**National Red List Assessment of Indian Flora and Fauna**

VISION 2025-2030

Ministry of Environment, Forest & Climate Change, Government of India
Botanical Survey of India
Zoological Survey of India
IUCN India
Center for Species Survival: India - Wildlife Trust of India

*Printed at*: Calcutta Repro Graphics
36/8B, Sahitya Parishad Street, Kolkata - 700006

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Date of Publication : 30th May, 2025

*Published by*
**The Director**
**Botanical Survey of India**
CGO Complex, 3rd MSO Building
Block-F, 5th & 6th Floor
DF-Block, Sector I, Salt Lake City
Kolkata 700064



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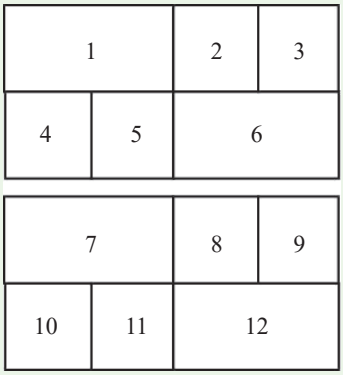


1. Blue sheep (*Pseudois nayaur*), courtsey: Naitik Patel
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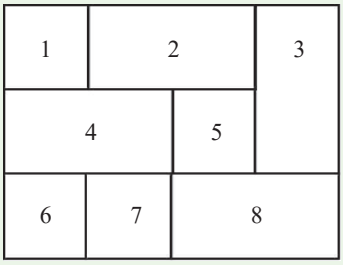


1. *Dendrobium chrysanthum*, courtsey: D.K. Agrawala
2. Asian Elephant (*Elephas maximus*), courtsey: Trikansh Sharma
3. *Dactylorhiza hatagirea*, courtsey: D.K. Agrawala
4. Mugger (*Crocodylus palustris*), courtsey: Surya P Sharma
5. Jelly Antler (*Calocera viscosa*), courtsey: James Lindsey's Ecology of Commanster Site
6. Gaur (*Bos gaurus*), courtsey: Siva R.
7. *Dipterocarpus bourdillonii*, courtsey: Vinayaraj
8. Golden Mahseer (*Tor putitora*), courtsey: Charles J. Sharp

सत्यमेव जयते

## FOREWORD

The Living Planet Report (2024) presents a grave picture of biodiversity loss, showing a 73% decline in global vertebrate populations since 1970, with freshwater species experiencing the most severe declines. Species are disappearing at rates 1,000–10,000 times higher than natural rates, posing a serious threat to ecological and economic health. India, despite being one of the world's 17 megadiverse countries and home to four biodiversity hotspots, has faced challenges in biodiversity assessments, which remain fragmented and outdated.

To meet its obligations under international frameworks such as the Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework (KMGBF), India has initiated a National Red List Assessment Project aligned with IUCN standards. The vision of the initiative is to establish a coordinated, science-based red listing system that accurately reflects the conservation status of Indian species. This effort is crucial as biodiversity conservation is intertwined with climate action, health, and sustainable development. The project's goal is to publish National Red Data Books on flora and fauna by 2030, forming a central resource for conservation planning and threat mitigation.

The most important deliverable would be to complete the red list assessment of about 11000 prioritized species of flora and fauna published in the form of peer reviewed individual assessments, thematic publications as books and a user-friendly online database. With this, a pool of 300 certified assessors will be created within the country enhancing the capacity and expertise. The initiative is spearheaded by the Botanical Survey of India (BSI) and Zoological Survey of India (ZSI) as the nodal agencies, with support from IUCN India and the Center for Species Survival: India - Wildlife Trust of India (CSS: India - WTI). A total of 30 National Red Data Books are planned, including interim publications focusing on critical groups such as endemics and threatened species. These assessments will inform conservation policy, identify Key Biodiversity Areas (KBAs), and strengthen India's contributions to global biodiversity goals. Broad participation from academic institutions and expert networks will be vital for the success of this project. Ultimately, the initiative aims to build a robust, upgradable national biodiversity database to guide evidence-based conservation actions.

नमिता

Nameeta Prasad
Joint Secretary
CS-II Division
Ministry of Environment, Forest and Climate Change

## KEY CONTRIBUTORS TO THE DEVELOPMENT OF VISION 2030

The development of the Vision 2030: National Red List Assessment of Indian Flora and Fauna has been made possible through the collective insight, expertise, and guidance of distinguished individuals who contributed during the conceptualisation and consultation phases. We gratefully acknowledge the valuable inputs provided during the brainstorming session held on 11th December 2024 at the Acharya Jagadish Chandra Bose Indian Botanical Garden, Howrah, as well as during subsequent discussions.

We extend our sincere appreciation to the following contributors:

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22. Dr. Prajna Panda, Programme Manager, Center for Species Survival: India - Wildlife Trust of India
23. Ms. Sayanti Basak, Programme Officer, Center for Species Survival: India - Wildlife Trust of India

We thank each of them for their invaluable role in shaping this national initiative.

## EXECUTIVE SUMMARY

A defining crisis of the Anthropocene is the unprecedented rate of biodiversity loss, far exceeding historical baselines. Since 1970, global vertebrate populations have declined by an estimated 73%, while deforestation has driven the extinction of approximately 40% of plant species. As one of the world's 17 megadiverse countries, India holds a unique responsibility and opportunity to lead biodiversity assessments and conservation efforts.

In alignment with international frameworks such as the Convention on Biological Diversity and the Kunming-Montreal Global Biodiversity Framework, the National Red List Assessment Project emerges against the accelerating biodiversity decline. The project underscores the urgent need for coordinated, science-based conservation action to safeguard species and ecosystems for future generations.

Globally, the IUCN Red List of Threatened Species provides a scientifically rigorous system for assessing species extinction risk. As of 2025, the IUCN Red List has assessed 169,420 species, with plans to assess an additional 94,000 species and to reassess 142,000 species by 2030. Recognizing the need for national level contributions to this global effort, the Ministry of Environment, Forest and Climate Change, Government of India, with its lead agencies – the Botanical Survey of India (BSI) and Zoological Survey of India (ZSI) – in collaboration with IUCN India, Center for Species Survival: India - Wildlife Trust of India (CSS: India - WTI), and the IUCN Species Survival Commission (SSC) network in India, has launched an ambitious initiative to develop a National Red Data Book of Flora and Fauna by 2030. This five-year initiative aims to assess the extinction risk of approximately 11,000 species – including 7,000 species of flora and 4,000 species of fauna – across India's biodiverse ecosystems. The vision of the project is to establish a nationally coordinated, participatory, and upgradable Red Listing system that accurately reflects the conservation status of India's biodiversity.

Aligned with the IUCN Species Conservation Cycle – Assess, Plan, Act, Network, and Communicate – this project will support the expansion of taxonomic and geographic coverage of the IUCN Red List, with a special focus on underrepresented taxa. Anchored in the IUCN Red List guidelines and methodology, the project envisages the following key outcomes:

1. A trained cadre of at least 300 qualified Red List assessors created within the country
2. A minimum of five national level trainers certified to conduct Red List assessment trainings
3. A national list of Flora and Fauna prioritized for assessments
4. Establishment of National Species Specialist Group to guide and oversee assessments
5. Peer reviewed species assessments published independently and integrated into a national database
6. Assessments to determine status and extinction risks completed for at least 11,000 species (7,000 species of flora and 4,000 species of fauna)

The project also plans to produce around 30 National Red Data Books, which will serve as key outputs of the National Red Listing initiative. These documents will be the culmination of individual species assessments conducted across various taxonomic and thematic groups. While comprehensive Red Data Books covering larger taxa are targeted for publication by 2030, interim publications focusing on smaller or high-priority thematic groups will be released throughout the project to support timely conservation planning and policy action.

With an estimated budget of ₹95 crores, ₹80 crores will be absorbed by BSI and ZSI through their Annual Programme of Research to support staff salaries, training and internal capacity building. The remaining ₹15 crores – earmarked for training, travel, workshops, expert consultations, and external capacity building – will be mobilised by IUCN India and CSS: India - WTI.

The National Red Listing Project represents a paradigm shift in India's approach to biodiversity monitoring and conservation – emphasizing participatory science, institutional collaboration, and adherence to global standards. By establishing a robust, nationally coordinated, science-driven system for assessing extinction risk, India is not only enhancing national conservation planning but also reinforcing its leadership in advancing global biodiversity goals. With strong institutional collaboration, expert engagement, and adherence to internationally accepted standards, the project will generate enduring value – delivering credible data, building national capacity, and shaping conservation priorities that safeguard biodiversity for future generations.

## INTRODUCTION

Nature is the foundation of human well-being and economic stability, yet global trends show a persistent loss of biodiversity, signalling a crisis that endangers both ecosystems and human life. The Living Planet Report (2024) highlights a critical decline in global biodiversity, reporting a 73% decrease in the average population sizes of 5,495 vertebrate species between 1970 and 2020, with freshwater species experiencing the most severe decline of 85% (WWF, 2024). Over 40% of plant species now face extinction due to ongoing habitat destruction (Humphreys et al. 2019; Nic Lughadha et al. 2020; Bachman et al. 2024). The current rate of species extinction is estimated to be 1,000 to 10,000 times higher than the natural background rate (Hilton-Taylor, 2000), highlighting the unprecedented scale of biodiversity loss driven by human activities.

Most extinctions occur in biodiversity hotspots – regions of high species richness under intense human pressure – better described as "extinction hotspots" (Reid 1998; Norman 2003; Brooks et al. 2002). Biodiversity loss has been observed in India as well but apart from a few species, there is little data to inform on the extinction risk faced by most plant and animal species. Protecting and restoring ecosystems is crucial for long-term sustainability. The Convention on Biological Diversity (CBD), to which India is a signatory, promotes biodiversity conservation through sustainable use and equitable benefit-sharing. The Global Strategy for Plant Conservation (GSPC) emphasizes comprehensive species assessments to prevent biodiversity loss (UNEP, 2010). The Kunming-Montreal Global Biodiversity Framework (KMGBF) and Sustainable Development Goals (SDGs) highlight the need for biodiversity conservation and set targets with Red List assessments playing a key role in tracking progress across multiple targets.

The IUCN Red List, the most widely recognized global assessment tool, categorizes species based on five scientific criteria – population reduction, geographic range, small population size and decline, very small and restricted population, and extinction probability (IUCN, 2012). As of 2025, the IUCN Red List of Threatened Species includes 169,420 species, of which 76,069 are plants, fungi, and protists, and the remaining 93,351 are animals (IUCN, 2025). According to the IUCN Red List Strategic Plan (2021-2030), the goal is to include an additional 2,60,000 species assessments by 2030 to expand the taxonomic and geographic scope, thereby enabling more targeted and effective species conservation.

India, one of the 17 megadiverse countries, hosts four of the world's 36 biodiversity hotspots—The Himalayas, Western Ghats, Indo-Burma, and Sundaland. Although covering just 2.4% of the world's land area, it harbours nearly 8% of global flora and 7.5% of fauna, with over 28% of endemic flora and 30% of endemic fauna. The country's biodiversity includes 22,108 angiosperms, 83 gymnosperms, 1,319 pteridophytes, and over 1 lakh documented faunal species.

Despite possessing such biodiversity, India's efforts at assessing and tracking the status of her faunal and floral wealth has largely been sporadic and fragmented. India

has traditionally followed earlier frameworks of threat assessment, which have guided conservation priorities over the years. However, it is time that a contemporary system of assessments is adopted which has universal acceptability. It must be mentioned here that several Indian scientists and conservationists have been contributing to global Red List assessments following the IUCN criteria. However, for targeted conservation action, countries must prioritise National Red Lists within their National Biodiversity Strategy and Action Plans (NBSAPs) to accurately track species' status through National Red List Indices (RLIs). These indices help monitor species trends, inform policy decisions, and identify Key Biodiversity Areas (KBAs). Additionally, National Red Lists guide terrestrial, freshwater, and marine resource management, shaping developmental and conservation priorities. They also play a critical role in addressing SDG 14 (Life Below Water) and 15 (Life on Land), by providing data-driven insights to safeguard biodiversity and ensure sustainable use of natural resources. Strengthening India's National Red List efforts is crucial to safeguarding its biodiversity and ensuring effective conservation action.

