



# Proceedings and Recommendations

of the

# National Webinar on Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS)

**August 27, 2020**

## Organized by

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SCIENCE FOR FARMERS' PROSPERITY

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# Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS)

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**Organized by**

UN Environment Implemented GEF Project, Alliance of Bioversity International and International Center for Tropical Agriculture (CIAT), New Delhi, India

***and***

Indian Society for Plant Genetic Resources (ISPGR), New Delhi, India

**with support from**

ICAR-National Bureau of Plant Genetic Resources (NBPGR), New Delhi, India
National Biodiversity Authority (NBA), Chennai, India
Protection of Plant Variety and Farmers' Rights Authority (PPV&FRA), New Delhi, India
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**https://www.youtube.com/watch?v=oTzCINr4wYk**

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The Alliance of Bioversity International and CIAT, India Office, ICAR-National Bureau of Plant Genetic Resources (NBPGR), Indian Society of Plant Genetic Resources (ISPGR), National Biodiversity Authority (NBA), Protection of Plant Variety and Farmers' Rights Authority (PPV&FRA) & Trust for Advancement of Agricultural Sciences (TAAS) cordially invites you to

National Webinar on

# Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS)

## Session Chairs

**Dr R.S. Paroda**
Chairman, TAAS
& President, ISPGR

**Dr P.L. Gautam**
Former Chairman,
NBA and PPV&FRA

**Dr T.R. Sharma**
DDG (Crop Science),
ICAR

Chief Guest
**Dr Trilochan Mohapatra**
Secretary DARE & DG, ICAR

Guest of Honour
**Dr Juan Lucas Resperato**
DG, Alliance of Bioversity International and CIAT

Special Invitee
**Dr V.B. Mathur**
Chairperson, NBA

## Session Co-Chairs

**Dr R.C. Agrawal**
DDG (Edu), & ND,
NAHEP, ICAR

**Dr Kuldeep Singh**
Director,
ICAR-NBPGR

**Live on YouTube**
**August 27, 2020 (Thursday), 2.00 p.m. Indian Standard Time (GMT + 5.5 h)**
**https://www.youtube.com/channel/UC49ZATBxhxxkxv8iikKNEsw**
**Moderator/Host : Dr Sunil Archak**


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# PREFACE

A National Webinar on "*Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS)"* was held on August 27, 2020. The meeting was co-organized by UN Environment Implemented GEF Project, Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), Delhi Office, India and the Indian Society of Plant Genetic Resources (ISPGR) with technical support from ICAR-National Bureau of Plant Genetic Resources (NBPGR), New Delhi, India; National Biodiversity Authority (NBA), Chennai, India; Protection of Plant Variety and Farmers' Rights Authority (PPV&FRA), New Delhi, India, Trust for Advancement of Agricultural Sciences (TAAS), New Delhi, India and Federation of Seed Industry of India (FSII), New Delhi, India. The webinar was attended by 200 stakeholders from academia, policy, management, farmers and private sector.

This document provides briefly the deliberations held during the meeting and the major recommendations which emerged. The organizers are very grateful to Dr R.S. Paroda, President, ISPGR and Chairman, TAAS, for conceiving as well as Chairing the webinar, and providing the necessary guidance. Dr T. Mohapatra, Secretary, Department of Agricultural Research and Education (DARE) & Director General, Indian Council of Agricultural Research (ICAR) is sincerely thanked for sharing his views as Chief Guest of the inaugural session. Dr Juan Lucas Restrepo, Director General, Alliance of Bioversity International and CIAT is gratefully thanked, for his remarks as special invite and support from the Alliance in organizing the webinar. Special thanks are accorded to Dr V.B. Mathur, Chairperson, NBA and Dr K.V. Prabhu, Chairperson, PPV&FRA, for their support in various ways. The success of the meeting was also due to enormous support provided by distinguished Chairs, Co-Chairs, Speakers and Panellists from India and abroad, each of whom is gratefully acknowledged.

We thank all the members of the organizing committee for their help in smooth conduct of the event. Support provided by staff of ICAR-NBPGR, ISPGR and TAAS in technical and logistic matters is sincerely appreciated. We gratefully acknowledge financial support provided by UN Environment Implemented GEF Project (being executed jointly by The Alliance of Bioversity International & CIAT and ICAR), and the Federation of Seed Industry of India (FSII), New Delhi. Finally, we thank all dignitaries and delegates who participated in the webinar.

**Editors**

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ABS | Access and Benefit Sharing |
| ABS-CH | ABS-Clearing House |
| APAARI | Asia-Pacific Association of Agricultural Research Institutes |
| APCoAB | Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources |
| BDA | Biological Diversity Act, 2002 |
| BMC | Biodiversity Management Committee |
| BMGF | Bill and Melinda Gates Foundation |
| BS | Benefit sharing |
| BSF | Benefit Sharing Fund |
| CBD | Convention on Biological Diversity |
| CGIAR | Consultative Group for International Agricultural Research |
| CIAT | International Center for Tropical Agriculture (Centro Internacional de Agricultura Tropical) |
| CIMMYT | International Maize and Wheat Improvement Centre (Centro Internacional de Mejoramiento de Maíz y Trigo) |
| CIP | International Potato Center (Centro Internacional de la Papa) |
| CP | Contracting Parties |
| CoP | Conference of Parties |
| DAC&FW | Department of Agriculture, Cooperation and Farmers' Welfare |
| DARE | Department of Agricultural Research and Education |
| DDG | Deputy Director General |
| DSI | Digital Sequence Information |
| DST | Department of Science and Technology |
| FAO | Food and Agriculture Organization of the United Nations |
| FPO | Farmer Producer Organization |
| FSII | Federation of Seed Industry of India |

| | |
|---|---|
| GB | Governing Body |
| GEF | Global Environment Facility |
| GoI | Government of India |
| GR | Genetic Resources |
| GST | Goods and Services Tax |
| IAC | 1st International Agrobiodiversity Congress |
| ICAR | Indian Council of Agricultural Research |
| ICARDA | International Center for Agricultural Research in the Dry Areas |
| ICRAF | International Center for Research in Agroforestry (World Agroforestry Center) |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IITA | International Institute of Tropical Agriculture |
| IJPGR | Indian Journal of Plant Genetic Resources |
| ILRI | International Livestock Research Institute |
| IP | Intellectual Property |
| IPO | Indian Patent Office |
| IPR | Intellectual Property Right |
| IRCC | International Recognized Certificate of Compliance |
| IRRI | International Rice Research Institute |
| ISPGR | Indian Society of Plant Genetic Resources |
| ITPGRFA | International Treaty on Plant Genetic Resources for Food and Agriculture |
| KVK | Krishi Vigyan Kendra |
| LMO | Living Modified Organism |
| MAT | Mutually Agreed Terms |
| MLS | Multilateral System of Exchange (under the ITPGRFA) |
| MNC | Multinational Corporation |
| MoA | Memorandum of Agreement |
| MoA&FW | Ministry of Agriculture and Farmers Welfare |
| MoC&I | Ministry of Commerce and Industry |
| MoEF&CC | Ministry of Environment, Forest and Climate Change |
| MoRD | Ministry of Rural Development |
| MTA | Material Transfer Agreement |

| | |
|---|---|
| NAHEP | National Agricultural Higher Education Project |
| NARS | National Agricultural Research System |
| NBA | National Biodiversity Authority |
| NBPGR | National Bureau of Plant Genetic Resources |
| NCBI | National Center for Biotechnology Information |
| NEF | Navara Eco Farm |
| NGO | Non-Governmental Organization |
| NP | Nagoya Protocol |
| NTAC | Normally Traded as Commodities |
| PBR | People's Biodiversity Register |
| PGR | Plant Genetic Resources |
| PGRFA | Plant Genetic Resources for Food and Agriculture |
| PIC | Prior Informed Consent |
| PPV&FR | Protection of Plant Varieties and Farmers' Rights Act, 2001 |
| PPV&FRA | Protection of Plant Varieties and Farmers' Rights Authority |
| PVP | Plant Variety Protection |
| R&D | Research and Development |
| SBB | State Biodiversity Board |
| SEZ | Special Ecological Zones |
| SMTA | Standard Material Transfer Agreement |
| SOP | Standard Operating Procedure |
| TAAS | Trust for Advancement of Agricultural Sciences |
| TBGRI | Tropical Botanical Garden and Research Institute |
| TKDL | Traditional Knowledge Digital Library |
| UN | United Nations |
| WTO | World Trade Organization |

# BACKGROUND

India is a signatory to the international treaties, Convention on Biological Diversity (CBD) as well as International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and is a forerunner in the adoption of benefit sharing principle. Consequently, the country enacted Biological Diversity Act (BDA) in 2002 and established the National Biodiversity Authority (NBA) in 2003 at Chennai. The NBA is a statutory body that performs facilitative, regulatory and advisory function for Government of India (GoI) on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of their use. The Nagoya Protocol (NP) on Access and Benefit Sharing (ABS), a supplementary agreement to CBD, was also ratified by India in 2012 and 'Guidelines on Access and Benefit Sharing' were issued in November 2014 under sections 64, 18 (1) and 21 (4) of the BDA, 2002. Within the provisions of the BDA, access to 64 food and forage crops (Annex 1) and resultant benefit sharing, regulated under ITPGRFA, is being implemented in India by the Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW). Likewise, Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001 was enacted by the Parliament and to implement

it, the Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) was established at New Delhi in 2005. It recognizes and protects the rights of the farmers in respect of their contribution made in conserving, improving and making available plant genetic resources (PGR) for the development of new plant varieties.

India provided a benefit sharing (BS) model on commercial use of PGR 20 years before NP on ABS came into existence. Indigenous traditional knowledge of *Kani* tribals on a stamina builder herb *Arogyapacha* was used in developing a commercial herbal product *Jeevani* by Arya Vaidya Pharmacy and Tropical Botanical Garden and Research Institute (TBGRI), Palode, Kerala, and its commercial benefits were shared with the *Kani* tribe. Farmers, tribal and indigenous communities in India have been playing a critical role as conservers of bioresources and related traditional knowledge and they should be rewarded with monetary and/or non-monetary benefits. The purpose of ABS framework is to ensure that biological resources are accessed and used with Prior Informed Consent (PIC) from the providers and on Mutually Agreed Terms (MAT) between the providers and users. When commercial benefits are accrued, consequent to access and use of bioresources, the user needs to share them fairly and equitably with the provider.

## Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014

The Access and Benefit Sharing (ABS) guidelines under BDA, 2002 have come into force with effect from 21 November 2014 and consist of: (i) procedures for access to biological resources and/ or associated traditional knowledge for research or biosurvey and bioutilization for research and commercial utilization for foreign entities; (ii) mode of BS for commercial utilization (1 to 3% for the trader and 3 to 5% for the manufacturer); (iii) option of BS on sale price of the biological resources (from 0.1% to 0.5% based on annual gross ex-factory sale of product); (iv) procedure and mode of BS for transfer of results of research; procedure and mode of BS in intellectual property rights (IPR) cases (directly by applicant 0.2 to 1.0% through licensing 3 to 5%); (v) procedure and mode of BS for third party transfers (2 to 5%); (vi) determination of BS and sharing of benefits; (vii) processing of applications received by NBA and details of exemptions to access for prior approval of NBA or SBB. Scope of implementation of these guidelines is very vast in India. However, their implementation is limited to a few cases only, both in public and private sectors, and has sometimes led to legal conflicts with the private sector.

## Implementation Challenges

Some challenges faced for operationalizing ABS in India include: (i) appropriate valuation of bioresources; (ii) correct interpretation of provisions and exemptions; (iii) harmonization across multiple implementing institutions and jurisdictions; and (iv) simplification of legal jargons and enhancing procedural transparency.

Commercial value of biodiversity is largely not estimated or under-estimated. Ecosystem services are invariably not accounted. The global seed market is expected to reach US $70 billion, of which Indian share is nearly 4%. Industries with about 25% bioresource-based products have massive global market value e.g. herbal supplements ($22 billion), personal care ($12 billion), food products ($31 billion), and pharma industry ($640 billion). Public and private research and development (R&D) institutes use bioresources for developing technologies. Some of the users need repeated access to resources for their industry, while others need resource only once as it can be multiplied using science and technology.

Most critical challenge in implementing ABS under the NP mainly dealing with bilateral exchanges, is to assess the actual as well as potential economic value of resources before arriving at appropriate terms of BS. This is accentuated in cases where the assessment is done *a priori*. Absence of clarity on market value, its appreciation and temporal/spatial variations as well as industry demand and market reach can put the fairness and equity elements of ABS at risk. Often such situations lead to reluctance on part of users and disillusionment in providers.

There is a general perception that ABS obligations are meant for foreign seed companies using Indian resources and not applicable to Indian seed industry. Although, Indian users need not get prior permission for accessing the resources for research, biosurvey and bioutilization purposes, but they need to get prior approval from the respective authorities if the resources are utilized for commercial purpose. On the other hand, foreign users of Indian bioresources (foreign individuals/entities including non-resident Indians or Indian companies having foreign shareholders) need to get prior approval from the NBA even before accessing the bioresources. Stakeholders still complain about the lack of clarity on (i) a cut-off date for access to pre-BDA material and their commercialization; (ii) access to genetic resources (e.g. insect, pest or weed) for services e.g. 'to be used to test against' for research; (iii) definitions of 'Indian Company', 'biological resource', 'genetic material', 'value-added product', 'conventional breeding', 'occurring in India' in today's context; (iv) overlapping jurisdictions e.g. NBA, PPV&FRA and DAC&FW (ITPGRFA implementing authority in India).

