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**Record caFe: We’re Open to Private Partnership for GM Crop Research: ICAR DG**

Ms. Vivian Fernandes, Author, Financial Express, Reproduced from the Financial Express Article Originally Published on August 18, 2016

Trilochan Mohapatra took over as secretary, department of agricultural research and education, and director general, Indian Council of Agricultural Research (ICAR) in February. A molecular geneticist, he is known for developing the first high-yielding basmati rice variety resistant to bacterial leaf blight and for genome sequencing of rice and tomato. In an interview with Vivian Fernandes, he adds that we need PPPs in biotech and for seed multiplication. Excerpts:

With weather getting more erratic and population set to increase, how is ICAR preparing for food and nutrition security? Agriculture contributes to GHG emissions, particularly low-land rice. It emits methane, which is more earth warming than carbon dioxide. Direct-seeded rice (without transplantation) and System of Rice Intensification (SRI) can help reduce these emissions. But these cannot be applied in every situation.

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rises are increasing. Some farmers want to change them every year. The seed corporations cannot supply enough because seed replacement needs of the country. Today, the National Seed Corporation and state have been released in 10 years. It is a record for India. Public and private cultivation. This has happened in (Bt) cotton. More than 1,500 hybrids in this particular hybrid (Dhara Mustard Hybrid 11) as we can back-cross Committee (GEAC) will, probably, take a final call. That should happen public domain and comments come, the Genetic Engineering Appraisal the public system. The bio-safety dossier is ready. Once it is placed in the DU (South Campus) has created transgenic mustard be less resistance? The preserve of private companies. If ICAR gets into the field, will there

ICAR was at the forefront of the Green Revolution. Why is it missing in action in the gene revolution? Not exactly, activities have been going on. There is a need to improve efficiency and speed. There are many laboratories which are involved in validation of gene functions. But the public system cannot catch private companies in funding, infrastructure and the critical mass of people focused on a project.

What are ICAR’s focus areas in agri-biotech? We are testing genes for C4 photosynthesis in rice. We are trying to improve nitrogen use efficiency (a) through nitrogen-fixing bacteria, (b) plant and rhizobia interaction, and (c) by manipulating host genetic mechanisms. With regard to phosphorus use efficiency, the genes and markers are available and we are doing the breeding. We have had very good success.

ICAR has more than 100 institutes. Why can’t it focus on a few critical crops like pulses? In pulses, the problem of pod borer is serious. We have a focused programme on GM pulses where we can use Bt genes, which has been proven safe in cotton (against bollworm). We are making tur resistant to pod borers. That is happening at Assam Agricultural University, Jorhat… It is doing work on chickpea (chana). The Indian Institute of Pulses Research, Kanpur, has identified 6-7 events (mutated transgenic cells). Event selection will happen next. In 3-4 years, we should be able to deliver it to the farmers if the regulatory system approves.

Political leaders are wary of GM technology because they see it as the preserve of private companies. If ICAR gets into the field, will there be less resistance? DU (South Campus) has created transgenic mustard with NDDB funding. It has gone through all the tests. It is a product of the public system. The bio-safety dossier is ready. Once it is placed in the public domain and comments come, the Genetic Engineering Appraisal Committee (GEAC) will, probably, take a final call. That should happen ideally before the mustard sowing season in October.

Is hybrid vigour in it proven? They have recorded more than 20% heterosis (yield enhancement). But I am not really worried by heterosis in this particular hybrid (Dhara Mustard Hybrid 11) as we can back-cross and generate better ones if this seed is deregulated and allowed for cultivation. This has happened in (Bt) cotton. More than 1,500 hybrids have been released in 10 years. It is a record for India. Public and private can join and create newer combinations.

You told reporters recently there should be PPPs in research. Can you elaborate? We need PPPs in biotech and for seed multiplication. Gone are the days when the public system could meet all the seed needs of the country. Today, the National Seed Corporation and state seed corporations cannot supply enough because seed replacement rates are increasing. Some farmers want to change them every year. The second area is having partnerships for GM research … partnering with multinationals, if they can put in money and we can do research together to solve a particular problem.