To fill this gap and meet global commitments like the CBD and SDG targets, the Ministry of Environment, Forest & Climate Change, Government of India, has initiated a National Red List Assessment of India's flora and fauna, following globally recognised and accepted IUCN guidelines. The Botanical Survey of India (BSI) and Zoological Survey of India (ZSI) will serve as nodal agencies for this assessment, with support from IUCN India, Center for Species Survival: India - Wildlife Trust of India (CSS: India - WTI), and the Species Survival Commission network in India, ensuring a comprehensive, and upgradable country-wide biodiversity assessment.

## II. VISION, GOALS, AND OUTCOMES

**Vision:** *To establish a nationally coordinated and participatory red listing system that is upgradable and reflects the true conservation status of Indian species of flora and fauna across India's diverse ecosystems*.

Biodiversity loss and climate change are among the top global risks (World Economic Forum), emphasizing the need for urgent conservation efforts. As per IPBES (2024), addressing climate change (SDG 13), water and ocean management (SDGs 6 & 14), health (SDG 3), and species conservation (SDGs 14 & 15) are linked to each other and addressing each is critical. A National approach to species' Red List assessments will result in accurate assessment of species status and thus, help guide threat mitigation measures and inform targeted conservation strategies. The vision statement emphasizes the need for a structured and strategic approach to conservation that prioritizes the specific needs of various species and results in categorising threat status of India's biodiversity, especially those that are endemic to India.


The National Red List Project aligns closely with the IUCN Species Conservation Cycle by advancing each of its core and supporting components. Through **ASSESS**, it undertakes comprehensive, science-based evaluations of extinction risk for approximately 11,000 prioritized species, generating critical data on status and trends. This evidence directly informs **PLAN**, enabling the development of targeted conservation strategies, policies, and actions. As assessments are completed, they lay the groundwork for **ACT** – mobilizing conservation efforts in collaboration with the government, researchers, and communities. The project also strengthens **NETWORK** by engaging national institutions, SSC members, and experts across disciplines, and enhances **COMMUNICATE** by producing peer-reviewed publications, Red Data Books, and accessible databases to inform policy and public awareness.

**Goal:** The goal of this project is to prepare the National Red Data Books of Indian flora and fauna, based on IUCN Red List standards, with periodic updates. Such a document shall serve as an important tool for strategic planning and decision-making in the conservation of India's biodiversity.

This document is expected to inform on the status and extinction risks of Indian animal and plant species and help streamline conservation efforts in the country. The effort will also create a national repository of the status of important species in the country that can be accessed to prepare appropriate responses to threats.

**Outcomes:** The Goal is accomplished through a set of outcomes which are independent targets towards the accomplishment of the goal.

**Outcome 1 (OC 1): A trained and qualified pool of at least 300 assessors created within the country during the project tenure**

The task cannot be accomplished unless the assessors are trained in the application of IUCN Red List Categories and Criteria and its guidelines. This training is provided

by qualified and accredited trainers and all potential assessors must pass a test to qualify as assessors. Ten training sessions spread over five years are required to train the requisite number of assessors, who will be chosen from the governmental and non-governmental organisations.

**Outcome 2 (OC 2): A minimum of five national level trainers certified to conduct Red List assessment trainings**

A cadre of at least five trainers will be developed and certified to lead Red List assessment trainings across the country. These trainers will be equipped with in-depth knowledge of IUCN Red List methodology and will play a key role in building national capacity by training assessors and supporting consistent, high-quality assessments throughout the project period.

**Outcome 3 (OC 3): A set of flora and fauna prioritized for assessments**

India has over 150,000 species of plants and animals and assessing all the species in the first phase is not feasible. The project must therefore prioritize certain groups and species over others. This prioritization must take into account India's conservation priorities and needs. Therefore, species that fall in categories like endemic, threatened, in use, protected by law etc. shall be prioritised. A total of 11,000 species (7000 flora and 4000 fauna) have been identified as prioritized species for assessment in the first phase. For more information, see Appendix 2.

**Outcome 4 (OC 4): Establishment of National Species Specialist Group to guide and oversee assessments**

A National Species Specialist Group (NSSG) will be constituted, comprising leading scientists and conservationists from across the country. The NSSG will enhance national representation within the global IUCN SSC network and highlight India's contribution to global species conservation discourse. It will provide technical guidance, support species prioritisation, review assessments, and act as a key knowledge resource to ensure scientific rigour and alignment with international best practices—not only throughout the Red List assessment process, but also across broader species conservation and research initiatives in India.

**Outcome 5 (OC 5): Peer reviewed species assessments published independently and integrated into a national database**

The draft assessments must be peer-reviewed and then published through an appropriate medium before being uploaded on an online platform for public access.

**Outcome 6 (OC 6): Assessments to determine status and extinction risks completed for at least 11,000 species (7,000 species of flora and 4,000 species of fauna)**

Assessments form the main part of the project and will be carried out over the whole duration of the project. The assessments shall be carried out by multiple teams led by ZSI for animals and BSI for plants. Taxon and thematic leaders will be identified who will take the responsibility of delivering the outputs as per schedule. During the course of the project, there will be outputs in the form of complete assessment reports for various thematic groups.

## III. WORK PLAN AND DELIVERABLES

While a detailed workplan is provided in Appendices 4-9, a summary is presented below. The aforementioned outcomes deliver one or more outputs.

The National Red Listing Work Plan outlines a coordinated and phased approach to assess the extinction risk of India's flora and fauna by 2030. Led in synergy with the Botanical Survey of India (BSI), the Zoological Survey of India (ZSI), IUCN India, and the Center for Species Survival: India - Wildlife Trust of India (CSS: India - WTI) in association with other scientific bodies, SSC membership in India and other relevant agencies, the plan targets the assessment of approximately 11,000 species across diverse taxa during the period 2025-2030. Key activities include training of the assessors, identification and prioritization of species, data collection, peer-reviewed assessments, and publication of thematic and taxon-specific Red Data Books. While BSI and ZSI lead the assessments and publications, in coordination with experts from different organisations, IUCN India, CSS: India - WTI and the SSC Network in India ensure scientific consistency, stakeholder coordination, and integration with IUCN Red List processes. Table 1 summarises the roles and responsibilities of various stakeholders involved in the National Red Listing process. The plan also emphasizes capacity building, the establishment of a National Species Specialist Group, and the engagement of external experts to strengthen scientific rigor.

A total of 30 National Red Data Book publications are planned under this five-year project, which will serve as key outputs of the National Red Listing initiative (see Table 2 for details on expected outputs). These documents will be the culmination of individual species assessments conducted across various taxonomic and thematic groups. While comprehensive Red Data Books covering larger taxa are targeted for publication by 2030, several interim publications focusing on smaller or high-priority thematic groups will be released earlier to support timely conservation planning and policy action.

Collectively, these efforts aim to produce a comprehensive and nationally relevant Red List that informs conservation policy, planning, and action at national and global levels. This will further strengthen India's commitment to international biodiversity targets including the Kunming-Montreal Global Biodiversity Framework and IUCN Red List Strategic Plan (2021-2030).

**Goal:** Assess ~11,000 species of Indian flora and fauna by 2030.

**Key Components:**

1. Species prioritisation
2. Cadre of Red List assessors (300+)
3. Pre-assessment data collection
4. Peer-reviewed species assessments
5. Thematic National Red Data Book publications
6. External expert engagement
7. Data security

**Impact:**

1. Data-driven conservation planning
2. Informed biodiversity policy
3. Contribution to global targets (IUCN Red List Strategic Plan, KMGBF 30x30)

**Table 1: Roles and Responsibilities of BSI, ZSI, IUCN India, and CSS: India - WTI (including the SSC Network in India) in the National Red Listing Process.**

| Sl. No. | Activity | BSI | ZSI | IUCN India, CSS: India - WTI (including the SSC Network in India) |
|---|---|---|---|---|
| 1 | Assessor trainings | Nominate trainees for assessments of flora species and ensure their participation | Nominate trainees for assessments of fauna species and ensure their participation | Support capacity-building efforts by mobilising IUCN-accredited Red List trainers for national training programmes |
| 2 | Prioritisation of species | Lead the development of prioritised list of flora species for respective taxa through coordination with internal taxonomic experts and consultation with external specialists to ensure scientifically robust prioritisation | Lead the development of prioritised list of fauna species for respective taxa through coordination with internal taxonomic experts and consultation with external specialists to ensure scientifically robust prioritisation | Facilitate the checklist preparation process and review alignment with national priorities |
| 3 | Formation of a National Species Specialist Group (NSSG) | Nominate experts from within their networks for NSSG memberships | Facilitate establishment and coordination of NSSG | |
| 4 | Workshops for review of pre-assessment data compiled based on IUCN Regional/National Red List Guidelines and preparing draft species assessment reports based on IUCN Red List criteria | Lead compilation of flora-specific pre-assessment data where expertise is available internally or identify external experts to accomplish the task and draft initial species assessments using IUCN criteria | Lead compilation of fauna-specific pre-assessment data where expertise is available internally or identify external experts to accomplish the task and draft initial species assessments using IUCN criteria | Facilitate review workshops and provide technical guidance and ensure alignment with IUCN documentation standards |
| 5 | Database management | Upload species assessments of flora, ensure accuracy and compliance with IUCN Red List Guidelines | Upload species assessments of fauna, ensure accuracy and compliance with IUCN Red List Guidelines | Lead creation of mirror SIS platform, provides assessment formats, Red List expertise, and coordinate with Red List Unit |
| 6 | Publication of thematic National Red Data Books, assessments of prioritised species of flora and fauna | Lead the preparation and publication of thematic Red Data Books for prioritised plant species | Leads the preparation and publication of thematic Red Data Books for prioritised faunal species | Coordinate and facilitate the overall assessment and publication process, ensuring alignment with IUCN standards and supporting underrepresented taxa |

**Expected Outcomes (2025-30)**

1. A set of flora and fauna prioritized for assessments
2. A trained and qualified pool of at least 300 assessors created within the country
3. A minimum of five national level trainers certified to conduct Red List assessment trainings
4. Peer reviewed species assessments published independently and integrated into a national database
5. Establishment of National Species Specialist Group to guide and oversee assessments
6. Assessments to determine status and extinction risks completed for at least 11,000 species (7,000 species of flora and 4,000 species of fauna)

**Table 2: Expected Outputs (2025-30)**

| **Lead Agency : BSI** | | |
|---|---|---|
| **Sl. No.** | **Outputs** | **Target year(s)** |
| 1. | Draft assessment reports of prioritised species of flora | 2025 - 2030 |
| 2. | Red Data Book of Endemic flowering plants of India | 2030 |
| 3. | National Red Data Book of Gymnosperms of India | 2028 |
| 4. | National Red Data Book of CITES and Protected Species of India | 2028 |
| 5. | National Red Data Book of Traded Medicinal Plants of India | 2030 |
| 6. | National Red List assessment of Endemic Non-flowering Plants of India - Volume 1 | 2030 |
| 7. | National Red Data Book of Orchids of India | 2025 - 2030 |
| 8. | National Red Data Book of Grasses of India | 2025 - 2030 |
| 9. | National Red Data Book of Legumes of India | 2025 - 2030 |
| 10. | National Red Data Book of Trees of India | 2025 - 2030 |
| 11. | National Red Data Book of Rhododendrons of India | 2025 - 2030 |
| 12. | National Red Data Book of Lillies of India | 2025 - 2030 |
| 13. | National Red Data Book of Gingers of India | 2025 - 2030 |
| 14. | National Red Data Book of Balsams of India | 2025 - 2030 |
| 15. | National Red Data Book of Indian Sedges | 2025 - 2030 |
| 16. | National Red Data Book of Wild Edible Species of Flora of India | 2025 - 2030 |
| **Lead Agency : ZSI** | | |
| **Sl. No.** | **Outputs** | **Target year(s)** |
| 17. | Draft assessment reports of prioritised species of fauna | 2025 - 2030 |
| 18. | National Red Data Book of Indian Mammals | 2030 |
| 19. | National Red Data Book of Endemic Mammals of India | 2027 |
| 20. | National Red Data Book of Indian Birds | 2030 |
| 21. | National Red Data Book of Endemic Birds of India | 2028 |
| 22. | National Red Data Book of Indian Reptiles | 2030 |

| | | |
|---|---|---|
| 23. | National Red Data Book of Endemic Reptiles of India | 2028 |
| 24. | National Red Data Book of Indian Amphibians | 2030 |
| 25. | National Red Data Book of Endemic Amphibians of India | 2029 |
| 26. | National Red Data Book of Indian Freshwater Fishes | 2029 |
| 27. | National Red Data Book of Indian Marine Fishes | 2029 |
| 28. | National Red Data Book of Endemic Fishes of India | 2029 |
| 29. | National Red Data Book of Indian Invertebrates | 2029 |
| 30. | National Red Data Book of species of Indian fauna in CITES Appendices | 2027 |
| 31. | National Red Data Book of Protected Species of Indian Fauna in Wild Life (Protection) Amendment Act, 2022 | 2028 |
| **Lead Agency : IUCN India & CSS: India - WTI** | | |
| **Sl. No.** | **Outputs** | **Target year(s)** |
| 32. | Publication of National Red List assessments of at least 750 flora and fauna species | 2030 |

**Gaps:**

While the current target is to assess 11,000 species of flora and fauna under the National Red Listing initiative, gaps remain in taxonomic, and thematic coverage. These gaps need to be strategically addressed to ensure a comprehensive understanding of extinction risks and to guide effective conservation planning across all ecosystems and species groups in India.

