



In the wake of COVID-19, the government along with all stakeholders is working round the clock to assess the on-ground situation and finding out solutions to help farmers meet their needs and for consumers to get steady supply of food. While sensitisation on movement of seeds and essential items are being provided to the administrations, last mile connects, farmers, drivers carrying inter-state goods, carrying produce to the *mandis* (marketplace) etc there have been multitude of resistance in building a seamless supply chain.

The central government has exempted various agri market related operations to allow ongoing harvest and transport of agri products. Since majority of farm practices, right from sowing, harvesting, grading, loading, cleaning, packaging etc are done manually, an acute shortage of labourers is posing a challenge for harvesting the crop of the previous season (which if not done at the right time will lead to food loss and wastage) and sowing for the next season.

To ease the process, the government has now set up control rooms to ensure uninterrupted farming operations during the lockdown, regular monitoring of various exemptions and relaxations to farmers. The Union Minister for Agriculture in India, Mr Narendra Singh Tomar too urged the state governments to relax agricultural produce market committee (APMC) norms so that farmers can sell their produce outside the designated mandis and keep extra fund for helping farmers in procuring their produce on minimum support price (MSP). Further, the State government has also requested the Centre to provide farming community sufficient crop production loans through Reserve Bank of India (RBI).

From April 15 onwards the procurement of Rabi crops will begin in all states. To ensure that the produce does not go waste and farmers get the right compensation, the state governments have been directed by the Centre to purchase farm produce within 90 days and to provide relief to farmers in mandi tax. The State governments have also been asked to purchase 25% oilseeds and pulses. Right now, 95-97% mustard crops have been harvested in Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh. About 95% of the gram in Madhya Pradesh, Rajasthan, Telangana, Maharashtra, Bundelkhand, and Andhra Pradesh has also been harvested. In Madhya Pradesh, 80-85% of wheat has been sown timely. However, about 18% of the wheat sown in Haryana and Punjab has not been harvested. The state governments are now working to make sure that the harvesting is not harnessed due to labor shortage. To facilitate the movement of farmers in the state, the Agriculture Department of Karnataka will be issuing green passes. It is expected that the same measure will be taken in other states as well.

For the movement of cargos, the government has also notified 62 parcel cargo routes with 167 such express trains already on the move. A parcel cargo express usually carries small quantities of parcels that are moved via the highways. These parcel trains have emerged as a viable alternative, since most of the truck drivers have abandoned their vehicles after the lockdown due to the closure of roadside eateries and non-clarity of inter-state movement.

All efforts are now made by the Government in collaboration with the industry to support farmers, labourers, employees of allied industries and all the stakeholders. It is ensured that they are well compensated, operations of the farm and companies continue with minimal workforce, proper sanitisation is done in factories, awareness on best practices are provided to farmers and employees while on the field and factories, there is seamless movement of produce and seeds across states and most importantly the consumers are fed.

While the times are challenging and most attention is rightly given to efforts to combat COVID19, significant research in other areas of biotechnology has been reported. In this newsletter, we have captured interesting developments and research work from around the world in the agri industry. We hope you find it a good read.



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## **AgBiotech News**

### **[International Year of Plant Health--Why Is This Important?](#)**

**(Agweb.com)**

Many nations in the developing world have not accepted policies that allow for the use of many crop care products or the use of other innovations such as biotech or gene-editing. These factors have hindered the ability to create resilience and capacity building for farmers large and small across developing nations that are food insecure. Many of these countries have the resources to feed their growing populations and possibly the entire continent but without the access to proven innovations we will need to continue our humanitarian support to stabilize their food security through aid. Until policy changes in these countries that allows access to these technologies people will continue to live in a cycle of poverty and food insecurity.

### **[Kiwis and tomatoes resistant to climate change, the new focus of engineers U. de Chile](#)**

**(Uchile)**

CRISPR gene editing could yield drought-tolerant tomatoes and kiwis that grow in salty soil. Genetic engineering will allow the production of tomatoes and kiwis that are more tolerant to saline lands and will require less water. The initiative will also develop biostimulants directly applicable to plants to make them more tolerant to stress caused by drought and salinity. One of the initial focuses of the project is to generate new varieties of tomatoes and kiwis using the CRISPR / Cas9 genetic engineering technique. In the case of tomato, the characteristics of "Poncho Negro", a Chilean variety originating in the Azapa Valley that has high resistance to salinity and the effect of heavy metals, will be studied.