India exempts specific uses/activities [value-added products, conventional breeding, certain government approved international collaborative research work and over

400 normally traded as commodities (NTAC) under certain conditions], certain users (local communities, traditional healers and farmers) and obligations (exchange of designated genetic resources of food crops and forages under the ITPGRFA for research, breeding and training for food and agriculture).

In India, ABS is affected by multiple statutes, governed by multiple ministries issuing multiple guidelines, and executed by multiple agencies. Modalities for access to genetic resources need to be harmonized before BS provisions are implemented. Coordination and cooperation among agencies has been a challenge for effective implementation of ABS. A functional interface [e.g. PPV&FRA and NBA; NBA and Indian Patent Office (IPO); NBA and DAC&FW; NBA and Indian Council of Agricultural Research (ICAR)] can establish non-encroaching, complementary and compliant procedures. Addressing issues such as (i) disparities in the applicability of biodiversity rules across states; and (ii) mismatch between bilateral Material Transfer Agreement (MTA) and multilateral Standard Material Transfer Agreement (SMTA) remains a challenge. The enabling process under multilateral access to genetic resources as per ITPGRFA needs further refinement.

## Access to Plant Genetic Resources

The NBA, State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) are the three statuary bodies that currently oversee governance of ABS in India. The implementation of the same, however is not unambiguously documented even five years after the notification of the Guidelines for ABS in India. Local communities are invariably the owners of traditional biological resources as common heritage. In the three-tier system of BDA, the BMC at grassroots level is the most powerful decision making body that grants permission for access to bioresource by any user. The BMCs are expected to be formed taking village or *Gram Panchayat* as a unit as per the provisions of BDA (guidelines of NBA). As of January 2020, there are 29 SBBs and 2,43,499 BMCs in India which have prepared 95,252 People's Biodiversity Registers (PBRs). Besides, there are several Government and Non-Governmental Organizations (NGOs) that contribute to conservation of biological resources. Also, there are a few outstanding individuals both in forest and agricultural ecosystems who conserve and use biological resources. Several community seed banks, supported by NGOs and others, also serve as source of seed for users. There are more than 1,750 genebanks in the world at the international, national and local level. Currently, genebanks under the Consultative Group for International Agricultural Research (CGIAR) Centers hold more than 7,50,000 accessions of PGR that are accessible through the multilateral system (MLS) of exchange of the ITGRFA using well accepted SMTA. The ICAR-National Bureau of Plant Genetic Resources (NBPGR), New Delhi has over 4,50,000 PGR collections held in seed, *in vitro*, cryo and field genebanks. Several research

institutes within and outside National Agricultural Research System (NARS) also conserve genomic resources in addition to seeds.

Accessing any biological resource or associated knowledge for research, commercial use, biosurvey and bioutilization, transfer of biological resources, transfer of research results or for obtaining IPR requires approval from the respective regulatory bodies. Regulatory requirements vary based on the nature of the applicant and the specific activities involved. The users, upon obtaining access, are expected to enter into a BS agreement with relevant institution or organization. BS arrangements (monetary or otherwise) are decided on a case-by-case basis after due consultation with the local bodies and the benefit claimers. As per NBA, of the benefits received by SBBs or NBA, only 5% can be retained whereas the rest be shared with the BMCs or for biodiversity conservation by the communities under the India's National Biodiversity Action Plan (2019).

## Mainstreaming Benefit Sharing

All the ABS instruments that are in place in India to regulate access to genetic resources and BS amount to a complex web of legal texts and beyond the interpretation and reach of most of the farmers. In fact, farmers are disproportionately unaware of the institutional rules and structures governing ABS. It is generally opined that ABS implementation and subsequent portfolio management have not yet struck the balance between conservers and users. The long-term sustainability of locally created legal bodies such as BMCs is at stake without any inbuilt financial mechanism and technical backstopping. Similarly, many authorities and institutions have provisions to incentivize the farmers and farming communities for promoting agrobiodiversity conservation but again it is only one-time award given to the genetic resource conservers. Currently, there is no policy or mechanism to incentivize the farmers and communities involved in the conservation of agrobiodiversity. There is also a need to quantify ecosystem services being provided by these communities in terms of monetary value. In fact, ideally the monetary benefits should reach these communities as compensation for the losses borne by the communities for not opting to grow high yielding crops and varieties. Also, there is a perception that regulatory restrictions on access for research would have negative impact on expected genetic gains and hence need to be more user friendly in the larger national interest. There has to be a clear distinction between the research aiming for proprietary rights and the research for conservation through use in the interest of national public goods.

## The Road Ahead

In a biodiversity-rich country like India, comprehensive inventorization of bioresources is a herculean task. Nonetheless, digitalized documentation must begin in a systematic

manner involving all stakeholders. The country has options to declare a few regions as Special Ecological Zones (SEZ) for evolving clarity of extent, nature and taxonomic limitations of access. Customized strategies for different bioresources use and user combinations need to be drafted and pilot projects and case studies need to be commissioned. All the steps across states must be harmonized within the framework of ABS provisions. Greater involvement of providers in awareness and capacity building will augur well for the successful implementation of ABS. The PPV&FRA, as an exemplary step, confers communities and individuals with genome saviour awards. However, how does the state handhold the conservers to ensure sustenance of their conservation efforts as well as expected economic growth? Can mentorship programs be established where rewardees work in close collaboration with either government R&D institutions or industry? How do the Indian regulatory agencies maximize the utility of benefit funds or genefunds? These concerns need to be addressed jointly by the experts and concerned stakeholders to brainstorm and find practical solutions.

In view of above, a 'National Webinar on Implementation of Access to Plant Genetic Resources and Benefit Sharing' was held on August 27, 2020 to have in-depth deliberations involving all stakeholders from different sectors conserving and using biological resources. The webinar was organized jointly by the Alliance of Bioversity International and CIAT under UN Environment implemented GEF project, India Office and Indian Society of Plant Genetic Resources (ISPGR) with support from ICAR-National Bureau of Plant Genetic Resources (NBPGR), National Biodiversity Authority (NBA), Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) and Trust for Advancement of Agricultural Sciences (TAAS) and Federation of Seed Industries of India (FSII). Participants included users and providers of genetic resources such as communities, national and international genebanks, crop-based institutes, universities, and private sector companies with experience in both commercialization and regulatory systems involved for use of biological resources.

## Objectives

- To understand the existing inconsistencies in the ABS system and suggest measures for improvements including policy reorientation
- To suggest options for regulating ABS beyond rewards and recognitions and to devise means for BS by the communities for sustainable management of bioresources
- To suggest effective models of ABS to benefit both public and private organizations
- To suggest mechanisms for optimal utilization of National Gene Fund meant for effective BS and capacity development

# INAUGURAL SESSION

The Webinar was conducted through zoom platform of ICAR-NBPGR and hosted by Dr Sunil Archak, National Fellow, ICAR-NBPGR and Editor-in-Chief, Indian Journal of Plant Genetic Resources (IJPGR). While 100 participants logged onto the Zoom platform, nearly 100 others watched its live stream on YouTube, the recording of which can be viewed on the weblink https://www.youtube.com/watch?v=oTzCINr4wYk.

**Dr J.C. Rana**, Country Representative, Alliance of Bioversity International and CIAT, India Office, & National Coordinator, UN Environment-GEF Project, India welcomed the participants and briefed about the purpose of holding the webinar. He also emphasized on the need to deliberate on finding possible ways and means to incentivize smallholder farmers

*Dr J.C. Rana*

and communities involved in the conservation of agrobiodiversity in particular. **Dr Kuldeep Singh**, Director, ICAR-NBPGR and Vice-President, ISPGR, also welcomed the delegates besides setting the context of the webinar. He mentioned that globally access to genetic resources was streamlined to a large extent after the MLS of ITPGRFA, using the SMTA, came into existence. In India, he appreciated the role of ICAR, for streamlining the procedure for accessing the germplasm for use by both public and private sector institutions in India and abroad, using the revised MTAs. However, some gaps remained, especially for crops outside the Annex 1 list of ITPGRFA, and in case of bilateral exchange on reciprocal basis. Most of the treaties and legislations have been built on addressing issues of BS, but progress made so far has been far from that was envisioned, as impact has not been visible, except in a few cases. He also stated that BS should be viewed at three tiers/levels - individual, community and national level, as all the three are involved in conserving genetic wealth. He recalled the previous meeting[1] held on ABS issues in 2016 and hoped that all the experts of the current meeting would deliberate further to suggest ways to have more BS models at the various levels.

*Dr Kuldeep Singh*

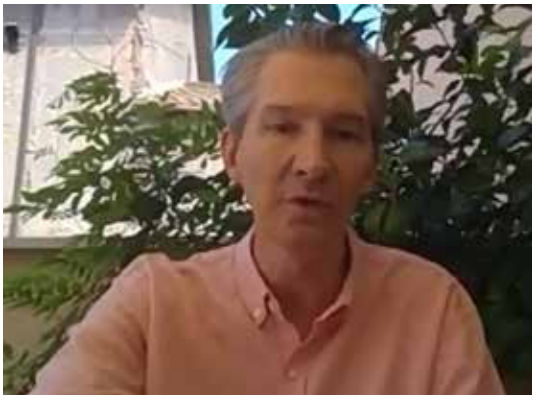
[1]Paroda R.S., S. Archak, N. Wilson, R.K. Tyagi, P. Brahmi, R.C. Agrawal and A. Agrawal (eds) (2017) Proceedings of the 'Awareness cum Brainstorming Meeting on Access and Benefit Sharing (ABS): Striking the Right Balance', New Delhi, India, Oct. 22, 2016., Indian Society of Plant Genetic Resources (ISPGR), New Delhi, India, 32 p.

**Dr V.B. Mathur**, Chairperson, NBA, while giving his remarks as Special Invitee, flagged three important implementation issues on ABS under the BDA – (i) correct valuation of bioresources, (ii) interpretation of the statutes (iii) missing or inadequate definitions. He informed that through an elaborate consultative process, revisions are being undertaken by the government for increased convergence between various implementing agencies, with the final objective of facilitating 'ease of doing business'. He highlighted the scope and goals of the impending

*Dr V.B. Mathur*

amendments with respect to ABS guidelines that would better address concerns of all relevant stakeholders.

**Dr Juan Lucas Restrepo**, Director General, Alliance of Bioversity International and CIAT, as Special Invitee, remarked that the disruptions caused to the food supply chains during the current COVID-19 pandemic makes a compelling case to ensure that an enabling environment be created for societal changes for long-term food and nutritional security. He further emphasized on mainstreaming of agrobiodiversity and diversification of agro-ecological landscapes. While appreciating India's efforts on implementation of ABS, he highlighted that there is need for greater harmonization in the NP and ITPGRFA for ABS issues. Further, he highlighted the need for wider availability and accessibility of genetic resources across geographies.



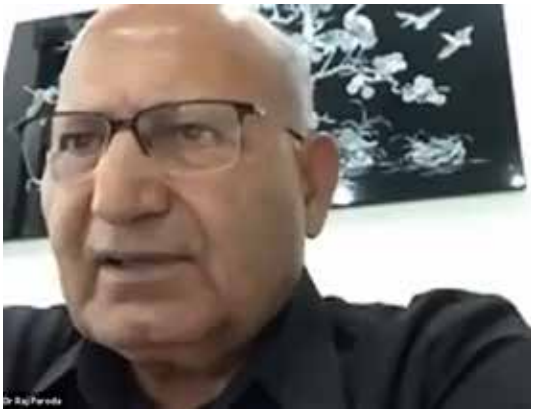
*Dr Juan Lucas Restrepo*

**Dr T. Mohapatra**, Secretary, Department of Agricultural Research and Education (DARE) & Director General, ICAR, and the Chief Guest in the Inaugural Session hailed the webinar as a much-needed one for developing evidence-based recommendations for the Indian government to implement ABS. India has been sharing a lot of its germplasm with the global community. For example, 15% of rice germplasm in IRRI belongs to India; recently the country has shared several stress tolerant legume crops to Africa under a collaborative project. He further stated that PGR conservation has been carried out in India satisfactorily, but utilization is comparatively poor which needs to be enhanced and only then the issue of equitable BS would arise. Further, implementation of rules on ABS had been uneven and complex, given the rich biodiversity of the country and lack of adequate capacity and awareness amongst the varied stakeholders. For this, interpretation of legal provisions under various statutes needs to be harmonized. He expressed hope of greater convergence and coordination amongst the authorities in Government dealing with these issues, especially in the light of revision of the BDA Rules and Guidelines, currently under deliberation at country level. Capacity building of conservers for

*Dr T. Mohapatra*

promotion of biological resources is required and the farmers who have not been given due credit for conservation need to be suitably rewarded. He urged that more technology and science-based evidences be applied to resolve issues of origin and ownership of genetic resource as well as trait discovery, to channelize BS mechanisms.

