



Conserving Agrobiodiversity and Promoting Livelihoods: *The Role of Biological Diversity Act, 2002*

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Species Richness in India (*Intra specific variation*)

Local Varieties of Aromatic Pickle-Mango in Sirsi, India

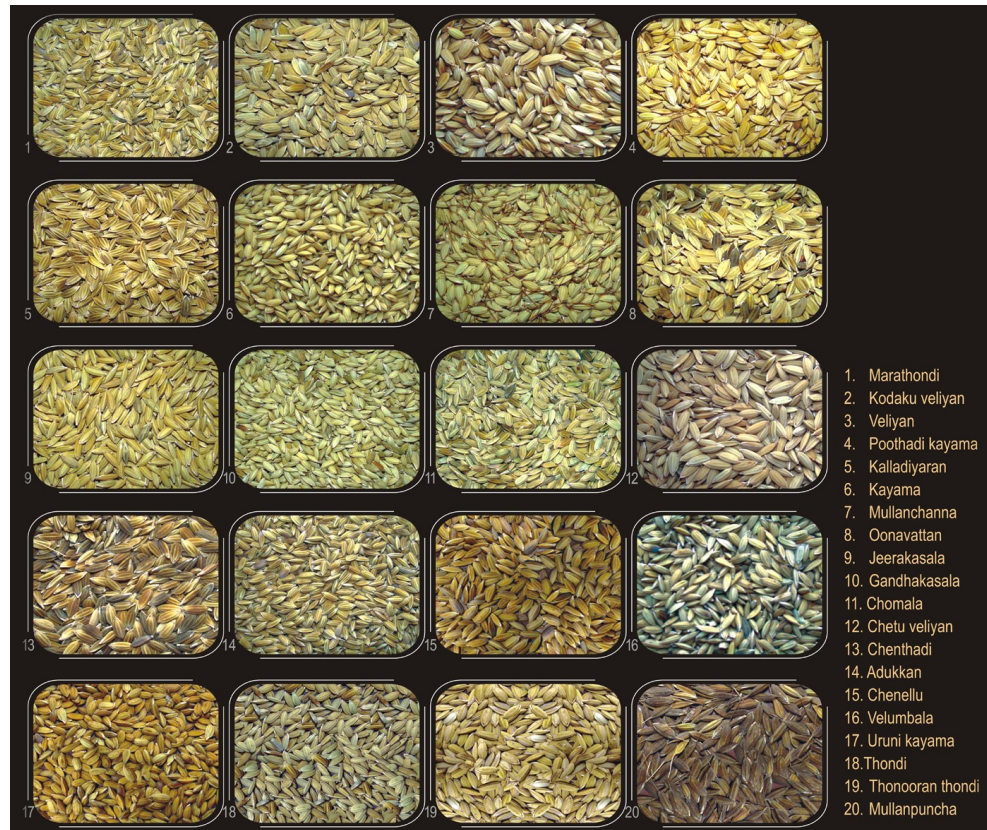
- A product of bio-cultural tradition of India



(Source: Vasudeva, 2011)

Species Richness in India (*Intra specific variation*)

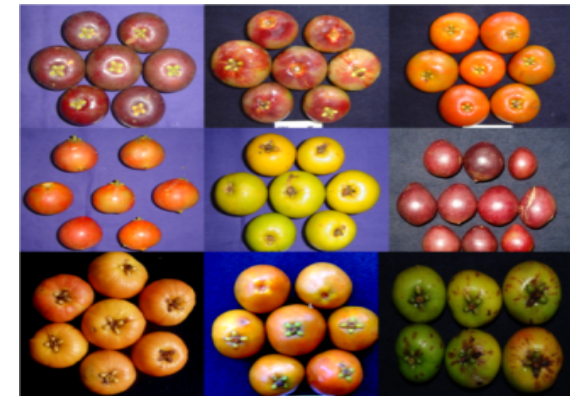
Traditional Varieties of Rice in Wayanad



Citrus spp.

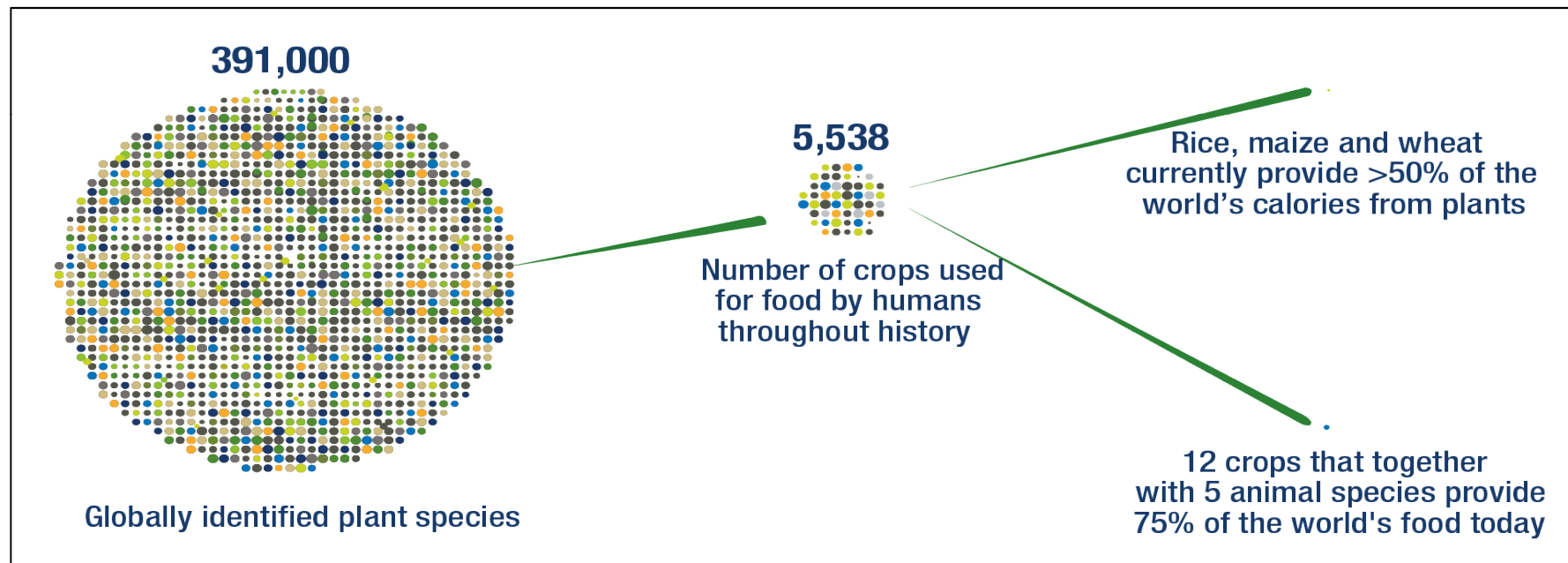


Garcinia spp.