It happened in Bt brinjal… There the event was provided (by Mahyco India) and it was back-crossed. It was not at the stage of gene discovery.

Political leaders are reluctant to allow private companies to charge for plant traits. The agriculture ministry virtually issued a compulsory licence on Bt cotton using the Essential Commodities Act. It capped the trait fees. In fact, a former IAS official, Pravesh Sharma, said the government should acquire critical technologies and provide them free to farmers… That is one way to deal with it. But we can partner from the very beginning and have an understanding on how to share credit, and how to make it (a desirable trait) a thing of public good.

Is there such a mindset in ICAR? This is what our mindset is. Certainly, there must be partners who are ready for it. We need to develop more transgenic events than the public system is handling at this time. Also, bio-safety study is not easy. The public system can involve the private sector.

Why can’t ICAR do field trials on behalf of private trait developers? If I have a sponsored project, I will be very happy. For (GM) mustard we did field trials in Punjab, Delhi and Bharatpur. There are a few issues. For event selection and confined field trials, state government NOC is required. What we are planning is to create sites, where selections can happen before it goes to GEAC. When the event is approved, we have to go back to GEAC. We have to see ways and means to rationalise that process.

Have you spoken to the Department of Biotechnology and the ministry of environment? We are discussing. Two rounds of meetings are over. There is quite a bit of evolution. The agriculture minister says whatever has been approved by the environment ministry for release, we will not have difficulty in promoting that.

Agri-biotech is an important area of science. Because of the uncertainty, are you finding it difficult to attract talent? This is one point which is being discussed among scientists and also the political leaders. This is a wonderful science, it has tremendous potential.

What about golden rice fortified with beta carotene for vitamin A? I don’t know when it will go to consumer. ICAR has it. It is sitting there. The day we get approvals, we will do the needful.

Politicians are wary of agri-biotech. Shouldn’t ICAR educate them? This country needs an awareness programme for the public, the political system and even educated people like scientists… even they do not understand. We have discussed this with the department of biotechnology and the National Academy of Agricultural Sciences.

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Spotlight on the Institutional Biosafety Officers: Mr. Kumaraswamy and Dr. Mohammad Akram

INSTITUTIONAL BIOSAFETY OFFICER: Mr. Kumaraswamy, H. Hosur.

JOB TITLE: Scientist (Biotechnology)

ORGANIZATION: ICAR-Indian Institute of Oilseeds Research, Hyderabad

BIOGRAPHY: Mr. Kumaraswamy, H. Hosur received his M.Sc. in Biotechnology from the University of Agricultural Sciences, Bangalore, India in 2001. He served as an examiner of Patents and Designs in the Indian Patent Office at Chennai from 2002-2005. From 2005-2008, while serving as a Scientist (Biotechnology) in the Intellectual Property (IP) Management Division of the Council of Scientific and Industrial Research (CSIR) at Head Quarters in New Delhi, he handled drafting, litigation and prosecution of more than 500 patent cases of CSIR research laboratories in the area of biotechnology and molecular biology. In 2008, he joined as a Scientist (Biotechnology) at ICAR-Indian Institute of Oilseeds and presently is working in the area of genomics assisted genetic improvement of Sesame (Sesamum indicum).

Mr. Kumaraswamy has more than thirteen years of experience in the field of biotechnology and molecular biology. He has six years of experience in IP protection and management, which enabled him to develop critical analysis and in-depth understanding of government regulatory requirements. He has more than seven years of research and development experience while working on a wide array of crops including rice, wheat, safflower and sesamum. Mr. Kumaraswamy has published nearly 10 research papers in peer-reviewed journals. He has examined patentability of nearly 400 patent applications related to foods, drugs, pharmaceuticals and agrochemicals. He has also obtained a law degree from the Faculty of Faw, University of Delhi. He is acquiring state-of-the-art skills and knowledge during his Ph.D. studies at the National Research Centre on Plant Biotechnology, New Delhi, India. Presently, he is preparing his thesis.