### **[Government intensifies smart agriculture](#)**

**(The Herald)**

The Government of Zimbabwe has said it will intensify climate smart agriculture, a farming technique that helps farmers to be more productive on a warming planet, than adopting "harmful" genetically modified crops. This comes against the backdrop of growing calls by Genetically Modified Organisms (GMOs) advocates pushing for the Government to adopt a policy that embrace the GM technology in

light of successive failed harvests due to droughts linked to climate change. Those actively campaigning for the GMOs are also arguing that the country is already consuming imported GMOs while maintaining the GM non-use policy was making the country's agricultural produce uncompetitive.

### [Health benefits of GMO crops: Fewer farmer suicides, cancers and pesticide poisonings](#)

(GLP)

The reality is that GM crops reduce and prevent cancers as well as a dozen other serious health problems from occurring, not only in regions where they are grown, but more widely as food products are traded globally. The human health benefits of GM crops are poorly understood by most people, but by far, they are the most significant benefits offered by any agricultural technology ever developed. The first human health benefit was recently quantified by a group of Italian scientists that examined 21 years of GM corn production, making three significant findings. Their research demonstrated that GM corn varieties are significantly healthier for humans to consume due to the lower concentrations of harmful mycotoxins, fumonisins and thricothecenes. The rate of mycotoxic corn was reduced by 29%, fumonisin infected corn was reduced by 31% and thricothecenes infection was reduced by 37%. All three of these can cause serious health problems.

### [CRISPR-Cas12b: Versatile gene-editing tool could help develop more high-yielding crops](#)

(Science Daily)

Assistant professor of Plant Science at the University of Maryland Yiping Qi has established a new CRISPR genome engineering system as viable in plants for the first time: CRISPR-Cas12b. Qi and his lab are constantly exploring new CRISPR tools that are more effective, efficient, and sophisticated for a variety of applications in crops that can help curb diseases, pests, and the effects of a changing climate. With CRISPR-Cas12b, Qi is presenting a system in plants that is versatile, customizable, and ultimately provides effective gene editing, activation, and repression all in one system.

### [Gene Editing and Plant Breeding in Canada](#)

(Saifood)

30 plant breeders from across Canada to participate in a survey on their use of gene editing in plant breeding. The results found that one-third of plant breeders surveyed in Canada are presently using gene editing as part of their crop variety development research. When this response was broken into public and private breeders, there were more public breeders (18 out of 54) are using gene editing technologies than private breeders (11 out of 26). While the respondents were not forced to identify their uses of gene editing, it appears as though both the public and private sectors are using various gene editing technologies, whether it be meganucleases, zinc finger nuclease (ZFN), transcription activator-like effector nucleases (TALENs), or clustered regularly interspaced short palindromic repeats (CRISPR).

### [How plants defend against fungi, insects decoded](#)

(Deccan Herald)

Researchers have discovered a communication network in plants which helps them respond to a hormone involved in pest resistance, a finding that may help develop crops that can withstand insect attack. The study, published in the journal Nature Plants, noted that the hormone called jasmonic acid is particularly important for a plant's defense response against fungi and insects. Using various computational approaches, the team could identify genes important for the plant's response to jasmonic acid, and for the cellular cross-communication with other plant hormone pathways. The two genes are involved in producing proteins that regulate the activity of thousands of other genes

### [Why It Is So Difficult To Communicate Biotechnology?](#)

(European Seed)

Besides science, we all know that agriculture involves culture. We 'cultivate' (i.e. agri-culture contributes culture – human values) to the natural environment. Farming is not nature; we learn from nature and use that knowledge to produce the goods that we need. Farmers plant 160,000 bean plants on a hectare. In nature, this would never happen. In agriculture, cereals keep their seeds on the plants waiting for the farmer to pass and harvest them for our bread & beer. Nature would make sure that seeds are shed and spread widely. It appears that people do not have this concept in mind when they

speak about certain breeding methods as ‘unnatural’. This is commonly followed by the argument that because of that lack of naturalness, such breeding methods or their products should be avoided or at best be strictly and extensively regulated.

