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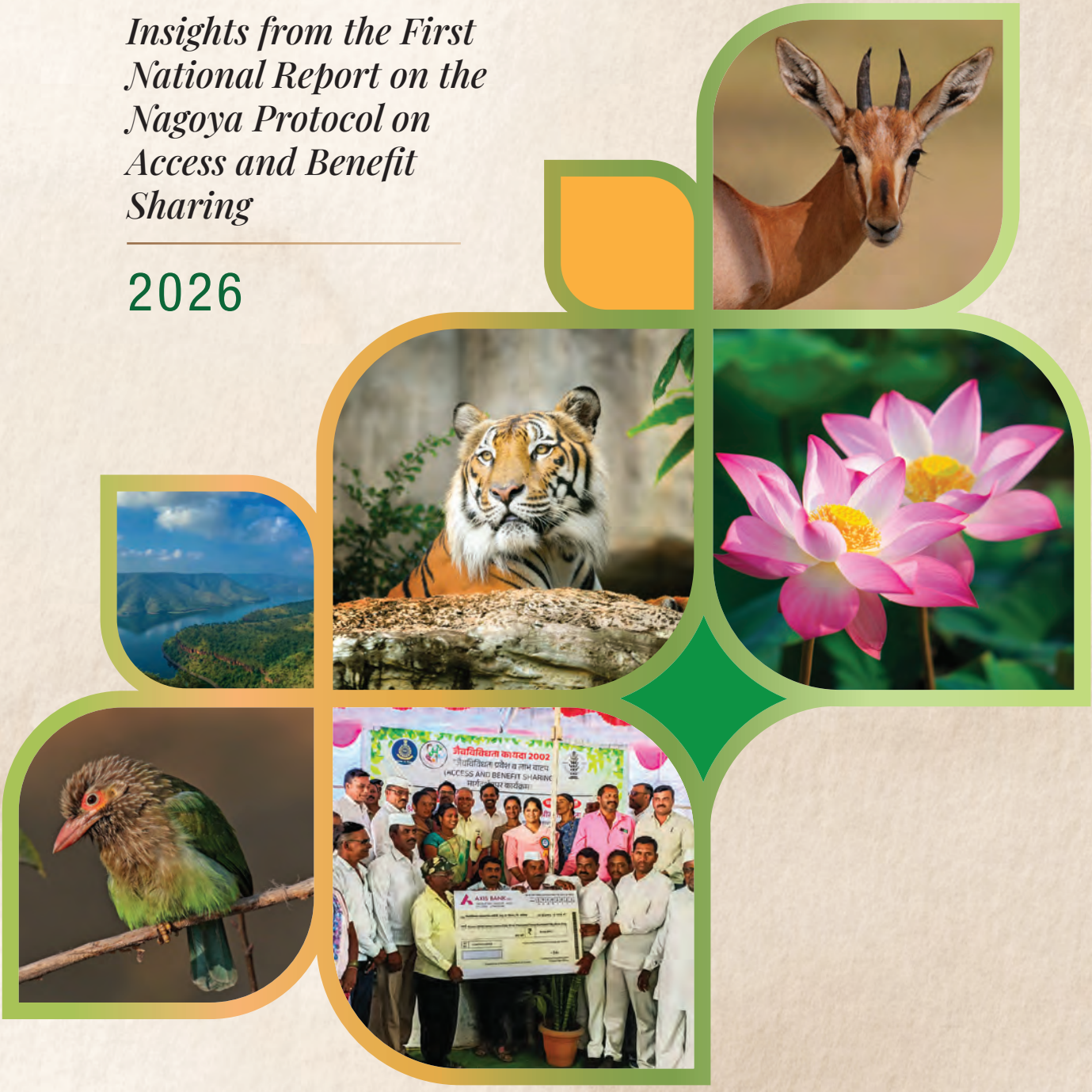
Implementation of ABS in India

Insights from the First National Report on the Nagoya Protocol on Access and Benefit Sharing

2026



Ministry of Environment, Forest and Climate Change, Government of India

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National Biodiversity Authority, India
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Implementation of ABS in India

Insights from the First National Report on the Nagoya Protocol on Access and Benefit Sharing

2026

Published by MoEFCC, India

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Bombax ceiba
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Ministry of Environment, Forest and Climate Change

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पर्यावरण, वन एंव जलवायु परिवर्तन
भारत सरकार

सत्यमेव जयते

भूपेन्द्र यादव
Bhupender Yadav

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Minister
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Foreword

India is endowed with rich biological diversity and a long tradition of living in harmony with nature. As a megadiverse country, India remains committed to the objectives of the Convention on Biological Diversity (CBD) for conservation, sustainable use, and the fair and equitable sharing of benefits arising from the utilisation of genetic resources. The Nagoya Protocol on Access and Benefit Sharing provides a clear framework to achieve the third objective of the Convention, namely, equitable sharing of benefits arising from the utilisation of biological resources and associated knowledge.

India has established a robust legal and institutional framework under the Biological Diversity Act, 2002 (amended in 2023), supported by the Biological Diversity Rules, 2024, and the Access and Benefit Sharing Regulations, 2025. The three-tier structure comprises the National Biodiversity Authority (NBA) at the national level, State Biodiversity Boards (SBBs) / Union Territory Biodiversity Councils (UTBCs) at the state/UT level, and Biodiversity Management Committees (BMCs) at the local level. This structure ensures the effective implementation of the ABS mechanism.

India's First National Report on the Nagoya Protocol highlights the country's progress in implementing Access and Benefit Sharing and reflects its commitment to inclusive and accountable governance. At the same time, the Government of India recognises the need to further strengthen the system by improving digital processes, building institutional capacity, and enhancing stakeholder awareness.

India remains committed to advancing the objectives of the CBD and the Nagoya Protocol through continued collaboration among stakeholders, Access and Benefit Sharing which will further support biodiversity conservation, sustainable development, and the well-being of present and future generations.

This document presents India's experience in implementing the Nagoya Protocol on ABS and aims to inform and engage the wider community committed to achieving the objectives of the Convention and the Protocol.

(Bhupender Yadav)

Ministry of Environment, Forest and Climate Change

राज्य मंत्री
पर्यावरण, वन एंव जलवायु परिवर्तन
विदेश मंत्रालय
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सत्यमेव जयते

कीर्तवर्धन सिंह

Kirti Vardhan Singh

LiFE Lifestyle for Environment

Minister of State
Environment, Forest and Climate Change
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Government of India

Message

India's rich biological diversity is a national asset that sustains ecosystems, supports livelihoods, and strengthens our cultural heritage. Access and Benefit Sharing is central to this commitment, serving as a key instrument for conservation, sustainable use, and inclusive development.

India has put in place a robust and progressive policy framework through the Biological Diversity Act, 2002 (amended in 2023), the Biological Diversity Rules, 2024, and the ABS Regulations, 2025. These provide a transparent and accountable mechanism to regulate access and ensure that benefits reach the rightful custodians of biodiversity.

The National Biodiversity Authority, State Biodiversity Boards / Union Territory Biodiversity Councils and Biodiversity Management Committees work in close coordination to implement ABS across the country and ensure that local communities and traditional knowledge holders are recognised and actively engaged in decision-making and benefit sharing.

India has made significant and measurable progress in operationalising ABS. The growing number of approvals, strengthened compliance systems, and the realisation of both monetary and non-monetary benefits reflect the effectiveness of our framework. Our active engagement with the ABS Clearing-House further demonstrates India's commitment to transparency, traceability, and international cooperation.

India's First National Report (NR1) on the implementation of the Nagoya Protocol on ABS, submitted in accordance with Article 29 of the Protocol, stands as a testament to this commitment. The report presents a comprehensive account of India's policy and institutional arrangements, progress achieved and lessons learned.

I take this opportunity to commend and place on record my sincere appreciation for the diligent efforts of all individuals and institutions involved in preparing this document, which effectively captures India's progress and achievements in implementing the Nagoya Protocol.

(Kirti Vardhan Singh)

Ministry of Environment,
Forest and Climate Change
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पर्यावरण, वन एंव जलवायु परिवर्तन मंत्रालय
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Tanmay Kumar, IAS

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Secretary
Ministry of Environment,
Forest and Climate Change
Government of India

Message

The Ministry of Environment, Forest and Climate Change has submitted India's First National Report (NR1) on the implementation of the Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilisation to the Secretariat of the Convention on Biological Diversity on 27 February 2026, in accordance with Article 29 of the Nagoya Protocol.

The report covers the period from 1 November 2017 to 31 December 2025 and reflects India's continued commitment to the effective implementation of the Nagoya Protocol.

India has established a comprehensive legal and institutional framework for Access and Benefit Sharing which facilitate effective implementation of ABS across the country with the participation of local communities and traditional knowledge holders.

This publication presents India's National Report in a narrative and user-friendly format, building on the earlier questionnaire-based submission. It provides a consolidated account of policy and institutional arrangements, implementation progress, key achievements, and national and transboundary initiatives on Access and Benefit Sharing. The report aims to strengthen understanding, inform policy and practice, and address emerging challenges in the implementation of the ABS framework.

I am confident that this knowledge product, based on India's First National Report, will serve as a valuable resource for policymakers, practitioners, and stakeholders, by offering key insights into effective strategies and supporting continued progress in the implementation of the access and benefit-sharing regime.

(Tanmay Kumar)

Ministry of Environment,
Forest and Climate Change
अपर सचिव
पर्यावरण, वन एंव जलवायु परिवर्तन मंत्रालय
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Ashutosh Agnihotri, IAS

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Additional Secretary
Ministry of Environment,
Forest and Climate Change
Government of India

Message

The implementation of Access and Benefit Sharing in India has witnessed steady and progressive advancement under a well-defined policy, legal, and institutional framework. Guided by the Nagoya Protocol on ABS under the Convention on Biological Diversity, India remains firmly committed to the fair and equitable sharing of benefits arising from the utilisation of genetic resources and associated traditional knowledge.

As a megadiverse country, India places high importance on effective domestic implementation of the Protocol, supported by strong institutions, responsive governance, and sustained stakeholder engagement. In this context, the three-tier institutional mechanism established under the Biological Diversity Act continues to play a central role in ensuring effective and inclusive implementation of ABS in the country.

In alignment with this global framework, India has developed a comprehensive national system that has evolved through continuous learning and adaptive governance. The experience gained through this process has highlighted the need to strengthen implementation systems to enhance efficiency, transparency, and consistency across the country.

Against this backdrop, the document provides a consolidated and accessible account of India's policy and institutional arrangements, implementation experience, and key outcomes under the ABS framework. Complementing these efforts, strengthening digital systems and data management, including integration with national platforms and the Access and Benefit Sharing Clearing-House, is essential to improve transparency, traceability, and ease of compliance.

I would like to express my sincere appreciation to the officials of MoEFCC and NBA for their dedicated efforts in facilitating and preparing this comprehensive document, which will serve as a valuable resource for a wider audience.

(Ashutosh Agnihotri)

अध्यक्ष, राष्ट्रीय जैव विविधता प्राधिकरण
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सत्यमेव जयते

Chairperson, National Biodiversity Authority
Government of India

वीरेन्द्र तिवारी, आई.एफ.एस. (सेवानिवृत्त)

Virendra Tiwari, IFS (Retd.)

Message

India, as one of the world's megadiverse countries, possesses an extraordinary wealth of biological resources and traditional knowledge that underpin ecological security, sustainable livelihoods, and national development. The effective implementation of Access and Benefit Sharing is therefore essential to ensure that the utilisation of these resources contributes to conservation outcomes and delivers equitable benefits to their rightful custodians.

The National Biodiversity Authority has played a central role in operationalising a transparent, credible, and robust ABS framework in the country. During the reporting period from November 2017 to December 2025), 12,830 ABS approvals were granted, comprising 5,913 approvals by the NBA and 6,917 approvals by SBBs and UTBCs.

India has emerged as a global leader in ABS compliance, with 3,556 Internationally Recognised Certificates of Compliance published on the ABS Clearing-House, accounting for over 60 per cent of the global total.

The ABS mechanism has yielded tangible and measurable outcomes. An amount of Rs 263.00 crore has been realised through NBA approvals, of which Rs 145.00 crore has disbursed to beneficiaries including Biodiversity Management Committees, local communities, and farmers, thereby supporting conservation initiatives and strengthening livelihoods. In addition, Rs 51.96 crore has been mobilised by SBBs and UTBCs.

The contributions of SBBs, UTBCs, and BMCs have been instrumental in strengthening ABS implementation at the grassroots level, ensuring that benefits reach local communities and custodians of biodiversity.

India's commitment to the Nagoya Protocol is further reflected in its proactive reporting, including the submission of the Interim National Report (2017) and the First National Report (February 2026), demonstrating sustained engagement with global processes. This knowledge product builds upon India's First National Report submitted in February 2026 and presents the information in a more comprehensive and accessible format.

Going forward, the National Biodiversity Authority remains committed to advancing an effective, transparent, and equitable ABS regime, ensuring the fair sharing of benefits with local communities while safeguarding India's rich biodiversity for future generations.

(Virendra Tiwari)

Acknowledgement

The preparation of India's First National Report on the implementation of the Nagoya Protocol on Access and Benefit Sharing reflects a sustained and collaborative effort involving multiple institutions and stakeholders across the country.

I express my profound gratitude to the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, for its exemplary leadership, guidance, and continued support in advancing the Access and Benefit Sharing framework and in facilitating the preparation of this report.

I place on record my deep sense of gratitude to Shri Tanmay Kumar, IAS, Secretary, MoEFCC, for his visionary guidance, constant encouragement, and invaluable support towards the effective implementation of the Nagoya Protocol, as well as for ensuring the timely submission of this First National Report.

I convey my sincere appreciation to Shri Vir Vikram Yadav, IAS, Additional Secretary, MoEFCC, for his insightful guidance and steadfast support in the preparation and submission of the report. I also gratefully acknowledge the leadership and guidance of Shri Ashutosh Agnihotri, IAS, Additional Secretary, MoEFCC, in furthering national initiatives related to the development of knowledge products based on the National Report.

I express my respectful appreciation to Shri Virendra Tiwari, Chairperson, National Biodiversity Authority, for his invaluable guidance and insightful direction throughout the process.

I gratefully acknowledge the valuable guidance and support extended by Shri Ragu Kumar Kodali, Scientist 'G', MoEFCC, Dr. Achuta Nand Shukla, Scientist 'E', MoEFCC and Ms. Nishtha, Under Secretary, MoEFCC.

I place on record my sincere appreciation to Shri T. Rabikumar, IFS, Chairman of the Multi-Stakeholder Working Group and Director, ICFRE–Institute of Forest Genetics and Tree Breeding, Coimbatore, along with all members of the Working Group, for their dedicated efforts and thoughtful inputs in reviewing and finalising the report.

I acknowledge the contributions of the State Biodiversity Boards and Union Territory Biodiversity Councils, whose field-level insights, constructive inputs and photographs provided by them have significantly enriched the quality and comprehensiveness of the report.

I extend special appreciation to the Biodiversity Management Committees and local communities, whose enduring role as custodians of biological resources and associated traditional knowledge forms the cornerstone of effective implementation of ABS in the country. I also gratefully acknowledge the support of the United Nations Environment Programme and partner organisations for their valuable technical and financial assistance in the preparation of this report.

I commend the dedicated efforts of Mr. K. Satheesh, Scientific Consultant, CBD Cell, NBA; Dr. J. Soundrapandi, Project Officer, UNDP; Shri P. Anandhakumar, Technical Assistant, NBA; Dr. K.P. Raghuram, Technical Officer (Benefit Sharing), NBA; Dr. R. Srirama, Scientific Consultant, CBD Cell, NBA; Ms. Kaveri Choudhary, Scientific Consultant, CBD Cell, MoEFCC; Shri Sameer Dubey, Senior Young Professional, MoEFCC; Dr. Ahmed Arfath Ghani, Young Professional, NBA, Dr. J. Joyson Joe Jeevamani, Scientific Consultant, CBD Cell and other officers of the National Biodiversity Authority, who have worked with diligence and commitment in compiling, analysing, and finalising the report within the stipulated timelines.

This knowledge product is expected to serve as a valuable reference for policymakers, researchers, and stakeholders, and to further strengthen the effective implementation of Access and Benefit Sharing in India.

Dr. B. Balaji, IFS

Member Secretary, National Biodiversity Authority.

List of Abbreviations

ABLE	Association of Biotechnology Led Enterprises
ABS	Access and Benefit Sharing
ABS CH	Access and Benefit Sharing Clearing House
ABS Regulation, 2014	Guidelines on Access to Biological Resources and Associated Knowledge and Benefit Sharing Regulations, 2014.
ABS Regulation, 2025	Biological Diversity (Access to Biological Resources and Knowledge Associated thereto and Fair and Equitable Sharing of Benefits) Regulations, 2025
ADMA	Ayurvedic Drug Manufacturers' Association
AHTEG	Ad Hoc Technical Expert Group
AMAM	Association of Manufacturers of Ayurvedic Medicine
AMMOI	Ayurvedic Medicine Manufacturers Organisation of India
ASBB	Assam State Biodiversity Board
ASEAN	Association of Southeast Asian Nations
AYUSH	Ayurveda, Yoga, Naturopathy, Unani, Siddha and Homoeopathy
BBNJ Agreement	Agreement on Marine Biological Diversity of Areas Beyond National Jurisdiction
BD Act	Biological Diversity Act, 2002
BD Rules, 2004	Biological Diversity Rules, 2004
BD Rules, 2024	Biological Diversity Rules, 2024
BDMA	Bulk Drug Manufacturers Association
BHS	Biodiversity Heritage Sites
BIOFIN	Biodiversity Finance Initiative
BIRAC	Biotechnology Industry Research Assistance Council
BMC	Biodiversity Management Committee
BRSI	Biotech Research Society of India
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CBD	Convention on Biological Diversity
CEBPOL	Centre for Biodiversity Policy and Law
CHASE	Centre for Himalayan and Sustainable Environment
CII	Confederation of Indian Industry
COP	Conference of the Parties

COP-10	10th Meeting of the Conference of the Parties to CBD
COP-15	15th Meeting of the Conference of the Parties to CBD
COP-16	16th Meeting of the Conference of the Parties to CBD
COP-MOP	Conference of the Parties serving as the Meeting of the Parties
CPCs	Checkpoint Communiqués
CSIR	Council of Scientific and Industrial Research
CSIR-IIIM	CSIR – Indian Institute of Integrative Medicine
CSR	Corporate Social Responsibility
DAHDF	Department of Animal Husbandry, Dairying and Fisheries
DGFT	Directorate General of Foreign Trade
DSI	Digital Sequence Information
EIACP	Environmental Information, Awareness, Capacity Building and Livelihood Programme
FICCI	Federation of Indian Chambers of Commerce and Industry
FMCG	Fast-Moving Consumer Goods
FSII	Federation of Seed Industry of India
GEF	Global Environment Facility
GIA	Grant-in-Aid
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IBHA	Indian Beauty & Hygiene Association
ICAR	Indian Council of Agricultural Research
ICAR-NIHSAD	ICAR – National Institute of High Security Animal Diseases
ICFRE	Indian Council of Forestry Research and Education
ICGEB	International Centre for Genetic Engineering and Biotechnology
IDMA	Indian Drug Manufacturers' Association
IFGTB	Institute of Forest Genetics and Tree Breeding
IOCL	Indian Oil Corporation Limited
IPR	Intellectual Property Rights
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IVMA	Indian Vaccine Manufacturers Association
JFMCs	Joint Forest Management Committees

KMGBF	Kunming-Montreal Global Biodiversity Framework
LBF	Local Biodiversity Fund
LMO	Living Modified Organisms
MAT	Mutually Agreed Terms
MLM	Multilateral Mechanism
MoEFCC	Ministry of Environment, Forest and Climate Change
NBA	National Biodiversity Authority
NBAGR	National Bureau of Animal Genetic Resources
NBF	National Biodiversity Fund
NBSAP	National Biodiversity Strategy and Action Plan
NIRDPR	National Institute of Rural Development and Panchayati Raj
NMC	Non-Monetary Compensation
NR1	First National Report
NSAI	National Seeds Association of India
NTFPs	Non-Timber Forest Products
PBR	People's Biodiversity Register
PIC	Prior Informed Consent
PPV&FR Act, 2001	Protection of Plant Varieties and Farmers' Rights Act, 2001
RGVN	Rashtriya Grameen Vikas Nidhi
SBBs	State Biodiversity Boards
SBF	State Biodiversity Fund
SBI	Subsidiary Body on Implementation
SHEFEXIL	Shellac and Forest Products Export Promotion Council
SMTA	Standard Material Transfer Agreement
TBB	Tripura Biodiversity Board
TSG	Technical Support Group
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USA	United States of America
UTBCs	Union Territory Biodiversity Councils

Executive Summary

Biological diversity, or biodiversity, refers to the variety and variability of life on Earth, encompassing diversity within species, between species, and of ecosystems. It underpins ecosystem stability, human well-being, and sustainable development by providing essential goods and services such as food, medicine, and climate regulation. India, recognized as one of the world's 17 megadiverse countries, harbors nearly eight percent of global biodiversity within only about 2.4 percent of the world's land area. Its rich and varied ecosystems including forests, grasslands, wetlands, coastal and marine habitats support a vast array of flora and fauna, along with extensive agrobiodiversity and traditional knowledge systems, making it a significant contributor to global biodiversity conservation.

In this context, the CBD provides the overarching international framework for the conservation and sustainable use of biodiversity, as well as the fair and equitable sharing of benefits arising from its utilization. One of its key pillars access and benefit-sharing seeks to regulate how genetic resources and associated traditional knowledge are accessed and used, while ensuring that benefits derived from such use are shared with provider countries and indigenous people and local communities. By linking conservation with equity and sustainable use, ABS serves as a critical mechanism to operationalize the objectives of the CBD and promote responsible stewardship of biological resources.

This concept recognises States' sovereign rights over their biological resources and balances conservation, sustainable use of biodiversity, and equitable benefit sharing. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (Nagoya Protocol on ABS), adopted in 2010 and in force since 2014, provides the operational framework for the implementation of ABS. It establishes procedures for access through Prior Informed Consent and Mutually Agreed Terms and places obligations on user countries to ensure compliance with the ABS provisions of provider countries. ABS thus functions as both a regulatory and developmental instrument by preventing misappropriation of biological resources and traditional knowledge while promoting responsible research, innovation, and community welfare.

India, as a Party to the Nagoya Protocol, has taken necessary measures to implement its provisions through a well-established legal and institutional framework. The implementation of ABS is anchored in the Biological Diversity Act, 2002 (BD Act), which provides the legal basis for regulating access to biological resources and associated knowledge and for ensuring fair and equitable sharing of benefits with benefit claimers, including local communities. The BD Act is supported by the Biological Diversity Rules, 2024 (BD Rules, 2024) and the Biological Diversity (Access to Biological Resources and Knowledge Associated thereto and Fair and Equitable Sharing of Benefits) Regulations, 2025 (ABS Regulations, 2025), which provide clarity in procedures and strengthen transparency and compliance mechanisms. The institutional structure for implementation is decentralised and comprises the NBA at the national level, SBBs and UTBCs at the State and Union Territory level, and BMCs at the local level. This three-tier structure facilitates coordinated implementation and ensures the active involvement of local bodies in biodiversity governance and benefit sharing.

The implementation framework has been operationalised effectively across the country. More than 2.76 lakh BMCs have been constituted, which are mandated for preparing PBRs and for supporting the process of benefit sharing at the local level. These committees play a significant role in documenting biological resources and associated knowledge and in ensuring that local communities are involved in decision-making processes. During the reporting period, 12,830 approvals were granted under the ABS framework. Of these, the NBA granted 5,913 approvals for activities such as research, bio survey and bio-utilisation, commercial utilisation, transfer of research results, intellectual property rights (IPR), and third party transfers. In addition, 6,917 approvals were granted by SBBs/UTBCs, primarily for commercial utilisation by Indian entities. These approvals indicate the effective functioning of the ABS mechanism on the utilisation of biological resources.