**Dr R.S. Paroda**, President, ISPGR and Chairman, TAAS & Chair of the Inaugural Session highlighted the genesis and objectives of the webinar. He said that a similar meeting on ABS had been organized by ISPGR in 2016 on the topic 'ABS-Striking the Right Balance'. He said that during the early 20th century, PGR was considered as heritage of humankind and freely available for exchange. By the late 1990s and early 2000, treaties like CBD brought in the issue of sovereignty leading to some restrictions. India brought in a *sui generis* system of protection for genetic resources, which included farmers' rights. He affirmed that currently regulations for access to genetic resources are more for the purpose of creating a system of facilitation, rather than a hindrance. If there had not been free exchange of genetic resources, our food basket would have been entirely different. Several programs on plant breeding by FAO and other organizations like Bill and Melinda Gates Foundation (BMGF) have laid emphasis on the use of conserved genetic resources. This was also the focus during the 1st International Agrobiodiversity Congress (IAC) held in Delhi in November 2016, which was inaugurated by the Hon'ble Prime Minister of India, and culminated in the Delhi Declaration on Agrobiodiversity Management. A balancing act is required for ABS, for which valuation of genetic resources is very important and this requires public-private partnership (PPP). The objective of the present webinar is to come out with a road map for a framework for effective implementation of ABS, possibly through a single window system (akin to GST Council of the GoI), with greater coordination and convergence. It is also required to see what kind of BS can be offered -monetary, knowledge sharing, capacity building, and better social development. He mentioned that more coordination and convergence was required to serve the society with the aim of not to 'govern' but 'serve'. He further stated that gene conservers need to be empowered through value addition and linking with the markets for better livelihood. He said that the Ninth Governing Body Meeting (GB9) of the ITPGRFA slated to be hosted by India in December 2021 would be a great opportunity to showcase India's strength and diversity, including ABS implementation mechanisms and impact.



*Dr R.S. Paroda*

# TECHNICAL SESSION

The technical session was Chaired by **Dr P.L. Gautam**, Former Chairman, NBA and PPV&FRA and Co-Chaired by Dr R.C. Agrawal, Deputy Director General (Education) & National Director, National Agricultural Higher Education Project (NAHEP), ICAR.

*Dr P.L. Gautam*

**Dr Vania C. Rennó Azevedo**, Head of Genebank, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) spoke on "ABS in PGRFA – Global Experience". She defined the term 'access' in the context of crops as access to genetic materials through the collections in the world's gene banks, which may include local seeds kept in small refrigeration units of research labs, national seed collections housed in government ministries or research center collections that

*Dr Vania C Rennó Azevedo*

contain all known varieties of a crop from around the world. Under the ITPGRFA and its MLS, collections of PGRFA that are in the public domain and under the management and control of 147 Contracting Parties (CP), are available under efficient rules of facilitated access, as also the international PGRFA collections hosted by CGIAR (including non-Annex 1 crops). The 'BS' under ITPGRFA happens when parties who access genetic materials through the MLS agree to either freely share any new developments ('PGRFA products') with others for further research and breeding or, if they want to keep the developments to themselves, agree to pay a percentage of any commercial benefits they derive from their research into a common fund to support conservation and further development of agriculture in the developing world. The Benefit Sharing Fund (BSF) created by the ITPGRFA was operationalized in 2008. She informed that the 11 CGAIR genebanks (Africa Rice, Bioversity International, CIAT, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IITA, ILRI and IRRI) currently hold some 753,170 germplasm accessions 'in trust' for global users, which are subject to policy guidance of international community. The accessions are provided facilitated access for free, or minimal administrative costs, for agricultural research under contract/MTA with set conditions for acceptable uses, dispute resolution, passing on to subsequent users, etc. Under the guidance of the Governing Body, benefits are shared in the forms of (i) exchange of information; (ii) access to and transfer of technology, (iii) capacity-building, and (iv) sharing of monetary benefits arising from commercialization.

By ratifying the ITPGRFA, the CPs agree that PGRFA of crops listed in Annex. 1, which are under the CPs management and control and in public domain, are automatically included in the MLS, available for distribution under the terms of Treaty as per SMTA. All countries further agree to create policy measures to encourage natural and legal persons to voluntarily include Annex 1 PGRFA in the MLS global process of exchange. On an average, material distributed under the MLS comes from CGIAR (23%), CGIAR breeding programs (63%) and countries/ other organizations (11%). So far, Asia has been the highest recipient of this germplasm (34%).

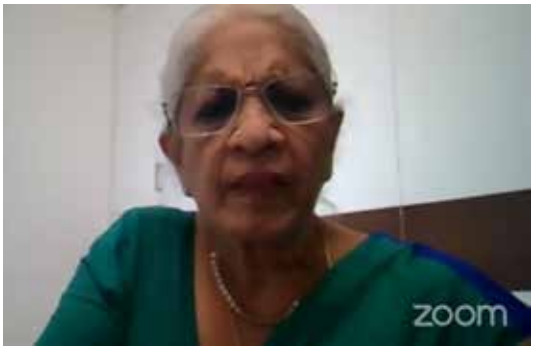
Dr Azevedo informed that the CGIAR is very active in implementing and guaranteeing the BS in different ways including (i) free and almost immediate access to

accessions conserved in the CGIAR genebanks itself is *per se* a BS; (ii) more than 800,000 accessions are available for distribution, and more than 4 million samples of germplasm and breeding lines were distributed in the past 10 years; (iv) data availability – passport, characterization, evaluation, DNA sequences and genomes, subsets, publications available in Genesys, genebanks and centers websites and databases, NCBI, etc.; and (v) capacity building. Unfortunately, some countries are unhappy with the current ABS system, due to the low monetary sharing of benefits. In 2013, the governing body of the ITPGRFA established a Working Group to enhance the MLS and BS by increasing payments and expand the scope through SMTA revision. However, in spite of nine meetings of the Working Group and three meetings of the Governing Body (GB) of the ITPGRFA, no consensus could be reached and negotiations were suspended at 8$^{th}$ meeting of the GB in November 2019.

Dr Azevedo further stated that CGIAR supported the Subscription System wherein recipients/subscribers agree to make annual payments to the BSF, for a fixed minimum number of years, based on their total seed sales and/or related license fees, of all crops that they sell which are included in Annex. 1 crops (even if not accessed through the MLS). Such a system does not require tracking or tracing, and it generates upfront, predictable payments to the BS system. None of the payment rates linked to these options have been fixed yet. Nonetheless, rates proposed for consideration were: (i) 0.015% of sales/licensing of all products by subscribers (under subscription option);(ii) 0.2% (minus 30%) of sales/licensing of particular PGRFA products derived from MLS germplasm, whose use is not restricted for further research and breeding (under single access option), and (iii) 2.0% (minus 30%) for sales/licensing of particular PGRFA products derived from MLS germplasm whose use is restricted for these purposes (also under single access option). Further it is opined that subscription system could also be a means for addressing BS from the use of Digital Sequence Information (DSI) with higher subscription payments to reflect the fact that subscribers got to enjoy commercial benefits associated from access to and use of both genetic materials and associated DSI. The DSI and BS from it and the expansion of Annex. I are two important issues under negotiation in the SMTA.

Finally, Dr Azevedo provided a detailed overview of the mandate and achievements of ICRISAT. The ICRISAT genebank conserves 128,155 accessions, of six mandate crops (sorghum, pearl millet, chickpea, pigeonpea, groundnut and finger millet) and five small millets (foxtail, kodo, little, proso and barnyard millet), originating from 144 countries. Of these 110,818 accessions are safely duplicated at the Svalbard Global Seed Vault, Norway. Most of the germplasm has been characterized and is actively used in breeding new varieties.

**Dr Malathi Lakshmikumaran**, Executive Director, Laxmikumaran & Sridharan Associates, spoke on "ABS in respect to conventional plant breeding under the BDA". She emphasized on the need for scientific and detailed definition of key terms used in the BDA 2002. For instance, the term 'biological resources' as defined under Section 2(c) includes plants, animals and micro-organisms or parts thereof and by-products with actual or potential use or value but does not include human genetic material. However, it excludes value added products. Similarly, under Section 2(f), 'commercial utilization' as defined in BDA means end user of biological resources for use such as drugs, industrial enzymes, food flavours, fragrance, cosmetics, emulsifiers, oleoresins, colours, extracts and genes used for improving crops and livestock through genetic intervention, but does not include conventional breeding or traditional practices in use in agriculture, horticulture, poultry, dairy farming, animal husbandry or bee-keeping.



*Dr Malathi Lakshmikumaran*

Dr Lakshmikumaran said that the NP clearly calls for recognizing the importance of genetic resources to food security, public health, biodiversity conservation, and the mitigation of and adaptation to climate change. It also talks about the special nature of agricultural biodiversity, its distinctive features and problems needing distinctive solutions. Hence, agrobiodiversity for food needs to have different solutions as compared to biodiversity used for medicines, cosmetics, perfumes, industrial enzymes, etc. with respect to commercial utilization. The NP also recognizes the interdependence of all countries with regard to genetic resources for food and agriculture as well as their special nature and importance for achieving food security worldwide and for sustainable development of agriculture in the context of poverty alleviation and climate change and acknowledging the fundamental role of the ITPGRFA and the FAO Commission on Genetic Resources for Food and Agriculture. Another aspect to keep in mind is that Article 8j of CBD and Article 7 and 12 of the NP relate to respecting, preserving and maintenance of traditional knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge (to be read as traditional knowledge), innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices through model contractual clauses. She hoped that the Indian BDA

also speaks of 'traditional knowledge' associated with genetic resources. This is very important in the seed sector.

The lack of definitions becomes subject to interpretation whenever legal issues arise. Under Section 2(p) 'value added products' means products which may contain portions or extracts of plants and animals in unrecognizable and physically inseparable form. As per BDA 2002 ABS Guidelines (Nov. 2014), Regulation No. 17 states that certain activities or persons exempted from approval of NBA or SBB among others include, *inter alia*, "access of biological resources for conventional breeding or traditional practices in use in agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping, in India". Despite defining 'value added products' under the BDA, there is lack of clarity in terms of implementation and enforcement. It is also not clear whether bio-waste comes under the purview of the BDA, especially since access and commercialization of the same is not detrimental to the objectives of the BDA. Clarity is lacking for scope of the terms 'or knowledge associated thereto' with respect to biological resources occurring in India under Section 3(1) of the BDA for access approval, when seen in the light of the CBD and NP that refer only 'traditional knowledge associated' with biological resources. In the absence of clear definitions or understanding of the terms 'conventional breeding' or 'traditional practices in use in agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping' to understand the scope of the exemption of the above from 'commercial utilization' as defined under Section 2(f) of the BDA, it is very difficult for NBA to govern the issues under the act. She urged the group of eminent people in the meeting to help in providing such definitions to NBA.

Similarly, under Section 2(m) 'research' means study or systematic investigation of any biological resource or technological application, that uses biological systems, living organisms or derivatives thereof to make or modify products or processes for any use. Conventional breeders use tools such as pathogens, insects, etc. to develop plants resistant to them. Given the wide frame of biodiversity under BDA, when breeders use the pest and pathogens as tool for conventional breeding, the former would also fall under the purview of BDA. Dr Lakshmikumaran opined that exemptions are required for these tools to develop new varieties. With respect to Section 3 of BDA, she pointed out there is no definition spelt out for 'knowledge associated thereto' in reference to biological resources. There is need for clarification whether this is traditional knowledge, DSI or characteristics of the plant.

Section 7 of BDA regulates all Indian players by asking them to intimate the SBB about use of biological resource for commercial utilization, or biosurvey and bioutilization for commercial utilization. It is clear that Indian players do not need prior approval or prior intimation for conducting research or biosurvey or bioutilization on bioresources. Section 2(f) automatically excludes all players (Indian and foreign)

for access of bioresources for commercialization using conventional breeding or traditional practices in use in agriculture, horticulture, poultry, dairy farming, animal husbandry or bee-keeping, but does not exclude those who would be using new technologies (like CRISPR/Cas, MAS, etc.) for their work. Section 4 pertains to situations where previous approval of NBA is required for transfer of results of research. For the purposes of section 4, 'transfer' does not include publication of research paper or dissemination of knowledge in any seminar or workshop, if such publication is as per the guidelines issued by Central Government. She said that there is need for clarity if internal sharing of research data with/between subsidiary and/or group companies that fall under Section 3(2) of the BDA is carried out without any monetary consideration, would not require prior approval under Section 4 of the BDA. She pointed out that there is lack of central government guidelines that enlist the criteria for exemption of publication of research papers or dissemination of knowledge in seminars or workshops from the ambit of 'transfer' under Section 4 of the BDA. Dr Lakshmikumaran requested that NBA should make such guidelines at the earliest or if already existing, to place on their website. This would avoid inadvertent non-compliance of Section 4 with respect to publications if there are no proper guidelines.

The Section 6 deals with prior approval before applying for IP, and exempts plant variety protection (PVP) under the PPV&FR Act 2001. Here again, the word 'information on a biological resource' needs clarification, especially DSI or genetic data. Also, if waste material of biological origin is part of patent, does it get covered by Section 6? It was opined by Dr Lakshmikumaran that there is lack of proper reasoning for the non-inclusion of seeds in certain cases under the notifications issued under Section 40 of the BDA. Seeds are an 'essential commodity' under the Essential Commodities Act, 1955 and thus, there exists a statutory basis to include seeds within the scope of the exemption under Section 40 of the BDA as they are 'normally traded commodities'. She emphasized that guidance and clarification is required in this regard.