**Stakeholders and Partners:**

The process shall be driven by relevant Divisions of the MoEF&CC, BSI and ZSI. Other notable organisations that are involved would be IUCN India and CSS: India - WTI who would facilitate the process and bridge the gap between the IUCN SSC office, the Red List Unit at Cambridge and the Indian process. The task of preparing the National Red Data Book is ambitious and needs involvement and utilization of all resources available. Therefore, academic institutions of the country, who are repositories of scientific information need to be involved. Also, the IUCN Species Survival Commission (SSC) network, who are represented through several specialist groups (around 90) hold the skills to assess and aid in accomplishing the task.

**Financing:**

This five-year initiative aims to produce comprehensive **National Red Data Books of Flora and Fauna by 2030**, along with several thematic publications, focussing on endemic flora and fauna, species of flora and fauna in trade, protected species of flora and fauna, etc. released at regular intervals. The total projected cost for implementing the National Red List of Flora and Fauna Vision 2030 is approximately ₹95 crores. The detailed budget breakdown is provided in Table 3.

**Table 3: Budget Allocation for the National Red List of Indian Flora and Fauna Project**

| Sl. No. | Lead agencies | Item | Amount (INR) | Remarks |
|---|---|---|---|---|
| 1. | BSI and ZSI | Staff salary | 80 crores | Absorbed by BSI & ZSI through integration into their Annual Programme of Research, supported by the MoEF&CC |
| | | JRF/SRF/research assistant salary | | |
| | | Training of Trainers | | |
| | | Red List assessment workshops | | |
| | | Internal capacity building | | |
| | | Contingencies | | |
| 2. | IUCN India and CSS: India - WTI | Red List assessment trainings | 15 crores | To be raised |
| | | Red List assessment review and consultative workshops | | |
| | | Database creation, maintenance, and upgradation | | |
| | | Professional charges | | |
| | | **Total** | **95 crores** | |

Funding will be mobilized from a combination of sources, including:

- Government schemes
- CSR contributions
- International agencies such as UNDP, World Bank, etc.

To ensure timely delivery of outcomes, the entire project budget is targeted to be secured by February 2026.

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# Appendices

# APPENDIX 1 - BRIEF ON THE FLORA AND FAUNA OF INDIA AND ITS ASSESSMENT STATUS

## Flora:

India has 55,726 recorded plant species, including algae, fungi, and microbes. Of these 6.33%, comprising 3,501 plant species and 27 fungi species have been assessed for the IUCN Red List (Global). The assessments include:

- 3479 species of Tracheophyta
  - Class Magnoliopsida – 2561 species
  - Liliopsida – 809 species
  - Polypodiopsida – 53 species
  - Pinopsida – 30 species
  - Cycadopsida – 11 species
  - Lycopodiopsida – 4 species
  - Gnetopsida – 11 species
- 03 species of Bryophyta
- 06 species of Marchantiophyta
- 13 species of Charophyta

## Fauna:

India has 1,04,561 documented fauna species, of which the IUCN Red List Assessment has been done for 7516 species, which is 7.2% of the recorded faunal diversity of India. The assessment results are alarming: 1012 species (13.4%) of the total species assessed are in the threatened category, and additionally, 289 species are Near Threatened. Furthermore, a large percentage of the species (13.8%) are in the Data Deficient category, which may or may not qualify for the threatened category.

The assessments include:

- Chordates (5842 species)
  - Actinopterygii – 2881 species
  - Chondrichthyes – 162 species
  - Aves – 1,272 species
  - Reptilia – 629 species
  - Amphibia – 467 species
  - Mammalia – 431 species
- Arthropoda (790 species)
  - Insecta (576 species):
    - Odonata – 472 species
    - Coleoptera – 10 species
    - Lepidoptera – 74 species
    - Hymenoptera – 5 species

        - Orthoptera – 10 species
        - Mantodea – 4 species
        - Phthiraptera – 1 species
    - Malacostraca (Decapoda) – 183 species
    - Arachnida – 20 species
    - Maxillopoda – 9 species
    - Merostomata – 2 species
- Mollusca – 383 species
- Cnidaria – 432 species
- Echinodermata – 67 species
- Annelida – 2 species

While no species have been assessed for national assessments, only 6.33% of Indian plant species and 7.2% animal species have been assessed for global assessments.

While no national-level Red List assessment has been conducted in India, Regional Conservation Assessments for some taxa have been carried out by the Zoo Outreach Organization in association with the IUCN Red List Unit, IUCN SSC members and local experts.

## APPENDIX 2 – PRIORITIZATION OF SPECIES FOR NATIONAL RED LIST ASSESSMENTS

In the Global South, where financial resources for conservation are often limited, prioritizing species for conservation is essential to maximize impact. Strategic allocation ensures that funding and conservation efforts are directed toward species at the highest risk of extinction or those with significant ecological importance. Although it may seem like an economic bargain, conserving species at higher risk of extinction can indirectly conserve those lower on the priority list by preserving entire ecosystems and maintaining ecological functions. Many threatened species play the role of umbrella species, thus protecting priority species and their habitats cascades to conservation of species that share the ecosystem. Additionally, conservation efforts targeting high-risk species often lead to habitat restoration, stricter environmental regulations, and management practices, which collectively support biodiversity at multiple levels. A targeted approach strengthens conservation outcomes while making the most of available resources.

Below is a scheme for prioritization that emerged from a meeting called for the purpose on 11th December 2024.

### A. Flora

India has recorded more than 55,000 plant species so far (including the algae, fungi, and microbes) of which nearly 34,000 species are macrophytes which are eligible for Red List assessments as per IUCN Criteria. Only 3501 Indian species have so far been assessed under the global standards of the IUCN Red List which contains mostly the non-endemic species. Owing to the large number of species and requirement of resource and manpower, the work can be executed in a phased manner with prioritization of species according to their importance and conservation dependency. Thus, Indian flora species have been prioritized for assessments as:

a) *Country Endemics*: Endemic species are important because of their restricted distribution. The gene pool offered by endemic species is not found anywhere else. They are more vulnerable to both natural and anthropogenic threats and can move towards extinction at a faster pace. Therefore, all the endemic species are to be prioritized for threat assessments. As these species are endemic to the country, their Red List assessments will be of global perspective and can be published in the IUCN Red List. India has nearly 25 percent of plant species as endemic to the country.

b) *Regional Endemics*: There are at least 15 percent of floral elements in India which are not widely distributed across the globe. They are either confined to the Himalayan region (including Pakistan, Afghanistan, China, Tibet, Nepal, Bhutan, and Myanmar); or North-East India and Bangladesh; or the Western Ghats and Sri Lanka. These species are also important like the endemics for their restricted distribution and narrow niche requirement. Such species will be listed and assessed in the second phase. These assessments will also be of global perspective as there are not many distribution points available outside India and we can obtain the data by collaborating with experts of the relevant range countries.

c) *Protected species under CITES and Wild Life (Protection) Amendment Act, 2022*: Some of the traded species and their morphs and/or variants are protected under the CITES and Wild Life (Protection) Act, 1972. The appendices and Schedules are continuously revised for possible inclusion/exclusion of species under these legislations. These species need to be assessed for their threat status to justify their inclusion/exclusion. Such species will also be prioritized for floral assessments.

d) *Species in Trade*: The traded species are highly conservation dependent if harvested in an unsustainable manner. They require immediate attention as their status can be rapidly depleted if the threats are not mitigated. India has 960 medicinal plants under trade of which, 178 species are highly traded (more than 100 metric tons per annum. The assessments on these species are also required to be carried out in the next phase.

e) *Wild relatives of crop plants*: India is considered as one of the important centers of origin of crop plants and the wild relatives of these crop species are natively distributed in the country. They carry the important gene pool that can be exploited for the development of better varieties which are more viable commercially. Such species need to be conserved with proper planning and assessments.

f) *Wild edible species*: India is one of the oldest civilizations where the interdependence between humans and nature has been especially profound. Many wild plant species in India are traditionally consumed by the local communities as vegetables, fruit, pickle etc. These species require conservation efforts if the harvesting is unsustainable, or the quality of habitats get declined due to natural and anthropogenic pressure. Such species would be listed and assessed in the next phase.

g) *Species inhabiting fragile ecosystems*: There are certain species which are distributed only in protected areas and sacred groves protected areas and sacred groves. Some myco-heterotrophic species have very narrow niche requirements, and the population can be depleted with a minor change in the micro-environment. Such species will be listed and assessed in the next phase.

h) *Remaining species*: All remaining species will be covered in the final phase.

**B. Fauna**

The prioritization criteria for Indian faunal components are hereunder.

a) *Endemic species*: India, despite occupying only 2.7% of the world's land, is the second most populous nation and one of the 17 megadiverse countries. Its rich biodiversity spans from the snow-clad Himalayas to varied coastal and marine ecosystems, encompassing forests, grasslands, deserts, wetlands, mangroves, and coral reefs. This diverse landscape nurtures numerous endemic species, uniquely adapted to their specific habitats. However, habitat degradation caused by human activities, such as agriculture, urbanization, mining, and deforestation, poses a significant threat. India hosts three biodiversity hotspots—the Western Ghats, Eastern Himalayas, and Indo-Burma—each crucial for global biodiversity but increasingly endangered due to rapid environmental changes. In terms of Indian species assessed by IUCN for Red

List, 1582 out of 6568 species are endemic to the country, with high endemism in amphibians (79%) and reptiles (54.9%). Red List Assessment of the endemic fauna has been prioritized as to contribute to the global assessment.

b) *Protected fauna*: As per the Wild Life (Protection) Amendment Act, 2022, a wide range of fauna (invertebrates and vertebrates). A total of 3739 species of different faunal groups have been included in the scheduled species list of the Act, of which 1879 species are listed under Schedule I and 1860 species are listed under Schedule II. In the amended Act, not only the native species found in India are protected but also the Schedule IV encompasses all the CITES listed species, i.e., species listed in the Appendices I-III of the CITES. The National Red List assessment prioritises species listed in Schedules I and II of the Act to better assess threats to those under legal protection.

c) *Species in Wildlife Trade*: Illicit wildlife trade occurs nationwide. Illegal wildlife trade has evolved into a complex activity, estimated to be worth at least USD15 billion per year globally. Between 2008 and 2014, around 3,350 pangolins were poached in India, while a staggering 150 million seahorses are utilized annually in Oriental Traditional Medicinal Systems, with a significant portion originating from India. Additionally, roughly one million seahorses are captured annually for the aquarium trade, a considerable number of which come from India. India also sees an annual catch of approximately 70,000 tonnes of sharks, primarily for the lucrative fin trade. Furthermore, from 2005 to 2012, India exported 1.5 million tonnes freshwater fish belonging to 30 threatened species. On average, 700,000 birds are trapped annually in India. Notably, Assam witnessed the poaching of around 44 rhinos in 2013, highlighting a critical conservation concern. Tiger, India's national animal, remains a primary target for poachers and traders, highly sought after for their pelts and bones in lucrative markets. Therefore, in the National Red List Assessment, priority will be given to species threatened by illegal trade. These species will be identified using available data from wildlife confiscation records.

d) *Species under CITES Appendices*: Over 40,900 species – including roughly 6,610 species of fauna and 34,310 species of flora – are protected and listed in the three appendices of CITES to control and regulate over-exploitation due to international trade. To protect the CITES listed species and regulate the export and import of non-native species, the Wild Life (Protection) Amendment Act, 2022 lists all the CITES Appendix listed species in Schedule IV. There are more than 965 Indian species of flora and fauna listed under different appendices of CITES. As committed to the CITES treaties, the IUCN National Red List assessment is an important step and hence the Indian faunal species listed in various Appendices will be prioritized for the assessment.

e) *Other taxa*: Priority will also be given to lesser-known taxa; species with bioprospecting, economic, or medicinal value; those with unique evolutionary lineages; species impacted by pollutants or climate change; species of cultural importance; and wild species subject to commercial exploitation. Furthermore, species that have

already been assessed globally and fall under any of the threatened categories – such as Critically Endangered, Endangered, or Vulnerable – or are listed as Near Threatened, Data Deficient, or Least Concern, are also included in the assessment process.

