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INDIA'S NATIONAL REPORT ON BIODIVERSITY

Government of India
Ministry of Environment, Forest and Climate Change
National Biodiversity Authority

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Ministry of Environment,
Forest and Climate Change, GoI

National Biodiversity Authority

मंत्री
पर्यावरण, वन एवं जलवायु परिवर्तन
भारत सरकार

भूपेन्द्र यादव
Bhupender Yadav

Minister
Environment, Forest and Climate Change
Government of India

Foreword

India is endowed with one of the richest ecological diversities in the world. As one of the 17 megadiverse countries, it harbors nearly 8% of the world's recorded species while covering only 2.4% of the global land area. This exceptional biodiversity spans a wide range of ecosystems across the mainland as well as island territories such as Lakshadweep and the Andaman & Nicobar Islands.

As per commitment under the UN Convention on Biological Diversity, India submitted its Seventh National Report (NR 7) on 26 February 2026, showcasing progress on the National Biodiversity Strategy and Action Plan (NBSAP) and all 23 National Biodiversity Targets (NBTs). The report holds special significance as India's first submission after the adoption of the Kunming-Montreal Global Biodiversity Framework (KMGBF), incorporating a comprehensive monitoring framework of 142 national indicators aligned with the Updated NBSAP (2024-2030).

NR 7 recorded progress across all 23 NBTs, with notable achievements in land and sea use planning, eco-restoration, area-based conservation, wild species recovery, invasive alien species control, pollution reduction, and climate change adaptation. Key ministries covering forests, wildlife, agriculture, fisheries, and water resources contributed through programs promoting sustainable land management, natural and organic farming, soil health, native crop conservation, and biodiversity mainstreaming. Complementary efforts in awareness, capacity building, research, technology, resource mobilization, and social equity have further strengthened conservation outcomes.

I express my heartfelt appreciation for the sustained efforts of the senior officials of the Ministry of Environment, Forest and Climate Change and the National Biodiversity Authority in facilitating the preparation of this knowledge product.

(Bhupender Yadav)

Ministry of Environment, Forest and Climate Change

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विदेश मंत्रालय
भारत सरकार

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

कीर्तवर्धन सिंह
Kirti Vardhan Singh

Message

India is actively fulfilling its global and national commitments on biodiversity conservation as a Party to the UN Convention on Biological Diversity (UNCBD). The country is currently implementing its Updated National Biodiversity Strategy and Action Plan (2024–2030), aligned with the Kunming-Montreal Global Biodiversity Framework (KMGBF).

India recently submitted its Seventh National Report (NR 7) to the UNCBD - a landmark submission distinguished by its grounding in a comprehensive biodiversity monitoring framework developed through wider consultation. The framework tracks 142 national indicators, monitored across central ministries, national and state agencies, and international bodies.

NR 7 indicated that India is on track to achieve all 23 national biodiversity targets by 2030, with meaningful contributions to the global conservation agenda. The science-and evidence-based monitoring process is being institutionalized for long-term impact.

To translate these findings into wider use, MoEFCC in collaboration with NBA has prepared this knowledge document.

Together, NR 7 and this knowledge document offer critical insights into India's conservation efforts, adaptive management strategies, and the future stewardship of natural living resources and agrobiodiversity.

(Kirti Vardhan Singh)

सचिव
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
भारत सरकार

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

तन्मय कुमार, आई.ए.एस.
Tanmay Kumar, IAS

Message

India is among the few nations to update and submit its National Biodiversity Strategy and Action Plan (NBSAP), and the Seventh National Report (NR 7) to the UN Convention on Biological Diversity (CBD) in alignment with the Kunming-Montreal Global Biodiversity Framework (KMGBF). These actions reflect India's firm commitment to the global conservation agenda and its ambition to halt and reverse biodiversity loss by 2030, advancing the 2050 vision of '*Living in harmony with nature*'.

The Ministry in association with National Biodiversity Authority (NBA), and guidance from the expert committee has prepared a knowledge document based on NR 7 covering India's biodiversity status, progress on national targets, challenges, new initiatives, and contributions towards implementation of the KMGBF.

India continues to advance conservation efforts through expansion of Protected Areas, Tiger and Elephant reserves, recognition of Ramsar Sites, Species recovery through conservation breeding and reintroduction programs; sustainable ecosystem management; equitable benefit-sharing from biological and genetic resources.

I commend the entire team of MoEFCC and NBA; the experts and stakeholders and all contributing specialists and agencies towards the preparation of this knowledge product. I am confident that this publication will serve as a valuable resource for stakeholders engaged in biodiversity conservation.

(Tanmay Kumar)

Ministry of Environment, Forest and Climate Change

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Forest and Climate Change
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आशुतोष अग्निहोत्री, आई.ए.एस
Ashutosh Agnihotri, IAS

Message

India has been a Party to the Convention on Biological Diversity (CBD) since 1994. Under Article 26, Parties must periodically report on implementation progress. In response to accelerating biodiversity loss, the CBD adopted the Kunming-Montreal Global Biodiversity Framework (KMGBF), urging Parties to update their NBSAPs, align National Biodiversity Targets (NBTs), and submit their Seventh National Report (NR 7) by February 2026.

India met this obligation with distinction. Being among the few nations to update its NBSAP, frame NBTs, and establish an institutionalized Biodiversity Monitoring Framework tracking 142 national indicators. NR 7 was prepared through an extensive nationwide consultative process engaging all concerned stakeholders following the “Whole of Government” and “Whole of Society” approach.

Building on NR 7, the present document demonstrates India's progress in a narrative form, adopting a thematic approach rather than a target-wise structure to avoid repetition. It covers India's biodiversity status, target progress, key challenges, new initiatives, SDG linkages and contributions to the KMGBF's four goals.

I congratulate the core teams from MoEFCC and NBA, for their dedicated work on this globally significant assignment. Together, NR 7 and the knowledge document offer an authoritative national perspective on India's conservation journey toward 'Living in harmony with nature' by 2050.

I am hopeful that this knowledge product will help the stakeholders, scientists, research scholars and students in building awareness for conservation and sustainable use of biodiversity.

(Ashutosh Agnihotri)

अध्यक्ष, राष्ट्रीय जैव विविधता प्राधिकरण
भारत सरकार

Chairperson, National Biodiversity Authority
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वीरेन्द्र तिवारी, भा.व.से. (सेवानिवृत)
Virendra Tiwari, IFS (Retd.)

Message

In early 2025, MoEFCC entrusted the NBA with preparing India's Seventh National Report (NR 7) to the CBD, a significantly more complex undertaking than previous reports. For the first time, the exercise required implementing a comprehensive Biodiversity Monitoring Framework tracking progress across 142 national indicators, aligned with the KMGBF and India's Updated National Biodiversity Strategy and Action Plan (NBSAP, 2024-2030) and the 23 NBTs.

NBA led this effort in partnership with WII, UNDP, and MoEFCC under the GEF-8 Umbrella Programme, encompassing data format development, multi-agency consultation, data collection, and report drafting. Inputs from concerned ministries and national agencies, hierarchical reviews, and a National Validation Workshop ensured quality and timely submission. A knowledge document based on NR 7 has also been prepared for wider use.

I am grateful to MoEFCC senior officials, central ministries, national and state agencies, and the Expert/Core Group for their guidance and support. I commend all core team members from NBA, WII, UNDP, and MoEFCC for their tireless dedication.

These achievements will accelerate the institutionalization of biodiversity monitoring across all levels. Most encouragingly, NR 7 confirms that India is firmly on track to achieve its NBTs by 2030 and advance toward CBD's Vision 2050.

(Virendra Tiwari)

List of Abbreviations

ABS	Access and Benefit Sharing
ABS-CH	Access and Benefit-Sharing Clearing-House
AFRI	Arid Forest Research Institute
AI	Artificial Insemination
AITM	All-India Tiger Monitoring
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AnGR	Animal Genetic Resources
APEDA	Agricultural and Processed Food Products Export Development Authority
ATARI	Agriculture Technology Application and Research Institute
ATREE	Ashoka Trust for Research in Ecology and the Environment
BBBP	'Beti Bachao Beti Padhao'
BBNJ	Biological Diversity Areas Beyond National Jurisdiction
BCIL	Biotech Consortium India Limited
BCM	Billion Cubic Meter
BDA 2002	Biological Diversity Act, 2002
BER	Biodiversity Expenditure Review
BFP	Biodiversity Finance Plan
BHS	Biodiversity Heritage Site
BioE3	Biotechnology for Economy, Environment, and Employment Policy
BIOFIN	Biodiversity Finance Initiative
BKPK	'Bhartiya Prakritik Krishi Paddhati'
BMC	Biodiversity Management Committee
BOD	Biochemical Oxygen Demand
BRC	Bio-Input Resource Centre
BR	Biosphere Reserve
BRSR	Business Responsibility and Sustainability Report
BSI	Botanical Survey of India
CA	Compensatory Afforestation
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CAF Act	Compensatory Afforestation Fund Act
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CASFOS	Central Academy for State Forest Service
CBD	Convention on Biological Diversity
CBG	Compressed Bio-Gas
CBI	City Biodiversity Index
CBO	Community-Based Organization
CBWTF	Common Bio Medical Waste Treatment Facility
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources
CCC	Carbon Credit Certificate
CCFU	Climate Change Finance Unit
CCMB-LaCONES	Centre for Cellular and Molecular Biology - Laboratory for the Conservation of Endangered Species
CCTS	Carbon Credit Trading Scheme
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CEIA	Cumulative Environment Impact Assessment
CEMDE	Centre for Management of Degraded Ecosystems
CEPI	Comprehensive Environmental Pollution Index
CIFRI	Central Inland Fisheries Research Institute of India
CII	Confederation of Indian Industry
CIPMC	Central Integrated Pest Management Centre
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMFRI	Central Marine Fisheries Research Institute
CMLRE	Centre for Marine Living Resources and Ecology
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CMS	Centre for Media Studies
CoE-HWC	Centre of Excellence-Human-Wildlife Conflict
CoFGR	Centre of Excellence on Forest Genetic Resources
COP 15	Conference of the Parties 15
CPCB	Central Pollution Control Board
CRZ	Coastal Regulation Zone
CSIR	Council of Scientific and Industrial Research
CSOs	Civil Society Organizations
CSR	Corporate Social Responsibility
CTH	Critical Tiger Habitat

CVCA	Critically Vulnerable Coastal Area
CWR	Crop Wild Relative
CZA	Central Zoo Authority
DAP	Diammonium Phosphate
DARE	Department of Agricultural Research and Education
DBT	Department of Biotechnology
DDA	Delhi Development Authority
DFE	Directorate of Forest Education
DLCC	District Level Coordination Committee
DLC	District Level Committee
DLR	Department of Land Resources
DoSEL	Department of School Education and Literacy
DPIIT	Department for Promotion of Industries and Internal Trade
DPPQS	Directorate of Plant Protection, Quarantine & Storage
DRR	Disaster Risk Reduction
DSI	Digital Sequence Information
DST	Department of Science and Technology
EAC	Expert Appraisal Committee
EBGR	Extended Bulk Generator Responsibility
EC	Environmental Clearance
EDC	Ecodevelopment Committee
EEP	Environment Education Programme
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIACP	Environmental Information, Awareness, Capacity Building and Livelihood Programme
EPA 1986	Environment (Protection) Act, 1986
EPR	Extended Producer Responsibility
ER	Elephant Reserve
ESA	Ecologically Sensitive Area
ESG	Environment, Social and Governance
ESZ	Eco-Sensitive Zone
ETF	Eco Task Force
ETT-IVF	Embryo Transfer Technology - *In Vitro* Fertilization
FAO	Food and Agriculture Organization
FCI	Food Corporation of India
FFS	Farmers' Field School
FFV	Forest Fringe Village
FGR	Forest Genetic Resources
FIDF	Fisheries and Aquaculture Infrastructure Development
FNA	Financial Needs Assessment
FOM	Fermented Organic Manure
FPOs	Farmer Producer Organizations
FRA	Forest Rights Act, 2006
FRI	Forest Research Institute
FSHC	Forest Soil Health Card
FSI	Forest Survey of India
FSI	Floor Space Index
FSSAI	Food Safety and Standard Authority of India
FSV	Forest Settlement Village
GA	Geographical Area
GAP	Good Aquaculture Practices
GBC	Gender Budget Cell
GBPNIHE	G. B. Pant National Institute of Himalayan Environment
GC	Green Credit
GE Plants	Genetically Engineered Plants
GEAC	Genetic Engineering Appraisal Committee
GEF	Global Environment Facility
GFD	Gujarat Forest Department
GIM	Green India Mission
GIS	Geographic Information System
GM	Genetically Modified
GMO	Genetically Modified Organism
GOBARdhan	Galvanizing Organic Bio-Agro Resources Dhan
GRFA	Genetic Resources for Food and Agriculture
GSLEP	Global Snow Leopard and Ecosystem Protection Programme
HCBP	Human Capacity Building Programme
HFRI	Himalayan Forest Research Institute

HGM	High Genetic Merit
HTPI	Handling, Transport, Packaging, and Identification
HWC	Human-Wildlife Conflict
IBBI	India Business & Biodiversity Initiative
IBCA	International Big Cat Alliance
IBC	Institutional Biosafety Committee
IBIN	India Biodiversity Information Network
IBKP	Indian Biosafety Knowledge Portal
ICAR	Indian Council of Agricultural Research
ICFRE	Indian Council of Forestry Research and Education
ICLEI	International Council for Local Environmental Initiatives
ICMBAs	Important Coastal and Marine Biodiversity Areas
ICT	Information and Communication Technology
ICZM	Integrated Coastal Zone Management
ICZMP	Integrated Coastal Zone Management Plan
IFA	Indian Forest Act
IFB	Institute of Forest Biodiversity
IFGTB	Institute of Forest Genetics and Tree Breeding
IFLOWS	Integrated Flood Warning System
IFP	Institute of Forest Productivity
IFSA	Indian Food Sharing Alliance
IGNFA	Indira Gandhi National Forest Academy
IIFM	Indian Institute of Forest Management
IIRS	Indian Institute of Remote Sensing
IMP	Integrated Management Plan
IndOBIS	Indian Ocean Biodiversity Information System
INRB 2026	India's National Report on Biodiversity-2026
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
IRCC	Internationally Recognized Certificate of Compliance
ISFR	India State of Forest Report
ISRO	Indian Space Research Organisation
ISTI	Integrated Seed Traceability Initiative
IT	Information Technology
ITBP	Indo-Tibetan Border Police
ITEC	Indian Technical and Economic Cooperation Programme
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUC	Inter-University Consortium
IUCN	International Union for Conservation of Nature
IWST	Institute of Wood Science and Technology
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
KBA	Key Biodiversity Area
KFRI	Kerala Forest Research Institute
KIPABiC	Korea Institute for Promoting Biosafety Cooperation
KMGBF	Kunming Montreal Global Biodiversity Framework
KVK	Krishi Vigyan Kendra
LaCONES	Laboratory for the Conservation of Endangered Species
LBSAP	Local Biodiversity Strategy and Action Plan
LFOM	Liquid Fermented Organic Manure
LMO	Living Modified Organism
LODR	Listing Obligations and Disclosure Requirements Regulations
LT-LEDS	Long-Term Low Greenhouse Gas Emission Development Strategies
MAITRI	Multipurpose AI Technicians in Rural India
MC	Miscellaneous Clearance
MDA	Market Development Assistance
MDF	Moderately Dense Forest
MEE	Management Effectiveness Evaluation
MFP	Minor Forest Produce
MF	Managed Forest
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MGRR	Microbial Genomic Resource Repository
MISHTI	Mangrove Initiative for Shoreline Habitats and Tangible Incomes
Mission LiFE'	Lifestyle for the Environment
MLR	Marine Living Resources
MNRE	Ministry of New and Renewable Energy
MoAFW	Ministry of Agriculture and Farmers' Welfare
MoAYUSH	Ministry of Ayush (Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy)

MoCAFPD	Ministry of Consumer Affairs, Food and Public Distribution
MoCF	Ministry of Chemicals and Fertilizers
MoE	Ministry of Education
MoEFCC	Ministry of Environment, Forest and Climate Change
MoES	Ministry of Earth Sciences
MoFAHD	Ministry of Fisheries, Animal Husbandry and Dairying
MoFPI	Ministry of Food Processing Industries
MoHA	Ministry of Home Affairs
MoHUA	Ministry of Housing and Urban Affairs
MoJS	Ministry of Jal Shakti
MOP	Muriate of Potash
MoPR	Ministry of Panchayati Raj
MoRD	Ministry of Rural Development
MoRTH	Ministry of Road Transport and Highways
MoSPI	Ministry of Statistics and Programme Implementation
MoST	Ministry of Science and Technology
MoTA	Ministry of Tribal Affairs
MOVCDNER	Mission Organic Value Chain Development for North Eastern Region
MoWCD	Ministry of Women and Child Development
MoYAS	Ministry of Youth Affairs and Sports
MPA	Marine Protected Area
MPEDA	Marine Products Export Development Authority
MRDP	Major Research & Development Programme
MSC	Marine Stewardship Council
MSME	Micro, Small, and Medium Enterprise
MSP	Minimum Support Price
M-STrIPES	Monitoring System for Tigers: Intensive Protection and Ecological Status
NAAQS	National Ambient Air Quality Standard
NABL	National Accreditation Board for Laboratories
NAEB	National Afforestation and Eco-Development Board
NAGB	National Animal Gene Bank
NAIMCC	National Agriculturally Important Microbial Culture Collection
NAMP	National Air Quality Monitoring Programme
NAP	National Adaptation Plan
NAP	National Afforestation Programme
NAPCC	National Action Plan on Climate Change
NARS	National Agricultural Research System
NBA	National Biodiversity Authority
NBAGR	National Bureau of Animal Genetic Resources
NBAII	National Bureau of Agriculturally Important Insects
NBAIM	National Bureau of Agriculturally Important Microorganisms
NBGC-IB	National Bovine Genomic Centre for Indigenous Breeds
NBPGR	National Bureau of Plant Genetic Resources
NBSAP	National Biodiversity Strategy and Action Plan
NBT	National Biodiversity Target
NCAC	National CAMPA Advisory Council
NCAP	National Clean Air Programme
NCCR	National Centre for Coastal Research
NCDC	National Cooperative Development Corporation
NCIPM	National Centre for Integrated Pest Management
NCONF	National Centre for Organic and Natural Farming
NCSCM	National Centre for Sustainable Coastal Management
NCT	National Capital Territory
NCZMA	National Coastal Zone Management Authority
NDC	Nationally Determined Contribution
NDMA	National Disaster Management Authority
NDMP	National Disaster Management Plan
NDRF	National Disaster Response Force
NER	North Eastern Region
NF	Notified Forest
NFCS	Natural Farming Certification System
NFSM	National Food Security Mission
NGO	Non-Governmental Organization
NGRBC	National Guidelines on Responsible Business Conduct
NGT	National Green Tribunal
NHRC	National Human Rights Commission
NIO	National Institute of Oceanography
NMCG	National Mission on Clean Ganga

NMEEE	National Mission for Enhanced Energy Efficiency
NMNF	National Mission on Natural Farming
NMNH	National Museum of Natural History
NMPB	National Medicinal Plants Board
NMSA	National Mission for Sustainable Agriculture
NMSH	National Mission on Sustainable Habitat
NMSHE	National Mission for Sustaining the Himalayan Ecosystem
NMSKCC	National Mission on Strategic Knowledge for Climate Change
NP	National Park
NPCA	National Plan for Conservation of Aquatic Ecosystems
NPCCHH	National Programme on Climate Change and Human Health
NPK	Nitrogen (N), Phosphorus (P), and Potassium (K)
NPOF	National Project on Organic Farming
NPOP	National Programme on Organic Production
NR 7	National Report 7/ Seventh National Report
NRIIPM	National Research Institute for Integrated Pest Management
NRLM	National Rural Livelihoods Mission
NRs	National Reports
NRSC	National Remote Sensing Centre
NSAP	National Social Assistance Programme
NSM	National Solar Mission
NSO	National Statistical Office
NTCA	National Tiger Conservation Authority
NTFPs	Non-Timber Forest Products
NWM	National Water Mission
OBIS	Ocean Biodiversity Information System
OC	Organic Carbon
ODOP	One District One Product
OECMs	Other Effective Area-based Conservation Measures
OFs	Open Forests
PARIVESH	Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub
PA	Protected Area
PAWS	Population Assessment of the World's Snow Leopards
PBR	People's Biodiversity Register
PCA	Penal Compensatory Afforestation
PESA	Panchayat (Extension to Scheduled Areas) Act, 1996
PF	Protected Forest
PGS	Participatory Guaranteed System
PIBOs	Producers, Importers, and Brand Owners
PIC	Prior Informed Consent
PK3Y	Prakritik Kheti Khushhal Kisan Yojana
PKVY	Paramparagat Krishi Vikas Yojana
PLISFPI	Production Linked Incentive Scheme for Food Processing Industries
PMFME	PM Formalization of Micro Food Processing Enterprises
PMJVM	Pradhan Mantri Janjatiya Vikas Mission
PMKSY	Pradhan Mantri Kisan Sampada Yojana
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan
PMMSY	Pradhan Mantri Matsya Sampada Yojana
PM-PRANAM	Prime Minister Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth
PMVDY	Pradhan Mantri Van Dhan Yojana
PPVFRA	Protection of Plant Varieties and Farmers' Rights Authority
PRI	Panchayati Raj Institution
PRL	Polluted River Location
PROM	Phosphate Rich Organic Manure
PRS	Polluted River Stretch
PSU	Public Sector Undertaking
PWP	Plastic Waste Processor
PWS	Pipe Water Supply
RARM	Risk Assessment and Risk Management
RCGM	Review Committee on Genetic Manipulation
RDAC	rDNA Advisory Committee
RF	Reserved Forest
RFA	Recorded Forest Area
RGM	Rashtriya Gokul Mission
RGSA	Rashtriya Gram Swaraj Abhiyan
RKVY	Rashtriya Krishi Vikas Yojana

RON	Regional Ocean Biodiversity Information System Node
RS	Remote Sensing
RT	Research and Training
RTI	Right to Information
SAC	Space Applications Centre
SACON	Salim Ali Centre for Ornithology and Natural History
SAG	Scheme for Adolescent Girls
SAIEE	Synchronous All India Population Estimation of Elephants
SAP	Surplus Agricultural Produce
SAPCC	State Action Plan on Climate Change
SAWEN	South Asia Wildlife Enforcement Network
SBBs	State Biodiversity Boards
SBCC	State Biodiversity Coordination Committee
SBSAP	State Biodiversity Strategy Action Plan
SCCC	State Climate Change Cell Programme
SCM	Smart City Mission
SCZMA	State Coastal Zone Management Authority
SDG	Sustainable Development Goal
SDMA	State Disaster Management Authority
SDRF	State Disaster Response Force
SEA	Strategic Environment Assessment
SEBI	Securities and Exchange Board of India
SEEA	System of Environment Economic Accounting
SFDA	State Forest Development Agency
SFD	State Forest Department
SFRI	State Forest Research Institute
SHC	Soil Health Card
SHG	Self-Help Group
SHRC	State Human Rights Commission
SLA	State Level Agency
SLEIAA	State Level Environment Impact Assessment Authority
SMAF	Sub-Mission on Agroforestry
SPAI	Snow Leopard Population Assessment in India
SPC	Sustainable Production and Consumption
SPCB	State Pollution Control Board
SSE	Social Stock Exchange
STR	Satpura Tiger Reserve
TBGRI	Tropical Botanic Garden and Research Institute
TCP	Tiger Conservation Plan
TERI	The Energy and Resources Institute
TKDL	Traditional Knowledge Digital Library
TNFD	Task Force on Nature-related Financial Disclosures
TOF	Trees Outside Forests
TRIFED	Tribal Cooperative Marketing Development Federation of India
TR	Tiger Reserve
UDF	Unclassed Forest
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UTBC	Union Territory Biodiversity Council
UT	Union Territory
VB-G RAM G	Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin)
VDF	Very Dense Forest
WCCB	Wildlife Crime Control Bureau
WCS	Wildlife Conservation Society
WDC-PMKSY 2.0	Watershed Development Component-'Pradhan Mantri Krishi Sinchayee Yojana 2.0
WEP	Women Entrepreneurship Platform
WHS	World Heritage Site
WII	Wildlife Institute of India
WLS	Wildlife Sanctuary
WPA	Wildlife (Protection) Act 1972
WTI	Wildlife Trust of India
WTI	Women Transforming India
WWF	World Wide Fund for Nature
ZCZP	Zero-Coupon Zero-Principal
ZSI	Zoological Survey of India

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CHAPTER **01**

INTRODUCTION

1.1

CONVENTION ON BIOLOGICAL DIVERSITY, NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, AND NATIONAL REPORTING

Convention on Biological Diversity (CBD) adopted by 196 parties during the 1992 Earth Summit is a turning point in the history of global biodiversity conservation. India is one of the first countries among the 168 signatories to sign the treaty in 1992, which was ratified in 1994. Since then, as per the requirement of CBD Article 26, India has been regularly submitting its National Reports detailing the measures taken to implement the CBD and their effectiveness, the latest being India's Seventh National Report (NR 7) submitted on 26 February, 2026. The earlier reports were submitted to CBD in the years 1998, 2001, 2005, 2009, 2014 and 2018.

Further, in pursuance to Article 6 of the CBD, India within five years of ratifying the Convention, had developed a National Policy and Macrolevel Action Strategy on Biodiversity in 1999. Thereafter, an externally-aided project on National Biodiversity Strategy and Action Plan (NBSAP) was also implemented in the country during 2000-2004, adopting a highly participatory process involving various stakeholders. After approval of the National Environment Policy (NEP) in 2006, preparation of National Biodiversity Action Plan (NBAP) was taken up by revising and updating the document prepared in 1999, and by using the final technical report of NBSAP project which was published as NBAP, 2008. In 2014, an addendum to NBAP was introduced, establishing 12 National Biodiversity Targets (NBTs) through extensive consultations. These targets aligned with Global Strategic Plan for Biodiversity (2011-2020) and the 20 Aichi Targets agreed upon at the CBD's 10th Conference of the Parties (CoP 10). Recently, the NBAP 2008 was updated as India's National Biodiversity Strategy and Action Plan, (2024–2030) developed through 'Whole-of-Government' and 'Whole-of-Society' approach which is aligned with the Kunming Montreal Global Biodiversity Framework (Fig. 1.1).

Fig. 1.1. National Reporting System till NR7 as per the Requirement of CBD

CONVENTION ON BIOLOGICAL DIVERSITY

ARTICLE 26 (National Reporting)

1998
National Report 1

2001
National Report 2

2005
National Report 3

2009
National Report 4

2014
National Report 5

2018
National Report 6

2026
National Report 7

ARTICLE 6 (NBSAP)

1999
National Policy and Macrolevel Action Strategy on Biodiversity

2008
National Biodiversity Action Plan

2014
Addendum to NBAP 2008 in line with Strategic Plan 2011-2020

2024
India's Updated NBSAP (2024-2030) aligned with KMGBF 2022

1.2
KMGBF AND INDIA'S UPDATED NBSAP

Fig. 1.2
Vision and Mission for Biodiversity Conservation as per Kunming-Montreal Global Biodiversity Framework

Kunming Montreal Global Biodiversity Framework

CBD adopted the Kunming-Montreal Global Biodiversity Framework (KMGBF) in December 2022, aiming to halt and reverse biodiversity loss by 2030, and achieve the 2050 vision of 'Living in harmony with nature' (Fig. 1.2). It focuses on reducing threats, promoting sustainable use, and strengthening implementation, supported by transparent monitoring and a whole-of-government and the whole-of-society approach, with four long-term goals and 23 global biodiversity targets guiding the progress (Fig. 1.3).

MISSION 2030

To take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people and planet by conserving and sustainably using biodiversity and by ensuring the fair and equitable sharing of benefits from the use of genetic resources, while providing the necessary means of implementation.

VISION 2050

A world of 'Living in harmony with nature' where "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people".

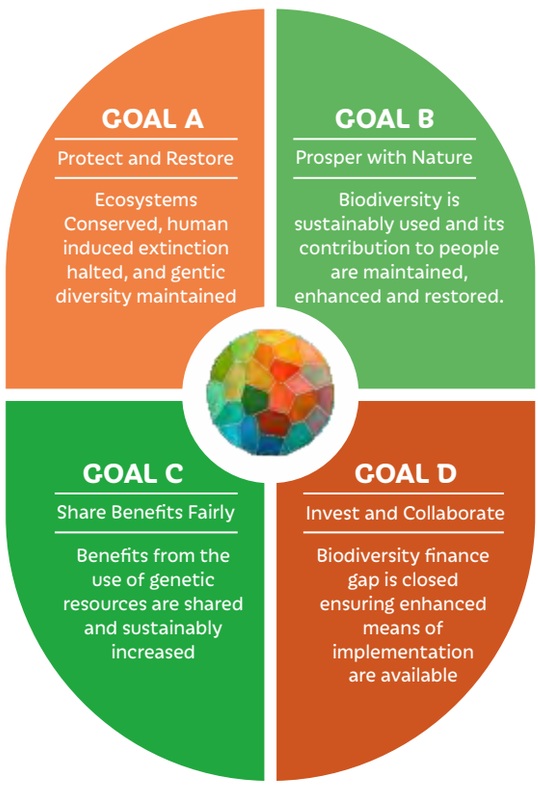


Fig. 1.3
Four Goals of Kunming-Montreal Global Biodiversity Framework

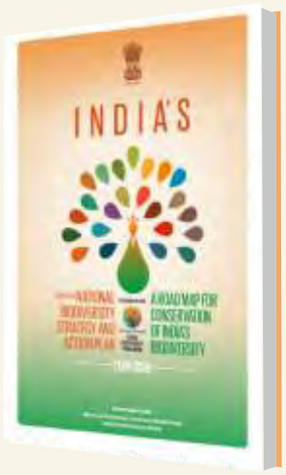
India's Updated NBSAP following KMGBF and Comprehensive Biodiversity Monitoring Framework

In October 2024, following specific decisions, directions, and guidelines by the Convention, India updated the country's National Biodiversity Strategy and Action Plan, aligning with the KMGBF. The updated NBSAP was released during CoP 16 in Colombia in October 2024 that incorporated 23 National Biodiversity Targets (NBTs) in sync with global biodiversity targets and an integral comprehensive biodiversity monitoring framework. The framework identified 23 global targets under three important themes: (i) reducing threats to biodiversity, (ii) meeting people's needs through sustainable use and benefit-sharing, and (iii) tools and solutions for implementation and mainstreaming.

Process followed for updated NBSAP (2024-2030)

India's updated NBSAP (2024-2030) included a comprehensive biodiversity monitoring framework developed through an extensive consultative process organized across the country involving representatives of 23 sectors/ central ministries or departments, national-level scientific organizations, Civil Society Organizations (CSOs), Community-Based Organizations (CBOs), Non-Governmental Organizations (NGOs), etc. (Fig. 1.4). Thus, the framework developed through an extensive consultative process included 142 national indicators for monitoring the progress of 23 NBTs.

The framework also listed select headline, component, and complimentary indicators against each NBT as described by the decision CBD COP 15/5. A careful review of the monitoring framework revealed that a good number of central ministries/ departments and their national/ state-level organizations/ agencies are directly or indirectly involved in conservation, management, regulation, use, and monitoring biodiversity across the country. The bulk of the identified indicators are mainly relevant to 'life-owning' central ministries/ sectors like the Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Agriculture and Farmers' Welfare (MoAFW), Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD), Ministry of Jal Shakti (MoJS), and Ministry of Earth Sciences (MoES), followed by 'life-supporting' ministries/ sectors, viz., Ministry of Rural Development (MoRD), Ministry of Panchayati Raj (MoPR), Ministry of Ayush (MoAyush), Ministry of Tribal Affairs (MoTA), Ministry of Science and Technology (MoST), Ministry of Housing and Urban Affairs (MoHUA), Ministry of Education (MoE), etc., and only a small proportion of indicators are pertinent to nearly a dozen 'biodiversity user or regulating' ministries/ sectors.



Constitution of High Level Working Group

→ Review of existing framework on NBSAP and NBTs

Preparation of zero draft of NBTs, actionable points, indicators and monitoring framework along with responsible agencies

National Consultation on updation of NBSAP and adoption of NBTs

1st Regional Consultation (Southern States)

2nd Regional Consultation (North and Northeastern States)

3rd Regional Consultation (East and Western States)

Draft NBTs, actionable points, indicators and monitoring framework

Ministerial Consultations

→ Draft NBSAP and NBTs shared with Ministries/ Departments seeking inputs

Updated draft NBSAP and NBTs prepared

High Level Working Group Meeting on Finalizing the draft NBSAP and NBTs

Updated NBSAP and NBTs placed at the 70th meeting of the Authority

Updated NBSAP

NBTs and Monitoring Framework adopted

Adoption and publication of NBSAP

NBTs & Indicators uploaded in CBD Portal

Fig.1.4
Process followed for Preparation of the India's Updated NBSAP (2024-2030)

1.3

National Reporting 7: Themes, NBTs, Headline Indicators, Component Indicators, Complementary Indicators and National Indicators

CBD COP Decision 15/6 (19 December 2022) requests Parties to submit their Seventh National Report (NR 7) by 28 February 2026. As per the guidance and prescribed template, the NR 7 was structured into five sections: (i) an overview of the preparation process; (ii) status of the updated NBSAP in alignment with the KMGBF; (iii) assessment of progress towards national targets; (iv) assessment of progress towards KMGBF goals and targets; and (v) overall conclusions on implementation of the Convention and KMGBF. The template facilitated comprehensive reporting on headline and binary indicators under the KMGBF monitoring framework, while also allowing inclusion of component, complementary, and nationally relevant indicators (Fig. 1.5). The Report included 137 global indicators under four types besides 142 national indicators. A summary of global and national biodiversity indicators listed against 23 NBTs is presented in Table 1.1 and the details are at Annexure 1.

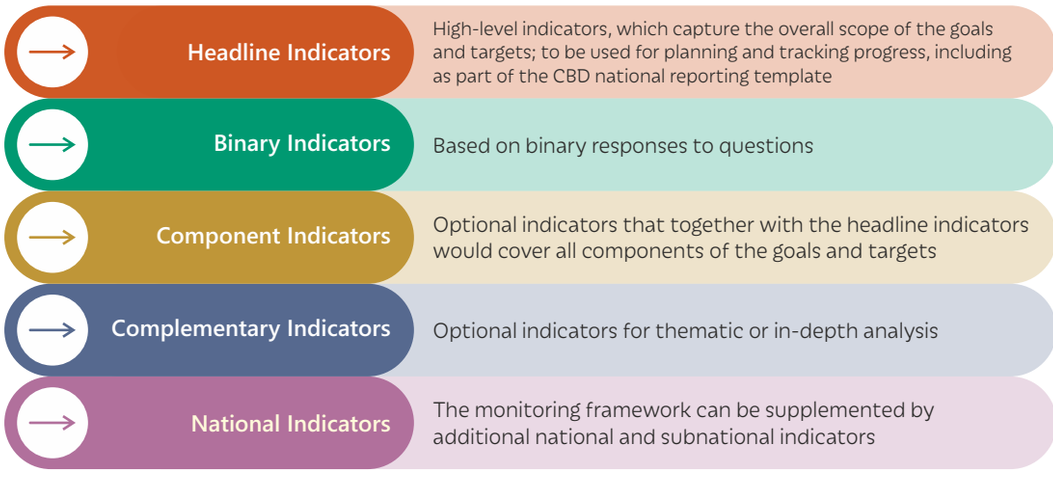


Fig. 1.5 Types of Biodiversity Monitoring Indicators

Table 1.1 - National Biodiversity Targets and Indicators

NBTs	Title	Number of Indicators			
		Headline	Component	Complementary	National
Reducing threats to biodiversity					
NBT 1	Biodiversity inclusive Integrated Land /Sea use Planning	2	1	2	6
NBT 2	Ecosystem Restoration	1	1	1	9
NBT 3	Conserve Biodiversity in Land, Water and Sea	1	1	2	11
NBT 4	Management of Species and Genetic Diversity	1	2	2	14
NBT 5	Sustainable Harvest, Trade, and Use of Wild Species	1	2	4	6
NBT 6	Manage Invasive Alien Species	2	0	1	5
NBT 7	Reduce Pollution Risks and Negative Impact	1	4	4	6
NBT 8	Minimize the Impact of Climate Change	1	1	4	5
Meeting people's needs through sustainable use and benefit-sharing					
NBT 9	Sustainable Use of Wild Species for Multiple Benefits	2	1	4	3
NBT 10	Sustainable Management of Agriculture, Animal Husbandry, Fisheries, Aquaculture and Forest Areas	2	1	7	14
NBT 11	Enhance and Maintain Ecosystem Services and Regulate Air and Water Quality, Hazards and Extreme Events	1	3	5	2

NBTs	Title	Number of Indicators			
		Headline	Component	Complementary	National
NBT 12	Enhance Green and Blue Spaces for Increased Access and Human Well-being	2	1	0	4
NBT 13	Access and Benefit Sharing	2	1	4	9
Tools and solutions for implementation and mainstreaming					
NBT 14	Mainstreaming Biodiversity	1	1	0	4
NBT 15	Sustainable Production, Supply Chains and Disclosure of Risks	2	1	1	3
NBT 16	Promote Sustainable Consumption Choices	1	4	4	5
NBT 17	Strengthen Biosafety Regulatory Capacity	1	0	1	6
NBT 18	Repurpose Detrimental Incentives for Biodiversity	2	6	0	5
NBT 19	Resource Mobilization	3	0	4	5
NBT 20	Capacity Development, Technology and Scientific Cooperation	1	1	3	8
NBT 21	Communication, Awareness, and Knowledge Management	1	2	6	4
NBT 22	Equitable and Effective Participation in Decision Making	1	1	5	3
NBT 23	Gender Equality in Decision Making and Implementation	1	2	3	5
	Total	33	37	67	142

1.4
Process followed for NR7 Reporting

The process followed for NR 7 reporting was highly consultative, using an automated data collection platform, the whole-of-government and the whole-of-society approach, involving all relevant ministries/ departments and institutions.

The MoEFCC, as the nodal Ministry for the CBD, in collaboration with the National Biodiversity Authority (NBA), coordinated the preparation of India's NR 7 with support from the United Nations Development Programme (UNDP) under the GEF-8 Umbrella Programme. The Wildlife Institute of India (WII) contributed as a key technical partner. The process involved extensive desk review, development of standardized data formats for all national indicators, and coordinated data collection through designated Lead/ Support Agencies across ministries and states. Data for these indicators was sourced from Annual Reports, official statistics, national databases, and inputs from states/ UTs. A centralized digital NR 7 portal facilitated structured, indicator-wise and time-series data submission (2020–2021 to 2024–2025), supported by consultations and meetings with concerned ministries and agencies.

The report was finalized through a robust validation process involving established monitoring protocols, inter-ministerial vetting, and review by an Expert/ Core group. National workshops and multiple consultations held between September 2025 and January 2026, with participation from over 30 Ministries/Departments/ agencies, ensured accuracy, transparency, and comprehensiveness of the report.

Aligned with Kunming-Montreal Global Biodiversity Framework

Aligned with INDIA'S NBSAP (2024-2030) and Biodiversity Monitoring Framework, Adoption of Template for NR7 Online Submission, and Focus on Five Sections

Desk Review and Standardised Data Formats, Consultative Process, Assessment of Progress on Global and National Indicators

Coordination, Data Collection and Validation by Designated Lead and Supporting Agencies Across Ministries & States/UTs, and Review by Expert Group

1.5
Scope of the Document "India's National Report on Biodiversity-2026"

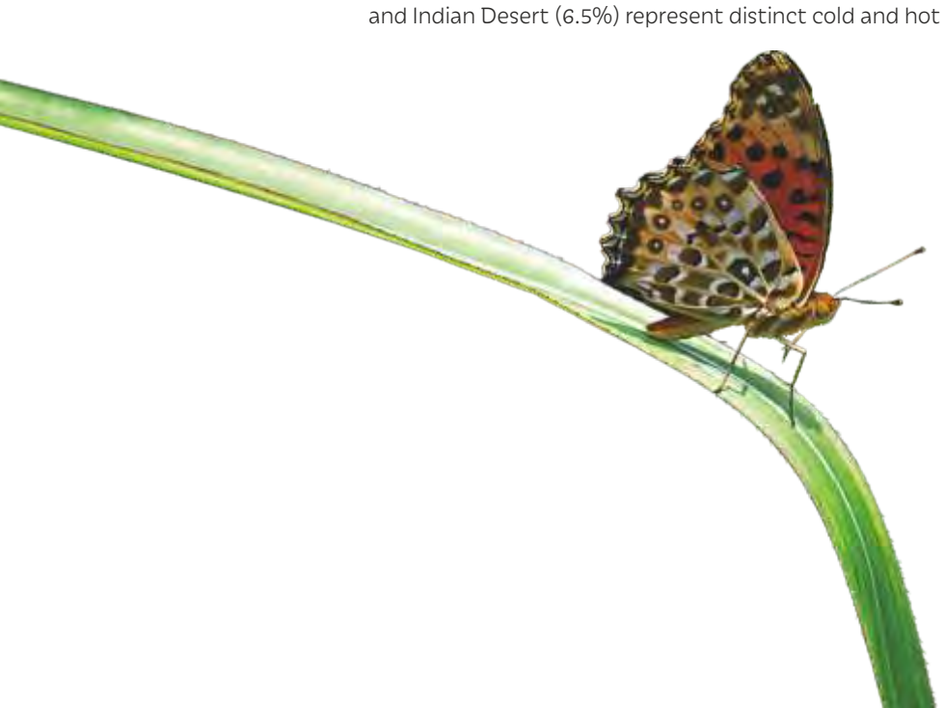
This document entitled, "India's National Report on Biodiversity-2026" (INRB 2026) is based on NR 7 that was prepared following the reporting template prescribed by the CBD COP Decision 15/6. INRB 2026, aimed at as a knowledge product of NR 7, intends to be a concise and simplified document easily understandable by common persons so that diverse sections of the society and stakeholders are effectively involved in conservation efforts after getting the first hand validated information on all relevant aspects of country's biodiversity and detailed knowledge on the future strategies to be adopted for its conservation. A key focus of INRB 2026 is the assessment of 23 National Biodiversity Targets (NBTs), highlighting the achievements and existing gaps, thereby providing a balanced and comprehensive overview of the progress.

The document is structured into six Chapters with an introductory Chapter followed by a chapter on India's Biodiversity and its Governance. Chapters 3 to 5 *viz*., Biodiversity: Conservation and Threats, Sustainable Use of Biodiversity and Benefit Sharing, and Implementation and Mainstreaming of Biodiversity Conservation are in alignment with the three themes of NR 7 i.e., Reduce threats to biodiversity, Sustainable use of biodiversity to meet people's needs, and Tools and solutions for implementation and mainstreaming. The document ends with a "Conclusion and Way forward" Chapter that highlights the achievements and outlines the future road map to achieve all the 23 NBTs as adopted by the nation.

Chapter **02**

INDIA'S BIODIVERSITY AND ITS GOVERNANCE

India is one of the 17 megadiverse countries of the world, as it is home to about 7-8% of the global biodiversity with only 2.4% of the world's land area. The remarkable range of geomorphic features and landforms (e.g., the young Himalayan Mountain Range, fertile Indo-Gangetic floodplains, the ancient Deccan Plateau, coastal plains with lagoons/ deltas, and the arid Great Indian Desert), altitudinal gradient (ranging from 3 m below the sea level i.e., Kuttanad in Kerala to the world's second highest peak of Khangchendzonga i.e., >8,586 m above sea level), and wide climatic variabilities along with its unique geographic location at the confluence of three major biogeographic realms *viz*., Indo-Malayan, Eurasian (or Palearctic) and Afro-tropical realms, together contribute to country's rich biodiversity across genetic, species, and ecosystem levels. This biological richness is complemented by diverse ethnic communities whose traditional knowledge and culture-based conservation practices play a crucial role in safeguarding natural resources. The representation of four global biodiversity hotspots *viz*., Himalayas, Western Ghats, Indo-Burma, and Sundaland, underscores India's global ecological significance and responsibility, particularly for conserving the endemic species and their habitats. Based on climatic conditions, geography, vegetation history, and species composition, India is divided into 10 biogeographic zones and 27 biotic provinces (Box 2.1), encompassing diverse forests, grasslands, wetlands (inland and coastal), west and east coasts, and two prominent archipelagos. Among the 10 biogeographic zones, Deccan Peninsula covers maximum area of the country's total geographical area (42%), followed by the Semi-arid zone (16.6%) and the Gangetic Plains (10.8%). The Trans Himalaya (5.6%) and Indian Desert (6.5%) represent distinct cold and hot desert ecosystems, respectively.



Box 2.1
Biogeographic Zones and Biotic Provinces

1

Trans-Himalaya
1A: Ladakh Mountains
1B: Tibetan Plateau
1C: Sikkim

6

Deccan Peninsula
6A: Central Highlands
6B: Chhota Nagpur
6C: Eastern Highlands
6D: Central Plateau
6E: Deccan South

- Trans-Himalaya
- Himalaya
- Desert
- Semi-Arid
- Western Ghats
- Deccan Peninsula
- Gangatic Plain
- Coasts
- North-East
- Islands

2

Himalaya
2A: Northwest Himalaya
2B: West Himalaya
2C: Central Himalaya
2D: East Himalaya

3

Desert
3A: Thar
3B: Kutch

4

Semi-Arid
4A: Punjab Plains
4B: Gujarat Rajputana

5

Western Ghats
5A: Malabar Plains
5B: Western Ghats Mountains

7

Gangetic Plains
7A: Upper Gangetic Plains
7B: Lower Gangetic Plains

8

Coasts
8A: West Coast
8B: East Coast

9

North-East
9A: Brahmaputra Valley
9B: North-East Hills

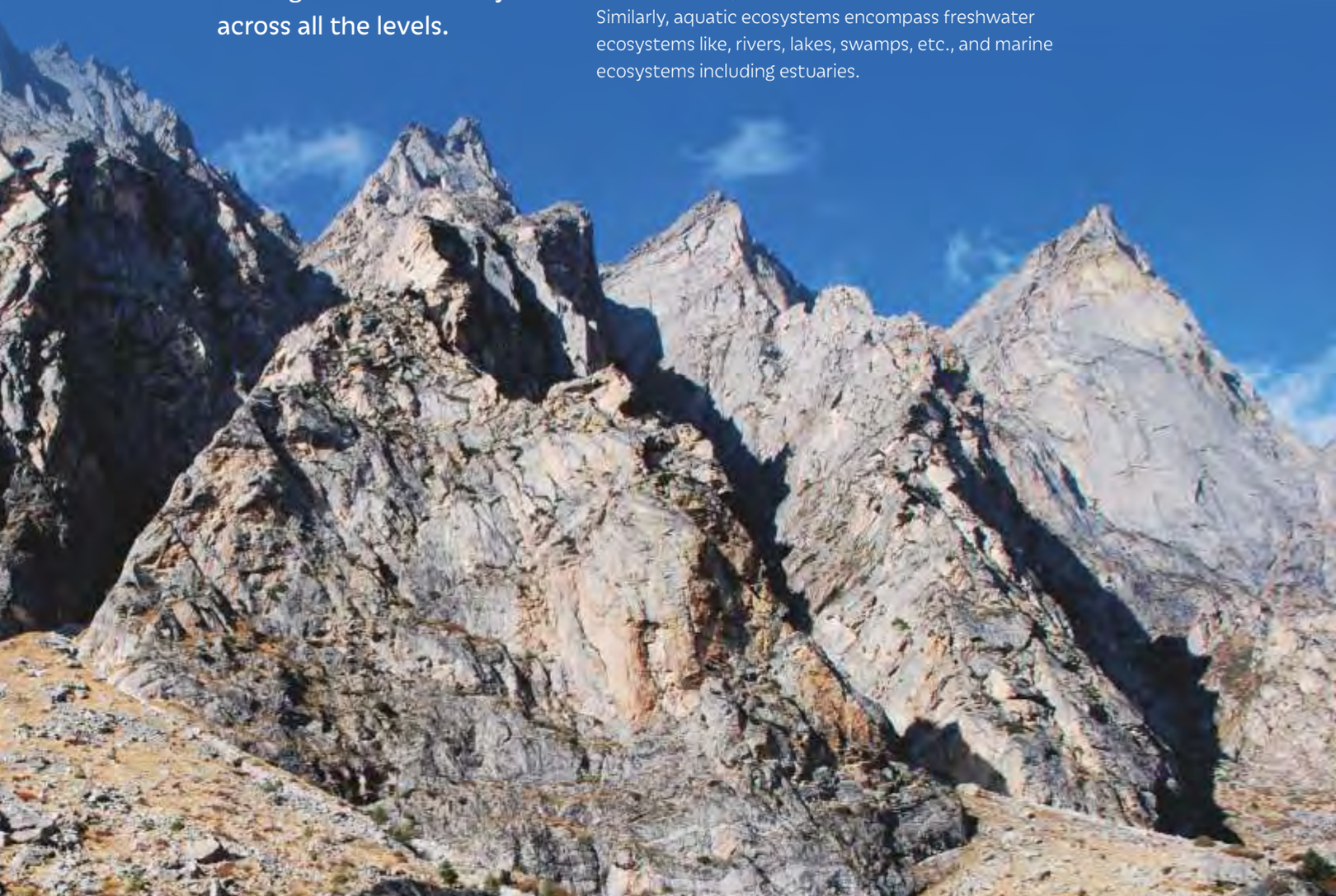
10

Islands
10A: Andaman Islands
10B: Nicobar Islands

Biodiversity has three interconnected levels i.e., ecosystem, species, and genetic diversity, and has the influence of cross-cutting cultural diversity across all the levels.

