

REPORT ON THE 1<sup>ST</sup> INTERNATIONAL AGROBIODIVERSITY CONGRESS, NEW DELHI

## Delhi Declaration provides a Roadmap for Agrobiodiversity Management

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First International Agrobiodiversity Congress (IAC2016) organized during 6-9 November 2016 at New Delhi was a watershed event in the field of agrobiodiversity. For the first time ever, an international scientific meeting dedicated to deliberate and discuss on conservation and use of agrobiodiversity in all its forms (plant, animal, aquatic, microbial and insect genetic resources relevant to food and agriculture) was organized. Objective of the first International Agrobiodiversity Congress (IAC2016) was to provide a platform to all the stakeholders engaged in genetic resource conservation and management to deliberate on thematic issues of global importance, with major emphasis on rational and effective use of agrobiodiversity for food, nutritional and environmental security. As many as 900 delegates belonging to 60 countries participated in Congress. For details of the program, speakers and to download publications please visit [www.iac2016.in](http://www.iac2016.in).

**Key Words:** Agrobiodiversity, Delhi Declaration, IAC2016

### Prime Minister Articulated Nation's Resolve on Agrobiodiversity

The IAC2016 was inaugurated by the Prime Minister of India who called for intensifying research in agrobiodiversity and harmonizing global laws on conservation to ensure food security. The Prime Minister elaborated on the strength of India's agrobiodiversity and the associated knowledge and invited the countries to develop a "shared vision" on the use of diversity for sustainability. More than 900 delegates representing 60 countries participated in the IAC2016. Organizers ensured adequate participation from gene-rich developing countries including from Africa, Central Asia and South Asia. Participants also included 41 genebank managers, over 100 students and more than 50 farmers and community representatives. Spanning the four days of IAC2016, there were 16 technical sessions, four satellite sessions, a genebank round table dialogue, a public forum, a farmers' forum and poster sessions. Participants witnessed eight plenary and two evening lectures, 72 invited lectures and 50 rapid oral presentations in the technical sessions and 30 presentations in the four satellite

sessions. About 450 posters were displayed offering a cross-sectional view of the ongoing work in conservation and use of genetic resources of plants, animals, fishes, microbes and insects for food and agriculture.

### Thought-provoking Plenary Sessions and Panel Discussions

In the first plenary session on "Agrobiodiversity for Sustainable Development Goals (SDGs)", while M Ann Tutwiler (Bioversity International) highlighted the need to develop an Agrobiodiversity Index to help deliver the SDGs, RS Paroda (ISPGR & TAAS)



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emphasized on the enhanced use of agrobiodiversity despite changing global paradigms. In the second plenary session on “Conservation through Use”, Gurdev S Khush, (University of California) illustrated the theme with use of rice germplasm to develop mega-varieties of rice. Toby Hodgkin (Platform for Agrobiodiversity Research) stressed the need for adopting systems based approach for conservation. In the ensuing panel discussion issues like preparedness for climate change (S Rajaram, RSM) and use of crop wild relatives (Marie Haga, Crop Trust), landraces (Calvin Qualset, University of California) and new technologies and tools (Usha Zehr, Mahyco) were highlighted. Third Plenary Session was on “Agrobiodiversity for Livelihood Security and Ecosystem Services” where two expositions linked livelihood security to conservation of biodiversity (Kamal Bawa, University of Massachusetts) as well as grassroots innovations and market mediated value chain development (Anil Gupta, NIF and IIMA). In the panel discussion issues raised include genetic erosion of farmers varieties and resultant vulnerability (Nikolay Dzyubenko, VIR), linkages between formal and informal seed system to strengthen ecosystem services (Coosje Hoogendoorn, Royal Tropical Institute) and the need of empirical studies (Gerry Jayawardena, SCARP). The last plenary session was about “Access and Benefit Sharing (ABS) in the Context of Regulatory Systems”. While RS Rana (NBA and Ex-NBPGR) described the international treaties that regulate access to genetic resources and benefit sharing along with some Indian examples, Ronnie Coffman (Cornell University) shared the experience of the Borlaug Global Rust Initiative in germplasm exchange. Panelists (RS Hamilton, IRRI; Sudhir Kochhar, Ex-ICAR; Neeti Wilson, Anand & Anand) expressed the need to increase awareness and simplify the procedures, and called for greater clarity of ownership issues, transparency and legal certainty.