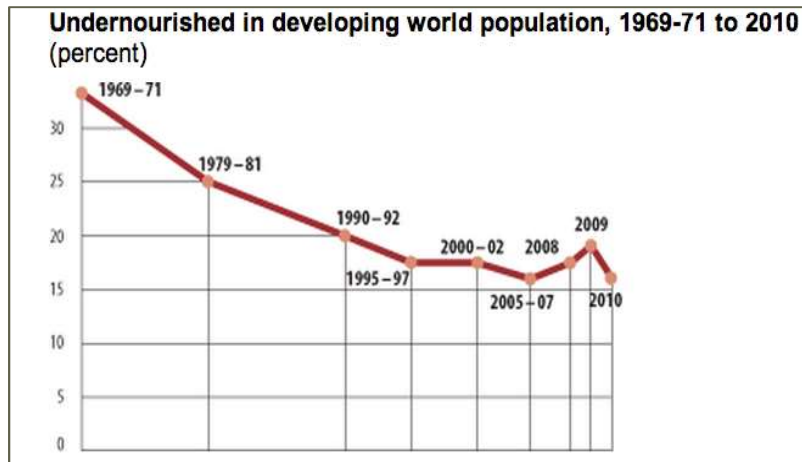
Agricultural Systems and Conservation of Agrobiodiversity

- ❖ For decades agriculture has been focused on increasing yields of commodity staple crops - often energy rich but invariably micronutrient poor
- ❖ Narrowing the global diet, people currently get 90% of their calories, protein and fat from the same 50 crops

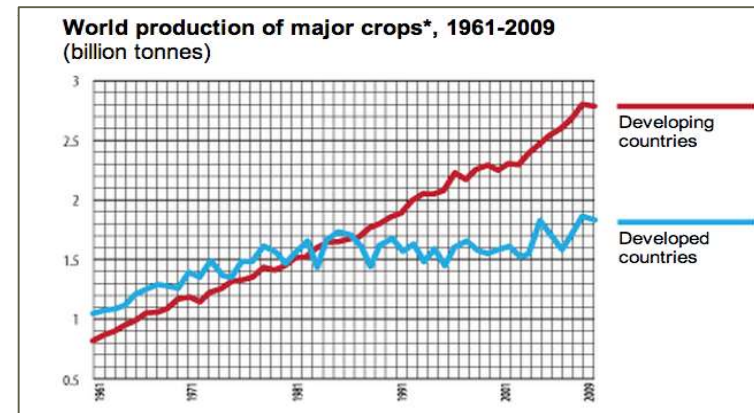


The 20th Century Scenario...

- ❖ Over the past century, farmers and breeders have used genetic diversity to breed high-yielding varieties. The Green Revolution brought new varieties and production methods to developing countries, with significant results.
- ❖ The world has been remarkable in delivering food to a growing population. But it has come at a cost.



FAO Save and Grow, 2011



FAO Save and Grow, 2011

The number of local varieties and breeds of domesticated plants and animals has decreased sharply

Proportion of the world's mammal and bird breeds by risk status category



Number of seed varieties on sale in 1983 (light green) as percentage of those on sale in 1903 (100%)

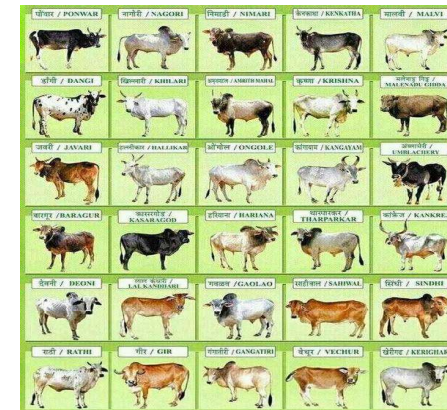


Image: <https://www.quora.com/What-is-the-breed-name-of-the-Indian-Desi-cow>



Photocredit Daniel M. Cáceres

‘Seed Systems Contribute Immensely’

Seed systems integrate 5 basic functions:

- ❖ Innovation
- ❖ Seed production and distribution
- ❖ Regulation
- ❖ Seed access support
- ❖ Conservation

These 5 functions can be found in any type of seed system - from farmers who rely on their own seed with occasional seed exchanges with family, neighbors and in open markets - to access seeds as well as to a fully-developed commercial seed sector.