### List of prioritised taxa along with timelines:

#### Flora

India has a total of 55,726 reported plant taxa also including algae, fungi and microbes. The flowering plants or angiosperms constitute 22,214 species, followed by gymnosperms (83); pteridophytes (1321); bryophytes (2835); lichens (3088); fungi (15812); algae (9085); and bacteria with 1288 taxa. Approximately 34,000 macrophyte species, including angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, macro-fungi, and macro-algae, are estimated to be eligible for Red List assessments. Only 3501 species which are distributed in India have been assessed for the IUCN Red List so far. BSI has a working list of all these plant groups along with their distribution data. A total of 56 teams will be assigned the task of completing the assessments of all 34,000 species, with 600 species on average for each team.

**Table 5: Groupwise prioritized taxa of Indian flora**

| Priority criteria | Name of the plant group | No. of taxa | Remarks |
|---|---|---|---|
| **A.Endemic taxa** | Angiosperms | 4103 | Please refer Annexure-1 for the list |
| | Gymnosperms | ca 10 out of total 83 taxa found in India | As the number of species in India is 83, all are proposed to be taken in one go |
| | Pteridophytes | ca 300 | There is total 1321 species of Pteridophytes which can be entirely completed by two teams in five years |
| | Bryophytes | ca 800 | 2835 taxa recorded from India in total, which can be covered by five teams |
| | Macro-fungi | ca 220 | 2000 species known from India which can be dealt by four teams |
| | Lichen | ca 500 | 3088 total from India and can be dealt by five teams |
| | Macro-Algae | ca 200 | 1000 species from India can be dealt by two teams |
| | Total | 6206 taxa including the 83 taxa of Gymnosperm | |
| **B. Traded species** | Medicinal plants | 960 taxa (including 178 highly traded species) | Please refer Annexure-2 for the list |
| **C. CITES species** | All group of plants, mostly angiosperms | Nearly 2500 species from India including the entire orchids, cycads, cacti, palms etc. | Annexure-3 depicts the global list of species under CITES Appendices |
| **D.Protected species under Wild Life (Protection) Amendment Act, 2022** | Mostly Angiosperms | 19 species plus all Cycads, and all Ceropegias | Please refer Annexure 4 for the list |
| **E.Remaining species** | All groups | Nearly 27000 taxa | |

Thus, there are around 7000 prioritized plant taxa (excluding duplicates amongst the prioritized taxa) which will be taken up during the initial 3-5 years. The remaining species will be continued for their assessments in the subsequent years. After the first cycle of 2-3 years, there will be expert workshops for vetting and the completed

species will be published as thematic Red Data Books. The endemic species will be uploaded in the IUCN Species Information Service (SIS) simultaneously so that these can be reviewed properly and published on time. The species already available in the IUCN Red List will be reassessed with the available updated data and communicated to the IUCN global office accordingly.

### Deliverables and timelines

**Table 4: Timeline for completing National Red List assessments of prioritized taxa (Flora)**

| Prioritized taxa | | Number of taxa | Timeline | | | |
|---|---|---|---|---|---|---|
| **A. Endemic taxa** | | | | | | |
| **Timeline for 2025-2030** | | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 | 2029-2030 |
| **Angiosperms** | 4103 | 1000 | 1103 | 1000 | 1000 | Vetting and publication |
| **Gymnosperms** | 83 (total taxa in India) | 33 | 50 | Vetting and publication | - | - |
| **Pteridophytes** | 300 | 75 | 75 | 75 | 75 | Vetting and publication |
| **Bryophytes** | 800 | 200 | 200 | 200 | 200 | Vetting and publication |
| **Macro-fungi** | 220 | 50 | 70 | 50 | 50 | Vetting and publication |
| **Lichen** | 500 | 125 | 125 | 125 | 125 | Vetting and publication |
| **Macro-Algae** | 200 | 50 | 50 | 50 | 50 | Vetting and publication |
| **Total** | 6206 | 1533 | 1673 | 1500 | 1500 | Vetting and publication |
| **B. Traded species** | | | | | | |
| **Medicinal plants** | 960 (including 178 highly traded) | 200 | 300 | 360 | 100 | Vetting and publication |
| **C. CITES species** | | | | | | |
| **Mostly angiosperms** | 2500 | 400 | 700 | 700 | 700 | Vetting and publication |
| **D. Protected species under Wild Life (Protection) Act, 1972** | | | | | | |
| **Mostly Angiosperms** | 60 | 30 | 30 | Vetting and publication | -- | -- |
| **E. Remaining species** | | | | | | |
| **All groups** | Nearly 27000 taxa | This will be continued after completion of prioritized taxa by the respective team | | | | |

## Fauna

The Zoological Survey of India proposed to assess the National Red List assessments of 4031 species of fauna covering 28 groups inclusive of endemics, protected fauna, species under trade, commercially important etc.

**Table 6: Timeline for completing National Red List assessments of prioritized taxa (Fauna)**

| Sl. No. | Faunal Group | Prioritized Species | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Name of the Coordinator | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | |
| | **Vertebrates** | | | | | | | |
| 1 | Mammals | Dr. Gaurav Sharma, Scientist-F | 40 | 50 | 50 | 60 | 60 | 260 |
| 2 | Birds | Dr. G Maheswaran, Scientist-F | 40 | 50 | 60 | 80 | 80 | 310 |
| 3 | Reptiles | Pratyush P. Mohapatra | 100 | 150 | 150 | 150 | 150 | 700 |
| 4 | Amphibia | Dr Kaushik Deuti, | 20 | 30 | 50 | 75 | 75 | 250 |
| 5 | Pisces (Freshwater) | Dr. L. Kosygin Singh, Scientist-F | 20 | 50 | 50 | 60 | 60 | 240 |
| 6 | Pisces (Marine) | Dr. Anil Mohapatra, Scientist-E | 10 | 50 | 50 | 50 | 50 | 210 |
| | **Invertebrates** | | | | | | | |
| 7 | Marine Polychaete | Dr. S. Balakrishnan, Scientist-E | 20 | 20 | 20 | 20 | 20 | 100 |
| 8 | Octocorals | Dr. Yogesh Kumar, Scientist-E | 20 | 20 | 20 | 20 | 20 | 100 |
| 9 | Scleractinia | Dr. Tamal Mondal, Scientist-D | 30 | 50 | 50 | 50 | 50 | 230 |
| 10 | Porifera | Dr. G. Sivaleela, Scientist-E | 10 | 20 | 20 | 20 | 20 | 90 |
| 11 | Arachnida | Dr. Souvik Sen, Scientist-E | 05 | 05 | 05 | 10 | 10 | 35 |
| 12 | Mollusca | Dr. Basudev Tripathy, Scientist-E | 10 | 10 | 20 | 20 | 20 | 80 |
| 13 | Collembola | Dr. G. P. Mandal, Scientist-E | 02 | 04 | 04 | 04 | 04 | 18 |
| 14 | Coleoptera | Dr. Devanshu Gupta. Scientist-D | 25 | 40 | 40 | 50 | 50 | 205 |
| 15 | Ephemeroptera | Dr. K. A. Subramanian, Scientist-E | 36 | 36 | 36 | 36 | 36 | 180 |
| 16 | Hymenoptera | Dr. Rifat H Raina, Scientist-E | 20 | 20 | 20 | 20 | 20 | 100 |
| 17 | Lepidoptera | Dr. Navneet Singh, Scientist-E | 10 | 10 | 10 | 20 | 20 | 70 |
| 18 | Odonata | Dr. K. A. Subramanian, Scientist-E | 80 | 80 | 80 | 80 | 80 | 400 |
| 19 | Echinodermata | Dr. Surendar C, Asst. Zoologist | 10 | 10 | 10 | 10 | 10 | 50 |
| 20 | Merostomata | Dr. Basudev Tripathy, Scientist-E | 02 | - | - | - | - | 02 |
| 21 | Centipede | Dr. P. G. S. Sethy, Scientist-D | 12 | 12 | 12 | 12 | 12 | 60 |
| 22 | Scyphozoa (Jelly Fish) | Dr. Jasmine P., Scientist-E | 4 | 4 | 4 | 5 | 5 | 22 |
| 23 | Hydrozoa | Dr. Jasmine P., Scientist-E | - | - | 02 | - | - | 02 |
| 24 | Cubozoa | Dr. Jasmine P., Scientist-E | - | - | 02 | - | - | 02 |
| 25 | Diptera | Dr Atanu Naskar, Scientist-C | 10 | 20 | 20 | 20 | 20 | 90 |
| 26 | Hemiptera | Dr Anil Dubey, Scientist-E | 10 | 20 | 20 | 20 | 20 | 90 |
| 27 | Orthoptera | Dr. Suresh Chand, Scientist-E | 10 | 20 | 20 | 20 | 30 | 100 |
| 28 | Bryozoa | Dr. C. Venkatraman, Scientist-E | 05 | 05 | 05 | 05 | 05 | 25 |
| 29 | Actiniaria | Dr. Tamal Mondal, Scientist-D | 02 | 02 | 02 | 02 | 02 | 10 |
| | **Total** | | **563** | **788** | **832** | **919** | **929** | **4031** |

## APPENDIX 3 – NATIONAL RED LISTING PROCESS

The IUCN National Red Listing of flora and fauna of India will be executed by the Botanical Survey of India and the Zoological Survey of India in an inclusive manner, together with IUCN India, CSS: India - WTI and the SSC network in India, and other experts. The Red List assessment will be inducted in the Annual Research Programme of both organizations and will be reflected from April 2025 to March 2030.

The Zoological Survey of India will be responsible for preparing a pre-assessment database for animal species and the BSI will maintain the same for the plant species. Data for each species will be recorded on the following fields to assess the status of the particular species:

a. Distribution records, including historical distribution data and point localities for subpopulations/metapopulations

b. Biology and life history

c. Ecological information

d. Conservation status (whether protected by the WLPA, CITES appendix, occurrence in PAs etc.)

e. Existing threats

f. Plausible threats

g. Conservation status of the species

h. GIS map of species distribution indicating EOO and AOO

i. References

Appendix 10 provides the species assessment datasheet aligned with the SIS framework of the IUCN National/Regional Res List Assessment guidelines, facilitating standardized data entry and evaluation for the species concerned. Based on the available expertise, group leads (for endemics, threatened/protected, species in use, and others) have been identified for both flora and fauna who will guide and supervise the production of National Red Data Books for those groups. The leads will be supported by taxon leaders, who will serve as taxon experts and will be entrusted with the task of compiling species-specific information along with personnel from ZSI and BSI. Once the pre-assessment data is ready, consultation meetings/ workshops will be held to validate the information by inviting experts working on these groups (scientists, academicians, conservationists, forest officials, independent researchers, etc.). After finalizing the information, the draft report will be peer-reviewed by the reviewers and the final reports will be uploaded for public use in the designated database.