### **Food, Nutrition and Environmental Security**

Speakers of technical session on “Food, Nutrition and Environmental Security” brought to fore significance of effective partnerships (Martin Kropff, CIMMYT), mainstreaming agrobiodiversity (T Mohapatra, ICAR), bio-fortification (Howdy Bouis, HarvestPlus), diversified agro-ecological systems (Emile Frison, IPES-Food), synecological farming (M Funabashi, Sony Computer Science), animal genetic resources for food security (Olivier Hanotte, ILRI), insect biodiversity in ecosystem services (NK Krishna Kumar, Bioversity International),

fish genetic resources for food security (JK Jena, ICAR), wealth of microbial diversity of extreme regions (Anil Kumar Saxena, NBAIM) and innovative integrated systems (Sijun Zheng, Yunnan Academy of Agricultural Sciences, China). Deliberations in the technical session on “Adaptation and Mitigation to Climate Change” focused upon use of orphan legumes (Ed Southern, Kirk House Trust), rethinking the role of science (Jacob van Etten, Bioversity International), mitigation strategies (JC Rana, NBPGR), post-disaster revival of local seed system (Devendra Gauchan, Bioversity International), diversifying rural livelihoods for climate resilience (Putri Hendrawan, ICRAF, Indonesia), policy framework (BK Joshi, Bioversity International, Nepal), and challenges to aquaculture (MP Paulton, CMFRI). Country experiences on germplasm enhancement for abiotic stresses tolerance from Nigeria (BN Motagi), Kenya (Ganga Rao), Niger (Hamidou Falalou), and Kenya (Manyasa Eo) were also presented.

### **Conservation Strategies and Science-led Innovations**

In the technical session on “Conservation Strategies and Methodologies” speakers on “Seed Genebanks” discussed the aspects of global system for the *ex situ* conservation (Marie Haga, Crop Trust), enhancing the genetic gains (HD Upadhyaya, ICRISAT), *in situ*/on-farm conservation of dryland agrobiodiversity (Mariana Yazbek, ICARDA), genetic erosion in *ex situ* collections (N Murthy Anishetty, Ex-FAO) and India’s prominent role in conservation and use of PGR (RK Tyagi, NBPGR). Speakers on “*In Situ* and On-farm Conservation” focused on crop landraces (Calvin Qualset, University of California), informal seed systems (Coosje Hoogendoorn, Royal Tropical Institute), strategic action plan for crop wild relatives (Nigel Maxted, University of Birmingham), tropical fruit tree diversity (V Ramanatha Rao, GRSV) and on-farm management of root and tuber crops (Stefan De Haan, CIAT). Speakers on “*In Vitro*, Cryo, and DNA Banking” highlighted scientific priorities (Hugh Pritchard, RBG), bridging the gap between gene function and phenotype (Hiroshi Abe, RIKEN), cryopreservation for perpetual conservation (Bart Panis, Bioversity International), applications of cryobanking (Rekha Chaudhary, NBPGR), and *in vitro* propagation of tropical RTBs (Badara Gueye, IITA). Concurrent sessions on genetic resources other than plants deliberated on complementary strategies and global innovation challenges (SJ Hiemstra, CGN), Indian dairy animal

biodiversity (SB Gokhale, BAIF), responsible fisheries and technologies (CN Ravishankar, CIFT), conservation of animal genetic resources in India (Arjava Sharma, NBAGR), birds and insectivory (A Verghese GPSIAM), Conservation of Fleshy Fungi (RC Upadhyay, DMR), conservation of pollinator biodiversity (VV Belvadi, UASB) and microbial conservation strategies (Sushil K Sharma, NBAIM).

Technical session on “Science-led Innovation: Trait Discovery and Enhanced Use of PGR” deliberated on global wheat breeding program (Ravi Singh, CIMMYT), value capture from PGR (Andreas Graner, IPK), trait value of Indian wild rice (NK Singh, NRCPB), introgression of biotic stress resistance genes in rice (Kuldeep Singh, NBPGR), and neglected and utilized crops (Zhang Zongwen, Bioversity International, China). Concurrent session on “PGR and Genomics” recorded the progress made in application of genomics to enhanced utilization (Robert Henry, QAAFI), deciphering the potential of wheat (Bikram Gill, Kansas State University), identification of novel genes and alleles for biotic stress resistance (TR Sharma, NRCPB) and genome sequencing of African indigenous tree species (Alice Muchugi, ICRAF). In the concurrent Session on “PGR Informatics”, speakers covered wide range of topics including third global assessment on the state of PGRFA conservation and use (Stefano Diulgheroff, FAO), digital technologies for effective use of PGR (Eric Huttner, ACIAR), accessing information for discovery and deployment of PGR (Michael Mackay, University of Queensland) and India as a crucible to develop integrated information systems (Sunil Archak, NBPGR). Concurrent sessions on other genetic resources recorded presentations on genetic improvement of adaptive traits in livestock (JM Reecy, Iowa State University), aquaculture genomic resource (Vindhya Mohindra, NBFGR), advanced reproductive biotechnologies for animal conservation (AK Srivastava, NDRI), molecular traceability of spatial genetic diversity of fish genetic resources (Kuldeep K Lal, NBFGR), innovation for utilization of insect genetic resources (Chandish Ballal, NBAIR), devising strategies for salinity and drought tolerance by using microbial diversity of the Rann of Kutch (KK Pal, DGR), insect derived volatiles (Bakthavatsalam N, NBAIR), and genome based informatics of agriculturally important microorganisms (Alok Srivastava, NBAIM).

