



Pakistan Biotechnology  
Information Center  
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# PAKISTAN BIOTECHNOLOGY

## INFORMATION CENTER



ISAAA  
International Service  
for the Acquisition  
of Agri-biotech  
Applications

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### TOPIC ISSUE

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Biotech News



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## NATIONAL NEWS:

### **Government and UN work together in strengthening agriculture, livestock and fisheries in Balochistan:**

Quetta, Balochistan 13 July 2023: To mobilize policy support for driving a sectoral development and fostering climate-smart practices in agriculture and fisheries, the Government of Balochistan (GoB) joins hands with The Food and Agriculture Organization of the United Nations (FAO) through a Unilateral Trust Fund (UTF) agreement signed at the FAO Office in Quetta. The collaboration will be implemented through Gwadar - Lasbela Livelihood Support Project (GLLSP-II), a project financed by the International Fund for Agricultural Development (IFAD) Florence Rolle, FAO Representative in Pakistan, and RehmatDashti, Project Director, GLLSP-II signed the agreement. Jointly implemented by GOB the National Rural Support Programme (NRSP), FAO, and the World Food Programme (WFP), the six-year project aims to promote climate-resilient agriculture and livestock farming systems, empower smallholder with knowledge and skills and enable them to build better resilience. Through this collaboration, the project aims to obtain technical assistance for various aspects such as Training of Trainers (ToT), curricula development, and training for small-holder farmers to enhance their capacities on climate resilience. Through interactive sessions and hands-on experiences, participants will gain invaluable insights, enabling them to adopt modern techniques and improve their farming practices," said RehmatDashti. Florence Rolle, FAO Representative in Pakistan, emphasized FAO's commitment to promoting sustainable agricultural practices and improving the resilience of vulnerable rural households. Through its programs across Pakistan, FAO has successfully promoted sustainable farming practices, resilient agricultural systems, and the adoption of climate-smart technologies.

Original link: <https://reliefweb.int/report/pakistan/government-and-un-work-together-strengthening-agriculture-livestock-and-fisheries-balochistan>

## INTERNATIONAL NEWS:

### **Farmers Embrace BT Cotton (GMO) in Mbeere:**

Farmers from the Semi-arid Mbeere region in Embu County have embraced BT Cotton a genetically modified variety despite the discussions propagated by anti-GMO Proponents. The farmers said that some NGOs had warned them of health hazards that included paralyzes on their hands after harvesting.

A farmer from Kanyuambora village, Joseph Nyaga, observed that he has been doing the BT Variety for three years now and has not encountered any problems. "My experience with the BT Cotton variety is its high yields triple production and with less labour as compared to the normal variety that I did for five years." The 44-year-old, a father of three says he has been able to educate his children with cotton farming and is now building a permanent house through the increased income from GMO Cotton variety.

He noted that he plants one and a half kilograms per acre as compared to six and eight kilograms of normal cotton. "On harvesting, we do it twice in March and July but if we had water we can even do two seasons which would mean we will harvest four times a year". For 60 year old Runji Karinge a father of six children, cotton farming has uplifted his living Standards where he noted poor rainfall patterns are not favourable to other crops.

The BT Cotton farming in Mbeere has attracted farmers and stakeholders from various parts of the globe with four parliamentary committees visiting the cotton farms on a fact-finding mission as it pertains to GMOs. Speaking during a visit, Biotechnology and Biosafety expert from ISAAA Africenter Dr. Paul Chege said the data that is available globally and research statements from WHO, FAO, and European Union have confirmed that GMO-derived crops are safe.

"BT Cotton is safe and has been grown for 30yrs now without any health concerns. The Variety grown in Mbeere is a hybrid that has a pest-resistant gene which makes it resistant to cotton ball worms that used to cause even 100 percent destruction to non-GMO cotton", Dr. Chege said.

Dr. Chege further observed that farmers are encouraged to spray twice as compared to normal varieties that would require to be sprayed 12 times. He further observed that only 36 percent of BT Cotton is used for the textile industry while the rest is used for other products like animal feeds and cooking oils

Members of Parliament from the departmental committees of Agriculture, health, trade, and delegated legislation who visited the farm were optimistic that GMOs will help farmers reap more benefits. The National Assembly Vice Chair of Trade, investment, and Cooperatives Maryann Keitany challenged Biosafety and Biotechnology experts to offer much-needed information on GMOs.