Photo: Women in a seedbank, India. Credit: Bioversity International/P. Bordon

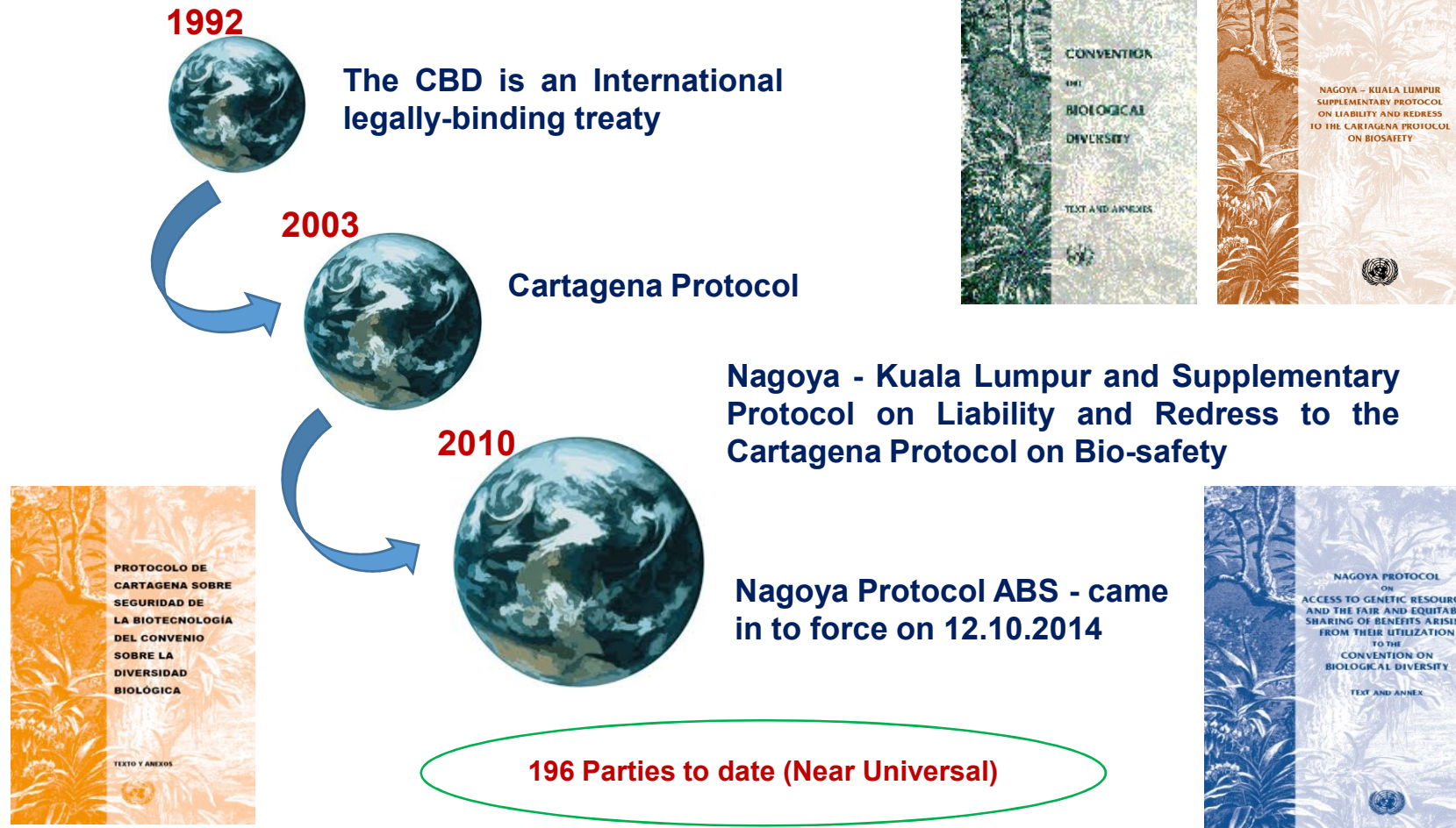
Nutritional Security...

- ❖ Although India has achieved self sufficiency in food grains production in a macro sense, it also has nearly a quarter of worlds' food insecure people.
 - ❖ Further, both macro-and micro-nutrient malnutrition is widespread.
 - ❖ 18.7% women and 16.2% of men are unable to access enough food to meet basic nutritional needs.
 - ❖ 32% of children below five years are still underweight as per the recently related 5th National Family Health Survey Report (2019-2021)
- More...

Nutritional Security...

- ❖ India is also ranked 101 out of 116 countries in the Global Hunger Index, 2021
- ❖ The country is this facing multiple challenges of achieving nutritional security as well as addressing:
 - a) declining land productivity
 - b) increasing land degradation and
 - c) loss of ecosystem services with change in land uses

Convention on Biological Diversity



Biological Resources and Emergence of ABS in the CBD

- ❖ Biological resources as Common Property Resources (pre-CBD conception)
- ❖ Large part of the world's biodiversity (megadiversity) lies in poorer countries
- ❖ Huge quantities of bioresources continue to be harvested from the wild but equitable sharing of benefits is not adequately happening
- ❖ Local communities are involved but have limited direct/equitable benefits of collection and/or use.
- ❖ Bioresources are the base for several industries contributing to the national economy and human security (pharmaceuticals, nutraceuticals, cosmetics, agro-processing and bio-technology etc.).



CBD provides for Regulated Access to Biological/Genetic Resources

CBD Article 15 - Access to Genetic Resources:

Art.15.1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.

Art.15.4. Access, where granted, shall be on mutually agreed terms (MAT) and subject to the provisions of this Article.

Art.15.5. Access to genetic resources shall be subject to prior informed consent (PIC) of the Contracting Party providing such resources, unless otherwise determined by that Party.