**Schematic overview of the IUCN Red List Assessment process:**

The IUCN Red List of Threatened Species was increasingly used during the 1980s to assess the conservation status of species for policy and planning purposes. The IUCN Red List Categories and Criteria (Figures 1 & 2) are designed to serve as

globally applicable and widely understood system for assessing species' extinction risk. The IUCN Red List Categories and Criteria have been widely adopted by scientists and conservation practitioners worldwide, forming the foundation for biodiversity monitoring tools. Notably, data from the Red List are used to calculate the Red List Index (RLI), a key indicator employed by the CBD to track progress toward the 2030 targets outlined in the KMGBF. The IUCN Red List provides information on taxonomy, distribution, ecology, threats and conservation status of taxa that have been evaluated using the IUCN Categories and Criteria.

The IUCN Red List Categories are based on a set of quantitative criteria linked to population trends, size and structure, and geographic ranges of species. The Regional or National Red List assessment is a three-step process. First, it requires identifying the taxa that are applicable/eligible for National Red List assessments. Introduced taxa or taxa representing an extremely small proportion of the global population in a particular country are generally excluded from national Red Listing for that country. In the second step, the eligible taxa are assessed using the IUCN guidelines for global assessment, which forms the preliminary assessment. In the third step, the impact of population of the species outside the national territory will be considered and the preliminary assessment results achieved in the second step will be adjusted accordingly (Figure 4). In addition to the nine Red List categories used at the global level, the regional context includes two additional categories: 'Regionally Extinct' and 'Not Applicable' (Figure 5). The IUCN has also released its latest guidelines for National Red List of species which also highlights its importance and beneficiaries. The National Red List also does not usually require SIS access and the time and resources required to review and publish in the global Red List.

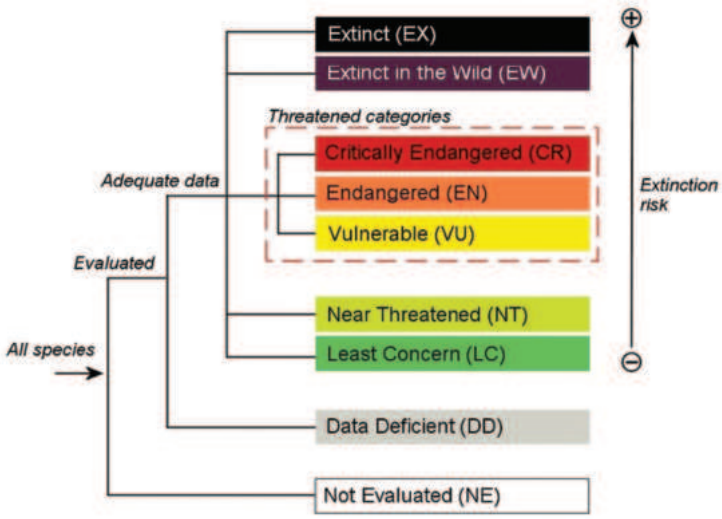


**Figure 1. Structure of IUCN Red List categories** (*Source: IUCN 2023*).

For each species, information needs to be collected on its geographic distribution, population data and overall trends, its habitat and ecology, use and trade where

applicable, threats, and conservation measures in place or required. Information for the assessments will have to be collated from published and unpublished sources including scientific papers, herbarium and museum records, and expert knowledge. A taxon sheet would be prepared for each species and information will be filled in on that sheet for applying IUCN assessment. Figure 3 presents a schematic representation of the process for conducting National/ Regional Red List assessments, in accordance with IUCN guidelines.

**A. Population size reduction.** Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3 & A4 | ≥ 80% | ≥ 50% | ≥ 30% |

**A1** Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.
**A2** Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.
**A3** Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) *[(a) cannot be used for A3]*.
**A4** An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

*based on any of the following:*

**(a)** direct observation *[except A3]*
**(b)** an index of abundance appropriate to the taxon
**(c)** a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
**(d)** actual or potential levels of exploitation
**(e)** effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

**B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)**

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| **B1.** Extent of occurrence (EOO) | < 100 km² | < 5,000 km² | < 20,000 km² |
| **B2.** Area of occupancy (AOO) | < 10 km² | < 500 km² | < 2,000 km² |
| **AND at least 2 of the following 3 conditions:** | | | |
| **(a)** Severely fragmented **OR** Number of locations | = 1 | ≤ 5 | ≤ 10 |
| **(b)** Continuing decline observed, estimated, inferred or projected in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals | | | |
| **(c)** Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals | | | |

**C. Small population size and decline**

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| **Number of mature individuals** | < 250 | < 2,500 | < 10,000 |
| **AND at least one of C1 or C2** | | | |
| **C1.** An observed, estimated or projected continuing decline of at least (upto a max. of 100 years in future): | 25% in 3 years or 1 generation (whichever is longer) | 20% in 5 years or 2 generations (whichever is longer) | 10% in 10 years or 3 generations (whichever is longer) |
| **C2.** An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions: | | | |
| **(a)** **(i)** Number of mature individuals in each subpopulation | ≤ 50 | ≤ 250 | ≤ 1,000 |
| **(ii)** % of mature individuals in one subpopulation = | 90–100% | 95–100% | 100% |
| **(b)** Extreme fluctuations in the number of mature individuals | | | |

**D. Very small or restricted population**

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| **D.** Number of mature individuals | < 50 | < 250 | **D1.** < 1,000 |
| **D2.** *Only applies to the VU category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. | - | - | **D2.** typically: AOO < 20 km² or number of locations ≤ 5 |

**E. Quantitative Analysis**

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| **Indicating the probability of extinction in the wild to be:** | ≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.) | ≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.) | ≥ 10% in 100 years |

**Figure 2. Summary sheet of IUCN Red List criteria** (*Source: IUCN 2012*).

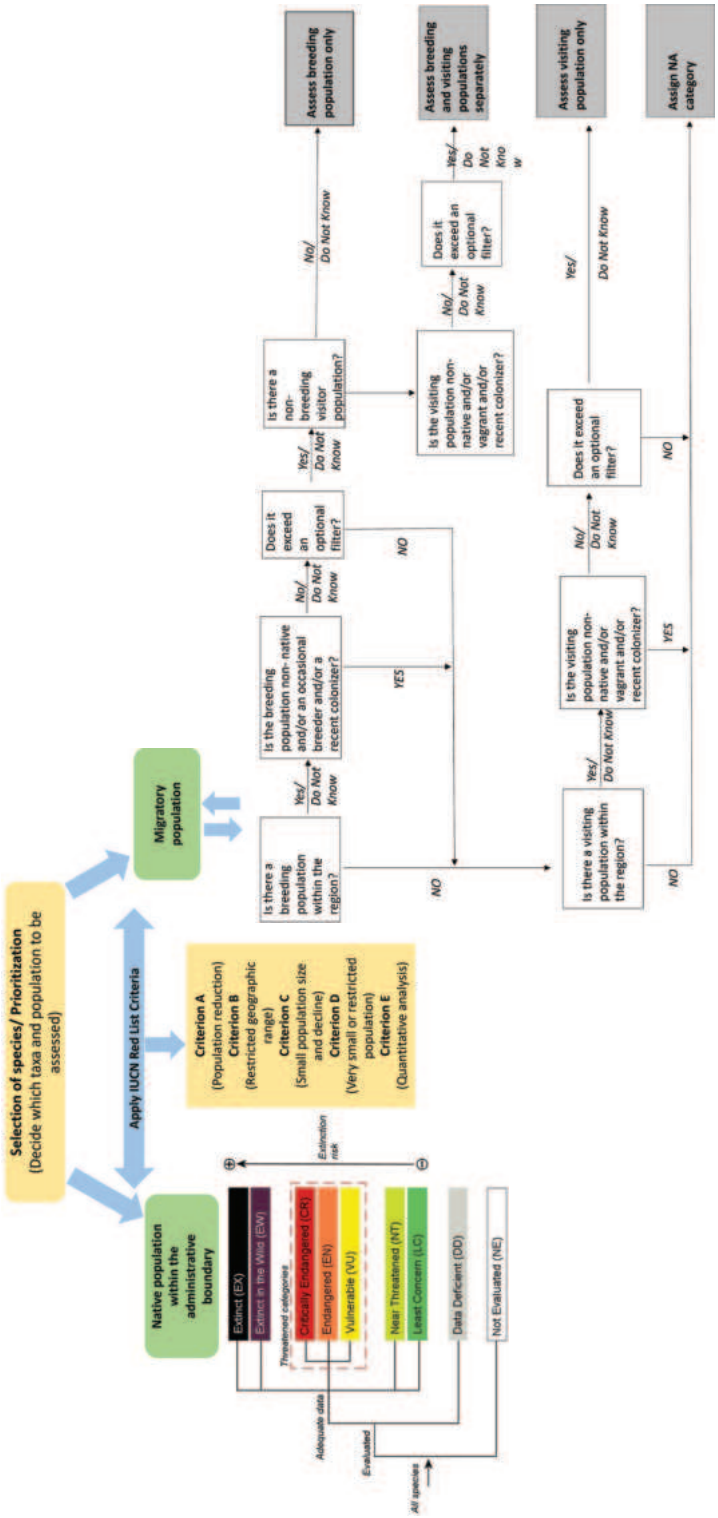


**Figure 3. Schematic presentation of National/ Regional Red List assessments as per IUCN guidelines.**

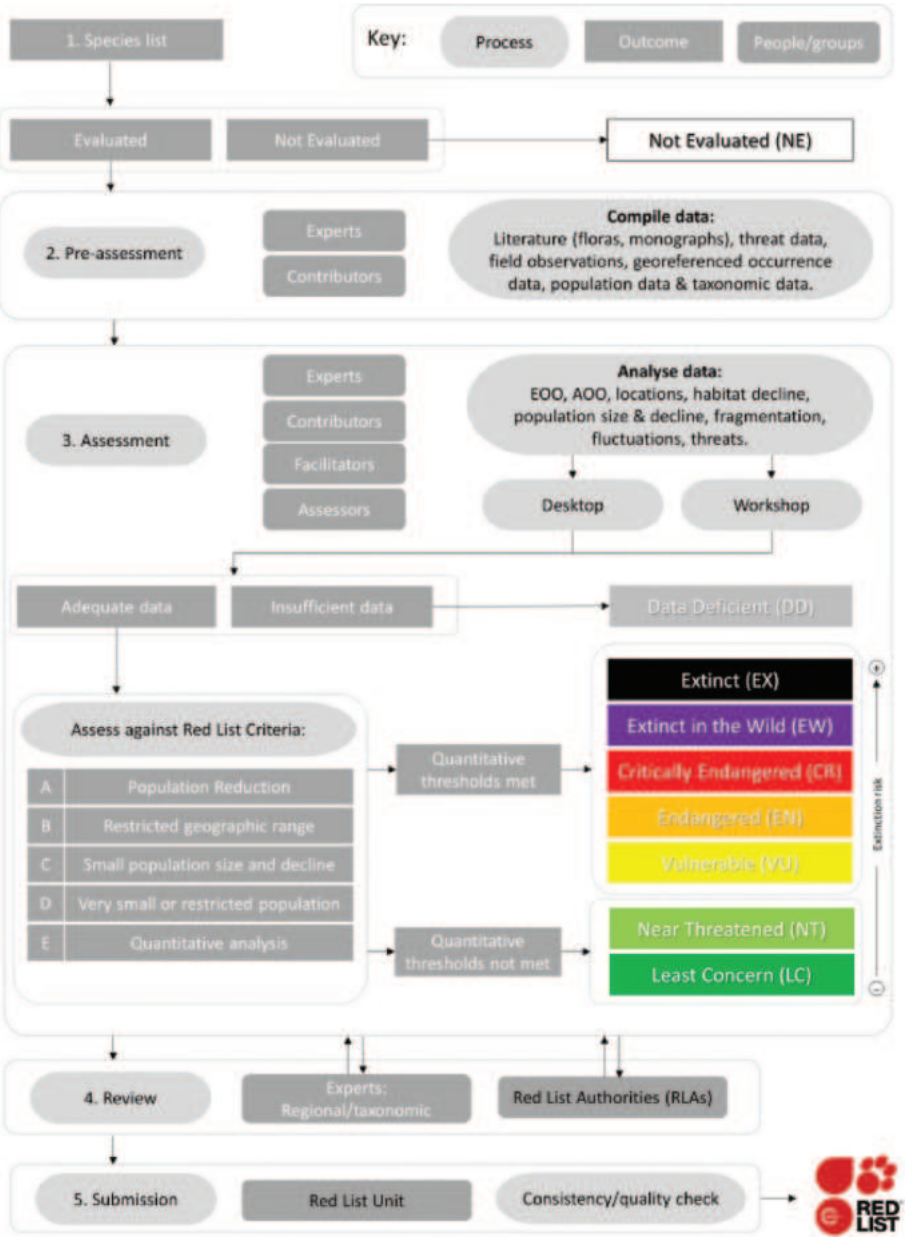


**Figure 4: Generalized Red List assessment workflow from species list to publication on the Red List** (*Source: Bachman et al., 2019*).