She also pointed out that lack of clarity exists in implementation of the ITPGRFA exemption as per the MoEF&CC and DAC&FW notifications. Whereas the NBA is of the view that the exemption under the said notifications is only limited to the 26,563 crop accessions of barley, chickpea, finger millet, lentil, paddy, pearl millet, pigeonpea, sorghum and wheat as notified by India from amongst the crops listed in Annex I of the ITPGRFA, the MoEF&CC and DAC&FW notifications appear to suggest that all activities related to 64 species listed in Annex 1 of ITPGRFA should be exempted from BDA. She suggested that guidelines be provided by NBA whether all the accessions in Indian system for the 64 crops be covered and also whether all the accessions of the CGIAR system are exempted under Section 3 and 4 of BDA.

**Dr Ram Kaundinya**, Director General, FSII, made his presentation on "Perspectives of Seed Sector on ABS". He informed that FSII is an association of 42 research-based seed companies, driven by principles of research investment, IP protection and compliance of all rules and regulations. The FSII also has a group of Alliance of Agri Innovation which looks at the biotechnology related issues and policy matters. He said the FSII is committed to make the system of ABS successful as they believe that individuals, communities and nations must get benefitted for conserving genetic resources. The FSII advocates a fair, smooth, transparent system which provides with ease of doing business and rewards for crop improvement work and thereby benefits are provided to farmers and consumers. He assured their commitment to work with institutions and regulators in making the process easier, smooth and transparent. He further stated that the seed industry is fully aligned with the core principles of BDA, CBD and NP. He informed that 90-95% seeds in the country are produced indigenously, in which the private seed sector contributes significantly. Thus, the industry is very deeply involved in protection and sustainable use of the biological resources. He said that seed industry as such does not deplete bioresources but rather helps in maintenance of agrobiodiversity through the process of plant breeding.

*Dr Ram Kaundinya*

While briefly highlighting the chronology of events related to CBD, ITPGRFA and NP, he opined that there was greater need for coordination between the MoA&FW and MoEF&CC for execution of ITPGRFA and NP. He sought the clarification as to who among ITPGRFA/CBD/NP governs ABS? He highlighted the need for seed sector specific guidelines for agriculture and food sectors and called for resolving the operational issues of seed industry being faced in the current ABS regime. Dr Kaundinya said that 64 crops listed under Annex. I of ITPGRFA are exempted from Sections 3 and 4 of BDA by MoEF&CC under a notification of 17 December, 2014. However, only 26,563 accessions of nine crops have so far been listed by DAC&FW. He said that a process should be in place to move from nine to all the 64 crops. Further, there is need to add more crops and expand the list to cover crops like maize, brassicas, sunflower and vegetables. Open free access to DSI should be encouraged and not be over-regulated.

The FSII feels that ABS for the seed sector should be governed under the ITPGRFA by the DAC&FW, MoA&FW. All these changes should be made with definite

timelines. Till such times, interim three steps were proposed. First is development of sector-specific guidelines for agriculture and food sectors (already initiated by NBA). These may be published and used to address sector-specific needs. Second, some of the key terms (conventional breeding, traditional practices, farmer/grower/cultivator/individual, breeders, indigenous and exotic) require definition on scientific basis to bring clarity. Third, there are certain operational issues of seed industry which need to be addressed to ensure smooth flow of the process. These include:

(i) *Upfront payment prescribed for accession for research purpose*: Currently, there is an upfront fee of INR 3,000 per variety/location/accession being charged. FSII believes that this is not fair as 90-95% of accessions are not used in the final variety development and where accession request if for commercial, cultivable seed varieties of less economic value. Hence, a lot of money goes into accessing the initial material. Further, 0.5% of sale value for BS on commercialization is high, where indigenous genetic resource utilization is minimal. Some of the accessions accessed are also freely available and traded commodities in the market. It is, therefore, suggested that the BS should be linked to the share of contribution of the accession to the final product, which can be verified through DNA fingerprinting technologies. The BS should be structured based on contribution of a particular accession to the final product. This would give a more nuanced and staged approach.

(ii) *Sharing of research results*: For global corporations, a lot of research work goes on in different countries and there is continuous exchange of information. Many a times the location of data storage is outside India (e.g. MNCs). Transfer of research results within/between subsidiary companies where there are no monetary benefits and/or transfer of results is only for administrative purpose. Approval for this takes a lot of time and is deemed unnecessary.

(iii) *Normally traded as commodity (NTAC) exemption list*: Seed should be restored in the NTAC list (as it existed till 2016) with immediate effect so that there is no bottleneck in the exchange of seeds.

(iv) Accessions of microorganisms for using as testing tools in the development of new plant varieties should be exempted.

(v) There should be exemption of biologicals from PIC for non-commercial utilization (sending leaf sample to labs, seeds for trials /evaluation purpose, etc.).

(vi) *Section 3 of BDA*: There should be an alignment in the Companies Act, Foreign Exchange Management Act and BDA for definition of 'Non-Indian.' In the absence of definition of non-Indian participation in BDA, many Indian entities are being considered as non-Indian.

In summary, Dr Kaundinya said that a collaborative approach is required between research based private seed industry, and various public institutions and regulators, as the objectives of both are the same. The system should not restrict the seed industry from delivering better products for the farmers in a mutually beneficial way. The next round of ITPGRFA discussions are scheduled to be held in Delhi in 2021. India can mark the event by pre-closing all the pending matters indicated above to develop a smooth and transparent system.

**Ms Shalini Bhutani**, Legal Researcher and Policy Analyst, Food and Agriculture Organization of the United Nations (FAO) spoke on "Respecting (Agrobio) Diversity, Sharing Benefits". She referred to the trends indicated in the report by FAO on the State of the World Biodiversity for Food and Agriculture and the SDG 2, *vis-a-vis* genetic diversity. The Target 2.5 of the SDG calls upon nations maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed. The FAO undertook a technical cooperation program (TPC) in India with MoEF&CC, NBA, MoAC&FW for mainstreaming agrobiodiversity during 2017-19. These were undertaken in Punjab, Mizoram and Kerala and learnings from this are being taken-up for grounds up view on agrobiodiversity, challenges in capacity development, and communities' views on ABS. More recently, FAO has been involved in some of the COVID-19 responses and inputs to some of the GoI empowered groups with respect to facilitating removal of bottlenecks in some of the supply chains due to the lockdown and containment measures.

*Ms Shalini Bhutani*

Ms Bhutani focused on the ground up view on how the concept of ABS works at grassroot level, especially in the post-COVID scenario. The NBA proactively (on April 3, 2020) took out two orders in commitment for India's solidarity to streamline and access to PGR, and for fast tracking therapeutics and diagnostics for COVID-19. The GoI called for self-reliance in economy, particularly relying on agriculture for its economic growth in the coming months and years, urging the *Krishi Vigyan Kendras* (KVKs) to develop area-wise, territorial agro-climatic models of agricultural development. Further, the Ministry of Rural Development (MoRD) has also issued

guidelines for developing more individual and community nutrition gardens. Hence, agrobiodiversity is being viewed as source of food and nutritional security especially for the people living in marginalized areas, with harsh production environments. These were the communities worst hit after the pandemic, when supply chains got cut-off due to the lockdown. Since they had continual access to their local bioresources, this helped them tide over the difficult times. For example sanitizers were produced from 'Mahua' flowers (*Madhuca longifolia*) in Central India by Self-Help Groups. Secured access to local bioresources helped the communities to sustain themselves. Respecting access to agrobiodiversity can be one of diverse ways to look at ABS from the ground, and there cannot be one homogenous system for this. Other approaches would include respecting diverse agrosystems. How can real keepers of bioresources (local communities) have continued access to diversity that keeps their agriculture possible? Traditionally seen, BS happens subsequent to access. Ms Bhutani drew attention to Article 5, of the UN Declaration on Rights of Peasants[2] wherein peasants and people in rural areas have the right to access and use in a sustainable manner the local natural resources required to enjoy adequate conditions of living and they have the right to management of these resources. Access to local resources present in their communities should be seen as a benefit itself because that is the basis on which the local knowledge systems and grassroots innovations which would help in recovery of local economy. This of course is well-covered in the idea of non-monetary benefits as per the NP. But that does not imply that the obligated BS from external users can be done away with. Sustainable use of bioresources can also offer real and tangible benefits to the local communities as enshrined in ITPGRFA (Article 6) dealing with fair agricultural policies that promote the development of diverse farming systems and supporting local knowledge systems. The post-2020 Global Biodiversity Framework has five long-term goals for 2050 Vision for Biodiversity which emphasize that genetic diversity must be increased in next decade and the benefits shared must be fair and equitable.

Finally, Ms Bhutani shared five guiding principles to relook ABS, according to national circumstances: (i) actively promote inclusion and social justice harmony. Under the PPV&FR Act, the BMC have been granted PVP certificates, while itself being the body to oversee the ABS (ii) revitalizing farmer participatory plant breeding and public plant breeding systems is another potential BS system; (iii) when granting access, one should see if the health of the people/community, area and globe is safeguarded; (iv) to support for greater diversified and decentralized seed industry because of the localized needs in a mega diverse country like India; and (v) ABS system interpretation of patents rule assessment and IPR interpretations under various acts-assessment of ABS *vis- a- vis* IPR are required.

[2]United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas, Resolution adopted by the General Assembly on 17 December 2018 (73/165)

As Co-Chair of the Session, **Dr R.C. Agrawal** complimented all the speakers and said that many of the issues flagged by them were being addressed under the revision of the BDA, especially for commercial utilization aspects. BS is a big issue, requiring understanding the difference between ownership and stewardship of varieties by the farmers. In spite of almost 15 years of existence of ITPGRFA, the weakest point has been implementation of Farmers Rights (Article 9). Since 2016 an Ad hoc Technical Committee has been constituted to suggest the options which is currently working on the issue. He cited some examples of recent court judgments on BS, which necessitates revision of the BDA provisions to address many of the issues raised in these judgments.

*Dr R.C. Agrawal*

**Dr P.L. Gautam**, Chair of the Session, while appreciating all the speakers, briefly mentioned that he had been associated with all the acts and treaties right from the beginning and stated that negotiating in a treaty in international fora is a huge task, due to diverse viewpoints of different stakeholders. The inclusion of Farmers Rights was a necessity for India in the ITPGRFA, but not important for several other countries. Indigenous Traditional Knowledge (ITK) was elaborately discussed in all CBD negotiations, but international processes are very slow, as one has to go by consensus. India's legislation has made good progress in implementation of ABS and other related provisions in both BDA and PPV&FR Act. Due to the unprecedented nature of the Acts, implementation was initially a problem. Relook is required so that "ease of business" can happen and for this several issues flagged in the webinar would be helpful. There is need for greater capacity building and awareness generation. Documentation, digitization and evaluation of PBRs, plant varieties and valuation will ease many things. There is need for sustainable institutional mechanism to provide BS to the conservers. Regarding germplasm exchange, a few important issues that need relook are reciprocal exchange of germplasm, international nurseries, foreign material to be tested in India and tracking mechanisms of GR. Dr Gautam opined that use of genetic resources has considerably declined, and more emphasis needs to be given to prebreeding and utilization. Interface between agencies is also very important.

# PANEL DISCUSSION

This session was chaired by **Dr T.R. Sharma**, DDG (Crop Science), ICAR and co-chaired by Dr Kuldeep Singh, Director, ICAR-NBPGR. Nine panelists shared their views on the subject, which are briefly presented below:

*Dr T.R. Sharma*

**Mr Álvaro Toledo**, Deputy Secretary, ITPGRFA, Rome, while thanking the previous speakers who had covered aspects about the treaty said that it was the integrated approach for the implementation of the treaty which would really allow bringing benefits to the small farmers. He said that India had taken an important step in offering to host the GB9 meeting of the ITPGRFA in 2021, which provides a unique opportunity to showcase the strength of its crop diversity

and India's leadership in the treaty negotiations. Mr Alvedo gave three key messages in line with questions related to implementation of ABS under the ITPGRFA:

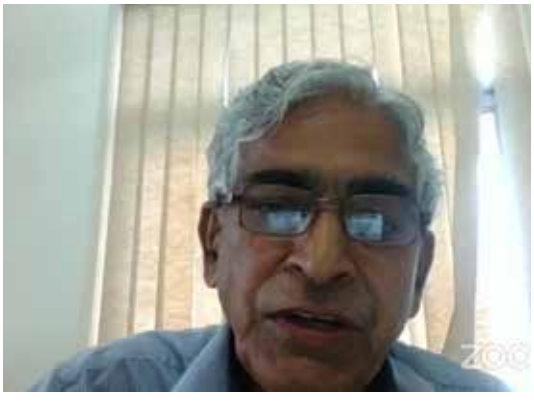

*Mr Álvaro Toledo*

(i) Unlike many countries, India is centre of origin of important plant species that feed the world and provide the basic PGR that give resilience to diverse agroecosystems. The future discussions about ABS need to keep in mind not only the farmers inhabiting the countries of origin, but also small farmers elsewhere in the world by drafting fair and equitable regulations.