India has made a significant global contribution through the Access and Benefit Sharing Clearing-House, publishing 3,556 Internationally Recognised Certificates of Compliance (IRCCs), which account for 60% of the global issuance. This reflects India's commitment to compliance for effective monitoring under the Nagoya Protocol.

The ABS mechanism has resulted in the generation of both monetary and non-monetary benefits. During the reporting period, a total of Rs 216.31 crore was accrued as ABS through approvals granted by the NBA, of which Rs 139.69 crore has been disbursed to benefit claimers. Since its inception, the NBA has realised approximately Rs 263.00 crore through benefit sharing and distributed Rs 145.00 crore to beneficiaries. In addition, Rs 51.96 crore has been realised through approvals granted by SBBs/UTBCs. Non-monetary benefits such as capacity building, training, technology transfer, and collaborative research have also been reveraged during the period. These measures have contributed to strengthening institutional capacities and supporting sustainable livelihoods.

The role of local communities has been recognised as central to the implementation of ABS. BMCs function as custodians of biological resources and associated knowledge and ensure that benefits arising from their utilisation are shared equitably. The documentation of Peoples Biodiversity Register's, notification of Biodiversity Heritage Sites (BHS), and establishment of repositories have further strengthened conservation efforts and improved documentation and monitoring of biological resources. These measures contribute to the effective implementation of ABS and support broader objectives of biodiversity conservation and sustainable development.

In accordance with Article 29 of the Nagoya Protocol, India submitted its First National Report (NR1) on 27 February 2026 through the Access and Benefit Sharing Clearing-House portal. The Ministry of Environment, Forest and Climate Change (MoEFCC) prepared this Report (NR1) in consultation with the NBA and other relevant stakeholders. The NBA spearheaded the preparation and submission of the report through a structured, transparent, and consultative process, in accordance with Article 29

Decentralised and Community Participatory Governance

2.76 lakhs BMC's *at local body level*

ABS approvals **12,830**

(NBA - 5,913 & SBB's / UTBC 6,917)

Monetary benefits received through ABS ₹**314.96 Cr.**

(NBA - ₹ 263.00 Cr.
SBB's / UTBC ₹ 51.96 Cr.)

Sharing of ABS with beneficaries ₹**145.00 Cr.**

Global leadership in IRCC issued **3,556** IRCCs contributes **60%** of the global issuance

Capacity Building

3,723 *workshop*
Trained over 2,56,393 individuals across the country

of the Nagoya Protocol and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (COP-MOP).

The report presents a comprehensive account of progress in implementing Access and Benefit Sharing (during the period from 1 November 2017 to 31 December 2025. It follows the prescribed reporting format comprising 27 sections and 68 questions and builds on the interim report submitted in 2017, marking India's first complete reporting cycle under the Nagoya Protocol.

The report draws on inputs from a wide range of stakeholders, including SBBs/ UTBCs, BMCs, research institutions, industry associations, and civil society organisations. The process included the constitution of a Multi-Stakeholder Working Group, multiple rounds of consultations with

various ministries, organizations and departments data validation exercises, and close inter-institutional coordination to ensure accuracy and comprehensiveness. The report also aligns with India's Seventh National Report under the CBD, ensuring coherence and consistency in reporting.

This report serves as a comprehensive knowledge product for stakeholders, including policymakers, regulators, industry, researchers, and local communities. It compiles key legal, institutional, and procedural aspects of ABS and provides practical tools such as model agreements, access procedures, PIC and MAT processes, and sector-specific case studies. The report supports informed decision-making, strengthens compliance, and facilitates effective implementation of ABS in line with national frameworks and the Nagoya Protocol on ABS.

At the same time, certain challenges have been identified in the report. These include the need to strengthen digital systems for improved monitoring and data integration, to develop appropriate methodologies for valuation of biological resources and to enhance capacity at State and local levels. The importance of strengthening international cooperation and ensuring compliance by user countries has also been emphasised. Addressing these issues will be necessary for further improving the effectiveness of the ABS framework.

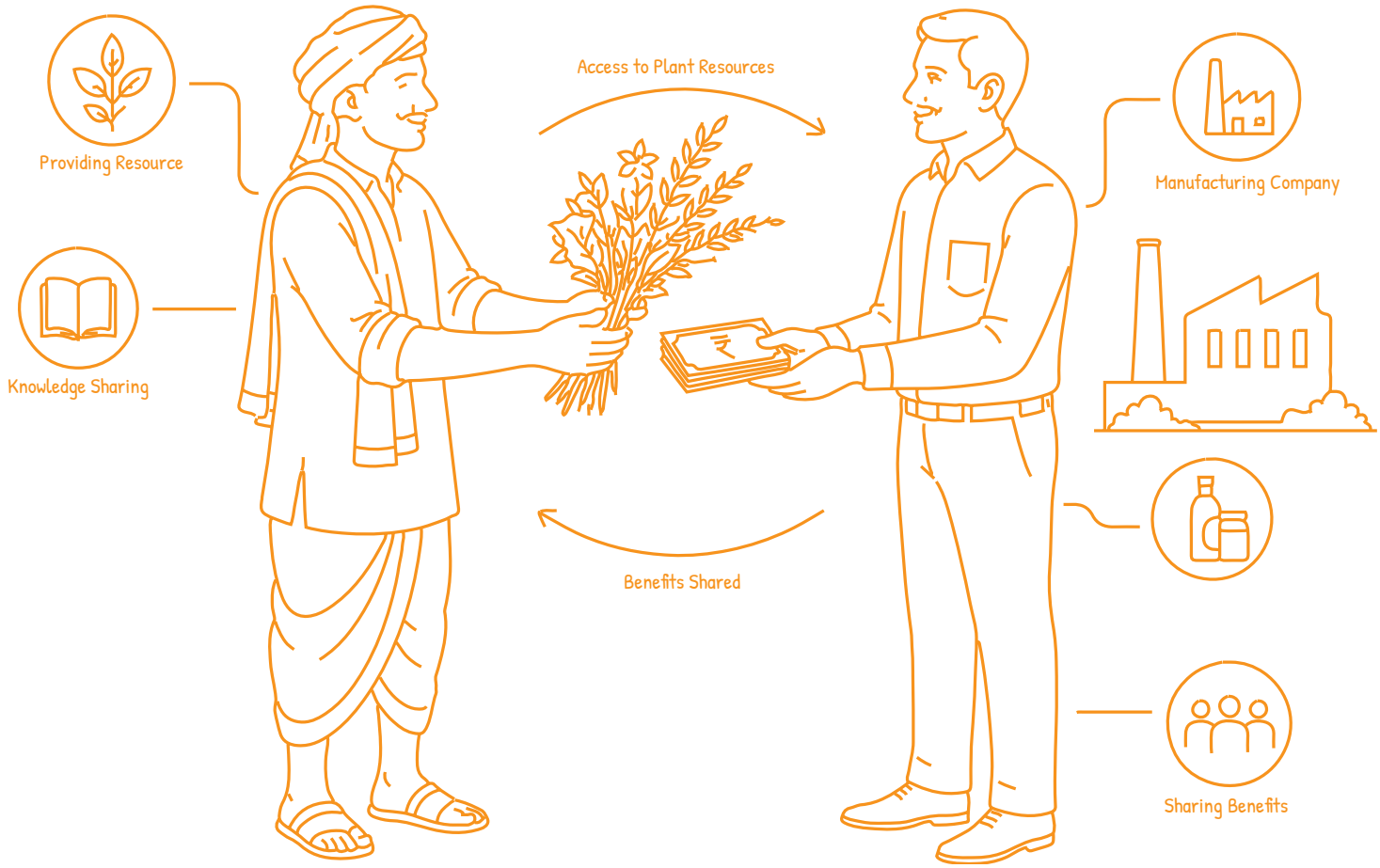
Going forward, the focus will be on strengthening institutional coordination, enhancing the use of digital technologies, and increasing stakeholder awareness. Efforts will also explore innovative financing mechanisms linked to ABS and integrate ABS considerations into broader policy areas such as climate change and sustainable development. India's experience demonstrates that a well-defined legal framework, supported by strong institutions and active community participation, can ensure effective implementation of ABS. India continues to play a leading role among megadiverse countries in advancing the objectives of the CBD and in promoting fair and equitable sharing of benefits arising from the utilisation of biological resources while supporting conservation and livelihoods.

Mawphlang Sacred Grove, East Khasi Hills, Meghalaya
Photo Credit: Meghalaya SBB

Chapter 1

Nagoya Protocol on Access and Benefit Sharing

An Overview



1.1 Convention on Biological Diversity

Since time immemorial, human societies have depended on biological resources to fulfil their essential needs such as food, shelter, clothing, medicine, and protection. These resources remain vital for human survival and well-being, especially for communities whose livelihoods are closely connected to nature. Biodiversity provides crucial provisioning services, offering food (from crops, wild plants, fisheries, and hunting), primary healthcare (through medicinal plants and traditional remedies), fodder for livestock, and raw materials for housing and tools. It also plays a critical role in sustaining genetic diversity, as wild relatives of crops contribute traits for developing resilient and improved varieties, while wild fauna enrich the genetic base of domesticated animals. Furthermore, biological resources serve as a cornerstone for innovation, forming the basis for the development of new products and applications across a wide range of modern industries.

Beyond direct provisioning benefits, biodiversity sustains essential regulating and supporting ecosystem services. These include maintaining landscape stability, preventing soil erosion and contributing to climate regulation. Historically, human settlements developed in and around the river basins. Some of the areas are most biodiverse regions, such as forests, wetlands, coral reefs and other ecological hotspots, where communities have lived in balanced coexistence with nature for millennia.

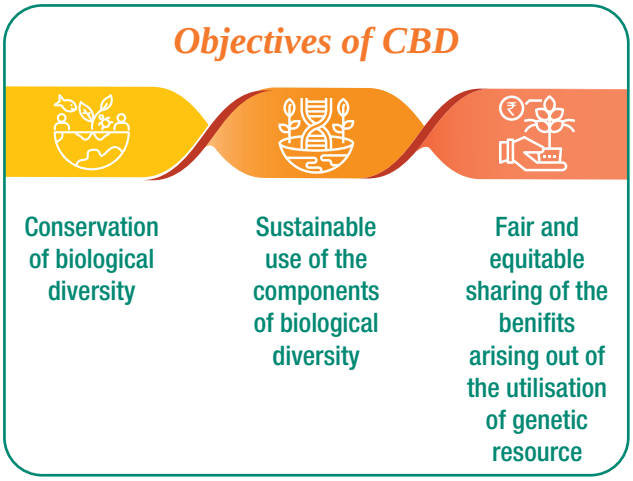


Figure 1-Objectives of CBD

With the onset of industrialisation, many industrial sectors began actively undertaking research and commercialising products derived from biological resources and associated traditional knowledge sourced from these ecosystems. Earth's biological resources are therefore indispensable to humanity's economic development and social well-being, positioning biological diversity as a shared global asset of immense value for present and future generations.

However, the growing demand for biological resources, coupled with unsustainable patterns of human activity has exerted unprecedented pressure on species and ecosystems. Consequently, biodiversity loss has intensified, with species extinction rates accelerating at an alarming pace, thereby posing serious risks to ecological balance and sustainable development.

The CBD, adopted in 1992 at the United Nations Conference on Environment and Development (Rio Earth Summit), marked a significant step forward in conserving biological diversity, promoting the sustainable use of its components, and ensuring the fair and equitable sharing of benefits arising from the use of biological resources (Figure 1). The CBD marked a pivotal advancement in global environmental governance by reflecting the international community's growing commitment to sustainable development. It stands as the most comprehensive legally binding treaty addressing biological diversity at the genetic, species, and ecosystem levels. With the adoption of the CBD, the unrestricted exchange and use of biological resources for commercial purposes shifted toward a regulated framework that recognises the sovereign rights of countries over their biological resources and establishes obligations to ensure fair and equitable sharing of benefits arising from their utilization. The CBD underscores the desirability of equitably sharing benefits arising from the utilisation of such traditional knowledge that is relevant to the conservation and sustainable use of biological diversity.

With 196 Parties (195 countries plus the European Union), the CBD has achieved near-universal acceptance as a legally binding international instrument. It recognises biological diversity as a common concern of humankind and a foundation for sustainable development, while affirming the sovereign rights of states over their biological resources, accompanied by the responsibility to conserve them responsibly.

Evolution of CBD and Its Protocols

Timeline

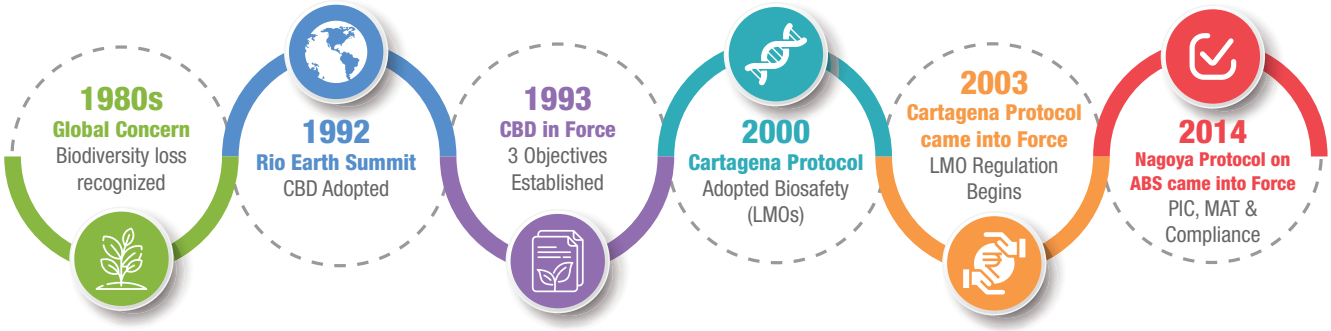


Figure 2- Evolution of CBD and Its Protocols

1.2 Development of the Nagoya Protocol on Access and Benefit Sharing

While the CBD established the principle of fair and equitable benefit sharing in 1992, its implementation required a more detailed, legally binding framework particularly to address concerns from biodiversity-rich countries about the unauthorized appropriation and commercialization of genetic resources and associated traditional knowledge without consent or benefit sharing with such countries.

The CBD prepared guidelines known as Bonn Guidelines 2000 and adopted the same at the sixth conference held in the Hague, the Netherlands. Many countries, including India have adopted these guidelines and India has relied on these guidelines verbatim. Early efforts included the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation (adopted in 2002), which provided voluntary guidance. However, provider countries sought stronger, enforceable rules. Negotiations for a supplementary protocol began in 2004 through the Ad Hoc Open-ended Working Group on Access and Benefit-sharing.

After six years of intense discussions involving complex issues like PIC, MAT, compliance mechanisms, traditional knowledge protection and the relationship with other international agreements, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation was adopted on 29th October 2010, at the 10th Conference of the Parties (COP-10) in Nagoya, Japan. The Protocol came into force on 12 October 2014, which was 90 days after the 50th ratification (Figure 2). As of 2026, it has 142 Parties (ratifications/accessions), with ongoing efforts to encourage broader ratification. It builds directly on Article 15 of the CBD and provides a transparent, predictable international framework for ABS.

Key new measures include mandatory checkpoints for compliance, the ABS CH, which is an online platform for publishing permits, national measures, and certificates of compliance, and provisions for user-country compliance monitoring have brought in the Protocol.

1.2.1. Objectives of the Nagoya Protocol on ABS

The Nagoya Protocol operationalises the third objective of the CBD i.e., the fair and equitable sharing of benefits arising from their utilisation, by providing a strong basis for greater legal certainty and transparency for both providers and users of genetic resources while reinforcing the first two objectives.

The Protocol reinforces the first two objectives of the CBD *i.e. conservation of biodiversity and sustainable use of its components,* by strengthening the ABS mechanism. By ensuring that benefits arising from the utilisation of genetic resources are shared fairly and equitably, ABS creates opportunities to channel financial and non-monetary benefits back into biodiversity conservation efforts. Besides, economic incentives generated through ABS encourage provider countries and local communities to conserve ecosystems, species and genetic diversity. At the same time, the Nagoya Protocol promotes the sustainable use of biological resources by establishing responsible access regimes that help to prevent overexploitation and support long-term ecological viability.

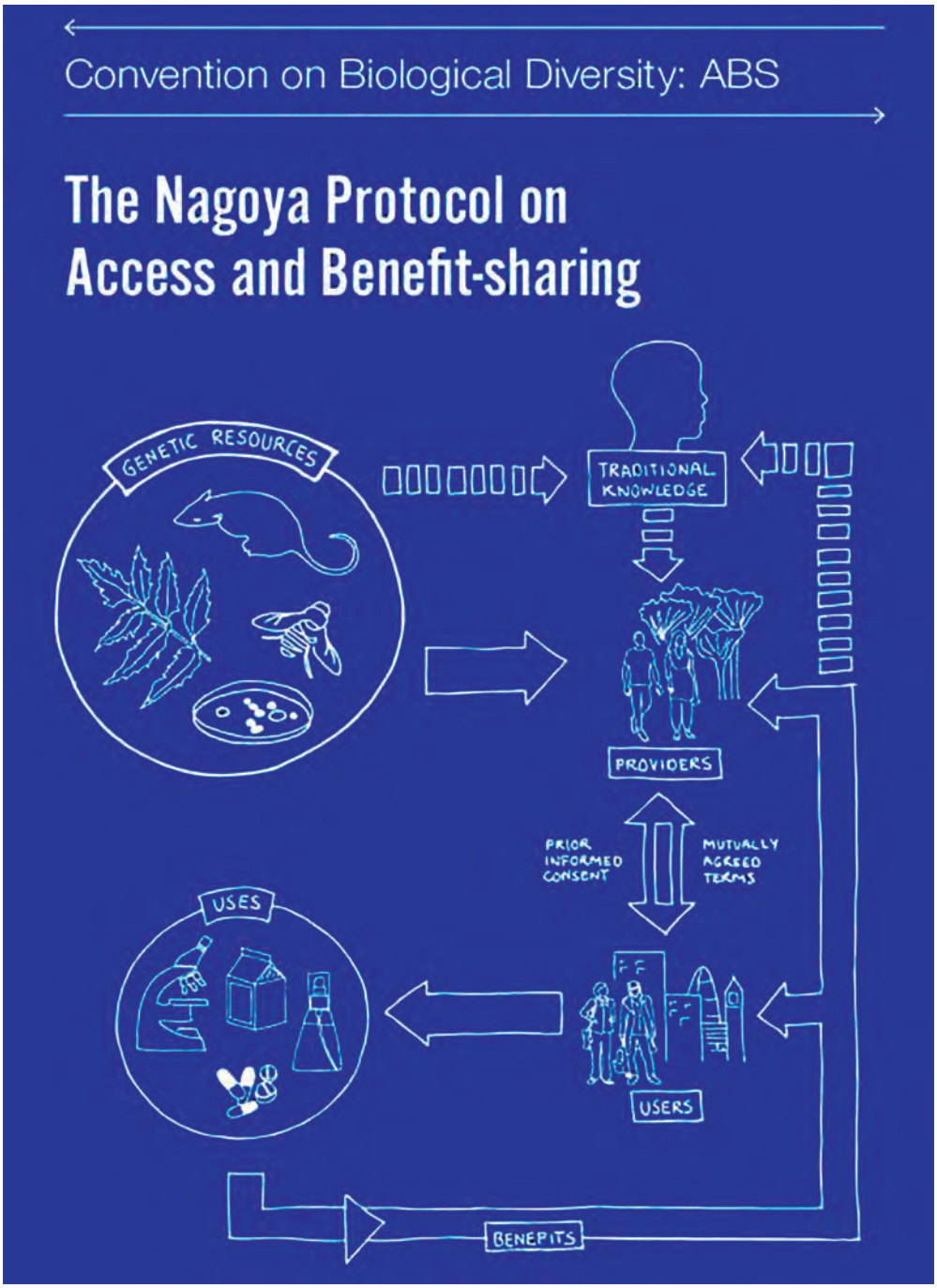


Figure 3- Overview of the Nagoya Protocol on ABS

Photo Credits: Dr. Vivek Sarkar

A major innovation of the Protocol is the establishment of specific obligations to facilitate compliance with the domestic legislation or regulatory requirements of the Party providing genetic resources, as well as with contractual obligations set out in mutually agreed terms. These provisions, together with measures that promote more predictable access conditions for genetic resources, support the fair and equitable sharing of benefits arising from their use. The Nagoya Protocol also requires similar compliance for access to traditional knowledge associated with genetic resources held by local communities, thereby strengthening their ability to benefit from the use of their knowledge, innovations, and practices (Figure 3).

Furthermore, the Nagoya Protocol on ABS enhances legal certainty and transparency for users including researchers, biotechnology and pharmaceutical companies, while safeguarding the sovereign rights of provider countries over their genetic resources. By establishing clear access procedures and mutually agreed terms, it reduces transaction costs, build trust among stakeholders and facilitate responsible global flows of genetic resources. In doing so, it supports broader objectives such as poverty alleviation food security, health innovation while aligning with the Sustainable Development Goals especially Goal 2 (Zero Hunger) and 15 (Life on Land).

1.3 Mainstreaming Access and Benefit Sharing in Global Biodiversity Targets.

The Aichi Biodiversity Targets "Strategic Plan for Biodiversity 2011 to 2020", adopted under the CBD, provided a global framework to halt biodiversity loss and promote the sustainable use of biological resources. Recognising this importance, Aichi Biodiversity Target 16 called for the Nagoya Protocol on ABS to be in force and operational by 2015, consistent with national legislation.

The integration of the Nagoya Protocol into the Aichi Biodiversity Targets marked an important step in promoting the conservation and sustainable use of genetic resources, as it established incentives through the fair and equitable sharing of benefits arising from their utilization with provider countries including indigenous people and local communities. By linking the use of genetic resources with tangible benefits and legal certainty, the Nagoya Protocol fosters trust and cooperation among stakeholders. In this way, ABS contributes not only to equitable benefit distribution but also to the conservation of biodiversity and the protection of valuable genetic diversity, as emphasized in Aichi Biodiversity Target 13.

In 2020, the global assessment of Aichi Biodiversity Target 16 in Global Biodiversity Outlook 5 reviewed the progress in ensuring that the Nagoya Protocol on ABS was in force and operational, consistent with national legislation under the CBD (Figure 4). The assessment concluded that the target had been largely achieved, as the Nagoya Protocol entered into force in 2014 and many Parties established national Access and Benefit Sharing frameworks, designated focal points and competent authorities, and published permits and certificates of compliance through the ABS Clearing House. However, the report noted that the implementation remained uneven, with continued challenges related to institutional capacity, stakeholder awareness, and monitoring the utilisation of genetic resources.