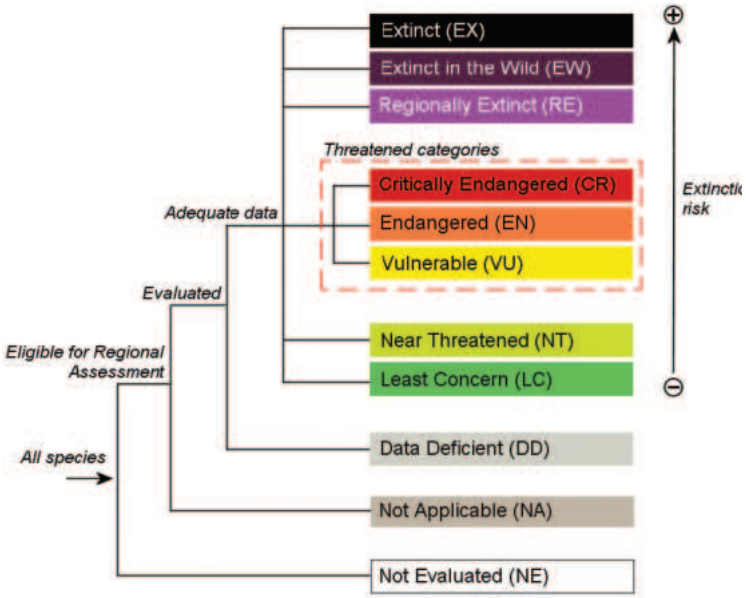


**Figure 5. Structure of the categories at regional level** (*Source: IUCN 2023*).

## APPENDIX 4 - DETAILED WORKPLAN (IMPLEMENTATION PLAN)

This section presents the proposed process/workflow from prioritization, capacity, assessments, database management, review, submissions, etc.

The Red List Assessment process is summarised in Figures 3 – 4 and will be done with strategic planning to achieve the target.

The Red List assessment is a dynamic and inclusive process that serves as a critical tool to evaluate the effectiveness of biodiversity conservation measures undertaken so far. Its adaptive nature allows for the integration of new findings and evolving threats, ensuring ongoing relevance to conservation planning. Species or taxa already assessed by the IUCN Red List (Global), whether endemic or non-endemic, may require re-assessment. This could include updates to taxonomic classifications; incorporation of newly discovered species or records in India; refinement of distribution ranges, especially at sub-national levels; and consideration of emerging threats or ecological pressures. Species and taxa not previously assessed shall be evaluated systematically, with a group-wise approach to ensure thorough and structured assessments. Comprehensive data to be gathered from the State Biodiversity Boards (People's Biodiversity Registers), state Forest Departments (wildlife management plans, poaching case records, and field data), academic institutions, NGOs, and researchers. Leveraging institutional data of ZSI and BSI (such as specimen collection localities, survey reports etc.), published literature, and distribution data from a range of credible platforms other than published literature records (social media platforms such as iNaturalist, GBIF etc.) will be analysed for the assessment. Voluntary participation from all relevant stakeholders including the citizen science initiatives will be invited for having a more robust and finetuned system.

**Products and other Outputs with timelines:**

Each Species Assessment Report is to be peer-reviewed and will be published with DOI by ZSI and BSI. The summary document for each taxon edited by the Director, Zoological Survey of India/ Botanical Survey of India, will be published with the partner institutions.

Reports on taxon groups will be published as books/ documents by the taxon coordinators after the completion of the review process.

**Timeline and deliverables:**

The assessments can be divided into two cycles: The first cycle - 2025-26 to 2027-28 and the second cycle from 2027-28 to 2029-30 for taking up the assignment in the Annual Programme of Research.

| Sl. No. | Deliverables | 2025-2026 | 2026-2027 | 2027-2028 | 2028-2029 | 2029-2030 |
|---|---|---|---|---|---|---|
| 1. | Project inception, Prioritization of taxa and assignment to Taxon Coordinators, in-house Pre-assessment workshop and training to the staff involved | | | | | |
| 2. | Preparation of Data Policy, finalization of outside experts, coordination with the SSGs, identification of reviewers | | | | | |
| 3. | Compilation of Pre-Assessment Data in individual Species Assessment Sheets including Preparation of distribution map and calculation of EOO and AOO | | | | | |
| 4. | Field surveys (for select species) | | | | | |
| 5. | Finalization of assessment sheets, Consultative workshops with experts for vetting and review of Species Assessment Reports | | | | | |
| 6. | Mid-term publication of assessments of prioritized taxa, if any | | | | | |
| 7. | Submission of FTR and publication of results | | | | | |

# APPENDIX 5 - WORK PLAN OF BOTANICAL SURVEY OF INDIA

| Sl. No. | Activity | Start Date | End Date | Expected Outputs | Expected Outcomes | Remarks |
|---|---|---|---|---|---|---|
| 1. | Conduct at least ten trainings of assessors (two in each year) | 01 August 2024 | 31 March 2030 | | A trained and qualified pool of at least 300 assessors created within the country | 16 Taxon Coordinators of 53 and 106 team members to undergo Red List assessment training. |
| 2. | Conduct at least four trainings of trainers | 01 April 2025 | 31 March 2030 | | A minimum of five national level trainers certified to conduct Red List assessment trainings | |
| 3. | Ensure prioritised species checklist is provided by taxon coordinators | 01 April 2025 | 28 February 2026 | | A set of flora and fauna prioritized for assessments | |
| 4. | Conduct workshops for approval of Prioritised Species List | 01 October 2025 | 28 February 2026 | | | |
| 5. | Ensure selection of reviewers during workshops | 01 April 2025 | 31 December 2026 | | | Reviewers will be selected from a pool of experts specializing in the relevant field. Each assessment will undergo a two-step review process to ensure scientific rigor and alignment with international standards. The first review will be conducted by a species or taxa expert, ensuring accuracy in biological and ecological aspects. The second review will be carried out by an IUCN Red Listing methodology expert, ensuring compliance with Red List criteria and guidelines. |
| 6. | Conduct workshops for review of pre-assessment data | 01 June 2026 | 31 March 2029 | | | |
| 7. | Conduct pre-assessment by collecting data and preparing draft species assessment reports based on IUCN Red List criteria | 01 June 2025 | 31 March 2029 | Species assessment reports, papers | Peer reviewed species assessments published independently and integrated into a national database | 27000 non-prioritised species of flora will be continued for assessments in the annual research programme of BSI. |
| 8. | Conduct workshops for vetting of assessments | 01 January 2026 | 31 March 2029 | | | |
| 9. | Ensure the formation of a National Species Specialist Group | 01 January 2026 | 31 March 2029 | | Establishment of National Species Specialist Group to guide and oversee assessments | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10. | Conduct National Red Listing of species | Groups | No. of species' assessments per year | 01 June 2025 | 31 March 2030 | | | Assessments to determine status and extinction risks completed for at least 7000 species of flora |
| | | | Y1 (2025-26) | Y2 (2026-27) | Y3 (2027-28) | Y4 (2028-29) | | |
| | | Angiosperms (Endemic, Non-endemic Flowering Plants of India) | 1000 | 1103 | 1000 | 1000 | | |
| | | Gymnosperms | 33 | 50 | 0 | 0 | | |
| | | Pteridophytes | 75 | 75 | 75 | 75 | | |
| | | Bryophytes | 200 | 200 | 200 | 200 | | |
| | | Macro-fungi | 50 | 70 | 50 | 50 | | |
| | | Lichen | 125 | 125 | 125 | 125 | | |
| | | Macro-Algae | 50 | 50 | 50 | 50 | | |
| | | Medicinal plants | 200 | 300 | 360 | 100 | | |
| | | CITES species | 400 | 700 | 700 | 700 | | |
| | | Protected species | 30 | 30 | 0 | 0 | | |
| | | Total no. of assessments | 2163 | 2703 | 2560 | 2300 | | |
| 11. | Ensure the publication of National Red Data Book of Endemic Flowering Plants of India (Volume I & II) | | | 01 June 2025 | 28 February 2030 | National Red Data Book of Endemic Flowering Plants of India (Volume I & II) | | |
| 12. | Ensure the publication of National Red Data Book of Gymnosperms of India | | | 01 June 2025 | 28 February 2028 | National Red Data Book of Gymnosperms of India | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. | Ensure the publication of National Red Data Book of CITES and Protected Species of India | 01 June 2025 | 28 February 2028 | National Red Data Book of CITES and Protected Species of India | | |
| 14. | Ensure the publication of National Red Data Book of Traded Medicinal Plants of India | 01 June 2025 | 28 February 2030 | National Red Data Book of Traded Medicinal Plants of India | | |
| 15. | Ensure the publication of National Red List assessment of Endemic Non-flowering Plants of India - Volume 1 | 01 June 2025 | 28 February 2030 | National Red List assessment of Endemic Non-flowering Plants of India - Volume 1 | | |
| 16. | Ensure thematic publications of Red List assessments - Orchids, Grasses, Legumes, Trees, Rhododendrons, Lillies, Gingers, Balsams, Bananas, Sedges, Wild Edible Species | 01 June 2025 | 28 February 2030 | National Red Data Book of Orchids of India | | |
| | | | | National Red Data Book of Grasses of India | | |
| | | | | National Red Data Book of Legumes of India | | |
| | | | | National Red Data Book of Trees of India | | |
| | | | | National Red Data Book of Rhodo-dendrons of India | | |
| | | | | National Red Data Book of Lillies of India | | |
| | | | | National Red Data Book of Gingers of India | | |
| | | | | National Red Data Book of Balsams of India | | |
| | | | | National Red Data Book of Sedges of India | | |
| | | | | National Red Data Book of Wild Edible Species of Flora of India | | |