His current areas of his interest include development and utilization of Simple Sequence Repeat (SSR) markers in crop improvement; genomics and phenomics assisted crop improvement in sesame; molecular diversity studies, population structure, association mapping and biostatistics; and DNA finger-prints and DNA barcodes for identifying public-domain varieties of sesame.

THE VALUE OF THE IBO PROGRAM: “This program has been very useful in making ICAR-IIOR ready to comply with regulatory requirements in developing transgenic crops.”

INSTITUTIONAL BIOSAFETY OFFICER: Dr. Mohammad Akram

JOB TITLE: Principal Scientist (Plant Pathology)

ORGANIZATION: ICAR-Indian Institute of Pulses Research, Kanpur

BIOGRAPHY: Dr. Akram’s specialization is plant pathology and diagnostic diversity and management of plant viruses; and molecular characterization of pathogens. His current areas of research include development of polymerase chain reaction (PCR) based diagnostics for major viruses and fungi of pulses; characterization of emerging viruses in pulses through next generation sequencing (NGS) and identification of stable sources of resistance in mungbean and urdbean against major pathogens. He has received many awards including the Young Scientist Award 2003-2004 in the field of Plant Protection by the National Academy of Agricultural Sciences, New Delhi; the Science Award 2004-2005 (Young Scientist Award Category) by the Council of Science and Technology, Uttar Pradesh, Government of Uttar Pradesh; the Lal Bahadur Shastri Young Scientist Award Blennium 2005-2006 in the field of Plant Protection by the Indian Council of Agricultural Research, New Delhi; and the Best Scientist Award-2015 by ICAR-Indian Institute of Pulses Research, Kanpur. He has published approximately 45 research papers in National Academy of Agricultural Sciences (NAAS) rated journals and 50 popular articles, book reviews, and bulletins. He has guided over 15 Postgraduate students.

THE VALUE OF THE IBO PROGRAM: “Research management in laboratories, especially on the hazardous chemicals, pathogenic microorganisms, DNA recombinant technology etc., needs to ensure the safety of researchers/technicians/research fellows/students, environment and animals. There is lot of literature available on the Good Laboratory Practices (GLP) to avoid the hazards to the researchers, human beings, environment and animals. But to follow the GLP, the first and most important issue is the availability of the standard infrastructure which includes the protected space, quality equipments, resource management, discipline and standard operating protocols/procedures. Several ICAR institutions have very good facilities to do the high quality research on plants/crops, animals and fish and are involved in developing transgenics.

The main aim of developing transgenic crops is to boost productivity and production of various crops so that the income of the growers is enhanced. Additionally, it is also to reduce the application of the chemical pesticides thereby reducing the environmental pollution. There is a need to create awareness on the use of standard operating procedures (SOPs) for developing the transgenic crops in accordance with the biosafety rules and regulation in the National Agricultural Research System (NARS) of the country. There is also a need to make the public aware on the safety and other benefits of the transgenic products so that their release is not opposed.

ICAR has initiated the programme on “Biosafety Awareness and Compliance Readiness” in collaboration with the ILSI Research Foundation, USA and Biotech Consortium Limited (BCIL), New Delhi to train 20 scientists from 10 ICAR institutes since 2015. I come from the ICAR-

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A consultation meeting on the safety assessment of foods derived from genetically modified (GM) plants was held at the Bangladesh Food Safety Authority (BFSA) on August 29, 2016. Prof. Dr. M.A. Malek, Member, BFSA, presided over the meeting. Participants were selected from among the biotech researchers working in the National Agricultural Research System (NARS) institutes and universities, including: Prof. Dr. Zeba Islam Seraj, Dhaka University; Prof. Dr. M. Imrakul Hoque, Dhaka University, and Country Coordinator, South Asia Biosafety Program (SABP); Dr. Tahmina Islam, Dhaka University; Dr. Md. Abdullah Yousuf Akhond, Biotechnology Division, Bangladesh Agricultural Research Institute (BARI); Mr. Md. Golam Sarwar, Bangladesh Standards and Testing Institution (BSTI); Prof. Dr. Md. Kamrul Hassan, National Food Safety Consultant (Horticulture), FAO; Md. Moinul Haque, BFSA; and Prof. Dr. Md. Iqbal Rouf Mamun, BFSA were in attendance.

