice's Appearance On Philippine Store Shelves And The Rise Of Biofortification](#)

(Hackaday)

When it comes to solving malnutrition in developing nations, it seems clear that biofortification efforts like golden rice can help reduce the health issues that come from lack of micronutrients. The effort required is also relatively low. With Canada, Australia, New Zealand, and now the US having declared golden rice safe for consumption, it seems that at least this biofortified food source may herald the beginning of the end of malnutrition in developing countries. Even so, unhealthy diets are a global issue, according to the 2017 Global Burden of Disease (GDB) study, despite many of the people affected having ready access to the ingredients for such a healthy diet. A major issue in developed nations was for example the significant intake of sugar-sweetened beverages, along with the elevated intake of processed meat, sodium, and red meat. It's perhaps ironic that solving particular sources of malnutrition in developing nations is as straightforward as changing to a crop like golden rice or other biofortified foods, while in richer countries the problem is behavioral and much less obviously solved.

[Food systems: seven priorities to end hunger and protect the planet](#)

(Nature)

Researchers need to find ways to restore soil health and improve the efficiency of cropping, crop breeding and recarbonizing the soil and biosphere. Linkages among all Earth systems must be considered together — known as a One Health approach. Alternative sources of healthy protein need to be advanced, such as plant-based and insect-derived proteins, including for animal feed. Plant-breeding techniques that capture nitrogen from the air, to reduce the need for fertilizers and increase nutrients, should be investigated. Genetic engineering and biotechnology should be applied to increase the productivity, quality and resistance of crops to pests and drought. Recent examples include banana varieties that are resistant to Fusarium wilt fungal diseases, and pest-resistant Bt

aubergines. To widen access to bioscience technologies, intellectual-property rights, skills and data sharing should be addressed.

[Plans to strengthen governance of gene editing](#)

(Farming UK)

Genetic innovation may create opportunities to transform agri-food systems through nutritionally healthier crop varieties that have greater disease resistance, the Regulatory Horizons Council said. The expert committee's report, which issued recommendations to government, suggested that genetic changes could help chemical use and greenhouse gas emissions fall. This in turn would improve climate resilience and contribute to more sustainable agricultural systems, the Council's report explained. The British Society of Plant Breeders (BSPB), the representative body for the UK plant breeding industry, welcomed the report. "This report recognises the benefits of genetic technologies and supports the proposals set out in the recent Defra consultation to take simple gene edited crop varieties – which could have occurred in nature or through conventional plant breeding – out of the scope of existing genetically modified organism (GMO) regulation," BSPB CEO, Samantha Brooke said.

New Research

[Giving plants the green light for growth](#)

(The Western Producer)

When the plants in the greenhouse grew at three times the normal rate, Chuan He and his colleagues knew they were onto something big. When they took their genetically modified rice and potatoes into the field, they were sure. The crops yielded 50 percent more, were 50 percent bigger, and they grew more and longer roots, making them more resistant to drought. The plants even increased their rate of photosynthesis. "When we saw the rice we were, 'holy smoke,' " said He, a biologist at the University of Chicago. "But when we saw the potato, we're like, 'OK, that's it. We've got it.' "The breakthrough could put some lofty goals within easy reach. For example, a 50 percent boost of 2020's Canadian canola yield of 41 bushels per acre would be about 61 bu. per acre, well above the ambitious 52 bu. per acre target set by the Canola Council of Canada for 2025. The work builds on the discovery of He and his colleagues a decade ago. They found that living things use something called RNA methylation to regulate which genes get expressed.

[Controlling Banana Xanthomonas Wilt Disease in East Africa](#)

(Open Access Government)

BXW, caused by *Xanthomonas campestris* pv. *musacearum*, is considered one of the most devastating limitations for the production of bananas in the GLA region of East Africa. The disease affects all cultivated varieties of bananas, and its impact is huge and rapid. It has destroyed whole plantations in many of the affected areas. Overall, economic losses from BXW were estimated at \$2 to \$8 billion over a decade (Tripathi et al., 2009). BXW disease has affected the food security and income of smallholder farmers, who depend on the banana for their livelihood. The use of disease-resistant varieties for many plants has been a productive and economically viable strategy for managing diseases. Yet, no source of resistance has been found against BXW in any cultivated banana varieties; only in the wild-type diploid banana progenitor "Musa balbisiana" exhibits resistance to this pathogen (Tripathi et al., 2019b). Transferring the disease resistance trait from wild-type bananas to farmer-preferred cultivars through conventional breeding is a lengthy and challenging process due to the sterility of most cultivars coupled with polyploid and the long generation times.