## APPENDIX 6 - GROUP-WISE DELIVERABLES OF BSI

| SL. No. | Target Floral Group | Taxon Coordinator(s) | No. of species' assessments per year | | | | Start Date | End Date | Deliverables | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Y1 (2025-26) | Y2 (2026-27) | Y3 (2027-28) | Y4 (2028-29) | | | Outputs | Outcomes |
| 1. | Angiosperms (Endemic flowering plants of India) * | Dr. C. Murugan, Scientist F<br>Dr. S.S. Dash, Scientist F<br>Dr. J. Jayanthi, Scientist F<br>Dr. Manas Bhaumik, Scientist F<br>Dr. Rajib Gogoi, Scientist F<br>Dr. Lal Ji Singh, Scientist F<br>Dr. Prasant K. Pusalkar, Scientist F<br>(to be teamed up with Dr. Priyanka Ingle)<br>Dr. K. Karthigeyan, Scientist F<br>Dr. Jeewan Singh Jalal, Scientist E<br>Dr. Dinesh Kumar Agrawala, Scientist E<br>Dr. L. Rasingam, Scientist E<br>Dr. Avishek Bhattacharjee, Scientist E<br>Dr. K.A.A. Kabeer, Scientist E<br>Dr. K.A. Sujana, Scientist E<br>Dr. M.Y. Kamble, Scientist E<br>Dr. Chaya Deori, Scientist E<br>Dr. W. Aris Dason, Scientist E<br>Dr. R. Manikandan, Scientist E<br>Dr. Manish K. Kandwal, Scientist E<br>Dr. Pushpa Kumari, Scientist E<br>Dr.J.H. Franklin Benjamin, Scientist D<br>Dr. Kumar Avinash Bharati, Scientist D<br>Dr. Umeshkumar L. Tiwari, Scientist D<br>Dr. Chandan Singh Purohit, Scientist D<br>Dr. David L. Biate, Scientist D<br>Dr. M. Murugesan, Scientist D<br>Dr. Manas R. Debta, Scientist D<br>Dr. Debasmita Dutta Pramanick, Scientist D | 1000 | 1103 | 1000 | 1000 | 01 June 2025 | 28 February 2030 | National Red Data Book of Endemic Flowering Plants of India (Volume I & II) | Assessments to determine status and extinction risks completed for at least 7000 species of flora |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dr. Priyanka Ingle, Scientist D<br>Dr. Puneet Kumar, Scientist D<br>Dr. O.N. Maurya, Scientist D<br>Dr. Sanjay Mishra, Scientist D<br>Dr. Sitaram Prasad Panda, Scientist D<br>Dr. Vivek C.P., Scientist C<br>Dr. Gopal Krishna, Scientist C<br>Dr. J. Swamy, Scientist C<br>Dr. Kottaimuthu, Scientist C | | | | | | | | |
| 2. | Gymnosperms | Dr. Lal Ji Singh, Scientist F | 33 | 50 | 0 | 0 | 01 June 2025 | 28 Feb-ruary 2028 | National Red Data Book of Gymnosperms of India | |
| 3. | Pteridophytes | Dr. A. Benniamin, Scientist F<br>Dr. Vineet Kumar Rawat, Scientist E<br>Dr. Brijesh Kumar, Scientist C | 75 | 75 | 75 | 75 | 01 June 2025 | 28 Feb-ruary 2030 | National Red List assessment of Endemic Non-flowering Plants of India - Volume 1 | |
| 4. | Bryophytes | Dr. S.K. Singh, Scientist F<br>Dr. Devendra Singh, Scientist E<br>Dr. Monalisa Dey, Scientist D | 200 | 200 | 200 | 200 | 01 June 2025 | 28 Feb-ruary 2030 | | |
| 5. | Macro-fungi | Dr. Kanad Das, Scientist F<br>Dr. Manoj E. Hembrom, Scientist C<br>Dr. Dyutiparna Chakraborty, Scientist C<br>Dr. Arvind Parihar, Scientist C | 50 | 70 | 50 | 50 | 01 June 2025 | 28 Feb-ruary 2030 | | |
| 6. | Lichen | Dr. Jagadeesh Ram Tam, Scientist F<br>Dr. Swarnalatha, Botanist | 125 | 125 | 125 | 125 | 01 June 2025 | 28 Feb-ruary 2030 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 7. | Macro-Algae | Dr. M. Palanisamy, Scientist E<br>Dr. Sudhir Yadav, Botanist<br>Dr. Sudipta Kumar Das, Scientist E<br>Dr. Sukumar Bhakta | 50 | 50 | 50 | 50 | 01 June 2025 | 28 Febru-ary 2030 | | |
| 8. | Medicinal plants | These thematic groups will be integrated within the broader assessments of major taxa and will be assessed by the respective | 200 | 300 | 360 | 100 | 01 June 2025 | 28 Febru-ary 2030 | National Red Data Book of Traded Medici-nal Plants of India | |
| 9. | CITES species | Taxon Coordinators. While species overlap across groups is expected, separate thematic group-wise publications will be developed to complement the main outputs. | 400 | 700 | 700 | 700 | 01 June 2025 | 28 Febru-ary 2028 | National Red Data Book of CITES and Protected Species of India | |
| 10. | Protected species | | 30 | 30 | 0 | 0 | | | | |
| 11. | Thematic Groups - Orchids, Grasses, Legumes, Trees, Rhododendrons, Lillies, Gingers, Balsams, Bananas, Sedges, Wild Edible Species | | - | - | - | - | 01 June 2025 | 28 Febru-ary 2030 | 1. National Red Data Book of Or-chids of India<br>2. National Red Data Book of Grasses of India<br>3. National Red Data Book of Legumes of India<br>4. National Red Data Book of Trees of India | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 5. National Red Data Book of Rhododendrons of India<br>6. National Red Data Book of Lillies of India<br>7. National Red Data Book of Gingers of India<br>8. National Red Data Book of Balsams of India<br>9. National Red Data Book of Sedges of India<br>10. National Red Data Book of Wild Edible Species of Flora of India | |
| | Total no. of assessments | | 2163 | 2703 | 2560 | 2300 | | | | |

*Note*:

** The outputs for broader taxa, such as Angiosperms, will be categorised into priority groups including endemic species, medicinal plants, protected species, and others to enable focused assessments and targeted publications. The Taxon Coordinators for Angiosperms will prioritise endemic plant species for assessments, contributing to the interim publication of the National Red Data Book of Endemic Flowering Plants of India (Volumes I & II).*

## APPENDIX 7 - WORK PLAN OF ZOOLOGICAL SURVEY OF INDIA

| Sl. No. | Activity | Start Date | End Date | Expected Outputs | Expected Outcomes |
|---|---|---|---|---|---|
| 1. | Conduct at least ten trainings of assessors (two in each year) | 01 August 2024 | 31 March 2030 | | A trained and qualified pool of at least 300 assessors created within the country |
| 2. | Conduct at least four trainings of trainers | 01 April 2025 | 31 March 2030 | | A minimum of five national level trainers certified to conduct Red List assessment trainings |
| 3. | Ensure prioritised species checklist is provided by taxon coordinators | 01 April 2025 | 31 March 2026 | | A set of flora and fauna prioritised for assess-ments |
| 4. | Conduct workshops for approval of Prioritised Species List | 01 October 2025 | 28 February 2026 | | |
| 5 | Ensure selection of reviewers during workshops | 01 April 2025 | 31 December 2026 | | |
| 6. | Ensure the formation of a National Species Specialist Group | 01 January 2026 | 31 March 2029 | | Establishment of National Species Specialist Group to guide and oversee assessments |
| 7. | Conduct workshops for review of pre-assessment data compiled based on IUCN Regional/National Red List Guidelines and preparing draft species assessment reports based on IUCN Red List criteria | 01 June 2026 | 31 March 2029 | Draft assessment reports | Peer reviewed species assessments published independently and integrated into a national database |
| 8. | Final assessment reports to be sent to assigned reviewers for a peer-reviewed process | 01 January 2026 | 31 March 2029 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9. | Conduct National Red Listing of species | **Faunal Group** | No. of species' assessments per year | 01 June 2025 | 31 March 2030 | | Assessments to determine status and extinction risks completed for at least 4000 species of fauna |
| | | **Vertebrates** | **Y1 (2025-26)** | **Y2 (2026-27)** | **Y3 (2027-28)** | **Y4 (2028-29)** | **Y5 (2029-30)** |
| | | **Mammals** | 40 | 50 | 50 | 60 | 60 |
| | | **Endemic Mammals** | 30 | 23 | - | - | - |
| | | **Birds** | 40 | 50 | 60 | 80 | 80 |
| | | **Endemic Birds** | 35 | 38 | - | - | - |
| | | **Reptiles** | 100 | 150 | 150 | 150 | 150 |
| | | **Endemic Reptiles** | 100 | 150 | 177 | - | - |
| | | **Amphibians** | 20 | 30 | 50 | 75 | 75 |
| | | **Endemic Amphibians** | 60 | 120 | 179 | - | - |
| | | **Fishes (Freshwater)** | 20 | 50 | 50 | 60 | 60 |
| | | **Fishes (Marine)** | 10 | 50 | 50 | 50 | 50 |
| | | **Invertebrates** | **Y1 (2025-26)** | **Y2 (2026-27)** | **Y3 (2027-28)** | **Y4 (2028-29)** | **Y5 (2029-30)** |
| | | **Annelida (Marine Polychaete)** | 20 | 20 | 20 | 20 | 20 |
| | | **Soft corals (Octocorals)** | 20 | 20 | 20 | 20 | 20 |
| | | **Hard corals (Scleractinia)** | 30 | 50 | 50 | 50 | 50 |
| | | **Sponges (Porifera)** | 10 | 20 | 20 | 20 | 20 |
| | | **Spiders and Scorpions (Arachnida)** | 5 | 5 | 5 | 10 | 10 |
| | | **Mollusca** | 10 | 10 | 20 | 20 | 20 |
| | | **Springtails (Collembola)** | 2 | 4 | 4 | 4 | 4 |
| | | **Beetles (Coleoptera)** | 25 | 40 | 40 | 50 | 50 |
| | | **Mayfly (Ephemeroptera)** | 36 | 36 | 36 | 36 | 36 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Sawflies, wasps, bees, and ants (Hymenoptera)** | 20 | 20 | 20 | 20 | 20 | |
| | | **Butterfly and Moth (Lepidoptera)** | 10 | 10 | 10 | 20 | 20 | |
| | | **Dragonfly and damselfly (Odonata)** | 80 | 80 | 80 | 80 | 80 | |
| | | **Starfish, sea urchin, sea cucumber (Echinodermata)** | 10 | 10 | 10 | 10 | 10 | |
| | | **Horseshoe crabs (Merostomata)** | 2 | - | - | - | - | |
| | | **Centipede** | 12 | 12 | 12 | 12 | 12 | |
| | | **Jelly Fish (Scyphozoa)** | 4 | 4 | 4 | 5 | 5 | |
| | | **Hydrozoa** | - | - | 2 | - | - | |
| | | **Box jellyfish (Cubozoa)** | - | - | 2 | - | - | |
| | | **Flies (Diptera)** | 10 | 20 | 20 | 20 | 20 | |
| | | **Hemiptera** | 10 | 20 | 20 | 20 | 20 | |
| | | **Orthoptera** | 10 | 20 | 20 | 20 | 30 | |
| | | **Bryozoa** | 5 | 5 | 5 | 5 | 5 | |
| | | **Actiniaria** | 2 | 2 | 2 | 2 | 2 | |
| | | **Threatened Mammals of India** | | | | | | |
| | | **CITES and Protected Species of Indian Fauna *** | - | - | - | - | - | |
| | | **Total** | 563 | 788 | 832 | 919 | 929 | |
| 10. | Ensure the publication of National Red Data Book of Indian Mammals | | | | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Mammals | |

| | | | | | |
|---|---|---|---|---|---|
| 11. | Ensure the publication of National Red Data Book of Endemic Mammals of India | 01 June 2025 | 28 February 2027 | National Red Data Book of Endemic Mammals of India | |
| 12. | Ensure the publication of National Red Data Book of Indian Birds | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Birds | |
| 13. | Ensure the publication of National Red Data Book of Endemic Birds of India | 01 June 2025 | 28 February 2028 | National Red Data Book of Endemic Birds of India | |
| 14. | Ensure the publication of National Red Data Book of Indian Reptiles | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Reptiles | |
| 15. | Ensure the publication of National Red Data Book of Endemic Reptiles of India | 01 June 2025 | 28 February 2028 | National Red Data Book of Endemic Reptiles of India | |
| 16. | Ensure the publication of National Red Data Book of Indian Amphibians | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Amphibians | |
| 17. | Ensure the publication of National Red Data Book of Endemic Amphibians of India | 01 June 2025 | 28 February 2029 | National Red Data Book of Endemic Amphibians of India | |
| 18. | Ensure the publication of National Red Data Book of Indian Freshwater Fishes | 01 June 2025 | 28 February 2029 | National Red Data Book of Indian Freshwater Fishes | |
| | Ensure the publication of National Red Data Book of Indian Marine Fishes | | | National Red Data Book of Indian Marine Fishes | |
| 19. | Ensure the publication of National Red Data Book of Endemic Fishes of India | | | National Red Data Book of Endemic Fishes of India | |
| 20. | Ensure the publication of National Red Data Book of Indian Invertebrates | 01 June 2025 | 28 February 2029 | National Red Data Book of Indian Invertebrates | |
| 21. | Ensure the publication of National Red Data Book on Indian fauna listed in CITES Appendices | 01 June 2025 | 30 March 2027 | National Red Data Book of CITES listed animals in India | |
| 22. | Ensure publication of National Red Data Book of Scheduled Species in Wild Life (Protection) Amendment Act, 2022 | 01 June 2025 | 30 March 2028 | National Red Data Book of Protected Species of Indian Fauna | |