In Dr. Malek's welcoming address, he mentioned that the Bangladesh National Parliament has passed the Food Safety Act, 2013 on October 10, 2013 after repealing and re-enacting the existing outdated laws in this regard. By passing the act, provisions were made for the establishment of an efficient, effective, scientifically based Authority and for regulating the activities relating to food production, import, processing, stockpiling, supplying, marketing and sales. It was also enacted to ensure the people's right to access safe food through appropriate application of scientific processes and state of the art technology. Obligated by the citizens' aspirations and being respectful towards the present Government's desire, the Bangladesh Food Safety Authority was established on February 2, 2015, with the commitment to make a united start with full strength and unstinting efforts.

Dr. Malek shared that as many as 18 different organizations, including various government ministries, departments, city corporations, Pourashava (municipalities), and district magistrates are involved with the BFSA. The Authority whole-heartedly welcomes the all out support of all food control agencies, food business operators and people of the country towards the landmark goal of establishing a modern and technological food safety system in Bangladesh to contribute to the Government's Vision 2021.

The Food Safety Act not only focuses on the safety of traditional foods, but also has the responsibility to ensure the safety of foods derived from GM plants. Therefore, this meeting provided an opportunity to discuss the issues related to the safety assessment of foods derived from GM plants.

Mr. Alam, Director of BFSA, gave a short presentation highlighting the current and future activities of BFSA. In his presentation, Mr. Alam pointed out the various articles of the Food Safety Act where the provisions for assessment of GM foods are addressed.

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After the presentation, the Chair requested Prof. Hoque to give a short presentation on the safety assessment of foods derived from GM plants, including their benefits and potential risks. He described the global status of biotech crops and how the foods derived from GM crops are being assessed internationally. He also described the guidelines for the safety assessment of foods derived from GM plants, including its development process, which has been adopted by the Bangladesh Standards and Testing Institution (BSTI) as their standard. He described the salient features of these guidelines and the guiding principles for the assessment of GM plants derived foods.

A lively discussion followed the presentations. In his concluding remarks, the Chair thanked all participants for sparing their valuable time for this meeting. He mentioned that this is just a preliminary meeting on this important issue and there are plans to hold such consultation meetings more frequently in the future so that the regulators may have better understanding about the foods derived from GM crops and their safe use.

A two-day event entitled, “Capacity Building Session with the Biosafety Regulators”, was held on August 11-12, 2016 at the Serena Hotel, Islamabad, Pakistan. This event was jointly organized by the Pakistan Biotechnology Information Center (PABIC), the Pakistan Agriculture Research Council (PARC), the Forman Christian College (A Chartered University), Lahore, and the United States Department of Agriculture, Foreign Agricultural Service US Embassy, Islamabad, Pakistan. Top biotechnologists and regulators from different countries including Pakistan, Philippines, Malaysia and Austria, participated in this capacity building event.

The event was attended by more than 70 participants, including researchers, members of institutional biosafety committees and regulators, representatives of various private sector seed companies and university faculty.