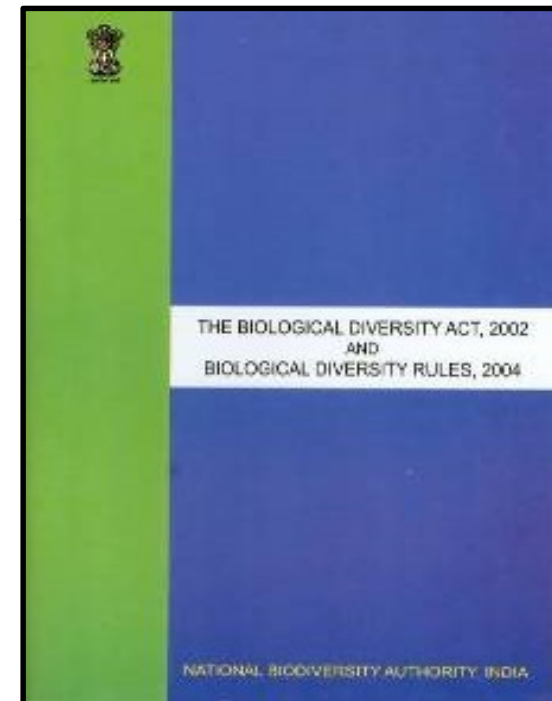


Biological Diversity Act, 2002

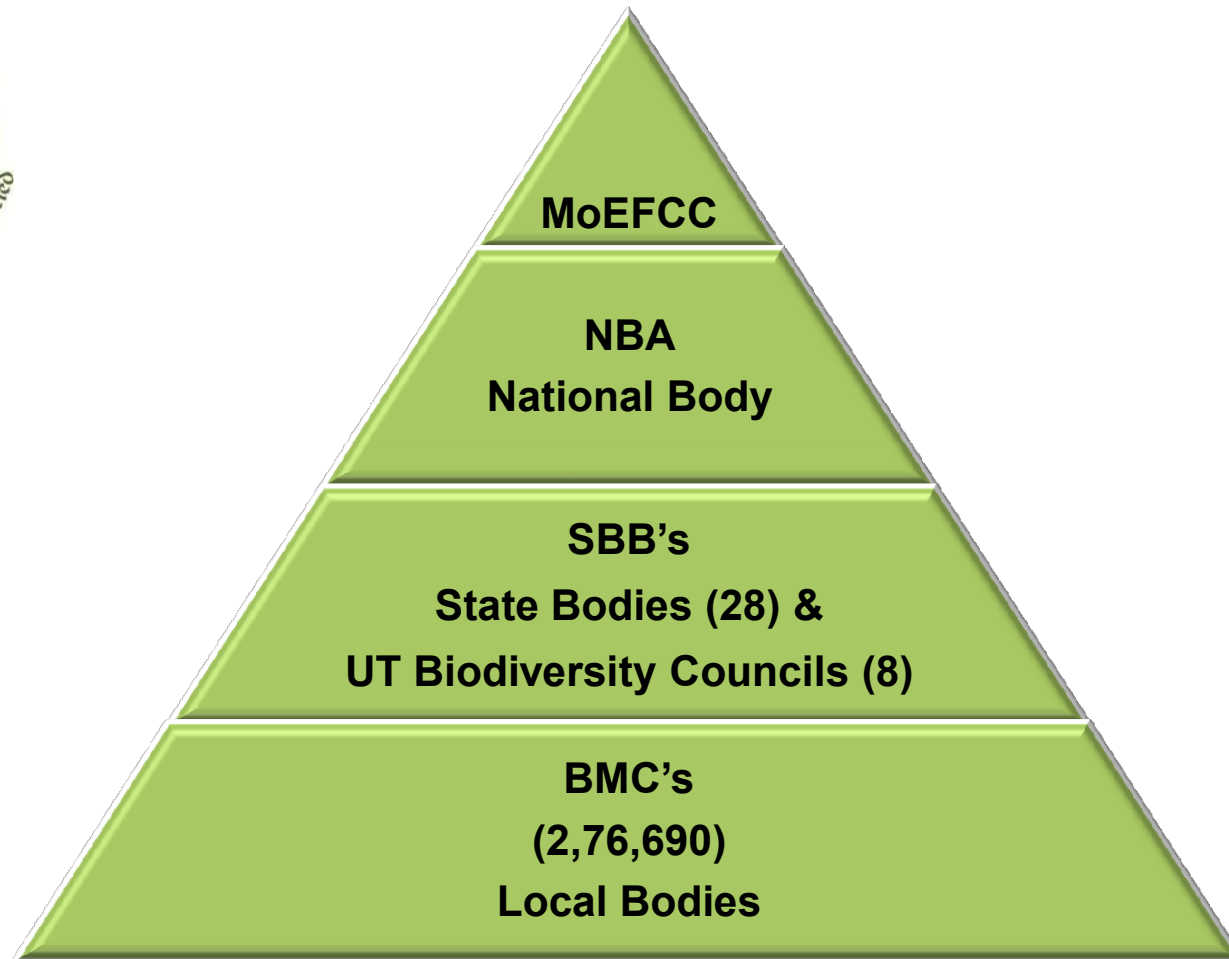
Three-tier Biodiversity Governance in the Country (NBA, SBB, UTBC, BMC)

12 Chapters, 65 Sections:

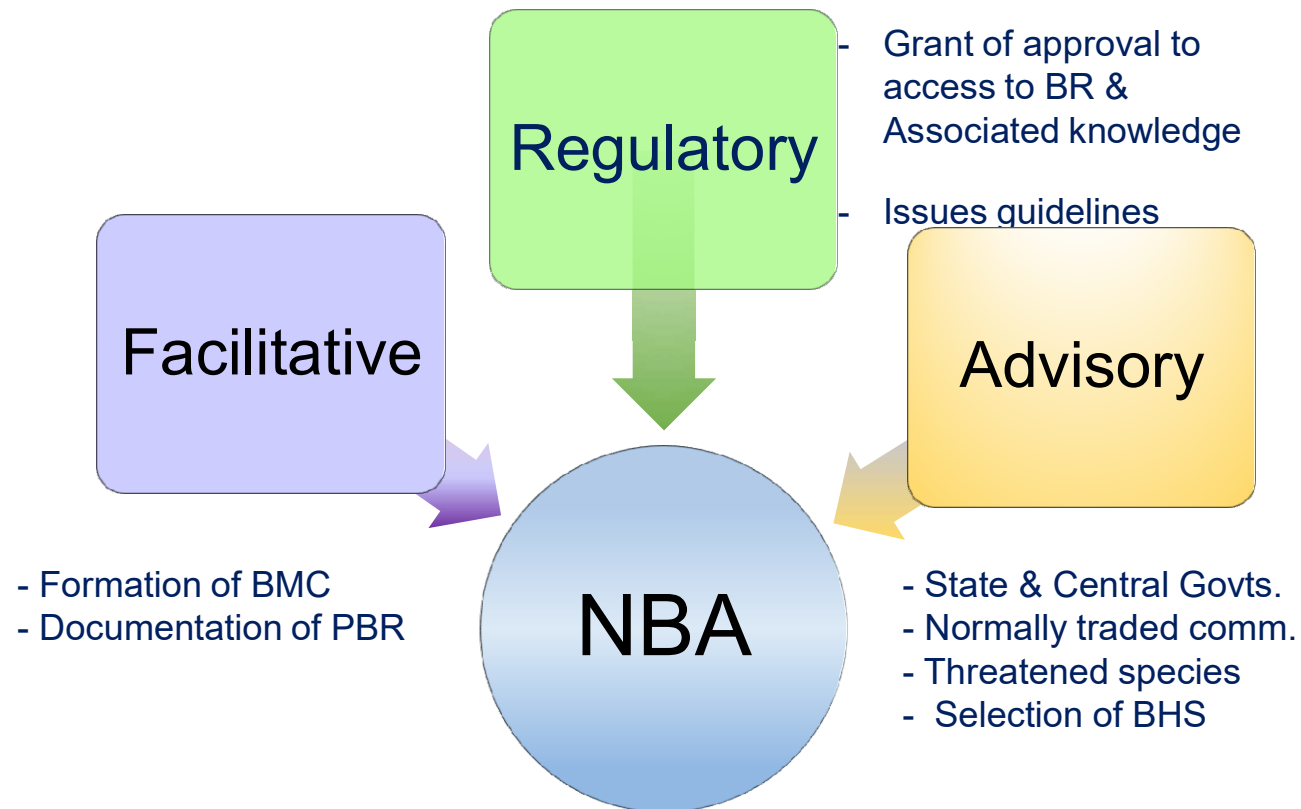
1. Preliminary (2)
2. Regulation of Access to Biological Diversity (5)
3. National Biodiversity Authority (10)
4. Functions and Powers of the NBA (1)
5. Approval by NBA (3)
6. State Biodiversity Board (4)
7. Finance Accounts and Audit of NBA (5)
8. Finance Accounts and Audit of SBB (5)
9. Duties of the Central and State Govt (5)
10. Biodiversity Management Committees (1)
11. Local Biodiversity Fund (6)
12. Miscellaneous (18)