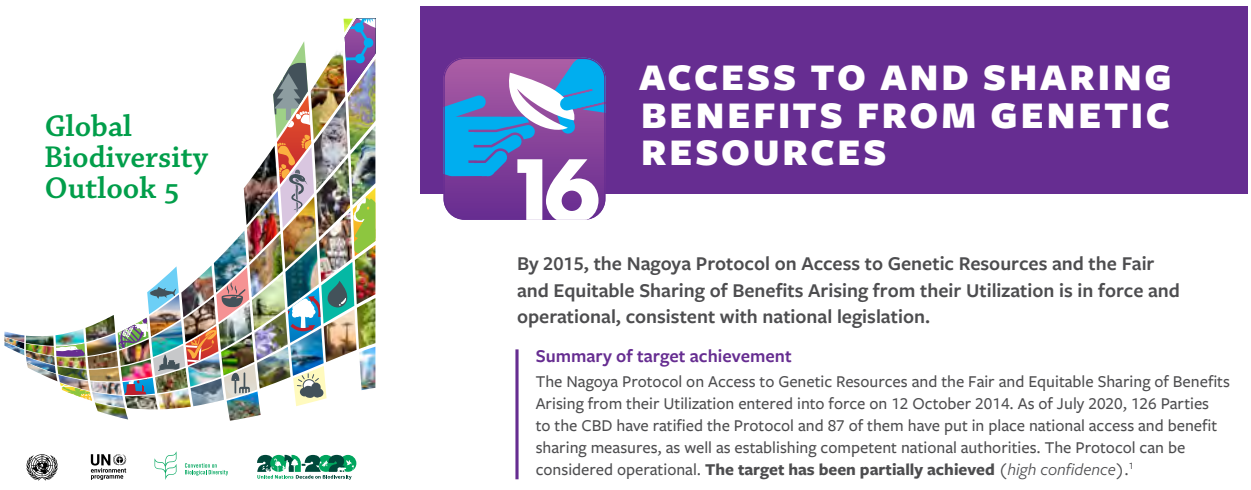


Figure 4 - Aichi Biodiversity Target 16 and GBO 5

The GBO 5 further emphasized that, while legal and institutional frameworks for ABS were expanding, strengthening effective implementation and ensuring that benefits reach provider countries and local communities remained a priority for Parties. As the use of genetic resources and associated traditional knowledge continues to grow in sectors such as biotechnology, pharmaceuticals, agriculture, Access and Benefit Sharing has become increasingly vital and strongly demanded by Parties as a mechanism to ensure fairness, equity, and incentives for biodiversity conservation.

Building on the lessons from the Aichi Biodiversity Targets, Parties adopted the Kunming Montreal Global Biodiversity Framework (KMGBF) at COP 15 in Montreal in December 2022 as the global biodiversity strategy for the post 2020 period (Figure 5). The framework aims to halt and reverse biodiversity loss by 2030 and achieve the 2050 vision of living in harmony with nature. It includes four global goals and 23 targets. Goal C highlights the need to substantially increase both monetary and non-monetary benefits arising from the utilisation of genetic resources, digital sequence information on genetic resources, and traditional knowledge associated with genetic resources, including those held by indigenous peoples and local communities.

In this context, Target 13 of the KMGBF aims to operationalize and scale up ABS by calling for effective legal, policy, administrative and capacity building measures. These measures are intended to ensure fair and equitable sharing of benefits arising from the utilisation of genetic resources, digital sequence information, and associated traditional knowledge, while also facilitating appropriate access to genetic resources. The inclusion of digital sequence information reflects emerging scientific and technological developments and addresses a key gap identified by Parties. Target 13 closely links with other elements of the KMGBF, including biodiversity finance, capacity building, and the effective participation of local communities. As a result, Parties increasingly recognise ABS as a central pillar of the KMGBF, essential for promoting equity, strengthening international cooperation, and creating incentives for the conservation and sustainable use of biodiversity.

Figure 5 Adoption of the KMGBF on December 19, 2022

1.4. India's participation in global ABS negotiations

Biodiversity rich countries often host a large share of the world's biological resources but historically received limited benefits from their commercial use in sectors such as pharmaceuticals, agriculture, cosmetics, and biotechnology. This imbalance has contributed to concerns over inequities and instances of biopiracy. The Nagoya Protocol directly addresses these concerns by ensuring the fair and equitable sharing of benefits arising from the utilisation of genetic resources and associated traditional knowledge with the providers. Through ABS mechanisms, countries and communities can receive monetary and non-monetary benefits that support biodiversity conservation, sustainable development and local livelihoods. Further, ABS also creates incentives to protect biodiversity and traditional knowledge while strengthening national sovereignty over biological resources and reducing unauthorised use.

For India, recognised as one of the world's 17 megadiverse countries, harbouring nearly eight percent of global species within about 2.4 percent of the world's land area, ABS is strategically important. India's rich biological diversity, extensive agro-biodiversity and deep-rooted traditional knowledge systems position it as a key provider of biological resources. India has therefore played an active and influential role in global ABS negotiations. Following its signing of the CBD in 1993 and ratification in 1994, India engaged proactively in discussions under the Working Group on ABS, advocating for robust compliance mechanisms, safeguards for traditional knowledge, and fair and equitable benefit sharing arrangements.

India signed the Nagoya Protocol on 11 May 2011 and ratified it on 9 October 2012, becoming one of the early Parties that enabled the Protocol's entry into force on 12 October 2014. India further demonstrated its leadership by hosting the eleventh meeting of the Conference of the Parties to the CBD in Hyderabad in 2012, which advanced global deliberations on the implementation of ABS.

UPDATED
NATIONAL BIODIVERSITY STRATERGY AND ACTION PLAN 2024-2030

Take effective legal, policy, administrative and capacity-building measures at all levels to ensure and increase the fair and equitable sharing of benefits that arise from the utilisation of biological resources/ genetic resources and digital sequence information as well as traditional knowledge associated with biological/genetic resources, and facilitating appropriate access and benefit-sharing instruments.

India's National Biodiversity Target 13 (NBT-13): Access and Benefit Sharing

ACTION POINTS

1. Develop sui generis system for protection of traditional knowledge and related rights.
2. Raise awareness at the central, state and local levels for effective implementation of the provisions under the Biological Diversity Act.
3. Provide support and capacity building for preparation and updation of PBRs with technical help from the scientific institutions and convert them into e-PBRs.
4. Strengthen systems for documentation, application and protection of biodiversity associated traditional knowledge, providing adequate protection to these knowledge systems while encouraging benefits to communities.
5. Revive and revitalize sustainable traditional practices and other folk uses of components of biodiversity and associated benefits to local communities with a view to promoting and strengthening traditional knowledge and practices.
6. Update the modalities for operationalizing provisions for prior informed consent and benefit sharing under the Biological Diversity Act.
7. Encourage and support SBBs/ UTBCs to develop and maintain state/UT level web portal on biodiversity management information system.
8. Establish a common platform for states with common biological resources to synergize ABS mechanisms.
9. Undertake inventorization of potential resources for commercial utilization and disseminate to BMCs/ Panchayats for effective benefit sharing.
10. Set up traceability mechanisms specially for use of Digital Sequence Information (DSI) from genetic resources and traditional knowledge linked to genetic resources.
11. Monitor various monetary modalities for benefit sharing from DSI and enable a mechanism for receiving funds from Global Multilateral Fund related to DSI.

Figure 6 - National Biodiversity Target 13 - National Biodiversity Stratergy and Action Plan 2024-2030

In its capacity as President of the Conference of the Parties at its eleventh meeting, India presided over the first Meeting of the Parties to the Nagoya Protocol, highlighting its leadership in shaping the global Access and Benefit Sharing framework. India has since continued to advocate for strengthened international measures on key issues, including digital sequence information (DSI), equitable benefit sharing for provider countries, and the meaningful participation of local communities.

In the post Nagoya Protocol period, India remains actively engaged in processes under the KMGBF, particularly in advancing the implementation of Target 13 on ABS and discussions related to DSI and benefit sharing mechanisms such as the Cali Fund (Figure 6). Through institutions such as the NBA, SBBs and BMCs, India continues to align its national ABS framework with global commitments while positioning itself as a leading example of operationalising ABS at a scale and advocating for equitable global biodiversity governance.

1.5 National Report to the Nagoya Protocol on ABS

India submitted its First National Report (NR1) on the implementation of the Nagoya Protocol on ABS to the Secretariat of the Convention on Biological Diversity on 27 February 2026 in accordance with Article 29 of the Nagoya Protocol and relevant COP-MOP decisions (available at: https://absch.cbd.int/en/database/ABSCH-NR1-IN-285093-1. The report covers progress from 1 November 2017 to 31 December 2025. The report builds upon India's Interim National Report on implementation of the Nagoya Protocol on ABS submitted in 2017, which presented an initial overview of implementation measures, and provides an updated and comprehensive account of progress made during the reporting period. It highlights key developments in ABS, including the strengthening of legal, policy, and institutional frameworks; operationalisation of ABS procedures; issuance of IRCCs and benefit-sharing outcomes.

The report also aligned with India's updated National Biodiversity Strategy and Action Plan (NBSAP) and the KMGBF, particularly in advancing Target 13 on the fair and equitable sharing of benefits arising from the utilisation of biological resources. It also contributes to strengthening biodiversity governance and enhancing monitoring and reporting systems. The preparation process followed a whole-of-government and whole-of-society approach, integrating inputs from multiple ministries and departments, SBBs/UTBCs, BMCs, research and academic institutions, industries, civil society organisations, and local communities.

The report was prepared through a structured and consultative process, involving the constitution of a Multi-Stakeholder Working Group, data validation exercises, and inter-institutional coordination to ensure accuracy and comprehensiveness. It also aligns with India's Seventh National Report under the CBD to maintain coherence and consistency in reporting.

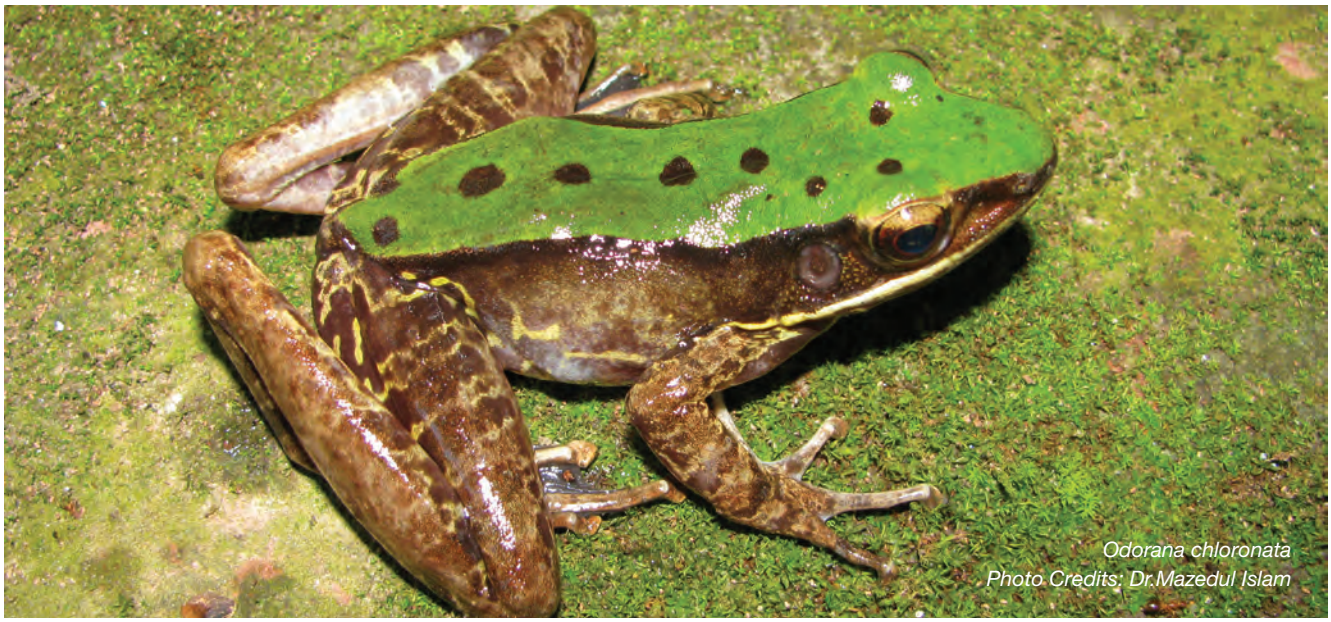


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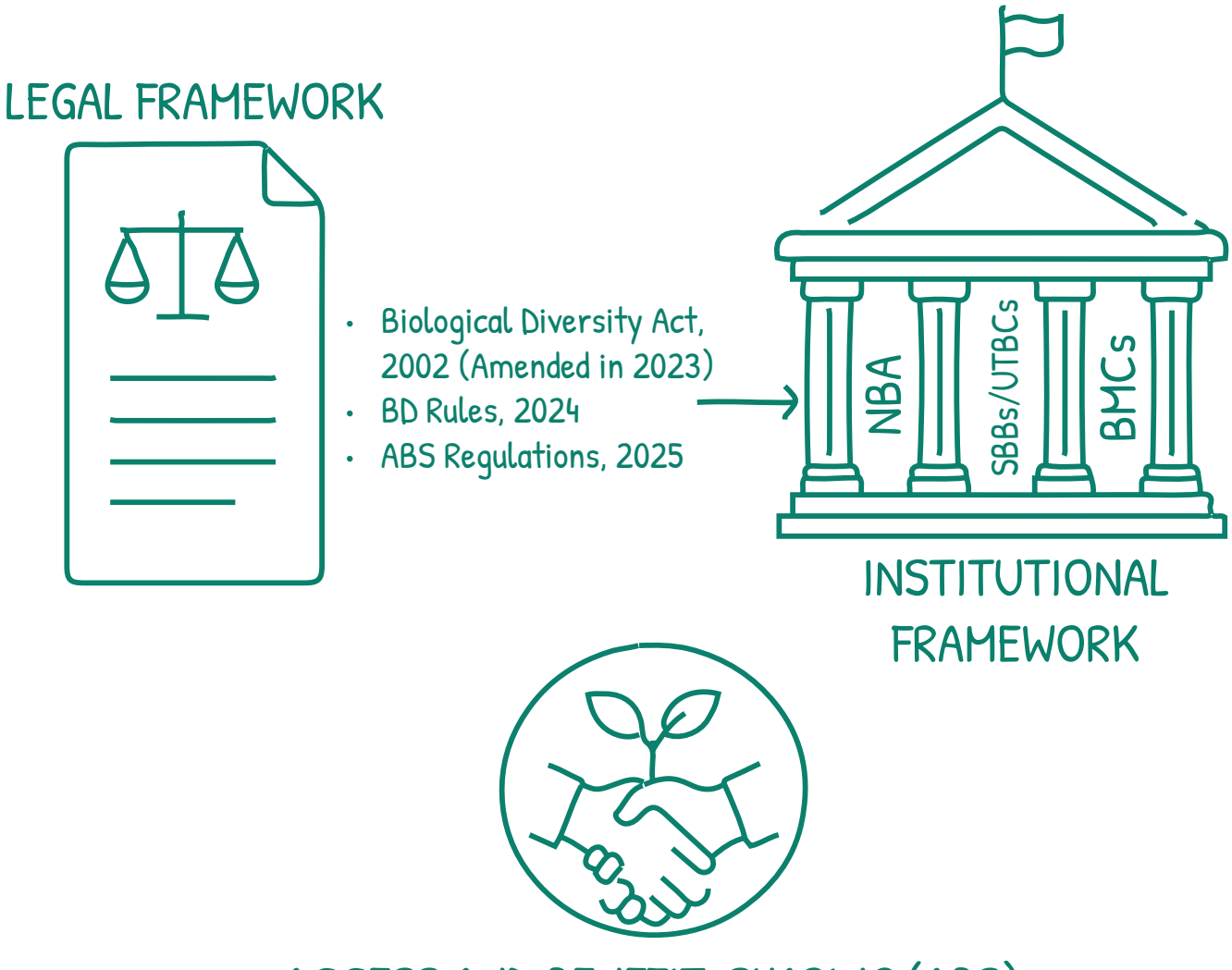
Photo Credits: Dr.Mazedul Islam

Chapter 2

Legal and Institutional Framework for ABS in India and Biodiversity Conservation



2.1. Biodiversity Profile of India

As a tropical country, India harbours a rich biodiversity due to diverse habitats, varied climate, unique location, and long ecological history, combined with cultural conservation practices. The rich biological diversity in India additionally contributes to the diverse natural ecosystems ranging from the cold and high Himalayan regions to the sea, coasts, arid deserts, forest types, wetlands, islands, oceans and high plateaus and several major rivers, including the Ganges, Brahmaputra and Godavari. The assorted physical features and climatic situations have formed varied ecological habitats that harbour and sustain immense biodiversity. India hosts about 1,05,244 faunal species and 56,177 floral taxa documented so far. Approximately 30% of animal species and over 28% of plant species are endemic to India. Endemism is especially high in biodiversity hotspots such as the Western Ghats and Eastern Himalayas, with new species discoveries continuing every year. Biodiversity is a crucial indicator of a healthy planet and a healthy society. Rich biological diversity is essential for maintaining the variety and variability of living species and for the associated ecosystem processes and their functioning.

2.2. Biodiversity Conservation in Ancient Indian Culture:

The concept of biodiversity conservation in India is deeply rooted in its historical and cultural traditions. Ancient Indian societies maintained a close relationship with nature, recognising forests, wildlife, water and plant resources as essential for livelihood and well-being. Communities relied on forests for food, shelter, medicine, and other resources, which encouraged practices that promoted sustainable use and stewardship of natural ecosystems.

Ancient texts such as the Vedas, Arthashastra, Brihat Samhita, Ramayana, and Rajatarangini contain numerous references to the protection and responsible use of forests and wildlife. These texts reveal an early environmental consciousness that emphasised ecological balance, ethical responsibility toward living beings, and prudent management of natural resources. Archaeological findings from the Indus Valley Civilisation further demonstrate the rich diversity of flora and fauna in the region and the long-standing interaction between people and nature.

Ancient Indian literature also reflects strong ecological values through philosophical verses. The Atharva Veda states, **"Mātā bhūmih putro'ham prthivyāh"** meaning, "Earth is my mother and I am her son," which emphasizes the close relationship between humans and nature and the responsibility to protect the Earth (Atharva Veda, c.1500–1000 BCE). Similarly, the Rig Veda contains invocations such as **"Vanaspatiyah Shantih, Oshadhayah Shantih,"** meaning "May the forests and medicinal plants bring peace," reflecting an early recognition of the ecological and medicinal importance of plant diversity (Rig Veda, c.1500 BCE). Governance mechanisms for managing natural resources were also articulated in classical texts such as the *Arthashastra*, which describes administrative measures including the designation of protected forests and the appointment of officials responsible for forest and wildlife management (Kautilya, c.4th century BCE).

Traditional cultural practices further reinforced these principles. Sacred groves, community stewardship of forests and reverence for species helped maintain ecological balance and conserve biodiversity across generations. Together, these philosophical teachings, governance systems and community traditions demonstrate that the foundations of biodiversity conservation in India were embedded in ancient knowledge systems long before the emergence of modern environmental policies.

2.3 Biological Diversity Act, 2002 and its sub-ordinate Legislations:

2.3.1. Constitutional provisions and Biological Diversity Act, 2002

The Constitution of India provides an important legal foundation for biodiversity conservation and the sustainable management of biological resources. It places responsibility on both the State and citizens to protect the natural environment and ensure that natural resources are used for the common good. This approach reflects the principle of public trust, under which the State acts as a trustee of natural resources for the benefit of present and future generations.

Environmental protection received explicit constitutional recognition through the 42nd Constitutional Amendment Act, 1976, which introduced Articles 48A and 51A (g). Article 48A directs the State to protect and improve the environment and safeguard forests and wildlife, while Article 51A (g) places a fundamental duty on citizens to protect and enhance the natural environment, including forests, rivers, lakes, and wildlife, and to show compassion for living creatures. These provisions collectively establish a shared responsibility between the government and society for conserving biodiversity and ecological systems.

India has strengthened biodiversity protection through several policies, programmes and legislations (Acts, rules, and regulations) as well as institutional mechanisms relating to environmental protection. Some key legislation relevant to biodiversity include Indian Forest Act, 1927, Wildlife (Protection) Act, 1972, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986, Protection of Plant Varieties and Farmers' Rights Act, 2001, and Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. These measures together provide the statutory framework for the conservation of flora, fauna, and ecosystems. India has also actively contributed to global biodiversity governance and played a significant role in the negotiations of the CBD.

India, as a Party to the CBD, enacted the BD Act, notified the BD Rules, 2004, and ABS Regulations to implement its provisions, including those on ABS. India further strengthened its commitment through the Nagoya Protocol on ABS, building on its early initiatives under the BD Act. It serves as a pioneering legal framework for regulating access to genetic resources and ensuring equitable benefit sharing, even before the Protocol entered into force in 2014.

Following a series of national consultations on biodiversity conservation during the 1990s, the Government of India adopted the National Policy and Macro-Level Action Strategy on Biodiversity in 1999, which was subsequently updated in 2008. To reflect the Aichi Targets, India revised the NBAP in 2010, incorporating 20 national targets. In response to the adoption of the KMGBF by the Conference of the Parties in 2022, India updated its NBSAP in line with the KMGBF by adopting a 'whole of government' and 'whole of society' approach. The updated NBSAP was launched during CBD-CoP 16 in Cali, Colombia (Figure 7).

Figure 7- India's updated National Biodiversity Strategies and Action Plan launched in Cali, Colombia in 2024 during CBD-COP-16

The updated NBSAP comprises 23 National Biodiversity Targets (NBTs) along with 142 indicators. It comprehensively addresses conservation, sustainable use and benefit sharing and envisages protecting terrestrial and marine areas, restoring degraded ecosystems and reducing biodiversity threats through pollution control and invasive species management.

2.3.2. Contemporary framework and recent developments

Based on two decades of implementation of the BD Act, there was a need to review and re-visit the provisions of the BD Act to achieve its objectives. Stakeholders across various sectors, including Indian Systems of Medicine, agriculture (particularly the seed sector), biotech, pharma and the research community, raised pertinent concerns. They emphasised the need to simplify procedures, streamline processes, and reduce compliance burdens to foster a more conducive environment for collaborative research, innovation and investment. Specifically, there has been a strong call to streamline procedures for obtaining Intellectual Property Rights (Patents), broaden the scope of benefit sharing with local communities, and reinforce efforts toward biodiversity conservation.

Responding to these calls, the Government of India introduced amendments to the BD Act, 2002 in 2023 which came into force on 1 April 2024. The Act introduced some new provisions for reducing the pressure on wild medicinal plants by encouraging cultivation of medicinal plants, encouraging research activities, fast-track processing of the applications, and granting expedited approvals by the NBA/SBBs/ UTBCs, and decriminalising certain provisions, without compromising the national interest.

Salient Features of the BD (Amendment) Act, 2023

PROMOTING CULTIVATION OF MEDICINAL PLANTS

Encourages cultivation of medicinal plants to reduce pressure on wild populations and promote sustainable use.

FACILITATING RESEARCH AND INNOVATION

Enables fast-tracking of research, patent applications and transfer of research results involving biological resources, while ensuring compliance with the CBD and the Nagoya Protocol.

DECRIMINALISATION OF CERTAIN PROVISIONS

Introduces monetary penalties and an adjudication mechanism in place of criminal penalties to simplify regulatory compliance.

PROMOTING FOREIGN INVESTMENT

Encourages responsible foreign investment in research, patents and commercial utilisation of biological resources while safeguarding national interests.

Rice field (Location- Sung Valley, West Jaintia Hills, Meghalaya)
Photo Credits: Meghalaya SBB

Subsequently, to give effect to the amended Act and to address the procedural issues raised by the different stakeholders, the Biological Diversity Rules 2024 (BD Rules, 2024) were notified on 22 October 2024, in supersession of the BD Rules, 2004. The BD Rules, 2024 aimed to simplify, streamline and reduce compliance burdens in order to provide a conducive environment for collaborative research and investments in different sectors, widen the scope of levying access and benefit sharing with local communities, and further conserve biological resources. Subsequently, the Biological Diversity (Amendment) Rules, 2025, notified on 6 May 2025 and it came into force from 1 November 2025.

Key features - Biological Diversity Rules, 2024

Faster Approvals - Approval timelines reduced from 180 days to 90 days (except for IPR-related approvals).

Simplified Approval Procedures - Streamlined processes for research and commercial utilisation by non-Indians, transfer of research results abroad, and commercialisation of IPRs.

Patent and Registration Procedures - Defined procedures for registration of further use of transferred research results for further research and patent applications by Indians.

Key features - Biological Diversity Rules, 2024

Facilitating Non-commercial Research - Simplified procedures for Indian researchers to send biological resources abroad for non-commercial research, including during emergencies such as pandemics.