2.1
Ecosystem Diversity

Ecosystem diversity represents the variety of ecosystems in the country that includes both natural as well as man-made ecosystems in terrestrial and aquatic environments. The terrestrial ecosystems include forests, grasslands, scrublands and deserts. Similarly, aquatic ecosystems encompass freshwater ecosystems like, rivers, lakes, swamps, etc., and marine ecosystems including estuaries.



Area Based Conservation

Best Practice

India's Protected Areas: From 745 to 1,134 in a decade - Expanding the 30x30 Frontier

India I 2014-2025

1,134
Protected Areas

106
National Parks

574
Wildlife Sanctuaries

145
Conservation Reserves

309
Community Reserves

India has achieved a remarkable expansion of its Protected Area (PA) network, growing from 745 PAs in 2014 to 1,134 in 2025 — a 52% increase in eleven years. This network, comprising National Parks, Wildlife Sanctuaries, Conservation Reserves, and Community Reserves, now forms the backbone of India's 30×30 commitment under the Kunming-Montreal Global Biodiversity Framework.

The 1,134 Protected Areas include 106 National Parks, 574 Wildlife Sanctuaries, 145 Conservation Reserves, and 309 Community Reserves — with Community Reserves alone growing from just 48 in 2014 to 309 in 2025, reflecting a significant shift toward community-centred conservation governance. Eco-Sensitive Zones (ESZs) provide a buffer layer of regulated development: 353 final ESZ notifications covering 496 Protected Areas have been issued, compared to only 23 ESZs covering 25 Protected Areas in 2014. India's Biosphere Reserve network — 18 reserves covering 91,425 km^2 — is deeply integrated with the PA system, with 13 recognised under UNESCO's World Network of Biosphere Reserves including the Cold Desert Biosphere Reserve (inducted September 2025). India's NR-7 reports that India supports 3,682 tigers (over 70% of global population), 4,014 greater one-horned rhinoceroses, 22,446 wild elephants, 891 Asiatic lions, and 718 snow leopards across this expanding network. The OECM (Other Effective Area-based Conservation Measures) framework is currently being institutionalised through the National Biodiversity Authority to count community conserved areas, sacred groves, and biodiversity-rich private lands toward national 30×30 targets.

Key Facts and Achievements

- 1,134 Protected Areas by 2025, up from 745 in 2014 — a 52% expansion in coverage.
- 309 Community Reserves established (from 48 in 2014), embedding community governance at the heart of PA management.
- 353 final Eco-Sensitive Zone notifications issued covering 496 PAs, providing regulated buffer zones around critical habitats.
- 18 Biosphere Reserves covering 91,425 km^2; 13 UNESCO-recognised including the newly inducted Cold Desert Biosphere Reserve.
- OECM framework institutionalised through NBA to count community conserved areas toward 30×30 commitment.
- India's NR-7 confirms all 23 National Biodiversity Targets are 'on track to achieve', with PA expansion a central driver.

India's success in expanding its *in situ* conservation area

India's significant progress in conservation efforts can be best exemplified by its species-specific conservation success as well as its fast expansion of protected area network that includes National Parks, Wildlife Sanctuaries, Conservation Reserves, and Community Reserves. In addition, India's *in situ* conservation efforts including 58 Tiger Reserves (TRs), 33 Elephant Reserves (ERs), 18 Biosphere Reserves (BRs), and Reserved/Protected/Undemarcated Forest areas are noteworthy.

Fig. 2.1 - Trend in Extent of Protected Areas in India

Source: ENVIS Centre on Wildlife & Protected Areas, Wildlife Institute of India

India's 54 Biodiversity Heritage Sites: Recognising community driven biocultural diversity conservation under Biological Diversity Act, 2002

Mawtneng Biodiversity Heritage Site (BHS), Meghalaya

Mawtneng Biodiversity Heritage Site (BHS), located in Mawtneng Village in the Bhoirymbong C&RD Block of Ri-Bhoi District, Meghalaya, spans over 54.20 ha within a heterogeneous landscape dominated by regenerating secondary forests. Notified on 2 January 2026 under Section 37(1) of the Biological Diversity Act, 2002, it is the second Biodiversity Heritage Site in the state. Ecologically, the site is significant for its rich biodiversity, including over 200 recorded plant species across canopy, sub-canopy, and understorey layers, along with several endemic and threatened species. These forest plays a crucial role in maintaining ecological balance through watershed protection, carbon sequestration, and soil conservation.

The site also has high cultural and historical significance, being a part of the traditional administrative unit of Raid Bhoilasa, formerly under Raid Lapngar of the Khasi Kingdom Hima Mylliem. The name "Mawtneng" originates from a prominent monolith, about 8 feet tall, erected by the warrior Khlawait Kohrakei, which continues to serve as a cultural landmark among the Khasi Tribe. The Mawtneng Biodiversity Management Committee (BMC), in collaboration with the Village Dorbar and local community actively undertakes conservation efforts such as annual cleaning drives and boundary maintenance, reflecting strong community stewardship.

To address various biotic and regeneration challenges, an adaptive management approach has been taken up, focusing on biodiversity conservation, habitat restoration, and preservation of cultural heritage. Emphasis is also placed on scientific monitoring, strengthening community participation, and promoting sustainable livelihood options such as ecotourism and regulated use of non-timber forest products to ensure long-term conservation and socio-economic benefits.

Plate. 2.1
Mawtneng Biodiversity Heritage Site, Meghalaya

Forest Ecosystems

Champion and Seth (1968) classified diverse forests of India into different biogeographic zones into six Major Groups, 16 Forest Type Groups, and 221 Sub-group types. Each of these forest types is home to a wide array of wild plant and animal species, and microbes. The total forest cover has an area of 7,15,342.61 km^2 (21.76% of country's total geographical area) under different forest types (FSI, 2023).

Grassland Ecosystems

Grassland ecosystems vary widely in India depending on elevation, edaphic and climatic conditions. Some of these are: Alpine moist meadows of the Greater Himalaya, Alpine arid pastures or steppe formations of trans-Himalaya, Hill-side grasslands in the mid-elevation ranges of Himalaya, 'Chaurs' of Himalayan foot-hills, Wet-alluvial or 'Terai' grasslands of Gangetic and Brahmaputra flood plains, 'Phumdi' or floating grasslands of Manipur, 'Banni' and 'Vidis' of Gujarat, Savannas of western and peninsular India, Plateau and valley grasslands in Satpuras and Maikal hills, Dry grasslands of Andhra Pradesh and Tamil Nadu plains, and 'Shola' grasslands of Western Ghats (Rawat and Adhikari ENVIS 2015). Based on remote sensing data, eleven categories of different grasslands in India were mapped that cover an area of 91,933 km^2 (Roy et al. 2015; MoEFCC 2024).

Desert Ecosystems

Deserts are natural fragile ecosystems. Depending upon the extremities in temperature, India harbours both, cold as well as hot deserts. The cold desert represents the 1-Trans-Himalaya biogeographic zone while hot desert represents the 3-Indian Desert biogeographic zone. The Trans-Himalaya (Cold desert) biogeographic zone is represented by three biotic provinces (1A-Ladakh; 1B- Tibetan Plateau; and 1C- Sikkim), and collectively they cover ~5.6% geographical area (GA) of the country. Hot Indian Desert is represented by two biotic provinces viz., 3A- Desert Thar and 3B-Desert Kachchh (Rodgers and Panwar, 1988).

Freshwater, Coastal and Marine Ecosystems

Coastal water ecosystems include oceans, seas and saline groundwater, while the freshwater ecosystems are lentic (pools, ponds, and lakes), lotic (fast moving water; including streams water and rivers) and other wetland ecosystems including swamps where the soil is saturated or inundated for a few months in a year.

According to the Ramsar Convention (1971), wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 m. As per the wetland inventory conducted across the country during 2018-2019 and published in 2024 by the Space Applications Centre (SAC) of ISRO, the total number of wetlands across the different basins are 24,90,584 covering a total area of 1,68,39,934 ha.

India is endowed with a vast and diverse marine resource base, supported by a coastline of approximately 11,099 km and an Exclusive Economic Zone (EEZ) of about 2.4 million km^2.

India's Ramsar Wetlands:

From 26 to 98 Sites

Asia's Largest Network

Best Practice

India has achieved the most dramatic expansion of Ramsar-designated wetlands of any country in the world over the past decade. From just 26 Ramsar Sites in 2014, India has added 72 new sites in eleven years - a 270% growth - taking its total to 98 sites as of January 2026. This makes India the largest Ramsar wetland network in Asia, surpassing China's 82 sites, and the third largest globally by number of sites

In 2025 alone, 11 new Ramsar Sites were declared, including Patna Bird Sanctuary (Uttar Pradesh) and Chhari-Dhand (Gujarat). The total area under Ramsar designation covers over 1.38 million hectares of ecologically critical wetland landscapes. These wetlands are crucial for migratory bird populations, freshwater biodiversity, water security, and climate regulation, supporting livelihoods of millions of dependent communities. In a landmark advance in urban wetland governance, Udaipur and Indore became India's first Ramsar-accredited Wetland Cities in January 2025. At the 15th Ramsar Conference of Parties held at Victoria Falls, Zimbabwe in July 2025, India introduced - for the first time since 1982 - a Resolution on 'Promoting Sustainable Lifestyles for the Wise Use of Wetlands', which was formally adopted by all 172 Contracting Parties, reflecting India's global wetland leadership. The National Coastal Mission has been extended for 2025-31 with a INR 767 Crore allocation to strengthen coastal and wetland ecosystem resilience.

India I 2014-2026

98
Ramsar Sites

1.38
million ha in India

3rd
Largest Network Globally

Key Facts and Achievements

- **98 Ramsar Sites as of January 2026, up from just 26 in 2014 - a 270% increase in eleven years.**
- **India is now #1 in Asia (ahead of China's 82 sites) and #3 globally by number of Ramsar Sites.**
- **1.38 million hectares of wetland landscapes under Ramsar protection.**
- **11 new Ramsar Sites declared in 2025, including Patna Bird Sanctuary and Chhari-Dhand, Gujarat.**
- **Udaipur and Indore designated India's first Ramsar-accredited Wetland Cities (January 2025).**
- **India's Resolution on 'Promoting Sustainable Lifestyles for the Wise Use of Wetlands' adopted by all 172 Ramsar Contracting Parties at COP-15 (July 2025)**

Mangrove Ecosystems

Mangroves are one of the most productive ecosystems on the earth found in intertidal environments predominantly at the tropical and subtropical latitudes along sheltered coastlines, shallow-water lagoons, estuaries, rivers and deltas, mainly on soft substrates (FAO, 2023). The Forest Survey of India (FSI) has been assessing the extent of mangroves across India since 1987 and biennial India State of Forest Reports (ISFRs) have been providing valuable insight on the status and temporal changes in mangrove cover across different States/ UTs. As per the ISFR 2023, mangrove cover in the country stood at 4,991.68 km^2, i.e., 3% of the global mangrove cover, and 0.15% of the country's GA.

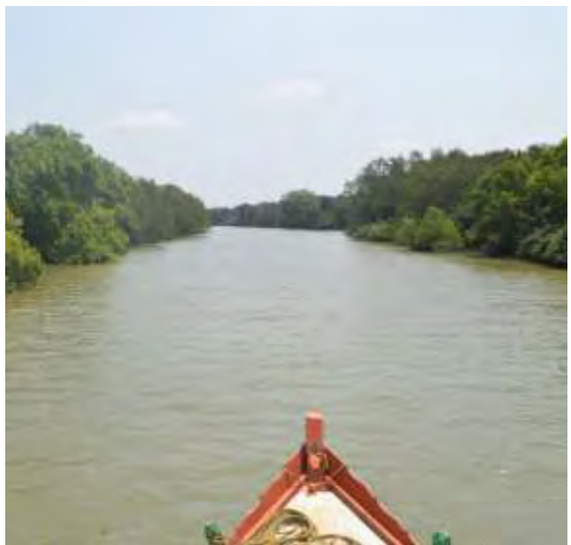
Estuarine Ecosystems

The estuaries occur over coastal plains along the west and east coasts of India whose elevation does not exceed maximum tidal elevation that varies from 0.5 to 11 m. India with long bounding coastline harbours ~220

estuaries (14 major, 44 medium and 162 minor) with total estimated surface area to 27,000 km^2, assessed from the mouth of the estuary to the region where tidal oscillations are almost negligible (Qasim, 2003; Rao and Sarma, 2013). Major Indian rivers such as, Ganga, Brahmaputra, Godavari, Mahanadi, Krishna, and Cauvery form estuaries on the east coast. West flowing rivers *viz*., Sabarmati, Narmada, Tapti, Mahi and several smaller coastal rivers in Kerala, Karnataka and Goa constitute estuaries along the west coast. Major estuarine systems on the east coast are: the Hooghly-Matlah estuarine system in West Bengal; the Mahanadi, Rushikulya, and Bahuda estuaries in Odisha; the Godavari, Krishna, and Pulicat in Andhra Pradesh; and the Adyar, Cauvery, Vellar, Vaigai, Kollidam, Muthupet, and Ennore estuaries in Tamil Nadu. Prominent estuaries of the west coast include, Sabarmati, Narmada, Tapti and Mahi in Gujarat; Daman Ganga in Daman; Mahim and Amba estuaries in Maharashtra; Mandovi- Zuari system of Goa; Nethravati- Gurupur, Mulki, Coondapur, Pavenja, Gangoli, Kali, Aghanashini, and Sharavati estuaries in Karnataka; and Asthamudi, Vembanad, and Periyar estuaries in Kerala (Qasim and Sengupta, 1984; Mohan Raj *et al*., 2023; MoEFCC, 2024).

Lagoons

Lagoons are shallow, often elongated bodies of water separated from a larger body of water by a shallow or exposed shoal, coral reef, or island. Lagoons are usually located parallel to the shoreline and elongated with narrow width. The depth of a lagoon seldom exceeds a few meters and generally remains in the range of 1-10 m (Kjerfve, 1994). Seventeen coastal lagoons have been described from west and east coasts of India (Saxena, 2012; Mahapatra *et al*., 2013). This includes eight major lagoons on the east coast and nine on the west coast. It was estimated to cover 2,159.4 km^2 area based on the assessment of 2017-2018 (Gupta *et al*., 2021).



Saltmarsh Ecosystems

Tidal saltmarsh ecosystem, hereafter referred as saltmarshes comprise the portion in the upper intertidal zone between land and open brackish water that is regularly flooded by the tides. ISRO-SAC mapped salt marshes in India using satellite data of 2017-2018 and estimated the overall area to be 1,441.88 km^2 (Gupta *et al*., 2021; MoEFCC, 2024).

Intertidal mudflats

Tidal flats or Mudflats are sedimentary deposits of mud, silt and clay with high organic content, made by tides or rivers along a coast. Mudflats play varied ecological and physical functions like dissipating wave energy, reducing the risk of erosion of salt marshes besides creating habitats for a wide array of invertebrates and aquatic birds. Mudflats have high biological productivity with abundant invertebrates that provide food for migratory and wintering birds, and are important fish nurseries. ISRO-SAC mapped the cover of intertidal mudflats in the country using imageries of 2018-2019 and estimated the area as 22,326 km^2 (Gupta *et al*., 2024). As per the estimate, Gujarat harboured the largest chunk of intertidal mudflats i.e., 2,142.21 km^2 or 93% of country's total intertidal mudflat area. Other important states *viz*., Andhra Pradesh, Tamil Nadu, Odisha, and Maharashtra had intertidal mudflats to the extent of 474.75 km^2, 297.97 km^2, 247.57 km^2, and 204.98 km^2, respectively (Gupta *et al*., 2021).

Seaweed Dominated Ecosystems

Seaweeds, a group of photosynthetic, non-vascular, large macroscopic marine algae without true root, stem and leaves, are one of the important primary producers of marine ecosystems. The Indian coastline, with its wide range of coastal ecosystems, supports luxuriant growth of diverse seaweed populations (Vagh *et al*., 2022).

Agroecosystems

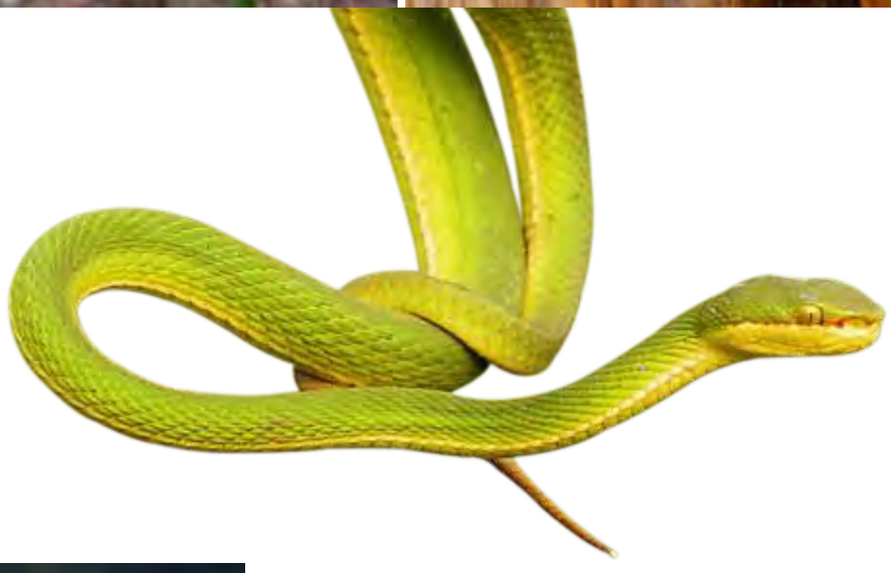
Agroecosystems are manmade ecosystems consisting of plant and animal communities interacting with their physico-chemical environments that have been modified by people to produce food, fibre, fuel and other products for human consumption and processing. The diversity of agroecosystems in India is numerous ranging from primitive shifting cultivation to modern agroforestry systems to energy subsidized mechanized agroecosystems. These agroecosystems vary widely with edapho-climatic conditions, elevations and cultural practices of the local farmers.

2.2
Species Diversity

Variety and variability among plants, algae, fungi, animals, and microorganisms represent species diversity. Taxonomic information on plant and animal species in India is being constantly updated based on field surveys/ explorations, descriptions, and acceptance of new species. The microbial diversity of India is now being studied extensively and new strains/ species are being discovered and described following metagenomic approach for identification. The number of known species is increasing every day and the total numbers of species / taxa in India is continuously changing. The Botanical Survey of India (BSI) and Zoological Survey of India (ZSI) have been undertaking field surveys to identify and describe new plant and animal species since 1890 and 1916, respectively. In addition, botanists, zoologists, and microbiologists working with other research organizations and universities across the country also contribute towards the discovery of new plant, animal and microbial species.

Floral Diversity

Terrestrial and aquatic (freshwater, brackish, and marine) ecosystems, being storehouses of biodiversity, hold plant diversity of 56,177 species, including 22,368 species of angiosperms, 83 species of gymnosperms, 1,325 species of pteridophytes, 2,850 species of bryophytes, 9,117 algae, 15,986 species of fungi, 3,151 species of lichens, and 1,297 species of microbes (viruses and bacteria). The number of reported plant taxa has increased steadily from 26,032 in 2020 to 26,626 in 2024. Altogether, 3,057 plants in India have been listed as threatened. Out of this, 3,049 are angiosperms (Plant Discoveries 2024, BSI).



Faunal Diversity

While varied ecosystems of India hold a total faunal diversity of 1,00,651 species that include 3,613 species of fishes, 464 species of amphibians, 799 species of reptiles, 1,347 species of birds, 438 species of mammals, and 94,990 species of invertebrates. A total of 5,474 animals (vertebrates and invertebrates) is under the threat of extinction and have been/ are being classified under various threat categories. (Animal Discoveries 2024, ZSI)

Project Tiger: Steward of 75% of the world's wild tiger population

Best Practice

India | 1973 **Ongoing**

58
Tiger Reserves

3,682
Tiger (2022 Estimation)

Launched in 1973 with just nine reserves, Project Tiger is one of the world's most celebrated conservation recovery programmes. From a critically low population threatened by hunting and habitat loss, India's tigers have rebounded to 3,682 individuals as per the 2022 All India Tiger Estimation - representing over 75% of the global wild tiger population. India's success demonstrates that political will, protected area expansion, anti-poaching enforcement, and community engagement can reverse even severe wildlife decline.

The program has continuously evolved its conservation toolkit. The number of Tiger Reserves has grown from nine in 1973 to 58 in 2025, including the newly designated Madhav Tiger Reserve in Madhya Pradesh, covering approximately 85,000 km^2. Tiger corridors - 32 identified nationally - maintain genetic connectivity between reserves. The 6th cycle of the All India Tiger Estimation, the first in the world at this scale, has been initiated. Further, technology has transformed field management with the Monitoring System for Tigers - Intensive Protection and Ecological Status (M-STrIPES) deployed across reserves for structured patrol data collection; AI-based species identification and conservation genetics guide the Standard Operating Procedure (SoP) for tiger translocation; and camera trap networks generate population data with scientific rigour.

Key Facts and Achievements

- **Tiger population grew from ~1,800 in 1973 to 3,682 tigers in 2022 - highest ever recorded in recent decades in India.**
- **58 Tiger Reserves cover 85,000 km^2 protecting India's tiger landscapes, up from 46 reserves in 2014.**
- **32 tiger corridors identified and secured to ensure genetic dispersal and landscape-level connectivity.**
- **6th cycle of All India Tiger Estimation - the world's first national-scale tiger survey of this type was initiated in 2024.**
- **M-STrIPES digital platform and AI-based tools transform evidence-based reserve management.**
- **India hosts over 75% of the global wild tiger population, making it the most important tiger range country on the Earth.**

Project Elephant: India hosts 60% of Asia's Wild Elephants

Best Practice

India | 1992-**Ongoing**

33
Elephant Reserves

150
Corridors

22,446
Wild Elephants

India is home to nearly 60% of the global Asian Elephant population - approximately 22,446 wild elephants. Launched in 1992, Project Elephant has systematically expanded habitat protection, identified and secured migratory corridors, and introduced cutting-edge technology to minimise human-elephant conflict which remains one of the greatest conservation challenges in densely populated South Asia.

The protection network was significantly strengthened between 2014 and 2025: Elephant Reserves increased from 26 to 33, bringing an additional 8,610 km^2 under formal protection. Across 15 states, 150 elephant corridors have been mapped to maintain movement routes between fragmented habitats. A landmark India-Bangladesh Transboundary Elephant Conservation Protocol was signed to safeguard transboundary herds. Addressing the critical problem of railway-track mortalities, Indian Railways deployed an AI-enabled Intrusion Detection System (IDS) uses Distributed Acoustic Sensors (DAS) to detect elephant movement near railway tracks via acoustic signatures, sending real-time alerts to train drivers. Following successful pilots in the Northeast, the system is being expanded across seven railway zones. Meanwhile, the *ex gratia* for human fatalities from elephant encounters has been doubled from INR 0.5 million to INR 1.0 million, and a rail-track mitigation portal was developed with 110 critical sites identified. DNA profiling of captive elephants is being undertaken through the 'Gaj Soochna App'.

Key Facts and Achievements

- **33 Elephant Reserves covering significantly expanded habitat protected India's elephant landscape, with 8,610 km^2 added since 2014.**
- **150 elephant corridors identified across 15 states, maintaining critical migratory connectivity.**
- **AI-enabled Intrusion Detection System (IDS) using Distributed Acoustic Sensors deployed across 7 railway zones to prevent elephant-train collisions.**
- **India-Bangladesh Transboundary Elephant Conservation Protocol signed, the first of its kind in the region.**
- **22,446 wild elephants - approximately 60% of the global Asian Elephant population - protected under the Project Elephant.**
- ***Ex gratia* for human fatalities doubled to INR 1.0 million; rail-track mitigation portal identifying 110 critical conflict sites.**

Project Dolphin: Saving India's River Dolphin

Best Practice

India I 2020-**Ongoing**

6,327
Riverine Dolphins

Ganga, Brahmaputra, Indus & Sundarbans

The Gangetic River dolphin — India's national aquatic animal — had long been a flagship indicator of freshwater ecosystem health, yet no comprehensive national population estimate existed. Project Dolphin, announced by the Prime Minister in 2020, set out to change this, establishing a science-based framework for the conservation of all river and marine cetaceans in India.

A nationwide survey conducted from 2021 to 2023 produced India's first-ever river dolphin population estimate of 6,327 riverine dolphins — providing an evidence base for conservation planning across major river systems. The survey covered the Ganga, Indus, Brahmaputra, Sundarbans, and Odisha river systems, and assessed populations of the Ganges River Dolphin, Indus River Dolphin, and Irrawaddy Dolphin. On 6 October 2025 during the Wildlife Week, Project Dolphin Phase II was formally launched, releasing a national Action Plan and a comprehensive Field Guide for population assessment. Simultaneously, the Second Range-Wide Estimation of River Dolphins and Other Cetaceans was launched in January 2026 from Bijnor, covering all five major river systems — the most comprehensive aquatic biodiversity survey ever undertaken in India.

Key Facts and Achievements

- **India's first-ever nationwide river dolphin survey estimated 6,327 riverine dolphins across major river systems.**
- **Project Dolphin Phase II launched (Wildlife Week 2025) with a national Action Plan and Field Guide for population monitoring.**
- **Second Range-Wide Estimation launched in January 2026 - the most comprehensive aquatic survey in Indian history.**
- **Survey covers Ganga, Indus, Brahmaputra, Sundarbans and Odisha rivers, assessing three dolphin species.**
- **Establishes a scientifically reproducible baseline for tracking the health of India's freshwater ecosystems.**
- **Conservation actions for saving river Dolphin are in progress.**
- **River dolphin conservation directly contributes to NBT 4 (species management) and NBT 11 (ecosystem services).**

Project Snow Leopard: India's First Scientific Census of the 'Ghost of the Mountains'

India I 2009-**Ongoing**

718
Snow Leopards

Ladakh, Himachal Pradesh, Uttarakhand, Arunachal Pradesh Sikkim and Jammu & Kashmir (2019–2023)

Best Practice

The snow leopard — India's iconic high-altitude apex predator — had never been counted with scientific rigour across its entire national range. For decades, population figures were estimate. The Snow Leopard Population Assessment in India (SPAI), India's first nationwide census, changed this fundamentally: covering approximately 1,20,000 sq. km — 70% of the potential high-altitude range — and applying standardised camera-trap and occupancy-based protocols, the survey produced the first defensible national population figure for this elusive species.

The SPAI was implemented by the National Tiger Conservation Authority, Wildlife Institute of India, state forest departments, and SECURE Himalaya project across six states and union territories. A training programme cascaded surveys to 2,000 frontline forest staff and community monitors. The assessment ran from 2019 to 2023 and resulted in an official count of 718 individual snow leopards: Ladakh (477), Uttarakhand (124), Himachal Pradesh (51), Arunachal Pradesh (36), Sikkim (21), and Jammu and Kashmir (9). The Cold Desert Biosphere Reserve in Himachal Pradesh (7,770 km^2) was simultaneously inducted into UNESCO's World Network of Biosphere Reserves. Building on this momentum, SPAI 2.0 was launched during the Wildlife Week 2025 to institutionalise long-term, science-based population monitoring. A national Action Plan and Field Guide for snow leopard monitoring was also released, shifting conservation toward a landscape-level, climate-resilient strategy.

Key Facts and Achievements

- **718 snow leopards counted in India's first-ever scientifically robust national snow leopard census.**
- **State-wise distribution: Ladakh 477 | Uttarakhand 124 | Himachal Pradesh 51 | Arunachal Pradesh 36 | Sikkim 21 | Jammu and Kashmir 9.**
- **Survey covered ~1,20,000 km^2 (70% of India's potential snow leopard range) using standardized camera-trap protocols.**
- **2,000 frontline staff and community monitors trained, creating a permanent institutional monitoring workforce.**
- **Cold Desert Biosphere Reserve (7,770 km^2) inducted into UNESCO's World Network of Biosphere Reserves (2025).**
- **SPAI 2.0 launched at the Wildlife Week 2025 to institutionalise long-term, reproducible national monitoring cycles.**

Project Cheetah: World's 1st Inter-Continental Large Carnivore Translocation

Best Practice

Kuno National Park, Madhya Pradesh

2022
Ongoing

30
Cheetahs

19
Cheetah Cubs born

After more than seven decades of absence, the cheetah returned to India on 17 September 2022 — making Project Cheetah the world's first inter-continental translocation of a large carnivore. Declared extinct in India since 1952, the cheetah was brought back through more than a decade of scientific assessment, diplomatic negotiation, and meticulous habitat preparation at Kuno National Park, Madhya Pradesh, to restore its ecological role as an apex predator of India's open grassland landscapes.

Eight cheetahs arrived from Namibia in September 2022, followed by 12 more from South Africa in February 2023. The National Tiger Conservation Authority established a dedicated Cheetah Project Steering Committee. Over 450 Cheetah Mitras were recruited from local communities as conservation partners, generating 380 direct jobs. In 2025, Project Cheetah entered an expansion phase: cheetahs were introduced into Gandhisagar Wildlife Sanctuary in Madhya Pradesh, with planned expansion to Noradehi and Banni Grasslands. The first cub born in India — named Mukhi — is now herself a mother of five, marking a historic milestone in India's conservation history. A next batch of nine cheetahs from Botswana was also received in 2025. India is on track for a self-sustaining metapopulation of 60–70 cheetahs across 17,000 km^2 by 2032.

Key Facts and Achievements

- **First cheetah cubs born on Indian soil in over 70 years - 19 India-born cubs as of December 2025.**
- **Total cheetah population: 30, comprising 11 founder animals and 19 India-born individuals.**
- **World's first inter-continental large carnivore translocation - MoUs established with Namibia, South Africa, and Botswana.**
- **Project entered expansion phase in 2025: cheetahs introduced to Gandhisagar Wildlife Sanctuary; next steps: Noradehi and Banni Grasslands.**
- **450+ Cheetah Mitras from local communities engaged; 380 direct jobs created.**
- **Target: self-sustaining metapopulation of 60-70 cheetahs across 17,000 km^2 by 2032.**

International Big Cat Alliance: India Leads Global Conservation of Seven Big Cats

Launched on 9 April 2023

18
Member Countries

Framework Agreement in Force from 23 January 2025

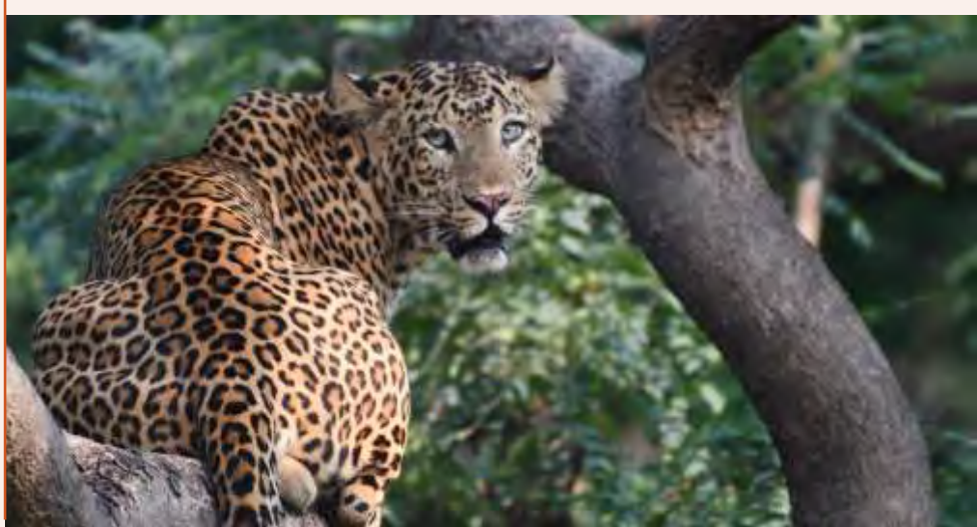
Best Practice

On 9 April 2023, Prime Minister Narendra Modi launched the International Big Cat Alliance (IBCA) in New Delhi to mark the 50th anniversary of Project Tiger — an initiative that transformed a domestic conservation programme into a global framework for the protection of all seven big cat species: Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma. The IBCA's Secretariat is headquartered in India, with India serving as the founding and leading member.

The Alliance was established following the Prime Minister's call at the 2019 Global Tiger Day for global leaders to unite against poaching and illegal wildlife trade. The Cabinet approved the establishment of IBCA with India as Secretariat host on 12 March 2024. The Framework Agreement entered into force on 23 January 2025, and membership has since expanded to 18 countries spanning tiger, lion, leopard, and cheetah range states across Asia, Africa, and the Americas. The IBCA links biodiversity conservation directly with climate adaptation, ecosystem services, water security, and community livelihoods — recognising that big cats serve as umbrella species whose protection secures entire ecosystem complexes. The Alliance facilitates sharing of conservation expertise, anti-poaching technology, population monitoring protocols, and training resources across range states.

Key Facts and Achievements

- **World's first multilateral alliance dedicated to the conservation of all seven big cat species, led by India.**
- **Framework Agreement entered into force on 23 January 2025; membership expanded to 18 countries.**
- **Secretariat headquartered in India - placing India at the centre of global big cat conservation governance.**
- **IBCA directly advances Kunming Montreal GBF Target 4 on species recovery and Target 22 on inclusive governance.**
- **Alliance facilitates technology transfer, monitoring protocols, and anti-poaching cooperation across tiger, lion, leopard, and cheetah range states.**
- **Links big cat conservation to climate adaptation, ecosystem services, water security, and community livelihoods - a model for integrated biodiversity-climate-livelihoods governance.**



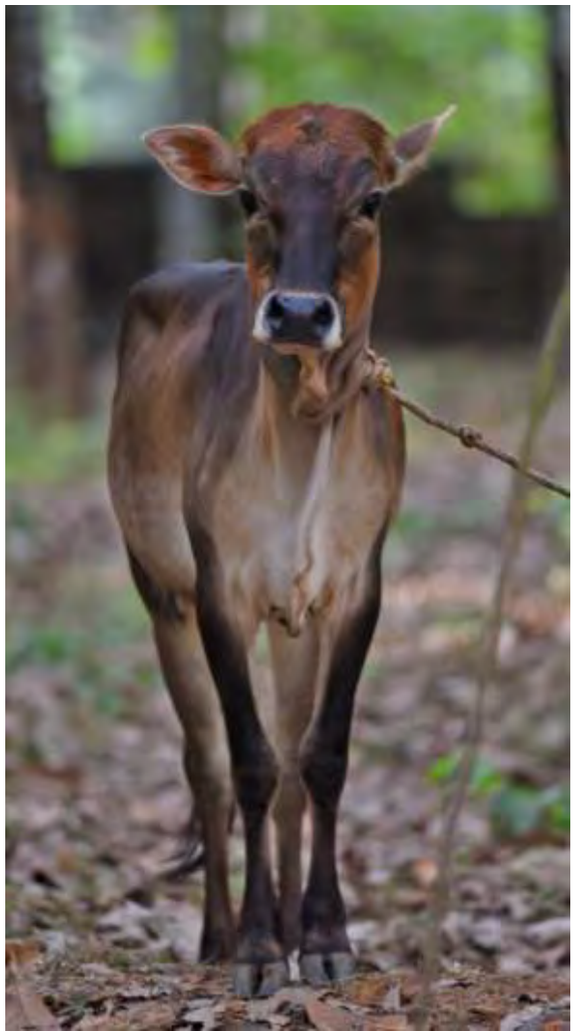
2.3
Genetic Diversity

India is equally rich in plant, animal and microbial genetic diversity as it is in species and ecosystem diversity. The Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) under the Ministry of Agriculture and Farmers' Welfare (MoAFW) has identified 22 agrobiodiversity hotspots across the country important from the perspective of their high levels of unique and diverse crop plant varieties, landraces, and animal breeds, which are vital for the conservation of agrobiodiversity and agricultural development. India has prioritized the conservation of 769 Crop Wild Relatives (CWRs) belonging to 171 native crops besides 230 native animal breeds.

Animal Genetic Diversity

India has made notable progress in recognizing, documenting, and conserving its rich diversity of native livestock breeds, led by the National Bureau of Animal Genetic Resources under the 'Mission towards Zero Non-Descript Animal Genetic Resources', which was launched in 2021. Through active engagement with state-level stakeholders, efforts have been strengthened to catalogue indigenous germplasm and formalize breed registration, resulting in an increase in officially registered domestic breeds from 212 in 2022-23 to 219 in 2023-24. This growth is reflected across several species, including goats (37 to 39), sheep (44 to 45), horses (7 to 8), pigs (13 to 14), chicken (19 to 20), and ducks (2 to 3), while other categories such as buffalo (20), cattle (53), camels (9), donkeys (3), yak (1), geese (1), and dogs (3) remain unchanged, indicating steady progress in strengthening conservation of animal genetic diversity in the country.

The populations of India's indigenous/ domestic livestock breeds (such as native cattle, buffalo, sheep, goat, pig, camel, equine and poultry) are increasing over time. A major achievement has been the steady increase in national germplasm accessions, with thousands of new samples of semen, DNA, embryos and biological tissue added to the National Animal Gene Bank (NAGB) at the National Bureau of Animal Genetic Resources (NBAGR). India registered an increase in the number of officially registered domestic breeds from 190 in 2020 to 219 in 2024. The 20th Livestock Census in 2019 recorded a total livestock population of 535.78 million, marking a 4.6% increase over the 2012 Census. One of the most notable shifts was the rise in female cattle population, which grew by 18%, reversing the earlier declining trend.



Plant Genetic Diversity

India is effectively conserving the genetic diversity of plants, including crops, medicinal plants, crop wild relatives, horticultural species and forest flora through various *ex situ* conservation measures such as national seed banks, field gene banks, botanical gardens, DNA banks and tissue-culture repositories.

The area under cultivation of indigenous, traditional and locally adapted crop varieties is changing over time across the country. Over the past five years, India has significantly strengthened both on-farm and landscape-based conservation of traditional crop varieties and crop wild relatives. Some of these efforts include, setting up on-farm conservation plots, encouraging farmers to maintain landraces, and documenting them through local institutions such as Biodiversity Management Committees (BMCs) and community seed groups. In 2022, the number of Crop Wild Relative species prioritized by National Bureau of Plant Genetic Resources (NBPGR) was 257 and the number of taxa prioritized was 292. State-led initiatives have also contributed meaningfully. Several states such as Karnataka, Odisha, Kerala and Nagaland have launched campaigns to collect, register and cultivate indigenous seed varieties, resulting in thousands of farmer-preserved landraces being conserved in farmers' fields rather than only in gene banks.

2.4
India's Bio-cultural Diversity

A large number of communities are deeply reliant on biodiversity and share a close, interdependent relationship with their surrounding landscapes and seascapes for their livelihoods, cultural practices, and traditional knowledge-based health care systems. All these are closely tied with the sustainable management of natural resources, making biodiversity central to their identity, sustenance, and resilience.

Sacred grove conservation is one such community-driven age-old practice of nature conservation based on deep rooted religious and cultural believes. These patches of forests that range from a few trees to more than 1,000 ha area are protected by local communities for their ecological, religious and cultural significance, and in the process they immensely contribute to conservation of local biodiversity. The Government of India has been supporting and encouraging such practices for biodiversity conservation. For instance, Clause 4.3.4.2 of the National Forest Policy, 1988, highlights the importance of encouraging people with customary rights in forests to help protect and improve forest ecosystems. Section 36-C of the Wildlife Protection Act, 1972, recognizes 'community reserves.' This provision highlights the connection between protecting biodiversity and preserving cultural values and practices. Thus, the Wildlife (Protection) Act, 1972 (WPA) empowers the State Government for declaration of any private or community land, including sacred groves as a community reserve, for protecting fauna, flora and traditional or cultural conservation values and practices.

Plate 2.4
Sacred Grove: an interface between culture and biodiversity

2.5
Biodiversity Related Policy and Legislative Framework

The MoEFCC is the nodal ministry responsible for formulating and implementing policies and legislations related to environment, forests, wildlife, biodiversity, coastal regulation, and climate change. These policies and legislations along with those governed by the other related ministries are listed in Table 2.1

India is not only one of the first nations to formulate and implement the Biological Diversity Act in the year 2002, it has successfully opertionalised most of its clauses and legislations framed under the Act. For example, India today is in a unique position in implementing the Access & Benefit Sharing (ABS) mechanism in alignment with the Nagoya Protocol resulting in several success stories across the country, beginning with the famous story pertaining to the Kani tribe in Kerala. A few recent success stories from diverse aspects of ABS, many of which were facilitated by the concerned State Biodiversity Boards and NBA guided by the ABS guidelines, 2014 and recently amended guidelines of 2025.

Table 2.1
Biodiversity Related Policy and Legislative Framework

Forests	Environment	Agriculture	Biodiversity
• Indian Forest Act, 1927 (last amended 2017) • Wildlife (Protection) Act, 1972 (last amended 2022) • The Prevention of Cruelty to Animals Rules, 1978 • Forest (Conservation) Act, 1980 (last amended 2023) • National Forest Policy, 1988 • Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 • Guidelines of Felling & Transit Regulations for Tree Species Grown on Non-Forest Private Lands, 2014 • National Wildlife Action Plan (2017-31) • State Forest Policy, 2017	• Water (Prevention and Control of Pollution) Act, 1974 (last amended 1988) • Water (Prevention and Control of Pollution) Cess Act, 1977 (last amended 2003) • Air (Prevention and Control of Pollution) Act, 1981 (last amended 1987) • Environment (Protection) Act, 1986 (last amended 1991) • Policy Statement for the Abatement of Pollution, 1992 • Coastal Regulation Zone (CRZ) Notification, 1991 (last amended 2019 and 2025) • Municipal Solid Waste (Management and Handling) Rules, 2000 • National Environment Policy, 2006 • Environment Impact Assessment Notification, 2006 • National Green Tribunal Act, 2010 • National Water Policy, 2012 • Guidelines for Conservation, Development & Management of Urban Greens, 2013 • National Plan for Conservation of Aquatic Ecosystems, 2013 • Guidelines on Sustainable Sand Mining, 2015 • Green Highways Policy, 2015 • Compensatory Afforestation Fund Act, 2016 • Wetlands (Conservation and Management) Rules, 2017 • Commission for Air Quality Management in NCR and Adjoining Areas Act, 2021	• Seeds Act, 1966 • Fertilizer (Control) Order, 1985 (amended 2017) • National Agriculture Policy, 2000 • Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV&FR Act) • National Seeds Policy, 2002 • Plant Quarantine (Regulation of Import into India) Order, 2003 • National Livestock Policy, 2013 • National Agroforestry Policy, 2014	• Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/ Genetically Engineered Organisms or Cells, 1989 • Biological Diversity Act, 2002 (amended 2023) • Biological Diversity Rules, 2004 • Recognition of Zoo Rules, 1992 and 2009 • National Zoo Policy, 1998 • Guidelines for Safety Assessment of Foods Derived from Genetically Engineered Plants, 2008 • Guidelines for Environmental Risk Assessment of Genetically Engineered Plants, 2016 • Guidelines for Establishment of Containment Facilities (BSL2 & BSL3), 2020 • National Fish Policy, 2020 • Guidelines and SOP for Research on Genetically Engineered Insects, 2023 • Access and Benefit Sharing Regulations, 2025

Access & Benefit Sharing: Nagoya Protocol

Best Practice

India's ABS at a Glance (2017–2025)

12,830
Approvals granted

INR 266 crore
Realised by NBA

INR 145 crore
Disbursed to communities

3,556
IRCCs published
(60% of global total)

2,76,653
BMCs constituted

2,72,648
PBRs prepared

Dapur village BMC benefits from probiotic commercialisation of local soil microorganisms

Soil microorganisms isolated from Dapur Village, Sinnar Taluk, Nashik District, Maharashtra — particularly *Bacillus coagulans* — demonstrated significant probiotic potential and were commercialised by M/s Advanced Enzyme Technologies Limited for the development of multiple consumer health products. This case is a landmark demonstration of the complete ABS cycle: from local bioresource to commercial product to community benefit.

The applicant sought NBA approval in 2019 under Form I for commercial utilisation. NBA obtained Prior Informed Consent (PIC) through consultation with the Dapur Village BMC via the Maharashtra State Biodiversity Board. After scientific and legal review by the Expert Committee on ABS, Mutually Agreed Terms (MAT) were finalised in an ABS agreement executed on 28 December 2022. Benefit sharing was fixed at 0.5% of annual gross ex-factory sale value. Multi-level verification — including field verification by experts and a community public meeting — ensured transparency before funds were released to the BMC. 95% of realised benefits were transferred to the Dapur BMC via Maharashtra SBB, with 2.5% retained each by NBA and SBB for administration.

Key Facts and Achievements

- INR 71,25,641 realised as ABS from probiotic product commercialisation.
- INR 67,69,358.95 (95%) transferred to Dapur BMC, Maharashtra - one of the largest direct community ABS payments in India.
- ABS funds utilised by BMC for: biodiversity management plan, medicinal plant nurseries, and site-specific plantation.
- Establishes a replicable template for community benefit sharing from microbial resource commercialisation.
- Demonstrates complete Nagoya Protocol compliance cycle: PIC → MAT → commercialisation → community benefit.

Best Practice

ABS: India's story of *Cocculus hirsutus*-based drug development

Chhindwara district, Madhya Pradesh I M/s Sun Pharmaceutical Industries Ltd I ABS Agreement 2019

In the dry forests of Madhya Pradesh, *Cocculus hirsutus* — a plant long valued in traditional medicine — emerged as a promising candidate for dengue treatment. M/s Sun Pharmaceutical Industries Ltd. approached the NBA in 2017 to access this resource for research and development, initiating one of India's most significant Forest-to-Pharma ABS journeys under the Nagoya Protocol.

The proposal involved collection from Chhindwara District and was processed under ABS mechanisms with PIC obtained through NBA approval, including consultation with local BMCs via the Madhya Pradesh SBB. A request for waiver of upfront benefit sharing was not accepted — reaffirming that benefit sharing is a core and non-negotiable obligation under the ABS framework. An upfront payment of INR 45,00,000 was determined and finalised as part of the MAT, which also incorporated non-monetary commitments including support for PBR preparation and biodiversity awareness at the BMC level. The agreement was executed on 24 January 2019. In 2020, 95% of the benefit-sharing amount (INR 4,27,500) was released to the Madhya Pradesh Minor Forest Produce Cooperative Federation for conservation and socio-economic activities.

Key Facts and Achievements

- **INR 45,00,000 upfront benefit sharing secured - establishing a precedent that waiver of benefit sharing for pharmaceutical research is not permissible.**
- **INR 4,27,500 (95%) released to Madhya Pradesh Minor Forest Produce Cooperative Federation serving forest-dependent communities.**
- **Non-monetary benefits: support for PBR preparation and biodiversity awareness programmes at BMC level.**
- **Traditional medicinal plant transitioned into modern drug development within a fully ABS-compliant framework.**
- **PIC obtained through formal consultation with local BMCs - demonstrating community recognition in pharmaceutical research ABS.**

Synergia Life Sciences: INR 5,47,77,545 ABS to 20 BMCs in Palghar District

Kalina, Matunga, Mumbai & Wada, Palghar, Maharashtra I M/s Synergia Life Sciences Pvt. Ltd.

Best Practice

An Indian biotechnology company successfully converted soil microorganisms isolated from Mumbai and Palghar District into high-value probiotics and nutraceuticals — including Vitamin K2-7 — generating one of the largest ABS payments ever made to local communities under India's Nagoya Protocol framework.

The company accessed *Bacillus clausii*, *Bacillus coagulans*, and *Bacillus licheniformis* strains from soil samples collected at Kalina Campus, Matunga (Mumbai), and Wada, Palghar District. Advanced fermentation technology was used to develop probiotic formulations and nutraceuticals. The ABS compliance process required submission of Form I to the NBA, expert committee review, and benefit sharing fixed at 0.5% of annual gross ex-factory sale price, with an additional condition to conduct biodiversity awareness programmes with the State Biodiversity Board. 95% of the total ABS amount was distributed among approximately 30 BMCs in Wada Tehsil, Palghar District, for biodiversity conservation, ecosystem restoration, socio-economic development, and PBR preparation.

Key Facts and Achievements

- INR 5,47,77,545 total ABS amount paid — one of the largest single ABS payments in India's history.
- INR 5,20,38,667.75 (95%) distributed among approximately 30 BMCs in Wada Tehsil, Palghar District.
- ABS funds utilised for biodiversity conservation, ecosystem restoration, socio-economic development, and PBR preparation.
- Demonstrates that industrial biotech can simultaneously generate high-value products and deliver substantial community biodiversity benefits.
- A model for ABS compliance in the probiotic and nutraceutical sector applicable nationally.

Best Practice

Indian Oil Corporation: ABS-Compliant Green Energy Research Benefits to Village Community

Narrau village, Akrabad, Aligarh, Uttar Pradesh I Indian Oil Corporation (IOL) Ltd.