Institutional Structures under the Biological Diversity Act, 2002



Functions of National Biodiversity Authority



Jurisdiction of NBA/SBBs under the BD Act, 2002

Activities	Persons u/s 3 (2)	Persons u/s 7
Research (S. 3)	NBA	NA
Bio-survey and Bio-utilization (S. 3)	NBA	SBB
Commercial utilization (S. 3)	NBA	SBB
Transfer of research results (S. 4)	NBA	NBA
Intellectual Property Rights (S. 6)	NBA	NBA
Third party transfer of already accessed bioresources/ knowledge (S. 20)	NBA	NA
Sending/ carrying of biological resources outside India for research / emergency purpose (Form-B)	NA	NBA

- ❖ Section 7 person or entity, who is a citizen of India doing research on Indian biological resources is NOT a regulated activity under BD Act

‘To regulate or Not to regulate’

Agrobiodiversity in the Multilateral Environmental Agreements

1719	•Thomas Fairchild – Formal Plant Breeding
1729	•First (Vilmorin) Seed Co.
1940	•Vavilov’s expeditions
1955	•Ex situ Gene (Seed) Banks
1961	•UPOV Convention
1983	•FAO International Undertaking on PGR
1989	•Revised Agreed Interpretation 4/89, Farmers’ Rights 5/89
1991	•Sovereign Rights of Nations 3/91
1992	•Convention on Biological Diversity
1995	•World Trade Organization
1996	•FAO Tech Conference - Global Plan of Action
2000	•Agenda 21
2001	•International Treaty on PGRFA adopted
	•sui generis Plant Variety Production (PPV&FR Act, 2001)
2002	•Biological Diversity Act, 2002
2004	•ITPGRFA implemented
2005	•Product patents regime (Pharmaceuticals and Biotech Products)
2014	•Nagoya Protocol to CBD came into force

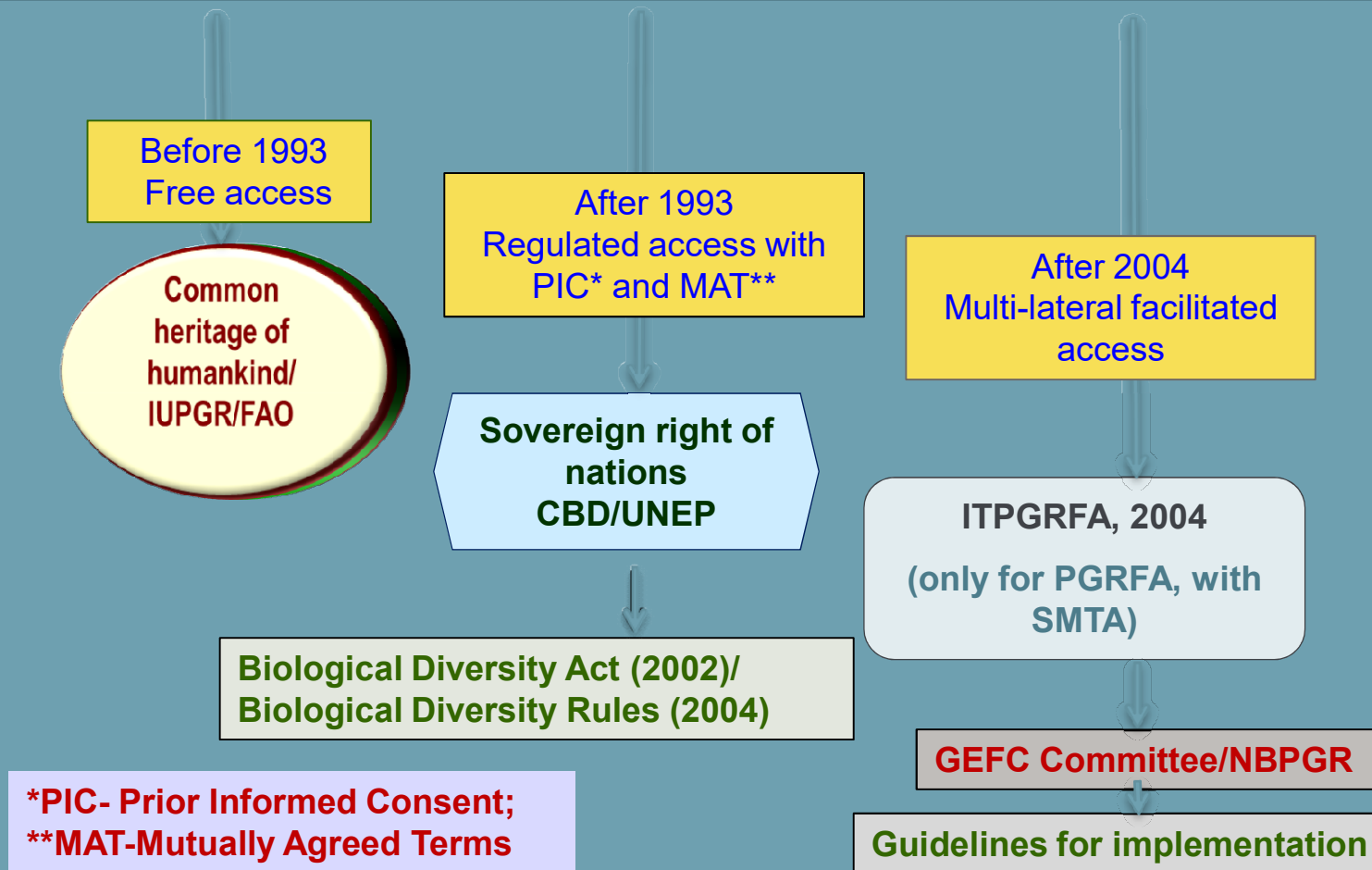
‘PGR are common heritage of mankind that should be made freely available for breeding and research’