Certificate of Origin for cultivate Medicinal Plants - Biodiversity Management Committees empowered to issue Certificates of Origin for cultivated medicinal plants for availing exemptions under Section 7(2).

Monitoring Foreign Biological Resources - Measures introduced to monitor use in India of biological resources and traditional knowledge sourced from foreign countries.

Adjudication Mechanism - Provision for Adjudicating Officers, penalty determination, and appeal before the National Green Tribunal (NGT).

Revised Application Forms and Fees - Updated application forms and fee structures for approvals from the NBA.

Thereafter, NBA, with approval of the MoEFCC, notified the Biological Diversity (Access to Biological Resources and Knowledge Associated thereto and Fair and Equitable Sharing of Benefits) Regulations, 2025 (Notification No. 332 dated 29 April 2025),

superseding the ABS Regulations 2014, issued under sections 64, 18(1) and 21(4) of the BD Act. The ABS Regulations, 2025 strengthen the ABS Mechanism by ensuring fair benefit sharing with local communities while making compliance easier for businesses. Exemptions were introduced for small entities, link ABS payments to turnover, and provide time-bound approvals by SBBs/ UTBCs with a deemed approval mechanism and dispute resolution. The regulations also standardize application formats, create a centralized online portal for section 7 applicants, and specify exemptions to cultivated medicinal plants and its products. In addition, they require intimation to the NBA when depositing novel microbial strains abroad and clearly define how ABS funds should be utilised.

SALIENT FEATURES - ABS REGULATIONS, 2025

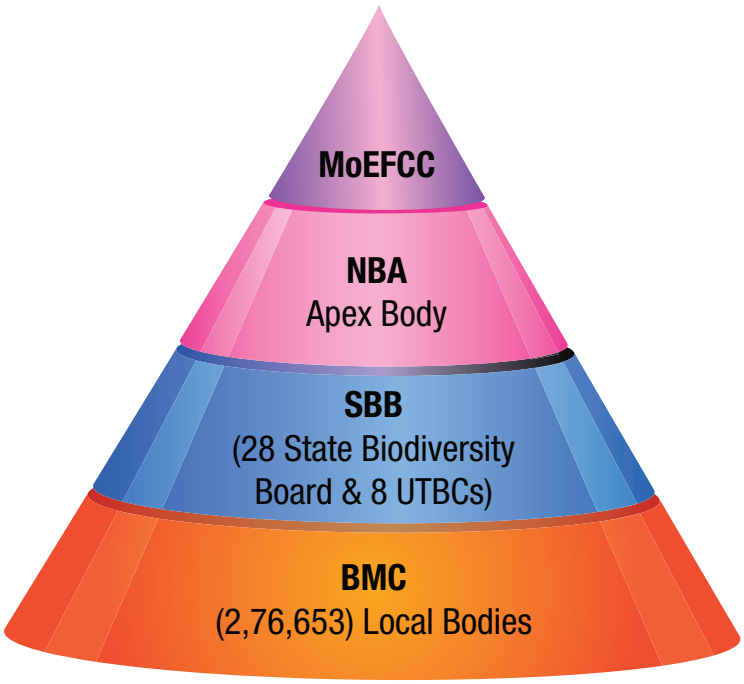
- Companies with annual turnover up to ₹5 crores are exempted from ABS payment.
- Benefit-sharing obligations aligned with MSME classifications, support ease of doing business.
- ABS is calculated based on gross ex-factory sale price (excluding taxes) and linked to annual turnover.
- SBBs / UTBCs must decide upon applications within 15 days. If no response is received by the applicant from SBBs / UTBCs, the application is deemed approved. NBA resolves disputes within 15 days.
- A standard format and centralized portal enables Indian applicants to apply to multiple State Biodiversity Boards (SBBs).
- Products containing both cultivated and non-cultivated medicinal plants are exempted from benefit sharing, as notified by MoEFCC.
- Indian scientists may deposit novel microbial strains in foreign repositories by informing NBA through the web portal.
- Modalities for sharing and utilisation of ABS funds by NBA and SBBs/UTBCs have been prescribed.

2.3.3 Institutional Framework for the implementation of BD Act

The BD Act is implemented through a three-tier institutional mechanism operating at the national, state, and local levels. This decentralized governance institutional mechanism ensures effective coordination between policy formulation, regulatory oversight, and grassroots-level biodiversity management.

The MoEFCC serves as Nodal Administrative Ministry, which notifies the Act, Rules, and notifications. Besides, it provides regular budgetary support to the NBA for implementation of the Act and in turn supports the SBBs/UTBCs for undertaking certain activities.

- At the national level, the NBA functions as the apex body responsible for implementing the provisions of the BD Act. The NBA regulates activities involving access to biological resources including DSI and associated traditional



knowledge by foreign individuals, companies, and non-resident Indians for research, bio survey and bio-utilisation and commercial utilisation. It also grants approvals for the transfer of research results, applications for IPR based on biological resources and traditional associated thereto obtained from India. Besides, the Authority performs an advisory role to the Central and State Governments on matters related to conservation, sustainable use and access to biological resources and benefit sharing with the local communities including notification of BHS, threatened species and normally traded as commodities.

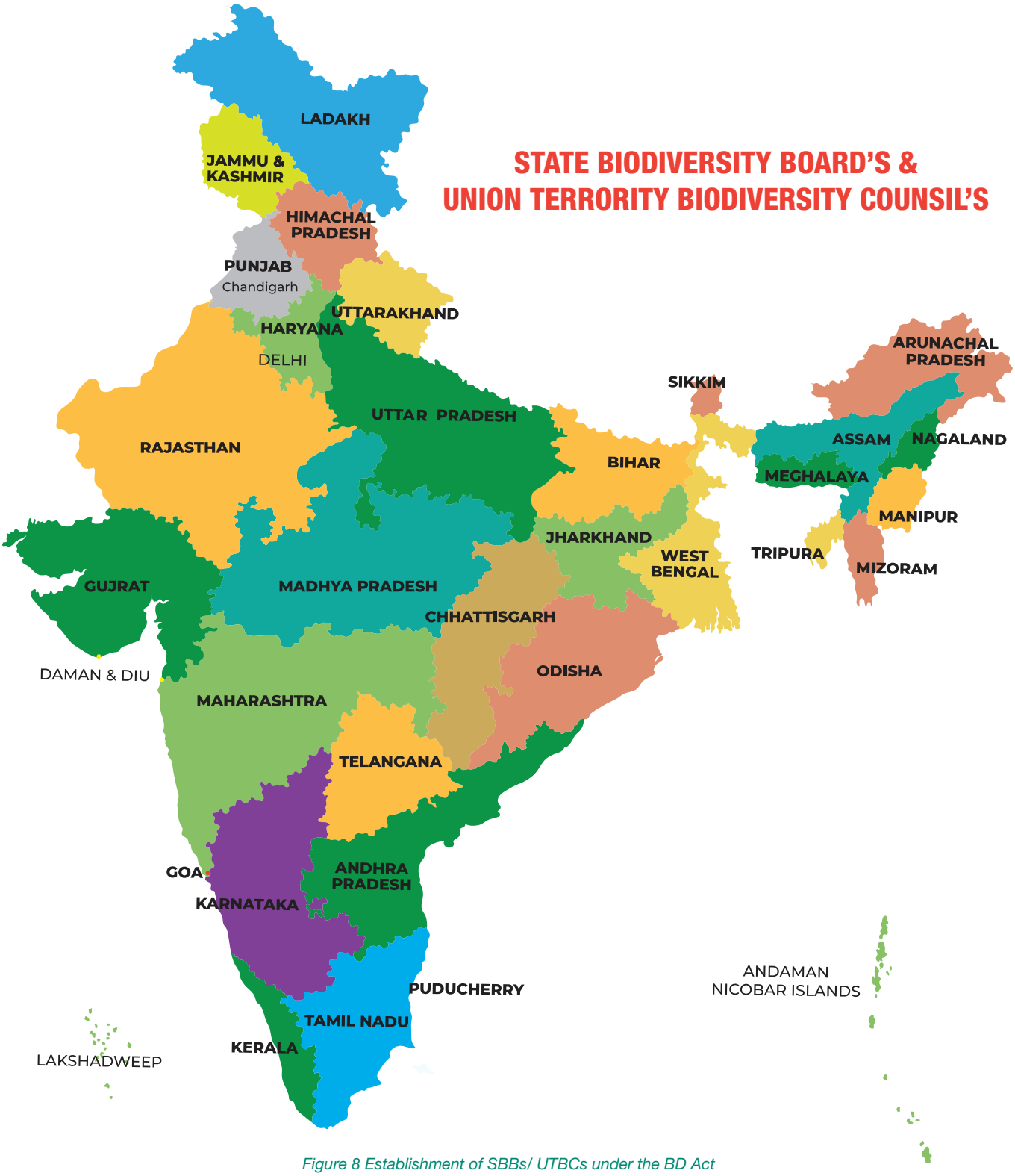


Figure 8 Establishment of SBBs/ UTBCs under the BD Act

- At the state level, SBBs / UTBCs established by respective State Governments/ Union Territories to regulate access to biological resources and associated knowledge thereto by Indian individuals, industries and institutions for commercial utilization (Figure 8). SBBs play a key role in advising State Governments on biodiversity conservation, sustainable use, and documentation of biological resources within their jurisdictions particular, BHS and constitution of BMCs. All the States and UTs have constituted the SBBs/UTBCs.
- At the local level, elected local bodies such as Panchayats and Municipalities constitute BMCs. BMCs are responsible for promoting biodiversity conservation at the grassroots level and for documenting local biodiversity through the preparation of PBRs. They also represent local communities in the implementation of benefit-sharing mechanisms and ensure that traditional knowledge holders receive fair and equitable benefits arising from the use of biological resources. Further, over 2,76,653 BMCs have been constituted by local bodies across 28 States and 8 Union Territories, demonstrating India's sustained commitment to participatory and community-based biodiversity governance.

2.4. Local Communities and Biodiversity Governance

Local communities in India hold customary usufructuary rights and entitlements over biological resources and their participation is firmly embedded within the national ABS framework. India has established legal and institutional measures to ensure PIC and the effective involvement of local communities in decisions related to access and use of biological resources, in line with Articles 6, 7 and 12 of the Nagoya Protocol on ABS.

Under the BD Act and the BD Rules, the NBA and SBBs/UTBCs are required to consult BMCs before granting approvals for access to biological resources or associated traditional knowledge, as provided under Sections 19 and 41 of the BD Act. This ensures that decisions relating to access and utilisation of biological resources are taken with the involvement of local communities, consistent with Articles 6.2 and 7 of the Nagoya Protocol. Further, Rule 13(4) of the BD Rules, 2024 mandates that the NBA/SBBs/UTBCs must consult the concerned community, individual, or entity through the BMC to obtain their PIC, in accordance with Article 6.3(e) of the Nagoya Protocol (Figure 9&10).

Nagoya Protocol on ABS

Article 6- Access to Genetic Resources

2. In accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that the prior informed consent or approval and involvement of indigenous and local communities is obtained for access to genetic resources where they have the established right to grant access to such resources.

Nagoya Protocol on ABS

Article 7. Access to Traditional Knowledge Associated with Genetic Resources

In accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that traditional knowledge associated with genetic resources that is held by indigenous and local communities is accessed with the prior and informed consent or approval and involvement of these indigenous and local communities, and that mutually agreed terms have been established.

BMCs play a key role in enabling community participation in biodiversity governance and ABS mechanism. They are empowered to levy collection fees for commercial use of biological resources and to issue Certificates of Origin for cultivated medicinal plants, which allow eligible users to avail exemptions from ABS requirements. Further, Section 37 of the BD Act provides for the declaration of BHS in consultation with local bodies and BMCs, thereby integrating community knowledge and stewardship into conservation efforts.

Figure 9 Meeting of the BMC in Arunachal Pradesh

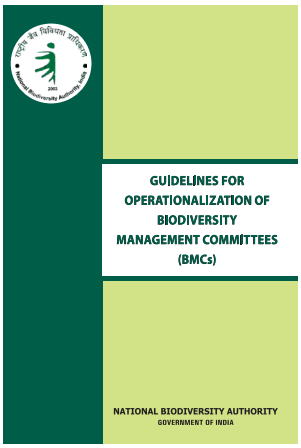


Figure 10 BMC Guidelines issued by the NBA

The BD Act also respects customary use and exchange of biological resources among local communities. Section 7 of the BD Act exempts cultivators, vaids, hakims, and registered practitioners of traditional systems of medicine under AYUSH from ABS requirements when accessing biological resources for their livelihood and practice, in line with Article 12.4 of the Nagoya Protocol.

2.4.1. People's Biodiversity Register

The rapid advancement of modern science and technology, particularly in biotechnology and information technology, has significantly enhanced the value of biodiversity and associated knowledge, including traditional knowledge. In this context, the sustainable use and systematic documentation of biodiversity are essential for achieving the objectives of the BD Act, especially given the increasing importance of biological resources and related knowledge systems.

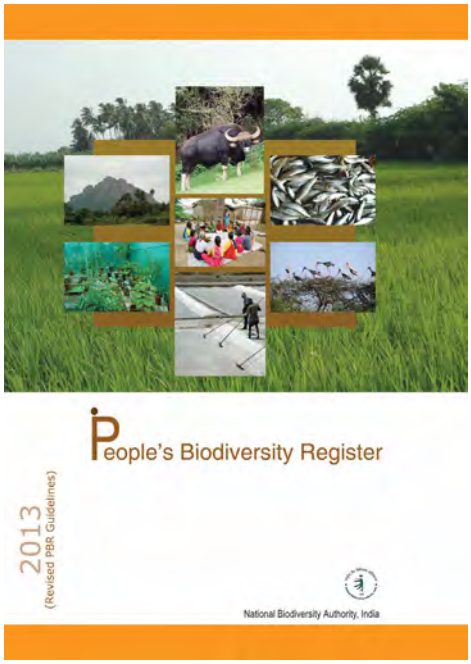


Figure 11 PBR Guidelines issued by the NBA

As per Section 41(1A), BMCs record bio-resources, their uses, and associated traditional knowledge, including habitats, landraces, cultivars, domesticated breeds, and microorganisms. PBRs function as key local records of bio-resources and their medicinal and other uses.

The PBR serves as evidence of prior knowledge and the source of biological resources, and aids in identifying benefit claimers for the distribution of Access and Benefit Sharing amount. It supports the conservation, sustainable use, and management of biodiversity, and also serves as a valuable educational resource for schools, colleges, and universities. The PBR should be periodically updated to incorporate new information (Figure 11).

As on date, 2,72,648 PBRs have been documented across the country (Figure 12). The PBR contains comprehensive information related to biological resources, traditional knowledge, the use of bio-resources, vaids, hakims, etc. The NBA is in the process of transitioning PBRs into electronic PBRs through the development of the National e-PBR Framework.

NUMBER OF PBRs PREPRED BY STATE BIODIVERSITY BOARD'S &
UNION TERRORITY BIODIVERSITY COUNSIL'S

Summary	
Total PBR's Prepered by SBB's	2,68,162
Total PBR's Prepered by UTBC	4,486
Total PBR's	**2,72,648**

Figure 12 Status of PBR prepared by SBBs/ UTBCs

Chapter 3

Biodiversity Governance - Access to Biological Resources and Associated Traditional Knowledge and Sharing of Benefits Thereof

3.1. Access and Benefits Sharing and its importance

Article 15 of the CBD establishes the framework governing access and benefit-sharing. It places responsibility on Parties to adopt appropriate legislative, administrative, and policy measures to facilitate access to genetic resources and associated knowledge, ensure PIC from provider countries, establish MAT between users and providers, and secure the fair and equitable sharing of benefits arising from their utilisation. As discussed in Chapter 2, India has developed a robust legal framework through the BD Act, which introduced a pioneering three-tier institutional structure to govern the implementation of the ABS mechanism in the country.

Senna alata
Photo Credits: Assam SBBs

Churna Forest - Biodiverse Zone within Satpura Tiger Reserve in MP
Photo Credits: Madhya Pradesh SBBs

Access and Benefit Sharing is grounded in the principle of equity, ensuring that biodiversity-rich countries and local communities receive fair and equitable monetary and non-monetary benefits from the use of their biological resources and associated traditional knowledge in research and commercial applications. It also supports the enhancement of the socio economic condition of the local communities who conserved and protected the bioresources and traditional knowledge for generations. By promoting fair and equitable benefit distribution, ABS supports poverty reduction, incentivizes biodiversity conservation, and fosters inclusive and sustainable economic growth.

3.2. ABS mechanism in the National Context:

In India, ABS is anchored through robust legislative measures, BD Act, BD Rules and ABS Regulation, . Although Article 15 of the CBD primarily addresses access to genetic resources, India has adopted a broader approach by regulating biological resources as defined under Section 2(c) of the BD Act. This scope is intended to safeguard the interests of local communities. Accordingly, the BD Act governs access not only to biological resources, but also to associated knowledge, including both traditional and contemporary knowledge systems. In line with evolving global developments, particularly the outcomes of CBD COP-16, DSI has been explicitly incorporated into the ABS Regulations, 2025, where it is treated on par with biological resources (Figure 13).

The BD Act defines key terms such as access, biological resources, bio-survey and bio-utilisation, derivatives, commercial utilisation and research. Together, these definitions clarify the scope of activities involving biological resources and provide a structured basis for legal certainty, transparent regulation of access, ensuring fair and equitable benefit sharing in line with the principles of the Nagoya Protocol.

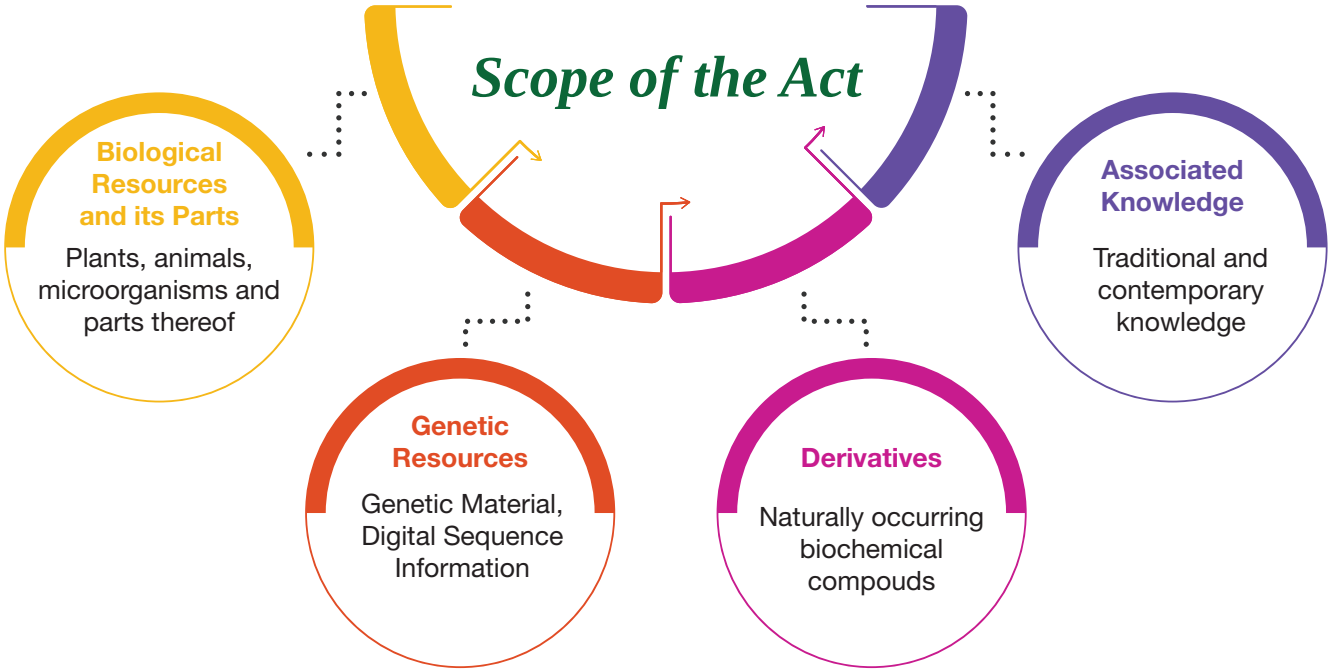


Figure 13 Scope of the BD Act

3.3. Access Procedures

The BD Act provides for two category persons *viz.* Section 3(2) and Section 7 person for delineating the ABS regulatory function among the NBA and SBBs/ UTBCs (Figure 14). Section 3(2) person are governed by the NBA, and Section 7 person are governed by the SBBs/ UTBCs which are at the State level, except for a few activities. Access to biological resources (including DSI) in India, or associated knowledge, for research, bio-survey and bio-utilisation, commercial utilisation, IPR, transfer of research results, or sending biological resources abroad for non-commercial research (including for epidemic control), is regulated. Accordingly, prior approval from the NBA or SBBs/UTBCs is required based on the entity's status under Section 3(2) of the BD Act. Similarly, the activity of deposition of microbes in foreign repositories for claiming novelty, exchange of biological resources under International collaborative research projects u/s 5 of the Act, and use of biological resources obtained from foreign countries in India needs to be intimated to the NBA by submitting respective forms.

CATEGORY OF PERSONS UNDER THE BD ACT

SECTION 3(2) PERSON

a. A person who is not a citizen of India;

b. A citizen of India, who is a non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961;

c. A body corporate, association or organization–

i. not incorporated or registered in India;

ii. incorporated or registered in India under any law for the time being in force, which is controlled by a foreigner within the meaning of clause (27) of Section 2 of the Companies Act, 2013.

SECTION 7 PERSON

Persons other than those does not fall under section 3(2) of the Act

Figure 14 Category of Persons under the BD Act

The BD Rules, 2024 provide a transparent procedure for access to the biological resources, including DSI and knowledge associated thereto, along with dedicated application forms, fees and timelines for its disposal. India has an online ABS application filing system, "ABS E-filing" and the use of this tool is mandatory for the applicants. The NBA has made information available on how to apply for seeking approval / obtaining PIC under the BD Act, including user guidelines, online ABS application formats and frequently asked questions, through its official website (http://nbaindia.org) and the ABS online portal, to facilitate users in complying with PIC requirements.

In accordance with the provisions of the BD Act, and the BD Rules, standard procedures are followed for granting approval to access biological resources, including DSI and associated traditional knowledge (Figure 15). The approval process adheres to fair and non-arbitrary rules as mandated by Article 6.3(b) of the Nagoya Protocol. This framework clearly outlines the requirements for obtaining approval, defines the respective roles of the NBA, SBBs, and UTBCs, and establishes the modalities for ABS. This legal structure ensures transparency, consistency, and equitable treatment for all applicants while safeguarding the rights of benefit claimers and indigenous communities.

3.4. Process of Obtaining PIC of local communities:

Section 41(2) of the BD Act and Rule 13(4) of the BD Rules, 2024 mandate that the NBA/ SBB/UTBCs must consult the concerned BMC while processing applications for access to biological resources and associated knowledge. This ensures that decisions are not taken in isolation at the national and State level but involve local communities.

While processing an ABS application, the NBA forwards it to the concerned BMC through the SBBs/UTBCs. The BMC consults local communities and knowledge holders to secure their consent or otherwise on the access request. This process is essential for obtaining Prior Informed Consent, ensuring that communities are fully informed about the purpose, scope, and potential impacts before giving consent or raising objections.

ACCESS AND BENEFIT SHARING – PROCESS FLOW

1. APPLICATION SUBMISSION

The applicant (person/entity) submits an application to the NBA.

2. RESOURCE DETAILS

Mandatory details of the biological resources including scientific name, variety/breed, location, quantity, associated knowledge, and intended use must be provided.

3. COMMUNITY CONSULTATION (PIC)

The NBA consults the concerned BMC through SBBs/UTBCs to obtain community consent (Prior Informed Consent).

4. EVALUATION & APPROVAL

Based on the consultation, the application is processed for approval along with benefit-sharing requirements under the ABS Regulations.