Indian Oil Corporation Limited (IOCL) — India's largest public sector oil company — undertook research to improve pre-treatment methods for lignocellulosic biomass to enhance efficiency in second-generation (2G) ethanol production, demonstrating that even agricultural residue research is subject to ABS obligations under the Nagoya Protocol framework.

Biological resources (agricultural residues) were accessed from Narrau Village, Akrabad and Kaul Taluk, Aligarh District, Uttar Pradesh. IOCL obtained prior NBA approval through five Form I applications for research access, coordinating with the Uttar Pradesh SBB and the BMC of Narrau Gram Panchayat. An upfront payment of INR 16,60,000 was made. INR 15,77,000 (95% of ABS) was allocated for disbursement to the Narrau BMC, with INR 41,500 (2.5%) each retained for NBA and UP SBB administrative charges. The research contributed to improving biomass conversion technologies for 2G ethanol, enabling efficient agricultural residue utilisation, reducing crop residue burning, and supporting India's renewable energy and emissions reduction goals.

Key Facts and Achievements

- **INR 16,60,000 ABS payment made by India's largest oil PSU for agricultural residue research access - establishing that even agro-residues trigger ABS obligations.**
- **INR 15,77,000 (95%) disbursed to Narrau Gram Panchayat BMC for conservation and socio-economic activities.**
- **Research advances 2G bioethanol production technology, reducing crop residue burning and supporting India's clean energy targets.**
- **Demonstrates coordinated functioning of NBA, State SBB, and local BMC in industrial research ABS compliance.**
- **Provides a replicable framework linking bioenergy research with biodiversity conservation and community benefit sharing.**

Non-Timber Forest Products Trade in Tripura: ABS for BMCs and Forest Communities

Tripura I Tripura Biodiversity Board I NTFP Traders & JFMCs/BMCs I 2019–Ongoing

Best Practice

Tripura's Non-Timber Forest Product (NTFP) sector — encompassing broom grass (*Thysanolaena maxima*), kanak kaich bamboo, gandhaki, and other forest products managed by BMCs and JFMCs — has been brought comprehensively within the ABS framework, directly channelling commercial trade benefits to forest-dependent communities.

Under Section 7 of the Biological Diversity Act, 2002, NTFP traders procuring forest products for regional and national markets must obtain prior approval from the State Biodiversity Board, even for commonly traded commodities. The Tripura Biodiversity Board (TBB) established a clear system: traders submit Form I with BMC and JFMC joint resolutions certifying sustainable harvest; after approval, TBB executes an ABS Agreement, and the forest department issues Transit Permits for lawful movement of bioresources. A predefined benefit-sharing formula distributes proceeds: 5% to JFMCs, 2% to BMCs, and 1% to the State Biodiversity Fund. Following process streamlining in 2019, ABS receipts have increased substantially and transparency has significantly improved. TBB has promoted standardised procedures, model resolutions, traceable supply chains, and clear valuation norms across the NTFP trading sector.

Key Facts and Achievements

- NTFP trading sector brought fully within the ABS framework - traders recognised as ABS stakeholders under Section 7 of BD Act.
- Benefit-sharing formula: 5% to JFMCs + 2% to BMCs + 1% to State Biodiversity Fund - directly benefiting forest-dependent community institutions.
- Streamlined process (2019) produced measurable increase in ABS receipts and improved transparency.
- TBB's standardised procedures, model resolutions, and traceable supply chains serve as a national model for NTFP ABS compliance.
- Community institutions (BMCs, JFMCs) empowered as formal stakeholders in the forest product value chain.
- Replicable framework for ABS in NTFP trade applicable across all forest-rich states with community-managed forest resources

2.6
Institutional Arrangement for Governance and Management of Biodiversity

Over the years, central and state governments have created a large number of hierarchical organizations at the national, state/ UT, and field level for management and governance of biodiversity across the country (Fig. 2.2). In addition, international organizations and NGOs also contribute towards conservation of biodiversity.

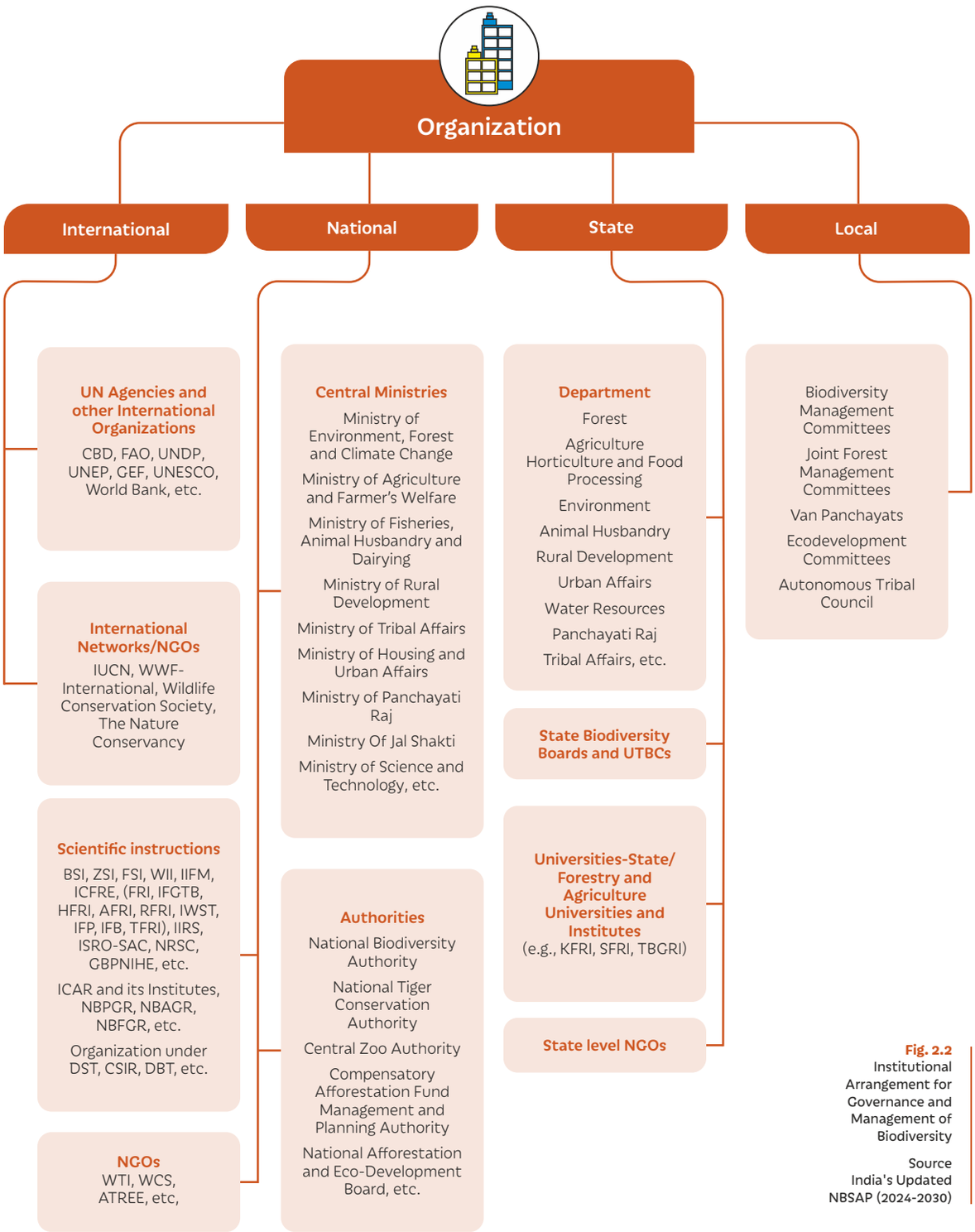


Fig. 2.2 Institutional Arrangement for Governance and Management of Biodiversity

Source
India's Updated NBSAP (2024-2030)

INDIA'S NATIONAL REPORT ON BIODIVERSITY

CHAPTER **03**

BIODIVERSITY: CONSERVATION AND THREATS

The competing uses of land, inland waters, and ocean spaces, along with the growing demands for their associated natural living resources, underscore the need for cross-sectoral approaches to biodiversity conservation that balance multiple interests and uses with a wide range of conservation values. Like most countries, India has also experienced widespread land and sea use change mainly on account of agricultural expansion, development of Infrastructure, and urbanization.

Integrated spatial planning and/ or effective management processes adequately address competing ecological, social, and economic objectives while allowing appropriate trade-offs between conservation and development. Integrated collaboration among diverse stakeholders for conservation, restoration and protection of biodiversity needs to take into account for sustainable development, while focusing on food security and human well-being.

Several steps have been taken to protect natural resources and ensure sustainability. Establishment of Protected Areas (PAs) or area-based conservation measures has been recognized as an effective strategy for biodiversity conservation, as they maintain a wide range of habitats, serve as refuges for threatened species, support vital ecological and evolutionary processes, and provide essential ecosystem services for human well-being and development.

Climate change has an overarching impacts on the, productivity, and functioning of all ecosystems. Ecosystem-based approaches, alongside other measures for mitigation, adaptation, and disaster risk reduction (DRR), have the potential to increase the resilience of ecosystems and human livelihoods to the impacts of climate change, including reducing emissions from deforestation and other land-use changes and enhancing carbon sinks. These mitigation, adaptation, and DRR approaches can also deliver numerous social, economic and environmental co-benefits.

KMGBF aims that all areas are brought under integrated, biodiversity inclusive spatial planning through effective participatory management processes. It emphasizes on addressing issues relevant to land and sea use change while respecting the rights of local communities and seeks to bring down the loss of areas of high biodiversity importance and ecosystems of high ecological integrity to close to zero besides achieving 30% restoration of all degraded ecosystems along with conserving 30% of land, inland waters, and coastal and marine areas by 2030 . The framework intends to halt extinction of species and reduce risk of extinction, maintain and restore genetic diversity, and effectively manage human-wildlife interactions.

It is critical that conservation, and restoration objectives are met through sustainable harvest, use and trade in wild species in a legal and safe manner by preventing overexploitation, minimizing impact on non-target species and ecosystems, and reducing the risk of pathogen spillover. Management of invasive alien species is a priority conservation need for arresting biodiversity loss while ensuring effective ecosystem functioning. Restricted use of chemical fertilizers in agroecological systems; reduction of waste and management of its disposal system, including that for plastics and hazardous waste, alongwith the reduction of air, water, soil, noise and seawater pollution by 2030 to levels that are not harmful to biodiversity and ecosystem functions and services, have also been recognized as appropriate strategies for reducing biodiversity loss. Considering the enormous impact and implications of climate change and ocean acidification, appropriate climate actions for mitigation and adaptation in exposed systems may help reduce biodiversity loss. India has made significant progress in respect of NBT 1 to NBT 8 to reduce threats to biodiversity.

The progress made under eight NBTs (NBT 1 to NBT 8) is highlighted in the following sections:

NBT 1

3.1 Biodiversity inclusive integrated land/ sea use planning

India has made notable progress in establishing a robust institutional system supported by arrangement, application of geospatial technologies, appropriate planning and management, and regulatory foundation required for evidence-based integrated biodiversity-inclusive spatial planning for land, inland waters, coastal and marine ecosystems.

India has implemented various program to achieve the NBT1, emphasizing integrated biodiversity-inclusive spatial planning and participatory management plans for forests, protected areas, inland wetlands, river systems, and coastal/marine zones. MoEFCC and other specialized agencies e.g., FSI, ISRO, NCZMA, NCCR, NCSCM, NIO, and NRSC have institutionalized geospatial mapping and assessments, using remote sensing, GIS, and field validations to track biodiversity-rich areas, wildlife corridors, and degraded zones across biogeographic regions, aiding evidence-based decisions for development projects. Comprehensive management planning has been undertaken as mandated in Acts and Rules for forests, wetlands, and ecologically sensitive areas.

Regular nationwide biennial assessments of forest resources, decadal national inventories and assessments of inland and coastal wetlands, and a focused approach to protection and conservation of shorelines, and marine resources through Coastal Regulation Zone (CRZ) notifications have led to formulation and update of appropriate integrated management plans (Box 3.1). Notable examples include Integrated Wetland/ Coastal Zone Management Plans (e.g., Vembanad Ramsar site, ICZM in Gujarat/Odisha/West Bengal), ESZ/ CVCA notifications with Zonal Master Plans, Management Effectiveness Evaluations across PAs and Tiger Reserves, OECM inventory efforts, state-level PA/ BR plans (e.g., Nanda Devi, Agasthyamala), and the PARIVESH (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub) portal for streamlined and transparent green clearances integrating EIA and biodiversity management plans . These measures have provided databases and information that collectively support enhanced spatial planning for balanced development with adequate safeguard for biodiversity conservation.

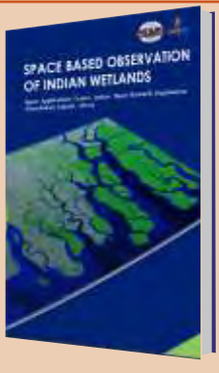
Box 3.1 - National Level Geospatial Planning for Bioresources

Assessment of Forest Resources and Forest Health

Since 1987, Forest Survey of India (FSI) has been undertaking a country-wide (32,87,469 km^2) biennial assessment on forest resources providing key information on recorded forest area, forest and outside forest tree cover, extent of forest types, tree species composition, growing stock, and carbon stock besides extent of livestock grazing area impacted by Invasive Alien Species and degradation at national and sub-national levels; and biogeographic zones. Biennial Indian State of Forest Reports (ISFRs) not only provide trends in forest cover but also capture the impact of conservation efforts made towards the protection and management of forests and afforestation.

National Inventory and Atlas on Wetlands

The Indian Space Research Organization (ISRO) - Space Application Centre (SAC), Ahmedabad on the behest of MoEFCC, Government of India carried out country/ state/ district/ biogeographic zone-wise inventory, mapping, and assessment on the extent of inland and coastal wetlands under a wide range of natural and manmade wetland categories for the periods: 2006-07 and 2017-18 using LISS III (23.5 m) satellite data; and 2018-19 based on high resolution (5.8 m), LISS IV satellite data, respectively. Decadal change (2006-07 and 2017-18) in wetlands across the country was also analyzed by ISRO-SAC, and the report was released in February 2022.



Assessment of Shoreline, Coastal, and Marine Resources

The MoEFCC issued a revised notification in 2019 on the CRZ under Section 3 of the EPA 1986. It envisages strict compliance of CRZ Rules in different coastal zones besides the assessment of shoreline, and effective management of coastal and marine resources. In addition, the CRZ Rules have provisioned for the constitution of the National Coastal Zone Management Authority (NCZMA) at the national level, while the State Coastal Zone Management Authority (SCZMA) at the state level. The CRZ Notification mandates each coastal state to prepare an 'Integrated Coastal Zone Management Plan'. Specialized national level organizations like the National Centre for Coastal Research (NCCR), National Centre for Sustainable Coastal Management (NCSCM), CSIR- National Institute of Oceanography (CSIR-NIO), NCZMA, and SCZMAs are providing vital information to coastal States/ UTs for effective planning and conservation of coastal and marine biodiversity and other natural resources.

PARIVESH: Single Window Integrated System for Green Clearances and (National Level Planning for Forest, Wildlife and Coastal Regulation Zones)

India's commitment to the growth and development of country aligns with conservation of biodiversity and ecosystem services through suitable policy decision and planning, as evident by consistent environmental and CRZ clearances. The number of final Environmental Clearance and Miscellaneous Clearance between 2023 to 2025 significantly increased from 201 to 427; and 463 to 752, respectively. Moreover, average processing time for environmental clearance reduced significantly from 129 days to 63 days, indicating improved administrative efficiency.

Changes in areas under riverine ecosystems and wetlands (inland and coastal)

Between two assessment periods i.e., FY 2006-2007 and FY 2017-2018, the decadal change revealed that the number and extent of inland wetlands (natural and manmade) and coastal manmade wetlands were increased. The number of notified wetlands by States/ UTs increased sharply from just two in FY 2020-21 to a cumulative number of 92 during the period from 2020 to 2024 reflecting improved mapping and designation. These findings integrated into the Visualization of Earth Observation Data and Archival System (VEDAS) Space Applications Centre portal.

Integrated Coastal Zone Management (ICZM) plan for identified priority stretches.

India's CRZ Notifications, 1991, 2011 and 2019 and their amendments under the EPA 1986, regulate activities in Coastal Regulation Zones (i.e., CRZ is the area between the Low Tide Line and 500 m from the High Tide Line on the landward. The CRZ Notification 2019, boost tourism with temporary facilities in CRZ-III while protecting critical ecosystems like mangroves, coral reefs, and turtle nesting grounds. Between FY 2020-21 to FY 2023-24, three states have approved ICZMPs out of the 13 coastal States/UTs of the country.

Management plans for specific areas identified within Critically Vulnerable Coastal Areas (CVCAs) to reduce anthropogenic pressure

The 2011 and 2019 CRZ notifications identified several key CVCAs, each requiring specialized management. Twelve CVCAs *viz*., (1) Sundarbans region of West Bengal; (2) Gulf of Khambhat, and (3) Gulf of Kutchh in Gujarat; (4). Malvan, and (5) Achra-Ratnagiri in Maharashtra; (6) Karwar, and (7) Coondapur in Karnataka; (8) Vembanad in Kerala; (9) Gulf of Mannar in Tamil Nadu; (10) Bhaitarkanika in Odisha; (11) Coringa-East Godavari, and (12) Krishna in Andhra Pradesh have been notified. Management plans for the CVCAs are formulated under the Coastal Regulation Zone (CRZ) Notification, 2019, aimed at protecting ecologically sensitive areas while supporting the livelihoods of local communities, such as fisherfolk. The National Centre for Sustainable Coastal Management (NCSCM) has developed a framework for scientific assessment and Integrated Management Plans (IMPs) for the 12 notified CVCAs. Management plans also include site-specific interventions (e.g., Gulf of Kutch & Khambhat) based on community dependence and governance ability assessments.

3.2 Ecosystem Restoration NBT 2

NBT 2 specifically focuses on restoration of 30% of all degraded ecosystems by the year 2030. India has undertaken works related to assessing desertification and land degradation, land degradation vulnerability, and varied type of restoration activities *viz*., afforestation, combating desertification, soil and moisture conservation measures, voluntary village relocation from PA/ TRs, river restoration and enhancing mangrove, etc.

The assessment of area under desertification and land degradation was undertaken by ISRO-SAC on the behest of MoEFCC at the national/ state level for the periods 2003-05, 2011-13 and 2018-19. Restoration activities for diverse ecosystems were undertaken through a robust institutional arrangement involving central ministries and their organizations *viz*., MoEFCC - National Afforestation and Eco-Development Board (NAEB), Green India Mission (GIM), Eco Task Force (ETF); MoAFW; MoFAHD; MoJS-National Mission on Clean Ganga (NMCG); MoRD; etc. These activities are undertaken in close collaboration with the state departments, urban bodies, community-based organizations, and NGOs. In coastal and marine areas, ecosystem restoration activities are carried out through various control measures using plants, erosion control measures and habitat development based on NCCR assessment. Various actions such as voluntary village relocation from TRs and creation of inviolate space for tiger conservation to ecorestore degraded lands and ecosystems for enhancing occupancy and abundance of wild prey is in place since 1967, which supports to achieve the restoration of degraded areas (Box 3.2). Various digital platforms such as e-Green Watch Portal for Automation, Streamlining and Effective Management of Processes (e-Green Watch)' related to plantation and other forestry works are facilitating ecosystem restoration activities at national level. Mangrove Initiative for Shoreline Habitats and Tangible Incomes (MISHTI)' launched in 2023 aiming to restore and expand mangroves forests has been contributing significantly to coastal and estuarian ecosystems of the country.

Box 3.2: Voluntary Village Relocation from Satpura Tiger Reserve

The village relocation process in STR initiated in FY 2004-05 has succeeded in the relocation and settlement of 38 villages from the legally designated core area, resulting in the creation of a contiguous habitat for wildlife, free from human disturbances. Relocation of villages created additional habitat of about 8,450.8 ha for wildlife and resulted in better living conditions for villagers at rehabilitated village sites. From FY 2004-05 to FY 2021-22, STR has relocated 49 villages from the reserve. Two options were offered to villagers for village relocation. Option-I included a one-time lump sum payment of the entire package amount of INR 15,00,000 per family, while Option-II involved carrying out relocation/ rehabilitation through the SFD. The STR has accrued the following beneficial outcomes of village relocation:

- Over 100 km^2 area for grassland management
- Reduction of biotic pressure on forests adjacent to village sites
- Enhanced occupancy and abundance of wild ungulates, tigers, and leopards
- Reduction of offense: 180-210 Preliminary Offense Reports (PORs) annually till 2016 and reduced to 50-60 annually
- Empowered the relocated villagers and secured their livelihoods along with improved basic amenities facilities

The restoration efforts have also contributed towards increased Forest and Tree Cover and other forest resources, resulting in storage of 30.43 billion tonnes of CO_2e. As compared to the base year of 2005, India has 2.29 billion tonnes of additional carbon sink against updated NDC of 2.5 to 3.0 billion tonnes (FSI, 2023).

The National Mission for Clean Ganga (NMCG), a statutory Authority constituted under the EPA 1986, is being implemented by the Department of Water Resources, MoJS. NMCG is executing the Namami Gange Program that focuses on measures for prevention, control and abatement of environmental pollution in the river Ganga, aiming 'Aviral and Nirmal Dhara' (clean water and continuous adequate flow of water/ e-flow). Main pillars of the programme include river surface cleaning; sewage treatment infrastructure; afforestation, biodiversity conservation; monitoring of aquatic biota, industrial effluents and water quality; riverfront development and public awareness; Ganga Gram and Ganga Praharis (a cadre of volunteers).

Forest area and cover

India's recorded forest area remained almost stable 7,75,377 km^2 between 2021 and 2023, indicating stability in legal forest classification. Forest Cover also remained stable between 2021 and 2023. Tree cover showed a marginal increase. The total forest and tree cover increased from 25.13% to 25.17%, conforming to a national net gain in green cover.

Aquatic ecosystems

Number and area of different types of wetlands (inland and coastal wetlands: natural and manmade) are presented in Table 3.1.

Table 3.1
Number and Extent of Inland and Coastal Wetlands in India in 2006-07 and 2017-18

Sr. No	Wetland Type	LISS III Data* Period (2006-07)			LISS IV Data# Period (2017-18)		
		Number of Wetlands (Number)	Area of Wetlands (ha)	Percentage of Wetland Area (%)	Number of Wetlands (Number)	Area of Wetlands (ha)	Percentage of Wetland Area (%)
A.	**Inland Wetlands**						
I.	**Inland - Natural**						
1.	Lakes	10795	692123	4.33	12514	437077	2.59
2.	Ox-Bow Lakes/ Cut-Off Meanders	4696	113429	0.71	8805	109254	0.65
3.	High altitude Lake	2627	130445	0.82	8116	128317	0.76
4.	Riverine Wetlands	2682	99400	0.62	4938	65389	0.39
5.	Waterlogged	11039	271761	1.70	27123	214716	1.27
6.	River/stream	10940	5708560	35.72	77042	5740110	33.98
Total I. Inland - Natural Wetlands		**42779**	**7015718**	**43.90**	**138538**	**6694863**	**39.63**
II.	**Inland - Man-made**						
7.	Reservoirs/ Barrages	12802	2735369	17.12	12253	2778539	16.45
8.	Tanks/Ponds	151815	1814202	11.35	2259600	2981535	17.65
9.	Waterlogged	3885	96206	0.60	13138	54239	0.32
10.	Salt pans	65	19557	0.12	116	13172	0.08
11.	Aquaculture ponds	2901	168899	1.06	22133	242858	1.44
Total II. Inland - Manmade Wetlands		**171468**	**4834233**	**30.25**	**2307240**	**6070343**	**35.93**
Sub-Total Inland Wetlands (A)		**214247**	**11849951**	**74.15**	**2445778**	**12765206**	**75.5**
B.	**Coastal Wetlands**						
III.	**Coastal - Natural**						
12.	Lagoons	83	215940	1.35	113	203144	1.20
13.	Creeks	929	254968	1.6	3524	256648	1.52
14.	Sand/Beach	1160	44821	0.21	1894	33781	0.20
15.	Intertidal mud flats	2802	2302519	14.41	7534	2232663	13.22
16.	Salt Marsh	862	144188	0.93	1124	149770	0.89
17.	Mangroves	5245	505980	3.17	14120	513970	3.04
18.	Coral Reefs	615	148035	0.93	577	141472	0.84
Total III. Coastal - Natural		**11696**	**3620451**	**22.67**	**28886**	**3531449**	**20.90**
IV.	**Coastal - Man-made**						
19.	Salt pans	1634	253811	1.59	1814	221452	1.31
20.	Aquaculture ponds	3618	257304	1.61	16504	321826	1.90
Total IV. Coastal - Man-made		**5252**	**511115**	**3.2**	**18318**	**543278**	**3.22**
21.	Sub-Total Wetlands (>0.10 ha)	231195	15981516	100	2492982	16839933	99.68
22.	Wetlands <0.10 ha) mainly Tanks	-	-	-	1093791	54690	0.32
Grand Total		**231195**	**15981516**	**100**	**3586773**	**16894623**	**100.00**

Note: Above two assessments are based on two different satellite data sets of varying resolutions
Source: SAC, ISRO- National Wetland Atlas
*- Gupta *et al.*, (2021)
#- Gupta, *et al.*, (2024)

At least, 68,827 wetlands were rejuvenated nationwide under the 'Mission Amrit Sarovar' in 2024, including 16,632 wetlands of Uttar Pradesh, the highest in the country.

India's wetland wealth is concentrated along some major river systems and coastal belts. A total 24,90,584 wetlands across different river basins, covering a total area of 1,68,39,934 ha was reported, with 24% under the Ganga Basin (making it the most critical hydrological landscape), 18.34% in Kutch-Saurashtra region, 33.92% in the Deccan Peninsula and 27.56% in Coastal Zone.

Ramsar Sites

India is one of the leading countries in respect to Ramsar sites, being first in Asia and third in the world. The number of Ramsar Sites increased from 26 sites (2018) to 98 sites (February, 2026), covering a total area of 13,84,141.10 ha (Fig. 3.1). Two cities namely, Indore in Madhya Pradesh and Udaipur in Rajasthan were accredited as 'Wetland Cities' for their outstanding commitment to safeguarding urban wetlands for the benefit of people and nature, under the Ramsar convention. Initiatives such as the National Plan for Conservation of Aquatic Ecosystems (NPCA) and the 'Amrit Dharohar-2023' have further strengthened country's wetland conservation efforts and governance through community participation. Sustainable livelihoods, improved monitoring with remote sensing technology, updated, management plans for designated wetlands, and awareness campaigns are other notable results of such initiatives.

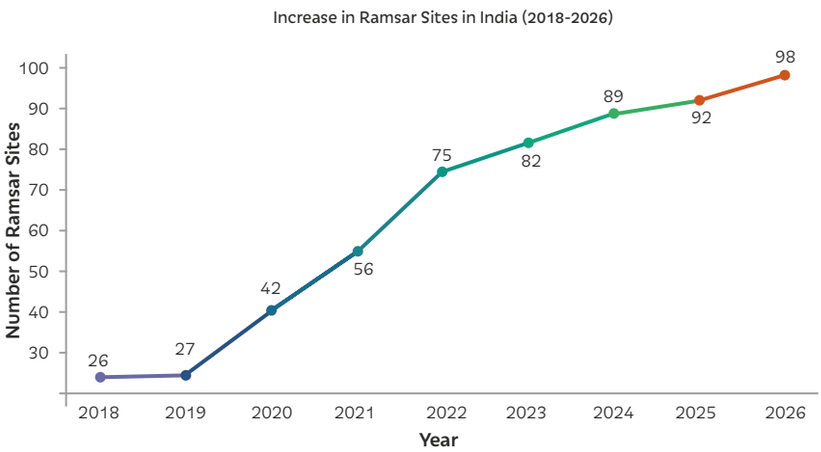


Fig. 3.1
Number of Ramsar Sites in India since the year 2018 till Feb 2026.

Source: Wetland Division, MoEFCC

Mangrove cover and coastal area management

Mangrove cover increased steadily from 4,046 km^2 in 1987 to 4,991.68 km^2 in 2023 (Fig. 3.2), confirming three decades of sustained mangrove conservation efforts.

Fig. 3.2
Trends in mangrove cover since 1987

Source: FSI (2021)

Table 3.2
Mangrove Cover in Western and Eastern Coasts of India, and A&N Islands

Sr. No.	State/ UT	Density			
		Very Dense Mangrove (km^2)	Moderately Dense Mangrove (km^2)	Open Mangrove (km^2)	Total Mangrove Cover (km^2)
A. Mangrove Cover in Western Coast					
1.	Goa	0.00	23.75	7.59	31.34
2.	Gujarat	0.00	179.09	984.97	1,164.06
3.	Karnataka	0.11	3.15	10.94	14.20
4.	Kerala	0.00	4.73	4.72	9.45
5.	Maharashtra	0.00	89.82	225.27	315.09
6.	Dadra & Nagar Haveli and Daman & Diu	0.00	0.21	3.65	3.86
Sub Total of Mangrove Cover in Western Coasts		**0.11**	**300.75**	**1,237.14**	**1,538.00**
B.	**Mangrove Cover in Eastern Coast**				
7.	Andhra Pradesh	0.00	213.90	207.53	421.43
8.	Odisha	81.67	94.61	82.78	259.06
9.	Tamil Nadu	1.19	25.07	15.65	41.91
10.	West Bengal	981.63	703.79	433.74	2,119.16
11.	Puducherry	0.00	0.08	3.75	3.83
Sub-Total of Mangrove Cover in Eastern Coast		**1,064.49**	**1,037.45**	**743.45**	**2,845.39**
12.	A&N Islands	399.37	162.64	46.28	608.29
	Total of Mangrove Cover in Western and Eastern Coasts and A&N Islands	**1,463.97**	**1,500.84**	**2,026.87**	**4,991.68**

Source: FSI -India State of Forest Report (2023)

Coastal area management

The shoreline length and the coastal fisherfolk population of the country in 2024 was 11,098.81 km and ~4.9 million, respectively indicating livelihood dependency on the sea coast. Moreover, the coastal/ sea water quality along the shoreline of the country was mostly 'moderate' to 'good' category with consistent in successive years, indicating less persistent pollution pressures.

Trends in river water quality

The number of water monitoring locations under the umbrella of the Central Pollution Control Board (CPCB) in the country is steadily increasing. The periodic water quality monitoring results indicate that 62% of river monitoring locations meet BOD standards. The details of 296 monitoring of polluted river stretches (PRSs) along with their Priority Classes (defined on the basis of maximum BOD level) in successive years is presented in Fig. 3.3 which shows decline in pollution across the rivers. The water quality of the river Ganga meets the standard for pH and Dissolved Oxygen and exceeded the limits in specific urban stretches for BOD and fecal coliform.

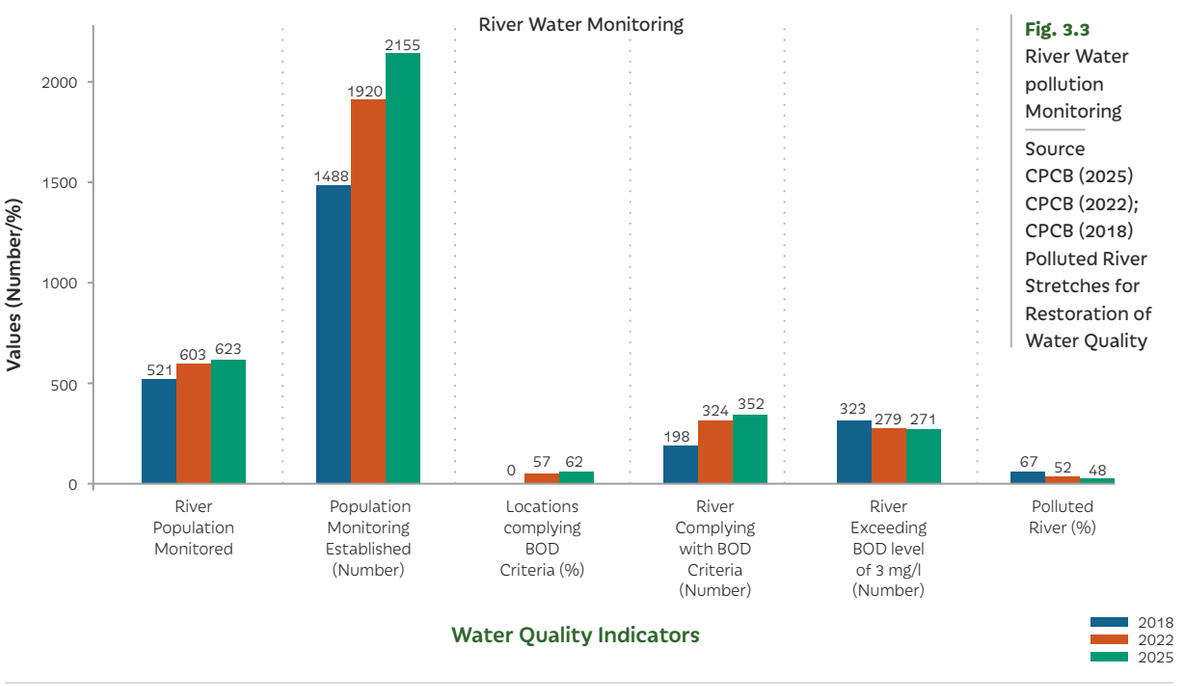


Fig. 3.3
River Water pollution Monitoring

Source
CPCB (2025)
CPCB (2022); CPCB (2018)
Polluted River Stretches for Restoration of Water Quality

Afforestation and restoration

The efforts for afforestation and restoration activities are undertaken under different schemes such as National Afforestation and Ecodevelopment Board (NAEB), Compensatory Afforestation Fund Management and Planning Authority (CAMPA) and National Mission for Clean Ganga (NMCG) in the country. (Table 3.3).

Table 3.3
Trends in afforestation and restoration activities

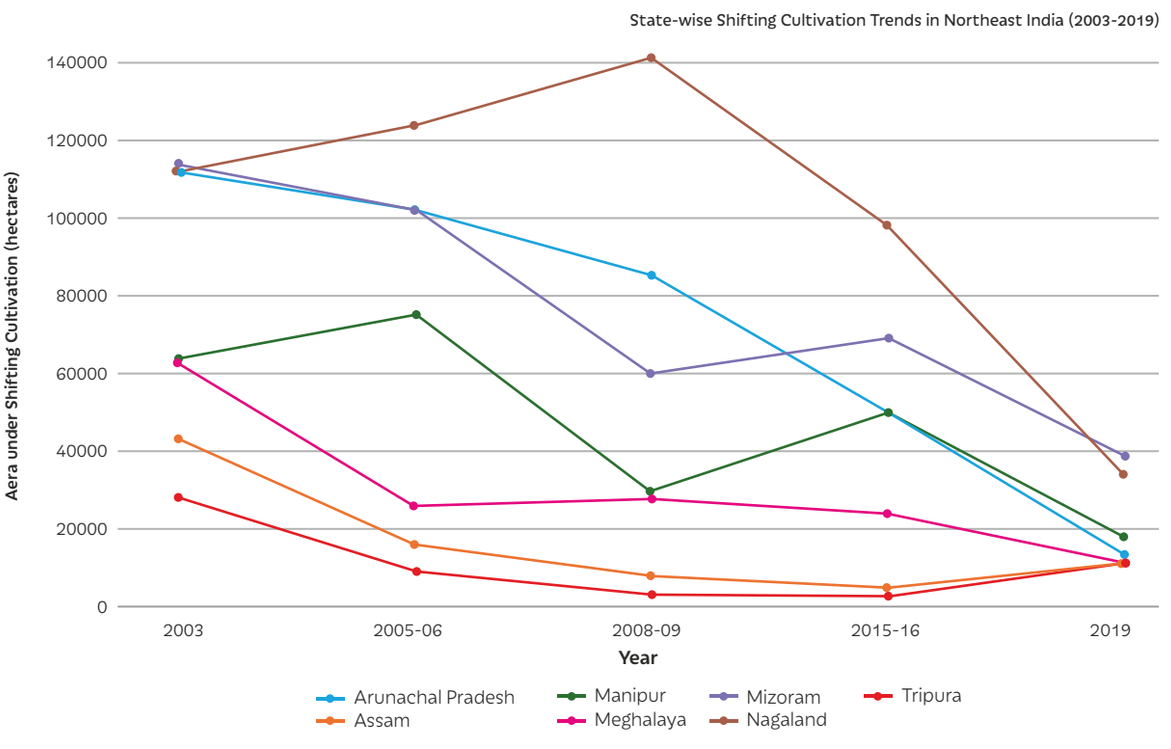
Sr. No.	Afforestation Agency/ Scheme	Year			
		2020-21	2021-22	2022-23	2023-24
A. National Afforestation and Ecodevelopment Board (NAEB)					
1.	Extent of afforestation under Nagar Van Yojana (in ha)	Initiation year	No data available	No data available	15,625.73
2.	Extent of afforestation by Ecological Task Forces (ETF) Area (ha)	2,115.64	1,879.78	2,888.92	2,092.92
	Number of plants planted (million)	2.11	3.19	3.19	2.35
3.	NAEB led Afforestation				
	Number of Projects	10	150	164	94
	Area approved (ha)	325	3,816.85	3,521.48	3,119.52
Total Cost sanctioned (INR Cr)		**93.36**	**1,075.54**	**884.46**	**930.69**
4.	Extent of afforestation in forest and non-forest areas under Green India Mission (ha)	1,66,751	1,93,498	52,863.80	28,238.83
5.	Extent of afforestation by SFDAs under Green India Mission (ha)	1,12,650	1,56,460	1,16,010	38,892.87
Total Extent of Afforestation under NAEB (ha)		**2,82,266.60**	**3,52,587.80**	**1,71,762.70**	**69,224.62**

Source: Ministry of Environment, Forest and Climate Change- Annual Reports (2020-21; 2021-22; 2022-23; 2023-24)

Reduction in shifting cultivation area indicating forest restoration

The area under shifting cultivation has been continuously reducing, indicating the restoration of forest lands affected by this age-old agricultural practice (Fig 3.4).

Fig. 3.4
Reduction in Shifting Cultivation
Trends in Northeast India (2003-2019)
indicating forest restoration



Maintenance of natural fertility in agricultural lands

The Government of India has implemented a national programme on distribution of soil health cards to farmers. The soil health card distribution has increased sharply over the years, reaching over 4.2 million farmers in FY 2021-22 (Table 3.4). The National Mission on Natural Farming (NMNF), approved in November 2024 for promoting chemical-free, low-cost agriculture (using indigenous cow-based preparations) and eliminating all synthetic inputs, with a focus on on-farm input production, covered 0.75 million ha with participation of 10 million farmers by 2026. Started in the year 2015, the 'Paramparagat Krishi Vikas Yojana' (PKVY) focuses on organic farming with the use of organic inputs such as bio-fertilizers, vermicompost, etc. and certified through the Participatory Guarantee System (PGS), has covered at least 1.5 million ha crop land which was under certification by the year 2025.

Under the network project "Enhancement of Soil Organic Carbon", ICAR developed 68 organic farming packages aiming to restore soil carbon and control soil erosion covering 16 states. As an incentive for adopting organic farming, financial assistance @ INR15,000 per ha was provided to farmers for meeting the expenditure towards on-farm and off-farm organic inputs for a period of 3 years (Table 3.4).

Table 3.4
Soil Testing and Soil Health Card Distribution

Sr. No.	Soil Fertility in Agricultural Lands	Year		
		2019-20	2020-21	2021-22
Soil Health and Fertility Scheme under Rashtriya Krishi Vikas Yojana (RKVY)				
1.	Total soil samples collected	21,43,345	16,37,832	38,02,893
2.	Total soil samples tested	21,40,768	16,31,384	36,11,236
3.	Total number of Soil Health Cards provided	23,71,552	16,83,900	42,22,363
4.	Number of States benefited	8	11	19

Source: Ministry of Agriculture and Farmers Welfare (Soil Health Card, National Mission on Natural Farming) Dashboard (2025)

3.3

Conserve biodiversity in land, water and sea (NBT 3)

The establishment of Protected Areas (national parks, wildlife sanctuaries, conservation reserves, and community reserves) has been recognized as an effective strategy towards conservation of biodiversity as they maintain a wide range of habitats, act as refugia for threatened species, allow vital ecological and evolutionary processes, and provide essential ecosystem services for human well-being. In addition to PAs, Other Effective Area-based Conservation Measures (OECMs) are a new category area which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services and where applicable, promotes cultural, spiritual, socio-economic, and other locally relevant values. The key distinction between Protected Areas (PAs) and OECMs is that the PAs have biodiversity conservation as a primary objective, while the OECMs are defined by effectiveness in conserving biodiversity, irrespective of their objectives.

As envisaged in the KMGBF, India aims to conserve 30% of its terrestrial, inland water, and coastal and marine areas by 2030 (30x30 agenda) under the NBT 3.

Coverage of PAs and OECMs

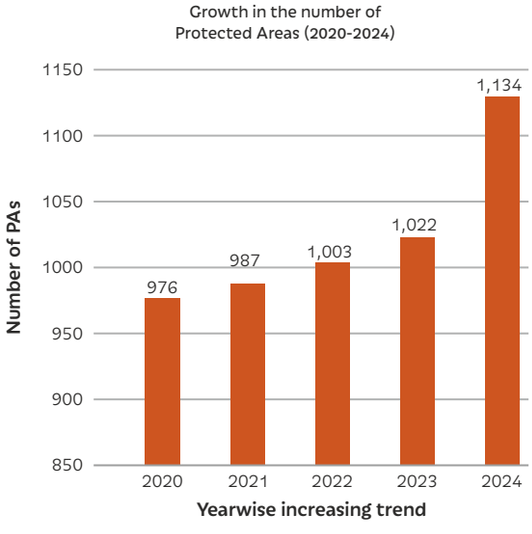
India has made notable progress in conserving biodiversity across land, water, and marine areas, and the current level of progress is 'on track' to achieve the target. Establishment of PAs, improved management effectiveness of PAs with integrated management plans, participatory ecodevelopment plans, and conserving sacred groves and Biodiversity Heritage Sites (BHSs) using traditional knowledge are some of the notable activities to conserve biodiversity across the country's terrestrial region, along with identifying agrobiodiversity hotspots and on-farm conservation. Identification of potential OECMs with enhanced ecosystem services and sustainable livelihoods and conservation of wetlands and river basins were also initiated to conserve the biodiversity across coastal regions. Under the conservation agenda - 30X30, India has brought about 27% of the country's land, water, and sea areas under appropriate legal coverage, ensuring biodiversity conservation (Table 3.5).

Table 3.5
Extent of Conservation areas under different categories/legal framework in India

Sr. No.	Legal Act/Additional Conservation Areas	Extent (km^2) / Reporting Year	Area Specific Categories
1.	Wildlife (Protection) Act 1972	1,87,592 (2024)	Protected Areas (PAs) in four legal categories: National Parks, Wildlife Sanctuaries, Conservation Reserves, and Community Reserves
2.	Indian Forest Act,1927	5,87,785 (ISFR 2023)	Territorial/ Managed Forests (MFs) in Recorded Forest Area (RFA) under three legal forest categories Reserved Forest, Protected Forest, and Un-Demarcated classed Forests
3.	Environment (Protection) Act, 1986	73,602.71 (2025)	Eco Sensitive Zones designated and notified around PAs
4.	Biological Diversity Act, 2002	1,363.53 (2024)	Biodiversity Heritage Sites (BHS)
5.	ISFR - Tree Cover	1,12,014.34	Tree Cover
6.	Wetlands	1,68,946.23	Inland and Coastal Wetlands; As per the Wetlands Atlas of India by ISRO-SAC (2024) based on satellite data of 2018-19

As in the year 2024, the PA network included a total of 1,134 PAs covering a total area of 1,87,592 km^2, representing 5.70% of the country's geographical area (EIACP- National Wildlife Database, WII). These PAs include 106 National Parks, 574 Wildlife Sanctuaries, 145 Conservation Reserves, and 309 Community Reserves.

The number of PAs increased across the four categories (National Park, Wildlife Sanctuary, Community Reserve and Conservation Reserve) in successive periods with the number of PAs increased 976 in 2020 to 1,134 PAs in 2024 (Fig. 3.5). During the period, the PA area increased from 1,75,152 km^2 in 2020 to 1,87,569 km^2 in 2024 (Fig. 3.6).



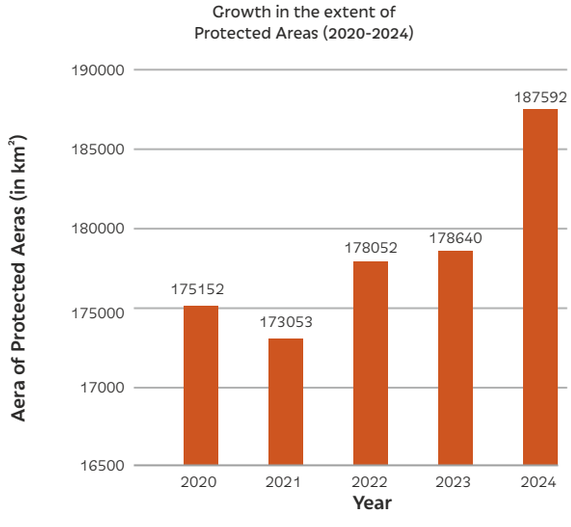


Fig. 3.5
Growth in Number of Protected Areas

Fig. 3.6
Growth in the Extent of Area of Protected Areas (2020-2024)

Source: ENVIS Centre on Wildlife & Protected Areas, Wildlife Institute of India

The number of Tiger Reserves and Elephant Reserves has increased by 14% in the last 5 years. A range of efforts across multiple domains of Eco-Sensitive Zones (ESZ) has led to a steady increase in the number and extent of ESZs from 423 covering 59,498 km^2 in 2020 to 488 covering 72,256.1 km^2 in 2024 (Fig 3.7). Moreover, India has notified 6 ESAs covering an area of 4,631 km^2 in 2020.

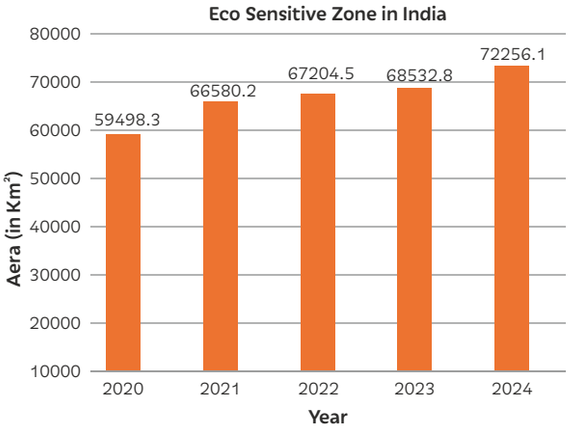


Fig 3.7 - Eco Sensitive Zone Areas under Different Management Regimes

Source: MoEFCC - Annual Report 2024-25, NR, ESZ division - NR7 micro site.

Key Biodiversity Areas (KBAs) are sites of global importance for the conservation of biodiversity, identified using a globally standardized scientific framework. There are over 650 KBAs in India spread across varying habitats, biogeographic zones and biodiversity hotspots (Goyal *et al.*, 2025).

The number of BHSs, notified under country's BDA 2002, now stands at 54. Between 2021 to 2024, the area under BHS has increased by 32% (Fig 3.8).

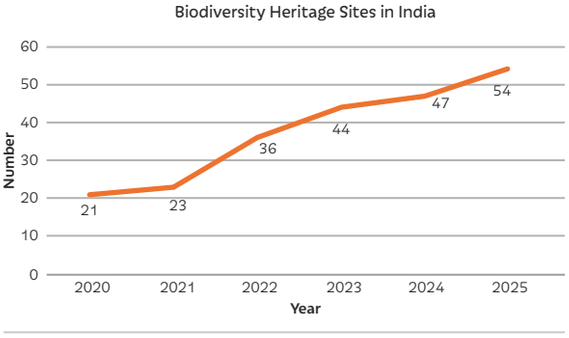


Fig. 3.8
Trends in number of Biodiversity Heritage Sites in India (BHS)

In addition to the state-driven biodiversity governance model relevant to PAs, India has four other biodiversity governance models as a landscape continuum under the state-driven conservation and community-driven conservation streams. Prominent OECMs include:

- Territorial Forests or Managed Forests (RFs, PFs, and UDFs) under SFDs.
- Legally notified Buffer Area of TRs, ERs, BRs, etc.
- Eco Sensitive Zones (ESZs)/ Eco Sensitive Areas (ESAs)
- Biodiversity Heritage Sites (BHSs)
- Van Panchayat Forests, Civil Soyam Forests, and other Community-Owned Forests

Wetlands under integrated management

Various initiatives including the implementation of Wetlands Rejuvenation Programme, 'Mission Sahbhagita', (to promote community participation) and enforcement of Wetlands (Conservation and Management) Rules, 2017, etc., have led to increase in number of wetlands under Integrated Management Plan (IMP).

Agrobiodiversity Hotspots

Twenty-two agrobiodiversity hotspots i.e., regions with exceptional genetic diversity of cultivated crops, domesticated animals, and their wild relatives, have been officially demarcated across the country by the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Authority, MAFW, Government of India. The country supports 171 native crops and their 769 wild relatives and 230 native animal breeds.