- FAO-IUPGR

‘Facilitate access to GRFA through Standard Material Transfer Agreement’

-ITPGRFA

Access to Plant Genetic Resources under different Regimes



‘Seed Treaty’ (ITPGRFA) and the CBD : ‘An uneasy relationship’

Nagoya Protocol to CBD	ITPGRFA
Bilateral	Multilateral
Built on the idea of national sovereignty over its natural/biological resources	Built on the idea of international sovereignty on plant genetic resources for food and agriculture
Covers all genetic resources and associated knowledge	Covers only plant genetic resources given in Annex-I
Utilization (research and development) of Genetic Resources	Research, Training, Breeding for food and Agriculture
Benefit sharing goes to Providers and Conservers of genetic resources	Benefit sharing goes to Trust Fund

Inherent ABS Challenge for the ‘Seed Treaty’

- ❖ How to construct an internationally agreed framework for the conservation and sustainable use of plant genetic resources for food and agriculture,
- ❖ and the fair and equitable sharing of the benefits, within this increasing privatization, and in the context of a continuing loss of biological diversity

Biological Diversity Act, 2002

Section 8 (1). 'a body to be called the National Biodiversity Authority'

(b) three *ex officio* members to be appointed by the Central Government, one representing the Ministry dealing with Tribal Affairs and two representing the Ministry dealing with Environment and Forests of whom one shall be the Additional Director General of Forests or the Director General of Forests;

(c) seven *ex officio* members to be appointed by the Central Government to represent respectively the Ministries of the Central Government dealing with -

- (i) Agricultural Research and Education;
- (ii) Biotechnology;
- (iii) Ocean Development;
- (iv) Agriculture and Cooperation;
- (v) Indian Systems of Medicine and Homeopathy;
- (vi) Science and Technology;
- (vii) Scientific and Industrial Research;

- ❖ DARE and DAC are Members of National Biodiversity Authority
- ❖ Four Chairpersons of NBA were from Agriculture Sector and three of them were from ICAR System itself.

CHAPETR- III NATIONAL BIODIVERSITY AUTHORITY

Committees of National Biodiversity Authority

Section 13. (1) The National Biodiversity Authority may constitute a committee to deal with **agro-biodiversity**.

Explanation - For the purposes of this sub section, "agro-biodiversity" means biological diversity of agriculture related species and their wild relatives

Agrobiodiversity in the Biological Diversity Act, 2002

[COMMERCIAL UTILIZATION]

Section 2 (f)....**but does not include** conventional breeding or traditional practices in use in any agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping;

[COLLABORATIVE RESEARCH PROJECTS]

Section 5.....**sections 3 and 4 not to apply** to certain collaborative research projects involving transfer or exchange of biological resources or information relating thereto between institutions, including Government sponsored institutions of India, and such institutions in other countries

[APPLICATION FOR INTELLECTUAL PROPERTY RIGHTS]

Section 6 (3)the provisions of this section **shall not apply** to any person making an application for any right under any law relating to protection of plant varieties enacted by Parliament

[PRIOR INTIMATION TO SBBS]

Section 7provided that the provisions of this section **shall not apply** to the local people and communities of the area, including growers and cultivators of biodiversity, and vaidas and hakims, who have been practicing indigenous medicine

[NATIONAL BIODIVERSITY AUTHORITY]

Section 8 (4) (c) (NBA).... a body to be called the National Biodiversity Authority.... **(DARE & DAC as members)**.

More...

Agrobiodiversity in the Biological Diversity Act, 2002

[COMMITTEES OF NBA]

Section 13. (1) The National Biodiversity Authority may constitute a committee **to deal with agro-biodiversity**.

[DUTIES OF THE CENTRAL AND THE STATE GOVERNMENTS]

Section 36 (3).... The Central Government shall, as far as practicable wherever it deems appropriate, integrate the conservation, promotion and sustainable use of biological diversity into **relevant sectoral or cross-sectoral plans**, programmes and policies.

Section 36 (5).... The Central Government shall endeavour **to respect and protect the knowledge** of local people relating to biological diversity, as recommended by the National Biodiversity Authority....

(a) "*ex situ conservation*" means the conservation of components of biological diversity outside their natural habitats;

[BIODIVERSITY HERITAGE SITES]

Section 37 notify in the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under this Act

[DESIGNATION REPOSITORIES]

Section 39 designate institutions as **repositories** under this Act for different categories of biological resources.

[SECTION 40]

Exchange of designated accessions of genetic resources of crops listed in **Annex-1 of the ITPGRFA** has been exempted from provisions of Sections 3 and 4 of the BD Act

Agrobiodiversity in the Biological Diversity Act, 2002

[BIODIVERSITY MANAGEMENT COMMITTEES]

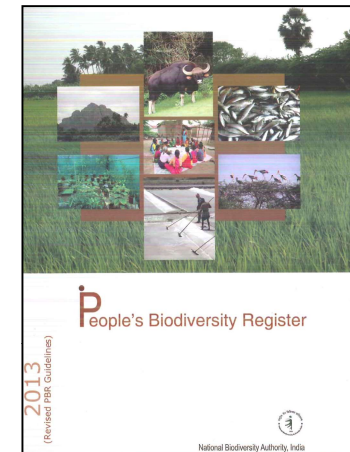
Section 41. (1)....Every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, **conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals** and microorganisms and chronicling of knowledge relating to biological diversity.

Explanation. - For the purposes of this sub-section,

(a) **“cultivar”** means a variety of plant that has originated and persisted under cultivation or was specifically bred for the purpose of cultivation;

(b) **“folk variety”** means a cultivated variety of plant that was developed, grown and exchanged informally among farmers;

(c) **“landrace”** means primitive cultivar that was grown by ancient farmers and their successors.