### [From hunger to profitable harvest: How GMO, CRISPR-edited plants can help curb \\$220 billion in annual crop losses](#)

(GLP)

Genetic engineering techniques have the potential to entirely prevent many plant diseases that are responsible for billions of dollars of crop losses every year, and which are quite expensive to control through disease management techniques that include the spraying of pesticides. Farmers and consumers will benefit immensely if these breeding solutions are successful. They could effectively immunize our major staple crops in the same manner that vaccinations have largely eliminated the scourge of childhood diseases.

### [Increased seed oil content could make CRISPR-edited Camelina a desirable choice for cooking and animal feed](#)

(Ap News)

Data from a field tests suggest that novel traits can be successfully deployed in the oil biosynthesis pathway using CRISPR genome-editing technology to boost seed oil content in Camelina. Additional results recorded in the field studies suggest that the activity and expression of trait C3004 can boost photosynthetic efficiency in Camelina, an outcome that supports further field work in 2020. Permitting is underway to continue the testing of these traits and for testing of several traits in Camelina and canola in 2020 field tests in the U.S. and Canada, with planting expected to begin in the second quarter.

### [Study identifies new temperature sensing mechanism in plants](#)

(University of California)

A protein called phytochrome B, which can sense light and temperature, triggers plant growth and controls flowering time. How it does so is not fully understood. In a paper published in Nature Communications, a group of cell biologists led by Meng Chen, a professor of botany and plant sciences at the University of California, Riverside, reveal the phytochrome B molecule has unexpected dynamics activated by temperature, and behaves differently depending on the temperature and type of light. As climate change warms the world, crop growth patterns and flowering times will change. A better understanding of how phytochromes regulate the seasonal rhythms of plant growth will help scientists develop crops for optimal growth under the Earth’s new climate and might even shed light on cancer in animals.

### [Scientists demonstrate that white flour is the healthiest it’s been in 200 years](#)

(Rothamsted Research)

A study comparing historic and modern wheat varieties grown side by side has shown an increase in dietary fibre and other features beneficial to human health. This is contrary to concerns that the push for higher yields has made today’s wheat less “healthy” than older types. The team also found the concentration of betaine, which is beneficial for cardio-vascular health, has increased, whilst levels of asparagine - which can be converted to the potentially cancer-causing chemical acrylamide when bread is baked - have decreased. The amount of certain sugars, including sucrose, maltose and fructose, have also increased over this period.

### [Interview: Genome editing can reshape agriculture](#)

(All About Feed)

One of the main market barriers for agricultural products of genome editing is the regulatory approach that some countries, such as those in the EU, may take and the current uncertainty for the regulatory landscape globally. Some countries in Latin America are taking an approach that, if other countries adopt it, provides the potential to really change the landscape for agricultural applications of genome editing and could allow these techniques to be used as a breeding tool that could be accessible in all countries. This would allow locally produced solutions to regional agricultural challenges to reach

farmers and consumers. In an ideal world, publicly funded, low-risk research solutions using genome editing could reach farmers without an expensive and lengthy regulatory process. Breeders in Kenya and India, for example, would then be able to edit crops and livestock adapted to their region to address the problems that their farmers face. We face serious agricultural challenges for which genome editing could help provide viable solutions.

### [Gene breakthrough in fight against weeds](#)

(Rothamsted Research)

A team of scientists from Rothamsted Research have successfully adapted genetic techniques developed for crop improvement to be used in weeds – allowing them, for the first time, to directly study the genetics responsible for herbicide resistance. Writing in the journal *Plant Physiology*, the group report they have used plant viruses to switch weed genes off, or alternatively, ramp up the production of specific proteins by weeds in the laboratory. This means that these researchers can now directly show that a specific gene is required for herbicide resistance, or else is sufficient to confer it. Lead researcher Dr Dana MacGregor said the research was a ‘game-changer’ for weed genetics.

### [Biotech, Poverty & Education in the 21st Century](#)

(Sai Food)

One of the consistent benefits of GM crop adoption has been a higher farm and household income. In an assessment of the impacts of GM crops by Dr. Qaim, nearly 150 publications from around the globe were examined, of which the average increase in farmer profits was calculated to be 68%. Further research led by Qaim on the adoption of GM Bt cotton in India, found the greatest share of benefits went to vulnerable farmers, who experienced household income increases of 134%. In this example, the extreme poverty households that adopted GM cotton experienced a level of fiscal benefit that is double the global average.