Conservation of coastal and marine areas

The number of coastal and marine PAs has increased from 129 in 2020 to 132 in 2024 with increase in area from 8,717 km^2 in 2022 to 9,615 km^2 in 2024. Out of the 132 Marine Protected Areas (MPAs), a total of 106 MPAs are spread across the two island UTs of the country protecting 60% of the terrestrial area of the islands and more than 40% of the coastal habitats. The remaining 26 MPAs are spread across the peninsular India. In addition, 106 coastal and marine sites have been identified and prioritized as Important Coastal and Marine Biodiversity Areas (ICMBAs) covering an area of 10,772.9 km^2.

Additional protection has also been provided to coastal areas identified as 'highly sensitive' within coastal ESA referred to as Critically Vulnerable Coastal Areas (CVCAs). Currently, India has 12 CVCAs across coastal states.

NBT 4

3.4

Manage Species and Genetic Diversity (NBT 4)

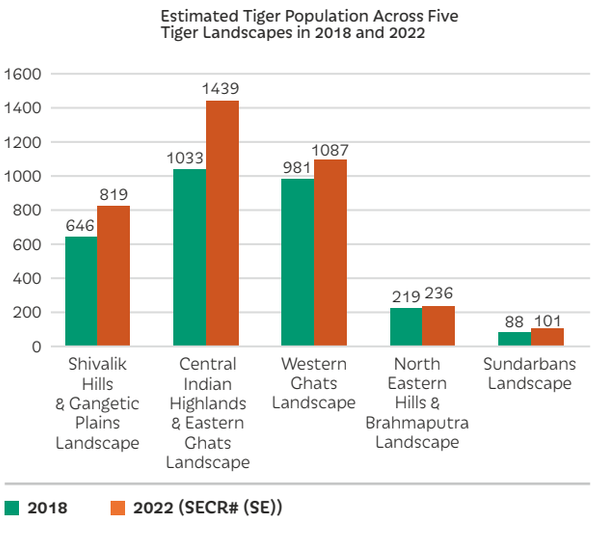
Species diversity, a fundamental component of biodiversity, plays a crucial role in functioning of ecosystems. Human well-being immensely relies on the survival of species. Genetic diversity within species ensures long term stability, evolutionary and adaptive potential, and resilience of biodiversity, both at the species and ecosystem levels. Thus, species richness and genetic diversity are of paramount importance. NBT 4 specifically focuses on conservation of species and maintenance of genetic diversity.

India has undertaken several steps and management interventions to halt the extinction of species, reduce the risk of extinction, maintain and restore genetic diversity, and effectively manage human-wildlife interactions, addressing the requirements of NBT 4.

The BSI and ZSI, primarily engaged in biological surveys, regularly undertake field exploration studies for discovery of new species. In addition, several specialized research institutions working under the MoEFCC, MoST, MoE, MoES and ICAR, etc. also provide vital information on wild species diversity, landraces, native crops, wild crop relatives, and livestock breeds; based on their research outputs. The information includes distribution range of species and their population dynamics; habitat characteristics, and threat factors and conservation status of species. The National Agricultural Research System (NARS) under ICAR supports food security while conserving agrobiodiversity. Various conservation measures *viz*., *in situ* (PAs, TRs, Ramsar Sites, etc.), *ex situ* (zoos, gene banks, botanical gardens), and on-farm program have helped recovery of threatened species such as the tiger, lion, rhino, and crocodile from near extinction. India has also successfully reintroduced/ augmented populations of gharial, barasingha, and gaur, while conservation breeding efforts for vultures, Great Indian Bustard, and lesser florican are underway. Five ICAR Bureaus of Genetic Resources *viz*., National Bureau of Plant Genetic Resources (NBPGR), National Bureau of Animal Genetic Resources (NBAGR), National Bureau of Fish Genetic Resources (NBFGR), National Bureau of Agriculturally Important Insects (NBAII), and National Bureau of Agriculturally Important Microorganisms (NBAIM) safeguard genetic resources across plants, animals, fish, and microorganisms. To tackle Human-Wildlife Conflict (HWC), a Centre of Excellence (CoE-HWC) was established at SACON, Coimbatore in 2025, complementing existing SFD-led relief, rescue, and ecodevelopment measures. National databases under the MoEFCC's EIACP program consolidates biodiversity information on wildlife, flora, fauna, and coastal ecosystems.

Population trends of selected animal species

In the 1960s, India witnessed widespread degradation of ecosystems and declining populations of wild faunal species, including of tiger, lion, leopard, rhino, barasingha, etc. The, Project Tiger was launched to conserve the population of tiger, which has expanded from an initial nine TRs covering 18,278 km^2 to 58 reserves covering 80,640.7 km^2. The All-India Tiger Monitoring (AITM) program that tiger population was 3,682 in 2022, constituting about 70% of world's tiger population. The landscape-wise estimates of tiger and leopard populations across India based on the four-yearly AITM highlighted an overall increase in populations of these species between 2018 and 2022 (Fig. 3.9). The Central Indian Highlands and Eastern Ghats landscapes had the highest concentrations of both species. These increases are attributed to enhanced protection, law enforcement, monitoring, and other conservation measures.



The total number of Asiatic lions in India has steadily increased from 523 (2015) to 674 (2020) to the present population of 891 (2025).

Fig. 3.9
Tiger population in 2018 and 2022 in different landscapes of India.
SECR- Spatially explicit capture recapture

The Government of India launched the Project Cheetah in 2020, aiming to revive the lost population of cheetah. Through intercontinental wild to wild translocation, eight wild cheetahs from Namibia were reintroduced to Kuno National Park, Madhya Pradesh in 2022. In the year 2023, second batch, with twelve individuals from South Africa were translocated, marking the presence of cheetah in India after 70 years. Since reintroduction, the project has registered population growth through births, reaching a total of 30 cheetahs by December 2025.

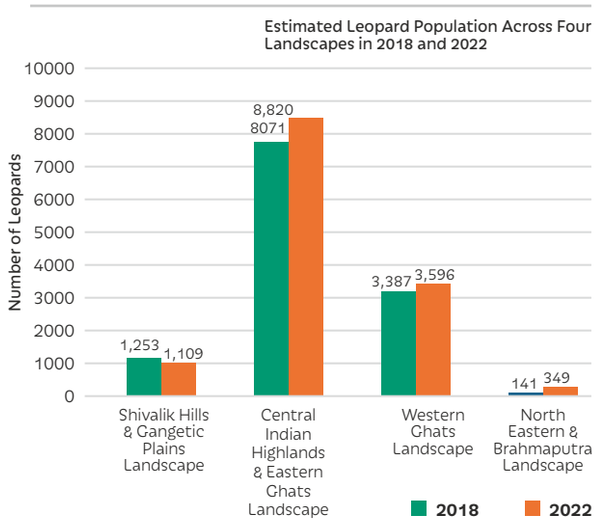


Fig. 3.10
Estimated Tiger and Leopard Populations Across Four Landscapes in 2018 and 2022

Source: All India Tiger Monitoring Reports (2018 and 2022)

In addition to five major big cat species, India is also home to 15 small cats. Jungle cat (96,275 km^2), and rusty-spotted cat (70,075 km^2) have the largest occupancy whereas Asiatic golden cat (1,850 km^2) and marbled cat (2,325 km^2) occupied more restricted areas.

Table 3.6
Estimated Occupancy of Nine Small Cats Across Tiger Range Forests

Sr. No.	Small Cat Species	Occupancy (km^2)	
		2022	
		Naïve Occupancy	Estimated Occupancy
1.	Asiatic golden cat (*Catopuma temminckii*)	696	1,850 (1,400 - 3,075)
2.	Caracal (*Caracal caracal*)	150	-
3.	Clouded leopard (*Neofelis nebulosa*)	1,455	3,250 (2,250 - 3,725)
4.	Desert cat (*Felis margarita*)	5,021	12,500 (10,675 - 13,850)
5.	Fishing cat (*Prionailurus viverrinus*)	4,922	7,575 (6,125 - 8,150)
6.	Jungle cat (*Felis chaus*)	59,881	96,275 (90,075 - 98,100)
7.	Leopard cat (*Prionailurus bengalensis*)	22,218	32,800 (27,950 - 35,900)
8.	Marbled cat (*Pardofelis marmorata*)	633	2,325 (1375 - 3550)
9.	Rusty-spotted cat (*Prionailurus rubiginosus*)	27,108	70,075 (66,225 - 96075)

Source: Habib *et al.* (2025); Status of small cats in the tiger landscapes of India
Note: Values in parentheses represent 95% confidence intervals

India has intensified its efforts to monitor and manage wild elephant populations under the Project Elephant. As per the latest report, the total Asian Elephant count stands at 22,446. The report is based on a DNA-based census method (Qureshi *et al.*, 2025).

The population of Asian Wild Ass (*Equus hemionus khur*) has increased from 6,082 in 2023 to 7,672 in 2024.

Dugong (*Dugong dugon*) conservation has evolved into a science-led, community-driven mission supported by the MoEFCC and the Wildlife Institute of India. A major milestone was the notification of India's first Dugong Conservation Reserve in Tamil Nadu, which prioritizes the protection of seagrass meadows as critical carbon sinks and feeding grounds. The total estimated population of Dugong in Tamil Nadu is 270 +/- 16 as per the population estimation coordinated by Tamil Nadu Forest Department from 2021-2023.

Under Project Dolphin, the first-ever comprehensive population survey of River Dolphins was conducted in the entire range of the Ganges River Dolphin in the Ganga and Brahmaputra as well as the Indus River Dolphin in the Beas River systems. The survey estimated a population of 6,324 Ganges River Dolphins.

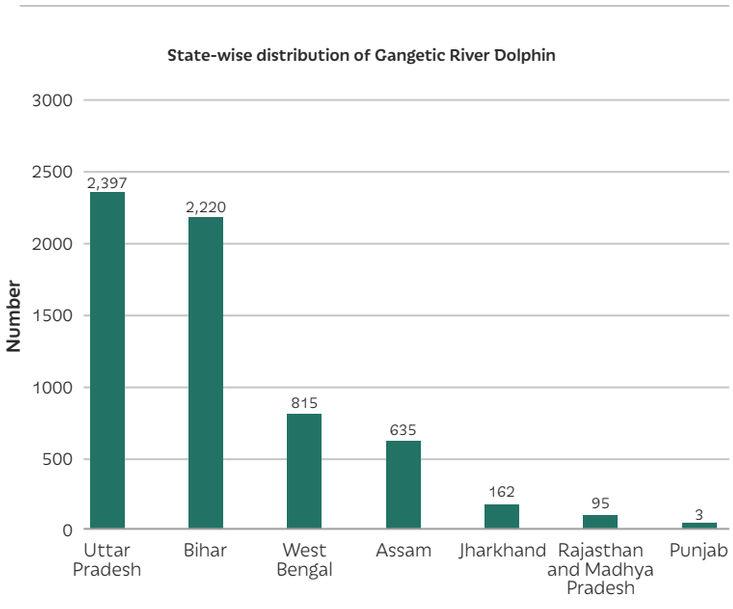


Fig. 3.11
State-wise distribution of Gangetic River Dolphin

Source: Qureshi *et al.* (2024)

The population of Great Indian Bustard is estimated to be about 130-150 birds with 120 birds in Jaisalmer district in the State of Rajasthan.

The population of the Hangul (*Cervus elaphus hanglu*) in wild has been estimated about 289 individuals in 2023.

Estimated Population of Nilgiri Tahr (*Nilgiritragus hylocrius*) as per the Synchronized Nilgiri Tahr population estimation in Kerala, Kerala Forest Department (2025) was 2668.

India developed Snow Leopard Population Assessment (SPAI) tool and undertook first comprehensive survey, which was completed in 2023 using camera trapping and occupancy-based habitat surveys across the range. The species is now estimated at around 718 individuals across the Indian range.

Pan India assessment and monitoring of Vultures have indicated the existence of 2758 of Long billed Vulture (*Gyps indicus*) and, 40 Slender Billed Vulture (*Gyps tenuirostris*).

Status of Indian plant and animal species included in the Red Data Book

In 2024, BSI has added 33 new species of flora bringing the total count of plant species to 56,177 (Table 3.7). The ZSI reported total faunal diversity of 1,01,651 species (ZSI, 2024) (Table 3.8). Out of the 56,177 plant species, 2,869 species are threatened with extinction and out of the 1,01,651 vertebrates assessed, 1,301 are threatened with extinction (Tables 3.7 and 3.8). In 2024, India has 11,404 species includes 5,904 vertebrates, 1,760 invertebrates, 3,663 plant species and 77 fungi, under the IUCN Red list, which is almost double as compared to 6,754 species in 2020.

Table 3.7
Threatened Plants of India

Sr. No.	Taxonomic Group	2021		2024		
		Number of Plant Taxa in India (No.)	Percentage of Plant Diversity in India (%)	Number of Plant Taxa in India (No.)	Percentage of Plant Diversity in India (%)	Number of Threatened Plants in Red Data Book(No.)
1.	Virus/ Bacteria	1,269	2.29	1,297	2.31	-
2.	Algae	9,008	16.4	9,117	16.22	580
3.	Fungi	15,602	28.3	15,986	28.46	-
4.	Lichens	2,989	5.41	3,151	5.61	-
5.	Bryophytes	2,800	5.11	2,850	5.07	80
6.	Pteridophytes	1,314	2.39	1,325	2.36	414
7.	Gymnosperms	82	0.15	83	0.15	13
8.	Angiosperms	21,984	39.92	22,368	39.82	1782
Total		**55,048**	**100**	**56,177**	**100**	**2,869**

Threatened Animals of India - Taxonomic Group-wise

Table 3.8
Taxonomic Group-wise Threatened Animals of India

Sr. No.	Taxonomic Group	2020			2024	
		Number of Animal Taxa in India (No.)	Percentage of Animal Diversity in India (%)	Numberof Animal Taxa in India(No.)	Percentage of Animal Diversity in India(%)	Number of Threatened Animals in Red Data Book(No.)
A. Vertebrates		**6,350**	**9.5**	**6,661**	**6.1**	**1,029**
1.	Pisces	3,472	10	3,613	5.1	396
2.	Amphibians	433	5.6	464	5.4	176
3.	Reptiles	670	6.4	799	6.8	144
4.	Aves	1,345	12.9	1,347	13	183
5.	Mammals	430	7.3	438	6.7	130
B. Invertebrates		**91,800**	**-**	**94,990**	**7**	**272**
Total Animalia (Vertebrates and Invertebrates)		**98,150**	**6.48**	**1,01,651**	**6.26**	**1,301**

Source: Animal Discoveries - Zoological Survey of India; EnviStat - Ministry of Statistics and Programme Implementation (2024)

Animal Breed Registration

India has made significant strides in recognizing, documenting and conserving its rich diversity of indigenous/ native livestock breeds. The NBAGR has expanded its efforts under the 'Mission towards Zero Non-Descript Animal Genetic Resources' initiative (launched in 2021). In FY 2024-25, the ICAR-NBAGR registered seven new indigenous breeds. After registration of new breeds, total indigenous animal breeds are now 219 in the country including 53 for cattle, 20 for buffalo, 39 for goat, 45 for sheep, 8 for horses and ponies, 9 for camel, 14 for pig, 3 for donkey, 3 for dog, 1 for yak, 20 for chicken, 3 for duck, and 1 for geese (ICAR, 2025).

Populations of domestic breeds (*in situ*)

Livestock Census and Livestock Population

Livestock Breed-wise Census

In India, a livestock census has been a quinquennial exercise, containing all domesticated animals and counts. A total of 16 animal species, *viz*., cattle, buffalo, mithun, yak, sheep, goats, pigs, horses, ponies, mules, donkeys, camels, dogs, rabbits, elephants, and poultry birds were included in the report. The livestock census commenced in 1919, and since then it has been conducted every five years. The 20th census in 2019 focused on breed-wise enumeration, digitization, and use of mobile apps. The report of 21st Livestock Census-2024, held in October, 2024 - February, 2025 is still awaited.

Populations of Domestic Breeds

The 20th Livestock Census (2019) recorded a total livestock population of 535.78 million, a 4.6% increase over 2012.

Cattle Population

Total cattle population was 193.46 million in 2019, of which indigenous and non-descript breeds comprised 73.46% (142.11 million) and exotics and crossbreds accounted for 26.54% (51.36 million). Among indigenous breeds, known breeds account for ~30% of the population; the remaining 70% are non-descript. Gir (6.85 million, 4.8%) and Lakhimi (6.82 million, 4.8%) were the most abundant, together comprising 9.6% of total cattle.

Sheep Population

Nearly 95% of sheep population is indigenous/ non-descript while remaining 5-6% population was comprised of exotics/ crossbreds as per livestock census of 2012 and 2019.

The indigenous sheep population of 70.17 million is represented by as many 41 breeds. In addition, exotics (Corriedale, Merino and Rambouillet) and their crossbreds added 4.08 million heads to the country's sheep population. Major sheep breeds were: Nellore, Bellary, Marwari, Deccani, Kenguri, and Mercheri. These six indigenous breeds accounted for 27.2% of the indigenous sheep population. Little over half (53.5%) of the indigenous sheep population were non-descript.

Buffalo

The 2019 Census recorded 109.85 million buffalo with 54.6% indigenous breeds, having five major breeds - Murrah, Mehsana, Jaffarabadi, Bhadawari, and Banni together contributing 53.4% of the total buffalo population. Minor breeds included Kalahandi, Toda, and Chilika. Non-descript buffalo comprised the remaining 45.4% of the total buffalo population (MoFAHD, 2024).

Goat

The 2019 Census recorded 148.88 million goats across 28 indigenous breeds, with 36.5% of indigenous goats. Black Bengal was the dominant breed at 18.6% of the indigenous population. Non-descript goats accounted for the majority at 63.5%

Pig

In 2019, the population of exotics and crossbred pigs in the country was 1.89 million. Indigenous breeds contributed 0.74 million pigs and indigenous and non-descript pigs were 6.41 million.

Horses and Ponies

Seven native breeds of horses and ponies constitute 22.4% of the indigenous breed population. Two predominant and major breeds *viz*., Marwari and Kathiawari horses, alone contributed nearly 77% population of indigenous horses and ponies. Other five breeds contributed about 33% of the total population of indigenous breeds. Non-descript horses and ponies represented 77.6% of total population (0.32 million) of horses and ponies.

Camel

The Livestock Census 2019 provided population data for nine camel breeds, which together accounted for 60.4% of the total camel population, while non-descript camels accounted for the remaining population. Major indigenous breeds, *viz*., Bikaneri, Jaisalmeri, and Kachchhi/ Kutchi, had a 91.61% share of the total population of indigenous breeds

Initiatives/ measures taken to conserve indigenous animal breeds

The ICAR-NBPGR and ICAR-NBAGR are actively involved in the conservation of plant and animal genetic resources, respectively.

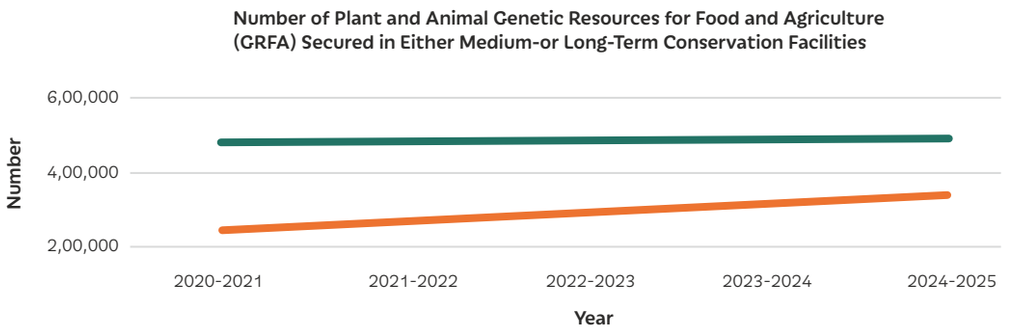


Fig 3.12
Number of Plant and Animal Genetic Resources for Food and Agriculture (GRFA) Secured

Proportion of local breeds classified as being at risk of extinction

Nearly 18% of local breeds are at risk of extinction. However, sustained conservation efforts, including the breed-wise livestock census since 2019 - have driven a gradual decline in this proportion over successive years (Table 3.9).

Table 3.9
Proportion of Local Breeds as Being at Risk of Extinction

Source: Ministry of Statistics and Programme Implementation's SDG India Dashboard Indicator 2.5.2; Ministry of Agriculture and Farmers' Welfare, National Bureau of Animal Genetic Resources

Year	Proportion of Local Breeds as Being at Risk of Extinction (%)
2022-2023	17.92
2023-2024	17.27
2024-2025	16.52

In 2014, the 'Rashtriya Gokul Mission (RGM)' was launched to conserve, develop, and genetically improve India's indigenous cattle and buffalo breeds. The budget allocation for RGM has more than doubled between 2020 and 2024 from INR 400 Crore to 869.54 Crore.

Accelerated Breed improvement Programme:

Status of ETT-IVF Centres/ Labs

During the period from FY 2021-22 to FY 2023-24, the number of Embryo Transfer Technology - *In Vitro* Fertilization (ETT-IVF) labs under the Rashtriya Gokul Mission (RGM) increased from 17 to 22. The number of donors maintained, and elite calves born also increased significantly. A remarkable increase was recorded in the number of embryos from elite animals of indigenous breeds, transferred and stored (Table 3.10).

Further, the number of sex-sorted semen dosages produced increased by seven times from 0.7 million in 2020 to 4.94 million in 2024. In FY 2023-24, 7.0 million artificial inseminations (AIs) were performed with sex-sorted semen dosages.

Table 3.10
Status of ETT-IVF Centres/ Labs under the Rashtriya Gokul Mission (RGM)

Sr. No	Activity	Year			
		2020-21	2021-22	2022-23	2023-24
1.	Number of Embryo Transfer Technology - *In Vitro* Fertilizer (ETT-IVF) Labs Established Across the Country	17	20	20	22
2.	Number of Donors Maintained	468	650	536	560
3.	Number of Embryos from Elite Animals of Indigenous Breeds Produced	4,793	12,093	16,038	20,859
4.	Number of Embryos Transferred	2,484	5,725	7,516	11,433
5.	Number of Elite Calves Born	458	962	1,219	1,784
6.	Number of Embryos Stored	2,083	5,975	7,987	8,756

Source: Annual Report (2023-2024)- Department of Animal Husbandry and Dairying- Ministry of Fisheries, Animal Husbandry and Dairying

Establishment of Sex Sorted Semen Production Facility

The progeny testing programme for pedigree selection under the RGM includes procurement of high genetic merit (HGM) bulls for progeny testing, while HGM bulls of indigenous breeds are being procured for the pedigree selection programme. The number of HGM bulls increased from 184 in FY 2020-21 to 823 in FY 2023-24.

Artificial insemination coverage

Artificial insemination coverage has been expanded through the establishment of Multipurpose AI Technicians in Rural India (MAITRIs). In FY 2022-23, 98.58 million AIs were performed. The number of MAITRIs increased from 15,459 in FY 2022-23 to 27,643 in FY 2023-24.

Animal Genetic Resources accessions in *ex situ* collection

ICAR-NBAGR has substantially expanded its National Animal Gene Bank, adding thousands of new semen, oocyte, embryo, DNA, and tissue-accessions from indigenous livestock and poultry breeds. Over the last five years, India has accelerated genomic profiling of indigenous breeds, integrating DNA data with *ex situ* germplasm collections. The number of deep-frozen semen dosages have increased from 2,87,947 in 2022-23 to 3,06,024 in 2023-24 (Table 3.11).

Table 3.11
Trends in Animal Genetic Resources Accessions in Ex situ Collection

Activity	Year	
	2022-23	2023-24
A. National Gene Bank		
Number of Cryopreserved Livestock Species	17	19
Number of Cryopreserved Animal Breeds	61	63
Number of Breeding Male's s (Bulls/ Rams/ Bucks/ Stallions) Semen Cryopreserved	-	590
Number of Deep-Frozen Semen Dosages	2,87,947	3,06,024
B. Somatic Cell Bank		
Number of Species Cryopreserved	28	47
C. Whole-Genome Sequence of Native Breeds for Developing snp Chips		
Number of Breeds Covered Under Whole Genome Sequencing	-	164
Number of Indigenous Populations Cryopreserved	-	125
D. DNA Bank		
Number of Breeds/ Populations of Indigenous Livestock Covered for Genomic DNA Samples	-	170

Source: Ministry of Statistics and Programme Implementation (2024)

Numbers of indigenous varieties (*in situ*)

India is effectively conserving the genetic diversity of plants, including crops, medicinal plants, wild relatives of crops, horticultural species and forest flora through *ex situ* systems such as national seed banks, field gene banks, botanical gardens, DNA banks and tissue-culture repositories.

A major milestone during the period (FY 2021-22 to FY 2023-24) has been the large-scale promotion of millets, culminating in the International Year of Millets (2023). In FY 2023-24, rice production increased to approximately 13.78 million tonnes and wheat production rose to 11.33 million tonnes up from previous years . In 2024, the food grain production reached a record high, suggesting overall increase in grain production.

Initiatives/ measures taken to conserve indigenous crop varieties and their wild relatives

Over the past five years, India has significantly strengthened both on-farm and landscape-based conservation of traditional crop varieties and crop wild relatives. Some of the efforts include establishing on-farm conservation plots, encouraging farmers to maintain landraces, and documenting them through local institutions such as the BMCs and community seed groups. In 2022, the number of Crop Wild Relative species prioritized by the NBPGR was 257, and the number of taxa prioritized was 292 (Table 3.12).

Table 3.12
Initiatives/ measures taken to conserve indigenous crop varieties and their wild relatives

Sr. No.	Crop-Group*	Number of Crops	Crop Wild Relatives (CWR) Species	Taxa
		Prioritized# 2022	Prioritized# 2022	Prioritized# 2022
1.	Cereals	3	46	50
2.	Millets	5	8	9
3.	Pseudo cereals	1	1	1
4.	Grain legumes	9	27	30
5.	Oil seeds	4	10	10
6.	Fibers	4	9	9
7.	Forages	4	4	5
8.	Fruits and nuts	14	55	65
9.	Vegetables	21	46	54
10.	Spices and condiments	7	22	24
11.	Ornamental plants	2	5	8
12.	Medicinal and aromatic plants	7	8	11
13.	Plantation crops	1	1	1
14.	Others	3	15	15
	Total	**85**	**257**	**292**

Source: India's updated NBSAP (2024-2030)

#NBPGR doing prioritization in two stages - Initial and Further. Data shown for Further Prioritized

*One crop may involve more than one species. Figures in parenthesis are crop taxa having wild/weedy form(s) or wild populations occurring in India, which are also included for counting as CWR

Germplasm accessions in *ex situ* collection

Plant genetic resources, including crops, crop wild relatives, horticultural species, medicinal plants, forest species, and under-utilized traditional varieties, are being safeguarded in *ex situ* conservation systems such as national seed banks, cryo-banks, DNA/ tissue repositories, botanical gardens, and field gene banks. As of 2024, the total number of germplasms holding reached 4,70,894 as compared to 4,48,581 in 2020, making it the one of the largest repositories globally.

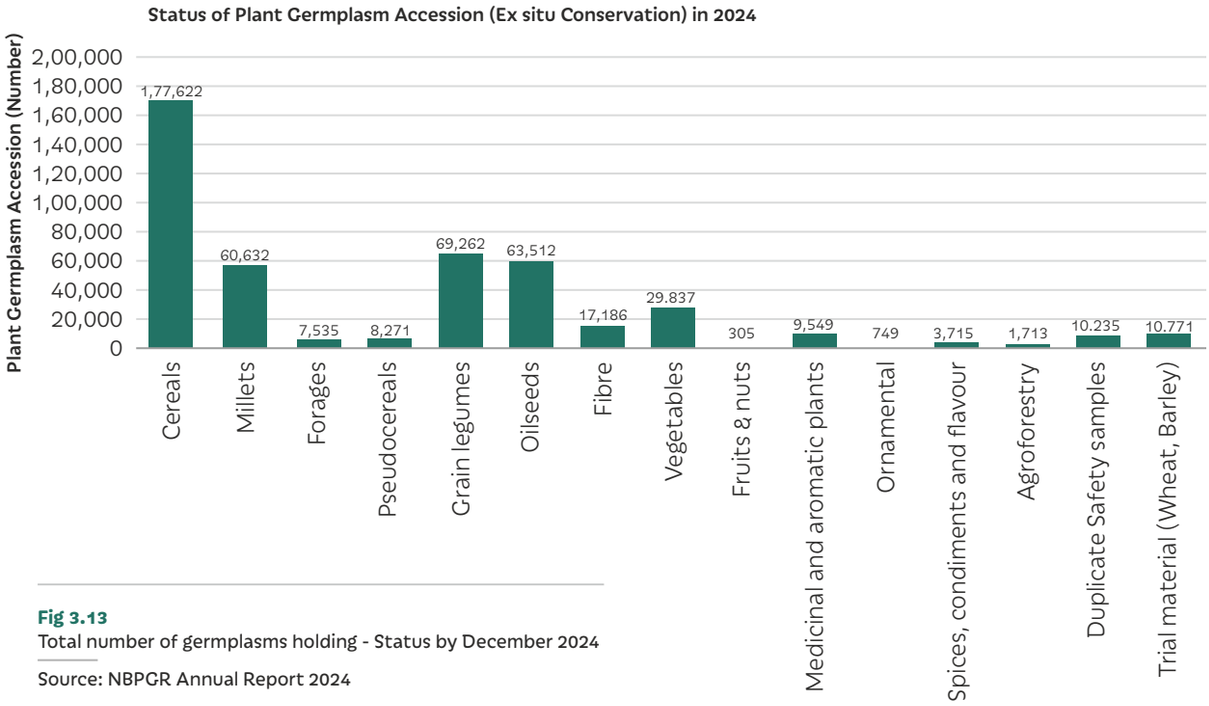


Fig 3.13
Total number of germplasms holding - Status by December 2024

Source: NBPGR Annual Report 2024

Species recovery

Currently, India has 22 species listed under the species recovery programme, which is an increase from 17 in FY 2021-22. These include 15 mammals, 5 avian and 2 reptilian species. The funding for the Integrated Development of Wildlife Habitats (IDWH) has increased four times from INR 87.6 Crore in FY 2020 to INR 349 Crore in 2024.

The number of plant species covered under the CAMPA Funded Conservation of Forest Genetic Resources has significantly increased from 40 in 2020 to 130 in 2024 (Table 3.13).

Table 3.13
Wild Plant Conservation

Sr. No.	Items	Year				Total
		2020-21	2021-22	2022-23	2023-24	
A.	**Number of Wild Plant Species under Species Recovery Programmes**					
1.	Number of Plant Species Covered under the CAMPA Funded Conservation of Forest Genetic Resources (FGR) (No.)	40	349	197	130	716
2.	Number of Wild Plant Species Under Restoration programmes by SFDs (No.)	1	-	25	3	29
B.	**Budget allocated for Species Recovery**					
1.	Budget Allocation under National CAMPA for Conservation of Forest Genetic Resources (INR in millions)	170.20	75.47	58.73	543.5	358.76

Source: Ministry of Environment, Forest and Climate Change; NBA - NR7 Microsite

NBT 5

3.5

Sustainable harvest, trade, and use of wild species (NBT 5)

Unsustainable harvest, use, and trade of wild species, particularly in marine ecosystem, has been recognized as the most important driver of biodiversity loss. Unsustainable harvest is the second largest driver in terrestrial and freshwater ecosystems.

Enhanced capacity for forest and wildlife protection, law enforcement, and wildlife forensics, and Marine Stewardship Council (MSC) Certification has immensely helped in reducing poaching, illegal wildlife trade, and fishing, resulting in the recovery of several threatened wild faunal species, thereby facilitated the progress 'on track' to achieve the target.

Protection of species, anti-poaching and combating illegal wildlife trade, bioprospecting, cultivation of plants of high economic value, development of innovative tools and techniques for fair pricing to collectors of NTFPs, breeding and release of wild species besides awareness and capacity of BMCs and other stakeholders with creation of a database of bioresources in trade and development of tools and mechanisms for certification of harvesting and trade of wild species have been strengthened to achieve NBT 5. Effective implementation of WPA and law enforcement through various designated entities, wildlife forensics, and MSC certification supported the progress towards NBT 5.

The Directorate General of Foreign Trade, Ministry of Commerce and Industries, New Delhi, maintains trade information and reports item-wise import and export including biodiversity goods.

Proportion of fish stocks within biologically sustainable levels

The Fishery Survey of India, Department of Fisheries, MoFAHD provides information on annual fish production in the country. The Central Inland Fisheries Research Institute of India (CIFRI) and the Central Marine Fisheries Research Institute (CMFRI) contribute valuable information on inland and marine fisheries, respectively. The annual marine fish landings majorly contributed by finfish and shellfish, grew consistently but witnessed 2% decline between 2023 to 2024 (Fig. 3.14). The total fish production of the country has increased from 14.72 million tonnes in FY 2020-21 to 18.40 million tonnes in FY 2023-24 at a growth rate of ~8% per year, driven largely by inland fisheries (Fig.3.15). In 2022, 86.7% of India's marine fish stocks were within biologically sustainable levels, with over 91% classified as healthy. Overfished and rebuilding stocks remain relatively low (8.2% and 0.7%, respectively), highlighting overall positive marine fishery sustainability trends (Table 3.14).

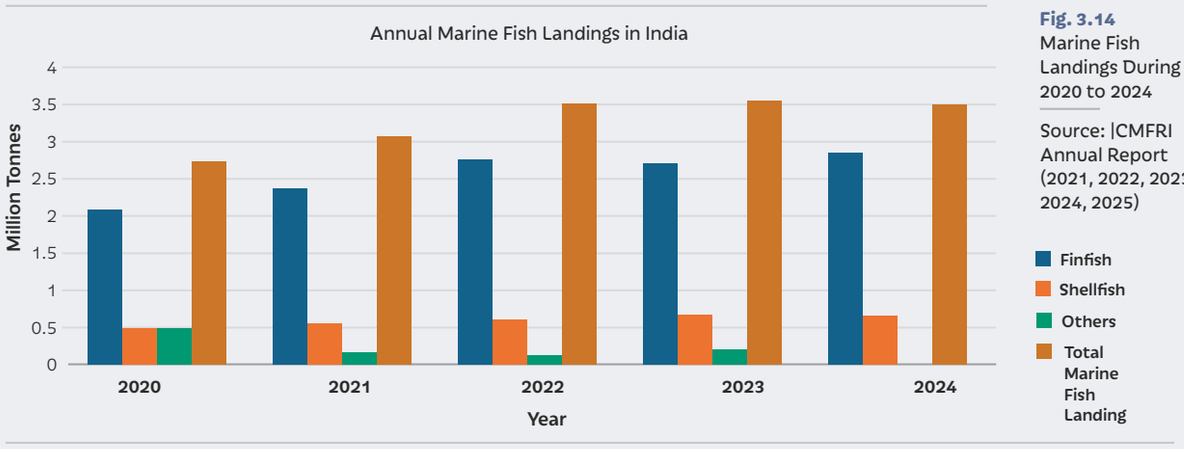


Fig. 3.14
Marine Fish Landings During 2020 to 2024

Source: |CMFRI Annual Report (2021, 2022, 2023, 2024, 2025)

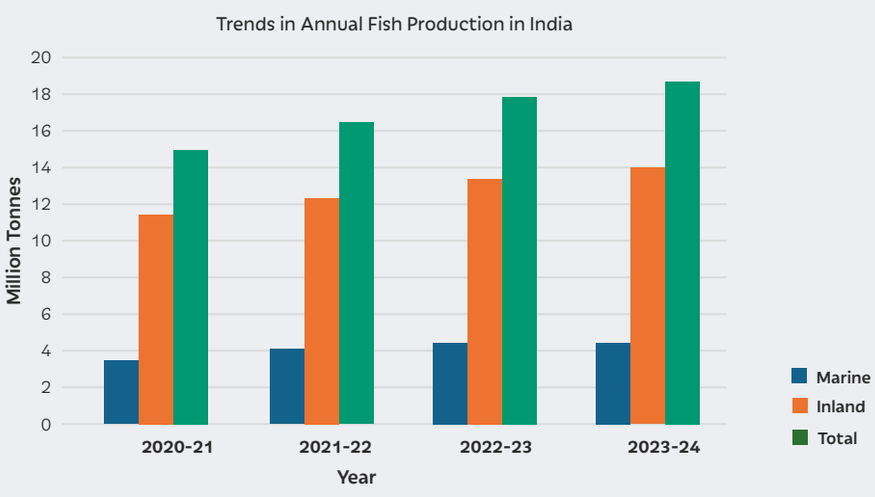


Fig. 3.15
Fish Production in India During FY 2020-21 to FY 2023-24

Source: CMFRI Annual Report (2021; 2022; 2023; 2024; 2025); CIFRI Annual Report (2021; 2022); Handbook on Fisheries Statistics (2023)

Table 3.14
Fish stocks within biologically sustainable levels

Sr. No.	Item	Marine Resources in 2022		
		Finfish	Shellfish	Total
1.	Fish Species Assessed (No.)	49	21	70
2.	Fish Stock Assessed (No.)	96	39	135
3.	Percentage of Sustainable Fishing (%)	-	-	86.7
4.	Percentage of Overfishing (%)	-	-	4.4
5.	Percentage of Healthy Stocks (%)	90.6	92.3	91.1
6.	Percentage of Overfished	9.4	7.7	8.2
7.	Percentage of Rebuilding	-	-	0.7
8.	Collapsed	0	0	0

Source: Central Marine Fisheries Research Institute (2023)

NBT 6

3.6 Manage Invasive Alien Species (NBT 6)

Proliferation of invasive alien species in terrestrial and aquatic ecosystems is gradually increasing (Table 3.15) and has become one of the five major threats to biodiversity loss. Considering the severity of the problem and wider implications on native biodiversity, NBT 6 focuses on managing invasive alien species in natural and manmade ecosystems.

Terrestrial and aquatic invasive alien species spreading in natural and manmade ecosystems, including agroecosystems, started receiving the attention of scientists and management agencies nearly five decades ago. In case of terrestrial ecosystems, prominent invasive alien species are *Lantana camara*, *Senna tora*, *Parthenium hysterophorus*, and *Prosopis juliflora*, *Eichhornia crassipes* is the major threat in aquatic ecosystems. These invasive species have received the attention of Protected Area (PAs)/ natural resource managers.

The FSI as a part of the National Forest Inventory (NFI) has assessed the extent of invasive species in the RFA of the country, covering an extent of 7,75,377 km^2. The country-wide assessment revealed that 2.51% of RFA was Very Densely infested by invasive species, followed by 10.21% Dense, 23.38% Moderately Dense, 18.92% Scanty, 23.61% Absent, and 21.37 Not Applicable categories of infestation (FSI, 2023).

Sr. No.	Species name	Year 2023
		Area (km^2)
1.	*Lantana camara*	32,837.35
2.	*Chromolaena odorata*	19,807.59
3.	*Cassia tora/Senna tora*	12,728.61
4.	*Ageratum conyzoides*	5,401.18
5.	*Mikania micrantha*	4,922.10
6.	*Triumfetta rhomboidei*	2,991.99
7.	*Ageratina adenophora*	1,382.71
8.	*Prosopis juliflora*	1,371.67
9.	*Imperata cylindrica*	840.99
10.	*Achyranthes aspera*	673.65

Table 3.15
Area under major plant Invasive species
Source: FSI- India State of Forest Report (2023)

Strengthening domestic quarantine measures, assessment of invasion potential and development of measures for control and management, and inventory of invasive alien species, along with assessment of impacted area and research and capacity building on management of invasive alien species, were put forward for the country to keep the NBT 6 on track.

Presently, India has a comprehensive list of invasive alien species of terrestrial and marine ecosystems. NBA published a strategy for control and management of five worst invasive alien species, in 2019 *viz*., *Prosopis juliflora*, *Parthenium hysterophorus*, *Mikania micrantha*, *Lantana camara*, and *Eichhornia crassipes*. The Directorate of Plant Production, Quarantine and Storage (DPPQS) has developed a 'Plant Quarantine Management System.' The Government of India has also approved three other national organizations to act as official quarantine agencies (ICAR-NBPGR-agriculture plants; FRI-forest plants; and BSI-other plants), especially for plant research materials.

Management plans for prioritized invasive species

The management efforts for priority invasive alien species show large yearly variation, with control of *Lantana camara* ranging from 10 km^2 to 6,988.24 km^2 and *Prosopis juliflora* from 30 km^2 to 1,160.23 km^2 between 2020-21 and 2023-24. However, recent ISFR 2023 mapped *Lantana camara* (32,837 km^2), *Chromolaena odorata* (19,807 km^2), and *Senna tora* (12,728 km^2). Moreover, the status of establishment of invasive species across India's Forest Cover was also estimated to plan a strategy for future conservation (Table 3.16).

Table 3.16
Status of Invasive Species Establishment across India's Forest Cover

Sr. No.	Variable	Year 2023	
		Area (km^2)	%
Extent of Forest Cover with Invasive Species where			
1.	Invasion is 'absent'	1,83,066.51	23.61
2.	Invasion is 'scanty'	1,46,701.33	18.92
3.	Invasion is 'moderate'	1,81,283.14	23.38
4.	Invasion is 'dense'	79,165.99	10.21
5.	Invasion is 'very dense'	19,461.96	02.51
6.	Invasion is 'not available'	1,65,698.06	21.37

Source: FSI- India State of Forest Report (2023)

Number of Invasive Alien Species on the National List

India's national list identified 171 invasive alien species across major ecosystems, as aquatic systems (56 species), terrestrial ecosystems (54 species), agricultural landscapes (47), and Island ecosystems (14) (NBA, 2018).

Number of invasive pests detected and quarantined

During the period 2020 to 2024, quarantine data showed rising agricultural import volumes but a sharp decline in invasive pest detections, signaling improved biosecurity performance. In this period, 6,62,823 consignments were processed. Only 3% consignments (20,166) required quarantine.

NBT 7

3.7

Reduce Pollution Risks and Negative Impact (NBT 7)

Varied forms of pollution, especially pollutants from nitrogen and fertilizers, industrial and vehicular emissions; pesticides and weedicides; and hazardous chemicals and plastics have harmful impacts on biodiversity and ecosystem function and services. The NBT 7 aims to reduce pollution, risks and the negative impact of pollution from all sources by 2030 to levels that are not harmful to biodiversity and ecosystem functioning.

In the past five decades, MoEFCC has enacted relevant laws; framed guidelines, rules and regulations; established scientific and monitoring institutions; and created regulatory bodies to deal with various aspects of multiple types of pollution. The Central Pollution Control Board (CPCB) is the national regulatory body and is responsible for curbing all types of pollution. Several central ministries *viz*., MoAFW, MoFAHD, MoHUA, MoJS, MoES, MoST etc., and their national level scientific organizations are also making huge investments and directly contributing towards reducing/ control of air, water, noise, and soil pollution besides treating and disposing solid, toxic and hazardous wastes.

India has significantly scaled up its environmental monitoring capacity, frameworks, and attained notable success (Box 3.3).

Box 3.3 - India's Enhanced Environmental Monitoring Capacity and Notable Success

Air: A network of 1,601 stations now covers 583 cities across 28 States and 7 UTs. The National Clean Air Programme (NCAP) is driving targeted improvements in 130 cities.

Water: 4,922 monitoring locations track surface water, groundwater, and drinking water quality across 28 States and 7 UTs.

Seawater: NCCR's Seawater Quality Monitoring Programme seasonally tracks 25+ parameters along the entire Indian coastline, with real-time forecasts accessible via the Clean Coast app.

Noise: 70 dedicated monitoring stations are operational across 7 major cities under the National Ambient Noise Monitoring Network.

Soil: The nationwide Soil Health Card programme under the MoAFW is equipping farmers with actionable data on soil fertility, complemented by growing certification systems for natural and organic farming under the National Programme on Organic Production (NPOP) and Participatory Guaranteed.

Enactment of appropriate laws with Extended Producer Responsibility (EPR)/ Extended Bulk Generator Responsibility (EBGR), along with Coastal water quality monitoring and cleanup with associated awareness programme, have supported India to progress towards achieving the NBT 7.

EPR Framework

MoEFCC has notified regulations on market based Extended Producer Responsibility (EPR) / Extended Bulk Generator Responsibility (EBGR) framework to incorporate circular economy in respect of following categories of wastes:

(I) plastic packaging waste in February 2022
(ii) battery waste in August 2022
(iii) e-waste in November 2022
(iv) waste tyres in July 2022
(v) used oil in September 2023
(vi) end-of-life vehicles in January 2025
(vii) construction and demolition waste in April 2025
(viii) scrap of non-ferrous metals in July 2025
(ix) solid waste in January 2026

Through the EPR regulations, the producers, importers or brand owners (PIBOs)/ Original Equipment Manufacturers (OEMs) who introduce the product in the market are obligated under law for its environmentally sound management after end-of-life of such products and are mandated to meet the EPR targets of the end-of-life products. Recyclers have been mandated to generate EPR certificates. Producers/OEMs can meet the EPR targets by setting up recycling facilities themselves. Alternatively, producers/OEMs may purchase the EPR certificates generated by the recyclers to meet the EPR obligations.

The EPR framework promotes recycling of end-of-life products, leading to the generation of recycled products and thereby reducing dependence on natural resources while encouraging the use of recycled content in manufacture of new products. Market-based EPR mechanism incentives the recyclers since the revenue earned by the registered recyclers from sale of EPR certificates is revenue earned over and above the revenue generated from the sale of recycled products.

It is evident from Table 3.17 that the number of registered e-waste producers and recyclers has risen sharply, indicating better regulation.

Table 3.17
Management of e-Waste

Sr. No.	Item	Year			
		2020-21	2021-22	2022-23	2023-24
1.	E-Waste Generation (million Tonnes)	1.35	1.60	1.61	1.25
2.	E-Waste Producers (Number)	1, 630	1,703	4,869	7,226
3.	Recyclers (Number)	312	400	295	569
4.	Annual Processing Capacity (million Tonnes Per Annum - TPA) tonnes	0.78	1.07	NA	NA

Source: Annual Reports, Ministry of Environment, Forest and Climate Change and Central Pollution Control Board (2020-24)

Coastal cleanup and awareness programme

The National Centre for Coastal Research (NCCR), MoES has been implementing a nationally coordinated research program on 'Coastal Ocean Monitoring and Prediction System (COMAPS)' since 1990. It is presently called as 'Sea Water Quality Monitoring (SWQM)' Program. Presently, there are 50 monitoring stations within 1,2,3 and 5 km from coasts and data on multivariable for pre-monsoon and post-monsoon period are being collected. Coastal Research Vessels (CRV) 'Sagar Tara' and 'Sagar Anveshika' with the state-of-the-art facility are deployed for the purpose.

In addition to water monitoring by NCCR, the CPCB has a wider Water Monitoring Network on polluted river stretches, estuaries, beaches, coastal areas, etc.

The MoES formulated the National Marine Litter Policy 2018 and launched the pan-India Coastal Clean-up and Awareness Programme. In 2024, clean-up and awareness program were conducted at 31 beaches.

Promotion of Natural and Organic Farming

The National Centre for Organic and Natural Farming (NCONF) under the MoAFW is implementing schemes/ program for promoting natural farming and organic farming certifications. The area under natural farming in India has been steadily increasing from 0.40 million ha in 2019 to 0.75 million ha in 2025, supported by 2,22,641 certifications issued.

NBT 8

3.8

Minimize the impact of climate change (NBT 8)

Climate change has emerged as one of the five major threats and direct drivers of biodiversity loss. It directly affects ecosystems, species, and ecosystem services impacting ecosystem productivity. Ecosystem-based approaches, and other measures towards mitigation, adaptation and Disaster Risk Reduction (DRR) have the potential to enhance the resilience of ecosystems and improve livelihoods to the impacts of climate change. Considering the enormous impact and wide range of implications of climate change and resultant ocean acidification, NBT 8 aims to minimize the impact of climate change on biodiversity.

Implementation of the National Action Plan on Climate Change, Shoreline Changes and Management Plan and the Integrated Flood Warning System (IFLOWS) led significant progress under the NBT 8. Monitoring various indicators revealed progress of the target 'on track'.

India's National Action Plan on Climate Change (NAPCC)', focusing on nine Missions. Six of them *viz*., (i) National Mission on Sustainable Habitat (NMSH); (ii) National Water Mission (NWM); (iii) National Mission for Sustaining the Himalayan Ecosystem (NMSHE); (iv) National Mission for a Green India (GIM); (v) National Mission for Sustainable Agriculture (NMSA); and (vi) National Mission on Strategic Knowledge for Climate Change (NMSKCC), are directly contributing towards conservation of biodiversity while, the remaining three missions namely, (vii) National Mission for Enhanced Energy Efficiency (NMEEE), (viii) National Solar Mission (NSM), and (xi) National Programme on Climate Change and Human Health (NPCCHH) have indirect bearing on biodiversity.

The NAPCC is being operationalized in all Indian States/ UTs through their respective State Action Plans on Climate Change (SAPCCs). Thirty-four States/UTs are having State Action Plans on Climate Change (SAPCC) and have been implementing them since 2020-21 , indicating stable policy commitment.