AGROBIODIVERSITY

Format 1: Crop Plants

Format 2: Fruit Plants

Format 3: Fodder Crops / Species

Format 4: Weeds

Format 5: Pests of Crops

Format 6: Markets for Domesticated animals

Format 7: Peoplescape

Format 8: Landscape

Format 9: Waterscape

Format 10: Soil type

Ministry of Environment and Forest Notification S.O.1911(E) dated 8 November, 2006

Guidelines for International Collaboration Research Projects issued under Section 5 of BD Act, 2002

**MINISTRY OF ENVIRONMENT AND FORESTS
NOTIFICATION**

New Delhi, the 8th November, 2006

S.O. 1911(E).— In exercise of the powers conferred by clause (a) of sub-section (3) of section 5 of the Biological Diversity Act, 2002 (18 of 2003) the Central Government hereby makes the following guidelines namely:-

1.(1) These guidelines may be called the Guidelines for International Collaboration Research Projects Involving Transfer or Exchange of Biological Resources or Information relating thereto between institutions including government sponsored institutions and such institutions in other countries.

(2) They shall come in to force on the date of their publication in the Official Gazette.

(3) In view of the fact that collaborative research projects have been exempted from obtaining approval of the National Biodiversity Authority established under section 8 of Biological Diversity Act, 2002, (hereinafter referred to as the Act) and that the need for transfer and exchange of biological resources cannot be ruled out in such projects, *sponsored under the bilateral and multi-lateral agreement, Memorandum of Understanding and work plan etc. under the International Collaborative Research Projects*, these guidelines are hereby notified by the Ministry of Environment and Forests in compliance with the said provisions of the Act and for such research projects.

Collaborative Research Projects duly approved by the Government and conform to policy guidelines issued by the Central Government are exempted from Section 3 and 4 of BD Act.

<http://nbaindia.org/uploaded/pdf/notification/7%20%20collaborative%20guidelines.pdf>



National Biodiversity Authority
(An Autonomous and Statutory Body of the Ministry of Environment and Forests, Government of India)

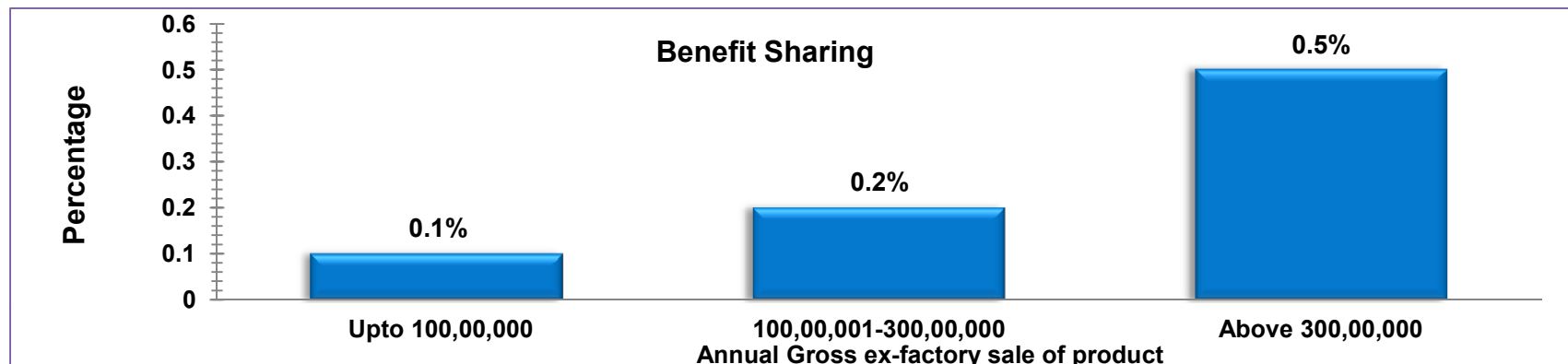
Guidelines for Designated Repositories

S. No.	Category of Biological Resource	Name of the Designated Repository
1	Flora (angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, macro fungi, macro algae)	Botanical Survey of India and its Regional centres. Indian Council of Forestry Research (FRI, Dehradun and IFGTB, Coimbatore; NBRI, Lucknow
2	Fauna Fauna in Protected Areas	Zoological Survey of India and its Regional centres. TFRI, Jabalpur for termites, butterflies and moths Wildlife Institute of India, Dehradun
3	Genetic Resources	NBPGR Cultivated Plants and their Wild Relatives NBAGR Domestic Animals NBFGR Fish NBAIM Agriculturally Important Microorganisms NBAIL Agriculturally Important Insects, Mites, Spiders
4	Marine Flora and Fauna	NIO, Goa
5	Microorganisms	IMTECH, Chandigarh (actinobacteria, bacteria, fungi and yeasts) NCCS, Pune (bacteria, fungi (including yeasts), recombinant DNA materials (in the form of clones in bacterial host) and bacteriophages) IARI, New Delhi (fungi / blue-green algae)
7	Viruses	NIV, Pune

All National Bureaus under the ICAR System are designated as National Repositories u/s 39 of BD Act