(ii) Food security during the early days of treaty was talked about in terms of ensuring certain calories per day. This concept has evolved to be more encompassing to include nutritional aspects which would require us to make available, share and conserve another set of PGR in the next decade. In order to enhance BS, strengthening of SMTA is required and for which the GB needs to take a final decision on the proposed new contract. Mr Toledo encouraged India to hold informal discussions and strive for a consensus in the region to take a step forward by the time of the GB9.

(iii) The issue between DSI and ABS is also a major challenge for all R&D sectors. There is a growing consensus that over-regulating access to DSI will not be beneficial or practical. He suggested that the Treaty's approach for access through MLS seems to be a good place to start from and it may be able to solve some of these difficult matters by leading a way for all the sectors.

**Dr S.K. Sharma**, Honorary Professor & Former Vice-Chancellor, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur and Former Director, ICAR-NBPGR said that for strengthening hassle-free implementation of the ABS system, valuation of bioresources is very important in different ecosystems like agriculture, forest, wetlands, etc. It will help the farmers and communities to get optimum value



*Dr S.K. Sharma*

for their bioresources. Sometimes bioprospecting will lead to valuation of the resources. For this, creation of well-defined database of important bioresources and the associated traditional knowledge (like the TKDL) and developing the standard valuation methods is required. Dr Sharma mentioned that there is need to strengthen the infrastructure, capacity and resources of the SBBs, because the SBBs in various states are not at the same stage. He advocated for a single window system for the ABS by convergence between agencies and ministries. The BMCs at the village/panchayat level are responsible for inventorization and conservation of bioresources, also need a lot of support, capacity building, awareness workshops and technical backstopping. When the National Gene fund is generated from the ABS, question arises about its utilization at the BMC level. Appropriate guidelines should be developed by the line departments. A well-defined mechanism is very much required.

**Dr Bhag Mal**, Secretary, TAAS, and former South Asia Coordinator, Bioversity International, stated that in India ABS is implemented by multiple statutes, governed by multiple ministries issuing multiple guidelines, and executed by multiple agencies. As a result, there are serious concerns to be tackled at various levels in order to benefit the stakeholders. The implementation of a single window system is a must, for which an integrated platform needs to be established for facilitating access of bioresources especially those related to agrobiodiversity, and eventual BS dedicated modules relevant to different regulatory authorities. This is a big challenge, but needs to be done. Farmers, tribals and indigenous communities in India have been playing a crucial role as conservers of bioresources and related traditional knowledge. Bioresources that provide various benefits to the society must be used in a sustainable manner and providers be rewarded in monetary and non-monetary benefits. Further, there is no in-built policy mechanism through which farmers and communities involved in conservation of agrobiodiversity get incentives on a long-term basis. The ecosystem services provided by communities need to be quantified in terms of the monetary value. In fact, these communities need to be compensated for the losses borne by them by not growing high yielding crops and varieties.


*Dr Bhag Mal*

Dr Bhag Mal highlighted that the PPV&FRA has taken good initiative by conferring 'Genome Savior Awards' to communities and farmers. Such efforts need to be

further intensified. In fact, question arises as to what happens to such awardees, and whether there is any handholding for them for their sustenance. Also, mentorship programs need to be initiated where they can work in close collaboration with R&D sector or industry. There is also a need to device suitable mechanisms to maximize utilization of BS funds by various agencies. The problems of slowing down of exchange and access to CGIAR materials need to be resolved. Capacity building also needs to be given due attention and regular programs on ABS need to be organized. There is a clarity required on the overlapping jurisdictions of NBA, DAC&FW and PPV&FRA. The delegation of responsibilities for agrobiodiversity needs to be redefined to ensure clarity and remove ambiguities. Greater convergence and coordination is required between NBA, SBB, BMC, PPV&FRA, DAC&FW and ICAR (including its five Bureaux).

He further suggested that a National Council on Agricultural Development, under the Chairmanship of the Hon'ble Prime Minister of India (similar to GST Council) or similar suitable mechanism needs to be developed to ensure effective coordination between central and state governments for successful implementation of ABS guidelines.

**Dr Sanjeev Saxena**, Assistant Director General (Intellectual Property & Technology Management), ICAR observed that Bureaux under the ICAR system, which are the designated repositories of the genetic resources by NBA, require to seek permission from SBBs for germplasm collecting. Thus, institutionalized linkages between the Bureaux, SBB and NBA need to be strengthened. He suggested that Bureaux can share their passport data with SBB/BMC and they should be exempted- from seeking permission for collecting. The identification numbers which these Bureaux would provide can be used for traceability during utilization. Further, in case of disputes, these samples would be available in the Bureaux. In respect of PPV&FR Act, lawful acquisition of genetic resource is required in terms of PIC, MTA, MoU or contracts. In the case of BS mechanisms (genefund) need to be developed to ensure that the funds should reach either the conserver, or developer or even the repositories.

*Dr Sanjeev Saxena*

**Dr R.K. Tyagi**, Coordinator, Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources (APCoAB), Bangkok, focused on the regional status of ABS. He informed that factors which determine how effectively a nation has implemented

*Dr R.K. Tyagi*

the ABS under NP are: (i) biodiversity conservation policies specifically designating the protected areas to motivate the actors to utilize NP, (ii) implementation of systems to protect GR and quality of institutions such as protection of property rights (tangible and intangible), (iii) efficiency of legal frameworks for dispute resolution, investor protection, and (iv) a low government regulation burden to utilize ABS agreements. These factors are measured through the lodging of International Recognized Certificate of Compliance (IRCC) in ABS-Clearing House (ABS-CH). An analysis based on records in ABS-CH shows that 18 countries (particularly biodiversity-rich countries) in Asia-Pacific region have placed the information on ABS procedures and national reports in ABS-CH. Out of these, only three countries i.e. India, Bhutan and South Korea have developed ABS procedure at national level and surprisingly even Australia, China and Japan have not done so far! Only nine countries have placed their National Reports in ABS-CH; meaning thereby that there is lot to be done at nation levels. India is one of 'the Leaders' in utilizing NP. On the basis of IRCC records, of the total 117 countries that ratified NP, only 16 have registered 564 agreements (64% non-commercial and 36% commercial) till August 2019. India is leader (220) in the world followed by France (153). Only other country that has IRCCs is Vietnam with 28 commercial/non-commercial agreements. India is one of the early adopters of NP and enacted the regulatory framework/legislation to this effect. Regulatory framework is in place in many other countries also, however, Rules have yet to be developed. India is well-placed to implement of ABS procedures under NP in comparison of other countries in Asia-Pacific region. Out of 65 points of compliance, only a few are yet to be complied as indicated in national report available on ABS-CH, e.g. checkpoints (information of use of GRs on research, innovations, pre-commercialization, commercialization etc.) and compliance with domestic legislation.

The other issue deliberated by Dr Tyagi was inclusion of DSI in NP. This subject is under discussion since 2016 in meetings of Parties of NP and CBD. The major issue is inequity and trust-deficit between high-income community and low-middle income countries. He opined that sharing DSI will ensure equitable collaboration and prevent exploitative practices. The benefits to DSI donor include improved research funding and collaboration; trust building between high and low-middle income countries; greater opportunity to access to GR; maintain high bioethical

values. The benefits to sample providers would be equitable, negotiable research opportunities, capacity development and reduced exploitative practices. The key challenges include: (i) ownership; (ii) potential conflicts of overlapping authorities; (iii) community sharing; (iii) negotiation of benefits; (iv) laws to deal with traditional knowledge.

He further informed that organizations like APCoAB/APAARI can help in facilitation role as a Regional Forum in capacity development, public awareness, policy dialogues, policy advocacy and cross-country sharing of learning experiences.

**Dr K.S. Varaprasad**, Former Director, ICAR- Indian Institute of Oilseeds Research (ICAR-IIOR), Hyderabad, informed that he was currently working on a global UNDP-GEF-ABS project involving 23 countries. Dr Varaprasad said that India has a leading role as many countries look forward to seeking guidance from the acts and guidelines developed for ABS. Under the UNDP-GEF-ABS India project, he is working with ICAR-National Academy of Agricultural Research Management, Hyderabad, on capacity building. In the last one year, 200 scientists have been trained across the research institutes of ICAR (in 20 states) on ABS awareness and implementation process. With respect to issues concerning ABS, multiple channels of access of genetic resources (including markets) is a problem. There is a gap (sometimes up to 10 years or more) when material is accessed and it comes as commercial product in the market. In such cases, monitoring becomes as problem and use of software and other new technologies (as being attempted by NBA) would be helpful. Dr Varaprasad opined that there should be no restriction or regulation with DSI for research purposes and only when a commercial product is developed using DSI, the ICRISAT subscription model should probably be used. He stated that the actual benefit to communities/farmers at the ground level is very meagre as compared to the potential that exists in India. Valuation of raw bioresources is more of an academic exercise, while valuating a commercial product is what is important. Institutional mechanism for R&D is important where organizations like ISPGR can play an important role in initiating a discussion. Harmonization of acts, treaties and agencies dealing with ABS is very important. Finally, he also emphasized that ABS can only be implemented if technology-based checkpoints are made available by the government.


*Dr K.S. Varaprasad*

**Mr K.P. Raghuram**, Technical Officer (Benefit Sharing), NBA, Chennai, informed the participants that the NBA which is in the process of revising the BDA rules and guidelines has recently streamlined many procedures to smoothen the process. For instance, only the applications are being dealt by the Expert Committee while all other activities are being dealt at the NBA Secretariat itself for disposing cases in a time-bound manner. As far as the utilization of BS fund (gained from companies and users of bioresources) is concerned, so far the NBA has released INR 500 million to the SBB and BMC which has been used for different purposes like conservation of Red Sanders, medicinal plants, etc. The NBA would be conducting case studies to document how the BS fund is being utilized by the SBBs/ BMCs. The issue regarding seeking permission from SBB by Bureaux for germplasm collecting, as per prevailing law (also stated in the BD Regulations of 2014), Indians are not required to seek permission for research purposes. Guidelines to BMCs are issued regarding the same. Only when non-Indians are involved in collecting, then approval is required from SBB or NBA.

*Mr K.P. Raghuram*

Dr Raghuram informed that the SOPs to comply with the BDA, and sought by the seed sector, are in final stages of completion. As per directions of the MoEF&CC, an Expert Committee has been constituted by NBA for developing and putting forth India's stand regarding DSI in the various international fora like ITPGRFA and NP.

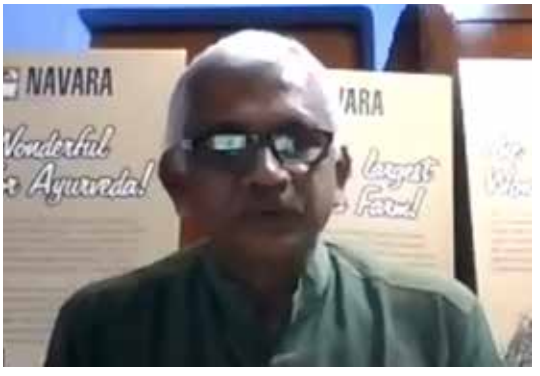
**Dr Neeti Wilson**, Partner, Anand & Anand, Noida, spoke specifically on various laws related to ABS. The PPV&FR Act provides BS with respect to registered varieties on the basis of the use of a variety conserved or possessed by either an individual or a community. The BS can be claimed by a party, who believes and claims that they have contributed to the development of a registered variety, such as in the development of parental lines. Till date, no BS claim has been made by any claimant except one where also the Authority did not grant the benefit on account of unsubstantiated claim. The extant

*Dr Neeti Wilson*

varieties under the PPV&FR Act are unique for India. If claimed for BS, such claims may not be ignored in the case of usage of extant varieties of public or private sector even if they were not registered, for development of new varieties whenever the latter are commercialized. Dr Wilson suggested that a database of such varieties and a system to link these to the ABS window of PPV&FR Act be developed.

Agricultural innovations and linkage between patents and PVP cannot be denied. Biotechnological innovations in agriculture are not only plant varieties and genetically modified organisms (GMOs), but much more. The use of agrochemicals, farm equipment, modern techniques such as aquaculture, hydroponics, etc. are equally important. The inventions linked to agrobiodiversity are to be seen in totality. IPR knowledge related to different IPs interface with different laws as can be seen in the recent Geographical Indications of Goods case. Dr Wilson mentioned that legal knowledge needs to be incorporated in a holistic manner, and Ministry of Commerce and Industry (MoC&I) which enforces the IP rights (other than PVP rights) need convergence with MoA&FW as the global markets work in totality. The BDA which furthers the objectives of the CBD, also needs to be seen in a holistic manner. The ABS provisions are actively being pursued to fulfill the provisions of the NP. Equal emphasis needs to be there on sustainable use of biological resources. The UN SDGs have received a set-back as per the 2030 agenda due to the COVID-19 crisis. However, the importance of agriculture sector has come to the limelight. Dr Wilson said that exemption of 64 crops of ITPGRFA and the limited NTAC is not enough. Extensive stakeholder meetings are required to speed up the updating of the list. The need of the hour is development of a single-window clearance system to simplify access to Indian biological resources, along with robust PICs and MATs systems. She further recommended for marketable products, that just like GIs, development of country-specific trademark or a mark associated for Indian biological resources be considered, for the purposes of tracking, BS and preventing biopiracy. Adoption of innovation should reflect experimentation and assessment at farmer's level, rather than social following. A farmer should not be buying seeds because all farmers are doing so. Counterfeit or spurious seeds would not only harm the farmer and the vendor but also Indian agriculture, economy, and will affect the traditional wisdom of the farmers, developed dynamically over the course of the years. The target of doubling of farmer income should thus go along with farmer education and increasing agricultural and legal knowledge. The farmer should be aware of the choices and also to respect innovations in plant variety development irrespective of their being the product of biotechnology or GM, so that benefits continue from all perspectives. The Indian agricultural economy and the constant need to innovate along with the current world scenario, emphasize that access to agri-innovations along with traditional wisdom is the way forward towards sustainable use and benefit for all.