Several NBTs and their actions contribute towards climate change mitigation and adaptation. India has enacted the Disasters Management Act in 2005 with an amendment in 2025. Thirty-four states/ UTs have adopted ecosystem-based DRR strategies. The Sendai Framework was adopted, and India is signatory to this Framework. India has prepared the National Disaster Management Plan (NDMP) in 2019. Various efforts of climate actions, such as the State Action Plan on Climate Change and Cumulative Environment Impact Assessment (CEIA), and Strategic Environment Assessment (SEA) are supporting the agenda towards minimizing the impact of climate change on biodiversity loss.

Nationally Determined Contribution and Long-Term Low Greenhouse Gas Emission Development Strategies (LT-LEDS)

The Government of India stands committed to combat climate change and has taken a number of measures to meet India's NDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC) under the Paris Agreement. In addition, India has also submitted its Long-Term Low Greenhouse Gas Emission Development Strategies (LT-LEDS) to the UNFCCC, which are aligned with its NDCs. India's LT-LEDS provides a framework comprising seven key strategic transitions to achieve net-zero emissions by 2070. The measures to combat and minimize the impact of climate change include various policies, schemes and program launched from time to time, to scale up India's action on both the adaptation and mitigation fronts. Appropriate measures are being taken for: (i) promotion of creating carbon sink through enhanced forest and tree cover; (ii) clean energy, especially renewable energy, and enhanced energy efficiency; (iii) development of less carbon intensive and resilient urban centres; (iv) promotion of waste to wealth; (v) safe, smart, and sustainable green transportation network; and (vi) strengthening climate resilience in agriculture, water resources, coastal regions, health, and disaster management. India's climate action also captures citizens' contributions, including those through the activities under 'Mission LiFE' (Lifestyle for the Environment) and initiatives like 'Ek Ped Maa Ke Nam.'

Various Capacities from Non-Fossil Fuel Sources

India has significantly increased its installed capacity of solar energy from 2.82 GW in 2014 to 135.80 GW i.e., >48 times in December 2025. In June 2025, India has reached a major milestone in its energy transition by achieving one of the NDC goals on achieving 50% of its installed electric power capacity from non-fossil fuel-based energy sources; five years ahead of the committed timeline of 2030. As on December 2025, the share of non-fossil fuel-based energy resources in the cumulative installed electric power capacity was 51.93%.

Gain in Forest Area and Carbon Sequestration

Schemes such as the Green India Mission (GIM), Compensatory Afforestation Fund Management and Planning Authority (CAMPA), National Afforestation Programme (NAP), Green Highway Policy 2015, Policy for Enhancement of Urban Greens, National Agro-forestry Policy, and Sub-Mission on Agroforestry (SMAF) are some of the prominent and important policy interventions of the Government of India. In 2020, India's forest and tree cover, along with other land use, sequestered ~522 million tonnes of CO_2, equivalent to reducing 22% of the country's total CO_2 emissions in 2020. India's forest and tree cover has consistently increased and now stands at 25.17% of the country's total GA (FSI 2023). During 2005 to 2021, additional carbon sink of 2.29 billion tonnes of CO_2 equivalent has been created.

'Nagar Van Yojana' (Urban Forest Scheme)

In 2020, on World Environment Day, the 'Nagar Van Yojana' (Urban Forest) scheme was launched. The scheme aims to develop 400 'Nagar Vans' and 200 'Nagar Vatikas' across the country in cities with Municipal Corporation/ Municipal Council/ Municipality. These forests will range in area from a minimum of 10 ha up to 50 ha. Altogether, 111 Nagar Vans were approved against the target of 100 Nagar Vans in 100-day action plan, spread across six states and one UT of the country. More than 750 million saplings had been planted by September 2024.

Initiatives under DST

Various programmes and activities are being conducted by the DST under the two missions of the NAPCCC, which include (a) NMSHE, and (b) NMSKCC. These program/ schemes are the Centres of Excellence (CoEs), Major R&D Programmes (MRDPs), Network Programmes, Human Capacity Building Programmes (HCBPs), State Climate Change Cell programme (SCCC) under NMSKCC and Thematic Task Forces (TFs), State Climate Change Cell Programme (SCCC), national and state level network programmes, and Inter-University Consortium (IUC) under NMSHE.

CHAPTER **04**

SUSTAINABLE USE OF BIODIVERSITY AND BENEFIT SHARING

Biodiversity serves as the vital life-support system for providing the essential resources for nutrition, food security, livelihoods, health, and general well-being. National Biodiversity Targets (NBTs) 9 through 13 aim to protect and enhance critical ecosystem services, regulate air and water quality, mitigate natural disasters, provide the protection against the impacts of extreme climatic events. These NBTs create a comprehensive approach to securing a future where biodiversity thrives alongside society by fostering the expansion of resilient green and blue spaces and embedding the principles of fair and equitable access and benefit sharing of genetic resources and associated knowledge.

Progress made under these five NBTs is highlighted in the following sections:

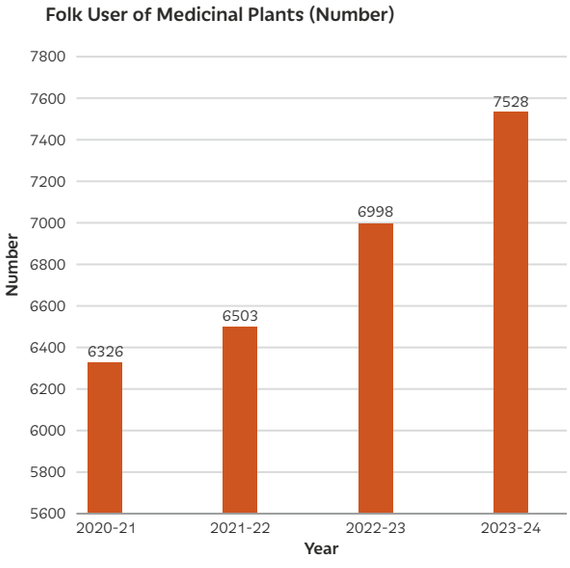
4.1 Sustainable Use of Wild Species for Multiple Benefits (NBT 9)

Biodiversity is being used by communities for their subsistence and livelihoods, and industries depend on it for raw materials. About two-third of India's population is rural and inhabits nearly 6,50,000 villages. The FSI (2020) reported 2,58,199 villages within the RFA and a buffer of 5 km of the RFA boundary. People living in Forest Settlement Villages (FSVs), Forest Fringe Villages (FFVs), and other villages in proximity have traditionally been dependent on forests to meet their daily needs. A wide range of NTFPs including aromatic and medicinal plants are being collected by communities for self-use or commercial purposes. At the grassroot levels, Panchayati Raj Institutions (PRIs), Joint Forest Management Committees (JFMCs), Ecodevelopment Committees (EDCs) and BMCs, play important role in the management and conservation of biodiversity.

Biodiversity governance for sustainable use

India has devolved considerable powers to local self-government institutions in rural areas, which are known as Panchayati Raj Institutions (PRIs). These have a three-tier structure with Gram Sabha and Gram Panchayat as the basic units, which are usually at the level of a village. The Constitution 73rd Amendment Act, 1992 added a new Schedule to the Constitution of India i.e., Eleventh Schedule that lists 29 subjects devolved to PRIs. The list includes minor forest produce, social forestry, farm forestry and fisheries. The PRIs play an important role in the implementation of the Biological Diversity Act, 2002, (Amendment 2023). Under the Act, every local body is required to constitute a Biodiversity Management Committee (BMC) for the purpose of promoting conservation, sustainable use and documentation of biological diversity. An important function of the BMC is the preparation of a People's Biodiversity Register (PBR) that contains comprehensive information on the availability and use of local biological resources, or any other traditional knowledge associated with them. Presently, 2,76,653 BMCs are functioning across 28 states and 8 UTs and 2,72,648 PBRs have been prepared so far. The number of documented folk users of medicinal plants has shown a consistent year-on-year increase from FY 2020-21 to FY 2023-24, indicating a growing recognition and documentation of traditional knowledge holders in the PBRs (Fig. 4.1).

Fig. 4.1
Number of folk users of medicinal plants from PBRs



Besides PRIs and BMCs, Van Panchayats, Autonomous District Councils/ Regional Councils, and traditional forest management institutions of North-east India are other examples of decentralized governance of biodiversity.

Sustainable forest resource management through community initiatives/participation

India has a long history of community involvement in the management of state forests. Under the Joint Forest Management (JFM), the state Forest Department enters into an agreement with the local community which allows greater access to the forest resources as well as a share in revenue, in return for protection of the forests against unauthorized extraction, encroachment and damage. The program of JFM was officially launched in 1990 and Joint Forest Management Committees (JFMCs) were constituted in States/ UTs and since then local communities are actively involved through JFMCs in the management of forests and in various forestry activities. In protected areas, active participation of Eco Development Committees (EDCs) yielded positive results towards effective wildlife protection, resolution of human-wildlife conflict, and improved sustainable livelihoods. Notable examples of such actions by the EDCs are galore throughout the country including those in Periyar Tiger Reserve, Kerala; and Gir National Park and Sanctuary, Gujarat.

Besides the above Government facilitated program, India has an age-old tradition of conservation and management of biological resources through diverse community initiatives in the form of Community Conserved Areas (CCAs), Sacred Groves (SGs)), and several other types of community forests governed by the respective traditional institutions spread across the country.

NTFPs: Collection, Value Addition, Marketing, and Databases

The forest dwellers are legally empowered with the ownership and governance of the NTFPs through the PESA (Panchayat Extension to Scheduled Areas) Act, 1996, and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. As per the FRA, MFPs include all NTFPs of plant origin, including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or kendu leaves, medicinal plants and herbs, roots, tubers and the like. They also form a major portion of food, fruits, medicines and other consumption items for forest dwellers. The FRA gives the right to collect and use minor forest produce which has been traditionally collected within or outside village boundaries. The Act protects the forest dwellers' right to use the forest land subject to fulfillment of certain criteria.

Besides JFMCs, EDCs, SFDs, Forest Development Corporations, and MFP/ NTFP Federations, "Tribal Co-

operative Marketing Development Federation of India Limited (TRIFED)", a national-level cooperative body under the Ministry of Tribal Affairs, has been working with the basic mandate of bringing about socio-economic development of tribal communities by institutionalising the trade of Minor Forest Produce (MFPs) and Surplus Agricultural Produce (SAP), and through cultivation of Non-Timber Forest Products (NTFPs). As a market developer and service provider, TRIFED empowers tribal people with knowledge, tools, and a pool of information so that they can undertake various operations relevant to NTFPs in a systematic and scientific manners.

The Ministry of Tribal Affairs (MoTA) is also developing guidelines in consultation with MoEFCC aimed at facilitating Gram Sabhas in managing community forest resources under their control in a sustainable, equitable, democratic, and transparent manner, as per the provisions of the Forest Rights Act (FRA).

These guidelines intend to establish an enabling institutional set up consisting of stakeholders' representation in the 'Community Forest Resources Committees (CFRC)' constituted by the Gram Sabha. Several websites, databases and portals belonging to the SFDs, Forest Corporations/ MFP Federations, scientific institutions, and the MoTA provide information on NTFP species, trade, cultivation, and their role in livelihoods.

The Minimum Support Price (MSP) Scheme for MFP, started by MoTA in the year 2013-14, was the first step in the direction of providing a fair price to tribals. The scheme includes 87 MFPs in all states. The scheme is implemented through a state-level agency (SLA). The MoTA provides a revolving fund to SLA. Loss, if any, is shared by the central and state governments in the ratio of 75:25 under 'Pradhan Mantri Janjatiya Vikas Mission (PMJVM)'.

Prohibition of Hunting of Wild Animals

The WPA, 1972 prohibits hunting of wild animals specified in Schedules I, II, III, and IV except as provided under Section 11 and Section 12.

This includes killing or poisoning, capturing, coursing, snaring, trapping, driving, or baiting of any wild or captive animal.

Marine Stewardship Council (MSC) Certification

India's marine fish and seafood exports touched an all-time high in volume during FY 2023-24. India shipped 17,81,602 MT of seafood worth INR 60,524 Crore during FY 2023-24. The Seafood Exporters Association of India (SEAI), with the support of CMFRI, WWF-India, State Fishery Departments and other agencies, is trying to seek certificates from MSC for the Indian marine fishery. India is currently working towards obtaining MSC certification for gill net caught blue swimming crab (*Portunus pelagicus*), Mud crab (*Scylla serrata*), and Threadfin bream fishery (*Nemipterus japonicus*); trawl caught Karikkadi shrimp (*Parapenaeopsis stylifera*), Indian nylon shrimp (Deep sea shrimp) (*Heterocarpus woodmasonii*), *H. chani*, and *A. alcockii*; and Poovalan shrimp (*Metapenaeus dobsoni*), Indian squid (*Uroteuthis photololigo duvaucelii*), Pharaoh cuttle fish (*Sepia phraonis*), and Web-foot octopus (*Amphioctopus neglectus*); Pole and line caught skipjack tuna (*K. pelamis*), and Ashtamudi clam (*Paphia malabarica*).

The ICAR-CMFRI, MoAFW, is mandated to monitor and assess the marine fisheries resources in the Indian Exclusive Economic Zone (EEZ). Assessment of 135 stocks across 70 species using monthly length-frequency data for the health status of the stock has revealed that 86.7% of the stocks were sustainable and 4.4% were transitioning towards overfishing (Kumar *et al.*, 2024).

NBT 10

4.2

Sustainable management of agriculture, animal husbandry, fisheries, aquaculture and forest areas (NBT 10)

Prominent production sectors such as agriculture, animal husbandry, fisheries, aquaculture and forestry have differently impacted ecosystems. NBT 10 focuses on sustainable management of these production sectors so that they continue to contribute towards conservation and maintain provisioning, regulatory and supporting ecosystem services.

Sustainable Agriculture

The MoAFW has initiated several schemes relevant to sustainable agriculture. These schemes include natural farming and organic farming, management of crop residue, soil health management, and natural resource management. These program also contribute to conservation of native crop species and landraces and their wild relatives along with indigenous and domesticated animal breeds. In addition, the ICAR has also played a major role in crop improvement program. Since country's independence, ICAR has officially released more than 7,100 high-yielding varieties of agricultural and horticultural crops.

The MoAFW, through the Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA), is actively involved in the on-farm conservation of agrobiodiversity hotspots in India, primarily by identifying key regions and encouraging local communities and protecting farmers rights. The PPVFRA has issued a total of 9,817 certificates to farmers up to September 2025, and crop-group-wise information is provided on the portal. Of these registered varieties, the majority were registered by farmers (around 52.6%), followed by the private sector (26.2%) and the public sector (21.2%).

The ICAR-NBPGR with mandate to explore and collect germplasm of agri-horticultural crops and their wild relatives has 2,84,337 accessions comprising 2,13,242 cultivated and 39,850 wild species accessions as on December 2023.

The Department of Animal Husbandry under the MoFAHD conducts the breed-wise livestock census every five years and has initiated national-level program and schemes to promote the conservation and improvement of indigenous/ local breeds while gradually reducing populations of exotic animals. The ICAR initiated a mechanism for 'Registration of Animal Germplasm' in the year 2007 and the ICAR-NBAGR is designated as the nodal agency for the registration. A total of 230 animal breeds has been registered from all the states and 2 UTs of the country so far.

Natural Farming, Organic Farming, and Certification

The NMNF, a standalone centrally sponsored scheme, was launched in November 2024 to strengthen agricultural practices with scientifically backed approaches towards sustainability, climate resilience, and safe food.

The two primary certification systems include NPOP and PGS-India. NPOP focuses on third-party certification for exports, ensuring international compliance, while the National Centre for Organic and Natural Farming (NCONF) under MoAFW manages the low-cost Participatory Guarantee System (PGS-India system), which tailored for small land holding farmers and the domestic market. As of 2024, 2.68 million ha was being brought under natural farming practices with 0.41 million farmers enrolled nationwide. By the year 2024, 1,14,155 NPOP certificates were issued Several states are practicing natural farming prominent among them being Andhra Pradesh, Gujarat, Himachal Pradesh, and Rajasthan. Till now, 6.5 lakh ha area has been covered under natural farming.

Box 4.1 - Natural and Organic Farming as Pathways for Agrobiodiversity Conservation

India has made notable progress in promoting natural and organic farming as pathways towards sustainable agriculture and agrobiodiversity conservation. Natural farming initiatives such as Andhra Pradesh Community Managed Natural Farming with over 1 million farmers, Himachal Pradesh's Prakritik Kheti Khushhal Kisan Yojana with over 0.2 million active farmers, and Gujarat's Prakrutik Gaam with over 0.8 million participating farmers have contributed to reduced input costs, improved soil health, and wider adoption of biodiversity-friendly farming practices.

Complementing above efforts, organic farming initiatives in Sikkim, Madhya Pradesh, and the North Eastern Region have supported certified production, value addition, and market access through cluster approaches, farmer producer organizations, and traceability systems. Together, these initiatives have contributed to expansion of biodiversity-friendly agricultural landscapes, conservation of indigenous crop varieties, and greater integration of sustainability considerations into agricultural production systems.

Soil Health Cards

As part of the National Mission for Sustainable Agriculture (NMSA), the MoAFW has been implementing the country-wide Soil Health Card (SHC) scheme. The SHC Portal has all updated and consolidated information including the current status of soil health. The card lists soil health indicators that can be assessed without the aid of technical or laboratory equipment. The SHC also prescribes fertilizers to raise the crop yield. In all, 1,10,51,995 SHCs were issued upto October 2025. The progress towards SHCs was evident from the notable increase in the number of Soil Health Cards generated nationwide, from 1.68 million in FY 2020-21 to 8.84 million in FY 2024-25.

Alternatives to Shifting Cultivation

Shifting cultivation has been the traditional method of cultivation in a few states of India, which is predominant in north eastern hills of the country. Gradual reduction in the extent of shifting cultivation area (*current jhum*) has been observed since 2003, and it has reduced from 5,360 km^2 in 2003 to 1,395 km^2 in 2019. This reduction has been possible through adoption of alternate land use practices dominated by horticulture and agroforestry duly supported by alternative non-land based economic activities including ecotourism (Fig. 4.2).

Bio-fertilizers, biofuel, organic manure and Vermicompost use

Schemes such as 'National Project on Organic Farming (NPOF)', Paramparagat Krishi Vikas Yojana (PKVY), PM-PRANAM, and the GOBARdhan have been undertaken to promote biofertilizer and biofuel use in India. The steady growth in carrier-based solid biofertilizer production reaching 0.33 million metric tonnes and liquid biofertilizer production increasing to 556.98 million litres in FY 2022-23 (Box 4.2). indicate growth in sustainable biodiversity and land management. Similarly, organic manure production was 7.64 million metric tonnes in FY 2022-23 and biofuel production was 74.9 million metric tonnes in FY 2024-25. (Table 4.1).

During the period from 2023 to FY 2025-26, under the Market Development Assistance (MDA) Scheme, financial assistance of INR 1,500/MT was provided to Compressed Bio-Gas (CBG) plants/ fertilizers marketing companies for promotion of soil carbon enhancers *viz*., Fermented Organic Manure (FOM), Liquid Fermented Organic Manure (LFOM), and organic fertilizer *viz*., Phosphate Rich Organic Manure (PROM) produced at plants under 'GOBARdhan' initiative. The government has released over INR 111.72 Crore under the MDA scheme since its inception in 2023.The chemical fertilizer imports declined from 16.92 million metric tonnes in FY 2022-23 to 14.83 million metric tonnes in FY 2023-24.

Table 4.1
Use of bio-fertilizers/ biofuels, organic manure and vermicomposting

Sr. No.	Item	Year				
				2020-21	2021-22	2022-23
1.	Annual production of Solid Bio-fertilizers (million metric tonnes)			0.19	0.17	0.33
2.	Annual Volume of Liquid Bio fertilizer (million litres)			42.24	232.93	556.98
3.	Total Production of Organic Manure (million metric tonnes)			1.37	4.50	7.64
	Item	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
4.	Annual Production of Biofuels (million litres)	302.32	433.6	508.5	707.38	749.00

Source: National Centre for Organic and Natural Farming Web Portal; Ministry of Petroleum and Natural Gas

Box 4.2 - Trends in the Production and Use of Agrochemical Fertilizers

India has taken important steps to reduce dependence on conventional chemical fertilizers and promote more sustainable nutrient management in agriculture. A notable development has been the increased adoption of nano-fertilizers, with sales reportedly rising up to 47% in FY 2024-25, contributing to the replacement of an estimated 1.2 million metric tons of conventional urea and a reduction of about 28% in the use of bulk chemical fertilizers. In parallel, the PM-PRANAM scheme has encouraged states to rationalize fertilizer consumption, with 14 states reportedly showing a decline in the use of conventional fertilizers. In addition, states such as Uttar Pradesh and Maharashtra have supported the transition through subsidies of up to 50% for bio-fertilizers and other natural inputs, encouraging more resource-efficient and biodiversity-friendly farming systems.

Integrated Pest Management

The Government of India has adopted Integrated Pest Management (IPM) as a pest control strategy since 1985. The IPM approach is being disseminated through various schemes/ projects at national and state levels. The ICAR - National Research Institute for Integrated Pest Management (NRIIPM) undertakes R&D activities and promotes eco-friendly, sustainable pest management technologies to minimize crop losses, reduce production costs, and minimize environmental hazards through integrated approaches and ICT-based surveillance. The Directorate of Plant Protection Quarantine and Storage (DPPQS), MoAFW is the responsible and lead national agency for integrated pest management and has 36 Central Integrated Pest Management Centres (CIPMCs) across India. The mandate of these Centers is pest/ disease monitoring, production and release of biocontrol agents, conservation of biocontrol agents, and human resource development in IPM by imparting training to agricultural extension officers and farmers at the grassroots levels by organizing Farmers' Field Schools (FFSs) in the farmers' fields (Box 4.3). The Division of Integrated Pest Management under DPPQS maintains updated information on pest surveys, lab production and releases of biocontrol agents, area coverage by augmentation, and area coverage by conservation. During FY 2023-24, the area under IPM in the country was 1,283.3 million ha. In the 4-year reporting period, altogether, total 35,660 farmers were trained in the IPM practices. The status of augmentation and conservation indicates a positive trend in adoption of IPM. Bio-control activities demonstrated an overall positive trend, with steady increases in both laboratory production and field release of bio-control agents. Area coverage through augmentation increased from 0.13 to 0.16 million ha, while conservation-based coverage remained consistently high, indicating continued adoption of ecologically sustainable pest management practices.

Box 4.3 - Integrated Pest Management for Sustainable Agriculture

India has promoted IPM to reduce dependence on chemical pesticides and encourage ecologically sustainable crop protection. The National Centre for Integrated Pest Management (NCIPM) has supported this transition through Farmer Field Schools, awareness programmes, and farmer training on pest monitoring and non-chemical management practices. Successful examples include the biological control of papaya mealybug using the parasitoid wasp *Acerophagus papayae* and the use of 'semiochemicals' in horticultural crops such as mango and guava to influence pest behaviour and reduce pesticide application. These approaches help conserve beneficial organisms, strengthen ecological balance in agricultural systems, and support biodiversity-friendly farming practices.

Conservation of Genetic Resources

Five National Bureaus, *viz*., National Bureau of Plant Genetic Resources (NBPGR), National Bureau of Animal Genetic Resources (NBAGR), National Bureau of Fish Genetic Resources (NBFGR), National Bureau of Agricultural Insect Resources (NBAIR), and National Bureau of Agriculturally Important Microorganisms (NBAIM) (Fig. 4.3) under the ICAR have established state-of-the-art facilities and have launched various program/ activities relevant to the conservation of genetic resources of plants, animals, fishes, and agriculturally important insects and microorganisms (Fig. 4.3). In addition to the above, several other national/ state-level organizations such as Centre for Cellular and Molecular Biology - Laboratory for the Conservation of Endangered Species (CCMB-LaCONES) also contribute to the conservation of genetic resources. The LaCONES is India's research facility engaged in conservation and preservation of wildlife genetic resources.

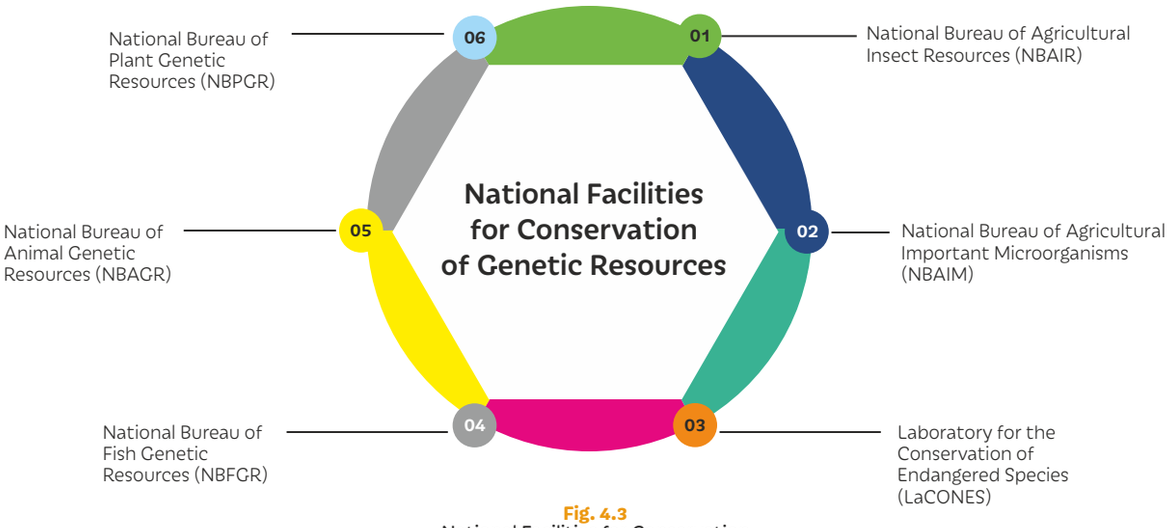


Fig. 4.3
National Facilities for Conservation of Genetic Resources

The progress made by five bureaus dealing with conservation of genetic resources of plants, animals, fish, and agriculturally important insects and microorganisms is highlighted below:

NBPGR, New Delhi - The NBPGR is responsible for acquisition and management of indigenous and exotic plant resources for food and agriculture, and to carry out related research and human resource development for sustainable growth of agriculture in the country. The National Plant Gene Bank conserves about 0.4 million accessions belonging to about 1,800 plant species. A portal as well as a database on plant genetic resources is maintained. The ICAR-NBPGR undertakes plant exploration and collection, characterization, conservation and utilization of wild relatives (Table 4.2).

Table 4.2
Wild relatives of cultivated plants

Sr. No.	Items	Year				
		2020	2021	2022	2023	2024
1.	Explorations conducted for accession of cultivated crops and wild relatives (Number)	28	38	29	21	23
2.	Districts covered (Number)	100	76	81	43	71
3.	Accessions of wild relatives (Number)	607	1,004	803	308	605

Source: Annual Reports (2020, 2021, 2022, 2023, 2024) - National Bureau of Plant Genetic Resources (NBPGR)

NBAGR, Karnal - Animal Genetic Resources (AnGR) include many indigenous breeds of farm animal and poultry species. India possesses wide array of native breeds of domestic livestock and poultry. The total number of registered breeds is 230. This database provides information on native tracts and breed descriptors of indigenous breeds. The National Livestock Gene Bank at the Bureau has been established with the objective of conserving the indigenous livestock biodiversity. Presently, a total of 3,06,948 deep frozen semen doses belonging to 590 breeding males (bulls/ rams/ bucks/ stallions) from 63 breeds representing cattle, buffalo, sheep, goat, camel, yak and equine have been collected and preserved at the National Gene Bank for posterity. The Bureau has preserved genomic DNA samples from 170 breeds/ populations of indigenous livestock. So far, 125 indigenous populations of 10 livestock species have been cryo-conserved.

NBFGR, Lucknow - The Bureau is engaged in the assessment and conservation of fish genetic resources for intellectual property protection, and sustainable utilization. It maintains Fish Karyome, a relational database of cytogenetic information on fish and other aquatic organisms. Presently, database includes information on 1,399 fish species represented by 214 families and 58 orders.

NBAIR, Bengaluru - It is the nodal institute for collection, characterization, documentation, conservation, exchange, research and utilization of agriculturally important insect resources including pests of crops, their natural enemies, pollinators, etc.

NBAIM, Mau, UP - NBAIM has established the National Agriculturally Important Microbial Culture Collection (NAIMCC). It has facilities for short term and long-term conservation of microorganisms with more than 6,500 preserved accessions, represented by 33 genera of fungi, 50 genera of bacteria and actinomycetes, 18 genera of cyanobacteria and archaea. NBAIM maintains a core collection of agriculturally important microorganisms that have commercial importance and are being used to develop formulations of biofertilizers, biopesticides and decomposers. The Microbial Genomic Resource Repository (MGRR) has more than10,000 accessions of genomic DNA, clones, plasmids, vectors and gene constructs.

Sustainable Fisheries

The Indian fisheries sector supports the livelihoods of around 30 million people, especially in coastal and rural areas. Indian fisheries, in recent years, has experienced a significant shift, moving from a marine-dominated sector to a greater focus on inland fisheries. The Department of Fisheries, MoFAHD, has initiated several activities relevant to sustainable fisheries. These include closed areas, closed and open seasons, catch limits, fishing gear restrictions, individual fishing quotas, habitat protection, monitoring and enforcement, and community participation. In addition, the actions to enhance catch (inland and marine) production, export, livelihoods, surveys, monitoring, and certification of marine fisheries are being undertaken. A holistic approach under the 'Pradhan Mantri Matsya Sampada Yojana (PMMSY)' focuses on optimal utilization of resources, technology infusion, and capacity building for fisheries sectors. A key contributor to this growth is the culture-based fishery in India's vast network of tanks and ponds, which cover approximately 2.36 million ha. The government is investing in expansion of rearing and grow-out pond areas, as well as diversifying species and adopting sustainable aquaculture practices. The PMMSY focuses on enhancing aquaculture productivity, improving fisheries management, creating new jobs in the sector, and bringing in big infrastructural changes in the sector e.g., establishing

Certification for Sustainable Fisheries

'Shaphari' Certification for Aquaculture and Hatcheries

Plate 4.1
Certification for Sustainable Fisheries

several integrated aquaparks. It also envisages doubling fisheries exports to INR 1 trillion. The Fisheries and Aquaculture Infrastructure Development Fund (FIDF) was introduced in FY 2018-19 to provide funding support for the creation of infrastructure for both marine and inland fisheries.

Under the PMMSY, the government is promoting sustainable and selective fishing practices. Accordingly, coastal states are increasingly encouraging eco-friendly gear modifications to reduce bycatch and protect marine biodiversity. Training program and monitoring efforts are helping fishermen to shift towards responsible fishing methods. As of 2025, 5,94,538 individuals benefitted under the Fishermen Support System during banned seasons.

The Fishery Survey of India and ICAR-CMFRI conduct periodic stock assessments and monitor marine finfish and shellfish resources along the Indian coast and disseminate scientific information on stock status, population dynamics, and life history parameters, supporting evidence-based management decisions and providing the scientific foundation necessary for ecolabelling and certification. Under the PMMSY, the Department of Fisheries, Government of India, is advancing several strategic initiatives on stock assessment and sustainable fisheries management. Demand for residue-free shrimp by international markets has necessitated freeing the aquaculture sector from the use of antibiotics and other pharmacologically active substances. Sustainability of aquaculture is also related to the biosecurity protocols and the responsible use of chemicals and pharmacologically active substances in hatcheries. In 2020, the Marine Products Export Development Authority (MPEDA), India launched the Shaphari certification programme (Plate 4.1). 'Shaphari' is a Sanskrit word for superior quality fisheries, products suitable for human consumption. It is a voluntary, market-based process certification launched to certify aqua farms and hatcheries that meet strict food safety and Good Aquaculture Practices (GAP). As of 2025, the MPEDA has certified 16 hatcheries and approved 344.21 ha of farm area under the Shaphari certification scheme.

Sustainable Management of Forests

Management of production (i.e., Reserved Forests/Protected Forests/Undemarcated Forests) is based on the approved Forest Working Plans, aiming to meet multiple objectives focused on the ecosystem-based management approach to conservation of biodiversity, climate change, livelihoods, and sustainable management. The ICFRE has undertaken the preparation of forest soil health cards across all the forest divisions to assess and enhance the understanding of forest soil fertility. A digital Forest Soil Health Card (FSHC) portal has been developed. The SFDs, Forest Development Corporations, MFP Federations, and TRIFED have initiated various programs/ schemes aiming at sustainable management of NTFPs. For example implementation of the MSP for selected NTFPs, cultivation of medicinal plants, awareness, capacity building, value addition, supply chain management and trade, support, etc. Forest Genetic Resources (FGRs) i.e., the heritable materials maintained within and among tree and woody plant species, possessing actual or potential economic, environmental, scientific, or societal values, constitute an important component of plant diversity. More than 80% of India's higher plant (angiosperm and gymnosperm) diversity is found in the forests (~14,500 species). About half of this constitutes FGR (~7,250 species), the remainder being herbaceous flora, including soft climbers, twiners, herbs, and grasses. The National CAMPA of MoEFCC had sanctioned a pilot project for the creation of a Centre of Excellence on FGR (CoFGR) at FRI, Dehradun. Under this pilot project, the FGR of Uttarakhand were explored, documented, characterized, and conserved using modern tools and techniques. Based on the success of this project, a national program on the conservation and development of FGRs was recently successfully completed. Management of PAs and other conservation sites (TRs, ERs, BRs, WHSs, Ramsar Sites, etc.) is based on approved management plans/ TCPs or conservation plans following a landscape/ riverscape/ seascape approach.

Wetland Management

The ISRO-SAC, on behalf of the MoEFCC, has carried out the national/ state and district-level assessment on the number, extent, and decadal change of wetlands (natural and manmade - inland and coastal) for 2006-2007, 2017-2018, and 2018-2019. The MoEFCC has also framed Wetland Management and Conservation Rules, 2017, focusing on integrated wetland management, awareness generation, research, and monitoring besides providing for the establishment of national and state-level wetland authorities.

NBT 11

4.3

Biodiversity and Ecosystem Services (NBT 11)

Ecosystems contribute to a wide range of provisioning, regulating, supporting and cultural services essential for human wellbeing and are vital for sustainable development. Ecosystem based approaches help society to adapt against adverse impacts of climate change, natural hazards and disaster risks while providing food and water security and improving human health. NBT 11 focuses on enhancing and maintaining ecosystem services while regulating air and water quality.

Ecosystem-based Management

India adopted an ecosystem-based management approach to conservation in the early 1970s. The BRs, PAs, WHSs, ERs, TRs and Ramsar Sites are being managed with a focus on the maintenance of ecosystems, species, and genetic diversity.

The internationally acclaimed 'Project Tiger' though focused on one species, adopted ecosystem approach for the conservation of their co-predators, prey, and habitats.

The National Forest Policy, National Wildlife Action Plan, India's Updated NBSAP, and NAPCC also advocate for adoption of ecosystem-based management and landscape/ riverscape/ seascape management-based approaches to conservation.

Economic Valuation of Ecosystem Services

Economic valuation of ecosystem services of the country has been undertaken by various national and international organizations from time to time (Plate 4.2). Several studies have covered assessments on diverse forest ecosystems, wetlands, and agroecosystems. The assessment of economic valuation of ecosystem services in six TRs in India has indicated that benefits from selected TRs range from US $769 /ha/year to US $ 2,923 /ha/year (Verma *et al.*, 2017).

Plate 4.2
Economic Valuation of Ecosystem Services and Ecosystem Accounts

MoSPI indicated that benefits from selected TRs range from US $769 /ha/year to US $ 2,923 /ha/year (Verma *et al.*, 2017).

MoSPI conducts comprehensive Ecosystem Accounting studies using the UN System of Environmental-Economic Accounting (SEEA) framework, and eight annual publications have been released so far related to forest, ocean, biodiversity, and pollination services in both physical and monetary terms to guide policy.

Management of Exigencies, Hazards, Disasters and Extreme Events

India has enacted the Disaster Management Act, 2005, and developed a three-tier hierarchical management system to deal with hazards, exigencies, disasters, and other extreme events. The country has established organizations such as the National/ State Disaster Management Authority (NDMA/ SDMAs), National/ State Disaster Response Force (NDRF/ SDRFs), and National Institute of Disaster Management (NIDM), besides adopting strategies towards ecosystem-based disaster risk reduction (DRR) on the lines of the Sendai Framework for DRR.

The NDMA and SDMAs provide real-time alerts related to hazards and extreme events and extend help in rescue, rehabilitation, and restoration through the National Disaster Response Force (NDRF) and State Disaster Response Forces (SDRFs), various law enforcement agencies, and other relevant state-level agencies.

Box 4.4 - Springshed Management and Catchment Maintenance

Springshed management has been taken up as an activity in the Watershed Development Component-'Pradhan Mantri Krishi Sinchayee Yojana 2.0 (WDC-PMKSY 2.0)'. The release of the Guidelines for New Generation Watershed Development Projects under WDC-PMKSY 2.0 by the Department of Land Resources (DLR) in 2021 placed special focus on springshed management by recognizing it as an activity under new generation watershed projects to mitigate spring water depletion. The restoration of springshed (catchments), with landscape restoration initiatives, will also yield co-benefits such as capacity building, reduction of disaster risks, and a secured quality of life. Under WDC-PMKSY 2.0, 2,641 springs have been identified by the 15 states/ UTs for rejuvenation/ development in watershed project areas in 90 districts.

Activities like the construction of check dams. Gabion structures, recharge wells, farm ponds, percolation tanks, bench terracing, making of trenches, etc. are being carried out. All States/UTs, particularly the Himalayan States, have recognized the importance of spring rejuvenation and management. Several program/ schemes by the central/state governments, international agencies, NGOs, and CBOs have been implemented to rejuvenate springs and maintain the catchments of major Indian rivers and their tributaries.

Prevention and Management of Forest Fires

The incidence and intensity of forest fires are increasing on account of erratic climatic conditions, enhanced human activities/ disturbances in forested landscapes, inadequate infrastructure, and fund constraints. The NDMA has recognized forest fires as a hazard and in the year 2023 developed a 'National Plan for Prevention and Management of Forest Fires,' and the same is being financially supported and implemented. The MoEFCC is operating a scheme to support SFDs in prevention, mitigation, and control of forest fires.

FSI issues real-time alerts for forest fires, monitors large fires, and generates valuable data on fire incidences. Several SFDs have installed a comprehensive fire management system for forest areas under their jurisdiction.

One Health Programme

Considering interconnections in diseases among livestock, wild animals, and humans, the 'One Health Program has received attention (Plate 4.2). The wildlife health professionals, veterinarians, and medical doctors are working together to understand such interconnections and to devise appropriate strategies to meet any exigency arising out of any disease outbreak or pandemic.

One Health Programme

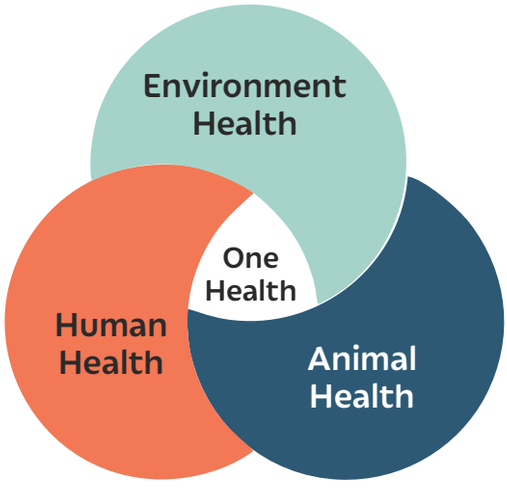


Plate 4.2
One Health Initiative

One Health-India

The **Prime Minister Science, Technology, and Innovation Advisory Council** approved to set up a **National One Health Mission** with a cross-ministerial effort which will serve to coordinate, support, and integrate all the **existing One Health activities** in the country.

Recently, **MOHFW**, has transformed its "**Division of Zoonotic Diseases Program**" into the "**Centre for One Health.**" The Centre for One Health comprises **8 technical divisions**, each focusing on comprise 8 technical division is focusing on different aspects of One Health.

Monitoring of Air Quality

The Central Pollution Control Board (CPCB) has an elaborate country-wide program for monitoring air quality following National Ambient Air Quality Standards (NAAQS), primarily focusing on six criteria pollutants: particulate matter, carbon monoxide, sulphur dioxide, nitrogen dioxide, ozone and lead. The country's ambient air quality monitoring network comprised of 1,601 stations (manual + real-time) covering 583 cities in 28 states and 7 UTs in January 2026. The manual monitoring is being carried out under the National Air Quality Monitoring Program (NAMP) at 1,035 stations covering 450 cities/ towns/ villages in 28 states and 7 UTs, and real-time air quality monitoring is carried out under the Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at 566 stations covering 293 cities/ towns/ villages in 27 states and 5 UTs. The number of monitoring stations in metropolitan cities and critically polluted areas shows an upward trend (Fig 4.5).

Under NAMP, three air pollutants, *viz*., Sulphur Dioxide, Nitrogen Dioxide and PM10, are being monitored regularly at all the locations, while other parameters like PM2.5, carbon monoxide, ammonia, lead, ozone, benzene, benzo(a)pyrene (BaP), arsenic, and nickel are being monitored at select locations.

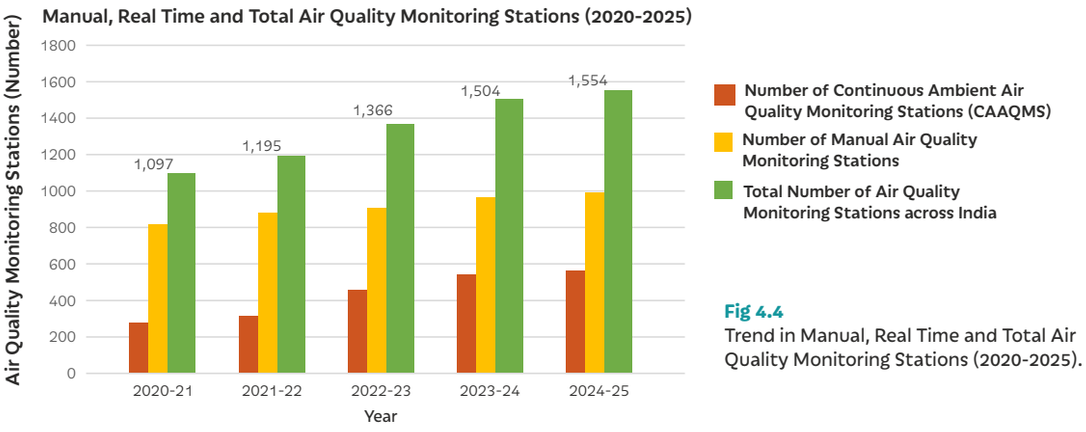


Fig 4.4
Trend in Manual, Real Time and Total Air Quality Monitoring Stations (2020-2025).

Water Quality

The CPCB, in coordination with State Pollution Control Boards (SPCBs), has developed a mechanism of periodic water quality monitoring in river stretches of high concern, various wetlands, and groundwater. It regularly publishes water quality data based on such monitoring, stretches in several rivers in India, especially the Ganga and its tributaries, have automated real-time monitoring.

There is a consistent growth in the number of water quality monitoring stations. The total number of stations increased from 4,260 in FY 2020-21 to 4,922 in FY 2024-25. The highest number of monitoring stations are in rivers, followed by ground water, lakes, and marine/ beach/ creek/ sea.

The CPCB has initiated the exercise of identifying Polluted River Stretches (PRS) in the country since 2009 based on the river water quality monitored considering Biochemical Oxygen Demand (BOD) as a criterion. Based on the periodic monitoring, CPCB has published four reports in the year 2009, 2015, 2018, and 2022. Polluted River Location (PRL) / PRS are categorized under five Priority Classes (I to V) based on maximum BOD level observed at the monitoring location. The criteria for prioritization of river stretches are: (i) Priority Class I (BOD exceeding concentration 30.1 mg/ l); (ii) Priority Class II (BOD between 20.1-30.0 mg/ l); (iii) Priority Class III (BOD between 10.1-20.0 mg/ l); Priority Class IV (BOD between 6.1-10.0 mg/ l; and (v) Priority Class V (BOD between 3.1-6.0 mg/l).

In 2022, CPCB identified PRS based on the water quality data of rivers for the years 2019 and 2021. Water quality data for the year 2020 has not been considered due to COVID 19 pandemic. In 2025, PRS were identified based on the water quality data of rivers for the years 2022 and 2023 (Table 4.3).

Table 4.3
Status of PRS identified by CPCB across the country for the year 2022 and 2025

Year	Priority				
	I	II	III	IV	V
2022 (Assessment year -2019 and 2021)	46	16	39	65	145
2025 (Assessment year -2022 and 2023)	37	22	43	45	149

Source: Central Pollution Control Board

Maintenance of Crop Diversity, Reduced Use of Chemical Fertilizers/ Pesticides/ Weedicides, and Enhanced Pollination

The Government of India has launched the National Food Security Mission, under which the crop diversification program (under the 'Rashtriya Krishi Vikas Yojana' and National Agri Insurance Scheme) is a prominent component. Further, several state-specific incentive program for crop diversification have been undertaken. Recognizing the adverse impact of toxic and hazardous chemicals and excessive use of chemical fertilizers on biodiversity, soil fertility, water quality, and vital processes like pollination, the MoAFW has implemented a number of other national-level program/ schemes relevant to the conservation of native crop varieties, natural farming, organic farming, agroforestry, and repurposing harmful subsidies on chemical fertilizers.

The Soil Health Card Scheme , introduced in the year 2015 identifies soil nutrient deficiencies and recommends appropriate fertilizer use, thereby improving soil fertility and crop productivity.

During the year 2023-2024, a total of 4,95,898 soil samples was assessed under the scheme to measure salinity and macro-nutrients (N, P, K, OC) and micro-nutrients (S, Fe, Zn, Cu, B, Mn) in the agricultural soils. Soil phosphorus and potassium were high to medium in most soil samples analyzed while most soil samples were deficient in nitrogen and organic carbon. Micronutrients such as copper, manganese, sulphur, iron, zinc and boron were found to be adequate in most soil samples. These results strengthen evidence-based nutrient management and guide focused soil fertility improvement measures, enabling targeted advisory services, fertilizer recommendations, and farmer support to sustain and improve soil health.

Efforts are underway to reduce the consumption of chemical fertilizers and repurpose harmful subsidies through adopting and popularizing practices of sustainable agriculture.

4.4

Enhance green and blue spaces (NBT 12)

Green and blue spaces in urban environment have a range of positive effects on human health besides offering valuable ecosystem services, including habitats for wildlife, habitat connectivity, and helping mediate extreme events. Thus, availability and accessibility of adequate green and blue spaces for urban people is of the utmost importance to rest, relax, and de-stress and to maintain air quality, besides reducing noise pollution. NBT 12 focuses on biodiversity inclusive urban planning and is of direct relevance to India which is witnessing rapid urbanization and resultant expansion in the built-up environment.

Recognition of Green and Blue Spaces

Historically, in India, while establishing a town/ city, the role of green spaces (parks, lawns, community gardens, woodlots/ forests, avenue plantations, vegetation, etc.) and blue spaces (lakes, ponds, reservoirs, canals, streams, rivers, coasts, seas, etc.) has been visualized within the human settlements. The majority of towns/ cities and even metropolises have continued to maintain them for relaxation, recreation, etc., besides open spaces that are accessible and open to all for public events, festivals, fairs, etc. Further, awareness is being created about green and blue spaces, and the central/ state governments, local municipal bodies, cantonments, and other government and private entities are making huge investments to expand the extent of such areas.

Urban Planning and Smart City Mission

The Ministry of Housing and Urban affairs (MoHUA), Government of India emphasizes integrating green and blue spaces in urban planning and specifically focuses on them in the City Master Plans and has launched a major national program of 'Smart City Mission (SCM)'. The SCM has undertaken a wide range of activities to enhance open spaces, greenfield development, and the development of riverfronts in several smart cities.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

The Atal Mission for Rejuvenation and Urban Transformation (AMRUT), initially launched in selected cities across the country in 2015, has been successful in enhancing liveability in AMRUT cities. AMRUT 2.0 launched in 2021, with a total outlay of INR 2,99,000 Crore - nearly three times the AMRUT-is the outcome of confidence gained during the implementation of the AMRUT scheme and the resolve to extend the basic services to every household. The mission envisages the rejuvenation of water bodies, green spaces, and parks as one of the main components of this pan-India initiative.

Biodiversity Parks, Botanical Gardens, orchards and water bodies

The Biodiversity Park concept was initially formulated as a conservation model aimed at restoring the lost natural heritage within the urban development framework (Box 4.4). Many such biodiversity parks have been established across the country. The MoEFCC has launched the 'Nagar Van Yojana' in 2020 with the goal of advancing urban forestry. By September 2024, 111 Nagar Vans (city forests) were established.