The inauguration ceremony was honored by the presence of His Excellency Sikandar Hayat Bosan, Federal Minister for National Food Security and Research and Mr. Syed Abu Ahmad Aifik, Secretary Ministry of Climate Change, as the Chief Guest and the Guest of Honor, respectively. Excellency Sikandar Hayat Khan Boson also launched the ISAAA Brief 51. Before the launch, Prof. M. Iqbal Choudhary, Director, PABIC, briefed the audience regarding important facts and figures in the ISAAA Brief written by Dr. Clive James and informed them that it is the 20th Anniversary of this technology. He enumerated the challenges faced by the country in the form of energy crisis, food security, rapid urbanization and climate change, adding that in the face of such challenges, the country took a step towards biotechnology. The Minister expressed pleasure at the progress made in the field of biotech crops, in the form of genebold step towards biotechnology. The Minister expressed pleasure at the progress made in the field of biotech crops, in the form of gene

The event ended with a long discussion among the speakers and participants about the further improvements required for the existing biosafety clearance system of GMOs in Pakistan. The participants urged that since the agriculture is the backbone of national economy, it is imperative to adopt science based agriculture at the national level in order to meet the constantly growing food, fiber and fodder demands in Pakistan. However, lack of coherent policies and clear implementation strategy to adapt agri-biotech need to be properly addressed and improved in order to feed the growing population and to provide raw material for high value exports.

Dr. Sammer Yousuf, Assistant Professor, H.E.J. Research Institute of Chemistry, University of Karachi, Karachi
### CALENDAR OF EVENTS

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<td><strong>INDIA</strong></td>
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<tr>
<td>Technical Workshop on “Practical Considerations of Applications of Genome Editing”</td>
<td>Department of Biotechnology (DBT), Government of India and Biotech Consortium India Limited</td>
<td>September 23, 2016 Hyderabad</td>
<td><a href="http://www.bcil.nic.in">www.bcil.nic.in</a></td>
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<td>1st International Agrobiodiversity Congress (IAC 2016)</td>
<td>Indian Society of Plant Genetic Resources (ISPRG) and Bioversity International</td>
<td>November 6-9, 2016 New Delhi</td>
<td><a href="http://www.iac2016.in/">www.iac2016.in/</a></td>
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<tr>
<td><strong>INTERNATIONAL</strong></td>
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<td>4th Annual South Asia Biosafety Conference</td>
<td>SABP, Center for Environmental Risk Assessment (CERA), ILSI Research Foundation, Biotech Consortium India Limited (BCIL)</td>
<td>September 19-21, 2016 Hyderabad, India</td>
<td><a href="http://sabc.biotech.co.in/">http://sabc.biotech.co.in/</a></td>
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<td>Workshop on Environmental Release of Engineered Pests: Building an International Governance Framework</td>
<td>OECD and Genetic Engineering and Society Center, North Carolina State University</td>
<td>October 5-6, 2016 North Carolina, USA</td>
<td><a href="https://research.ncsu.edu/ges/oecd-crp-meeting/">https://research.ncsu.edu/ges/oecd-crp-meeting/</a></td>
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<td>4th Asia Pacific International Food Safety Conference &amp; 7th Asian Conference on Food and Nutrition Safety</td>
<td>ILSI Southeast Asia Region and Southeast Asia Association for Food Production</td>
<td>October 11-13, 2016 Penang, Malaysia</td>
<td><a href="http://www.apacfoodsafty2016.com">www.apacfoodsafty2016.com</a></td>
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<tr>
<td>8th International Plant Tissue Culture &amp; Biotechnology Conference</td>
<td>Bangladesh Association for Plant Tissue Culture &amp; Biotechnology (BAPTC&amp;B) and University of Dhaka</td>
<td>December 3-5, 2016 Dhaka, Bangladesh</td>
<td><a href="http://www.baptcb.org/">www.baptcb.org/</a></td>
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### The South Asia Biosafety Program (SABP)

The South Asia Biosafety Program (SABP) is an international developmental program implemented in India, Bangladesh and Pakistan with support from the United States Agency for International Development. SABP aims to work with national governmental agencies and other public sector partners to facilitate the implementation of transparent, efficient and responsive regulatory frameworks for products of modern biotechnology that meet national goals as regards the safety of novel foods and feeds, and environmental protection.

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