Benefit Sharing Component under ABS Regulations, 2014

1. Commercial Utilization:

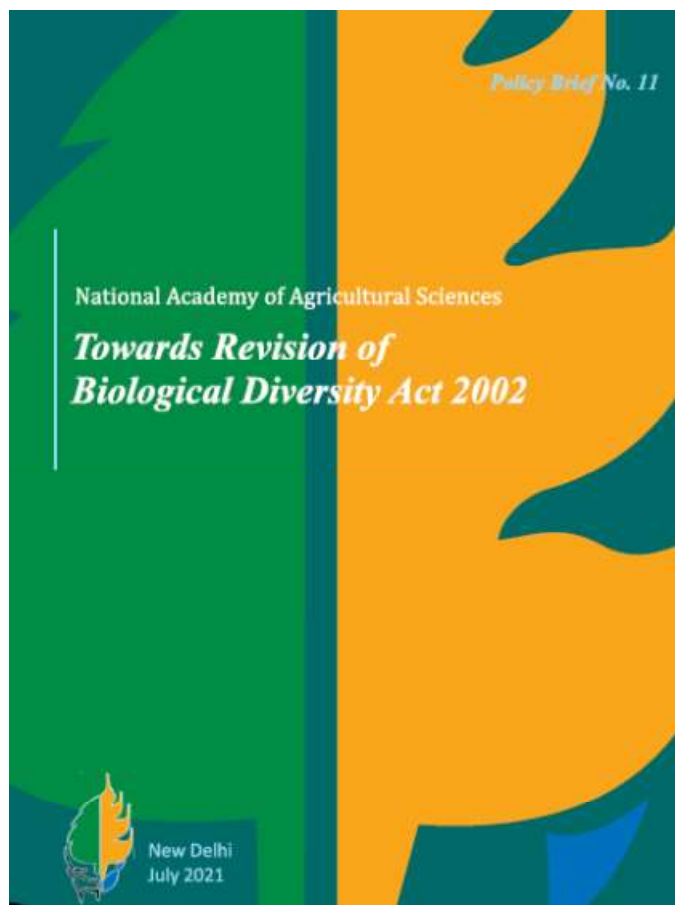


2. Transfer of results of research: benefit sharing obligation is **3.0 to 5.0%** of the monetary consideration.

3. Intellectual Property Rights (IPR) :

If applicant himself commercialize the process/product/innovation	0.2 – 1.0% of Annual Ex-factory gross sale (minus govt. taxes)
If applicant assigns / licenses the process / product / innovation to a third party for commercialization	3.0 – 5.0 % of the fee received in any form. And 2.0 – 5.0 % of Royalty

4. Transfer of accessed bio-resources and AK, the benefit sharing obligation is **2.0 to 5.0%** (following sectoral approach) of any amount and / or royalty received from the transferee.



Understanding of the Biological Diversity Act, 2002 as well as its interpretation and effective implementation is a key challenge!!!



**Preparation of a document on
“Frequently Asked Questions (FAQs)
on the Biological Diversity Act, 2002”**

4.1 Review of selected schemes: strengths, weaknesses and constraints in implementation and strategies for mainstreaming biodiversity

This section is prepared based on extensive consultation among subject matter experts, interaction with selected senior officials from the State Development Departments from across the country and final moderation and triangulation with the stakeholders.



Why Mainstreaming? - Biodiversity Expenditure Perspective

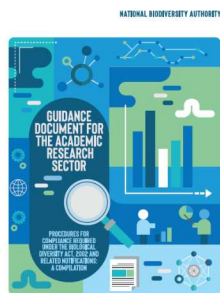
All India
(2018-19)

Scheme	Allocation 2018-19 [In Million \$]	BD Attribution (%)	BD contribution [In Million \$]
Ministry of Agriculture and Farmers Welfare			
Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR)	520.16	9.01	46.87
National Food Security Mission (NFSM)	244.29	10.13	24.75
Paramparagat Krishi Vikas Yojana (PKVY)	52.02	67.49	35.11
Rainfed Area Development (RAD)	33.81	37.5	12.68
National Mission on Oilseeds and Oil Pam (NMOOP)			
Soil Health Card (SHC) & Soil Health Management (SHM) Schemes	57.8	25.5	14.74
Mission for Integrated Development of Horticulture (MIDH)	366.42	24.16	88.53
National Bamboo Mission (NBM)	43.35	16.25	7.04
NMSA-Sub-Mission on Agroforestry (SMAF)	10.84	33.5	3.63
Sub Mission on Seed and Planting Material (SMSP)	47.97	17.11	8.21
Sub-Mission on Plant Protection and Plant Quarantine (SMPPQ)	18.68	37.5	7.01
Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)- Per Drop More Crop	577.95	15.0	86.69
Sub-Mission on Agricultural Extension (SMAE) under Umbrella Scheme – Green Revolution – Krishonnati Yojana	147.38	2.91	4.29
Sub-Mission on Agricultural Mechanization (SMAM)	168.37	7.48	12.59
Department of Fisheries, Dairying & Animal Husbandry			
Rashtriya Gokul Mission (RGM)	43.56	15	6.53
National Livestock Mission (NLM)	54.91	20.52	11.27
Blue Revolution (BR)	91.4	10	9.14
Ministry of AYUSH			
National Ayush Mission (NAM)	72.88	82.5	60.13
Minimum Support Price for Minor Forest Produce (MSP for MFP)	18.78	15.0	2.82
Ministry of Rural Development			
Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA)	15893.66	21.05	3345.62
National Rural Livelihood Mission (NRLM)	830.8	0.62	5.15

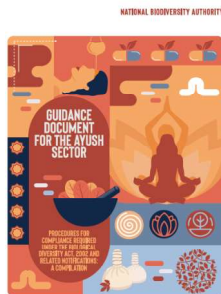
Themes for Mainstreaming Biodiversity in the Agricultural Sector

1. **Mainstreaming Traditional Varieties into gene pool:** Support to ensure economic viability; Operationalize 4C continuum of conservation, cultivation, consumption and commerce; Opening niche markets for traditional foods, etc.
2. **Crop Wild Relatives:** Mapping CWR; Hotspots; assessment of genetic erosion; conservation targets & strategies.
3. **ABD vis-à-vis Climate Change Adaptation:** In-site on farm conservation of traditional crops and landraces; Managing alien invasive species; Study climate analogues.
4. **Organic Farming:** *Quality inputs (seeds, biofertilizers); Supply chain/market issues; Disincentivize chemical use; Certification issues; etc.*
5. **Integrated Pest Management (IPM):** Efficacy & availability of biopesticides; economic and operational feasibility
6. **Community Seed banks:** Key to protect BD. Engage community. **Natural Resource Management:** INM, IWM, afforestation; soil conservation; soil health (SOC)

Sector – Specific Guidance Documents on BD Act



Research



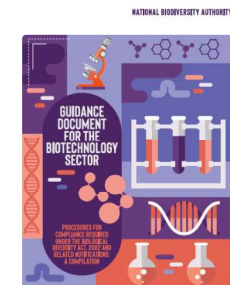
AYUSH



Cosmetics



Seeds



Biotechnology

The Way Ahead...

1. Preparation and Dissemination of FAQ document to clarify doubts
2. Preparation of Sector-specific Guidance Documents
3. Engage with Agricultural Sector through NAARM and other such institutions for capacity development

The Way Ahead...

- ❖ Promote better convergence between agriculture, agrobiodiversity and biodiversity sectors to ensure efficient *“science-society-policy interface”*.
- ❖ Need to bring in a *“theory of change”* that focuses sustainability and resource efficiency as the central pillars for transforming both agriculture and biodiversity.

thank you...