Box 4.5 - Delhi Biodiversity Parks: A Model for Urban Ecological Restoration and Reconciliation Ecology

Delhi's Biodiversity Parks, developed by the Delhi Development Authority (DDA) with the Centre for Management of Degraded Ecosystems (CEMDE), University of Delhi represent a pioneering model of restoring degraded urban landscapes into functional ecosystems. With a network of seven parks (~864 ha) established so far, the project has achieved large-scale restoration of degraded floodplains, ridge systems, and urban wastelands into functional ecosystems. Significant biodiversity gains are evident with increased diversity of terrestrial plants, birds, and butterflies. Wetland restoration (Yamuna, Neela Hauz, and Kalindi) has enabled the return of many native fish, amphibians, reptiles, mammals, and migratory birds, alongside improvements in groundwater recharge, microclimate regulation, and habitat connectivity across Yamuna floodplains and Aravalli Ridge systems. All major parks host nature interpretation/ learning centers that support education, research, and policy engagement. These efforts have enabled Delhi's position as a leading global model in demonstrating measurable ecological recovery and stronger ecosystem service delivery in a densely populated urban conglomerate.

'Ek Ped Maa Ke Naam' (Plant4Mother)

On the World Environment Day, 2024, India launched the 'Ek Ped Maa Ke Naam' campaign, a unique initiative combining environmental responsibility with a heartfelt tribute to mothers. The essence of 'Ek Ped Maa Ke Naam' is a symbolic gesture planting a tree in the name of one's mother. The nationwide program emphasizes the importance of collective efforts to improve the environment and efforts towards increasing forest cover. This campaign aligns with the nation's quest for sustainable development. This popular program is expected to enhance green space in urban areas besides the forest cover in India.

Inventory and Assessment of Green and Blue Spaces

The ISFR 2023 reported the extent of forest cover in six megacities (FSI, 2023). Often, city town plans/master plans also have some valuable insight into the green and blue spaces within the urban area. The BSI, SFDs, or local bodies also contribute information on green spaces, while the SFDs, MoJS, State Wetland Authorities (SWAs), or local bodies provide information on blue spaces (wetlands). The MoJS helps in providing information on rivers and tributaries.

Values of total area under green spaces within 100 smart cities w.r.t cumulative urban area of 100 smart cities ranged from 47.37% in 2024 to 53.65% in 2020 while cumulative values of blues spaces ranged from 0.74% in 2021 to 0.80% in 2020 and 2023 (Table 4.4).

Table 4.4
Availability of urban green and blue spaces in smart cities

Sr. No.	Item	Year				
		2020	2021	2022	2023	2024
1.	Total Urban Area within 100 Smart Cities (km^2) *	12,402.72	12,402.72	12,402.72	12,402.72	12,402.72
2.	Total Area under Green Spaces within 100 Smart Cities (km^2)	6,654.49	6,033.03	6,550.75	6,394.44	5,875.67
3.	Percentage of Green Spaces w.r.t cumulative Urban Area of 100 Smart Cities (%)	53.65	48.64	52.82	51.56	47.37
4.	Total Area under Blue Spaces within 100 Smart Cities (km^2)	98.64	91.80	97.86	98.98	93.90
5.	Percentage of Blue Spaces w.r.t cumulative Urban Area of 100 Smart Cities (%)	0.80	0.74	0.79	0.80	0.76

Source: Wildlife Institute of India
*Cumulative area of 100 Smart Cities based on their boundary files in 2024, assuming the urban area in smart cities have not changed.
Note: The data for urban area, blue (wetlands) and green (sparse and dense vegetation) spaces in urban areas were computed using Normalized Difference Water Index (NDWI) and Normalized Difference Vegetation Index (NDVI) for 100 smart cities of India. The cumulative urban area for 100 smart cities was computed using shapefiles downloaded from Smart Cities Mission India web portal.

Tree Census in Cities

Some cities (Pune, Bengaluru, Nagpur, etc.) have carried out a 'Tree Census.' In 2025, the Supreme Court of India has ordered the Forest Research Institute (FRI), Dehradun, to carry out the major task of 'Tree Census' in the National Capital Territory of Delhi in collaboration with the Forest Department of NCT. Geo-tag-based tree enumeration provides accurate data into green space in such cities.

City Biodiversity Index

Presently, the International Council for Local Environmental Initiatives (ICLEI), local governments for sustainability through the ICLEI South Asia, encourage the SBBs and local bodies of cities, metropolises, and megacities to prepare a 'City Biodiversity Index' in collaboration with scientific institutes and experts. Nearly a dozen cities (e.g., Chennai, Dehra Dun, Gangtok, Hyderabad, Itanagar, Jammu, Kochi, Mira-Bhayandar, Rajkot, Siliguri, Srinagar, Thane, Visakhapatnam) have City Biodiversity Index and are uploaded on the website of ICLEI (Box 4.5). Hyderabad has assessed changes in urban biodiversity between 2012 (baseline year) and 2021 and shown a significant improvement in its biodiversity score.

Box 4.6 - Using the City Biodiversity Index to Mainstream Biodiversity in Cities

The City Biodiversity Index (CBI), or Singapore Index, was adopted under the Convention on Biological Diversity (COP-10, 2010) to assess urban biodiversity. In India, Hyderabad became the first city (2012) to implement CBI, evaluating indicators on native biodiversity, ecosystem services, and governance and further strengthening conservation of over 169 lakes and urban green spaces. Subsequently, 12+ Indian cities have computed CBIs. The initiative has enabled evidence-based biodiversity governance, enhanced community participation, and better ecosystem service valuation, thereby strengthening its nature-based urban planning aligned with CBD targets and SDGs.

Sacred groves and sacred trees

Presently, the data on sacred groves and sacred trees in different Indian states are available in published literature. However, the data specific to urban areas need to be collected and compiled for the entire country as such information on sacred trees and sacred groves is available in the context of few cities only e.g., Bengaluru with 62 sacred groves (Jaganmohan *et al.*, 2018).

In addition, some publications on heritage trees of India are available e.g., Heritage Trees of Gujarat (Gujarat FD, 2011), Heritage Trees of Uttar Pradesh (UPSBB, 2021) Heritage Trees of India (Natesh, 2024), Heritage Tree Census of Nasik (Nasik Municipal Corporation), Heritages Trees Report, Chandigarh although they are not confined to urban areas only.

4.5

Access and Benefit Sharing (NBT 13)

The third objective of the CBD focuses on the fair and equitable sharing of benefits arising from the use of genetic resources and associated traditional knowledge. Article 8(j) of the Convention provides the foundation to encourage the equitable sharing of the benefits arising from the utilization of knowledge, innovations, and practices of local communities. The adoption of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization reinforced the CBD objective and also created greater legal certainty, clarity, and transparency for both users and providers of genetic resources and associated traditional knowledge. In view of technological advances mechanisms to share benefits from the use of Digital sequence information (DSI) on genetic resources are also being developed. NBT 13 focuses on legal, policy, and administrative measures along with capacity-building for the implementation of ABS, including DSI.

Legal, Policy, Governance, and Implementation Support

India has established a national legal framework to implement ABS provisions which has been periodically amended as per the emerging needs. This includes the BD Act (2002), BD Rules (2004), and ABS Regulations (2014), and these were amended in the years 2023, 2024, and 2025, respectively. These instruments provide a robust legal, policy, and institutional foundation for regulating access, utilization, and benefit-sharing, including DSI. Implementation is supported through a hierarchical, decentralized governance system involving the NBA at the national level, SBBs/ UTBCs at the state/ UT level, and BMCs at the local level. Community-level governance is reinforced through PBRs, which are being digitized as e-PBRs for improved documentation, verification, and use in decision-making. Approvals for ABS are given and agreements executed by NBA, SBBs and BMCs as per provisions of the BD Act. Details are as follows;

Box 4.7 - Achievements under ABS

Number of ABS Agreements Executed by NBA – In all, 3,873 agreements have been executed during FY 2020-21 to FY 2023-24.

MOUs signed between SBBs/ BMCs and Industries/ Traders – A total of 4,444 MoUs have been signed between SBBs /BMCs and Industries/ Traders from FY 2020-21 to FY 2023-24.

Patents Granted by the Indian Patent Office on the Invention based on the Biological Resources or Traditional Knowledge Associated thereto or DSI increased from 961 in FY 2020-21 to 3,124 in FY 2023-24.

From FY 2020-21 to FY 2023-24, 150 applications have been approved by the NBA for access to biological resources and associated TK for commercial utilization.

23 applications have been approved by the NBA so far for transferring research results to foreign nationals, companies, and non-resident Indians for commercial purposes.

This reflects strengthened biodiversity compliance and increasing translation of regulated access of biological resources for research, innovation, and biodiversity-based development. Monetary benefits received and disbursed in accordance with ABS - India has been recognized as a pioneer country in operationalizing the ABS framework. Since 2020-21, INR 146.07 Crore has been received and INR 61.49 Crore has been disbursed.

Plate 4.3 Disbursement of ABS Amounts to Beneficiaries

Benefit-Sharing and Resource Mobilization

The BD Act and ABS regulations provide modalities for determining and collecting the benefit-sharing component from the users of biological resources and associated knowledge. Further, the ABS amount collected is being disbursed to the benefit claimers for the conservation of bioresources, enhancing the livelihoods of the local communities, and socioeconomic conditions of the area from where the bioresource was accessed. India emphasizes the inventorization of potential commercial resources and the dissemination of this information to BMCs and Panchayats to ensure equitable benefit-sharing at the local level. Monitoring monetary flows from DSI use and accessing resources from the 'Global Multilateral Fund' further ensures that benefits are mobilized for biodiversity conservation, community development, and sustainable livelihoods. These actions link the use of biological resources to tangible benefits for communities while reinforcing conservation goals (Box 4.8 and 4.9).

Internationally Recognized Certificates of Compliance (IRCCs)

Internationally Recognized Certificates of Compliance (IRCCs) are permits or their equivalents issued by national authorities that are published in the ABS Clearing-House (ABSCH) of the Nagoya Protocol. These documents serve as proof that access to genetic resources was granted in accordance with the Nagoya Protocol, providing transparency and legal certainty for users and providers of these resources. The IRCCs are uploaded to the ABSCH by National Competent Authorities. The ABSCH maintains and share information related to access and benefits sharing and the implementation of the Nagoya Protocol. As per the ABS Clearing House Mechanism (CHM), 3,556 Internationally Recognized Certificates of Compliance (IRCC) have been issued until December 2025.

Capacity-Building and Awareness

Capacity-building and stakeholder awareness are critical for effective implementation of the agenda on ABS. India has focused on raising awareness at national, state, and local levels to enhance the understanding of ABS provisions and compliance. Additionally, capacity-building activities have also focused on the themes of preparation, updating, and digitalization of PBRs to enhance documentation, monitoring, and reporting of biological resources. These measures ensure that both institutions and communities are equipped to participate actively in biodiversity governance and benefit-sharing processes.

Documentation and Protection of Traditional Knowledge

India underscores strengthening existing systems for the documentation, application, and protection of biodiversity-associated traditional knowledge. In parallel, efforts have been made to revive and revitalize sustainable traditional practices and uses of biodiversity to promote the continuation of culturally significant and conservation-friendly practices. These initiatives link traditional knowledge with livelihoods and community well-being, ensuring that local communities gain tangible benefits while biological resources are sustainably used and conserved.

Traditional knowledge protection is strengthened through the Traditional Knowledge Digital Library (TKDL) and community-focused ABS programmes, ensuring Free Prior informed consent (FPIC) and equitable benefit-sharing.

Box 4.8 – Mainstreaming Implementation of ABS in India

- India has taken a lead in operationalization of ABS mechanisms, including recognition of DSI under the national scope.
- Over 700 farmers and 36 community institutions have been honoured through awards supported by the 'National Gene Fund' under the Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA), MoAFW.
- More than 10,000 plant varieties, including farmer and traditionally cultivated varieties, have been registered under PPVFRA.
- In all, 8,19,541 accessions of plants, animals, fish, agriculturally important microorganisms, and other critical resources have been conserved in national repositories and gene banks.
- India has implemented multiple initiatives relevant to capacity building and linking biodiversity conservation with sustainable livelihoods.
- The National Medicinal Plants Board (NMPB) promotes cultivation, sustainable harvesting, and conservation of medicinal plants, improving community incomes through value-added herbal products.
- The MoAyush has initiated several programmes/ schemes relevant to the preservation and promotion of traditional health knowledge systems besides the development of herbal value chains.

Box 4.9 - Implementation of ABS - Key Achievements

1 Number of BMCs constituted - 2,76,653
2 Number of IRCC certificates issued - 3,500
3 Number of ABS agreements issued - >5,600
4 ABS amount collected so far - INR 263 Crore
5 ABS amount disbursed to benefit claimers - INR 140 Crore (till Dec 2025)

Box 4.10 - Access to bovine cattle embryos

A Brazilian firm, M/s Brasif S.A., sought access to 4,000 high-value bovine embryos for zoo-technological research. After consultations with the SBB, Gujarat and scientific institutions, NBA granted approval under mutually agreed terms, including an upfront benefit-sharing payment of 5% of the embryos' production cost. An amount of INR 1.20 Crore was allocated from the users as benefit sharing. Although Gir and Kankrej breeds originate from Gujarat and Ongole from Andhra Pradesh, embryos were accessed in Gujarat through a trust sourcing from various regions. As benefit claimers could not be individually identified, the BD Act mandates that benefit-sharing funds support conservation, sustainable use, and livelihood enhancement in the regions of origin. Accordingly, the amount was shared between Andhra Pradesh and Gujarat in a 60:40 ratio for conservation activities such as increasing registered animals, supplying animal semen to farmers, organizing cattle shows, training and awareness programmes, animal health camps, and supporting BMC formation and PBR documentation in native areas.

Box 4.11 - Access to Red Sanders

As per the provisions of the BD Act and regulation relating to benefit sharing for the biological resources of high economic value like red Sanders and sandalwood, the NBA granted approvals for access to auctioned and cultivated red Sanders to 161 foreign buyers. In this process, NBA realized around INR 120.00 Crore as a benefit-sharing component from the foreign buyers, and it is shared with the benefit claimers, such as farmers, the Andhra Pradesh Forest Department, the Karnataka Forest Department, and the Andhra Pradesh State Biodiversity Board, for conservation of red Sanders.

Transparency, Traceability, and Digital Systems

India has initiated actions for establishing biodiversity portals at the national and state/ UT levels for digital tracking and information sharing to improve transparency and accountability in the use of biological resources, genetic resources, and DSI. Traceability mechanisms for DSI are also being developed to ensure compliance with the ABS regulations and to enable effective monitoring of resource use.

Sui Generis System for Protection of Traditional Knowledge and Related Rights

India has enacted the PPVFRA for protection of plant varieties and farmers rights. The authority has registered the varieties of researchers and farmers since the enactment of this Act. Registrations have risen sharply from 387 in FY 2020-21 to 1,763 in FY 2023-24, driven largely by farmer-bred varieties (from 91 to 1,546). This demonstrates strengthened legal protection across private, public, and farmer sectors, promoting compliance and encouraging innovations in agriculture (Table 4.5).

Table 4.5
Varieties Registered with the PPVFRA

Sr. No.	Items	Year			
		2020-21	2021-22	2022-23	2023-24
1.	Private	187	178	68	144
2.	Farmers	91	128	95	1,546
3.	Public	109	169	53	73
4.	Total Registrations	387	475	216	1,763

Source: Protection of Plant Varieties and Farmers Rights Authority; NBA - NR7 Microsite

Accessions in repositories and gene banks

India has made significant progress in conserving genetic resources across plants, animals, fish, agriculturally important microbes, and insects through its national bureaux. In the plant sector, NBPGR has conserved 4,70,894 accessions in the National Gene Bank as of 2024. Additionally, 12,790 accessions have been preserved through tissue culture and cryopreservation. For animal genetic resources, NBAGR has conserved 230 accessions up to FY 2023-24. In the fisheries sector, NBFGR has conserved a cumulative total of 24,273 accessions during the same period. Similarly, conservation of agriculturally important microorganisms and insect resources by NBAIM and NBAIR stands at 1,808 and 3,14,786 accessions, respectively, as of FY 2023-24.

Number of Genome Saviour Awards to Communities and individuals Awards

The PPVFRA annually honors the individuals and communities engaged in conservation and utilization of biological resources of different economic plant species. From FY 2020-21 to FY 2022-23, total farmer rewards, farmer recognition and community awards were 18, 8 and 10, respectively. The continued conferment of awards has encouraged community participation, and conservation of valuable genetic resources.

INDIA'S NATIONAL REPORT ON BIODIVERSITY

CHAPTER **05**

BIODIVERSITY: IMPLEMENTATION AND MAINSTREAMING

Mainstreaming biodiversity through inter-ministerial coordination, inter-agency cooperation, community engagement at the grassroots level, and adoption of biodiversity-friendly practices in production sectors are key to translating policy goals to effective actions. Implementation of conservation agenda requires support of various tools like communication, public awareness, capacity development, research, and monitoring.

Chapter 5 covers the broad themes of implementation and mainstreaming.It includes 10 NBTs emphasizing on actions relevant to mainstreaming, sustainable production, sustainable consumption and choices, waste management, rationalizing subsidies, capacity development, knowledge management, resource mobilization, participatory approaches, and equitable and gender responsive planning, decision making, and implementation.

Progress and achievements for each of the 10 targets are summarized below:

5.1

Mainstream Biodiversity

Mainstreaming of biodiversity 'is the process of embedding biodiversity considerations into policies, strategies, and practices across all sectors (production and development) that impact or rely on biodiversity so that it is conserved and sustainably used'. Rather than treating biodiversity conservation as a standalone activity, mainstreaming ensures that the value of nature is factored into every decision-from building a highway to setting a national budget.

State Biodiversity Strategy and Action Plans (SBSAPs) and Local Biodiversity Strategy and Action Plans (LBSAPs)

SBSAPs are mandated under the country's BD Rules, and all states have prepared first-generation plans. Telangana became the first state to prepare its SBSAP aligned with the KMGBF, followed by Kerala and Arunachal Pradesh. LBSAPs have been prepared for five local bodies (cities), *viz*., Kochi, Gangtok, Jammu, Srinagar, and Udaipur, serving as models for other local bodies. In addition, LBSAPs in case of Bhopal, Indore, Noida, and Rajkot are under preparation.

Integrating Biodiversity in Sectoral Plans

Landscapes/ riverscapes/ seascapes are managed through management plans prepared for BRs and Ramsar Sites, Ganga Action Plan, National Plan for Prevention and Management of Forest Fires, Species Recovery Plans, buffer zone management plans ; TCPs; NDMP; NAPCC, etc., showing how different ministries/departments integrate biodiversity management in their respective sectoral plans. The following programmes further illustrate how biodiversity is being incorporated into core operational frameworks by different ministries.

- **PM-PRANAM Scheme**
  The PM-PRANAM scheme is an incentive-based scheme to reduce the use of chemical fertilizers, promoting balanced nutrients via biofertilizers and natural farming, thus improving soil biodiversity.
- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**
  AMRUT programme implemented by the MoHUA integrates environmental and biodiversity conservation into urban development by promoting water-sensitive urban planning, rejuvenation of urban water bodies, green spaces, and improved wastewater management.
- **Green Highways Policy (2015)**
  MoRTH implement the Green Highways Policy (2015) where plantations of diverse species are integrated into highway projects, to reduce air pollution.
- **Mahatma Gandhi National Rural Employment Guarantee Act**
  MGNREGA now replaced by 'Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) (VB-G RAM G) Act,' 2025 has been consistently undertaking biodiversity-related activities such as pasture development, and plantations. Under the programme, various soil and water conservation measures e.g. contour bunds, gully plugging and creating water harvesting structures, rejuvenating traditional water bodies, percolation dams, building check dams, and clearing irrigation canals, etc. are undertaken which indirectly contribute to biodiversity maintenance and conservation. During the period from FY 2020-21 to FY 2023-24, MGNREGA consistently supported biodiversity-related activities, with annual attributable expenditures ranging between INR 18,791 crore and INR 23,401 crore.

EIA and Environmental Clearances

Integration of biodiversity into the Environmental Clearance (EC) process is primarily governed by the EIA Notification, 2006, and its updates. The process categorizes projects into 'A' or 'B' based on their potential impact, requiring appraisal by either the Expert Appraisal Committee (EAC) at the central level or the State Level Environment Impact Assessment Authority (SEIAA). There are 39 broad categories/sectors listed in the Schedule that require prior Environmental Clearance under the EIA Notification 2006, These sectors are broadly organized into functional groups to ensure specialized appraisal viz. Mining & Power, Infrastructure & Logistics, Industrial Processes, Waste Management and Real Estate & Urban Development The MoEFCC, while granting environmental clearance, ensures appropriate mitigation of adverse impacts. Biodiversity management plan is a mandatory component of the Environmental Management Plan (EMP) as per EIA notifications.

In accordance with the 'Digital India' initiative and capturing the spirit of minimum government and maximum governance, a single window digital platform named PARIVESH has been developed by the MoEFCC to grant green clearances (under environmental, forest, wildlife, and coastal zone regulations) and monitor subsequent compliances across the nation.

Buffer Zone Management

The amendment to WPA 1972 in 2006 envisioned legally designated 'Critical Tiger Habitat (CTH) or Core Area' and 'Buffer Area' in the context of TRs. The guidelines for CTH required their strict protection while making them as 'inviolate space' for tigers and other wild animals. Planning for buffer areas provisioned for multiple uses and objectives thus promoting the agenda of 'co-existence' and

mainstreaming conservation with development activities.The sub-plan of the buffer area provides prescriptions focusing on mainstreaming biodiversity in production sectors.

Mainstreaming Marine Biodiversity

The MoES has taken several steps to mainstream marine biodiversity conservation into the national governance and management of country's ocean and sea areas. As a party to the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (commonly known as BBNJ Agreement or High Seas Treaty), that entered into force on 17 January 2026, India is committed to the conservation and sustainable use of marine biodiversity in areas beyond its national jurisdiction. MoES has designated the Centre for Marine Living Resources and Ecology (CMLRE), Kochi as the National Focal Point for the implementation of BBNJ Agreement. CMLRE is also responsible for Clearing-House Mechanism to support marine biodiversity regulation, information sharing, and ABS related to marine genetic resources under CBD. It undertakes systematic documentation and assessment of marine living resources through national initiatives such as the Deep Ocean Mission and the Marine Living Resources (MLR) Programme under the 'Prithvi Vigyan Scheme', as well as international collaborations including the Indian Ocean Biodiversity Information System (IndOBIS) and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). The CMLRE also operates the "Bhavasagara" Referral Centre, designated in March 2026, as India's National Repository for Deep-Sea Fauna. It has 3,500 specimens, including 50 holotypes of new species and more than 100 rare deep-sea specimens, supporting blue economy initiatives.

National Green Tribunal

The NGT was established in 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multidisciplinary issues.

Green Credit Rules, 2023

Green Credit Rules, 2023, created a framework for voluntary environmental actions generating Green Credits (GCs). SFDs register land on the GC Programme portal, enabling entities to fund plantation and ecorestoration. The portal manage funding, credit issuance, and monitoring.

National Disaster Management Plan

In compliance with the Disaster Management Act 2005, the NDMP 2019 outlines a comprehensive strategy and action plan towards prevention, mitigation, preparedness, response, and recovery in the context of a wide-ranging natural and manmade disaster events while focusing on post-disaster restoration and rehabilitation.

National Action Plan for Climate Change (NAPCC)

The NAPCC and SAPCC focus on biodiversity conservation, ecosystem management, and disaster risk reduction taking a sectoral integration approach. The National Reporting to UNFCCC illustrates the country's efforts towards mainstreaming biodiversity.

Business Responsibility and Sustainability Report

BRSR have been mandated by the Securities and Exchange Board of India (SEBI), for compliance, and progress by companies. Detailed progress on BRSR has been covered under NBT 15.

Capacity Development

Under the Central Scheme 'Rashtriya Gram Swaraj Abhiyan (RGSA),' capacity building is being carried out by the States/ UTs for the elected representatives, functionaries, and other stakeholders of Panchayats/ rural local bodies on different aspects of biodiversity conservation, constitution of BMC, preparation of PBRs, and the role of Gram Panchayat in the conservation of natural resources.

NBT 15

5.2 Sustainable Production, Supply Chains and Disclosure of Risks (NBT 15)

Recognizing that large business houses, transnational companies and financial institutions have immense global biodiversity impact footprint, NBT 15 specifically focuses on the development sector and envisages biodiversity-related disclosures on sustainable production, and supply chains. Such disclosures will help in identification of risks, dependencies, and impact on biodiversity. Most businesses are dependent on biodiversity for raw materials but also for their operations e.g. fuel and water. Assessment and monitoring of dependency, risks, and impact of business operations on biodiversity can help in taking mitigatory measures against biodiversity loss. India has taken the lead in creating desired policy, legal, institutional, and governance mechanisms relevant to sustainable production, supply chains, and disclosures of risks.

Business Responsibility and Sustainability Report (BRSR): Environment, Social and Governance (ESG) Disclosure

The Business Responsibility and Sustainability Report (BRSR) is a mandatory ESG disclosure framework in India, enforced by SEBI for the top 1,000 listed entities from FY 2020-21 to enhance transparency around environmental impact, social inclusion, and governance practices. It aligns Indian businesses with global sustainability standards. Comprehensive information on the BRSR is also being made available online. India achieved near-universal BRSR compliance among the top 1,000 listed companies , with submissions rising from 1,000 (FY 2020-21) to 1,200 (FY 2023-24). External assurance of environmental data surged from zero to 480 companies by FY 2023-24, while Micro, Small, and Medium Enterprises (MSME) sourcing disclosures grew from 600 to 900 companies (Table 5.1).

Table 5.1
BRSR compliance by companies

Sr. No.	Items	Year			
		2020-21	2021-22	2022-23	2023-24
1.	Companies Submitting BRSRs (Number)	1,000	1,150	1,012	1,200
2.	Companies Reporting on Sourcing from MSMEs (Number)	600	791	729	900
3.	Companies Reporting External Assurance of Environmental Data (Number)	0	100	349	480

Source: Securities and Exchange Board of India (SEBI), 2025

Adopting Task Force on Nature-related Financial Disclosures (TNFD) Recommendations

TNFD is a market-led, science-based initiative providing organizations with the tools to act on evolving nature-related issues, which has published its recommendations to operationalize global target 15 of the KMGBF, enabling business and finance to integrate nature into their governance, strategy, risk management, and capital allocation decision-making. UNDP, through its BIOFIN programme, has been actively supporting the enabling ecosystem for TNFD uptake by conducting sector-specific stakeholder consultations to identify potential adopters and assess corporate capacity gaps. In India, 26 companies have so far adopted or committed to adopt the TNFD recommendations, spanning sectors mentioned in Table. 5.2. India has transitioned from a period of early adoption by heavy industrial pioneers into a broad-based national movement, with current momentum shifting toward pharmaceutical and utility sectors and future commitments already secured from the high-impact infrastructure and logistics industries.

Table 5.2
Trends in reporting biodiversity related risks in disclosure (Sector-wise)

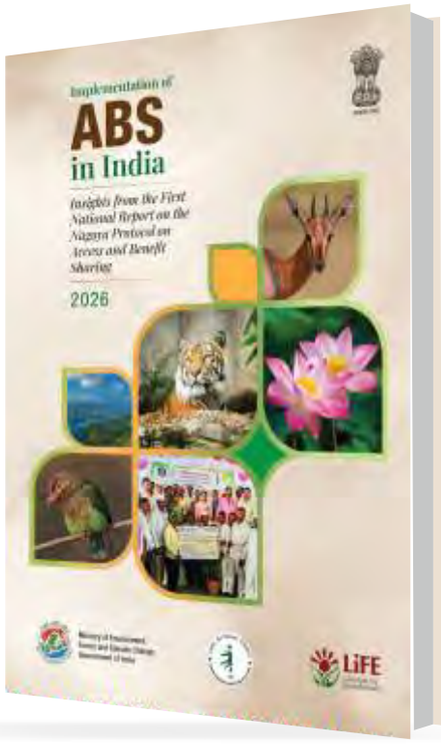
Sector	Early Adopters (By FY 2024)	Current Adopters (FY 2025)	Future Commitments (FY 2026)	Total Organisations
Heavy Industry & Extractives	4	2	-	6
Infrastructure & Real Estate	1	-	3	4
Technology & Services	2	1	-	3
Renewables & Utilities	2	-	1	3
Consumer Goods & Healthcare	-	3	1	4
Logistics & Transportation	-	5	1	6
TOTAL	**9**	**11**	**6**	**26**

Fair and Equitable Sharing of Benefits

Businesses using biodiversity in their production and supply chain are required to fulfil the legal and mandatory requirements of the BD Act, 2002 (amended in 2023), including fair and equitable benefit sharing because of the use of genetic resources through the NBA, SBBs, and BMCs as applicable.

India Business & Biodiversity Initiative (IBBI)

The MoEFCC and the Confederation of Indian Industry (CII) jointly established the India Business & Biodiversity Initiative (IBBI) to strengthen corporate commitment to biodiversity conservation and the sustainable use of ecosystem services. The updated IBBI Declaration, 2024 consists of eight targets aligned with the GBF, and participating companies are required to have their CEOs formally endorse this commitment. At present, 81 Indian and global businesses are signatories to the IBBI Declaration and have committed to advancing the implementation of the KMGBF.



NBT 16

5.3

Promote Sustainable Consumption Choices (NBT 16)

Sustainable production and consumption (SCP) is the production and use of products and services in a manner that is socially beneficial, economically viable, and environment friendly over their life cycle. Governments have a central role to play in making information available and accessible to consumers who, in turn, can make better and more informed consumption choices. NBT 16, which aims to encourage reducing footprint of unsustainable consumption in an equitable manner, including food waste, overall overconsumption, and overall waste generation.

The Government of India has initiated several program and schemes to address the requirements of NBT 16.

Mission LiFE (Lifestyle for Environment)

Mission LiFE seeks to channelize the efforts of individuals and communities into a global mass movement of positive behavioral change. The Mission LiFE Portal offers open access to resources, including action plans of ministries/ departments, while the Meri LiFE Portal enables ministries, departments, and institutions to upload reports on actions and events and track the progress of the mass mobilization drive (Plate 5.1).

More than 4.71 crore people have participated in 2.8 million Mission LiFE action events. As a part of the mission, a massive plantation drive has been inititated adopting the 'Whole-of-Government' and the 'Whole-of-Society' approach by engaging state governments, local bodies, schools, industries, and community-based organizations.According to the web portal, as of 18 November 2025, over 10.36 Crore saplings have been planted under the 'Plant4Mother' (i.e., one plant in the name of mother) programme. Eco Clubs for Mission LiFE (Lifestyle for Environment) are a significant initiative to promote environmental consciousness among students, and instilling values and behaviour necessary for sustainable living. As of February 2026, 1,07,60,038 participants from 0.39 million Eco-Clubs participated in 3,60,822 events. The Mission LiFE has achieved visible, measurable behavioral and institutional impact at the national scale, particularly in ecological restoration and youth engagement.

Consumer Awareness

The Department of Consumer Affairs, Ministry of Consumer Affairs, Food and Public Distribution (MoCAFPD), is primarily responsible for consumer awareness and deals with their various rights, like the right to safety, right to be informed, right to choose, right to be heard, right to seek redressal, right to consumer awareness, right to a healthy environment, and right to fair and just treatment (under the Consumer Protection Act, 2019). Sustainable consumer choices are being promoted by choosing products and services that are eco-friendly, organic and healthy food, energy efficient, and responsible sourcing, checking certifications and sustainability claims, use of social media, research, brand transparency, use of digital platforms, and reducing waste.

Minimizing Food Losses

The Food Corporation of India (FCI) undertakes various measures to reduce post-harvest storage and distribution losses of central/ state pool stocks of wheat and rice. The Ministry of Food Processing Industries (MoFPI) supports the creation and expansion of processing/ preservation capacities through the implementation of three schemes for the overall development of the food processing sector, including the creation of modern infrastructure with

Mission Lifestyle for Environment recognizes that Indian culture and living traditions are inherently sustainable. The importance of conserving precious natural resource and living in harmony with nature are emphasized in the Indian ancient scriptures. The need of the hour is to tap into that ancient wisdom and spread the message to as many people as possible.

Mission LiFE seek to channel the efforts of individuals and communities into a global mass movement of positive behavioural change.

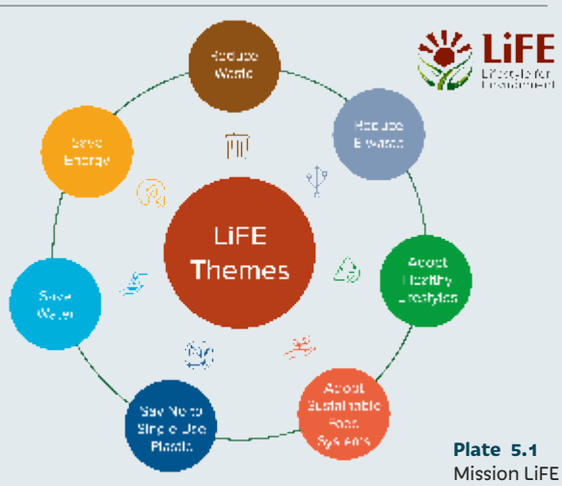


Plate 5.1
Mission LiFE

efficient supply chain management from farm gate to retail outlets, reducing post-harvest losses and creating value-added products, providing better returns to farmers, creating employment opportunities, increasing the processing levels, and promoting the export of processed foods. These schemes are: (i) Central Sector Scheme - 'Pradhan Mantri Kisan Sampada Yojana (PMKSY)', (ii) Centrally Sponsored Scheme - 'PM Formalization of Micro Food Processing Enterprises (PMFME)', and (iii) Central Sector Production Linked Incentive Scheme for Food Processing Industries (PLISFPI).

Indian Food Sharing Alliance

Indian Food Sharing Alliance (IFSA) formed by the Food Safety and Standard Authority of India (FSSAI) aims to recover the surplus food generated, reduce the amount of food waste generated, and increase the amount of safe and nutritious food donated to those in need by integrating various partner organizations, food recovery agencies, and NGOs. 'Food Safety and Standards (Recovery and Distribution of Surplus Food) Regulation, 2019 have been framed to promulgate food donation drives and prevent food loss and waste in India.

Waste Management

The 'Swachh Bharat Mission' web portal by MoHUA maintains fully updated information relevant to waste management across the country. Portal provides information on the basis of the number of total wards in the country; wards with 100% door-to-door collection; wards with 100% segregation - waste generation and processing. State/ UT-wise information is also available on the portal. The number of wards practicing waste segregation increased steadily from 68,248 in FY 2020-21 to 86,405 in FY 2023-24. This reflects consistent urban behavioural change toward waste management and sustained national scale implementation.

Management of Hazardous Waste

The MoEFCC, through the CPCB, its statutory body, is responsible for the implementation of market-based 'Extended Producer Responsibility (EPR)' regulations for priority waste streams, including plastic packaging, e-waste, waste batteries, waste tyres, and used oil, in alignment with circular economy principles. EPR is an environmental policy approach that places responsibility on producers for the entire lifecycle of their products, including post-consumer collection, recycling, and environmentally sound disposal. The EPR portal, administered by CPCB, currently has three operational modules: (i) Registration of Producers, Importers, and Brand Owners (PIBOs); (ii) Registration of Plastic Waste Processors (PWPs); and (iii) Generation and Transfer of EPR Certificates. The portal provides category-wise data on registered PIBOs, registered recyclers, EPR certificate generation, and EPR certificates traded across notified waste categories.

Extended Producer Responsibility Implementation Indicators

The progress of EPR implementation is assessed through measurable indicators, including the generation and transfer of EPR credits across different waste categories, which serve as key metrics for tracking compliance and performance against prescribed targets. It serves as an economic incentive for manufacturers to design products having a reduced environmental footprint. High volumes of EPR credits have been generated and traded across plastic waste (over 17.60 million tonnes generated), e-waste, used batteries. and tyres. Corporate compliance with EPR is now firmly institutionalized, especially for plastic and tyre waste, reinforcing circular economy principles.

Table 5.3
Companies Taking up Extended Producer Responsibility (EPR)

Sr. No.	EPR Credits	Year 2023-2024			
		E waste	Plastic waste	Used Batteries	Tyres
1.	Generated (in million tonnes)	0.26	17.60	1.27	2.75
2.	Transferred (in million tonnes)	0.15	14.07	0.99	2.29

Source: EPR Portal (2025) - Central Pollution Control Board

Certification

The NPOP (certification by a third party) and the PGS are the two types of organic certification that have been put in place across the value chain in terms of production, processing, and marketing. The total area under organic certification increased steadily from 5.49 million ha in FY 2020-21 to 6.76 million ha in FY 2022-23, showing growing consumer demand for organic products. The Government of India has also notified the final criteria for 17 product categories (1992-2018) under the 'Ecomark Scheme. These 17 product categories have 335 standards therein for different products.

NBT 17

5.3

Strengthening Biosafety Regulatory Capacity (NBT 17)

The advances in modern biotechnology raised concerns about biosafety of Living Modified Organisms (LMOs) that may have adverse effects on biological diversity and human health. The 'Cartagena Protocol on Biosafety,' is a Supplementary Protocol to CBD, relates to procedures for intentional introduction of LMOs for food, feed, and processing, and has four thrust areas *viz*., (i) Risk Assessment and Risk Management (RARM); (ii) Handling, Transport, Packaging, and Identification (HTPI); (iii) Information sharing through Biosafety Clearing House; and (iv) Public Awareness. Recognizing significant advances in modern biotechnology and associated concerns, there is a need for enhanced governance and capacity for implementation of biosafety measures for Living Modified Organisms (LMOs). NBT 17 aims to further strengthen biosafety capacity.

Biosafety Regulations and Guidelines

India has a robust and well-established regulatory framework governing the research, development, testing, commercialization, handling, and monitoring of Genetically Modified Organisms (GMOs) including genetically modified (GM) crops, with a strong emphasis on biosafety, environmental protection, and public health. A comprehensive biosafety regulatory system was put in place in 1989 through the notification of the Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/ Genetically Engineered Organisms or Cells under the EPA, 1986. These rules provide biosafety oversight across all stages from laboratory research and field trials to environmental release and commercialization. The Rules, 1989, are implemented through a series of biosafety guidelines taking into account scientific developments.

Regulatory Committees

Biosafety Rules,1989 provide for constitution of six statutory committees (Fig. 5.1).

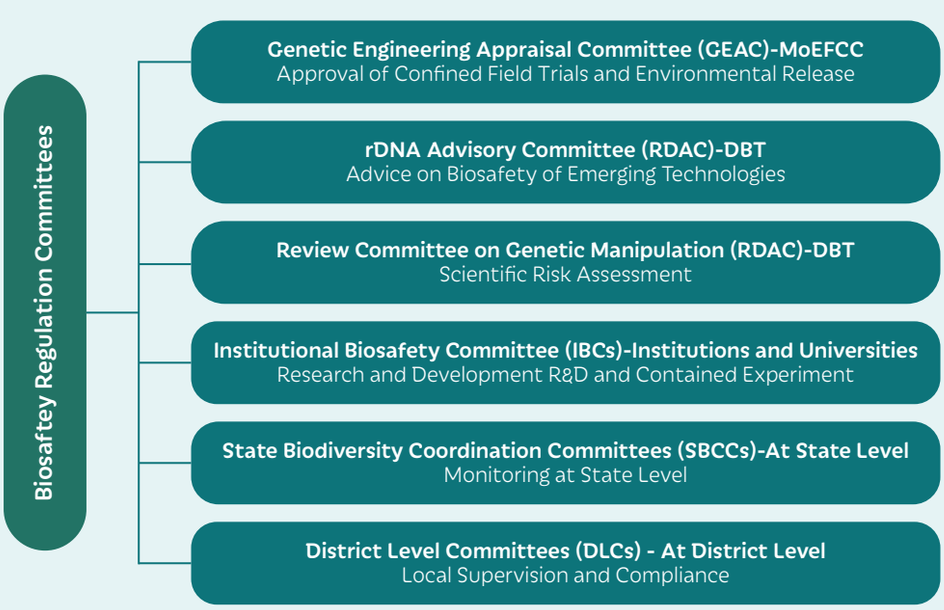


Fig. 5.1 Hierarchical Governance Mechanism for Biosafety in India

The Genetic Engineering Appraisal Committee (GEAC) in MoEFCC is responsible for granting approvals for confined field trials and environmental release. The rDNA Advisory Committee (RDAC) and Review Committee on Genetic Manipulation (RCGM) based at DBT advises on emerging technologies relevant to biosafety, and help in scientific risk assessment, respectively. The Institutional Biosafety Committees (IBSCs) at the various institutions/ universities advise and approves R&D activities and contain experiments. In the year 2024-25, 224 IBSCs were active and functional. The State Biodiversity Coordination Committees (SBCCs) and District Level Committees (DLCs) are responsible for monitoring biosafety measures at the state and district level respectively. Two of the most important committees, the RCGM and the GEAC, meet regularly to review scientific data for / granting permissions. RCGM meets frequently as

it is responsible for biosafety review of laboratory research and small-scale trial applications of LMOs. The GEAC deals with large-scale environmental releases and commercial policy. As of 2025, RCGM conducted more than 320 meetings and GEAC has held 158 meetings.

Risk Assessment and Risk Management of LMOs/ GMOs

RARM is critically important in India to ensure that LMOs do not pose unacceptable risks to human and animal health, agricultural sustainability, or biological diversity, while also meeting India's international obligations under the Cartagena Protocol on Biosafety. RARM provides a structured, science-based and precautionary framework to identify potential hazards, assess their likelihood and consequences, and prescribe regulatory conditions to prevent or mitigate risks before and after environmental release. In India, risk analysis for LMOs is guided by a Risk Analysis Framework (2016) available on the IBKP and GEAC website. This framework provides structured guidance on how regulatory authorities apply scientific principles in the evaluation of hazards and risks associated with LMOs under the Rules, 1989. Till now, a total of 36 LMOs have successfully completed the full RARM process in India, with approvals restricted primarily to Bt cotton events.

The Government of India has notified four referral labs for detection of LMOs that include: GM detection laboratory at the NBPGR, New Delhi; Punjab Biotechnology Incubator, Mohali; Export Inspection Agency, Kochi; and DNA Fingerprinting and Transgenic Crops Monitoring Laboratory, Amravati. In addition, there are 39 laboratories (both public and private sector) accredited for LMO detection by the National Accreditation Board for Laboratories (NABL) and the APEDA.

Capacity Building on Biosafety

India has implemented two projects on Capacity Building on Biosafety. The Phase I Project was implemented from 2004 to 2007 while the Phase II Project was executed from 2013 to 2018 with the support from the Global Environment Facility (GEF). Recently, a national project on 'Mainstreaming of Biosafety and Institutional Capacity Building for the Cartagena Protocol on Biosafety', has been approved by the GEF and implementation has been initiated.

India is also a partner in multi-country project on 'Promoting the Safe Application of Biotechnology through Multi-country Cooperation in the Implementation of National Biosafety Frameworks in Asia' coordinated by Korea Institute for Promoting Biosafety Cooperation (KIPABiC). The other partner countries include Mongolia, Philippines, and Bangladesh. In addition, capacity building activities by national institutions are being undertaken on a regular basis. These include trainings for the IBSCs by the DBT, annual biosafety workshops/ courses by NBPGR, workshops by Biotech Consortium India Limited (BCIL), and the industry associations.

Technical Resources

Preparation of technical resources is a regular activity by concerned agencies in the country. In 2019, MoEFCC prepared specific modules for officials of Agriculture Department, including seed inspectors, food safety officials besides customs officials, farmers and public. All agencies involved in providing specific training program prepared technical resources and others included sections on LMOs in their training modules. MoEFCC in association with BCIL has prepared a Course on 'Biosafety Aspects of GE Plants' consisting of six video series to provide basic information on: (i) Introduction to GE plants; (ii) Biosafety Regulations in India; (iii) Confined Field Trials; (iv) Cartagena Protocol on Biosafety; (v) Environmental Risk Assessment; and (vi) Safety Assessment of Foods Derived from GE Plants. The Course aims to strengthen capacities of relevant institutions and enhance awareness among various stakeholders for effective implementation of Cartagena Protocol on Biosafety. This Course is available at SWAYAM PORTAL' and as of February 2026, 6,545 participants have taken the Course since it was posted in 2020.

As per the global commitments made under the Cartagena Protocol on Biosafety, India Biosafety Clearing House has been set up (http://in.biosafetyclearinghouse.net/). In addition, two important websites provide updates on biosafety activities in the country. These are: (i) GEAC - http://www.geacindia.gov.in/; and (ii) Indian Biosafety Knowledge Portal (IBKP) (https://ibkp.dbtindia.gov.in/Registration/Index).

NBT 18

5.4

Repurpose Detrimental Incentives for Biodiversity (NBT 18)

Eliminating, phasing out, or reforming harmful incentives is a vital step that would immensely help ongoing conservation efforts besides generating net socioeconomic benefits. It is important to assess extent of detrimental subsidies and plan to repurpose detrimental incentives; and promote positive incentives for effective conservation and sustainable use of biodiversity. NBT 18 focuses on this important theme.

India has initiated the following programs and schemes to repurpose detrimental incentives.

Assessing the Extent of Subsidies

The central government provides subsidies for fertilizer, food, petroleum, interest items, and other schemes in its annual budget (Table 5.4). The Indian Budget provides information on various subsidies, indicates an overall declining trend and contribution to biodiversity friendly framework.

Table 5.4
Union Budget - Subsidies and Subsidy Related Schemes

Subsidy	Actual Expenditure (FY 2023-24) (INR in Crore)	Budget Revised Estimates (FY 2024-25) (INR in Crore)	Budget Estimates (FY 2025-26) (INR in Crore)
Fertilizer	1,88,292	1,71,299	1,67,887
Food	2,11,814.39	1,97,420.00	2,03,420.00
Petroleum	12,240.00	14,700.01	12,100.01
Interest Subsidies	19,515.82	28,155.68	27,840.38
Other Subsidies	3,036.67	16,294.19	14,968.62
Total	**4,34,898.50**	**4,27,868.38**	**4,26,216.21**

Source: Government of India - Union Budget Documents 2025-26; Statement 7 - Subsidies and Subsidy Related Schemes (https://www.indiabudget.gov.in/doc/eb/stat7.pdf)

Promoting positive incentives

There is a provision to provide incentives to States/UTs for reduction of consumption of chemical fertilizers (urea, DAP, NPK, and MOP) in a given financial year, compared to the average consumption over the previous three years, equivalent to 50% of the subsidy saved under the PM-PRANAM programme. The NFSM also offers assistance for biofertilizers to promote nutrient management. 'Galvanizing Organic Bio-Agro Resources Dhan (GOBAR-dhan) Scheme, supports organic and bio-fertilizer production. Assistance has increased threefold from INR 50 crore in FY 2020-21 to INR 150 crore in FY 2023-24, enabling more biogas and biofertilizer plants and promoting eco-friendly inputs. The NMNF, a major centrally sponsored scheme, builds upon earlier efforts like 'Paramparagat Krishi Vikas Yojana (PKVY)' and its sub-scheme 'Bhartiya Prakritik Krishi Paddhati (BPKP).' Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) scheme has supported organic farming of niche crops in the Northeastern Region of India, focusing on Farmer Producer Organizations (FPOs) and exports, with financial aid for organic inputs. 'Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PM-KUSUM)' by the Ministry of New and Renewable Energy (MNRE) promotes solar energy in agriculture, aiming to boost farmers' income and reduce diesel dependence for irrigation by providing subsidies for solar pumps and power plants. While NMNF promotes soil quality, PM-KUSUM provides for biodiversity-friendly energy policies.

Green Budgeting

Green budgeting ensures that public finances support biodiversity conservation and sustainable natural resource use, integrating ecological concerns into economic planning. In the FY 2022-23, the percentage of budget aligned to green budgeting was 5.6% (Climate Change Finance Unit-CCFU, Department of Economic Affairs, Ministry of Finance).

Together, above initiatives demonstrate India's integrated efforts to redesign harmful subsidies towards biodiversity-positive incentives through policy reforms, fiscal realignment, and market-based support, advancing sustainable agriculture and environmental stewardship nationwide.

NBT 19

5.5

Resource Mobilization (NBT 19)

Significant finances are required for transformative change and implementation of the NBSAP adopting whole-of-government and the whole-of-society approach. The target focuses on a multipronged approach that moves beyond public funding and bridging the funding gap through innovative financing solutions including corporate and international cooperation. India has concurrently taken the lead in carrying out assessment using the BIOFIN framework, initiation of innovative biodiversity solutions, and creation of required policy, legal, and institutional mechanisms to operationalize them. Increasingly, biodiversity finances other than public funds are being channeled for conservation of biodiversity.

India has adopted several innovative solutions to biodiversity finance. The following section highlights the progress and key achievements.

Biodiversity Finance Initiative (BIOFIN)

India is one of the leading nations adopting the BIOFIN. It followed five steps, including the Policy and Institutional Review (PIR) in the context of biodiversity conservation, Biodiversity Expenditure Review (BER), Biodiversity Financial Needs Assessment (FNA), Biodiversity Finance Plan (BFP), and Resource Mobilization. The BIOFIN assessments were done in year 2019. The BFP has assessed that India spends nearly USD 10 billion per annum towards biodiversity during the assessment period of 2017 - 2022. The BFP is currently being updated in alignment with India's updated NBSAP (2024-2030). Different sources of funding have been mapped, such as public, private, international, philanthropic, and other innovative finance solutions.