### **Policies on Biosecurity, ABS and Partnership**

Technical session on “Quarantine, Biosafety and Biosecurity Issues” discussed effect of provisions of CBD and WTO (Ravi Khetrpal, CABI), invasive species and international trade (Kenza Le Mentec, STDF, WTO) on the use and exchange of germplasm (P Lava Kumar, IITA, Nigera). There was a panel discussion within the session (Panelists: GJ Randhawa, NBPGR; Vibha Ahuja, BCIL; and Neeraj Sood, NBFGR) that brought out specific recommendations on enhanced use of agrobiodiversity complying with the provisions of biosecurity and biosafety. In the technical session on “IPRs, ABS and Farmers’ Rights” speakers presented the status on Indian initiatives on farmers’ rights (RR Hanchinal, PPV&FRA), strategies for enhanced role of ITPGRFA in use of agrobiodiversity (Lim Engsiang, ITPGRFA), and ABS of animal genetic resources (Ilse Köhler-Rollefson, LPP). On the other hand, technical session on “Partnership, Networks and Capacity Building” witnessed talks on lessons learned and success stories from PGR networks (Stephan Weise, Bioversity International), capacity building in application of biotechnology (Darshan Brar, PAU), implementation of SUWON declaration (Raghunath Ghodake, APAARI), transforming Indian agriculture for national and global environmental benefits (GG Koppa, FAO), and plant diversity to improve food security and support the livelihoods of local communities (Tiziana Ulian, Royal Botanic Gardens).

### **Public Forum, Farmers’ Forum, Round-table Dialogue and Satellite Sessions**

Participants were regaled by inimitable duo of MS Swaminathan (MSSRF, India) and Peter Raven (MBG, USA) in their evening lectures full of narratives where they both underlined “agrobiodiversity for hunger-free world”. A public forum on “Role of Stakeholders in Agrobiodiversity Management” was coordinated by MS Swaminathan and RS Paroda. Panelists represented international organization (Adel El-Beltagy, IDDC, Egypt); grass-root innovators (Anil Gupta, NIF); farmers (Ajay Jakhar, BKS) and legal fraternity (Sunita Sreedharan, SKS Law). Public forum called for urgent attention to check biodiversity loss and incentivizing stakeholders’ participation. A farmers’ forum was also arranged on the topic “Farmers’ Role in Conservation

of Genetic Resources” and was moderated by RR Hanchinal (PPV&FRA), AK Singh (ICAR) and Vipin Kumar (NIF). Practicing on-farm conservators presented their case (in vernacular dialects helped by translation) on passion to conserve; economics of conservation activities; and need for sustained support. IAC2016 had a unique session as “Round Table Dialogue on Genebank Management: Challenges and Opportunities” where genebank managers from 41 countries participated in the discussion. Recommendations included completion, rationalization and documentation of collections, and capacity building.

IAC2016 also hosted satellite sessions on “Harnessing Biodiversity for Food Security and Sustainable Development” (Organized by CIMMYT); “Agrobiodiversity for Nutrition and Health” (Organized by Bioversity International and National Institute of Nutrition); “Climate Change as an Opportunity for Agrobiodiversity Management” (Organized by GIZ) and “Crop Wild Relatives: Back to the Wild to Save the Future” (Organized by Bioversity International and University of Birmingham). Besides all the scientific deliberations, major attraction of the IAC2016 was an

agrobiodiversity exhibition. Diverse live exhibits of genetic resources representing India’s agrobiodiversity hot-spots were on display by farmers and research institutes.

Based on the four-day deliberations, the delegates unanimously adopted the **Delhi Declaration on Agrobiodiversity Management**. The Declaration calls upon nations to accord top priority to the shared vision of agrobiodiversity conservation and their sustainable use towards achieving targets of SDGs relating to poverty alleviation, food and nutritional security, good health, gender equity and partnership. Participants urged for periodic organization of International Agrobiodiversity Congress starting with IAC2020 that was agreed to be facilitated by Bioversity International. A Special Issue of the Indian Journal of Plant Genetic Resources, containing extended summaries of 71 invited talks as well as a Souvenir containing messages and agrobiodiversity-related functional profile of organizing partners were also released during the Congress. Detailed information about the Congress including publications and photographs are available at [www.iac2016.in](http://www.iac2016.in).