5. AGREEMENT

The NBA enters into a agreement with the applicant on a Mutually Agreed Terms, which serves as evidence of Prior Informed Consent and MAT.

6. CERTIFICATION (IRCC)

An Internationally Recognized Certificate of Compliance (IRCC) is issued through the ABS Clearing-House portal.

7. AGREEMENT OBLIGATIONS

The agreement specifies obligations such as ABS payments, submission of annual status reports, and conditions for use of biological resources.

8. COMPLIANCE & REPORTING

The applicant must submit annual status reports and comply with agreed benefit-sharing terms.

9. BENEFIT SHARING

The collected ABS amount are distributed by NBA/SBB to rightful beneficiaries such as BMCs, communities, or individuals as per ABS Regulations.

Figure 15 Access and Benefit Sharing – Process Flow

The provision also strengthens decentralised decision-making by integrating inputs from local communities into decision making process. It reinforces the role of BMCs as key institutions in biodiversity governance and ensures that the rights and interests of communities are safeguarded. Further, this mechanism is aligned with obligations under the Nagoya Protocol, particularly Articles 6.2 and 7, which emphasise the need to obtain consent from indigenous people and local communities for access to genetic resources and associated traditional knowledge.

3.5. Model Contractual Agreements under the Biological Diversity Act

The NBA receives applications from various stakeholders, including non-Indian individuals or entities and Indian individuals or entities, seeking approval to access biological resources, including DSI and associated knowledge, for activities envisaged under the BD Act. NBA grants approval in the form of a formal agreement executed between the applicant (user) and the concerned BMC, represented by the NBA, in accordance with the provisions of the Act.

To ensure transparency and consistency in implementation, the NBA, in consultation with relevant stakeholders, developed model contractual clauses incorporating the minimum requirements of MAT for granting approval for different activities covered under the Act. The agreements set out clear and standard terms, including ABS obligations, details of the biological resources, duration of access, period of collection, and submission of annual status reports. These provisions help users to understand their roles and responsibilities, while also clarifying the duties of the authority granting access. SBBs/UTBCs are encouraged to adopt similar model clauses while establishing mutually agreed terms with users.

3.5.1. Approvals Granted by NBA

The agreement executed between the authority and the applicant serves as evidence of PIC and MAT and is treated as a permit equivalent, thereby ensuring compliance with Article 6.3(e) of the Nagoya Protocol, which requires Parties to issue a permit or its equivalent when access to genetic resources is granted. This framework ensures that India's access procedures are fair, transparent, and consistent with the international obligations under the Nagoya Protocol on Access and Benefit Sharing.

During the reporting period from November 2017 to December 2025, the NBA granted 5,913 approvals for access to biological resources, including DSI and associated knowledge, after following due process. Specifically, the Authority issued 535 approvals for research or bio-survey and bio-utilization, 257 approvals for commercial utilisation, 29 approvals for the transfer of research results, 5,085 approvals for obtaining IPR, and seven for the third-party transfer of accessed biological resources (Figure 16).

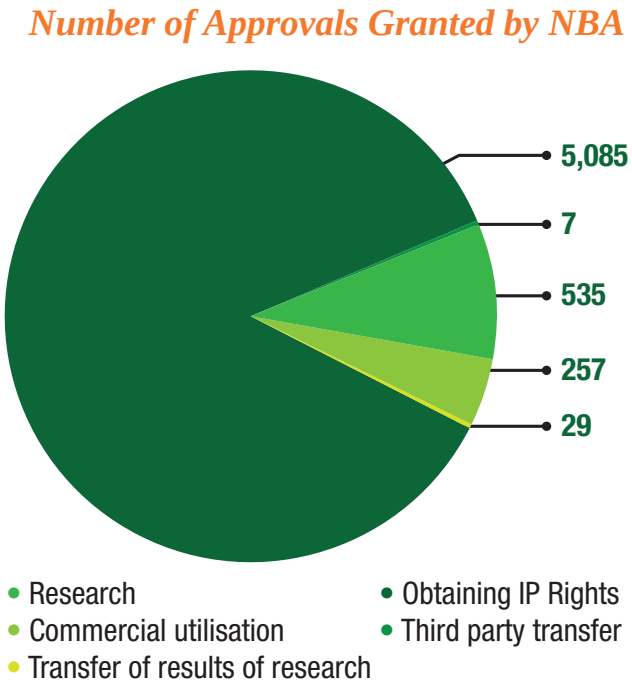


Figure 16 Number of Approvals Granted by NBA

3.5.2. Approvals granted for access to biological resources for commercial utilisation by SBB/ UTBCs

Under Section 7 of the BD Act, person and entities who have not covered under section 3(2) of the BD Act accessing biological resources including DSI and associated knowledge for commercial utilisation are required to provide prior intimation to the concerned SBB/UTBC. This requirement operates in accordance with Section 23(b) and Section 24(2) of the Act, which empower SBB/UTBC to regulate such access and determine fair and equitable benefit-sharing, as per the ABS Regulations notified by the NBA.

To facilitate ease of compliance and improve transparency, a common format for prior intimation, approval, and rejection within timelines has been introduced in the Regulation 5 of ABS Regulation 2025. It enables Section 7 applicants to submit applications to multiple SBBs/UTBCs through a centralized online portal. Accordingly, Section 7 individuals or entities covered engaged in commercial utilisation of biological resources are required to submit prior intimation in the prescribed form as per the State specific BD Rules and comply with the applicable ABS under the Act, Rules, and ABS Regulations.

For facilitating the SBBs/ UTBCs, NBA issued model procedure for processing the access and benefit sharing applications received by the SBBs / UTBCs under section 7 of the BD Act for adoption by the SBBs in the year 2018 and also issued revised guidelines in the year 2025 to meet the provisions of the BD Act as amended in 2023.

From November 2017 to December 2025, SBBs and UTBCs granted 6,917 approvals for commercial utilisation of biological resources under section 7 of the BD Act. The number of approvals increased overall, with significant rises in 2020–21 with 1,289 approvals and in 2022–23 with 1,665 approvals, indicating awareness and better regulatory compliance (Figure 17).

Comparative Analysis of Access Approvals Granted by NBA and SBBs/UTBCs

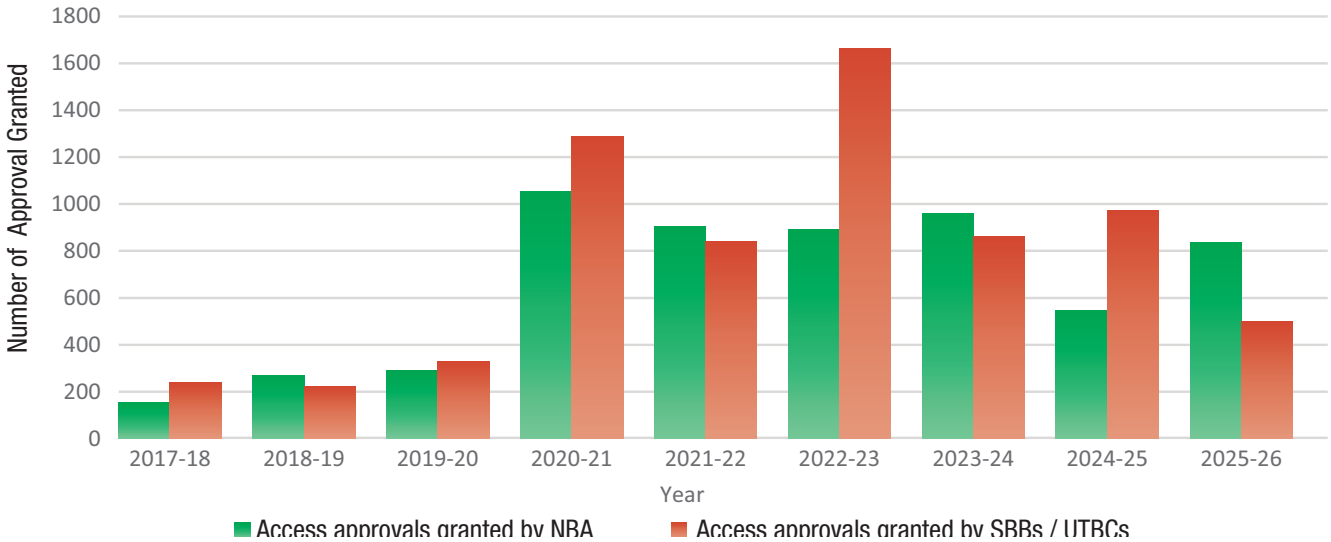


Figure 17 Access Approvals Granted by NBA and SBBs/UTBCs

3.6. Benefit Sharing mechanism under the Biological Diversity Act

The provisions for determining and implementing benefit sharing component are provided in the BD Act, BD Rules, and ABS Regulations. The ABS Regulations, 2025 provide modes of benefit sharing, which may be monetary, non-monetary, or a combination of both. The monetary benefits may include upfront payments, access fees, royalties on commercialised products, milestone payments during product development, License fees related to IPR, Joint ventures or profit-sharing arrangements. The non-monetary benefits may include technology transfer related to the utilisation of biological resources, sharing of research results and scientific information, capacity building and training of local communities or institutions, Institutional collaboration and joint research Programmes, and support infrastructure development of biodiversity conservation initiatives.

Table 1- Mode of Benefit Sharing for Commercial Utilisation of Biological Resource Including DSI And Associated Knowledge Thereto

Sl. No.	Annual turnover of the person (in Indian rupee)	Amount payable on account of benefit sharing for access to biological resource for commercial utilisation (Percentage of annual gross ex-factory sale price of product excluding Government taxes)
(1)	(2)	(3)
1.	Up to 5 crore	Nil
2.	Above 5 crore to 50 crore	0.2%
3.	Above 50 crore to 250 crore	0.4%
4.	Above 250 crore	0.6%

ABS payments for commercial utilisation are determined on the annual gross ex-factory sale price of the product (excluding government taxes), with rates ranging from 0.2% to 0.6% depending on the annual turnover of the entity (Table 1). Further, entities with annual turnover exceeding Rs. One crore and below Rs. Five crore is exempted from ABS payments but must submit annual statements on utilization of biological resource. Where access involves biological resources of high conservation or economic value, such as red sanders, sandalwood, agarwood, or threatened species notified under Section 38 of the Act, including DSI or associated knowledge, an additional 20% over the applicable benefit-sharing amount are be levied.

3.6.1. Benefit sharing amount generated by the NBA

The mechanism for disbursement of ABS has been streamlined under the ABS Regulations, 2025. The benefit-sharing amount collected by the NBA is deposited in the National Biodiversity Fund (NBF) and utilised for channelling benefits to benefit claimers, conservation and sustainable use of biological resources, and socio-economic development of areas from where such biological resources or associated traditional knowledge have been accessed, in consultation with the BMCs. The ABS Regulations provides, 10-15% of the accrued benefits may be retained by the NBA, of which half may be shared with the concerned SBBs/ UTBCs. The remaining 85-90% of the benefit-sharing amount is distributed among identified benefit claimers, including BMCs, local communities, farmers, and holders of traditional knowledge as per Rule 21(4) of the BD Rules, 2024 and Regulation 12 of the ABS Regulations, 2025.

During the ABS approval process, the NBA identifies benefit claimers based on information provided in ABS applications and through consultations with SBBs/UTBCs, BMCs and other local stakeholders. Where the source of the biological resource or associated knowledge is known, benefits are directly shared with the identified claimers. In cases where the source of the biological resource or holder of the associated knowledge is unknown, the benefit-sharing amount is deposited in the NBF, in accordance with Section 27 of the Act, and utilised for biodiversity conservation and socio-economic development of areas from where such biological resources or associated traditional knowledge have been accessed.

Photo Credits: Dr.Vivek Sarkar

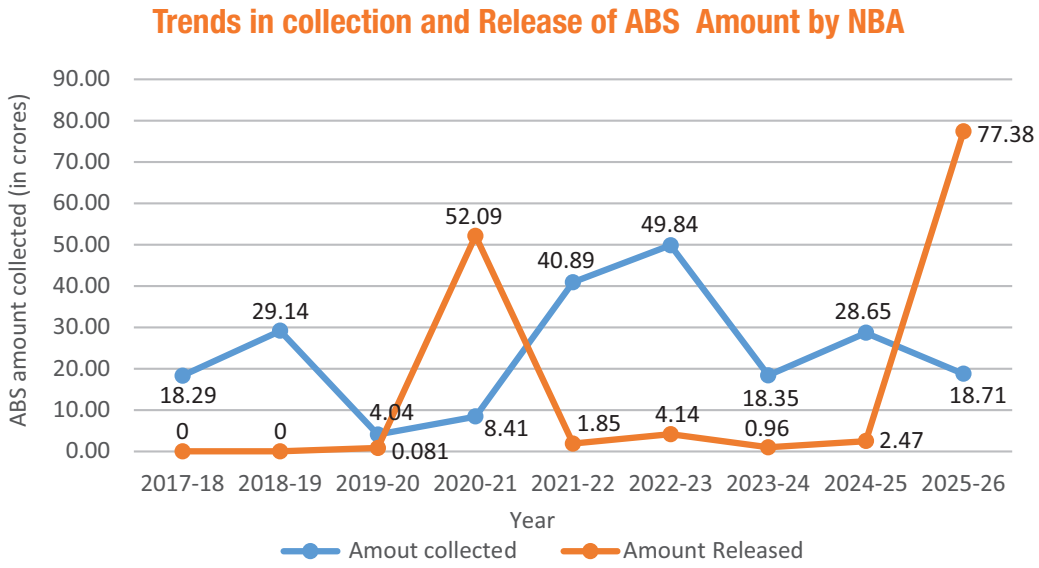


Figure 18 Trends in Collection and Release of ABS Amount by NBA

During the reporting period, a total of Rs 216.31 crore was accrued through approvals granted by the NBA, of which Rs 139.69 crore has been disbursed to benefit claimers (Figure 18). Since its inception, the NBA has realised approximately Rs 263.00 crore through benefit sharing, with Rs 145.00 crore distributed to beneficiaries. These benefit claimers include over 10,000 BMCs, 23 SBBs, and three UTBCs, along with the Forest Departments of Andhra Pradesh, Karnataka, Odisha, Telangana, and Tamil Nadu, as well as 47 institutions under ICAR, CSIR, and other research organisations and universities.

In addition to monetary benefits, 395 approvals for access to biological resources were granted by the NBA incorporated non-monetary benefits, such as capacity building, thereby strengthening scientific cooperation and enhancing community participation in biodiversity conservation.

3.6.2 Benefit sharing component realised by SBBs / UTBCs

At the state level, SBBs/ UTBCs regulate access to biological resources by Indian entities for commercial utilisation under Sections 7, 23(b) and 24(2) of the Act. The procedures for determining ABS in such cases are provided under ABS Regulations. Accordingly, SBB/ UTBCs realised a ABS amount to the tune of Rs 51.96 crore from the section 7 person who obtained approval for commercial utilisation (Figure 19).

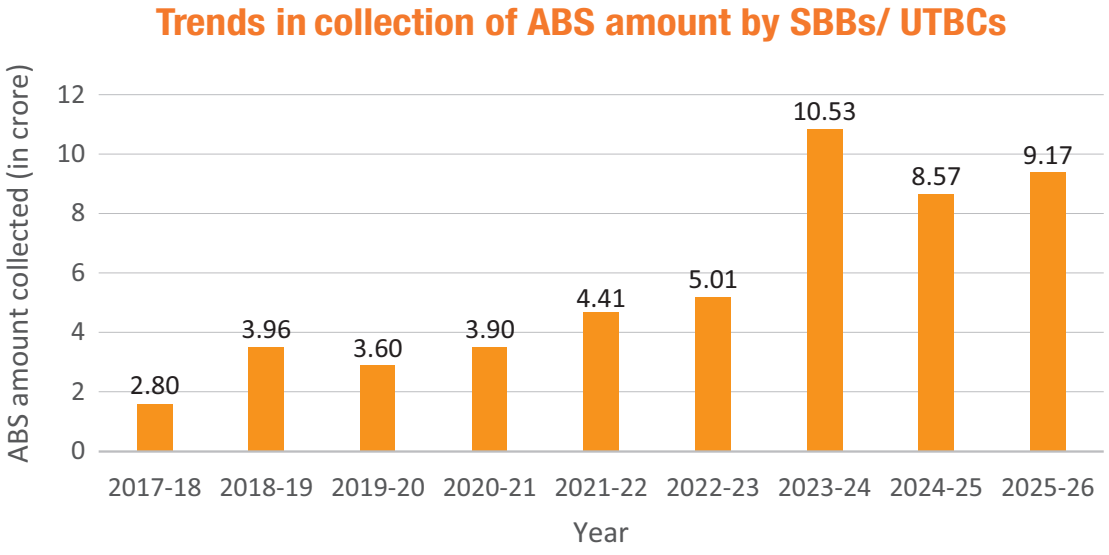


Figure 19 Trends in Collection of ABS Amount by SBBs / UTBCs

The analysis reflects that the ABS amount realised by SBBs/ UTBCs shows a generally increasing trend over the years.

When SBBs or UTBCs grant approval, they may retain 10-15% of the accrued benefits and distribute the remaining amount among benefit claimers, including BMCs and local communities. When the biological resource, including DSI, is accessed from an unknown source, they may retain the entire amount and utilise it in accordance with Section 32(2) of the Act, as provided under Regulation 12(2) of the ABS Regulations, 2025. These funds support management and conservation of BHS, compensation or rehabilitation of communities affected by BHS notification under Section 37 of the BD Act, conservation and sustainable use of biological resources, and socio-economic development of source areas, in consultation with the concerned BMCs or local bodies.

3.6.3. Special Considerations for ABS

The ABS Regulations, 2025 provide for special considerations in determining benefit sharing. Under Regulation 9, Authorities may apply such considerations when access leads to technologies, innovations, or products that serve public interest, including control of epidemics, mitigation of environmental pollution affecting human, animal or plant health, food security, and biodiversity conservation.

The ABS Regulations also allow the Authority to waive benefit-sharing requirements, including upfront payments, on a case-by-case basis when biological resources, including DSI or associated knowledge, are accessed for academic research.

3.6.4 Non-Compliance and Revocation of Approvals

The non-compliance under the BD Act generally arise in specific circumstances, including access to biological resources or associated traditional knowledge without prior approval under Sections 3, 4, 6, and 7 of the BD Act. In such cases, the NBA, SBBs, and UTBCs are empowered to take appropriate action, including suspension or revocation of approvals and registrations as per Rule 17 of the BD Rules, 2024. It forms an integral part of the compliance and enforcement framework established under the Act and the BD Rules, 2024. Grounds for such action include submission of inaccurate or incomplete information, failure to comply with statutory provisions or the conditions of approval and MAT, and activities that may adversely affect biodiversity, community interests, or public interest. These actions are undertaken following due process, including the provision of an opportunity to be heard, in accordance with the principles of natural justice.

The recent amendments to the BD Act introduce a significant shift in the enforcement framework by replacing earlier criminal provisions with a proportionate, compliance-oriented system based on monetary penalties (effective from 1st April 2024). Under Section 55, contraventions of Sections 3, 4, 6, or 7 attract penalties starting from Rs. One lakh, which may extend up to Rs 50 lakh or higher, where the damage exceeds this amount, commensurate with the extent of harm. In cases of continuing violations, additional penalties may be imposed, up to a maximum of Rs one crore. Such penalties shall be imposed by the Adjudicating Officer(s) as appointed by the Central Government under section 55A of the Act.

India has also established a robust framework for access to justice in alignment with Article 18.3(a) of the Nagoya Protocol. Under Section 52A of the BD Act, any aggrieved person may appeal against orders or benefit-sharing determinations of the NBA or SBBs/UTBCs before the National Green Tribunal (NGT). The NGT provides specialised and expeditious adjudication of environmental and biodiversity-related disputes, while upholding the principles of natural justice. It is empowered to grant interim relief, award compensation, and enforce its orders within prescribed timelines.

This framework is further strengthened by the adjudication mechanism under Section 55A, with scope for appellate recourse where applicable. Additionally, enforcement provisions under Section 52A, including execution of orders as civil court decrees, along with recognition of arbitral mechanisms, support effective compliance and cross-border enforceability, consistent with Article 18.3(b) of the Nagoya Protocol.

3.7. Specialised ABS Instruments and India's Harmonised Approach (Article 4 of the Nagoya Protocol)

Article 4 of the Nagoya Protocol emphasises that the Protocol should be implemented in a mutually supportive manner with other relevant international agreements, including specialised ABS instruments. It recognises that such instruments may govern specific sectors, provided they are consistent with the objectives of the Convention and the Nagoya Protocol. In this context, India is a Party to key specialised ABS instruments, notably the International Treaty on Plant Genetic Resources for Food and Agriculture(ITPGRFA), and has also signed the BBNJ Agreement (September 2024, yet to be ratified). India has adopted a harmonised national approach to implement these frameworks alongside the Nagoya Protocol.

Recognising the importance of plant genetic resources for food security and agricultural research, the Government of India has operationalised this approach through Section 40 of the Biological Diversity Act, 2002. Accordingly, a notification issued by MoEFCC (17 December 2014) exempts crops listed in Annex I of the ITPGRFA from the provisions of Sections 3 and 4 of the Act when used for breeding, research, and training (Figure 20). In such cases, ABS provisions are not applicable, ensuring facilitated access for research and innovation while maintaining alignment with international commitments.

International Treaty on Plant Genetic Resources for Food and Agriculture

The Department of Agriculture and Cooperation may, from time to time, specify such crops as it considers necessary from among the crops listed in Annex I of the ITPGRFA. These crops are exempted from Sections 3 and 4 of the BD Act for the purpose of utilisation and conservation for research, breeding, and training for food and agriculture.

26,563 accessions belonging to 9 crops have been notified in India:

Barley, Chickpea, Finger millet, Lentil, Paddy, Pearl millet, Pigeon pea, Sorghum, and Wheat.

Figure 20 Accessions Belong to Annex-1 Crops of ITPGRFA Exempted from the BD Act

3.8. Case Studies on ABS demonstrated by NBA

India is a global front-runner in turning the idea of Access and Benefit Sharing into practical reality. With a strong legal framework in the BD Act, and BD rules notified thereunder, the country has built a system that connects policy with real people and real outcomes. The case studies in this section bring this to life, showing how ABS is being used across different sectors like medicines, cosmetics, farming, and even microbial research.

At the heart of these stories are simple but powerful ideas getting permission before using biological resources (Prior Informed Consent) and agreeing on fair terms for sharing benefits (Mutually Agreed Terms). In practice, this means local communities are not left out; they are partners who share in the gains. These examples also echo the global goals of the CBD protecting nature, using it responsibly, and making sure the benefits are shared fairly and equitably. Together, they show how biodiversity conservation can go hand in hand with better livelihoods and stronger local institutions, offering lessons that others can adapt and build on.

3.8.1. Dapur Village, Maharashtra – Access to soil samples for identifying potential microorganism having industrial application and commercialisation of probiotics

This case pertains to the commercial utilisation of soil-derived microbial resources sourced from Dapur Village, Sinnar Taluk, Nashik District, Maharashtra, by M/s. Advanced Enzyme Technologies Limited. The microorganisms identified, particularly *Bacillus coagulans*, demonstrated significant probiotic potential and were subsequently utilised for the development of multiple commercial products.

M/s Advanced Enzyme Technologies Limited applied to NBA in Form 1 in 2019 seeking approval for

commercial utilisation. NBA after consultation with the BMC of Dapur Village through the Maharashtra SBB, signed agreement between the applicant and NBA on 28th December 2022 with a benefit sharing compoment at 0.5% of the annual gross ex-factory sale price of product derived from the use of bioresources (excluding taxes), as per Regulation 4 of the ABS Regulations, 2014.