Public Finance

Twenty-one central ministries and two departments have schemes and programmes that are relevant for biodiversity. Prominent amongst them are: 'life-owning ministries, like MoEFCC, MoAFW, MoFAHD, MoJS, MoES, and 'life supporting' ministries such as MoRD, MoPR, MoAyush, MoST, and other related agencies. In addition, more than a dozen central ministries/ departments are either users or regulatory authority in the context of biodiversity. India's updated NBSAP revealed that the public funding towards biodiversity has demonstrated sustained growth, with ca. INR 1,96,403 crore mobilized across four financial years (Fig. 5.2). The value total amount of attributable biodiversity expenditure increased from INR 36,105.21 crore in FY 2020-21 to INR 60,254.50 crore in 2023-24. This represents a clear policy commitment to increasing investment in biodiversity conservation.

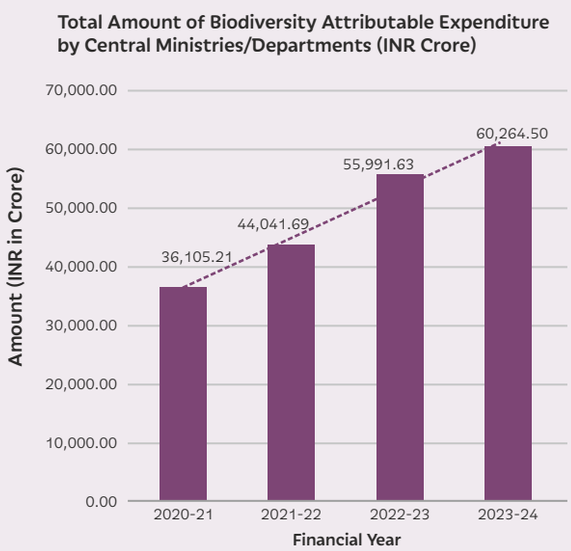


Fig. 5.2
Financial resources made available by public funding for implementing NBSAP

Source: India's updated NBSAP (2024-2030)

Corporate Social Responsibility (CSR)

Private sector contributions through CSR framework provide a structured avenue for funding biodiversity conservation. CSR data for the entire country, specific to the development sectors relevant to the environment, animal welfare, and conservation of resources for the past four years shows an increasing trend from INR 1,085.19 crore in FY 2020-21 to INR 3,459.00 Crore in FY 2023-24, i.e., three times enhanced spending in three years (Table 5.5).

Table 5.5
Corporate Social Responsibility Spent - Development Sector: Environment, Animal Welfare, and Conservation of Resources during FY 2020-2021 to 2023-2024

Financial Year	CSR Spent - Development Sectors 'Environment, Animal Welfare, and Conservation of Resources' (INR in Crore)
2020-2021	1,085.19
2021-2022	2,240.17
2022-2023	2,985.41
2023-2024	3,459.00

Source: National CSR Portal, Ministry of Corporate Affairs

In addition, India's philanthropic sector includes a multi-tiered ecosystem where legacy trusts, family foundations, and high-net-worth individuals are increasingly collaborating for the cause of biodiversity conservation through blended finance models.

Tourism Income for Management of Protected Areas (PAs) and Tiger Reserves (TRs)

Ecotourism is an integral activity of most PAs (National Parks and Sanctuaries) and Tiger Reserves. The NTCA allows ploughing back of income generated by way of tourism activities in TRs through the 'Tiger Conservation Foundation' for effective management of each reserve, tiger conservation, and support for local communities. Likewise, select States/ UTs also allow ploughing back of income generated by PAs through ecotourism.

Innovative Financial solutions

Green Credits demonstrate successful market-based conservation funding model with rapid institutional adoption and increasing state participation. Presently, 17 states and 14 PSUs have registered for the Green Credit programme. 'Biodiversity credit,' a new instrument being considered by India under the NBSAP. The NBA and UNDP convened a National Roundtable in December 2025 to develop a national framework for promoting biodiversity credits. The 'Social Stock Exchange (SSE)' has emerged as a transformative force for biodiversity conservation in India. Zero-Coupon Zero-Principal (ZCZP) is used as an instrument to raise public funds for specific wetland restoration projects. Launch of two innovative schemes on Carbon Credits and Green Bonds by the Government of India not only contributes to the agenda on conservation of biodiversity and climate change, but also immensely help in the overall agenda on resource mobilization. The India's Carbon Credit Trading Scheme (CCTS), enabled by the Energy Conservation (Amendment) Act, 2022 is a market-based mechanism designed to support the nation's climate goals while enabling sustainable economic growth. The CCTS aims to decarbonize the economy, incentivize emissions reductions, and allow companies to trade verified carbon credit certificates (CCCs).

NBT 20

5.6

Capacity Development, Technical and Scientific Cooperation (NBT 20)

Capacity development, scientific cooperation, technology transfer and innovations are vital for enhancing the abilities, resilience and effectiveness of individuals, institutions and systems at various levels for improved biodiversity-related decision-making, action and outcomes. Most policies, strategies, and plans relevant to conservation of biodiversity by different central ministries emphasize capacity development. India has been successful in developing a strong network of national/ state level organizations dealing with capacity development for biodiversity conservation.

All concerned ministries related to conservation of biodiversity and their associated national/ state level organizations develop annual calendar for capacity development program on diverse themes addressing the requirements of varied target audiences.

Capacity Development Plan for Biodiversity Conservation

India's updated NBSAP (2024-2030) has incorporated a comprehensive 'Capacity Development Plan' which identifies not only the need of building capacities at the individual level, but also at the level of organizations, as well as, creating an 'enabling environment'. The Plan is based on needs assessment, describes objectives of capacity development, identifies gaps and newer target audiences, highlights thrust areas, and provides details of monitoring and evaluation.

Saviours of Himalaya

A cadre of para taxonomists and 'Himal Rakshak' (Saviours of Himalaya) were identified and capacitated in conservation activities and supported SFDs and other conservation agencies in conducting the first-ever snow leopard population enumeration in India under a GEF-MoEFCC-UNDP-supported 'Secure Himalaya' Project. Under the same project, special trainings were given to youth, especially women, for nature guides and nature tourism, and para-veterinarians to support conservation actions by BMCs. Multiple tools like classroom training, on-the-job training, and exposure visits were used for training besides documentation of best practices

Incorporation of Advanced Technologies

Over the years, national/ state-level organizations under the MoEFCC, MoAFW, MoFAHD, MoST, MoES, MoJS, ICAR, DBT, etc., and other concerned central ministries have made outstanding progress towards the development of a wide range of tools, techniques, and technologies relevant to planning, assessment, management, conservation, and monitoring of wild biodiversity, as well as, agrobiodiversity. Some of the prominent technologies used for biodiversity monitoring and conservation are: Advance applications of Remote Sensing (RS) and Geographic Information System (GIS), Communication and Information Technology (IT), Digitalization, Telemetry/ Satellite Telemetry, Molecular technique-based Wildlife census, Camera Trap, Unmanned Aerial Vehicles, Biotechnology, Databases, and Web Portals, etc. These advancements have immensely helped the country in carrying out biological surveys, field-level assessments, and detecting spatial-temporal changes in terrestrial and aquatic environments, including coastal and marine ecosystems, besides the development of participatory approaches and preparation of

integrated management plans for diverse natural resources. Modern technologies are being increasingly used in the biennial assessment of forest resources, monitoring of tiger, co-predators, prey and habitats and species recovery and management programmes, Breed-wise livestock census; conservation of genetic resources; natural farming and organic farming; and biodiversity research, monitoring, and conservation. Several taxonomic catalogues on deep-sea organisms have been published by CMLRE supporting national taxonomic capacity building and biodiversity awareness. The IndOBIS, CMLRE hosts geo-referenced and taxonomically resolved marine species occurrence records which support science policy interfaces, marine spatial planning, and global marine biodiversity conservation initiatives.

Biodiversity Documentation

A multi-tiered system of portals hosted by ministries/ departments and statutory bodies has been created to manage biodiversity related documentation in India. Presently there are more than 20 primary national portals, supplemented by a network of over 60 specialized resource centres. Some of the key portals include: MoEFCC (NBA, EIACP), MoAFW (NBPGR and NBAGR) and MoST (Indian Bioresource Information Network - IBIN and ISTI Portal - India Science, Technology & Innovation). India has a vast network of NGOs and CBOs working in the area of environment in general, and biodiversity in particular. Further, a large number of 'Mahila Mandals' (women groups, primarily in rural areas) exist which are registered under various state-level departments and local bodies. In addition, there are about 0.6 million villages and 0.27 million Gram Panchayats (village level local bodies). The Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Cell of the MoEFCC under the Mission LiFE conducts mass awareness programmes for various target audience, particularly children, students and youth.

Research and other initiatives

Several organizations at the national/ state level are concurrently involved in climate research and

modelling impact on natural ecosystems, agroecosystems, wild species, crops, indigenous and local breeds, and socioeconomics. Presently, India is implementing the NAPCC while all states/ UTs also have SAPCCs. Several states have started preparing SAPCC 2.0 as well. The finalization of the National Adaptation Plan (NAP) is in advanced stage. The DST, MoST, is implementing two national missions under the NAPCC, namely the NMSHE and the NMSKCC, which support multidisciplinary research, capacity building, and knowledge generation on climate change impacts on ecosystems, water resources, agriculture, health, coastal systems, and Himalayan environments. DST also supports State Climate Change Cells/ Knowledge Centres that undertake training, awareness program, and stakeholder engagement at state and local levels.

Transboundary Landscape Management

India is a signatory to several Conventions (e.g., CITES, CMS, UNCLOS) promoting transboundary management/ conservation (Box 5.1 and 5.2).

Box 5.1 - 'Secure Himalaya' Project

The Secure Himalaya Project supported by GEF, UNDP and MoEFCC, adopted a transboundary landscape approach and enhanced transboundary conservation through identification of critical corridors (that connect India's high-altitude landscapes with neighbouring countries) to prevent population isolation and conduct standardized population monitoring. The project launched its first comprehensive national assessment (under SPAI - Snow Leopard Population Assessment in India) and aligned India's data collection with the Population Assessment of the World's Snow Leopards (PAWS), a global transboundary initiative. It also prevented illegal wildlife trade through inter-agency cooperation by enhancing capacity of the Wildlife Crime Control Bureau (WCCB) and Indo-Tibetan Border Police (ITBP) and supported India's participation in regional networks like the South Asia Wildlife Enforcement Network (SAWEN). Capacity building at government and citizen level was a key component of the project. About 2,000 frontline forest staff and community members were trained in monitoring wild habitats.

Box 5.2 - International Big Cat Alliance (IBCA)

IBCA, launched by the Government of India, represents a treaty-based, intergovernmental, international organization for the conservation of the world's seven big cat species *viz.*, tiger, lion, leopard, snow leopard, cheetah, jaguar and puma with its Secretariat based in New Delhi. The objectives of the Alliance include fostering international cooperation, knowledge exchange, capacity building and resource mobilization to strengthen big cat conservation globally. IBCA has actively advanced South–South cooperation by bringing together range and non-range countries to share experiences and best practices in species management, anti-poaching strategies, habitat protection and ecological monitoring. IBCA's expanding membership with 21 countries and many international partner organizations demonstrates growing global engagement and collaboration. IBCA has participated in key international environmental and wildlife conservation forums such as CITES CoP 20, UNFCCC CoP 30, Standing Committee of CITES, 9th Steering Committee Meeting of GSLEP etc. contributing to global dialogue on biodiversity and cross-border conservation, and serves as a platform linking national action with multilateral efforts. Additionally, IBCA has organized and facilitated capacity building programmes, including training workshops and practitioner courses aimed at strengthening institutional and technical capacities of member countries to implement science-based conservation measures. The 1st ITEC Executive Course for wildlife and conservation practitioners conducted by IBCA in February 2025 in Kaziranga National Park witnessed participation of 44 international delegates from 27 countries across the globe while the 2nd ITEC Executive Course conducted by IBCA in February 2026 in Bandipur and Nagarahole Tiger Reserves in Karnataka witnessed participation of 38 international delegates from 22 countries across the globe. Through these efforts, IBCA operationalizes India's commitment to South–South and triangular cooperation and capacity development.

Entrepreneurship

Department for Promotion of Industries and Internal Trade (DPIIT), Ministry of Commerce and Industries, has registered 17,901 start-ups that are related to bio-resources (Table 5.6). Key sector-wise start-ups included; food processing (7,933), agriculture (6,166), biotechnology (725), environmental services and equipment (416), horticulture (451) and fisheries (199).

Table 5.6
Start-ups that are involved in developing technological solutions for sustainable management of biodiversity

Sr. No.	Sectors	Year -2025
1.	Agriculture	6,166
2.	Animal Husbandry	282
3.	Biotechnology	725
4.	Dairy Farming	404
5.	Environmental Services and Equipment	416
6.	Fisheries	199
7.	Food Processing	7,933
8.	Food Technology/ Food delivery	1,269
9.	Food and Beverage	56
10.	Horticulture	451
	Total	**17,901**

Source: *Department for Promotion of Industries and Internal Trade (DPIIT), Ministry of Commerce and Industries (2025)*

Scientific Cooperation and Technology Transfer

Relevant ministries/ departments and organizations encourage and support scientific cooperation and exchange and technology transfer. The DBT, MoST has demonstrated a consistent upward trajectory in fostering innovation ecosystems for conservation and sustainable utilization of bio-resources between FY 2020-21 and FY 2023-24. Data from DBT for FY 2020-21 to FY 2023-24 and BSI reveals significant progress in institutional partnerships, technology commercialization, and international cooperation under South-South and Triangular frameworks-directly.

Capacity Building of Various Stakeholders

Institutions/ organizations concerning biodiversity conservation have been involved in imparting training at local and community levels in agriculture sector, and field personnel engaged in conservation of wild biodiversity. Traditionally, local communities across the country have been involved in biodiversity conservation. Farmers, villagers, pastoralists, fisherfolk, etc. constantly interact with wild biodiversity and help to maintain it. In the past four decades concepts of JFMCs, EDCs, fishery cooperatives, etc., and more recently, BMCs relevant to the implementation of conservation activities at the field level have evolved. SFDs, SBBs, and the ICAR and its institutes, Central/State level Agriculture Universities, and KVKs; State Departments- Agriculture, Animal Husbandry, Fishery, Forest, Wildlife, etc.; specialized national/state level organizations; NGOs, and CBOs conduct field-level trainings for personnel at the field level implementation units. In FY 2020-21, ICAR conducted 57,879 training program, reaching 1.73 million beneficiaries (farmers, farm women, rural youth, and extension personnel). This increased progressively to 74,065 program and 2.32 million participants by FY 2023-24, a 28% rise in program and 34% growth in outreach over four years. The majority of trainings (averaging 57%) were delivered off-campus, ensuring direct field-level engagement with local communities and aligning with the decentralized, community-driven approach.

The Research and Training (RT) Division, MoEFCC is responsible for capacity building under the Forestry Sector Scheme; training of IFS and SFS officers; personnel of other services and other stakeholders; foreign training of forestry personnel; and capacity development for forest management and training of personnel under Externally Aided Projects. Thus, the RT Division with the support of Indira Gandhi National Forest Academy (IGNFA), ICFRE and its institutes, FSI, IIFM, Directorate of Forest Education (DFE), and other specialized national/ state level organizations and NGOs ensure human resource development relevant to forestry, wildlife/ biodiversity conservation, and environmental management.

Awards for Distinguished Contributions

Indian professionals working towards environmental management, wildlife management, and biodiversity conservation are being honored by several national and international agencies and given prestigious awards, including the Goldman Environmental Prize ('Green Nobel'), the Equator Prize, the Whitley Awards ('Green Oscars'), the UNEP Champions of the Earth, the IUCN Kenton Miller Award for innovation in protected areas management, the IUCN Tree of Learning Award for long-term contribution to conservation communication and environmental education, and the Normon Borlaug Award for outstanding work in the field of agriculture and environment.

NBT 21

5.7

Communication, Awareness, and Knowledge Management (NBT 21)

Communication, Education and Public Awareness (CEPA) for the conservation of biodiversity is a crosscutting issue with implications for all the goals and targets of the NBSAP, and progress towards NBTs.

Each central ministry concerned with biodiversity has its own comprehensive strategy towards CEPA which is supported by specialized 'think-tanks' national/ regional/ state level organizations. A wide range of activities are regularly undertaken which includes promoting data generation through research and surveys, citizen science initiatives, using ICT tools like creating interactive exhibitions and dioramas, web portals, publishing reports, dashboards and other communication materials, besides the use of social media and folk media for knowledge dissemination. In addition, ministries are optimally using print, television, social media and modern technologies in popularizing specific programs/ schemes and activities useful to the masses.

India has made notable contributions towards CEPA. All concerned ministries relevant to conservation of biodiversity implement a comprehensive strategy towards CEPA.

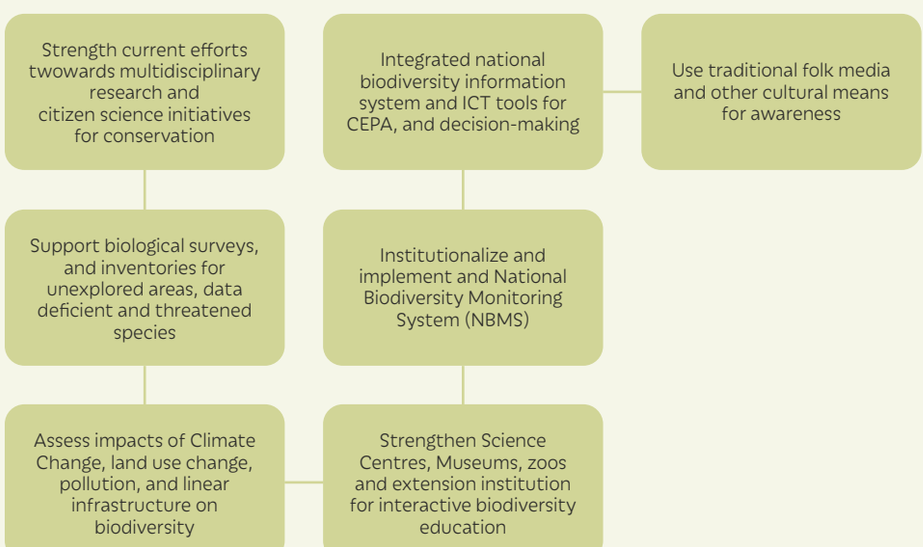


Fig. 5.3
Major CEPA initiatives

Knowledge Management on biodiversity

Specialized scientific and training institutions serving as the 'Knowledge Centres' have been set up by different ministries to support communication, education and innovation, For example, MoEFCC (the nodal ministry for biodiversity), is being supported by its regional and subordinate offices, autonomous institutions, and statutory authorities functioning under its administrative control. These include the BSI, ZSI, ICFRE, FSI, IGNFA, WII, IIFM, GBPNIHED, NCSCM, DFE, and CASFOS. In addition, statutory bodies under the administrative ambit of MoEFCC include the NBA, NTCA, CZA, and the Wildlife Crime Control Bureau (WCCB). All these institutions are mandated to support CEPA under their respective programmes. Likewise, other ministries are also supported by comparable institutional arrangements to facilitate effective implementation, governance and communication within their respective sectors.

The National Agricultural Research System (NARS), at the forefront of the agricultural revolution in India supports domesticated biodiversity. The NARS is a complex system of organizations in which public agricultural research institutions and universities under the central and state governments are networked with farmers and farming organizations, policymakers, state governments, international agricultural organizations, seed and agribusiness companies, agri-tech start-ups, funding institutions, and others. The ICAR, an autonomous organization of the DARE, MoAFW, is the nucleus of the network that brings these diverse entities together into an integrated system. The ICAR has 113 research institutes, six Bureaux, 76 agricultural universities, and 731 Krishi Vigyan Kendras (KVKs), i.e., Agriculture Science Centres supervised by 11 Agriculture Technology Application and Research Institutes (ATARI) spread across the country. India, with ca. 30,000 agricultural scientists (6,500 in the ICAR and 23,500 in the agricultural universities) and more than 1,00,000 technical and support personnel,

has one of the largest human resource capitals in agricultural research in the world. The NARS, in particular the ICAR and various entities under its umbrella, have continued to provide vital inputs for CEPA and knowledge management in the context of the wider discipline of agrobiodiversity.

'Whole-of-Government' and the 'Whole-of Society' Approach

All concerned ministries have launched new programs/ schemes/ initiatives aiming for outreach across various sections of society regarding biodiversity. Prominent among them are Mission LiFE; area-based conservation, species recovery, green clearances, control of pollution and waste management, control of invasive alien species, eco-restoration, integrated coastal zone management, green and blue spaces, climate change mitigation and adaptation, natural farming, organic farming and certification, blue economy, repurposing harmful subsidies, business responsibility and sustainability reporting, and sustainable management of forests, agriculture, fishery, and aquaculture. Ministries have created relevant dashboards for new initiatives, and progress is evident in each such program/ scheme.

More than 4.71 Crore people have participated in 2.8 million Mission LiFE action events. As a part of the mission, a massive plantation drive by engaging state governments, local bodies, schools, industries, and community-based organizations has been initiated. Over 10.36 Crore saplings have been planted under the 'Plant4Mother' (i.e., one plant in the name of mother) program (downloaded from the portal on 18 November 2025). The Department of School Education and Literacy (DoSEL) mobilized over one million schools in the program.

Local Communities

Local communities in India also play a major role in conservation of biodiversity which is facilitated through a three-tier governance model for rural self-governments established vide the 73rd Constitutional Amendment Act of 1992 which takes cognizance of the vast linguistic diversity of the country. The BD Act, 2002, has also provisioned for a three-tier governance system for management of biodiversity. At the local/ field level, 2,76,653 BMCs have been constituted and represented by local people, including the deprived sections of society and women. Besides, JFMCs and EDCs, are part of the decision-making process at the field level.

Biodiversity Sensitization/ Education

The proportion of threatened species in India as per IUCN criteria and procedures is assessed by BSI and ZSI from time to time. These national organizations provide data on the proportion of India's known plant and animal species *vs* threatened species as per the IUCN criteria and procedures. Communication of this information to the public is expected to promote conservation action at local level.

Similarly, the Ocean Biodiversity Information System (OBIS) provides information on marine species occurrence as per the records accessible through the Regional OBIS Node (RON) run by the CMLRE since 2009. IndOBIS collects, collates and disseminates marine species distribution records from the Indian Ocean region and the maintenance of voucher specimens from the Indian EEZ. Till October 2025, all together 1,08,190 occurrence records have been generated.

Most zoos, TRs, aquaria and other ex situ conservation facilities, and PAs in India take up environmental education and biodiversity awareness programmes through interpretation centers, nature camps, audiovisual materials, etc. which are assessed from time to time. Presently, there are 155 zoos recognized by the CZA under section 38-H of the WPA, 1972 in the country. The BSI also supports and maintains Botanical Gardens with large number of threatened and endemic species . It also operates mobile exhibitions.

Data on biodiversity of plants, animals and traditional knowledge have been successfully digitized especially with respect to Traditional Knowledge Digital Library (TKDL), formulation and practices recorded by CSIR (Fig 5.4). This shows an increasing trend. Digitization of PBRs has also been initiated by the NBA in 12 states. This would enable transition from paper based to dynamic georeferenced data on digital platforms.

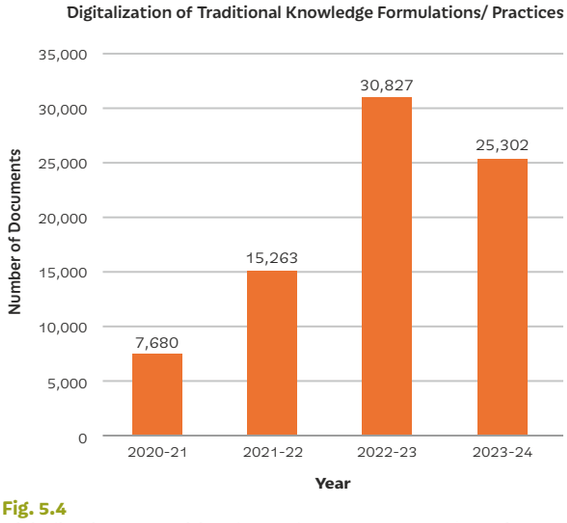


Fig. 5.4
Digitalization of Traditional Knowledge Documents/ Specimens

Source: CSIR, TKDL: NBA-NR7

Museums and Exhibitions

Several exhibits and galleries on biodiversity have been developed at Museums and Science Centres, like National Museum of Natural History (NMNH), Interactive Science Museums/ Science Cities/ Science Centers under National Council of Science Museums (NCSM) and various state governments across the country to enhance public knowledge and appreciation of biodiversity issues. Some of these are equipped with Large Format Film Theatres, 3 and 4 D facilities, Virtual Reality Shows, etc. Many of these also organize theme-based exhibitions and operate interactive mobile science exhibitions to increase outreach to rural schools and public to ensure 'fun as you learn'.

Trends in visitor footfall

Data on visitor footfalls and visits to exhibitions and educational programs of these museums and science centers is maintained which indicates an increasing trend reflecting good outreach. A surge in visitor footfalls was observed in post-COVID era (Fig 5.5).

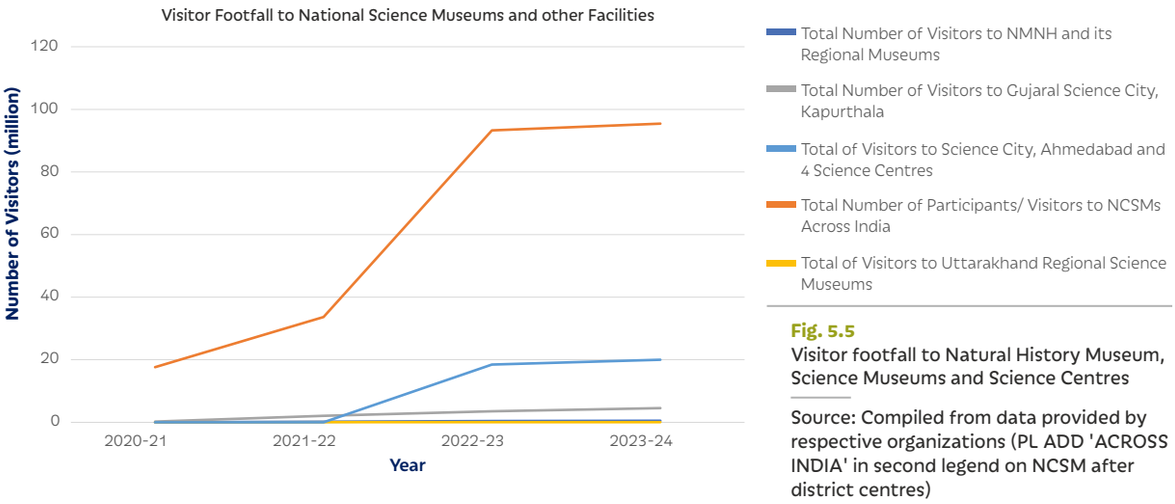


Fig. 5.5
Visitor footfall to Natural History Museum, Science Museums and Science Centres

Source: Compiled from data provided by respective organizations (PL ADD 'ACROSS INDIA' in second legend on NCSM after district centres)

Further, until 2023-24 India had established 58 TRs, 156 zoos and deer parks, and 11 botanical gardens managed by BSI. Visitor footfall indicates significantly increased interest of the general public to such areas. The information is presented in Fig. 5.7.

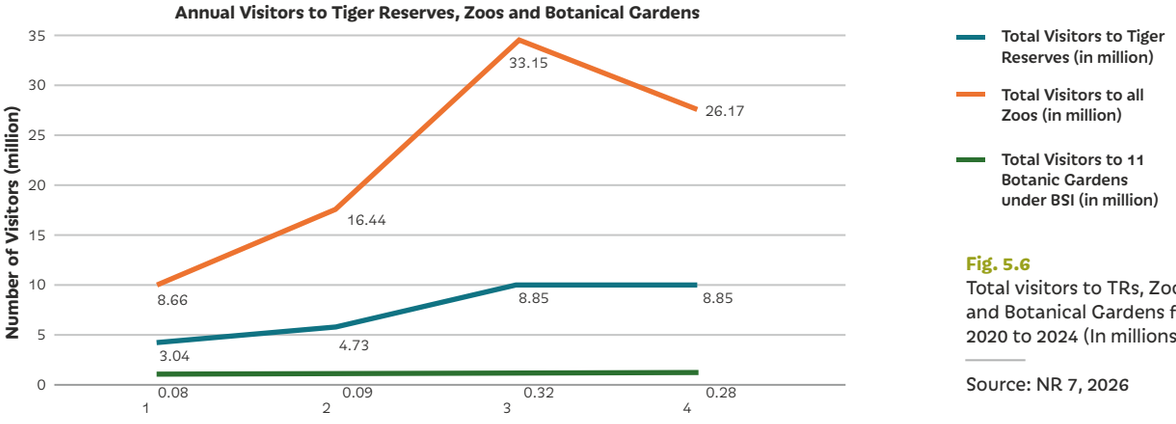


Fig. 5.6
Total visitors to TRs, Zoos and Botanical Gardens from 2020 to 2024 (In millions)

Source: NR 7, 2026

Films and Social Media

To take scientific and technical information to the masses in an easily understandable manner, a number of documentaries and feature films related to biodiversity are being prepared. The information is available across various agencies. MoEFCC has produced a documentary series telecasted on the national television in 2024 and films on wetlands under Mission LiFE with CMS Vatavaran. NBA has prepared 3 short films in 2022 which were translated to many regional languages. UNDP produced 34 short films between 2021 to 2024. ICFRE has produced 7 films, Pushpa Gujral Science City has produced one Virtual Reality film and 2 short films and several SFDs and SBBs have prepared several short films. In addition, MoEFCC frequently collaborates with Centre for Media Studies, New Delhi (CMS), to organize CMS Vatavaran, a

biennial environmental film festival, where Indian films on environment produced in the last two years by individuals and organizations across India are invited for screening at the festival. In 2021 and 2024, total 173 and 168 films, respectively, were received, and best films were awarded during the festival. The MoEFCC has also conducted short film competitions for schools, colleges and professional categories in 2019 and 2025.

Thus, the Environment Education Programme (EEP) of the country successfully sensitizes citizens including children and youth, to environmental issues through diverse pedagogical initiatives, workshops, projects, campaigns, nature camps, films, exhibitions, etc. This is expected to promote pro-environmental behaviour and adoption of sustainable lifestyles.

In addition to the above, CEPA examples include knowledge products like, 'India, Naturally!', 'Conservation Across Landscapes', and 'A Compendium of Best Practices for Conservation of Wildlife in India' showcasing case studies from India Biodiversity Awards (Plate 5.2).

COMMUNICATION, AWARENESS, AND KNOWLEDGE DEVELOPMENT

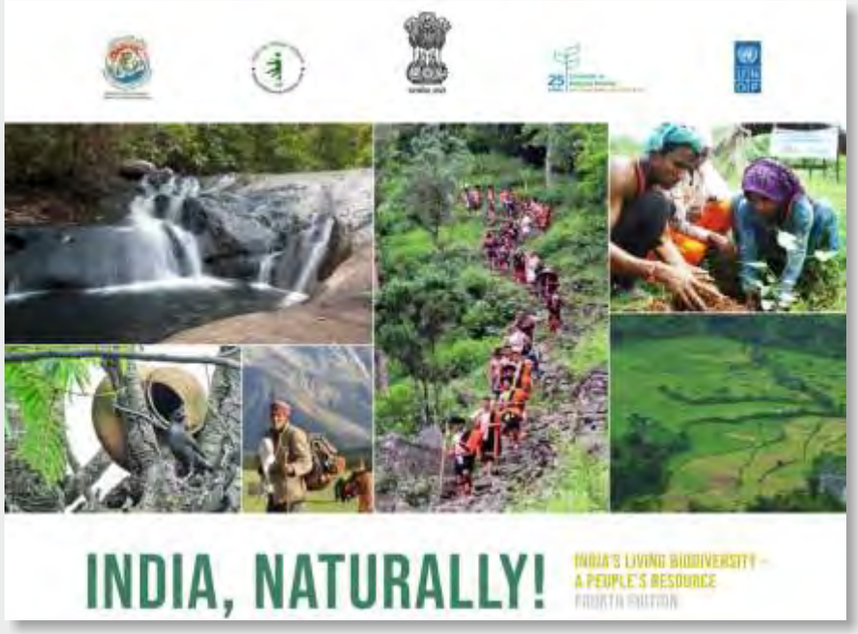


Plate 5.2 Documents Related to Communication, Awareness and Knowledge Development

A wide array of specialized organizations, national/ state-level facilities, strategies, programmes/ activities, communication tools and modes, knowledge products, human resource, financial investments, etc. relevant to conservation of biodiversity by several concerned ministries across the country amply indicate how central/ state governments, international organizations, and NGOs have made efforts to communicate, create public awareness, and enhance knowledge of the society at large about growing environmental concerns and the role people can play in reducing loss of biodiversity, climate change mitigation, control of pollution, etc. However, the financial gap to reach out to the large and culturally and linguistically diverse population of the country needs to be bridged.

NBT 22

5.8 Equitable and Effective Participation in Decision-Making (NBT 22)

Local communities have a cultural and holistic understanding of nature-based traditional knowledge, practices, and innovations, and play a pivotal role in the conservation and sustainable use of biodiversity. Accordingly, India has adopted a comprehensive, transformative, and rights-based approach to conservation by recognizing and strengthening the vital role and fair and equitable participation of local communities, including women and girls, children and youth, and persons with disabilities in various endeavours to achieve the broader goals of biodiversity conservation. Focus is on fair and equitable participation of local communities, including women and girls, children and youth and persons with disabilities in various programs relevant to conservation.

India has made notable contribution towards policy, law, institutional, and governance mechanisms in order to strengthen equitable and effective participation in decision making. Prominent actions/ activities under NBT 22 are presented in Fig 5.7.

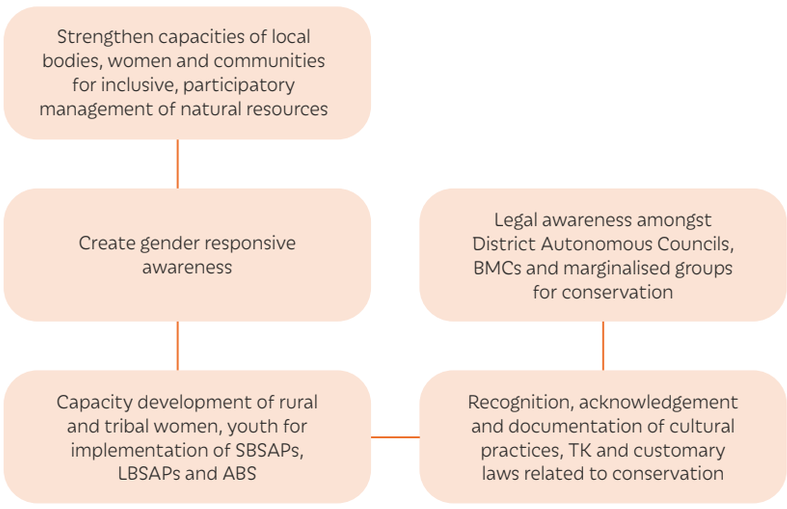


Fig. 5.7 Actions for Effective Participation in Decision making

Local Rights and Community-Led Governance

Several central ministries e.g., MoWCD, MoTA, MoYAS support communities, tribals, women, and youth, in natural resource management and conservation of biodiversity. Various policies and laws adopted/enacted by Government of India and State Governments have emphasis on balancing gender, rights, fair and equity. Further, legal provisions under the BD Act, 2002, FRA, 2006 and PESA Act, 1996, institutionalize decentralized governance. In Scheduled Areas, traditional institutions/ Gram Sabhas have been empowered for the management of natural resources, protection of customary rights, and conservation of biodiversity.

Capacity Building

Mandatory representation of women in BMCs and forest governance bodies has been supported through leadership training, awareness campaigns and livelihood-linked conservation programmes to improve gender-responsive participation. Youth involvement has been expanded through initiatives such as the National Green Corps, campus-based biodiversity clubs, and participation in restoration and climate resilience projects. Efforts to improve access to information and justice include digital platforms for biodiversity data, awareness programmes on ABS mechanisms, and grievance redressal systems at local and state levels. Partnerships with CSOs, research institutions, and community networks continue to strengthen capacities, safeguard traditional knowledge, and ensure that biodiversity decisions reflect the needs and priorities of the most affected stakeholders. Awareness and capacity development programs are organized at the national, state, and local level from time to time.

Equitable Participation

India has implemented a range of measures to strengthen equitable and effective participation of youth, women, and local communities in biodiversity governance. More than 99% of villages in India have constituted BMCs, with the mandatory 33% representation of women and 18% representation of marginalized groups in each BMC so that they have a voice in decision-making. Out of these 94.6% BMCs have prepared PBRs under the BD Act. This has enhanced community engagement in decision-making at the grassroots level. Further, the Central Ministry of Women and Child Empowerment ensures gender equality and representation of women and girls in national and local institutions including public service, legislature and judiciary. As a result, the number of CSOs and NGOs working for biodiversity conservation in sectors like agriculture, environment, forest, and animal husbandry show a strong upward trend representation (Fig. 5.8). The proportion of female to male professional and technical workers has also increased and is currently around 49%. Gender Budget Cells (GBC) in ministries at the national level and state level have been institutionalized for financial allocations to facilitate gender friendly programmes

Thus, the country has policy, legislative and administrative frameworks at the national and subnational levels in place to ensure representation and participation of (a) local communities; (b) women and girls; (c) children and youth; and (d) persons with disabilities in biodiversity decision-making and respects their rights, provides protection from lawsuits against environmental human rights defenders and ensures access to information and justice.

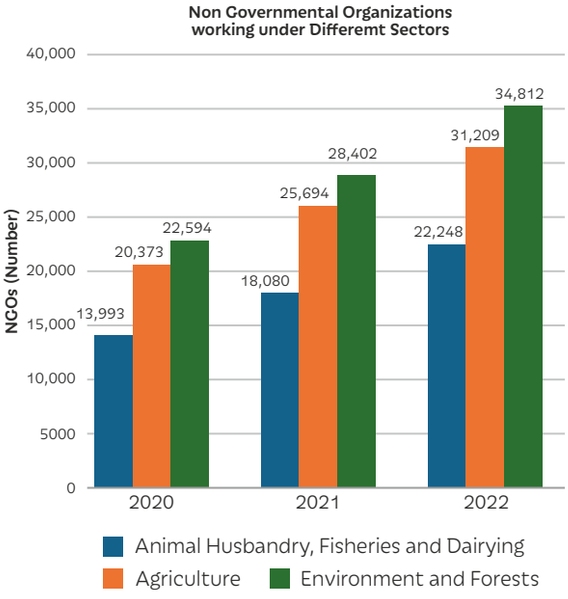


Fig 5.8
Number of Civil Society Organizations, and Non-governmental organizations working in the field of conservation of biodiversity

Source: NR 7, 2026

Box 5.2 - Recognitions by the government- Padma Awards

The country recognizes the role of local communities for their dedicated contributions to environment conservation, forestry, biodiversity, and sustainable agriculture.

From 2021 to 2025, 21 individuals have been conferred with Padma Awards (primarily the Padma Shri) for work undertaken in above areas.

NBT 23

5.10

Gender Equality in Decision-Making and Implementation (NBT 23)

The key role played by women and girls in biodiversity conservation, its sustainable use, and natural resource management has been globally recognized. NBT 23 which is exclusively concerned with gender issues, affirms equal rights of women and girls, including access to land and natural resources, it's uses, and benefits.

NBT 23 relates to one of the 17 SDGs. The Government of India through its central ministries, state governments and departments have initiated a wide range of programs and schemes to ensure gender equality in decision making and implementation relevant to different sectors, including conservation of biodiversity.

Institutional Mechanisms and Policy Integration

Gender equality and their participation in decision-making and programme implementation relevant to the conservation of biodiversity are in place. Whereas, provisions under the FRA, 2006, and amendments to the Hindu Succession Act, 2005, ensure women's entitlement to land and forest resources, legally supporting women's access to, and decision-making power over land-use planning. The BD Act and Rules promote women's participation in biodiversity related issues. This ensures active role of women in implementation of biodiversity programmes at local level.

'Nari Shakti Vandan Adhiniyam, 2023'

The Constitution (One Hundred and Sixth Amendment) Act, 2023, commonly known as the Women's Reservation Act, marks a historic milestone in enhancing women's political representation in India. This Constitutional amendment mandates the reservation of one-third (33%) of seats for women in the Parliament- Lok Sabha (House of the People) and State Legislative Assemblies.

'Sashakt Panchayat-Netri Abhiyan'

Sashakt Panchayat-Netri Abhiyan' is a comprehensive and targeted capacity-building initiative aimed at strengthening women elected representatives of PRIs across the nation. It focuses on sharpening their leadership acumen, enhancing their decision-making capabilities, and reinforcing their role in grassroots governance. Recognizing the on-ground challenges faced by women leaders and duty bearers a comprehensive document on 'Primer on Law Addressing Gender-Based Violence and Harmful Practices' for Panchayat-elected representatives has also been prepared. The government has launched the 'Model Women-Friendly Gram Panchayats Initiative' with an aim to establish at least one 'Model Gram Panchayat' in each district in the country that is both women- and girl-friendly, reinforcing the commitment to gender equality and sustainable rural development.

Community-Led Conservation and Traditional Knowledge

Biodiversity management through seed conservation, water harvesting, agroecological practices, and forest protection committees is increasingly recognized in Community Forest Resource (CFR) management plans and by BMCs.

Capacity Building and Networks

Capacity building and development of community networks have been carried out under several national and state-level programs, such as the National Rural Livelihoods Mission (NRLM), EDCs, and SHGs which integrate women into biodiversity-linked livelihoods (e.g., medicinal plants, NTFPs, ecotourism), thereby strengthening their economic independence and decision-making capacity.

Awareness and Advocacy

The networks of women leaders, NGOs, and grassroots organizations also create awareness and advocate for greater inclusion of women in biodiversity action, climate adaptation, and sustainable livelihoods.

Gender Segregated Surveys

Gender segregated surveys are being used to collect information/ data, for facilitating equitable and informed participation of women and girls at different levels of action and engagement, and analysis and distribution of this data to explicitly recognize and

protect their rights through, policies and legislations. The constitution of India guarantees gender equality and empowers the state to formulate affirmative action in favour of women, as well as, through the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), to which India is a signatory.

Initiation of Gender Specific Schemes

Initiation of gender specific schemes like 'Beti Bachao Beti Padhao (BBBP),' i.e., Protect Girl Child, Educate Girl Child, National Social Assistance Program (NSAP), and Scheme for Adolescent Girls (SAG) support women and girls to be socially secure, whereas initiatives like 'Samagra Shiksha', Scheme of National Overseas Scholarship, ensure that schools are girl-friendly especially for vulnerable sections of society and have adequate facilities in place to fulfil their special requirements (PIB, 19 July 2021 on Welfare schemes of the Government promoting girls education). These schemes are implemented through a dedicated central ministry i.e., MoWCD.

Budget Allocation for Gender Inclusive/ Responsive Schemes Linked to Biodiversity

Most central ministries at the national level and state/ UT Governments have Gender Budget Cell (GBC). For the FY 2026-27, a total of 53 ministries/ departments and 5 UTs have reported allocations which is the highest number of reporting by the ministries/ departments in the GBC since its inception. These schemes show a steady upward trend from 2020 to 2024, e.g. 'Mahila Kisan Sashaktikaran Pariyojana' (Women Farmers Empowerment Scheme).

BMC Meeting and Training and Capacity Building

Capacity Building across Various Developmental Sectors

Women trained in agriculture are the largest and most consistent, crossing 1.2 million participants. Further, the 'Van Dhan Yojana' (Forest Wealth Scheme), strengthens value chains for NTFPs by organizing tribal communities into enterprise-based groups for value addition and market access. The initiative has substantially empowered tribal women by improving incomes, skills, and leadership in biodiversity-based sustainable livelihoods. Furthermore, 'Drone Didi Scheme' is a flagship revolution where women in SHGs are trained to operate drones for precision agriculture. They use biopesticides and biofertilizers more efficiently, mapping biodiversity and soil health from the air.

Economic Empowerment

There are 1,70,140 women members in JFMCs. The MoRD also supports the setting up of women led SHGs and micro enterprises dealing with bio-resources and biodiversity-based livelihoods particularly under the MSME and cooperative sectors. The number of women-owned MSMEs surged from about 0.49 million in FY 2020-21 to over 1.4 million by FY 2023-24, indicating a strong entrepreneurial trend. Gender allocations are strongest in the rural development sector (66%) followed by renewable energy sector (41%), reflecting deeper integration of women-focused actions in these areas. Women researchers in natural sciences and agriculture has 22.5% representation. Increasing participation in programs such as Women Cooperatives under National Cooperative Development Corporation (NCDC) and other women-centric initiatives highlights women's growing economic empowerment through biodiversity-linked schemes and activities.

Bio-manufacturing at village level has been strengthened by schemes like 'Lakhpati Didi' that are incentivizing women to set up small-scale units for processing bioresources such as converting agricultural waste into biogas (the Gobardhan model) or producing high-value essential oils from local flora.

The handicraft sector provides employment to about 7 million artisans, with significant female representation (50.07%). Approximately 1.69 million women handicraft artisans are registered with the Office of the Development Commissioner (Handicrafts). Under

'Pehchan Initiative' (Recognizing Initiative) that aims to identify artisans, roughly 2.0 million out of 3.2 million registered artisans were females. Similarly, silk sector also engages 55% women in the silk production value chain.

Representation of Women in Governance and Decision-Making at Various Levels

Representation of women in governance and decision-making at various levels has remained robust at the local level, with over 45% participation in PRIs and strong women's political presence in governance and decision-making. As per the UN Women, the proportion of women in managerial positions in India was 14.95% in 2023.

Recognitions

Women contribution is adequately recognized by the Government of India through Padma awards and Nari Shakti Awards by MoWCD. In addition, Women Transforming India (WTI) Awards are also hosted by NITI Aayog's Women Entrepreneurship Platform (WEP).

Padma awards and Nari Shakti Awards

Padma Awards

In 2024 and 2025, out of 10 individuals from rural communities who in 2025, have been conferred with Padma Shri, for their dedicated contributions to environment conservation, forestry, biodiversity, and sustainable agriculture, 30 per cent was women

Nari Shakti Puraskar

Based on the Nari Shakti Puraskar award records between 2019 and 2025, 13 women were recognized for their work in environment, biodiversity-based livelihoods, and plant/ animal conservation.

CHAPTER **06**

CONCLUSION AND WAY FORWARD

India has made significant progress in all three themes of the updated NBSAP. Many programs and activities undertaken across the 23 National Biodiversity Targets represent unique initiatives based on country's rich tradition and culture and are contributing significantly towards achieving the goal of conserving nation's biodiversity.

6.1
Achievements

The achievements under 23 National Biodiversity Targets under the three themes as per KMGBF are summarized in the following sections:

Biodiversity: Conservation and Threats

Over the past several decades, India has developed a strong cross-sectoral policy, legal framework for biodiversity conservation besides establishing a robust institutional mechanism for its effective implementation, duly supported by appropriate governance structure, capacity building, research, monitoring, and technology integration. A whole-of-government and the whole-of-society approach has resulted in steady expansion of natural ecosystems under various conservation regimes. For example, the extent of Protected Areas (PAs), Tiger Reserves (TRs), Elephant Reserves (ERs), Ramsar Sites, and Eco-Sensitive Zones (ESZs) has increased notably, and the required policy and strategy to expand Other Effective Area-based Conservation Measures (OECMs) are in place. With nearly 27% of its land, water, and marine areas under conservation, India is progressing steadily towards achieving National Biodiversity Target (NBT) 3 aligned with the global "30x30" agenda. Complementary efforts such as habitat restoration, ecosystem-based management, landscape, riverscape, and seascape approaches combined with participatory conservation and community engagement, have strengthened ecosystem integrity, connectivity, and resilience, while contributing to climate mitigation and adaptation under frameworks like the National Action Plan on Climate Change.

India has also made notable strides in halting human-induced species extinction through integrated *in situ* and *ex situ* conservation measures. Targeted actions such as anti-poaching initiatives, habitat protection, and species recovery programs have helped revive populations of several threatened species, including the Bengal tiger, Asiatic lion, Snow leopard, Great one horned rhinoceros, and Gharial. Science-based approaches including biodiversity assessments, population monitoring, conservation breeding, and species reintroduction have enabled recovery of populations and restoration of distribution ranges. Integration of biodiversity safeguards into environmental clearances and sectoral policies has further ensured that development pathways remain aligned with conservation priorities.

In addition, India has made substantial progress in documenting and conserving the genetic diversity of its flora and fauna including their wild relatives to safeguard the adaptive potential of species'. Advancements in biotechnology, genetic engineering, and conservation genetics supported by diverse range of institutions have strengthened the conservation of plant, animal, fish, insect, and microbial genetic diversity. A robust biosafety framework, including a multi-tier regulatory system (IBSC-GEAC-SBCC-DLC), supports risk assessment, monitoring, and compliance with international commitments such as the Cartagena Protocol on Biosafety. These coordinated efforts reflect India's comprehensive approach to advancing area-based conservation, preventing species extinction, and preserving genetic diversity. Some of the achievements in quantitative terms are:

- India's tiger conservation initiative, launched in 1973 under Project Tiger, has led to a significant increase in tiger population, with tiger reserves expanding from 9 in 1973 to 58 in 2025.
- The India State of Forest Report (ISFR) 2023 highlights growth in India's forest cover, increasing from 6,98,712 km^2 in 2013 to 7,15,343 km^2 in 2023.
- Under Mission Amrit Sarovar, launched to promote water conservation and wetland rejuvenation, 68,827 wetlands have been restored nationwide reflecting unprecedented community-driven efforts.
- A significant conservation achievement is the addition of 158 Protected Areas between 2020 and 2024 (from 976 to 1,134), expanding coverage by 12,000 km^2 is a significant achievement of India's *in situ* conservation effort.
- India's Ramsar sites network has expanded from 26 sites in 2014 to 98 sites in 2026.
- In January 2026, country had a network of 1,601 stations (Manual + real-time) for ambient air quality monitoring covering 583 cities in 28 States and 7 Union Territories.