She observed that people opposed to biotechnology were doing so without any evidence adding that their tour had revealed that Kenyan Farmers can do wonders in the Agricultural sector. "Most cotton used for textile at the Export Promotion Zone is 100 percent imported when we have farmers who can produce enough cotton if supported. We need to reverse this such that when we say made in Kenya it is made for Sure," Ms Keitany noted.

She urged the County governments to up their game by providing extension officers who will help farmers achieve maximum production. "Farmers are currently one ton per acre but Experts say one acre can produce a maximum of seven tonnes". Matayos MP Geoffrey Odanga observed that the government needs to be firm to protect local farmers against imports. "As legislators, we will amend the law to protect cotton farmers to avoid what happened when Rivatex and other textile industries were hijacked by cartels".

He added that the new law will ensure that any importation of cotton will only be done to fill the gap adding that the government should put more funding to the research sector that is currently underfunded. "We also encourage farmers to embrace BT Cotton as we revive ginneries and encourage more investors.

original link: <https://www.standardmedia.co.ke/farmkenya/article/2001477151/farmers-embrace-bt-cotton-gmo-in-mbeere>

### **Xi'an city agri enterprises invited to collaborate for advanced agriculture in Pakistan:**

BEIJING-Pakistani Commercial Counsellor at the Pakistan embassy in Beijing, Ghulam Qadir has visited Xi'an, a Chinese city known for its advanced agriculture.

The visit aimed to understand the region's cutting-edge agricultural enterprises and pilot projects, and to foster agricultural ties between the two countries. Impressed by the progress and potential for collaboration, Ghulam Qadir invited Xi'an-based enterprises to explore cooperation opportunities in Pakistan and participate in the inaugural Food & Agriculture Expo 2023 in Karachi on August 10, Gwadar Pro reported on Monday. "I visited the Shaanxi Food and Agriculture Group, Yangling Agriculture Group, Shaanxi Seed Industrial Group, Qinzagu Group, and other enterprises. I was impressed by the rich agricultural heritage, modern farming techniques, sustainable agriculture practices, precision farming, and agricultural technology. I observed the application of smart farming techniques, advanced machinery, and high-tech greenhouses, all contributing to increased productivity and efficient resource utilisation," he stated.

The counsellor emphasised the potential for mutually beneficial collaboration, highlighting Pakistan's vast agricultural potential, diverse climate zones, and abundant natural resources. Pakistan's agriculture sector could benefit from advanced technology transfer, improved productivity, and better crop quality through precision farming, smart irrigation systems, and modern cultivation methods. "Pakistan, with its advantageous geographical location and fertile land, presents an ideal environment for agricultural investment and partnership. By leveraging Xi'an's expertise and technologies, Pakistan can enhance its agricultural productivity, optimize resource management, and explore innovative farming practices to address challenges such as water scarcity, post-harvest losses, and sustainable agriculture," Qadir added. He noted that his visit to Xi'an could help learn experience in enhancing Pakistan's productivity, optimising resource management, and addressing key agricultural sector challenges. This collaboration can strengthen bilateral ties, contributing to sustainable agricultural practices, food security, and economic growth in both nations. "Joint ventures and knowledge-sharing initiatives can promote research and development in areas such as seed technology, biotechnology, and

agrochemicals. This collaboration can enhance crop yields, introduce disease-resistant varieties, and address food security and sustainable agriculture practices,” he mentioned.

original link: <https://www.nation.com.pk/18-Jul-2023/xi-an-city-agri-enterprises-invited-to-collaborate-for-advanced-agriculture-in-pakistan>