### [With approval to plant GMO insect-resistant Bt cowpea, Nigerian farmer says her nation can lead Africa’s biotech ‘revolution’](#)

(GLP)

I haven’t wanted to plant cowpea here in Nigeria because the plant suffers from one of the worst enemies imaginable: the nasty maruca worm. But now farmers like me and across Nigeria have a way to defeat this terrible pest and produce an important food crop with enormous advantages for both growers and consumers. That’s because Nigeria has just approved the commercialization of Bt cowpea—and I couldn’t be more excited about the opportunity to take advantage of this new technology. We knew it was coming—or at least we had good reason to hope. All along, of course, farmers have wanted it. We seek to grow the best food, and that means gaining access to every tool and advantage science can offer.

### [Better plant edits by enhancing DNA repair](#)

(EurekAlert)

A new genome editing system enhances the efficiency of an error-free DNA repair pathway, which could help improve agronomic traits in multiple crops. Genome editing involves cutting DNA at very specific locations and utilizing cells' natural repair pathways to modify genes. Plant cells contain two repair pathways: nonhomologous end joining (NHEJ) and homology-directed repair (HDR). In plants, NHEJ is the dominant repair pathway at most cell stages, but it is prone to errors. For precise genetic modifications we need more control than provided by NHEJ. HDR is error-free but is inefficient in plants. We designed a genome editing system to enhance HDR efficiency. The system uses Cas9 as its DNA scissor. Cas9 is fused to VirD2 a protein that comes from *Agrobacterium tumefaciens*, a soil bacterium that causes disease in plants by inserting part of its own DNA into the plant genome. VirD2 leads the bacterial DNA into the plant nucleus.

### [Organic vs. GMOs: six recurring a priori of an ideological debate](#)

(European Scientist)

The ground-breaking documentary *Food Evolution* offered the general public a science-based introduction to crop biotechnology, revealing how activists attack it and debunking some of the more

pernicious myths about GMOs along the way. After watching the film and attending a debate immediately following the screening between the French National Federation of Organic Farming (FNAB) and several experts on GMO and gene-edited plants, it was clear to me that many organic food advocates and large swaths of the general public still accept a lot blatant untruths about biotechnology and its impacts on food safety and environmental sustainability.

### [Norwegians see advantages to gene editing food](#)

(Alliance for Science)

Norwegian consumers are receptive to using gene editing tools in agriculture if they bring social, economic and environmental benefits, a new study shows. The findings offer yet another indication that European consumers' opinions about genetic engineering are more fluid than has been generally perceived. In a consumer survey carried out by GENEinnovate, a collaboration of private Norwegian companies, research institutes and the Norwegian Biotechnology Advisory Board, a majority of respondents said that they are in favor of using gene editing techniques like CRISPR to improve sustainability and benefit society.

### [Farmers around the world share their stories](#)

(Alliance for Science)

All around the world, smallholder farmers toil in their fields to feed their families and their communities. Though these farmers differ in where they live, the crops they grow and the soil conditions they must contend with, their share similar challenges. In many countries, smallholders farm at subsistence levels and their incomes are limited. They often lack money to buy pesticides, fertilizer or employ advanced technologies that would make their back-breaking work easier. Many have found that planting insect-resistant genetically modified (GM) crops can drastically reduce their use of pesticides, saving them precious resources while also improving their health and that of their local environments. But others aren't as lucky. Many farmers still contend with bans on GM seeds and misinformation campaigns that lead them to question the safety of GM crops. In some cases, farmers don't even know that improved seeds are an option.

### [The busy frontier of corn genetics](#)

(The High Plains Journal)

The time-to-market for genetically modified traits is significantly longer than that for traits developed by conventional breeding, due not only to their expense and difficulty but to the various regulatory hurdles placed on them, especially overseas. Seed companies don't want to introduce a new variety until farmers are free to export it. So although genetic breakthroughs like this get headlines, they remain a longer-term answer to the challenge of increasing yields. The lengthy and expensive process of developing new genetic traits is one factor driving the consolidation of seed developers.

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