Addressing Key Challenges

- Technology constraints - Geospatial assessment processes and pollution control devices are expensive, and require sophistication, and involve a huge skilled and professional workforce. These need to be in place for effective monitoring/ control.
- Assessment and monitoring at regular interval- Regular monitoring/assessment of ecosystems and biodiversity at shorter time interval would help taking appropriate policy measures and planning that would in turn help achieve the desired conservation outcome faster than that is achieved currently with a long interval assessment period e.g., mapping of wetlands.
- Enhanced human-induced disasters- Human-induced disasters need to be controlled with stricter regulations and effective enforcement. These range from faulty land use, alteration and blocking of natural drainage systems, altering hydrological regimes, wildlife habitat loss and degradation (leading to human-wildlife conflicts), and habitat fragmentation to industrial disasters.
- Agriculture intensification and declining soil health- Large-scale faster adoption of natural/ agroecological farming practices will improve the soil health and ensure sustainable agricultural land management. The current efforts need to upscale manifold.
- Anthropogenic pressures- Recurrent forest fires, biotic pressure across PAs and other conservation areas, Illegal livestock grazing, pollution, unsustainable extraction of resources and use of faulty harvesting methods for extraction of natural resources need to be curbed with extensive awareness raising efforts, and appropriate technology interventions.
- Inadequate resources- The country needs to augment the human, financial, and technological resources along with a sustained and timely flow of funds to achieve the desired targets within the time.
- Long-term research for ecosystems- Long-term studies across the country's diverse ecosystems need to be initiated for monitoring the program outcomes and also designing new programs to achieve the desired goals.

Sustainable Use of Biodiversity and Benefit Sharing

Over the past two decades, India has significantly advanced the sustainable management and use of biodiversity through coordinated initiatives led by the MoAFW, MoFAHD, and MoEFCC, along with international partners. These efforts encompass a wide range of programs promoting natural and organic farming, soil health management, integrated pest management, conservation of genetic resources, and sustainable fisheries practices such as regulated fishing seasons, catch limits, habitat protection, and community participation. Initiatives supporting traditional crops, conservation of indigenous livestock breeds, sustainable management of non-timber forest products, and integrated wetland and forest certification have further strengthened sustainability, with national indicators under NBT 10 showing positive trends.

In addition, sustainable consumption and production practices such as reducing food loss, promoting recycling, and adopting Extended Producer Responsibility have gained policy and regulatory support. Community-led conservation has been strengthened through the promotion of climate-

resilient crops, local innovations, and integration of traditional knowledge into livelihoods. Gender-responsive approaches, particularly those enhancing women's participation and leadership in biodiversity governance, are increasingly contributing to improved conservation outcomes and sustainable resource management.

Recognizing the pressures from ecosystem degradation, pollution, invasive alien species, and overexploitation, India has undertaken targeted interventions to maintain the integrity of its diverse ecosystems and enhance their ecosystem services. Programs focusing on control of invasive species, pollution abatement, waste management, and development of urban green spaces are being implemented by government agencies, community-based organizations, and civil society. These efforts are improving ecosystem resilience and sustaining ecosystem services, meeting NBTs 6, 7, 8, 11, and 12

India's biodiversity initiatives are closely aligned with the Sustainable Development Goals, with actions across all 23 National Biodiversity Targets contributing directly to multiple SDGs. The country has established a robust framework for Access and Benefit Sharing (ABS) under the Biological Diversity Act 2002, ensuring equitable sharing of benefits derived from biological resources and associated traditional knowledge. With over 5,600 ABS agreements generating around INR 266 Crore of which nearly INR 145 crore has been distributed to beneficiaries India demonstrates strong implementation of the Nagoya Protocol. The issuance of more than 3,500 Internationally Recognized Certificates of Compliance (IRCCs) further strengthens transparency, while increased documentation in People's Biodiversity Registers reflects growing community participation.

India has strengthened its ongoing programs and initiated several new programs for the prioritized the protection and promotion of biodiversity-associated traditional knowledge through documentation, validation, revitalization of sustainable practices, and integration with livelihoods. Legal frameworks such as the Forest Rights Act, 2006, Panchayats Extension to Scheduled Areas Act, 1996, and the Biological Diversity Act, 2002 reinforce community rights and ensure equitable benefit-sharing. These measures empower local communities as key custodians of biodiversity, promote culturally significant conservation practices, and strengthen long-term sustainability, positioning India as a leader in inclusive biodiversity governance and the sustainable use of genetic resources. Some of the achievements in quantitative terms are:

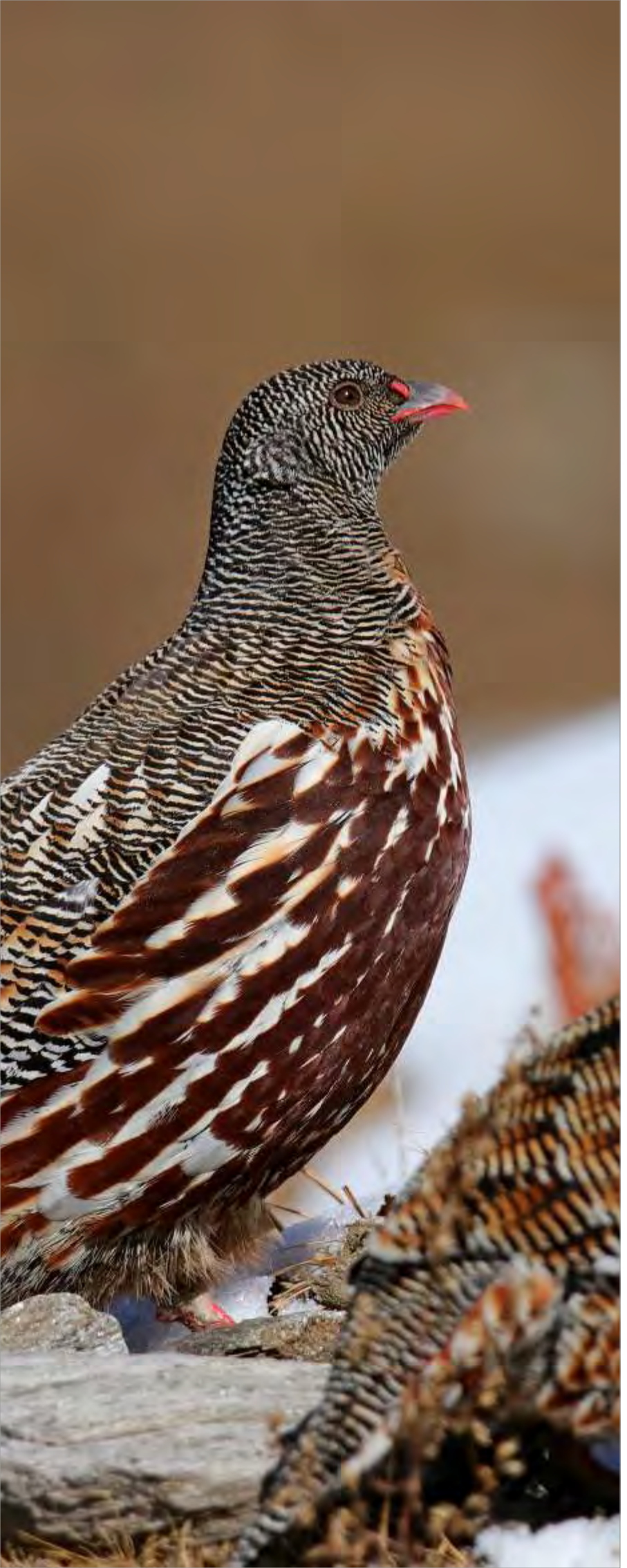
- India has constituted 2,76,653 BMCs at the grassroots level and prepared 2,72,648 PBRs. The Government of India has promoted the expansion of natural farming, resulting in 2.68 million ha being brought under natural farming practices as of 2024, with 0.41 million farmers enrolled nationwide.
- India follows a three-tier disaster management system (NDMA-SDMAs-districts) with National Disaster Response Force and State Disaster Response Forces support, alongside strengthened early-warning systems and over 96,600 trained volunteers under the Aapda Mitra Scheme.
- India has taken a lead in operationalization of ABS mechanism including recognition of DSI under national scope.
- Over 700 farmers and 36 community institutions have been honored through awards supported by the National Gene Fund under Protection of Plant Varieties and Farmers' Right Authority (PPVFRA), MoAFW.
- More than 10,000 plant varieties including farmers and traditionally cultivated varieties have been registered under PPVFRA.

Addressing Key Challenges

- The SFDs, SBBs, and several state/ national level organizations under the MoEFCC, and State Institute of Rural Development & Panchayati Raj (SIRDPRs)/ National Institute of Rural Development and Panchayati Raj (NIRDPR) regularly carry out awareness campaigns, and also conduct short-term capacity building courses for PRIs and CBOs focusing on themes like participatory approaches to conservation; forest protection; sustainable management of forests; collection/ harvest of NTFPs, value addition, supply chain management, and marketing; access and benefit sharing, ecotourism, etc. Such activities need to be accelerated with a special focus on value addition of known NTFPs that will ensure high economic return leading to the sustainable management of these resources.
- Fast tracking the inventory and bioprospection of biodiversity by scientific institutions for realizing their commercial potential to boost bioeconomy and ensure benefits to communities through ABS.
- Although several steps have been taken to curb air and water pollution, more stringent regulations and their implementation is required along with adequate awareness programs. Development of indigenous effective advanced technologies to mitigate and control such pollutions needs to be prioritized.

Implementation and Mainstreaming of Biodiversity

Effective biodiversity conservation in India is supported by multi-scale, multidisciplinary, and multi-stakeholder approaches, underpinned by strong means of implementation such as communication, education and public awareness (CEPA), capacity development, scientific cooperation, and technology transfer. Multiple central ministries and specialized institutions contribute to research, monitoring, and training,



supported by India's extensive National Agricultural Research System and well-established forest and wildlife research networks. Advanced tools such as remote sensing, GIS, satellite telemetry, UAVs, camera traps, and DNA-based techniques are increasingly used for monitoring ecosystems and species. Institutional mechanisms like the National Green Tribunal, Right to Information Act 2005, and environmental impact assessment processes strengthen transparency, accountability, and access to justice, while a comprehensive biodiversity monitoring framework with 142 indicators across 23 NBTs ensures robust tracking of progress.

India has also made significant strides in addressing biodiversity finance through innovative and structured approaches. As a pioneer in the Biodiversity Finance Initiative, the country has undertaken detailed assessments of biodiversity expenditure, financial needs, and funding gaps, and developed strategic finance plans for resource mobilization. Efforts to bridge the finance gap include leveraging instruments such as corporate social responsibility (CSR), green bonds, carbon credits, and green credits, along with promoting sustainable production systems, repurposing harmful incentives, and strengthening supply chain sustainability. These initiatives have contributed to positive trends in national indicators related to resource mobilization and sustainable finance.

Some of the achievements are:

- Eco-Clubs under Mission LiFE promote environmental consciousness and sustainable behavior among students, engaging over 10.76 million participants across 3,87,196 clubs in 3,60,822 activities (as of February 2026).
- PM-PRANAM is a Government of India initiative that incentivizes States/UTs to reduce chemical fertilizer use, achieving a reduction of 1.459 million metric tonnes across 9 States/UTs in 2023-24.
- India is the first country to mandate CSR under the Companies Act 2013, requiring eligible companies to spend 2% of profits, with INR 59,505 Crore (2014-2020) contributed to SDG-aligned sectors including environmental sustainability and conservation.
- India has a functional biosafety regulatory framework that is updated as per the emerging requirements.
- Green budgeting integrates ecological priorities into economic planning by directing public finances toward biodiversity conservation and sustainable resource use, with 5.6% of India's FY 2022-23 budget aligned to green objectives as reported by the Climate Change Finance Unit.
- With Gender Budget Cells (GBCs) across most ministries and states/UTs, FY 2026-27 saw a record 53 ministries and 5 UTs reporting allocations, continuing a steady rise since 2020, led by schemes like ‘Mahila Kisan Sashaktikaran Pariyojana’.

Addressing Key Challenges

- The wider subject of biodiversity is being covered by nearly 30 central ministries. However, contributions from other stakeholders remain a challenge for effective mainstreaming of biodiversity across the sectors.
- Conservation of biodiversity, being a multidisciplinary, multiscale, multisectoral, and multistakeholder subject, requires enormous financial resources. Presently, there is a gap between the current biodiversity expenditure and the biodiversity finance need. The implementation of scale is also limited regarding disclosures by the businesses and companies.
- Reaching out to a large number of professionals, frontline staff, grassroots-level workers, and other stakeholders in different regions and adapting to local situations is also a major challenge for the national-level specialized organizations.
- Regional disparities in physical, climatic, biological, and socioeconomic conditions limit the reach and effectiveness of biodiversity conservation and CEPA efforts, in particular. These efforts are further compounded by significant linguistic and cultural diversity that necessitates extensive translation of materials, policies, and outreach content into multiple regional languages. Awareness, education, and capacity at the local level require enhanced thrust towards achieving the national agendas and effective CEPA implementation.
- Social and cultural norms, especially in rural areas also often restrict women's participation in governance and natural resource management, and limited ownership of land and productive assets reduces their decision-making power. The country is taking steps to address this issue by promoting scientific temper in the society.

6.2 Way Forward

While preparing NR7, data and information were collected from all the concerned ministries and state/UT departments in respect of each indicator. Peer-reviewed published literature, and authentic web information were also consulted and used wherever appropriate. During the process, information and documentation gaps by different ministries and State/UT departments, needs for undertaking specialized research and studies for indicator-oriented data generation, and requirement of initiating new programs and activities to achieve the targets were identified and prioritized. A few indicators not relevant to India, but included in the updated NBSAP, 2024 were identified, which need to be re-examined and recommended for dropping in future reporting exercise. Actions pertaining to many indicators need to be undertaken at a much faster space by the states/UTs and at local government/community/civil society levels in addition to the Government of India's programs, for which appropriate strategy needs to be developed and implemented. Considering the above needs, and based on the consultations with diverse stakeholders, the following activities were prioritized for achieving the desired progress under each NBT.

Bringing all significant Biodiversity Rich Areas under planning framework:

Although a number of ecosystems/protected areas/Tiger Reserves/Reserved Forests have been covered under management working plan, it is yet to be taken up for several terrestrial and aquatic biodiversity rich areas for their effective conservation planning. There is a felt need to prepare and implement a comprehensive strategy to implement the above tasks.

Restoration of Degraded Ecosystems:

To achieve the target of 30 percent of degraded terrestrial, inland water and marine and coastal ecosystems under effective restoration, by 2030, the following activities needs to be undertaken: (i) Selection of areas and eco-systems for restortion based on pre-defined criteria, (ii). Strengthen and augment the existing program and schemes to accelerate the pace and technology and capacity development support for restoration.

Biodiversity Conservation in land, water and sea:

1. India is committed to agenda 30x30. This necessitates expansion of the network of PAs and OECMs; 2. Prioritise the Biodiversity rich areas e.g. Biodiversity Heritage Sites in inland, water and sea areas, for research on threatened and endemic species, identification of hotspots of agrobiodiversity and their conservation; and 3.Update the database on sacred groves, ponds and landscapes to document bioresource and associated knowledge for effective conservation of biodiversity including cultural diversity.

Management of Species and Genetic Diversity:

1. The ongoing efforts for threat classification based on IUCN Criteria has to be accelerated to prepare a complete list of threatened flora and fauna and their prioritisation for their conservation action; 2. Conservation measures for such priotised species; 3. Documentation of genetic diversity among the crops, other animal and plant resources and microbes; and 4. Deployment of appropriate technology and other resources including management strategy need to be in place to mitigate human- wildlife interaction.

Sustainable use of Wild species:

1. To prepare an inventory of potential economically important wild biological resources for bioprospecting;

2. Maintain a database of such bioresources which are in trade and encourage cultivation of economically and medicinally important bioresources; and 3. Develop sustainable harvest practices and market linkages for effective trade.

Manage Invasive alien species:

1. Management strategies for invasive alien species in different eco-regions need to be developed and implemented through focused research and actions; 2.Creation of baseline information and a database on terrestrial and aquatic invasive alien species; 3. Mapping the current distribution, population status, and prediction of spread of the Invasive alien species; 4.Long-term research and monitoring on priority invasive for their control measures; 5. Piloting the best control measures and capacity development of the various stakeholders; 6. To upscale and implement appropriate control and management measures; and 7. To develop and implement Standard Operating Procedures (SOPs) for effective quarantine measures including regional / global cooperation.

Reduction of pollution and its impact:

1. Strengthening the ongoing efforts relevant to awareness, pollution monitoring and control; 2.Survey and develop a national inventory of toxic and hazardous wastes dumps and an online monitoring system for the movement of hazardous wastes; 3. Strengthening the capacity of institutions responsible for monitoring and enforcement in respect of toxic and hazardous wastes; 4. Further, strengthening the legal instruments and response measures for addressing emergencies arising out of transportation handling and disposal of hazardous wastes; 5. Accelerated efforts to eliminate point and non-point sources of pollution and promote the use of clean technologies to reduce its adverse impacts on biodiversity; 6. Develop and facilitate public-private partnership for collection, segregation and setting up/operating secure landfills, incinerators and deployment of other appropriate techniques for the treatment and disposal of municipal, industrial and biomedical wastes including e-waste and micro/nano plastics; 7. Promote biodegradable and recyclable substitutes for non-biodegradable materials; and 8. Encourage utilization of non-hazardous industrial waste e.g., fly-ash, with appropriate technology deployment to reduce pollution.

Minimizing the impact of climate change:

1. In view of climate change- biodiversity nexus, biodiversity conservation efforts need to be accelerated at all levels by way of mainstreaming, inter-agency cooperation, participatory, and integrated management of natural resources at the national/ state level; 2. Identify ecosystems and species vulnerable to climate change at national, state and local levels, and promote ecosystem management based approaches and relevant measures such as watershed management, coastal and marine areas planning and regulation, agricultural technologies and practices, forest management and health programs; 3. Mission LiFE (Lifestyle for Environment) across the country highlighting the importance of conserving natural resources and living in harmony with nature based on Indian culture and living traditions which are inherently sustainable; 4. Promote research on various aspects of climate change and its impact on biodiversity; 5. Promote ecosystem-based approaches for climate change mitigation and adaptation; and 6. Develop programs for implementing biodiversity conservation actions that would maximize co-benefits in relation to climate change.

Sustainable use of wild species:

1. Inventory, population survey, phytochemical nutrient characterization and database development of wild species in different ecosystems for their sustainable use; 2. *In situ* conservation efforts of wild species need augmentation and strengthening; 3. Multiplication and domestication of wild species for commercial purposes would need a comprehensive strategy for enhancing natural regeneration; sustainable harvest and use; supply chain management; value addition; processing; and marketing; 4. Promote best practices in sustainable cultivation and harvest based on traditional knowledge for providing benefits to local communities; 5. Encourage and support relevant institutions and community organizations e.g., JFMCs/ EDCs/BMCs/Panchayats. tribal bodies, Community Forest Resource Management Committees [CFRMC] for sustainable use of wild species through developing participatory management plans; and 6. Develop micro and small entrepreneurs sustained supply of raw material and value addition.

Sustainable management of agriculture, animal husbandry, fisheries, aquaculture and forests:

1. Engagement with concerned international, national, state, and local agencies besides local communities needs to be strengthened; 2. Encourage adoption of science-based and traditional sustainable land use practices through research and development, knowledge sharing, pilot scale demonstrations, and large-scale dissemination including farmer's training and wherever necessary, access to institutional finance; 3. Promote sustainable alternatives to shifting cultivation where it is no longer ecologically viable.; 4. Encourage agroforestry, organic farming, agroecological approaches, environmentally sustainable cropping patterns. traditional crop varieties, and the adoption or efficient irrigation techniques; 5. Integrate wetland conservation, including management or village ponds and tanks, Springs and streams into sectoral development plans for poverty alleviation and livelihood improvement; 6. Enhance restoration and strengthen sustainable management of mangroves to ensure the protection of coastal belts and

conservation of flora and fauna; 7. Promote natural and sustainable farming of locally adapted and traditional crop varieties through traditional practices (draught animals) and appropriate incentives and direct access to markets duly supported by appropriate certification systems; 8. Strengthen effective management of forests for multiple benefits while ensuring sustained flow of ecosystem services; 9. Promote climate-smart agriculture and water-efficient crops; 10. Promote best animal husbandry practices for semi-domesticated and indigenous livestock; and 11. Raise awareness or the interlinkages between biodiversity and health for nutrition, food security, livelihoods and food system resilience.

Enhance and maintain ecosystem services and regulate air and water quality, hazards and extreme events:

1. Current efforts towards ecosystem management and integrated management planning in the prioritized landscapes/ riverscapes/ seascapes need augmentation and strengthening for ensuring the continuous flow of ecosystem services and maintaining air and water quality; 2. Scale up studies on the economic evaluation of ecosystem services and develop standardized protocols for wider use and consistency; 3. Promote ecosystem-based approaches to enhance ecosystem services and regulation of air, water, hazards and extreme events; 4. Ensure timely and effective planning and management for dealing with exigencies, disasters and extreme events impacting PAs and other biodiversity-rich areas including fire events; and 5. Scale up activities relevant to rejuvenation of mountain springs, streams, rivers and water catchment areas.

Enhanced green and blue spaces:

1. The Ongoing efforts by the MoHUA, MoEFCC, and other organizations need to be strengthened by generating baseline information and managing green, blue, and open spaces in urban environments through innovative participatory approaches; 2. Recognize green and blue spaces as a part of Other Effective Area based Conservation Measures; 3. To establish blue and green urban spaces in all municipal bodies.

Access and Benefit Sharing:

1. Strengthening of SBBs and BMCs and enhancing their capacity for harnessing the benefits of ABS mechanisms; 2. Undertake inventory of potential resources for commercial utilization and disseminate to BMCs/ Panchayats for effective benefit sharing; and 3. Set up traceability mechanisms especially for use of Digital Sequence Information (DSI) from genetic resources and traditional knowledge linked to genetic resources.

Mainstreaming Biodiversity:

1. Strengthening cross-, sectoral integration of landscape / riverscape/ seascape-level planning and management, 2. Integrate biodiversity concerns into inter-sectoral policies and programs to identify elements having adverse impacts on biodiversity and design policy guidelines to address such issues; 3. Ensure that valuation of biodiversity is an integral part of the pre-appraisal of projects and programs to minimize adverse impacts on biodiversity; 4. Formulate policies, guidelines, and schemes for supporting conservation and management of grasslands, pastoral lands, sacred groves and other areas significant for biodiversity conservation; and 5. Effectively use the System of Environmental Economic Accounting (SEEA)- Ecosystem Accounting (EA) to reflect the ecological and economic values of biodiversity, for different ecosystems using advance green accounting tools for their inclusion in national accounts.

Sustainable production, supply chains and disclosure of risks:

1. Businesses will be encouraged to adopt best practices and ensure compliance with the BRSR framework by all companies; 2.Development of appropriate liability and redress mechanisms for businesses to internalize environmental costs and address economic concerns in case of any damage to biodiversity; 3. Harmonize provisions concerning disclosure of the source of biological material and associated knowledge used in the inventions under the Patents Act, Protection of Plant Varieties and Farmers Rights Act and Biological Diversity Act to ensure the sharing of benefits to the communities holding traditional knowledge from such use; 4. Promote adoption of best practice norms in key sectors like tourism, renewable energy for addressing biodiversity concerns; and 5. Implementation of mandatory disclosure of the movement of biological resources that are not native to the country or from priority conservation areas.

Promote Sustainable consumption:

1. Ongoing programs/ activities related to Mission LiFE, PMKSY, PMFME, PLISFPI, natural farming, organic farming, certification, ecolabeling, consumer rights, and sustainable consumption choices need augmenting and strengthening; 2. Identify sources and patterns of unsustainable consumption within the government system, urban and rural societies, and industries to take appropriate measures for its redressal; and 3. Strengthen programs to promote cold storages and food processing to reduce wastage of perishable commodities.

Strengthening biosafety and regulatory compliance:

Finance and human resources, infrastructure, and use of appropriate technologies in research, scientific exchange, and technology advancement need to be supported for effective biosafety and regulatory compliance.

Repurpose detrimental incentives for Biodiversity:

1. Regular updating of national subsidy inventories and its periodic monitoring to continue; 2. Continue to identify and assess the extent of detrimental subsidies e.g., in agriculture, fossil fuel, construction, automobile, fisheries. etc. and plan to repurpose detrimental incentives; and 3. Promotion of positive incentives for effective conservation and sustainable use of biodiversity.

Resource Mobilization :

1. Designing innovative fiscal instruments for promoting conservation and sustainable utilization of biodiversity; 2. Mobilise supplemental financial resources through private finance, international finance, and other innovative finance solutions such as biodiversity cess and conservation license plates cess; 3. Development of protocols for promoting biodiversity credits; and 4.Provide adequate and timely support for mobilizing resources for effective implementation of NBSAPs. SBSAPs, and LBSAPs.

Capacity Development, technology and scientific cooperation:

1. Supporting institutional collaborations through South-South, North-South, and triangular cooperation for technology access, transfer, innovation, and joint scientific initiatives; 2. Resource mobilization and sustained funding to enable full utilization of course capacity, and expansion of training infrastructure; and 3. Promoting community-led and decentralized capacity-building efforts involving all stakeholders including policy makers, BMCs, and frontline workers;

Communication, awareness and knowledge management :

1. Developing high-quality local language materials and conducting targeted awareness programs such as workshops, exhibitions, and citizen science initiatives to reach diverse populations; 2. Capacity building would be prioritized through systematic training of BMCs and local stakeholders, reinforcement of Environmental Information Hubs under the EIACP; 3. Designing and promotion of community-led conservation models coupled with multilingual outreach strategies to ensure inclusive, scalable, and sustained dissemination of biodiversity knowledge across the country.

Equitable and inclusive decision making:

India has been ensuring effective community-empowerment approaches towards targeted capacity-building for women, youth and communities in biodiversity governance, including leadership and legal literacy. Building on this robust foundation, further efforts shall focus on scaling up these initiatives and strengthening institutional mechanisms to enhance participatory biodiversity governance across the country.

Gender Equality in decision-making and implementation:

India has made notable progress towards gender equality. However, efforts are needed to further develop the capacity of BMCs, particularly women representatives. Likewise, capacity development of women representatives in PRIs, EDCs, and JFMCs is also needed.

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Annexure

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
NBT 1 Biodiversity inclusive integrated land /sea use planning	A.2 Extent of natural ecosystems 1.1 Per cent of land and seas covered by biodiversity inclusive spatial plans	Protected Area Representiveness and connectedness (PARC-Connectedness)	Forest areas as a proportion of total land area Proportion of transboundary basin area with an operational arrangement for water cooperation	1.1 Trends in reflection of biodiversity and ecosystem services in policy decisions, planning and reporting processes 1.2 Changes in area under riverine ecosystems and wetlands (inland and coastal) 1.3 Number of wetlands under integrated management plan 1.4 Extent of area under shifting cultivation on 10 year/5 year/3year cycle 1.5 Trends in finalising Integrated Coastal Zone Management (ICZM) Plan for identified priority stretches -those with ecosystems, facing severe anthropogenic pressure due to tourism 1.6 Trends in preparing management plans for specific areas identified with Critically Vulnerable Coastal Areas (CVCAs) to reduce anthropogenic pressure
NBT 2 Ecosystem Restoration	2.1 Area under restoration	Land degradation (Sustainable Development Goal indicator 15.3.1)	Proportion of Key Biodiversity Area in favourable condition	2.1 Trends in forests cover 2.2 Trends in aquatic ecosystems 2.3 Trends in mangrove cover and coastal area management 2.4 Trends in river water quality in river stretches of high concern 2.5 Trends in afforestation and restoration 2.6 Trends in combating desertification 2.7 Trends in the maintenance of natural fertility in agricultural lands 2.8 Extent of abandoned areas of shifting cultivation 2.9 Extent of restoration of degraded forests
NBT 3 Conserve biodiversity in land, water and sea	3.1 Coverage of protected areas and Other effective area-based conservation measures	Protected Area Connectedness Index (PARC-connected-ness)	Proportion of Key Biodiversity Areas in favourable condition The number of protected areas that have completed a Site-level Assessment of Governance and Equity	3.1 Trends in PA coverage under four legal categories (National Park, Wildlife Sanctuary, Community Reserve and Conservation Reserve) 3.2. Trends in Other Effective Area-Based Conservation Measures 3.3. Trends in coverage under Biodiversity Heritage Sites (BHS)

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
				3.4 Trends in wetland brought under integrated management 3.5 Trends in Important Bird Areas (IBAs) 3.6 Trends in forest cover in four canopy density categories 3.7 Trends in areas of exceptionally rich agrobiodiversity and their threat status 3.8 Trends in extent and conservation of coastal and marine areas 3.9 Trends in extending additional protection to coastal areas identified as highly sensitive within coastal ESAs 3.10. Trends in approved master plans for notified ESZs around protected areas 3.11. Trends in approved management plans for PAs/ BHSs/ OECMs
NBT 4 Manage species and genetic diversity	A.3 Red List Index	Number of plant and animal genetic resources for food and agriculture secured in medium or long - term conservation facilities Proportion of local breeds classified as being at risk of extinction	Red List Index (wild relatives of domesticated animals) Number of island invasive alien species eradications	4.1 Population trends of selected species 4.2 Status and population trends of terrestrial and marine species under Integrated Development of Wildlife Habitats (IDWH) Scheme 4.3. Trends in the status of Indian plant and animal species included in the Red Data Book 4.4 Conservation status of species **Animal genetic diversity** 4.5 Trends in number of indigenous/domesticated breeds (*in situ*) 4.6 Trends in population of domestic breeds (*in situ*) 4.7 Initiatives/measures taken to conserve indigenous animal breeds 4.8 Trends in Animal Genetic Resources accession in *ex situ* collection **Plant genetic diversity** 4.9. Trends in numbers of indigenous varieties (*in situ*) 4.10 Trends in area under cultivation and production/yield (*in situ*)

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
				4.11. Initiatives/ measures taken to conserve indigenous crop varieties and their wild relatives 4.12. Trends in germplasm accessions in *ex situ* collection 4.13. Trends in management of human wildlife interactions 4.14. Trends in species recovery
NBT 5 Sustainable harvest, trade and use of wild species	5.1 Proportion of fish stocks within biologically sustainable levels	Red List Index for used species Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing	Red List Index (for internationally traded species) Marine Stewardship Council Fish Certified Catch Bycatch of vulnerable and non-target species Biodiversity-based trade, growth rate	5.1. Proportion of fish stocks within biologically sustainable levels 5.2. Trends in collection of plants from wild/ natural sources providing raw drugs used in Indian systems of medicine 5.3. Management measures to sustainable fisheries harvest 5.4. Trends in illegal trade of wild flora and fauna 5.5. Number of Medicinal Plant Conservation Areas (MPCAs) established in the country 5.6. Trends in collection of Non-Timber Forest Products (NTFPs)
NBT 6 Manage Invasive alien species	6.1 Rate of invasive alien species establishment 6.b Number of countries adopting relevant regulations, processes and measures to reduce the impact of invasive alien species		Red List Index (impacts of invasive alien species)	6.1. Number and coverage of management plans developed for prioritized invasive species and integration with PA management plans and wetland management plans 6.2. Change in areas affected by priority invasive species in PAs 6.3. Rate of invasive species establishment and their impact 6.4. Number of invasive alien species on the national list 6.5. Number of invasive pests detected and quarantined
NBT 7 Reduce pollution risks and negative impact	7.1 Index of coastal eutrophication potential	Cropland nutrient budget Proportion of domestic and industrial wastewater flow safely treated Floating plastic debris density (by micro and macro plastics (Sustainable Development Goal indicator 14.1.1(b))	Trends in nitrogen deposition Municipal solid waste collected and managed Hazardous waste generation Plastic debris density	7.1. Extent of restored forest cover in India 7.2. Trends in natural farming/ agricultural products and their certifications 7.3. Trends in wetlands area being brought under integrated management for delivering freshwater 7.4. Trends in the proportion of people using improved water services 7.5. Trends in the management of e-waste and biomedical waste

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
		Red List Index (impact of pollution)		7.6. Trends in coastal water quality near metropolitan/ cities
NBT 8 Minimize the impact of climate change	8.b. Number of countries with policies to minimize the impact of climate change and ocean acidification on biodiversity and to minimize negative and foster positive impacts of climate action on biodiversity.	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030 which include biodiversity	Above-ground biomass stock in forest (tonnes/ ha) National greenhouse gas inventories from land use, land-use change and forestry Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies Sustainable Development Goal indicator 14.3.1 (Marine Acidity)	8.1. Trends in biodiversity-inclusive climate change adaptation and mitigation measures formulated/ implemented through State Action Plans on Climate Change (SAPCC). 8.2. Number of state / UT governments that adopt and implement ecosystem-based disaster risk reduction strategies. 8.3. Trends in the decline of availability of drinking water. 8.4. Trends in the number of studies on biodiversity-inclusive environment impact assessment, cumulative environment impact assessment (CEIA) and strategic environment assessment (SEA). 8.5. Trends in identification, assessment, establishment and strengthening of incentives that reward positive contributions to biodiversity and ecosystem services
NBT 9 Sustainable use of wild species for multiple benefits	9.1 Benefits from the sustainable use of wild species 9.b Number or countries with policies to sustainably manage use of wild species, providing social, economic and environmental benefits for people, and to protect and encourage customary sustainable use by indigenous peoples and local communities.	Red List Index (species used for food and medicine)	Degree of implementation of international instruments aiming to combat illlegal, unreported and unregulated fishing Number of Marine Stewardship Council Chain of Custody Certification holders by distribution country Spawning stock biomass (related to commercially exploited species) Number of plant and animal genetic resources for food and agriculture secured in medium- or long-term conservation facilities	9.1. Number of folk users of medicinal plants documented from Peoples Biodiversity Registers (PBRs) prepared by BMCs 9.2. Number of wild species used as per PBRs 9.3. Percentage of national marine catch that is Marine Stewardship Council (MSC) certified
NBT 10 Sustainable management	10.1 Proportion of agricultural area under productive and sustainable agriculture	Average income of small-scale food producers, by sex and indigenous status	Agrobiodiversity Index Soil organic carbon stocks (Sustainable Development Goal indicator 15.3.1)	10.1. Trends in area under natural farming and its certification. 10.2. Trends in area under integrated pest management

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
of agriculture, animal husbandry, fisheries, aquaculture and forest areas	10.2 Progress towards sustainable forest management		Red List Index (wild relatives of domesticated animals) Red List Index (forest-specialist species) Proportion of local breeds classified as being at risk of extinction Proportion of land that is degraded over total land area Area of forest under sustainable management: total forest management certification by the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification	10.3. Trends in the production/ usage of agrochemical fertilizers 10.4. Trends in the use of bio-fertilizers/ biofuels, organic manure and vermicomposting 10.5. Trends in soil quality 10.6. Trends in groundwater table 10.7. Trends under organic production on farms of agricultural research institutions and universities 10.8. Trends in the proliferation of traditional crops and varieties that are more adapted to the environment, requiring less external inputs and therefore more integrated into the ecosystem, at the same time enhance prospects of greater household food security 10.9. Percentage of forest area covered in terms of approved Working Plans under National Forest Working Plan Code 10.10. Trends in area of restored forests 10.11. Extent of use of non-selective fishing gears 10.12. Trends in the certification of fish produce 10.13. Trends in NTFP production 10.14. Wild relatives of cultivated plants
NBT 11 Enhance and maintain ecosystem services and regulate air and water quality, hazards and extreme events	B.1 Services provided by ecosystems	Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities Proportion of bodies of water with good ambient water quality Level of water stress	Air emission accounts Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management Proportion of population using safely managed drinking water services Mortality rate attributed to unsafe water, unsafe sanitation and lack of	11.1. Status and trends of ambient air quality in metropolitan cities and critically polluted areas; monitoring water quality for physico-chemical and bacteriological parameters, trace metals, pesticides at selected sites; 11.2. Trends in soil health parameters in agricultural ecosystems

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
			hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services Number of deaths, missing persons and directly affected persons, attributed to disasters per 100,000 population	
NBT 12 Enhance green and blue spaces for increased access and human well-being.	12.1 Average share of the built-up area of cities that is green/blue space for public use for all 12b Number of countries with biodiversity inclusive urban planning referring to green or blue urban spaces	Singapore Index on Cities' Biodiversity index		12.1. Trends in the availability of urban green and blue spaces 12.2. Number of Biodiversity Parks, Botanical/ Public Gardens, Orchards, Water Bodies, Heritage Sites and Nature Learning and Interpretation Centers (NILC) in urban areas 12.3. Number of cities prepared City Biodiversity Index 12.4. Number of sacred trees and sacred groves in urban areas
NBT 13 Access and Benefit Sharing	C.1 Monetary benefits received in accordance with applicable internationally agreed Access and Benefit-sharing instruments C.2 Non-monetary benefits arising from applicable international Access and Benefit-sharing instruments	Total number of internationally recognized certificates published in the Access and Benefit-sharing Clearing-House	Total number of transfers of crop material from the Multilateral System of the International Treaty on Plant Genetic Resources received in a country for Food and Agriculture received in a country Number of users that have provided information relevant to the utilization of genetic resources to designated checkpoints Number of checkpoint communiqués published in the Access and Benefit-sharing Clearing-House Number of internationally recognized certificates of compliance for non-commercial purposes in the	13.1. Trends in number of proposals for intellectual property rights 13.2. Trends in number of cases seeking third party transfer for accession of biological resources and associated traditional knowledge 13.3. Trends in number of cases for seeking prior approval of National Biodiversity Authority (NBA) for transferring the results of research to foreign nations, companies, Non-Resident Indians (NRIs) for commercial purposes 13.4. Trends in number of cases seeking approval to bio-resources and associated traditional knowledge for commercial utilization 13.5. Trends in number of Genome Saviour Awards to communities and individuals 13.6. Trends in the number of accessions in repositories and gene banks 13.7. Number of Benefit Sharing Agreements with Stakeholders and Biodiversity Management Committees (BMCs)

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
			Access and Benefit-sharing Clearing-House	13.8. Number of Certificates of Origin issued by Biodiversity Management Committees (BMCs) to industries and traders. 13.9. Number of Memorandum of Understandings (MoUs) signed between SBBs/BMCs and industries/ traders
NBT 14 Mainstreaming biodiversity	14.b Number of countries integrating biodiversity and its multiple values into policies, regulations, planning, development processes, poverty eradication strategies and, as appropriate, national accounts, within and across all levels, across all sectors, and progressively aligning all relevant public and private activities and fiscal and financial flows with the goals and targets of this Framework	Integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting (Sustainable Development Goal indicator 15.9.1b)		14.1. Trends in preparation of State Biodiversity Strategy Action Plans (SBSAPs) 14.2. Trends in implementing the activities envisaged under Local Biodiversity Strategy and Action Plans (LBSAPs) 14.3. Trends in percentage of biodiversity attributable expenditure under large multi-purpose schemes such as Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) 14.4. Compliance on earlier strategic environment impact assessments
NBT 15 Sustainable production, supply chains and disclosure of risks	15.1 Number of companies disclosing their biodiversity-related risks, dependencies and impacts 15.b Number of countries with legal, administrative or policy measures aimed at encouraging and enabling business and financial institutions, and in particular, ensuring that large and transnational	Number of companies publishing sustainability reports (Sustainable Development Goal indicator 12.6.1)	Number of organizations within the country that have signalled an intent to start adopting the Taskforce on Nature-related Financial Disclosures Recommendations	15.1. Number of/ Trends in Companies submitted Business responsibility and sustainability reporting, sector wise and follow up action taken 15.2. Trends in sector-specific biodiversity reporting 15.3. Trends in reporting biodiversity related risks in disclosures

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
	companies and financial institutions progressively reduce their negative impacts on biodiversity, increase their positive impacts, reduce their biodiversity-related risks and promote actions to ensure sustainable patterns of production.			
NBT 16 Promote sustainable consumption choices	16.b Number of countries developing, adopting or implementing policy instruments aimed at encouraging and enabling people to make sustainable consumption choices	Food Waste Index Material Foot-print per Capita Global Environmental Impacts of Consumption Ecological Footprint	Extent to which global citizenship education and education for sustainable development, including gender equality and human rights, are main-streamed at all levels in: (I) national education policies; (ii) curricula; (iii) teacher education; and (iv) student assessments Recycling rate Change in water-use efficiency over time Indicators from the Life Cycle Impact Assessment Poverty level	16.1. Trends in consumer awareness enabling consumer choices. 16.2. Post-harvest storage and distribution losses of Central/ State Pool Stocks of wheat and rice 16.3. Number of municipal corporations using waste segregation techniques 16.4. Number of companies taking up Extended Producer Responsibility (EPR) for Hazardous Waste, Plastic Wastes, Used Batteries and Tyres and following circular economy principles 16.5. Quantifiable Indices from Mission LiFE adopted
NBT 17 Strengthen biosafety regulatory capacity	17.b Number of countries that have taken action to implement biosafety measures as set out in Article 8(g) of the Convention and measures for the handling of biotechnology and the distribution of its benefits as set out in Article 19		Indicators related Cartagena Protocol on Biosafety to the Convention	17.1. Number of Biosafety Laboratories for Living Modified Organisms (LMOs) detection in place 17.2. Number of guidelines and procedures for new categories of Living Modified Organisms (LMOs) and emerging technologies for including storage, transportation, and sampling etc. 17.3. Number of technical resources prepared, training conducted at the regional and national levels for seed inspectors, food safety inspectors, officials of the State Pollution Control Board, Customs, and State Agriculture Department etc.

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
				17.4. Number of online resources for information access and sharing 17.5. Number of State Biotechnology Co-ordination Committee (SBCC) and District Level Committee (DLC) constituted 17.6. Number of Living Modified Organisms (LMOs)/ GMOs undergone Risk Assessment and Risk Management (RARM)
NBT 18 Repurpose detrimental incentives for biodiversity	18.1 Positive incentives in place to promote biodiversity conservation and sustainable use 18.2 Value of subsidies and other incentives harmful to biodiversity	[Revenue generated from biodiversity-relevant taxes, fees and charges] [Monetary value of biodiversity-positive subsidies] Revenue generated by biodiversity-relevant tradable permits (if auctioned) Monetary value of payments for ecosystem services [Number of other positive incentives in place for biodiversity (by type)] [Monetary value of other positive incentives in place for biodiversity		18.1. Number of policy instruments adopted to repurpose subsidies for sustaining biodiversity 18.2. Percentage of budget aligned to green budgeting 18.3. Trends in states availing incentive to reduce chemical fertilizer subsidy 18.4. Trends in market development assistance made available to promote organic/ bio-fertilizers under Galvanizing Organic Bio-Agro Resources Dhan (GOBAR-dhan) scheme 18.5. Trends in under-recovery and writing off of power charges in the agriculture sector by state level power utilities
NBT 19 Resource mobilization	D.1 International public funding, including official development assistance for conservation and sustainable use of biodiversity and ecosystems D.2 Domestic public funding on conservation and sustainable use of		Monetary value of the annual budget for biodiversity from total national budget Percentage of annual biodiversity expenditure of total national government budget Total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of	19.1. Trends in financial resources made available (public, private including Corporate Social Responsibility (CSR) and philanthropic sources, international fund flow) for implementing KM-GBF and National Biodiversity Targets 19.2. Trends in human resources made available for implementing KM-GBF and National Biodiversity Targets 19.3. Trends in technical resources made available for implementing KM-GBF and National Biodiversity Targets 19.4. Percentage of Corporate Social Responsibility (CSR) funds to meet National Biodiversity Targets

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
	biodiversity and ecosystems D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems		environmentally sound technologies Volume of official development assistance flow for scholarships by sector and type of study	19.5. Trends in innovative financial solutions e.g., Green Credits, Green Bonds, Access and Benefit Sharing (ABS), Carbon Credits, etc.
NBT 20 Capacity development, technical and scientific cooperation	20.b Number of countries that have taken significant action to strengthen capacity-building, development and access to and transfer of technology and to promote the development of and access to innovation and technical and scientific cooperation	Total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies	Volume of official development assistance flows for scholarships by sector and type of study Proportion of total research budget allocated to research in the field of marine technology Joint scientific papers published (in Ocean Biodiversity Information System) by sector	20.1. Trends in training/ capacity building and development and Human Resource Development (HRD) by institutions at local and community levels 20.2. Numbers of State Biodiversity Boards (SBBs), Biodiversity Management Committees (BMCs), Panchayati Raj Institutions (PRI) and other related line department personnel trained 20.3. Documentation of awareness meetings/ capacity building and development workshops/ seminars/ conferences for various target groups (NGOs, CBOs, Mahila Mandals, academicians, Youth groups), preferably done in regional/local languages 20.4. Trends in the number of MoUs signed between scientific, educational institutions, user agency, and industry for the development of innovative technology and technology transfer for conservation and sustainable utilization of bioresources 20.5. Trends in technology developed and transferred 20.6. Number of active portals of various ministries documenting biodiversity-related information 20.7. Number of start-ups that are involved in developing technological solutions for sustainable management of biodiversity 20.8. Trends in funding made available to developing countries for promoting development, transfer,

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
				dissemination and diffusion of environmentally sound technologies through South–South and Triangular Cooperation
NBT 21 Communication, Awareness, and Knowledge Management	21.1 Indicator on biodiversity information for monitoring the Kunming-Montreal Global Biodiversity Framework	Participation in decision-making of indigenous peoples and local communities in the implementation of the Convention at all levels Index of Linguistic Diversity	Growth in number of records and species in the Living Planet Index database Growth in species occurrence records accessible through the Global Biodiversity Information Facility Growth in marine species occurrence records accessible through the Ocean Biodiversity Information System Proportion of known species assessed through the International Union for Conservation of Nature - Red List of Threatened Species™ Number of assessments on the International Union for Conservation of Nature - Red List of Threatened Species™ World association of Zoos and Aquariums bio-literacy survey (biodiversity literacy in global zoo and aquarium visitors)	21.1. Trends in digitization of biodiversity, associated traditional knowledge related data including number of e-PBRs prepared 21.2. Number of documentaries and feature films related to biodiversity 21.3. Number of exhibits and galleries on biodiversity in science centres/ museums 21.4. Trends in visits to Protected Areas/ Natural History Museums/ Science Centers, conservation exhibitions, and zoological and botanical gardens, urban parks, city forests and eco-tourism areas
NBT 22 Equitable and effective participation in decision-making	22.b Number of countries taking action toward the full, equitable, inclusive, effective and gender responsive representation and participation, in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities respecting	Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure.	Percentage of positions in national and local institutions, including: (a) the legislatures; (b) the public service; and (c) the judiciary, compared to national distributions, by sex, age, persons with disabilities and population groups Number of countries with systems to track and make public allocations for gender equality and women's	22.1. Number of awareness and capacity development program organized 22.2. Trends in number of Civil Society Organizations/ Non-governmental organizations working in the field of conservation of biodiversity 22.3. Trends in number of Biodiversity Management Committees (BMCs), Joint Forest Management Committees (JFMCs), Ecodevelopment Committees (EDCs), Panchayati Raj Institutions (PRIs), Management of Community Forest Resources (CFRMC) constituted/ operationalized

National Target	Headline Indicators	Component Indicators	Complementary Indicators	National Indicators
	their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by, women, and girls, children and youth and persons with disabilities, and the full protection of environmental human rights defenders		empowerment Proportion of total agricultural population with ownership or secure tenure rights over agricultural land, by sex; and share of women among owners or rights-bearers of agricultural land, by type of tenure Number of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group	
NBT 23 Gender equality in decision-making and implementation	23.b Number of countries with legal, administrative or policy frameworks, inter alia, the Gender Plan of Action, to ensure that all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by ensuring women's equal rights and access to land and natural resources.	Proportion of seats held by women in (a) national parliaments and (b) local governments Indicator on national implementation of the Gender Plan of Action	Percentage of positions in national and local institutions, including: (a) the legislatures; (b) the public service; and (c) the judiciary, compared to national distributions, by sex, age, persons with disabilities and population groups Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group (Sustainable Development Goal indicator 16.7.2) Proportion of countries where the legal frame-work (including customary law) guarantees women's equal rights to land ownership and/or control	23.1 Trends in budget allocation for gender responsive schemes linked to biodiversity 23.2. Trends in training of women members of Biodiversity Management Committees (BMCs) 23.3. Trends in women self-help groups dealing with bioresources for economic and social empowerment 23.4. Trends in the representation of women in governance and decision-making at various levels in local communities, groups, Panchayati Raj Institutions, districts and state 23.5. Gender Plan of action for Biodiversity conservation in all sectors

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