Figure 21 Release of ABS to BMCs in Maharashtra

The commercialisation of probiotic products resulted in realisation of Rs. 71,25,641 as benefit sharing. In accordance with the ABS framework 95% (Rs. 67,69,358.95) was transferred in October 2025 to Maharashtra SBB for disbursement to the Dapur BMC and 2.5% (Rs 1,78,141.03) each was retained by NBA and Maharashtra SBB. The ABS funds are being utilised by BMC for activities such as preparation of a Biodiversity Management Plan, establishment of medicinal plant nurseries, and site-specific plantation initiatives (Figure 21).

This highlights that effective ABS implementation requires clear traceability of bioresources and a direct linkage between utilisation and benefit-sharing obligations. It underscores the role of robust regulatory processes and coordinated functioning of NBA, SBB and BMCs in ensuring compliance and timely realisation of benefits. It also emphasises the need for strengthened institutional capacity, procedural transparency, and enhanced awareness at the BMC level for effective utilisation of ABS funds.

3.8.2. Chhindwara District, Madhya Pradesh- Access to wild medicinal plants for developing drug for dengue treatment

This case pertains to the access and commercial utilisation of the medicinal plant *Cocculus hirsutus*, (Figure 22) sourced from forest areas of Chhindwara District, Madhya Pradesh, by M/s. Sun Pharmaceutical Industries Ltd. *Cocculus hirsutus, t*raditionally valued in indigenous medicine, the plant demonstrated promising therapeutic potential for dengue treatment and was subsequently taken up for research and product development.

M/s. Sun Pharmaceutical Industries Ltd. applied to the NBA in 2017 in Form I seeking approval for access to the bioresource. The proposal was processed in consultation with local BMCs through the Madhya Pradesh State Biodiversity Board, ensuring PIC in line with the Nagoya Protocol.

Considering the commercial potential, NBA determined an upfront payment of Rs. 4,50,000 under the ABS Regulations, 2014. The request for waiver made by the user was not accepted, reaffirming

Figure 22-Cocculus hirsutus

benefit sharing as a mandatory obligation. Later, mutually agreed terms were finalised, incorporating both monetary (upfront payment) and non-monetary components, including conducting of biodiversity awareness programmes at the BMC level. The agreement with NBA was executed on 24 January 2019 upon recipt of Rs 4,50,000 as upfront payment.

As per the ABS Regulations, 95% of this amount Rs. 4,27,500 was transferred to the Madhya Pradesh Minor Forest Produce Cooperative Federation in 2020 for conservation and community development activities, while 5% was retained by NBA as per the extant provisions.

This case highlights that ABS applies from the research stage where commercial intent exists, with PIC ensuring recognition of local stakeholders. Upfront benefit sharing enables early and tangible benefits, while coordinated functioning of NBA, SBB and BMCs ensures effective implementation. It demonstrates how a traditional medicinal bioresource can transition into modern pharmaceutical use within a framework that ensures compliance, equity, and conservation outcomes.

3.8.3. Transfer of H9N2 Avian Influenza Vaccine Technology by ICAR–National Institute of High Security Animal Diseases to Companies

This case pertains to the transfer of research results for an inactivated Low Pathogenic Avian Influenza (H9N2) vaccine developed by ICAR–National Institute of High Security Animal Diseases (ICAR–NIHSAD) to M/s. Hester Biosciences Limited. The vaccine, based on a virus strain isolated from field samples in Rajasthan, demonstrated significant potential in addressing disease outbreaks and strengthening resilience in India's poultry sector.

ICAR–NIHSAD applied to the NBA in Form II seeking approval for transfer of research results and associated technology for commercial scale-up. The proposal did not involve transfer of biological material. In parallel, M/s. Hester Biosciences Limited applied separately in Form I for access to the biological resource for commercial utilisation, ensuring compliance under the BD Act. The application was processed through technical and legal evaluation by NBA and approved in 2023 for a defined period.

Based on mutually agreed terms, benefit sharing was fixed at 3% of the monetary consideration in accordance with Regulation 7 of the ABS Guidelines. The MAT was operationalised through licensing arrangements facilitated by Agrinnovate India Ltd., enabling effective transfer of technology from the public research system to the private sector. The vaccine subsequently received regulatory approval for commercial manufacturing in 2026, marking a key milestone in poultry disease management (Figure 23).

The technology transfer resulted in realisation of monetary benefits under the licensing agreement. In accordance with ABS provisions, an amount of

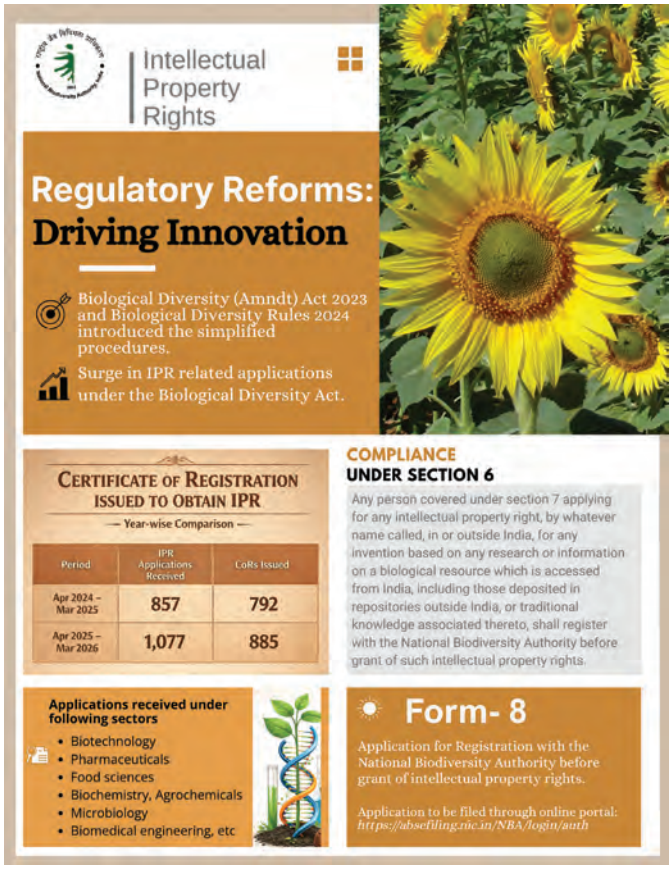
Figure 23 Transfer of Technology 'Inactivated Low Pathogenic Avian Influenza (H9N2) Vaccine for Chickens' Developed by ICAR-NIHSAD, Bhopal @ PIB-ICAR

Rs. 75,000 (3%) was remitted to NBA in 2024 by ICAR–NIHSAD which is being transferred to the State of Rajasthan and institute concerned.

This highlights that effective ABS implementation in transfer of research results requires clear regulatory distinction between access to biological resources and technology transfer, supported by a dual compliance. It underscores the importance of coordinated functioning of NBA, research institutions, and industry in ensuring compliance and benefit sharing. It also demonstrates how ABS enables responsible public–private partnerships while aligning with the principles of the Nagoya Protocol.

3.8.4. From Innovation to Equity: IPR-Based Benefit Sharing under the Biological Diversity Act

This case pertains to benefit sharing arising from intellectual property rights (IPR) based on biological resources, associated traditional knowledge, and digital sequence information accessed from India. Under the BD Act, prior approval of NBA is mandatory before applying for IPRs related to biological resources, associated traditional knowledge, and digital sequence information, ensuring regulated access that aligns with national interests and conservation priorities.



Streamlined IPR process

Applicants seeking IPR protection are required to comply with Access and Benefit Sharing provisions, including equitable sharing of monetary and/or non-monetary benefits with benefit claimers such as BMCs, communities and traditional knowledge holders. Under the ABS Regulations, benefit sharing is structured according to the mode of commercialisation. For commercialisation by patent holder, ABS ranges from 0.2% to 1.0% of the annual gross ex-factory sale price (excluding taxes), while in cases of licensing or assignment of IPR, ABS ranges 3.0% to 5.0% of the licence fee along with 2.0% to 5.0% of royalty.

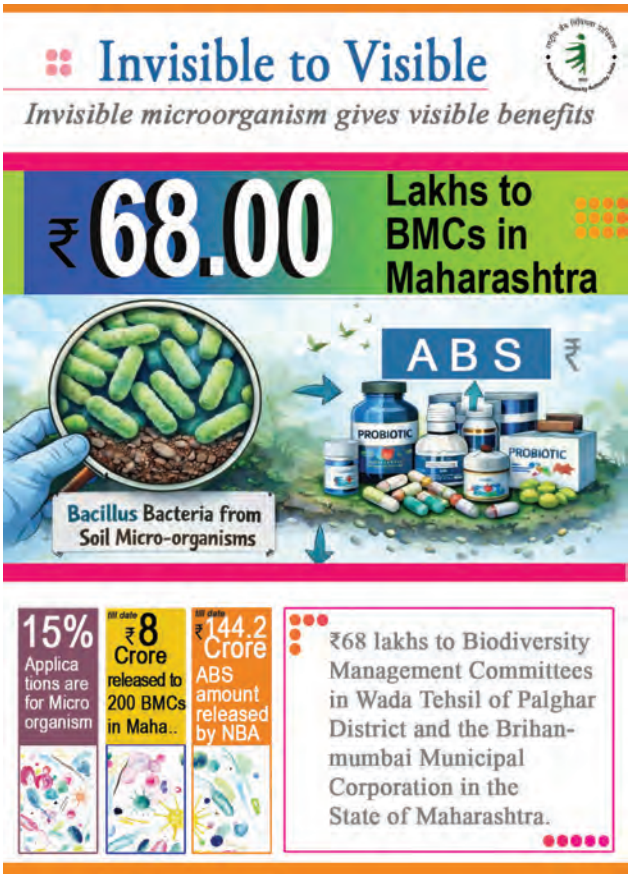
Through implementation of these provisions, the NBA realised and disbursed Rs. 43.22 lakh as patent-linked ABS. The funds were distributed to 16 SBBs, including Andhra Pradesh, Tamil Nadu, Odisha, Uttar Pradesh, and Madhya Pradesh, with major allocations to Andhra Pradesh (Rs. 20.66 lakh) and Tamil Nadu (Rs. 16.79 lakh), for onward transfer to BMCs and local communities.

At the grassroot level, the ABS funds are being utilised for activities such as updating PBRs, documentation of traditional knowledge, biodiversity conservation, and livelihood enhancement initiatives.

This highlights that effective integration of IPR with ABS establishes a clear linkage between innovation, commercialisation, and equitable benefit sharing. It underscores the role of robust regulatory processes and coordinated institutional mechanisms in ensuring that benefits arising from biodiversity-based innovations are channelled towards conservation and community welfare, in alignment with the principles of the Nagoya Protocol.

3.8.5. Wada Tehsil, Palghar District, Maharashtra: Commercial Utilisation of soil derived Microbial Resources by M/s. Synergia Life Sciences Pvt. Ltd., Maharashtra

This case pertains to the commercial utilisation of microbial resources derived from soil samples collected at Kalina Campus and Matunga (Mumbai), and Wada Tehsil, Palghar District, Maharashtra, by M/s. Synergia Life Sciences Pvt. Ltd. The microorganisms identified, Bacillus *clausii, Bacillus coagulans,* and *Bacillus licheniformis*, demonstrated



Release of ABS to BMCs

significant probiotic and nutraceutical potential and were subsequently utilised for the development of high-value probiotic formulations and Vitamin K2-7 products.

M/s. Synergia Life Sciences Pvt. Ltd. applied to the NBA in Form I seeking approval for commercial utilisation of soil derived microbes. The proposal was examined by the Expert Committee on ABS and approval was granted with mutually agreed terms. Benefit sharing was fixed at 0.5% of the annual gross ex-factory sale price of the products (excluding taxes), in accordance with Regulation 4 of the ABS Regulations, 2014. An additional condition required the company to conduct biodiversity awareness programmes in collaboration with the SBB.

The commercialisation of probiotic and nutraceutical products resulted in realisation of Rs. 5,47,77,545.00 as benefit sharing amount. In accordance with the ABS regulations, 95% (Rs. 5,20,38,667.75) was distributed to nearly 84 BMCs in Wada Tehsil, Palghar District, while 2.5% each (Rs. 13,69,438.63) was retained by NBA and the concerned SBB towards administrative costs.

The ABS funds are being utilised by BMCs for activities such as biodiversity conservation and ecosystem restoration, preparation and updating of PBRs, capacity building and awareness programmes, along with supporting socio-economic development of local communities.

This highlights that effective ABS implementation enables alignment of commercial biotechnology with regulatory compliance and equitable benefit sharing. It underscores the importance of traceability of bioresources, robust regulatory oversight, and coordinated functioning of NBA, SBBs, and BMCs in ensuring that benefits from bioresource utilisation reach grassroots institutions. It also demonstrates how microbial-based innovations can support sustainable utilisation while strengthening local biodiversity governance.

3.8.6. Narrau Village, Uttar Pradesh – Access to Agricultural Residues for 2G Bioethanol Research by Indian Oil Corporation Limited

This case pertains to access to agricultural residues sourced from Narrau Village, Akrabad (Kaul Taluk), Aligarh District, Uttar Pradesh, by Indian Oil Corporation Limited for research aimed at improving pre-treatment methods for second-generation (2G) bioethanol production. The biomass, though widely available, constitutes a biological resource under the BD Act, 2002, and its access was regulated in alignment with national legislation and the Nagoya Protocol. This case highlights the importance of ensuring regulated access, sustainability, and equitable benefit sharing even for non-conventional biological resources such as agricultural residues.

Indian Oil Corporation Limited submitted five Form I applications to the NBA seeking prior approval for research access. The approval process involved consultation with the Uttar Pradesh SBB and the BMC of Narrau Gram Panchayat, ensuring representation of local stakeholders. An upfront payment of Rs. 18,60,000 was determined as per the ABS Regulations.

Out of this, Rs. 17,67,000/ (95% of the ABS amount) was released to the Uttar Pradesh State Biodiversity Board and Rs. 46,500.00 each was retained by the NBA and the SBB towards administrative charges. These funds are utilised for conservation of biological resources, promotion of biodiversity-based livelihoods, and socio-economic development activities at the local level.

The research strengthens biomass conversion technologies for second-generation (2G) ethanol production by improving the efficient utilisation of agricultural residues. This not only mitigates environmental issues such as stubble burning but also promotes circular bioeconomy approaches and contributes to India's renewable energy and emission reduction commitments.

This case exemplifies the effective operationalisation of ABS provisions at the research stage, ensuring that tangible benefits accrue to local communities even prior to commercialisation. It highlights the critical role of coordinated action among NBA, SBBs/ UTBCs and BMCs, while reinforcing the principle of fair and equitable benefit sharing. The approach provides a replicable model for integrating industrial bioenergy research with biodiversity conservation and community-based governance.

3.9. Best Practice demonstrated by the SBBs and UTBCs

3.9.1. Operational Handbook on ABS (Assam-Specific Guidelines)

Under the Assam Project on Forest and Biodiversity Conservation Phase II, the Assam State Biodiversity Board developed a State-specific ABS Operational Handbook. It received technical support from CHASE Advisors and RGVN. The handbook supports the implementation of the BD Act, 2002, the Nagoya Protocol, and the ABS Regulations, 2025.It converts national ABS rules into practical tools. These include model contract clauses, procedures for PIC, benefit sharing, and compliance mechanisms suited to Assam. It also includes four sector-specific case studies on trade, manufacturing, high-value forest resources, and inter-state sourcing. The handbook provides a clear and practical guide for companies, BMCs, and regulators (Figure 24).

Figure 24 Operational Handbook on ABS issued by Assam SBB

3.9.2 M/s. Emami Limited – Manufacturing Sector in Assam

Emami Limited (Assam manufacturing unit) accessed biological resources such as aloe vera, neem, turmeric, green tea, cucumber, coconut, and coriander for use as industrial inputs in cosmetics, healthcare products and edible oils

These resources were used for large-scale commercial manufacturing, and therefore Emami was required to submit ABS formats (Form-A and Format-I), enter into turnover-based MAT under the ABS Regulations 2025, and contribute benefit-sharing to the State and local biodiversity funds, which operate as the institutional mechanism for PIC and community participation. Through repeated notices, valuation tables and application of the updated regulations, ASBB created a standard corporate compliance pathway that now functions as a model code of conduct for FMCG, Ayurveda and food industries (Figure 25).

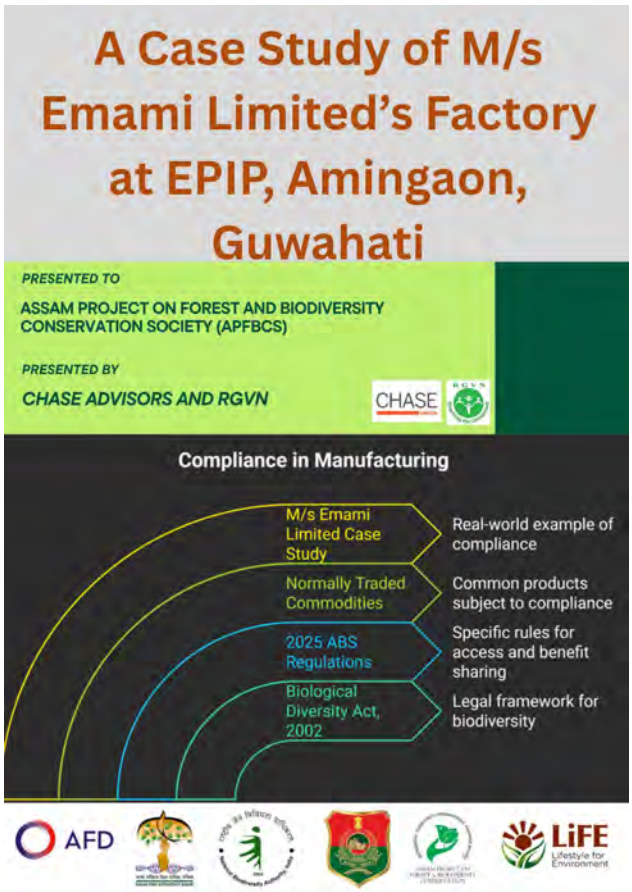


Figure 25 Case Study on Emami Ltd By Assam SBB

3.9.3. M/s. Patanjali Ayurved Ltd. – Inter-State Manufacturing and Sourcing

Patanjali Ayurved Ltd. (Assam unit and interstate sourcing) used plant-based ingredients such as aloe vera, neem, tulsi, tea, medicinal herbs and palm-oil related crops in the manufacture of Ayurvedic medicines, personal care products and food items, alongside large-scale oil-palm expansion in Assam.

The purpose was commercial production and agro-industrial expansion, which required disclosure of the origin of all biological inputs and compliance with ABS where Assam-sourced resources were involved. ASBB insisted Patanjali to submit ABS declarations, ensure PIC through verification of local sourcing via BMCs, and apply MAT where applicable so that benefits flow to biodiversity funds and community conservation. By mandating disclosure, traceability and ABS reporting, ASBB promoted company-wide due-diligence standards that now serve as best-practice guidance for multi-state bio-resource users under ABS system.

3.9.4. M/s. Nahar Organics – Trade and Aggregation of Biological Resources

Nahar Organics (Assam and other North-Eastern India) accessed a wide range of organic spices, medicinal herbs and agro-commodities such as turmeric, ginger, black pepper, star anise, bay leaf, Brahmi and Amla from biodiversity-rich regions of Assam and other North-Eastern states for aggregation and supply to food, pharmaceutical and cosmetic industries. The purpose of access was commercial trade and export for commercial utilisation, a core and indispensable element of the biological resource supply chain, linking local collectors and farmers to national and international markets. Under Section 7 of the BD Act, such procurement and trading for commercial utilisation requires prior intimation and regulatory oversight by the SBB. Accordingly, under the ABS framework, traders like Nahar Organics are treated as ABS stakeholders, with benefit-sharing

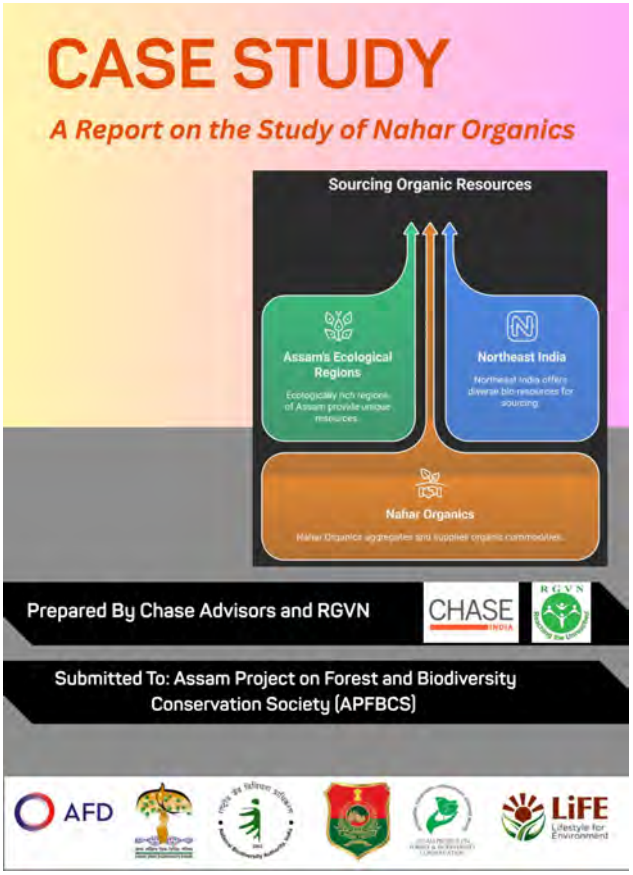


Figure 26 Case Study on Nahar Organic - Assam SBB

structured through turnover-linked MAT and PIC operationalised through sourcing arrangements with farmers and BMCs. The Assam State Biodiversity Board, supported by NGOs, has encouraged this sector by issuing trader-specific interpretations of ABS rules and promoting traceability-based codes of conduct, standard formats and model MAT structures, thereby embedding ABS compliance across the trading segment of the bio-economy (Figure 26).

3.9.5. Access to Agarwood (*Aquilaria malaccensis*)

Agarwood (*Aquilaria malaccensis*) in Assam is accessed predominantly from homestead plantations, tea-garden intercropping systems and private agroforestry holdings located in districts such as Golaghat, Jorhat and Sivasagar, which together account for more than 114 million trees, representing over 80 per cent of India's agarwood plantation stock

The biological resource, comprising resin-bearing wood, chips and agar oil, is utilised for the manufacture of perfumes, incense, traditional medicines, cosmetics and other high-value fragrance products for domestic consumption and export. In accordance with the ABS Regulations, 2014 agarwood has been notified as a high-economic-value biological resource and is therefore subject to up-front and turnover-linked benefit-sharing obligations, bringing growers, processors and traders within the ABS framework. The access and utilisation of agarwood operate through a regulated value chain involving growers, traders, processors and exporters, supported by plantation registration, Legal Procurement Certificates and CITES-compliant permits, which together ensure traceability and PIC.

MAT are implemented through State-determined ABS rates and export-linked benefit-sharing mechanisms. The Assam SBB, in coordination with the Forest Department and partner organisations, has promoted standardised registration, supply-chain documentation and ABS valuation procedures, thereby encouraging the adoption of codes of conduct, guidelines and best practices for sustainable and legally compliant agarwood trade.

3.9.6. Trade of Non-Timber Forest Products (NTFPs) in Tripura

Trade of Non-Timber Forest Products (NTFPs) in Tripura involves access and commercial utilisation of bioresources such as broom grass (*Thysanolaena maxima*), kanak kaich bamboo, gandhaki and other

forest products sourced from areas managed by BMCs and JFMCs (Figure 27).

Traders procure these bioresources for trade in regional and national markets and value addition. Under Section 7 of the BD Act, they must obtain prior approval from the SBB, even for commonly traded commodities for commercial utilisation. Accordingly, traders act as ABS stakeholders and enter into MAT with the Tripura Biodiversity Board (TBB). Concerned BMCs and JFMCs issue joint resolutions to operationalise PIC, certifying availability and sustainable harvesting of bioresources. Traders submit these resolutions along with Form I and prescribed fees to TBB. After approval, TBB executes the ABS Agreement and the forest department issues Transit Permits (GP/TP) for lawful movement of bioresources.