**Mr P. Narayanan Unny**, Progressive Farmer, Navara Eco Farm (NEF), Palakkad, first gave an introduction about his farm. The NEF is a 125-year-old traditional family farm located in the rice belt of Kerala, Chittur of Palakkad district in the shadow of the Western Ghats. The Silent Valley region is also located in Palakkad district. NEF is an integrated farm growing 72 varieties of agricultural crops including specialty rice like Navara and Palakkadan Matta, vegetables, spices, medicinal trees and plants, coconut, fruit trees and other trees. NEF maintains herbarium of 200 plants. The entire farm is "Certified Organic" for India, European Union and the United States Department of Agriculture. It was under the initiative of NEF that the Geographical Indication [GI] registrations of *Navara* rice and *Palakkadan Matta* rice were achieved. The *Navara* rice is a traditional medicinal and nutritional rice and is endemic to Kerala. This rice is known as "*Shashtika Rice*", meaning the rice that matures in 60 days and is used in Kerala Ayurveda "*Panchakarma*" treatment for arthritis, paralysis, neurological complaints and polio in children effectively. It is also used as a nutritional rice and health food for people of all ages starting from small babies to the elderly and has been claimed to develop immunity, very much relevant in the current COVID-19 times. This work was recognized by GoI by conferring the Plant Genome Saviour Recognition Award in year 2008. NEF, therefore, presents a farmer-led initiative for conserving an important traditional and ancient rice variety and is a classic example of on-farm conservation.




*Mr P. Narayanan Unny*

The first recommendation given by Mr Unny was to provide access and conservation funding every year, at least for 10 years, for such farmer beneficiaries as NEF. The objective of such a funding is to encourage farmers/producers who produce products which have unique and widespread applications in addition to direct consumption and to further encourage cultivation by using methods which conserve ecology and environment and maintain biodiversity contributing to ecosystem services. This will be in line with "*Atmanirbhar Bharat Abhiyan*". The reasons/logic to provide such a funding are: (i) *Navara* rice is a seasonal crop and is cultivated only during the summer and the plant is very fragile and lodges even with dew; (ii) to ensure that the entire medicinal properties of the *Navara* rice are retained, it is imperative that it be grown organically as otherwise due to the use of chemical pesticides and fertilizers the medicinal properties will be destroyed; (iii) organic *Navara* rice cultivation is labour intensive and very costly. Farmers lose revenue for a number of reasons like not opting for high yielding varieties, non-availability of water, limitation of one crop per year and low yield due to organic cultivation, leading to increased cost of production; (iv) there

is tremendous loss due to natural calamities. For more than a decade now, weather has been unpredictable and farmers incurred heavy losses due to floods; (v) loss due to man-animal conflicts. Since 2006, protected species such as peacocks and wild boars have started invading farmlands leading to considerable destruction of crops. This has resulted in heavy losses to the farmers with no respite or compensation being provided by State/Central Government agencies; (vi) financial non-viability has led many rice farmers to migrate to other farming activities. Fragmentation of previously large rice field holdings have put the rice farmers in disadvantage as these holdings have become economically unviable; (vii) poor financial viability is also a serious concern. The steady increase in the cost of production while the sale prices have remained constant has led to rice farming becoming unviable.

Mr Unny suggested the parameters to help identify agricultural products for which the funding support is to be provided. These included (i) traditional items endemic to the region and (ii) GI registered in India will ensure that encouragement is given to the products that are endemic and is unique to that region ("Vocal for Local"). He further mentioned that the process of providing the funds should be by direct transfer to the account of the farmer's/producer's Bank Accounts, *PM Jan Dhan Yojana* or state bank accounts. With respect to the quantum of amount of benefits to be provided, smallholder farmers may be given INR 1,00,000/per acre/per year for non-organic farmers and additional 75% per acre for Certified Organic Farms. Medium farm holding farmers may be given INR 65,000 per acre / per year for non-organic farmers and additional 75% per acre for Certified Organic Farms. For farmers having large farm holdings INR 25,000 per acre/ per year for non-organic farming process and additional 75% per acre for Certified Organic Farms. An escalation of 10% should also be provided every year. This additional 75% has been suggested for farms with organic certification, as in addition to ensuring chemical free produce despite resulting in very low yield, the organic methodology of farming also helps provide ecosystem services such as conservation of biodiversity, natural resources, ecology and environment besides addressing problems relating to global warming.

Another method of BS is the model for sustainable management adopted by *Navara* rice and *Palakkadan Matta* rice farmers clusters and Farmer Producer Organizations (FPOs). They are (a) Navara Rice Farmers Society, and(b) *Palakkadan Matta* Farmers Producer Company Ltd. Since both rice varieties are GI registered, it would be best to channelize all sales through the above-mentioned entities. GI legal framework should also ensure punitive action against infringement. Additionally, it will not always be possible to monitor the end user pricing and quantities. So, it is recommended that, an additional 3% cess such as a BS cess be added and this amount be credited back to the cluster administration/society- who will then distribute the proceeds among its farmer members, in proportion to the amount supplied by each farmer. All these can be audited.

**Dr Kuldeep Singh**, Director, ICAR-NBPGR, thanked the Chair of the session for summing up salient features of intervention by each panelist. He said that food security and availability itself is the biggest BS, which the society and country as a whole has accrued from genetic resources. Valuation of a product has become an important issue and investment needs to be made in HRD to develop valuation experts. While appreciating the model suggested by Mr Unny, Dr Singh sought more ideas to design more ABS models to promote on-farm conservation, so that farmers are encouraged to grow diverse foods, and varieties, which would help in allowing the natural evolution of these crops. Though India has done well in terms of *ex situ* conservation (ICAR-NBPGR genebank has >0.45 million germplasm accessions of > 1,900 plant species), but *in situ* conservation also need to be promoted from an evolutionary point of view.

*Dr Kuldeep Singh*

The Chair, **Dr T.R. Sharma**, DDG (Crop Science) concluded the session by thanking all the panelists for bringing forth several new and useful suggestions and recommendations. He said that an interesting well-known example of valuation is that of the gene *Xa21*cloned from *Oryza longistaminata,* a wild rice species originated from Mali[3]. The gene was mapped and transferred to *indica* rice at IRRI, then cloned at University of California, Davis by Pamela Ronald and her associates, further transferred into different transgenic rice varieties, then licensed to several companies. A voluntary BS was constituted (Genetic Resource Recognition Fund), which besides the developers, also included people of Mali, in the form of Fellowships at University of California, Davis and access at cost price to all Mali residents the transgenic varieties developed using *Xa21*gene. This is an important case study for BS mechanism.

Dr Sharma noted that many organizations and countries are involved in conservation and use of PGR in products commercialized, but only a few of them have taken the initiative of developing mechanisms for BS. He emphasized that a balanced ABS system is required for the benefit of the all the stakeholders.

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[3]Pamela C. Ronald (1998) The Genetic Resources Recognition Fund, AgBiotech News and Information Vo.10, No.1; http://www.agbiotechnet.com/review/jan98/html/ronald.htm

# CONCLUDING SESSION

The session was Chaired by **Dr R.S. Paroda**, President, ISPGR and Chairman, TAAS and Co-Chaired by Dr V.B. Mathur, Chairperson, National Biodiversity Authority (NBA). Due to paucity of time, a general discussion could not be held, and the Chair invited the participants to share their views and suggestions by sending the same through emails for inclusion in the proceedings. He then invited the Co-Chair for his remarks.

*Dr R.S. Paroda*

The Co-Chair of the Session, **Dr V.B. Mathur**, welcomed all suggestions made during the webinar, though he observed that most of them led to actionable points leading to NBA itself! He informed that some of the points made are already under

process within the NBA, which may not be known to outsiders. Dr Mathur agreed to the suggestion made by many on the need to build capacity, which is very much required at the level of SBBs and BMCs. He assured that NBA was looking into this and acting in a systematic manner, by engaging as many people, including local universities/colleges as technical support group for PBRs. A big country like India needs to move forward and this can only be done on a digital mode, starting with the metadata, to facilitate ABS. For the issue regarding greater convergence between scientists of all ICAR bureaux and the SBBs, Dr Mathur said that rules for free exchange of material and information already exist for academic/ research purposes, and only in very few cases of commercialization one needs to come to NBA.

*Dr V.B. Mathur*

Dr Mathur informed that he is the Member of the CoP Bureau, and at the highest level of global governance, the DSI is a very burning issue and shall remain so in the near future. The MoEF&CC has set up a taskforce on DSI with representatives from all the concerned ministries and India's position on the subject is being worked out. The issues between the BDA and PPV&FRA are being addressed by convergence as Chairperson of PPV&FRA is currently the Chair of Agrobiodiversity Committee of the NBA. Dr Mathur sought sector specific guidance to increase understanding about the implementation and interpretation of BDA, involving different stakeholders, possibly in small group meetings. In the end, he said that a collective viewpoint of the country is required which is acceptable to all the stakeholder groups, built on evidence-based suggestions.

**Dr R.S. Paroda** as Chair of the Session gave his concluding remarks. He said that most of the stakeholders in the ABS had participated and provided their suggestions. For ABS, there are two mechanisms which have been legally adopted internationally: (i) multilateral system of ITPGRFA, wherein even farmers rights are being defined. Dr Paroda recalled him chairing the Working Group on Farmers' Rights before the Treaty was accepted; and (ii) bilateral system under the NP of the CBD. For the MLS, countries have already gone ahead with the acceptance of SMTA, although some issues continue to be debated. It is presumed that these

would be discussed in the next meeting of the GB, slated to be held in India in 2021 and hosted by the MoA&FW. This would be an opportunity to showcase and demonstrate India's strength on not only use of its vast genetic diversity, but also on ABS mechanisms developed so far. We still need to fully understand the requirements under the NP. With the NP developing after the BDA and many technological and other unforeseen developments taking place, it is right time to relook at the definitions in the BDA to have the needed reforms in the guidelines. Given the importance of agrobiodiversity from its use perspective, it may require separate treatment than the overall biodiversity. For this, ITPGRFA matters were earlier governed by MoA&FW and decisions related to genetic resources were delegated to ICAR-NBPGR. Dr Paroda suggested that similar kind of delegation may be possible under NBA through necessary delegation of responsibilities. Hence, a national system, working in unison may be developed. Dr Paroda also emphasized on the need for greater coordination and convergence especially between MoA&FW and MoEF&CC. This may be accomplished though a high level Coordination Committee, so that all issues can be flagged, technically debated and resolved. For the suggestion regarding single window system, Dr Paroda suggested that for agrobiodiversity, ICAR-NBPGR can be accorded the responsibility, given its infrastructure and capacity, including human resources. He also opined that a relook is also needed for the PPV&FR Act, based on various issues flagged in the webinar by diverse stakeholders, especially the private seed sector. Existing ambiguities need to be removed and clear-cut guidelines defined through technical committees. Dr Paroda while appreciating the model of rewarding for ecosystem services and benefits to farming community, mentioned that to strengthen this area, we would require documentation, capacity building, mentoring through institutions and work at grassroot level, including KVKs, BMCs and SBBs. There is need to strengthen the Gene Fund under both BDA and PPV&FRA. Dialogues are required at the national level on ABS considering the need for mutual respect and confidence building amongst the stakeholders. He also encouraged greater public-private partnership for breeding, new technologies, from very beginning and through the process of registration as well as commercialization. He expressed great concern about the fact that in spite of nearly 15 years of PPV&FRA existence, nearly 66% of the extant crop varieties had still not been applied for registration and suggested that ICAR should take this up as a matter of priority in national interest. Finally, Dr Paroda advised that in preparation of the GB9 meeting of the ITPGRFA, two issues be taken forward: (i) the ABS with possible working models and case studies to demonstrate India's strength, and (ii) expansion of the Annex 1 list of crops (e.g. inclusion of soybean, minor millets, legumes and other crop spp.) especially for needed diversification of existing food basket.

The Session concluded with a vote of thanks by **Dr B. Sarath Babu**, Councillor (South Zone), ISPGR to all the dignitaries, participants and organizers of the webinar.