### **Pakistan sets up center to boost agricultural growth with \$500 million Saudi assistance:**

Pakistan has established a Land Information and Management System, Center of Excellence (LIMS-CoE) to improve modern agro-farming by using over 9 million hectares of uncultivated state land. The facility, which has been funded by Saudi Arabia, aims to improve agricultural productivity and address recurrent economic challenges in Pakistan. The country faces a food insecurity rate of 36.9% and severe food crises, with a shortfall of 4 million metric tons in wheat production and a 40% drop in cotton production. The LIMS-CoE will work in collaboration with Saudi Arabia, the United Arab Emirates, Qatar, Bahrain, and China on various agri projects to boost Pakistan's exports. The center aims to ensure food security and optimize agricultural production through innovative technologies and sustainable practices, while preserving the environment. The LIMS-CoE has initiated modern agri-farming projects in Punjab, focusing on certified hybrid seeds and joint ventures with multinational companies.

original link: <https://www.arabnews.pk/node/2333736/pakistan>

## **AGRIBIOTECH NEWS:**

### **‘Jumping Genes’ Help Plants Become More Resilient in Extreme Temperatures and Pathogen Attacks:**

Researchers from the Okinawa Institute of Science and Technology (OIST) and the Center for Sustainable Resource Science, RIKEN found that the model plant *Arabidopsis thaliana* expresses thousands of transcripts between regular [genes](#) and jumping genes. The researchers report that the plant alters the expression of these hybrid genes in response to extreme temperatures or pathogens.

"Jumping genes," or transposons, are sections of the [DNA](#) that can copy themselves and jump between different parts of the [genome](#). The study published in *Nature Communications* finds that these genes might help plants adapt to stressful, changing conditions. The researchers identified the transcripts using Direct RNA Sequencing that can read long RNA sequences. They then used a computational tool they developed, called ParasiTE, to classify the gene-transposon transcripts, based on the effect that the transposon had on the gene.

The research team then conducted a systematic study of how environmental stresses affect gene-transposon transcripts and found that a transposon called ONSEN, caused a change in expression of its associated gene, GER5, in response to excessive heat. Their other finding is a gene called RPP4, which produces a protein that helps *Arabidopsis* fight pathogen infections. The researchers found that suppressing the expression of the RPP4 gene affects the plant's resistance to pathogens.

For more details, read the news article in [OIST Research Updates](#)

### **APHIS Issues Review for Bayer's Short-Stature Corn:**

Bayer's [genetically engineered](#) shorter-stature corn known as Smart Corn System has received safety approval from the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS). The shorter corn plants are modified to be 30% smaller with the same yields as other corn plants.

Bayer CropScience modified the corn plant to reduce the plant growth hormone gibberellic acid, to produce shorter plants and reduce the likelihood of lodging or stem buckling. In its review, USDA APHIS found that the [modified corn](#) is unlikely to pose an increased plant pest risk compared to other cultivated corn plants. As a result, it is not subject to regulation under 7 CFR part 340, and this plant may be safely grown and bred in the United States.

For more information, read the [APHIS review](#) and the news article in [Feed&Grain](#).

### **Soybean Seeds Produce Meat Protein:**

In developing meat substitutes, the goal is to make the food ingredient more meat-like and healthy. This breakthrough is what UK-based food ingredient company, Moolec, has accomplished. With genetic engineering, they have developed soybean seeds with high levels of pork protein.

According to Moolec, the animal protein expressed in “Piggy Sooy” is about a quarter (26.6%) of the total soluble protein in soybean seeds. This increased amount of meat proteins led to a pinkish color in the seed, similar to pork.

Aside from Piggy Sooy, Moolec also produces pea plants containing beef proteins. They claim that their products will have a similar taste, texture, and nutritional value as meat but without the high costs linked to cultured meat.

The successful introduction of pig proteins in soybean seeds has led Moolec to apply for a new patent using a novel molecular farming technique to provide the company with a frictionless regulatory pathway in the future.

Know more from [Moolec](#).

### **GE Rice Linked with Hunger, Health, and Climate Resilience:**

A review article in the journal *Foods* highlights the potential of [genetically engineered rice](#) to improve nutrition and reduce malnutrition. The article discusses how [genetic engineering](#) can be used to increase the nutritional value of [rice](#), improve grain size and yield, and generate bioactive components with potential health benefits.