The system follows a predefined benefit-sharing formula: 5% to JFMCs, 2% to BMCs and 1% to the State Biodiversity Fund, leading to increased ABS receipts and improved transparency after streamlining in 2019.TBB promotes standardised procedures, model resolutions, traceable supply chains and clear valuation norms, strengthening sustainable and equitable bioresource trade.

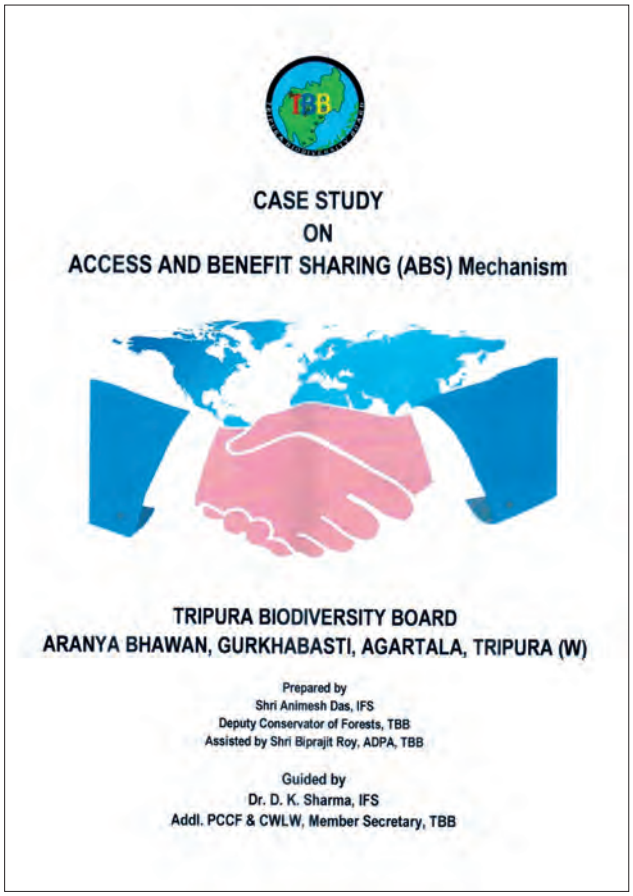
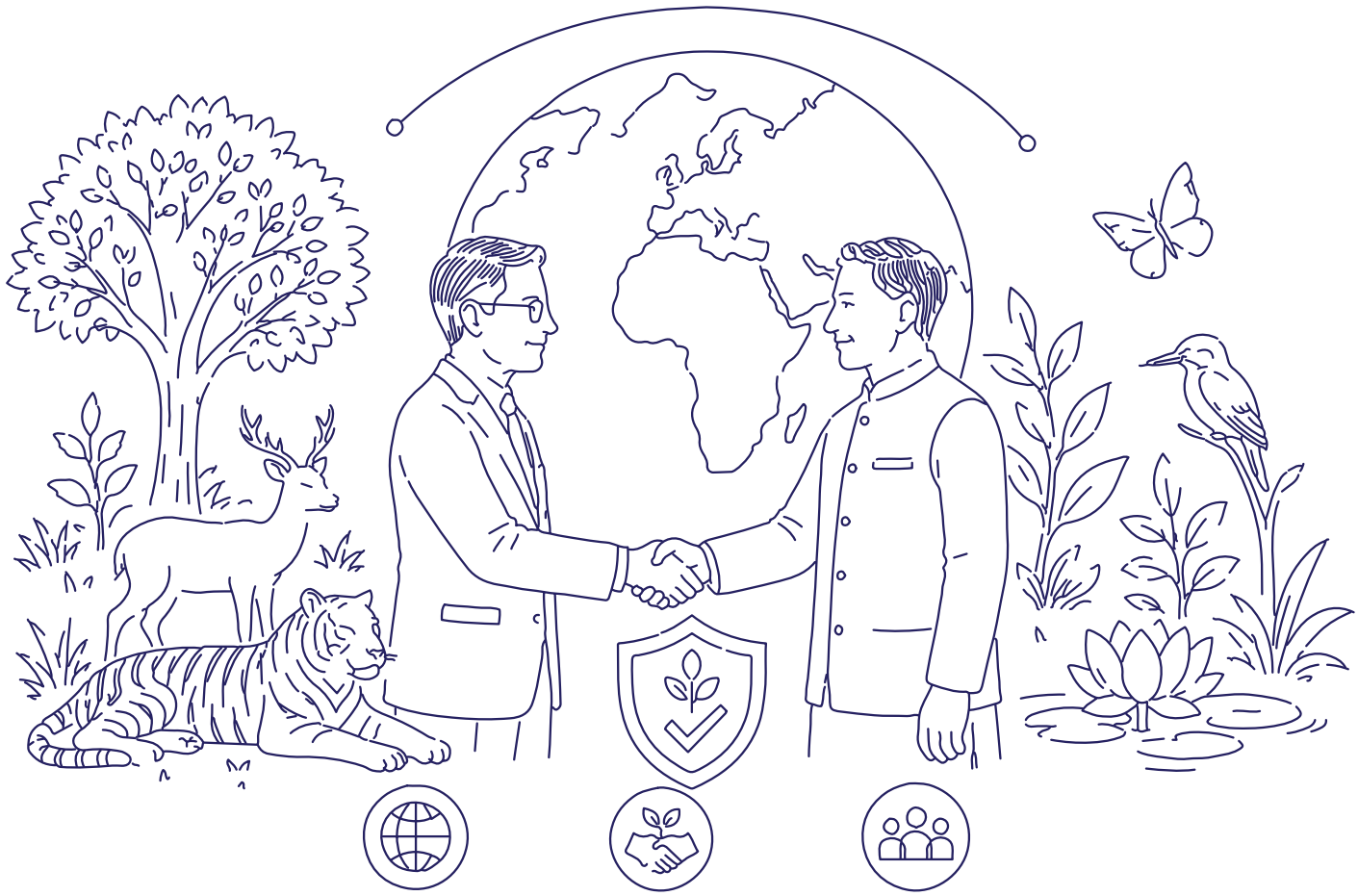


Figure 27 Case Study on NTFPs by Tripura SBB

Nilgiritragus hylocrius

Chapter 4

International Compliance and Cooperation



ABS operates under the CBD and its supplementary agreement, the Nagoya Protocol on ABS. In a globalized context, biological resources and associated traditional knowledge are often accessed in one country but utilized in another; therefore, ABS cannot function through national measures alone and requires coordinated international action.

A core pillar of this system is international compliance, particularly reflected in Articles 15 and 16 of the Nagoya Protocol, which obligate Parties (user countries) to ensure that genetic resources and associated traditional knowledge are accessed in accordance with the provider country's PIC and MAT. This creates legal accountability for users across jurisdictions, helping prevent biopiracy and ensuring fairness.

Indian Delegations in the COP -16 at Cali, Colombia

Further, Article 17 establishes mechanisms for monitoring and traceability, including checkpoints such as patent offices, research funding agencies, and regulatory authorities. These enable tracking of biological resources across borders and ensure transparency in their utilization.

International cooperation also plays a vital role in enabling fair and equitable benefit-sharing both monetary (royalties, licence fees) and non-monetary (technology transfer, capacity building) while promoting legal harmonization, reducing uncertainty for cross-border research and industry, strengthening enforcement where provider countries alone have limited reach, and fostering trust and long-term collaboration.

Overall, international cooperation and compliance transform ABS from a national regulatory tool into a globally enforceable governance framework, essential for achieving biodiversity conservation and sustainable use.

4.1 Checkpoints under the Nagoya Protocol on ABS:

India being biodiversity rich country act as provider country by permitting with the terms and conditions for access to biological resources and knowledge thereto to entities in foregin countries such as France, USA, Spain, Brazil, UAE, China, and Netherlands for research and development followed by commercial utilisation. Even though the approval granted by the provider country comprises terms and conditions needs to be adhered by the users, there is a need for cooperation from the user country in case of any non-compliance with the terms and conditions by users. Unless legal or administrative measures in place to monitor the use of foreign biological resources, the benefits of ABS cannot be yielded by the provider countries.

Provider countries face a key challenge in tracking genetic resources once they leave national jurisdiction. A major added value of the Nagoya

Protocol is the establishment of compliance measures that extend responsibility to user countries. Article 17 of the Nagoya Protocol specifically addresses the monitoring of utilisation of genetic resources to ensure adherence to Access and Benefit-Sharing requirements. It obliges Parties to track the use of genetic resources after access has been granted, ensuring compliance with PIC and MAT. To operationalize this, Parties must designate checkpoints at relevant stages such as research funding, patent applications, and product development where key information such as IRCCs or its equivalent, source of genetic resources and compliance conditions are collected.

Article 17. Monitoring the Utilisation of Genetic Resources

1. To support compliance, each Party shall take measures, as appropriate, to monitor and to enhance transparency about the utilisation of genetic resources. Such measures shall include:
   - (a) The designation of one or more checkpoints, as follows:
   - (i) Designated checkpoints would collect or receive, as appropriate, relevant information related to prior informed consent, to the source of the genetic resource, to the establishment of mutually agreed terms, and/or to the utilization of genetic resources, as appropriate;
   - (ii) Each Party shall, as appropriate and depending on the particular characteristics of a designated checkpoint, require users of genetic resources to provide the information specified in the above paragraph at a designated checkpoint. Each Party shall take appropriate, effective and proportionate measures to address situations of non-compliance;
   - (iii) Such information, including from internationally recognised certificates of compliance where they are available, will, without prejudice to the protection of confidential information, be provided to relevant national authorities, to the Party providing prior informed consent and to the Access and Benefit-sharing Clearing-House, as appropriate;

Under the India's extant Access and Benefit Sharing legal framework, the NBA is one of the authorities responsible for monitoring access to and utilisation of foreign biological resources in India, ensuring that PIC has been obtained and that MAT have been established, in accordance with the domestic access and benefit sharing legislation or regulatory requirements of the providing Party.

According to Section 36A of the BD Act read with Rule 18 of the BD Rules, 2024, users of foreign biological resources or associated traditional knowledge (e.g., industries, researchers) are required to provide the information by declaring in Form-10 to the NBA through online portal. The submission of Form-10 applies to the activities conducting after 21st December 2025 (Figure 28). So far, 41 such declarations have been received by the CNA.

Crocus sativus
Photo Credits: Himachal Pradesh SBB

Procedure to use the foreign biological resources and associated traditional knowledge in India

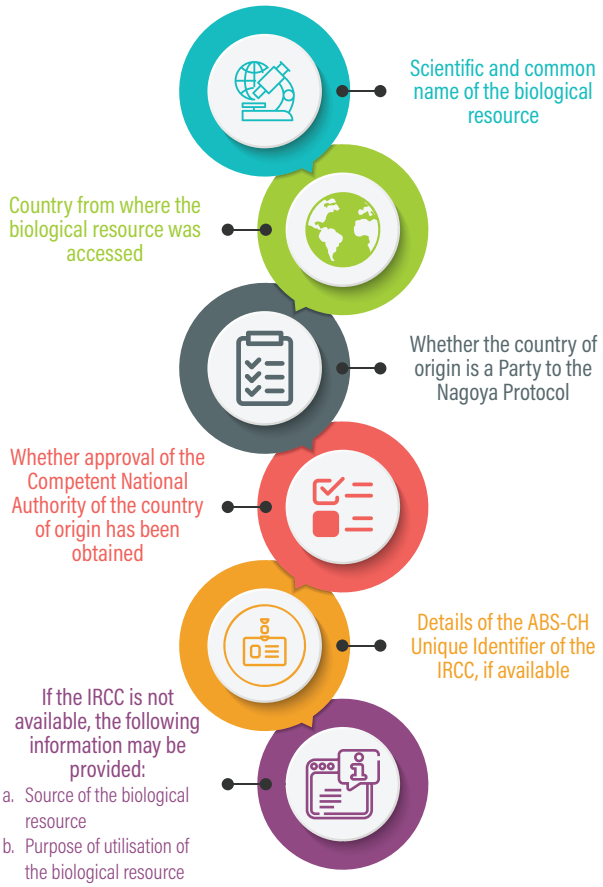


Figure 28 Procedure to Use the Foreign Biological Resources and Associated Traditional Knowledge in India

4.2 Access and Benefit Sharing Clearing-House (ABS-CH)

The ABS CH is a platform developed and maintained by SCBD as mandated under Article 14 of the Nagoya Protocol, for exchanging information on access and benefit-sharing (https://absch.cbd.int), as part of clearing-house mechanism under Article 18, paragraph 3 of the CBD. It is a key tool for facilitating the implementation of the Nagoya Protocol by enhancing legal certainty, clarity and transparency on procedures for access and for monitoring the utilisation of genetic resources along the value chain. By making relevant information available in the ABS CH, it helps users to access genetic resources and associated traditional knowledge, and providers to get fair and equitable share in the benefits arising from their utilisation. The requirements under the Article 17 of the Nagoya protocol are dealt in the ABS CH Portal.

The ABS-CH captures records such as ABS National Focal Points, Competent National Authorities, legislative, administrative or policy measures, ABS procedures, national model contractual clauses, IRCCs, national websites or databases, checkpoints, checkpoint communiqués, and national reports on implementation.

Indian Delegations in the CBD- SBSTTA-27, 20–30 October 2025 at Panama

4.2.1. Publication of Records in the ABS CH:

Under the Nagoya Protocol, India has published several records in the ABS CH, reflecting its implementation of ABS measures. India has notified 32 legislatives, administrative, and policy measures and has established one ABS procedure in accordance with Article 13 of the Protocol.

Dr. Achuta Nand Shukla, Scientist-E, MoEFCC serves as India's ABS National Focal Point and facilitates information exchange, coordination, and communication among national institutions, stakeholders, and the CBD Secretariat.

The NBA functions as the Competent National Authority, grants access approvals, ensures

compliance with PIC and MAT, monitors adherence to ABS obligations, and facilitates the issuance of IRCCs, which it records in the ABS CH to promote transparency.

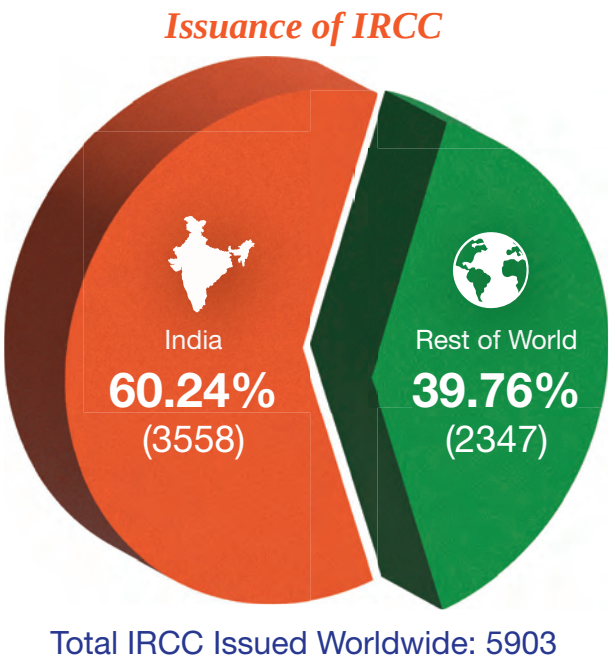


Figure 29 Issuance of IRCCs

4.2.2. Internationally Recognised Certificates of Compliance: Act as a tool to help monitor the utilisation of genetic resources.

The ABS-CH provides a centralised system to track the utilisation of genetic resources across the value chain. When a provider country grants access and publishes permit information, an IRCC is generated, serving as proof of compliance with national ABS rules (Provider country). This enables users to furnish required information at designated checkpoints, which is then published as checkpoint communiqués (CPCs) in the ABS-CH and shared with relevant stakeholders, including the provider country, thereby ensuring transparency and traceability even beyond national jurisdictions.

Under Article 17.2 of the Nagoya Protocol, India has generated 3,556 IRCCs on the ABS-CH portal as of 31 December 2025, accounting for about 60.24% of the total 5,903 IRCCs globally (Figure 29). Although the NBA granted 5,913 access approvals, IRCCs were issued only for approvals involving non-Indian applicants, leading to the difference between total approvals and IRCCs generated. This enables user countries to verify that genetic resources originating from India have been accessed legally and are being utilized in accordance with the terms and conditions of the Mutually Agreed Terms.

4.2.3 Submission of Reports to the Nagoya Protocol on ABS

Article 29 of the Nagoya Protocol requires Parties to monitor implementation and periodically report on measures taken to operationalize the Protocol. In line with this obligation, India has established monitoring and reporting mechanisms through its national ABS legal framework.

India has submitted its Interim National Report in November 2017 and the first National Report on the implementation of the Nagoya Protocol on ABS detailing legislative, administrative, and institutional measures for ABS implementation was submitted through ABS CH on 27th February 2026 (report can be accessed @ https://absch.cbd.int/en/database/ABSCH-NR1-IN-285093-1) . These reports highlight progress in operationalising the BD Act, strengthening ABS regulatory processes, sharing of ABS amount, strengthening capacity building and enhancing institutional coordination through the NBA and SBBs/UTBCs.

4.2.4. Technology Transfer, Collaboration, Cooperation and Transboundary Engagement under the Nagoya Protocol on ABS

Under the Nagoya Protocol, India has demonstrated a comprehensive approach for implementing ABS through legal, institutional, and collaborative measures.

Article 11 of the Nagoya Protocol seeks to establish transboundary cooperation between Parties when the same genetic resources or associated traditional knowledge are found within the territory of more than one Party. India recognises the importance of collaboration and information exchange with other Parties to address issues related to the cross-border utilisation of genetic resources. Through institutional mechanisms and diplomatic channels, India endeavours, as appropriate and subject to national legislation, to cooperate in instances where the same genetic resources or associated traditional knowledge is shared by local communities across

more than one Party, thereby contributing to global compliance and prevention of biopiracy.

Article 23 of the Nagoya Protocol promotes technology transfer, collaboration and cooperation among Parties. It requires countries to support joint research, share technologies (including biotechnology), and build capacity, especially in developing countries to effectively implement ABS mechanism. For India, it is important as it strengthens scientific capacity, enables access to advanced technologies, supports institutional capacity-building and enhances global partnerships for equitable benefit-sharing, recognising that India has been collaborating and cooperating in technical and scientific research and development programmes as a means to achieve the objective of the Protocol.

CEBPOL has played a significant role in building professional expertise, supporting policy research, and strengthening legal understanding of biodiversity governance, including ABS mechanism. In addition, India has hosted international exchange and training programmes for officials from countries such as Nepal, Indonesia, Singapore, Malaysia, and Norway. These peer-learning initiatives have enabled practical exposure to India's ABS procedures, regulatory systems, and implementation experience under the BD Act, 2002 and the Nagoya Protocol. Overall, India's implementation reflects a balanced and proactive approach combining strong domestic regulation with international cooperation, technical collaboration, and capacity-building while also recognizing the need to further scale up awareness and outreach to fully realise the objectives of the Nagoya Protocol.

Indo - German Technical Co-operationon

"Development of National Framework for Electronic People's Biodiversity Register in India

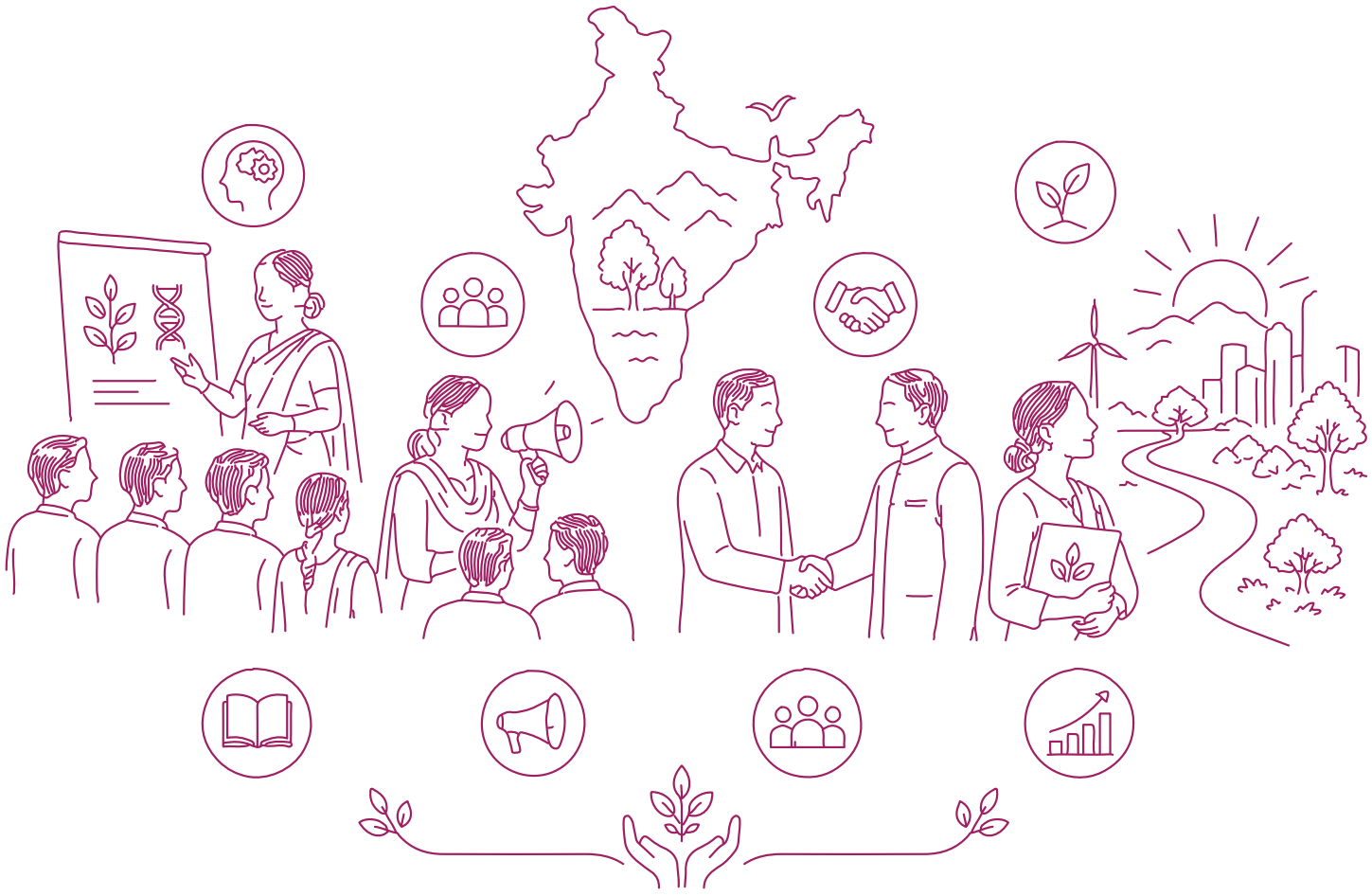
Centre for BiodiversityPolicy and Law (CEBPOL),

Intiative of the Government of India,and Government of Norway to develop professional expertise on policies and legal issues related to biodiversity, including ABS.

Photo Credits: Telangana SBB

Chapter 5

Capacity Building, Awareness, Partnerships and Future Pathways for Strengthening ABS Implementation



5.1 Importance of Capacity Building on ABS

Capacity building is critical for the effective implementation of ABS under the Nagoya Protocol and BD Act. It strengthens the ability of institutions such as the NBA, SBBs/ UTBCs and BMCs to interpret, implement and enforce ABS provisions in a consistent and efficient manner. Further, capacity building supports scientific, technical, and legal expertise, enabling India to engage effectively in international negotiations and collaborations.