*Dr B. Sarath Babu*

# RECOMMENDATIONS

## General

1. India's ABS system under BDA and BS system under PPV&FR Act needs to be addressed within the provisions under the national legislations (BDA and PPV&FR Act) keeping in view the compliance requirements to the international treaties (ITPGRFA and NP). This requires harmonization of regulatory systems concerning conservation and use of biodiversity resources, sustainable development, climate change and environmental protection. There is an urgent need for greater convergence and coordination among NBA, PPV&FRA, MoA&FW and MoEF&CC, besides the five National Bureaux on Plants, Animals, Fish, Microorganisms and Insects under ICAR. For this, a high-powered Inter-Ministerial Coordination Committee may be constituted to facilitate effective implementation of ABS provisions in India. The proposed committee could monitor BS under various instruments of access (BDA, PPV&FR Act, ITPGRFA and NP) to oversee that benefits reach bioresource(s) providers (farmer, researcher, breeder, community, village, district, state or country) when

commercial gains are accrued from the use of legally acquired bioresource(s) under any of the above-mentioned instruments of access. The Committee is expected to have representation from MoEF&CC (including NBA), MoA&FW (including DARE, DAC&FW, PPV&FRA, ICAR), Ministry of Science & Technology (including DBT, DST, CSIR, BSI, ZSI etc.) and Ministry of Commerce, among others which can submit its recommendations to the NBA and PPV&FRA for consideration.

2. Both NBA and PPV&FRA may formally develop a mechanism of interface on harmonious and coordinated implementation of the provisions on BS mechanisms on national bioresources within the provisions of the respective legislations. In view of the provisions of Sections 8 and 13 of PPV&FR Act, and Section 18 of BDA, it is recommended that the common goal of dealing with conservation and documentation of the native plant genetic materials be met by both the Authorities. These become the source for facilitating ABS related aspects involving the users of the traditional native plant species in India and elsewhere. Both the Authorities may develop an institutionalized mechanism that formally enables common unambiguous decision making, including assigning costs or hearing grievances for necessary orders. It is also observed that both Authorities are empowered to form as many committees as required to achieve the targets envisaged in the Acts, respectively.

3. India is a center of origin of important plants. Therefore, resilient and diverse agro-ecosystems have great stake at global level with respect to multilateral system of exchange of PGRFA. India has so far notified 26,563 accessions belonging to nine crops (barley, chickpea, finger millet, lentil, paddy, pearl millet, pigeonpea, sorghum and wheat) from Annex I list of ITPGRFA. There is an urgent need to expand this list, to move from nine to all the 64 crops, and also to add more crops to expand the list to cover crops like maize, brassicas, sunflower and vegetables. The ITPGRFA has to revisit SMTA and associated subscription system to ensure an effective and implementable ABS system, besides discussion on expansion of Annex 1 crops to include all PGRFA. The 9th Session of the Governing Board of the ITPGRFA is scheduled to be held in December 2021 in India. India needs to build consensus through prior consultations/ dialogues/ meetings on the above-mentioned issues, as also revise its guidelines on ABS to facilitate better access to genetic resources by the private sector. This opportunity may also be availed to showcase India's strength and diversity of genetic resources, as well as regulatory and institutional systems in place for food systems security for the present and for posterity.

4. There is justified need to have in place a 'Single Window System' to facilitate ABS to serve as an integrated platform for easy access to bioresources, especially those relating to agrobiodiversity. There is also further justification for additional allocation of about INR 200 crores by the GoI along with defined guidelines to use the National Biodiversity Fund [section 27(1) of BDA], State Biodiversity Fund [section 32(1) of BDA] and Local Biodiversity Fund [section 43 of BDA] since these would support the grassroot level conservers and users of bioresources. In fact, such a Fund could be used in various agrobiodiversity/genetic resource conservation programs, including the much needed incentive for the environmental services provided by the farming/tribal communities engaged in PGR activities. Hence, explicit guidelines for the utilization of Biodiversity Fund may be developed and a subcommittee under Agrobiodiversity Committee of NBA be constitutued to expedite the utilization of existing funds

## Amendments in Biodiversity Act, 2002

5. There is urgent need to clearly define the key terms under Section 2(f) of the BDA *inter alia*, 'commercial utilization', 'research', 'conventional breeding', 'traditional practices', 'value-added products', 'equitable benefit sharing', 'mutually agreed terms', etc. Clarity is also required on dealing with scope of 'biological waste', 'associated knowledge', 'wholly Indian entities' and exemptions under various sections. The definitions also need to be sector-specific to facilitate sectoral approach while determining ABS obligations. The lack of clear definitions within the BDA could be subject to different interpretations, resulting in legal issues. This is especially so to understand the scope of exemption of conventional breeding and traditional practices from those of commercial utilization. The Central Government guidelines that enlist the criteria for exemption of publication of research papers or dissemination of knowledge in seminars or workshops from the ambit of 'transfer' under Section 4 of BDA needs further clarity regarding internal sharing of research data with/between subsidiary and/or group companies that fall under Section 3(2), without any monetary consideration.

6. Proper reasoning for the non-inclusion of seeds in certain cases for notifications issued under Section 40 of the BDA is required. Also, clarity is needed as to whether use of biological resources as testing/reference tools, which are otherwise not the object of research, biosurvey, bioutlization or commercial utilization, but are used to confirm or verify the desired features of other bioresources or products developed or are under development, should be subject to regulation under the BDA.

7. There is need for clarification of discrepancies between the provisions of the BDA and the SBB rules, specifically in relation to approval or intimation for the use of bioresources and ABS obligations on 'wholly Indian entities' and the understanding of the scope and ambit of Section 7 of the Act.

8. Recent advances in biology, medicine and agriculture have been due to success of modern 'omics' technologies, made possible due to sharing and mining of freely accessible digital sequencing data. Hence, concerns are being raised about possible fair and equitable ways of sharing data. Given that the BDA's letter and spirit largely preceded most of the genomics developments, it remains unclear, in which realm this information exchange is to be considered in daily practice. Therefore, it needs to be clearly indicated how use of DSI and the implications thereof come under the purview of BDA. Organizing a national brainstorming workshop on this subject on priority is advocated.

9. The amendments expected in BDA need to be geared towards the concept of "ease of doing business" for those who wish to access and use India's biodiversity. This should entail simplification of the technical, legal and procedural requirements. The provisions in the BDA that are either not clear or conflicting need to be addressed on priority. There is need to expedite approvals or have provision of conditional/interim approvals (in specific cases) preferably within one month. For this, digitization and transparency of online clearances may be ensured. Such transformation can become integral to the ongoing revision process of the BDA Rules and Guidelines.

10. Overlapping areas and ambiguities in the provisions of the two Acts (BDA and PPV&FR Act) regarding Breeders Rights, Farmers' Rights and BS needs to be relooked critically in order to have better harmony and clear understanding. Under Section 3(1) of the BDA, there is need for better clarity on the scope of the terms "or knowledge associated thereto" with respect to biological resources occurring in India for approval of access, when seen in the light of the CBD and NP that only refer to "traditional knowledge associated" with biological resources. Farmers play a critical role as conservers of bioresources and related traditional knowledge. Accordingly, formulating a section/legislation protecting farmers' traditional knowledge against misappropriation may be considered.

11. There is a need to unambiguously inform public the requirements for seeking permission/approvals of NBA or SBBs on plant varieties registered under the PPV&FR Act in execution of the rights to produce, sell, market, distribute, import and export the varieties for their use as seed or seeding materials by either the breeders, their assignees or agents or licensees. For those covered under Section 3 of the BDA, till they register the varieties with PPV&FRA, the

Section shall operate. In the case of registered varieties all aspects that ABS covers in BDA are already covered in the contributions to be made to the Gene Fund of the PPV&FR Act, that is with similar responsibilities for taking care of the plant biodiversity in the country as in the BDA. Further, no user of the bioresources can be made to pay more than once to the exchequer for the same purpose in two different names thereby making registration a redundant exercise defeating the purpose of the Acts.

## Research & Development

12. A very important aspect is valuation of biological resources, which needs to be undertaken on priority by creating suitable templates. The process should be led by biologists and economists, and must involve research institutes and state agricultural universities with adequate support from funding agencies. It is important that only valuation of the material should be the basis of decisions as to what can be shared and what should be the price. Periodic updating of valuation in the context of dynamic demand and supply is the key to ABS. This is a huge exercise and would involve significant investment and collaboration. Bioresources valuation would also require public-private collaboration and partnership, for which an enabling environment and desired policy support would be critical.

13. While assessing germplasm for trait discovery, or origin or ownership, the scientific processes need to be transparent as well as trustworthy employing all modern and innovative technologies. This would generate facts that in turn would help in facilitating decisions concerning BS.

14. An effective and functional mechanism needs to be developed to ensure benefits of PPV&FRA Gene Fund and other funds under regulatory agencies to reach the conservers/developers/repositories of valuable genetic resources and registered varieties as provided in the respective legislations. Also, there is an obvious need for hand holding support for capacity development of conservers of agrobiodiversity. Mentorship programs also need to be initiated where awardees/rewardees can work in close collaboration with respective R&D institutions either in public or private sector.

## HRD and Awareness

15. The BMCs are local bodies engaged in the implementation of conservation and ABS through *Gram Panchayat* system, which is indeed an enormous task. Trained biodiversity professionals are invariably not available to assist the BMCs. The routine capacity building programs and training capsules are

inadequate. Hence, SBBs and BMCs could engage biodiversity professionals as employees or consultants for effective implementation of BDA. These may include local experts or biology teachers, from local universities, colleges and schools for developing People's Biodiversity Registers (PBR).

16. There is need for innovative ways to create awareness and educate the users on provisions associated with ABS, including various IPRs, especially on coverage and exemptions under BDA. For this, massive multilingual multimedia outreach programs may be developed. Also, regular programs need to be organized on ABS for promotion, awareness and capacity building to ensure effective implementation of ABS provisions. A simple brochure encompassing end-to-end guidelines for ABS needs to be developed in local languages and widely distributed to all concerned.

## Alternative Models for Benefit Sharing

17. The issue of BS should be viewed from grassroots level, especially in view of the recent COVID-19 pandemic. The communities in marginal areas were the worst hit after pandemic, but continued access to local bioresources provided them much needed relief. Hence, due attention needs to be paid to agrobiodiversity conservation and its access and the diverse ways in which benefits can be shared right from the ground level. Article 5 of the 'United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas' (Res No. 39/12 of Sept 2018) includes access to local resources by peasants, shepherds and other people working in rural areas for sustainable use and also the right to management participation of these resources. Similarly, Article 6 of ITPGRFA provides for fair policies for diverse agricultural systems. Hence, access to local resources becomes a benefit itself, which should be enshrined in local governance systems. Planning the public-funded agrobiodiversity conservation programs and strategies for access must be revisited from the grassroots level.

18. The ABS framework and protocol is a vital requirement for ensuring that farmers are encouraged to cultivate endangered or niche crop varieties and conserve such endemic and traditional crops even if they are economically unviable. This may lead to significant financial stress to the farmers, which needs to be addressed. There is need to ensure that farmers continue safeguarding and enhancing agricultural biodiversity by developing and conserving PGR for food, nutrition and livelihood security and for protection of environment and ecology. To incentivise the farmers and communities involved in conservation of bioresources that provide various benefits to the society, a monetary ABS model needs to be developed which should reach these individual farmers/

communities as compensation for the losses borne by them for not opting to grow high yielding crops and varieties. This can only be achieved by providing adequate financial support (on the lines of 'Direct Benefit Transfer' scheme) in addition to formulating policies that lead to self-sufficiency in production and financial independence to the farmers for a foreseeable period in future. The objective of such a funding is to encourage farmers/producers to further encourage cultivation of local crops by using methods which conserve ecology and environment and maintain biodiversity contributing to ecosystem services. This will be in line with '*Atmanirbhar Bharat Abhiyan*'. Certified organic farming may be given a special consideration as it is low yielding, labour intensive and preserves traditional farming methodology (*Paramparagat krishi*) while protecting ecology, biodiversity and environment, leading to sustainable development. It also ensures optimum use of water and addresses global warming issues.

19. Involvement of farmers in participatory plant breeding is another potential BS system. This involves fostering, as appropriate, plant breeding efforts with the participation of farmers, to strengthen the capacity to develop varieties particularly adapted to social, economic and ecological conditions, including in marginal areas.

20. Women play a significant role and serve as repository of traditional knowledge in conservation and utilization of genetic resources and hence need to be given special recognition and suitably rewarded. Both NBA and PPV&FRA may consider promoting the role of women as conservers of biodiversity and create suitable incentives like awards, stipend or fellowships.