One of the promising areas of research is the identification of quantitative trait loci (QTLs) involved in grain weight and nutritional quality. QTLs are regions of DNA that are associated with specific traits, such as grain weight or nutritional content. By identifying QTLs, scientists can develop genetically engineered rice that is more nutritious and productive.

For example, one QTL called grain weight on chromosome 6 has been identified. This QTL has been amplified by the Kasa allele, which results in a substantial increase in grain weight and brown grain. Another study has shown that overexpressing a specific gene in rice, *Oryza sativa* plasma membrane H<sup>+</sup>-ATPase1, can improve the absorption and assimilation of ammonium in the roots, as well as enhance stomatal opening and photosynthesis rate in the leaves under light exposure. These studies suggest that genetic engineering can be used to improve the nutritional value and productivity of rice.

The article also discusses the potential of genetically engineered rice to help mitigate the effects of climate change, such as methane–nitrous oxide emissions and global warming, and how they may be significantly improved by genetically engineered rice through modifying a water-management technique.

Read the review article in [Foods](#).

## Experts Tackle Big Questions on Gene Editing and the Future of Food:

In a new ISAAA publication titled [Points to Ponder on Gene Editing: Can We Edit the Future of Food?](#), a group of experts from around the world discuss the potential impacts of gene editing in the context of food security.

The publication begins by outlining the challenges that the global food system faces. The world's population is expected to reach 9.7 billion by 2050, and demand for food is expected to increase by 50%. At the same time, climate change is making it more difficult to produce food in many parts of the world.

Gene editing, the authors argue, could help to address these challenges. By making precise changes to the DNA of plants and animals, gene editing can help to create crops that are more productive, more resistant to pests and diseases, and better suited to our changing climate.

The new publication is part of *ISAAA Biotech Communication Series*, a collection of visual monographs that aim to provide stakeholders with accurate and up-to-date information about agricultural biotechnology. The series covers a wide range of topics, including modern biotechnology and science communication.

[Download the full publication](#) for free from the ISAAA website.

## Natural Tomato Mutation Found to be Related to BER Resistance:

Scientists finally uncovered the mechanism behind the mutation in tomato that causes the plant's inability to sense gravity. But more interestingly, the mutated tomatoes, known as *adpressa*, were also found to be completely resistant to the disease known as blossom-end rot (BER).

The scientific team led by experts from the Boyce Thompson Institute uncovered the precise genetic change in *adpressa* tomatoes, in which mutation blocks the synthesis of starch. Specifically, *adpressa* tomatoes show major transcriptional and metabolic adjustments which includes increased levels of soluble sugars and enhanced growth. Further analysis also found that the mutant plants are resistant to BER, a plant disorder that causes deterioration of fruit cell membranes leading to black, sunken bottom of tomato fruits. They are now focusing on determining the target tomato genes or compounds responsible for it.

The new information provides opportunities for researchers to engineer or breed tomatoes with improved fruit yield and quality while withstanding stressful environmental conditions.

Learn more from [Boyce Thompson Institute](#) and [Journal of Experimental Botany](#).

## GE High Antioxidant Purple Tomato Completes FDA Consultation:

Norfolk Plant Sciences has announced the successful completion of its consultation with the U.S. Food and Drug Administration (FDA) regarding its [genetically engineered](#) (GE) high-antioxidant purple tomato following the agency's comprehensive review.

The FDA review states, "We have no further questions concerning human food derived from Del/Ros1-N tomato at this time." This decision from the FDA aligns with the United States Department of Agriculture's favorable decision in September 2022, marking a significant milestone for Norfolk. The FDA meticulously reviewed the purple tomato's composition, safety, and other relevant parameters.

Purple tomatoes have a similar nutrient composition as their conventional counterparts, except for their intended higher levels of anthocyanins. The FDA concluded that the GE purple tomatoes do not present concerns for human food. The purple tomato was developed by Norfolk Founder Professor Cathie Martin at the John Innes Centre in Norwich, United Kingdom.

This tomato derives its exceptional antioxidant properties from two [genes](#) from the edible snapdragon flower. These genes naturally stimulate the tomato's ability to produce purple pigments, resulting in the vibrant hues of purple-skinned tomatoes, blueberries, blackberries, and eggplants.