For India, capacity building enhances awareness and compliance among users of biological resources, including researchers, industries, and local communities. It helps stakeholders to understand key requirements such as PIC and MAT, thereby reducing violations and improving legal certainty. At the local level, it empowers communities to protect the biological resources and their traditional knowledge while ensuring they receive fair and equitable benefit-sharing. It also plays a vital role in improving documentation and governance, including the preparation of PBRs, monitoring the use of biological resource, and reporting to NBA/SBB.

Therefore, strengthening capacity ensures better implementation of the BD Act, promotes conservation and sustainable use of biodiversity, and enables India to realize equitable benefits from the use of its rich biological resources.

5.2. Awareness, Capacity-Building and Cooperation under Articles 21 and 22 of the Nagoya Protocol: India's Experience

In line with Article 21 (Awareness-Raising), India has undertaken sustained efforts to enhance awareness on biological resources, associated traditional knowledge, and Access and Benefit-Sharing. These efforts span national, State/UT, and local levels, strengthening understanding and compliance under the BD Act, 2002. Key initiatives include training-of-trainers programmes, capacity-building for BMCs, stakeholder consultations, and integration of biodiversity governance into academic and training curricula. A wide range of stakeholders including ministries/departments, SBBs, UTBCs, patent attorneys, local institutions, research organisations, industry, and academia, have been actively engaged.

India has developed and implemented a structured capacity-building and communication strategy based on comprehensive stakeholder analysis. Tailored approaches address specific knowledge and skill gaps across regulatory authorities, BMCs, SBBs/ UTBCs, researchers, industry, legal professionals, forest and line departments, customs authorities, and civil society organisation. The strategy combines one-way communication tools such as guidelines, factsheets, advisories with interactive approaches such as trainings, workshops, consultations, dialogue forums, and exposure visits. Special

Training for IFS Officers Organised by NBA and MSSRF

emphasis is placed on strengthening BMCs through simplified materials, local language communication, and hands-on training supported by Technical Support Groups, thereby improving awareness, compliance, coordination, and implementation of ABS at grassroot level.

India has also developed and disseminated knowledge products including guidelines, manuals, training modules, and digital resources on BMCs, ABS, and PBRs). The NBA, through initiatives such as the Centre for Biodiversity Policy and Law in collaboration with the National Institute of Rural Development and Panchayati Raj (NIRDPR), has developed training modules covering key provisions of the BD Act, ABS Regulations, roles of Panchayati Raj Institutions and BMCs, PBR preparation, and benefit-sharing procedures, thereby strengthening implementation of the BD Act at the local-level.

A key feature of India's awareness strategy has been targeted engagement with industry and sectoral associations through communication and consultative meetings, including the Ayurvedic Drug Manufacturers' Association (ADMA), Ayurvedic Medicine Manufacturers Organisation of India (AMMOI), Association of Manufacturers of Ayurvedic Medicine (AMAM), Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI), Federation of Seed Industry of India (FSII), National Seeds Association of India (NSAI) (Figure 30), Indian Vaccine Manufacturers Association (IVMA), Association of Biotechnology Led Enterprises (ABLE), Biotech Research Society of India (BRSI), Biotechnology Industry Research Assistance Council (BIRAC), Shellac and Forest Products Export Promotion Council (SHEFEXIL), Indian Drug Manufacturers' Association (IDMA), Bulk Drug Manufacturers Association (BDMA), Indian Pharmaceutical Alliance (IPA), Essential Oil Association of India, Indian Beauty & Hygiene Association (IBHA), and Association of Beauty Therapy and Cosmetology (ABTC). These engagements have played a critical role in promoting awareness on ABS compliance requirements, regulatory procedures, and responsible utilisation of biological resources among commercial users.

Figure 30 Meeting with Stakeholders from Seed Sector Organized by NBA

These efforts have been further strengthened through national and international initiatives, including the ASEAN–India Cooperation Project (2017–2021), UNEP-GEF ABS Project (2012–2020), Indo-German ABS Project (2016–2020), CEBPOL, and the UNDP Biodiversity Finance Initiative (BIOFIN). Ongoing Programmes such as the GoI–UNDP–GEF Biodiversity Project (2025–2030) continue to integrate biodiversity into development planning while enhancing institutional capacities. Additional strategies include engagement with the Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) of MoEFCC, collaboration with national training institutions, internship Programmes, and large-scale preparation and digitalization of PBRs with participation from students, researchers and local communities.

Figure 31 Capacity Building Programme for BMC on BD Act and PBR

Pursuant to Article 22 (Capacity-Building and Development), India has strengthened its human and institutional capacities through its three-tier structure comprising the NBA, SBBs/UTBCs, and BMCs (Figure 31). During the reporting period, over 2,56,393 individuals were trained through 3,724 workshops and 600 capacity-building programmes (Figure 32). India also maintains dedicated human resources, with full-time staff at national and State levels, including 10 or more personnel directly engaged in Nagoya Protocol implementation, enabling sustained capacity-building, monitoring, and compliance.

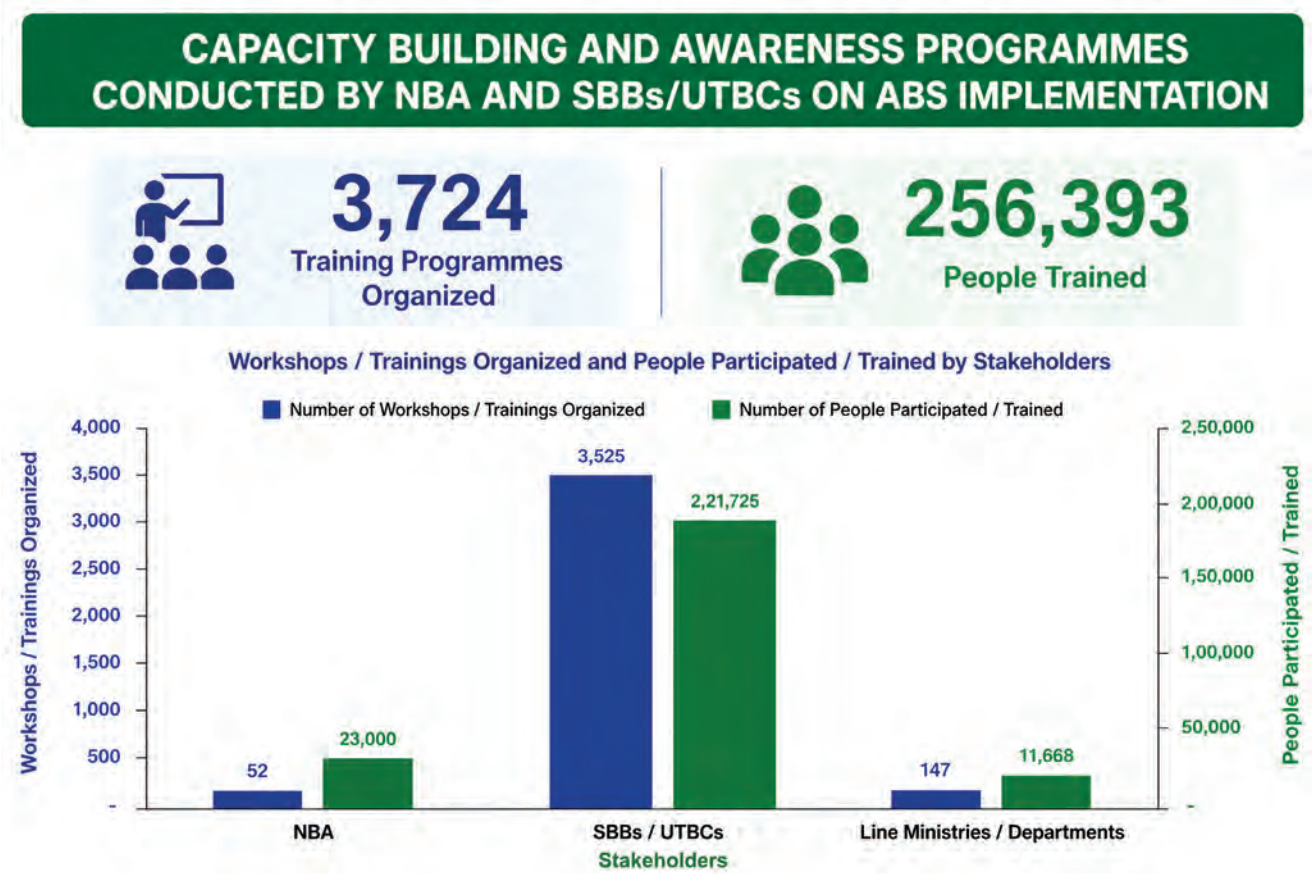


Figure 32 Details of Capacity Building Programmes Conducted and Peoples Trained

India has further contributed to capacity-building of other Parties, consistent with Article 22, through initiatives such as the ASEAN–India Cooperation Project and international exchange Programmes. Officials from countries including Nepal, Indonesia, Singapore, Malaysia, and Norway have participated in learning visits to understand India's ABS framework and regulatory practices, promoting peer learning and international cooperation. India's experience reflects a comprehensive, multi-level approach to awareness-raising, capacity-building, and institutional strengthening, contributing significantly to the effective implementation of ABS under the Nagoya Protocol.

5.3. Biodiversity Finance and Resource Mobilisation in India

India's biodiversity governance architecture is anchored in the updated National Biodiversity Strategy and Action Plan (NBSAP) 2024–2030, supported by monitoring framework and further strengthened through BIOFIN-led financial planning. Together, these initiatives provide a comprehensive and integrated framework for biodiversity conservation and sustainable use.

Despite this progress, India's biodiversity finance analysis highlights a significant resource gap. Estimated biodiversity-related expenditure during FY 2017–2022 is approximately Rs 34,650 crores, while the projected requirement for 2024–2030 is around Rs 81,900 crores. This underscores the urgency of scaling up financial resources to effectively implement national biodiversity targets and global commitments.

Addressing this gap will require enhanced and diversified resource mobilisation strategies, including increased public investment aligned with biodiversity priorities, leveraging private sector and CSR contributions, strengthening Access and Benefit Sharing based financial flows, and accessing international climate and biodiversity finance through multilateral and bilateral channels.

During the reporting period, the NBA received budgetary support of Rs 140.19 crore from the Central Government for the implementation of the BD Act. In addition, SBBs and UTBCs received financial support amounting to approximately Rs 361.9 crore from State Governments, Union Territory administrations, CAMPA and various external aided projects (Table 2). These financial allocations have played a critical role in strengthening institutional capacity, supporting regulatory processes, and operationalising ABS mechanisms at national and sub-national levels. Collectively, they contribute to the effective implementation of the Nagoya Protocol by facilitating fair and equitable benefit-sharing, enhancing compliance systems, and promoting sustainable utilisation of biological resources.

Table 2 Funds Received by NBA and SBBs/UTBCs for Implementation of the BD Act During the Reporting Period

Funds Received for Implementation of the BD Act During the Reporting Period				
NBA Amount (in Crore)	**State Biodiversity Boards/ Union territory Councils Amount (in Crore)**			
Central Government-GIA	State Government -GIA	CAMPA fund	NBA -GIA	External Aided Projects
140.19	**308.91**	**1.64**	**34.6**	**16.75**

Strategic resource mobilization combining domestic and international sources will be central to achieving long-term biodiversity and development outcomes. Strengthening financial planning, tracking, and accountability mechanisms will further enhance investment effectiveness and support the mainstreaming of biodiversity across sectors. Recognising that, India has mobilized resources to the tune of USD 15.50 million for implementing the CBD and Nagoya Protocol on ABS through the Global Environment Facility funded projects and bilateral and multilateral partnerships (Table 3, Figure 33). These efforts have contributed to strengthening institutional capacity, policy frameworks, and digital systems related to ABS.

Table 3 Financial Resources Mobilization through External Aided Funded Projects and Bilateral and Multilateral Partnership

Financial Resources Mobilization through External Aided Funded Projects and Bilateral and Multilateral Partnership			
S. No.	**Project title**	**Funding Agency**	**Amount (USD)**
1	ASEAN–India Cooperation Project on "Capacity Building towards Implementing the Nagoya Protocol on Access and Benefit Sharing, the City Biodiversity Index and the Strategic Plan on Biodiversity"	ASEAN–India Green Fund (AIGF)	10,00,000
2	UNEP GEF MoEFCC Project on Access and Benefit Sharing ''Strengthening the Implementation of the Biological Diversity Act and Rules with focus on its Access and Benefit Sharing Provisions"	GEF	5,016,000
3	GIZ- Access and Benefit Sharing Partnership Project	Government of Germany	3, 537, 930
4	India–Norway Technical and Institutional Cooperation: Establishment of a Centre of Excellence for Biodiversity Law and Policy (CEBPOL)	Government of Norway	1,550,000
5	GoI-UNDP Biodiversity Finance Initiative (BIOFIN)	UNDP	15,00,000
6	Indo-German Technical Cooperation Project on "Development of National Framework for Electronic People's Biodiversity Registers (e-PBRs) in India"	Government of Germany	21,80,000
7	GEF-UNDP Enabling Activity 'Umbrella Programme to Support Update of National Biodiversity Strategies and Action Plan (NBSAP) and the 7th National Report'.	GEF	6,92,000
8	GEF-UNDP Enabling Activity 'Umbrella Programme to Support Update of National Biodiversity Strategies and Action Plan (NBSAP) and the 7th National Report'.	GEF	30,000.00

This experience indicates that blended finance approaches enhance sustainability and long-term impact; however, challenges remain in the form of procedural delays and inter-institutional coordination constraints, which need to be addressed to improve efficiency and scale.

Exposure visit of Forest Range Officers (Trainees) from the Telangana Forest Academy NBA

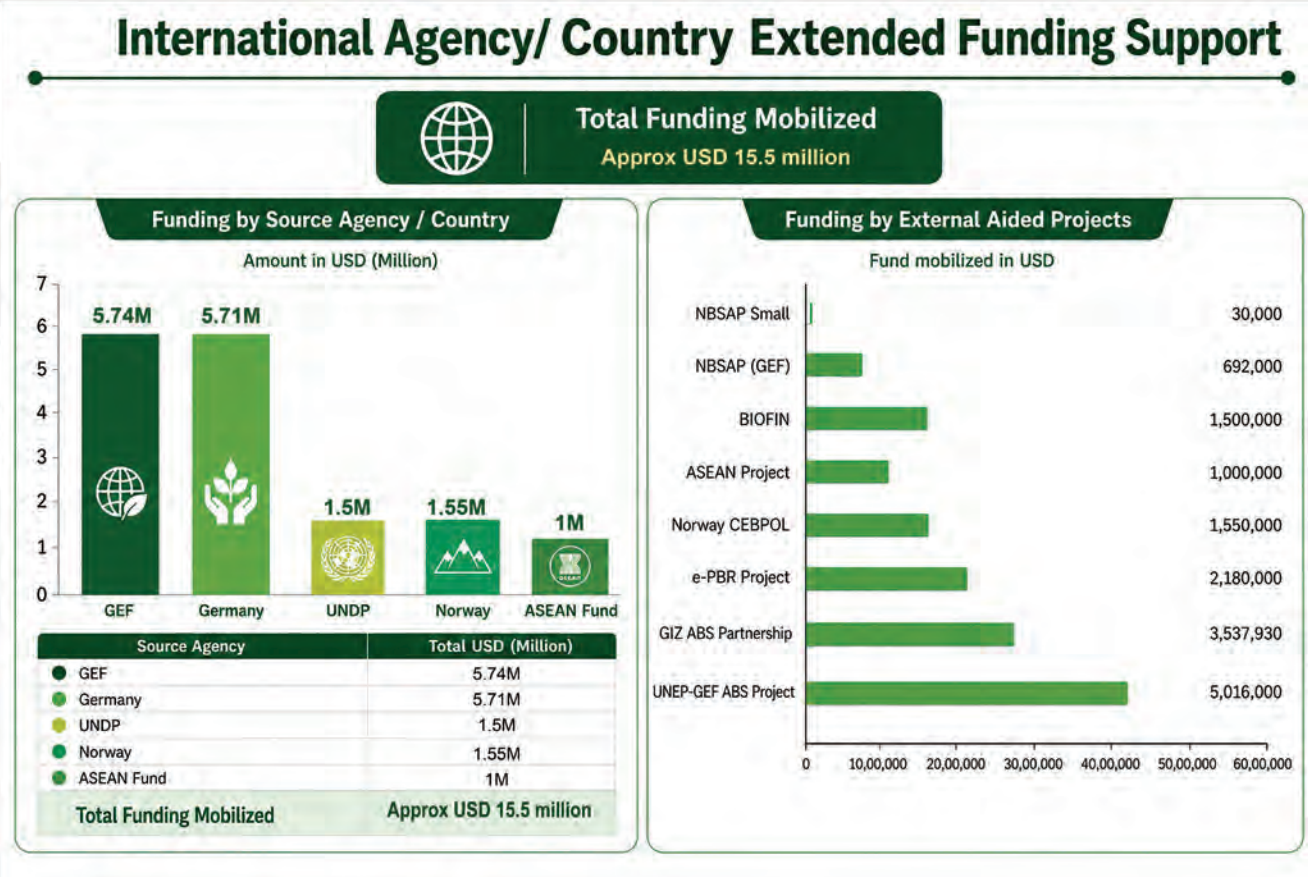


Figure 33 International Agency / Country Extended Funding Support

5.4. Key Achievements, Challenges and Future Priorities

5.4.1. Key Achievements

India has established a robust and well-defined ABS mechanism under the BD Act, supported by the BD Rules, 2024 and ABS Regulations, enabling the effective channelling of both monetary and non-monetary benefits towards biodiversity conservation, sustainable use, and improvement of the socio-economic conditions of local communities.

Building on this legal framework, India has adopted digital governance tools, including the national ABS e-filing portal and regular updates to the ABS CH, which have significantly enhanced transparency, traceability, and compliance monitoring in line with Article 17 of the Nagoya Protocol. India has issued a total of 12,830 ABS approvals, including 5,913 approvals by the NBA for Section 3(2) entities and 6,917 approvals by SBBs and UTBCs for Section 7 entities (Figure 34).

India's early operationalisation of the ABS CH, including the issuance of the world's first IRCC in 2014, demonstrates its leadership in compliance implementation. To date, India has published 3,556 such certificates on the ABS CH, accounting for over 60 percent of the global issuance (Figure 34).

Experience shows that regular and predictable funding, supported by adequate human resources and strong institutional coordination, is critical for effective ABS compliance. In this context, consistent budgetary support to SBBs and UTBCs has strengthened institutional capacity and improved implementation. India has also prioritised awareness and partnerships, training over 2,56,000 individuals, conducting 3,724 Programmes, and supporting over 600 initiatives, while contributing globally through the ASEAN–India Cooperation Project (2017–2021).

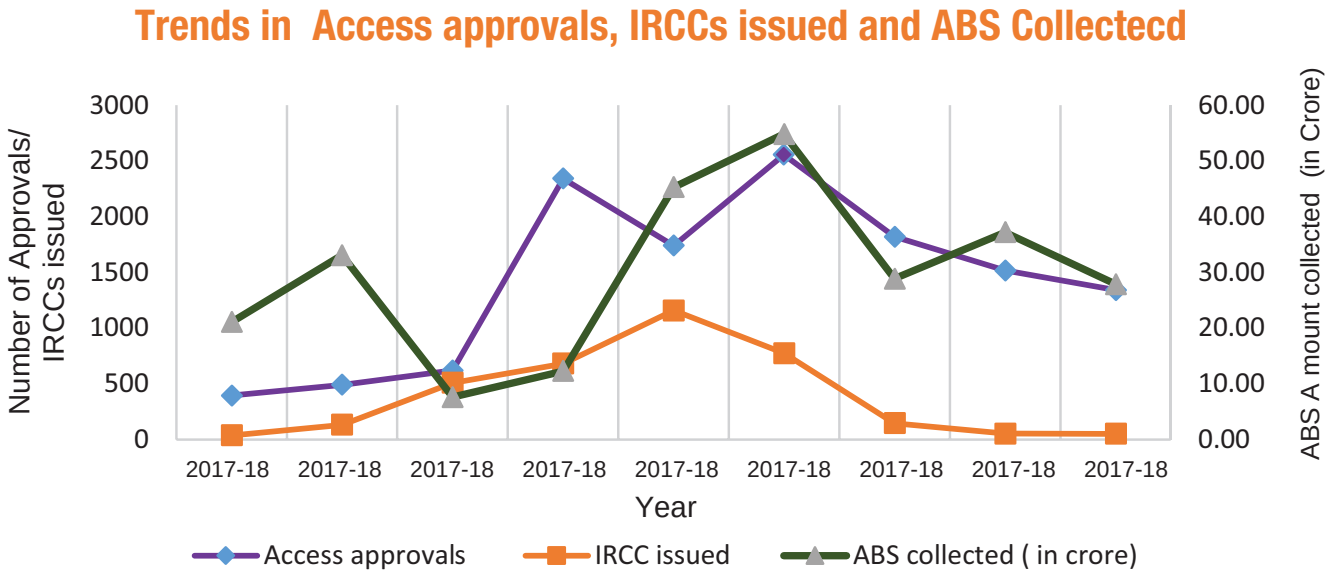


Figure 34 Trends in Access Approvals, IRCCs issued and ABS Collected

5.4.2 Challenges

Despite significant progress, several interrelated challenges continue to affect the effective implementation of the ABS framework in India. A key constraint is the limited understanding of ABS measures in provider countries, along with evolving disclosure and due diligence requirements among users in India, which affects compliance with obligations under Articles 15 and 16 of the Nagoya Protocol.

At the operational level, the process of generating IRCCs remains time-intensive. Approvals under the BD Act are granted through agreements based on mutually agreed terms, and the subsequent extraction and standardisation of information into IRCC formats requires additional effort. The incomplete or inconsistent information submitted by applicants is leading to delays in processing of special consideration of ABS applications under Article 8 of the Nagoya Protocol.

Another major challenge relates to traceability of biological resources, particularly where access occurs through markets, value chains, traders or intermediaries. In such cases, establishing the origin of resources and identifying rightful benefit claimers becomes difficult affecting the sharing of benefits with beneficiaries.

These issues are further reinforced by broader systemic constraints, including:

- Limited awareness and technical understanding of ABS procedures among users and local stakeholders
- Long timelines in research, product development, and commercialisation, which delay benefit-sharing outcomes
- Fragmented and insufficient funding, along with limited private sector participation
- Coordination gaps across institutions involved in ABS implementation

In addition, India's linguistic, cultural, and geographic diversity creates challenges in communication, standardisation of procedures, and consistent implementation of ABS across regions.

5.4.3 Future Priorities

To address these challenges and strengthen implementation in line with the Nagoya Protocol, India is prioritising the development of a simplified, ABS end-to-end portal to enhance traceability, efficiency, and user compliance under Article 17.

Efforts are underway to establish standard operating procedures, improve inter-agency coordination, and expand targeted capacity-building and awareness programmes, including on DSI governance, disclosure obligations, and international ABS frameworks. Continued engagement with research

institutions, academia, industry and civil society, along with strengthened international cooperation and peer learning, will further support effective implementation.

Recognising the importance of financial and institutional enablers, there is a need for sustained and predictable funding, strengthened digital infrastructure and enhanced private sector participation to improve compliance outcomes. In this context, simplified and dedicated financial mechanisms, including those under the CBD, will be important to support capacity-building, digital systems and long-term stakeholder engagement.

Overall, strengthening institutional capacity, ensuring financial sustainability and enhancing digital systems will be critical for advancing India's Access and Benefit Sharing framework and maintaining its alignment with the Nagoya Protocol and the objectives of the CBD.

With a comprehensive legal framework, well-established institutions, and active community participation, India has emerged as a global leader in ABS implementation, demonstrating how equitable benefit-sharing can effectively support biodiversity conservation while enhancing the livelihoods of local communities, farmers, and custodians of traditional knowledge.

Photo Credits: Jharkhand SBB

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