[Ghana's first genetically modified crop – pod borer resistant cowpea – is poised to address widespread protein deficiency challenges](#)

(GLP)

A Senior Research Scientist with the Science and Technology Policy Research Institute of the Council for Scientific and Industrial Research (CSIR) says Ghana's first genetically modified crop – the pod borer resistant cowpea (beans), will help the country deal with protein deficiency challenges among the population. Dr Richard Ampadu-Ameyaw believes the variety will offer the country many benefits when it is eventually approved for the benefit of farmers and consumers. "In a lot of places, being able to buy fish or meat is a challenge, so more beans will help ensure more proteins for the people," he

observed. “If it is well managed and well farmed, it could help a lot of people move away from poverty,” he added.

[Genome Edited Wheat Field Trial Gets Go-Ahead from UK Government](#)

(Seed World)

UK research institute Rothamsted Research, a pioneer of GM crop trials since the 1990s, has been granted permission by Defra to run a series of field trials of wheat that has been genome edited. The Hertfordshire-based experiments will be the first field trials of CRISPR edited wheat anywhere in the UK or Europe. The wheat has been edited to reduce levels of the naturally occurring amino acid, asparagine, which is converted to the carcinogenic processing contaminant, acrylamide, when bread is baked or toasted. The ultimate aim of the project is to produce ultra-low asparagine, non-GM wheat, says project leader Professor Nigel Halford. “Acrylamide has been a very serious problem for food manufacturers since being discovered in food in 2002. It causes cancer in rodents and is considered ‘probably carcinogenic’ for humans. It occurs in bread and increases substantially when the bread is toasted but is also present in other wheat products and many crop-derived foods that are fried, baked, roasted or toasted, including crisps and other snacks, chips, roast potatoes and coffee.

[\\$25M tech grant lets Illinois researchers ‘talk’ to plants](#)

(Mirage News)

The National Science Foundation (NSF) announced today an investment of \$25 million to launch the Center for Research on Programmable Plant Systems (CROPSS). The center, a partnership among the University of Illinois at Urbana-Champaign, Cornell University, the Boyce Thompson Institute, and the University of Arizona, aims to develop tools to listen and talk to plants and their associated organisms. “CROPSS will create systems where plants communicate their hidden biology to sensors, optimizing plant growth to the local environment. This Internet of Living Things (IoLT) will enable breakthrough discoveries, offer new educational opportunities, and open transformative opportunities for productive, sustainable, and profitable management of crops,” says Steve Moose, the grant’s principal investigator at Illinois. Moose is a genomics professor in the Department of Crop Sciences, part of the College of Agricultural, Consumer and Environmental Sciences (ACES).

[US Grant speeds development of enhanced crops](#)

(Horti Daily)

While gene editing technology has improved crop breeding and adaptation, the process of regrowing a plant from edited cells is costly, lengthy and unpredictable. Many popular crops are difficult to regenerate with existing methods. The Foundation for Food & Agriculture Research (FFAR) is providing a \$664,000 grant through its Crops of the Future Collaborative to the University of Maryland (UMD) to develop a technology that can both edit a crop’s genes and speed up crop regeneration. Matching funds are providing a total \$739,000 investment. “The limitations of current regeneration methods are throttling the development of enhanced nutritional and agronomic traits,” said Dr. Jeff Rosichan, director of the Crops of the Future Collaborative. “Breakthroughs in gene editing are constrained if they don’t lead to viable, affordable crops. Applying proven gene editing technology to the problem of crop regeneration bottlenecks will more easily produce crops with enhanced nutrition and agronomic benefits.”

[British scientists experiment with gene editing](#)

(The Western Producer)

When United Kingdom Prime Minister Boris Johnson came to power in July 2019 during the country’s Brexit transition to separate from the European Union, he pledged to sidestep Europe’s grip on curtailing development of genetically modified and gene-edited foods. Since then, field trials of gene-edited brassica crops conducted by scientists at the John Innes Centre in Norwich have shown immense potential. The trials took place just as the U.K. government was considering whether to allow gene-editing for food production. More recently, reports have indicated that the European Commission has launched its own review of EU rules on GMOs with the possibility of lightening their tight restrictions. With new gene-editing methods, a narrow part of an organism’s DNA is cut or edited. Unlike with conventional GM techniques, there is no DNA transfer from one organism into another. “Modern technologies such as gene editing by CRISPR provide opportunities to nutritionally fortify

foods and safely adapt crops to new environments, addressing the serious challenge that the climate crisis is posing to global food production,” said Professor Lars Ostergaard, group leader at the John Innes Centre in Norwich, in a news release.

[Ghana’s first GM crop will help country deal with protein deficiency challenges – CSIR Scientist](#)

(Ghana Web)

Senior Research Scientist at the CSIR Dr Richard Ampadu-Ameyaw says Ghana's first genetically modified crop - the pod borer resistant cowpea (beans), will help the country deal with protein deficiency challenges among the population. Dr Ampadu-Ameyaw who works with the Science and Technology Policy Research Institute of the Council for Scientific and Industrial Research (CSIR) says the variety will offer the country a lot of benefits when it is eventually approved for the benefit of farmers and consumers.