For more details, read the announcement from [Norfolk Healthy Produce](#) and the response letter from [US FDA](#)

## **HEALTH BIOTECH NEWS:**

### **Advantages and Challenges of Using CRISPR-Cas to Target miRNA in Cancer:**

Researchers from various universities in Iraq analyzed the different benefits and challenges of using [CRISPR-Cas](#) to target miRNA in Cancer. They also offered advanced strategies that can be used to overcome potential issues.

CRISPR-Cas can be used to insert permanent mutations in the genome that can be transferred to the next generation of cells. Other benefits of this technique include higher accuracy and specificity compared to other methods, as well as the targeting of several loci in the miRNA [gene](#). CRISPR-Cas approach for miRNA gene knockdown also reaches a high success rate of 75% -99% with minimal off-target activity.

The challenges of CRISPR-CasmiRNA targeting that need to be addressed include Cas9 PAM deficiency in miRNA sequence, the short sequence of miRNA, off-target outcomes in CRISPR-Cas-mediated miRNA editing, and delivery issues of the CRISPR-Cas system. The researchers provided different strategies to help resolve these issues.

Read the journal article at [Military Medical Research](#) for more information.

### **CRISPR Will be Used to Develop Genetic Medicines for Sickle Cell:**

Researchers will develop *in vivo* therapies for sickle cell disease and other genomic diseases. The project team will use Scribe Therapeutics' CRISPR XE technologies and Sanofi's non-viral delivery technologies.

*In vivo* [genome editing](#) involves directly modifying [genes](#) inside the body, and it provides numerous advantages compared to existing treatment methods and late-stage investigational therapies. One of the benefits of the *in vivo* approach is that it may be used to streamline sickle cell disease's treatment process.

*In vivo* genome editing may also reduce complications related to investigational *ex vivo* autologous treatments, which includes long, complex cell manufacturing processes and conditioning regimen toxicities. The *in vivo* approach also aims to minimize the time and cost necessary for treatment, which will boost patients' access to the technology.

Read the press release of [Scribe Therapeutics](#) for more information.

## **OTHER THAN CROP BIOTECH NEWS:**

### **New CRISPR-Like System Could Revolutionize Genome Editing:**

A team of experts led by Feng Zhang at the Massachusetts Institute of Technology (MIT) reported the first programmable RNA-guided system in eukaryotic organisms, including plants, animals, and fungi. Their findings are published in *Nature*.

The system's main component is a protein called Fanzor, which uses RNA as a guide to target [DNA](#) accurately. Fanzors can also be reprogrammed to edit the genome of human cells. These systems could be efficiently

delivered to cells, and tissues better than [CRISPR-Cas](#) systems and could still be adjusted to perform more efficiently. According to Zhang, the Fanzor system provides another technique to make accurate modifications in human cells, complementing the available genome editing tools. Thus, their main goal is to develop genetic medicines using the systems to modulate human cells by targeting particular [genes](#) and processes.

“Nature is amazing. There's so much diversity...There are probably more RNA-programmable systems out there, and we're continuing to explore and will hopefully discover more,” he added.

Read more from [MIT News](#).

## **Hunger Levels Reach Record High, 735 Million People Struggling:**

Around 735 million people are struggling with hunger, according to the latest report on the *State of Food Security and Nutrition in the World* (SOFI) released by five agencies of the United Nations. Compared with the 2019 data, the count has increased by over 122 million, which is attributed to the [COVID-19](#) pandemic, as well as repeated weather shocks and conflicts.

The specialized agencies that compiled the report include the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), and the World Food Programme (WFP). They said that if the hunger trends continue to be the same in the next few years, the Sustainable Development Goal of zero hunger by 2030 will not be achieved.

“There are rays of hope, some regions are on track to achieve some 2030 nutrition targets. But overall, we need an intense and immediate global effort to rescue the Sustainable Development Goals. We must build resilience against the crises and shocks that drive food insecurity—from conflict to climate,” said UN Secretary-General AntónioGuterres via video during the report launch at the UN Headquarters in New York.

Read the news release from [FAO](#) or download the [report](#) for more information.