# PROGRAM

| INAUGURAL SESSION | | |
|---|---|---|
| ***Chair*** **: R.S. Paroda**, President, ISPGR & Chairman, TAAS | | |
| ***Chief Guest*** **: T. Mohapatra**, Secretary, DARE & DG, ICAR | | |
| ***Guest of Honour*** **: Juan Lucas Restrepo**, DG, Alliance of Bioversity International and CIAT | | |
| **Time (IST)** | **Activity** | **Resources Persons/Speakers** |
| **14.00-14.05** | Welcome | **J.C. Rana**, National Coordinator, UNEP-GEF Project |
| **14.05-14.10** | Context of Webinar | **Kuldeep Singh**, Director, ICAR-NBPGR |
| **14.10-14.20** | Remarks by Special Invitee | **V.B. Mathur**, Chairperson, NBA |
| **14.20-14.35** | Address by Guest of Honour | **Juan Lucas Restrepo**, DG, Alliance of Bioversity International and CIAT |
| **14.35-14.50** | Address by Chief Guest | **T. Mohapatra**, Secretary, DARE & DG, ICAR |
| **14.50-15.00** | Remarks by Chair | **R.S. Paroda**, President, ISPGR and Chairman, TAAS |
| **TECHNICAL SESSION - Perspectives on ABS Implementation** | | |
| ***Chair*** **: P.L. Gautam**, Former Chairperson, NBA & PPV&FRA | | |
| ***Co-Chair*** **: R.C. Agrawal**, DDG (Education) & ND, NAHEP | | |
| **15.05-15.20** | ABS in PGRFA – Global experience | **Vania C.R. Azevedo**, Head of Genebank, ICRISAT |
| **15.20-15.35** | ABS in respect to conventional plant breeding under the BDA | **Malathi Lakshmikumaran**, Executive Director, Laxmikumaran & Sridharan Associates |

| Time (IST) | Activity | Resources Persons/Speakers |
|---|---|---|
| **15.35-15.50** | Perspectives of seed sector on ABS | **R. Kaundinya**, DG, FSII |
| **15.50-16.05** | Respecting (agrobio) diversity, sharing benefits | **Shalini Bhutani**, Legal Researcher and Policy Analyst, FAO-India |
| **16.05-16.15** | Remarks by Co-Chair and Chair | |
| **PANEL DISCUSSION** | | |
| ***Chair* : T.R. Sharma**, DDG (Crop Science), ICAR | | |
| ***Co-Chair* : Kuldeep Singh**, Director, ICAR-NBPGR | | |
| **16.20-17.20** | Álvaro Toledo, Deputy Secretary, ITPGRFA Secretariat<br>S.K. Sharma, Former Director, ICAR-NBPGR<br>Bhag Mal, Secretary, TAAS<br>Sanjeev Saxena, ADG (IPTMU), ICAR<br>R.K. Tyagi, Coordinator, APAARI/APCoAB<br>K.S. Varaprasad, Former Director, IIOR<br>K.P. Raghuram, Technical Officer (Benefit Sharing), NBA<br>Neeti Wilson, Partner, Anand & Anand<br>P. Narayanan Unny, Progressive Farmer, Navara Eco Farm<br>*Remarks by Co-Chair and Chair* | |
| **CONCLUDING SESSION** | | |
| ***Chair* : R.S. Paroda**, President, ISPGR & Chairman, TAAS<br>***Co-Chairs* : V.B. Mathur**, Chairperson, NBA | | |
| **17.20-17.40** | ***General Discussion*** | |
| **17.40-17.55** | ***Concluding Remarks*** | **Co-Chair and Chair** |
| **17.55-18.00** | ***Vote of Thanks*** | **B. Sarath Babu**, Councillor (SZ), ISPGR |

# COMMENTS FROM PARTICIPANTS

## Mr K.S. Sugara, IFS (Retd), Former PCCF (Head of Forest Force) Karnataka and Co-Chair, Expert Committee on ABS, NBA

- Having worked in forestry sector for 35 years and three years' tenure as Member Secretary of Karnataka Biodiversity Board, I have closely experienced the biodiversity management at grassroot level. The salient points of my expression on the matter are as under: The three important terms: conservation, sustainable utilization and fair and equitable sharing of benefits arising out of utilization (ABS) used in the Biological Diversity Act, 2002 should not be interpreted in equal footing.
- Conservation of biodiversity is the main objective of the Biological Diversity Act 2002.
- The instrument provided to achieve this noble objective is ensuring sustainable utilization of biological resources. Once sustainability aspect is examined by NBA or SBB, the access of biological resources and fair and equitable sharing of benefits arising out of the utilization of biological resources will have to be decided.
- Without understanding and ensuring the sustainability of biological resources, the ABS exercise remains a mere collection of revenue and not an instrument of conservation of biological diversity.
- In order to estimate the quantity of each biological resource to be harvested sustainably, several research studies and experiments will have to be conducted. This requires substantial funding and technical manpower in field. In the existing scenario, neither NBA nor SBBs can take up such research work on sustainability.
- The sustainability of cultivated biological resources also must be examined critically and robust parameters must be standardized to conserve biodiversity in cultivated lands. While the importance of agriculture is respected, the fact remains that it is one of the main drivers of biodiversity loss all over the world

and mismanagement in cultivation threatens biodiversity in other ecosystems such as forests, rivers, lakes, ground water etc.

- Another important aspect is valuation of Biological resources. This is a huge exercise and involves significant investment and collaborative approach. Periodic updating of valuation in the context of dynamic demand and supply is key to ABS.

- The current Biodiversity Management Environment is top heavy. It has taken 18 years to understand the issues on implementation of the law. The biodiversity professionals are not available at local body level to service the Biodiversity Management Committees (BMCs).

- The routine capacity building programs and training capsules are not enough to handle the tasks on hand. Biodiversity professionals are required to provide regular service to Biodiversity Management Committees for effective implantation of Biological Diversity Act. They must be employed as regular employees at least in all biodiversity rich Taluqs/Blocks in the country. The concerned line departments will also be benefitted from these professionals.

- Adequate funds should be provided to Biodiversity Management Committees to discharge their functions. Lot needs to be done regarding preparation of quality People's Biodiversity Registers by involving local people and their validation.

- Biodiversity Management Committees are part of local body and mainstreaming of implementation of conservation and ABS in *Panchayat* system is humungous task.

- As observed by me from 2010 onwards, National Biodiversity Authority has come up a long way in shouldering the responsibilities and made excellent contributions. The current leadership has taken-up various initiatives to invigorate and engage various institutions and sectors to achieve higher outcomes. I am sure that they will provide practical solutions to important issues such as amendments to BD Act & Rules, harmonization and convergence among institutions & bureau and generate consensus and synergy. A big applaud to Dr V B Mathur.

- However, much more needs to be attended at the level of State Biodiversity Boards and BMCs. The recommendations of various speakers are quite relevant. I wish to specially stress that Dr S K Sharma, Former Director ICAR-NBPGR spoke for need of valuation of biodiversity, strengthening of BMCs, creation of National Fund for ABS and its utilization by BMCs and conservation departments and tracing the sources of biological resources procured from markets. Sri P N Narayanan Unny, Farmer from Navara Eco Farm provided excellent inputs for practical solutions at grassroot level.

- Sustainability, valuation and strengthening of BMCs with technical and financial resources must be taken up on priority. Needless to state that ABS has tremendous potential to reverse the trend of migration from rural areas to urban centres and it can be important instrument in building *Atmanirbhar Bharat* in true sense.

## Dr Umesh Srivastava, Consultant, TAAS, and Former Assistant Director General (Horticulture), ICAR

- There is need to ensure that farmers continue safeguarding and enhancing agricultural biodiversity. All targets in SDG-2 are inter-connected and similar is the inter-connectivity between all the goals, clearly emphasizing that maintaining genetic diversity of seeds and cultivated plants, etc. and equitable sharing of the benefits with the farmers is key to achieve zero hunger, food security and improved food, nutritional and livelihood security and protection of environment and ecology, other targets and goals set under the SDG including climate change adaptation and issue of Biodiversity.
- Gene Savior awards including financial support are given every year to farming communities and individual farmers. There is need to evaluate the role of these awardees impacting in the areas for conservation and safeguarding the rare genetic materials by the farmers in the hotspot areas around them.
- There is dire need to make conserved genetic resources in different gene banks/ repositories serviceable, on extreme priority, so that these may be utilized and share the benefits accrued from these valuable resources, otherwise it has no value.
- There is need to create farmer centric strategies for the conservation of genetic resources and associated traditional knowledge, also identification and removal of local constraints which inhibit sustaining *in situ*/ on-farm genetic resource collection and conservation.
- What would be the strategy so that, farmers actually benefit from various provisions under the law and under programs. Special recognition to the role of women as repository of traditional knowledge in conservation and utilization of genetic resources.
- Overlapping areas and ambiguities in the provisions available in various legislations in BDA and PPV&FRA regarding Farmers' Rights and Benefit Sharing may be re-visited and ambiguity therein be removed. Also, legislation pertaining to the protection of farmers' traditional knowledge against misappropriation, very little has been done when it comes to implementation. This may also be attended to.
- A clear-cut Road Map for realizing Farmers' Rights for protecting agrobiodiversity and BS is essentially needed

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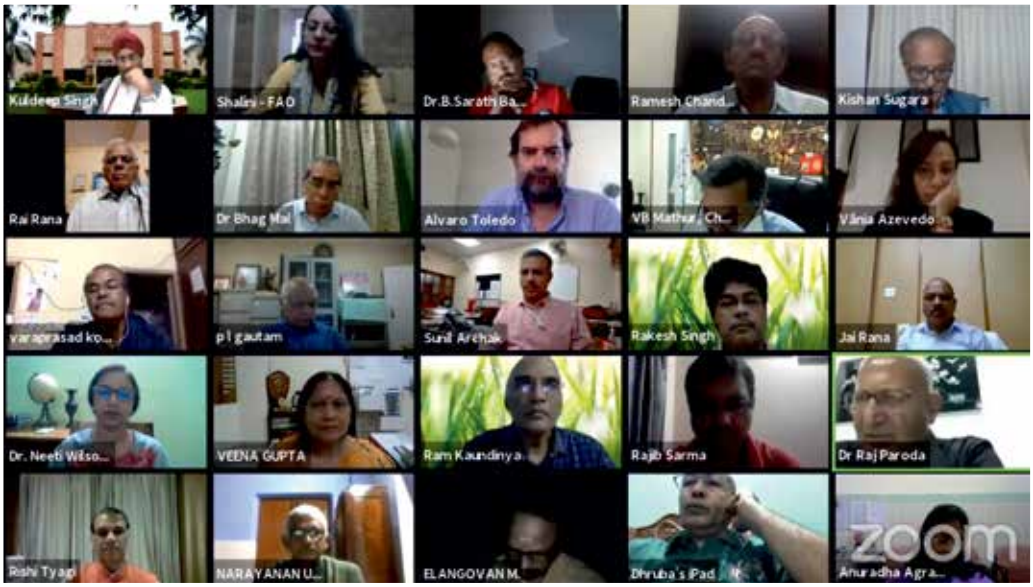
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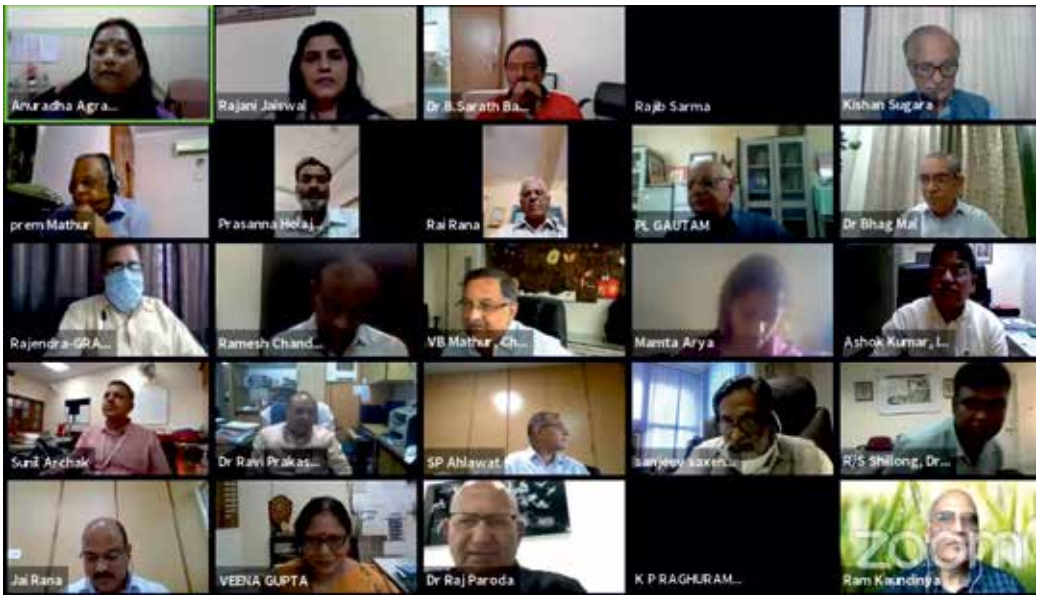
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The ISPGR is a non-profit, multidisciplinary scientific society involved in various issues of plant genetic resources (PGR) and related fields. The ISPGR was formally registered under the Indian Societies Act (1860) on November 3, 1987 with the Registrar of Societies, Delhi, India (Registration No. S/18336 of 1987). The primary objective of the society is to provide a forum to various workers in the field PGR to express their views, publish their findings and interact with different stakeholders. The Society regularly publishes its research journal, the 'Indian Journal of Plant Genetic Resources', since 1987. It also facilities publication of books, proceedings and other literature related to PGR. The ISPGR periodically organizes conferences, seminars, symposia, meetings and lectures. It also confers awards and recognition to PGR workers. Membership to ISPGR is open to all persons interested in the field of PGR in India and abroad.