* *Note: CITES Appendices list approximately 450 Indian faunal species, including around 175 birds, 162 mammals, 68 reptiles, four amphibians, eight actinopterygian fishes, six insects, and four echinoderms, among others. Similarly, the species listed in Schedules I and II of the Wild Life (Protection) Amendment Act, 2022 comprises 183 mammals, 208 birds, 62 reptiles, four amphibians, 20 fishes, 97 insects, and around 388 corals and Schedule II includes 34 mammals, 1134 birds, 22 reptiles, 32 amphibians, 10 fishes, 295 insects, and 15 molluscs. Many of these species are to be covered in completed National Red List assessments of taxa of fauna; data of relevant species will be extracted and compiled into the National Red Data Book of CITES and Protected Species of Indian Fauna.*

# APPENDIX 8 - GROUP-WISE DELIVERABLES OF ZSI

| Sl. No. | Target Faunal Group | Taxon Coordinator | No. of species' assessments per year | | | | Start Date | End Date | Deliverables | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Vertebrates | | Y2 (2026-27) | Y3 (2027-28) | Y4 (2028-29) | Y5 (2029-30) | | | Outputs | Outcomes |
| 1. | **Mammals** | Dr. Gaurav Sharma, Scientist-F | 50 | 50 | 60 | 60 | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Mammals | Assessments to determine status and extinction risks completed for at least 4000 species fauna |
| 2. | **Endemic Mammals (53)** | | 23 | - | - | - | 01 June 2025 | 28 February 2027 | National Red Data Book of Endemic Mammals of India | |
| 3. | **Birds** | Dr. G Maheswaran, Scientist-F | 50 | 60 | 80 | 80 | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Birds | |
| 4. | **Endemic Birds (79)** | | 38 | - | - | - | 01 June 2025 | 28 February 2028 | National Red Data Book of Endemic Birds of India | |
| 5. | **Reptiles** | Pratyush P. Mohapatra, Scientist-E | 150 | 150 | 150 | 150 | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Reptiles | |
| 6. | **Endemic Reptiles (427)** | | 100 | 150 | 150 | - | 01 June 2025 | 28 February 2028 | National Red Data Book of Endemic Reptiles of India | |
| 7. | **Amphibians** | Dr. Kaushik Deuti, Scientist-D | 30 | 50 | 75 | 75 | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Amphibians | |
| 8. | **Endemic Amphibians (359)** | | 120 | 179 | - | - | 01 June 2025 | 28 February 2029 | National Red Data Book of Endemic Amphibians of India | |
| 9. | **Fishes (Freshwater)** | Dr. L. Kosygin Singh, Scientist-F | 50 | 50 | 60 | 60 | 01 June 2025 | 30 March 2030 | National Red Data Book of Indian Freshwater Fishes | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10. | **Fishes (Marine)** | Dr. Anil Mohapatra, Scientist-E | 50 | 50 | 50 | 50 | | | National Red Data Book of Indian Marine Fishes | |
| 11. | **Endemic Fishes (667)** | Dr. L. Kosygin Singh, Scientist-F and Dr. Anil Mohapatra, Scientist-E | 120 | 150 | 150 | 150 | 01 June 2025 | 28 February 2029 | National Red Data Book of Endemic Fishes of India | |
| 12. | **Invertebrates** | | Y2 (2026-27) | Y3 (2027-28) | Y4 (2028-29) | Y5 (2029-30) | | | | |
| 13. | **Annelida (Marine Polychaete)** | Dr. S. Balakrishnan, Scientist-E | 20 | 20 | 20 | 20 | 01 June 2025 | 28 February 2029 | National Red Data Book of Indian Invertebrates | |
| 14. | **Soft corals (Octocorals)** | Dr. Yogesh Kumar, Scientist-E | 20 | 20 | 20 | 20 | | | | |
| 15. | **Hard corals (Scleractinia)** | Dr. Tamal Mondal, Scientist-D | 50 | 50 | 50 | 50 | | | | |
| 16. | **Sponges (Porifera)** | Dr. G. Sivaleela, Scientist-E | 20 | 20 | 20 | 20 | | | | |
| 17. | **Spiders and Scorpions (Arachnida)** | Dr. Souvik Sen, Scientist-E | 5 | 5 | 10 | 10 | | | | |
| 18. | **Mollusca** | Dr. Basudev Tripathy, Scientist-E | 10 | 20 | 20 | 20 | | | | |
| 19. | **Horseshoe crabs (Merostomata)** | | 2 | - | - | - | | | | |
| 20. | **Springtails (Collembola)** | Dr. G. P. Mandal, Scientist-E | 40 | 40 | 50 | 50 | | | | |
| 21. | **Beetles (Coleoptera)** | Dr. Devanshu Gupta, Scientist-D | 36 | 36 | 36 | 36 | | | | |
| 22. | **Mayfly (Ephemeroptera)** | Dr. K. A. Subramanian, Scientist-E | 20 | 20 | 20 | 20 | | | | |
| 23. | **Sawflies, wasps, bees, and ants (Hymenoptera)** | Dr. Rifat H Raina, Scientist-E | 10 | 10 | 20 | 20 | | | | |
| 24. | **Butterfly and Moth (Lepidoptera)** | Dr. Navneet Singh, Scientist-E | 80 | 80 | 80 | 80 | | | | |
| 25. | **Dragonfly and damselfly (Odonata)** | Dr. K. A. Subramanian, Scientist-E | 10 | 10 | 10 | 10 | | | | |
| 26. | **Starfish, sea urchin, sea cucumber (Echinodermata)** | Dr. Surendar C, Asst. Zoologist | - | - | - | - | | | | |
| 27. | **Centipede** | Dr. P. G. S. Sethy, Scientist-D | 12 | 12 | 12 | 12 | | | | |
| 28. | **Jelly Fish (Scyphozoa)** | Dr. Jasmine P., Scientist-E | 4 | 4 | 5 | 5 | | | | |
| 29. | **Hydrozoa** | | - | 2 | - | - | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 30. | **Box jellyfish (Cubozoa)** | | - | 2 | - | - | | | | |
| 31. | **Flies (Diptera)** | Dr Atanu Naskar, Scientist-C | 20 | 20 | 20 | 20 | | | | |
| 32. | **Hemiptera** | Dr Anil Dubey, Scientist-E | 20 | 20 | 20 | 20 | | | | |
| 33. | **Orthoptera** | Dr. Suresh Chand, Scientist-E | 20 | 20 | 20 | 30 | | | | |
| 34. | **Bryozoa** | Dr. C. Venkatraman, Scientist-E | 5 | 5 | 5 | 5 | | | | |
| 35. | **Actiniaria** | Dr. Tamal Mondal, Scientist-D | 2 | 2 | 2 | 2 | | | | |
| 36. | **Species of Indian Fauna listed in CITES Appendices** | - | The total number of species listed under CITES and the Wild Life (Protection) Act, 1972 is approximately 2,750. Many of these species may already be included in the completed Red List assessments. The task now is to filter and extract these species from the assessments and compile them into a National Red Data Book of CITES and Protected Species of Indian Fauna. | | | | 01 June 2025 | 30 March 2027 | National Red Data Book of Indian Fauna listed in CITES Appendices | |
| 37. | **Species of Indian Fauna scheduled in Wild Life (Protection) Amendment Act, 2022** | - | | | | | 01 June 2025 | 30 March 2028 | National Red Data Book of Indian Fauna in Wild Life (Protection) Amendment Act, 2022 | |
| | | **Total** | **786** | **828** | **915** | **925** | | | | |

## APPENDIX 9 - WORK PLAN OF IUCN INDIA AND THE CENTER FOR SPECIES SURVIVAL: INDIA - WILDLIFE TRUST OF INDIA

| Sl. No. | Activity | Start Date | End Date | Expected Outputs | Expected Outcomes |
|---|---|---|---|---|---|
| | National Red List Assessments | | | | |
| 1. | Enlist at least 50 more members to the SSC network in India | 01 June 2025 | 31 March 2030 | | Establishment of National Species Specialist Group to guide and oversee assessments |
| 2. | Ensure the formation of a National Species Specialist Group | 01 June 2025 | 31 March 2030 | | |
| 3. | Coordinate with BSI, ZSI, IUCN India and finalise criteria for the prioritization of species for assessments | 01 April 2025 | 28 February 2026 | | A set of flora and fauna prioritised for assessments |
| 4. | Constitute a steering committee with JS MoEF&CC - consisting of directors BSI and ZSI, IUCN India, SSC and other experts to monitor the overall progress of National Red Listing of India flora and fauna | 01 June 2025 | 28 February 2026 | | |
| 5. | Organize meetings between MoEF&CC and SSC chairs and other members to involve them in Red Listing process | 01 June 2026 | 28-Feb-30 | | |
| 6. | Facilitate National Red List assessment of at least 11,000 species of flora and fauna prioritised by BSI and ZSI | 01 June 2025 | 31 March 2030 | Publication of National Red List assessments of at least 750 flora and fauna species | Assessments to determine status and extinction risks completed for at least 11,000 flora and fauna species of India |
| 7. | Conduct National Red List assessments for at least 750 species of flora and fauna not prioritised by BSI and ZSI | 01 June 2025 | 31 March 2030 | | |
| 8. | Conduct at least ten trainings of Red List assessors (two in each year) | 01 June 2025 | 31 March 2030 | | A trained and qualified pool of at least 300 assessors created within the country |
| 9. | Coordinate the travel and accommodation of trainers for the training of assessors | 01 June 2025 | 28 February 2029 | | |
| 10. | Facilitate at least four trainings of trainers | 01 June 2025 | 28 February 2029 | | A minimum of five national level trainers certified to conduct Red List assessment trainings |
| 11. | Develop a database of potential reviewers across taxa in consultation with SSC Specialist Groups and other institutions | 01 April 2025 | 28 February 2029 | | |
| 12. | Facilitate the pre-assessments data review workshops and ensure the presence of taxon coordinators, assessors, and reviewers | 01 June 2025 | 31 March 2030 | Draft assessment reports | Peer reviewed species assessments published independently and integrated into a national database |
| 13. | Coordinate the planning and execution of vetting workshops | 01 June 2025 | 31 March 2030 | | |
| 14. | Facilitate the submission of vetted assessments to the IUCN Red List Unit for final review and integration | 01 June 2025 | 31 March 2030 | | |

## APPENDIX 10 - NATIONAL RED LIST SPECIES ASSESSMENT DATASHEET

***Genus species* - (Author, Year)**

Kingdom - Phylum - Class - Order - Family - Genus - species

**Common Names:** *May include vernacular names also*

**Synonyms:**

**Taxonomic Note:**

**Global Red List Status:** *Category Abbreviation - Category, Criteria* (*IUCN version* .....)

**National Red List Status:** *Category Abbreviation - Category, Criteria* (*IUCN version* .....)

### Red List Assessment

### Assessment Information

**Date of Assessment:**

**Reviewed:**

**Assessor(s):**

**Reviewer(s):**

**Contributor(s):**

**Facilitators/Compilers:**

### Assessment Rationale

### Reasons for Change

**Reason(s) for Change in Red List Category from the Previous Assessment:** *Use NA if Not Applicable*

### Species Attributes

**Generation Length:**

**Justification:**

**Movement Patterns:**

**Congregatory:** *Congregatory and dispersive/ Congregatory* (*Year-round*)

**System:** *Terrestrial/ Freshwater/ Marine*

**Identification description:**

**Origin:** *Native/ Reintroduced/ Benign introduction/ Vagrant/ Origin Uncertain/ Assisted colonization*

**Seasonality:** *Resident/ Breeding season/ Non-breeding season/ Passage/ Seasonal Occurrence Uncertain*

## Distribution

**Geographic Range in India:**

## Area of Occupancy (AOO)

**Estimated area of occupancy (AOO) - in km²:**

**Continuing decline in area of occupancy (AOO):** *Yes/No/Unknown*

**Extreme fluctuations in area of occupancy (AOO):**

**Qualifier:** *Observed/Projected/Inferred/Estimated*

**Justification:**

## Extent of Occurrence (EOO)

**Estimated extent of occurrence (EOO) - in km²:**

**Continuing decline in extent of occurrence (EOO): Yes/No/Unknown**

**Extreme fluctuations in extent of occurrence (EOO):**

**Qualifier:** *Observed/Projected/Inferred/Estimated*

**Justification:**

## Locations Information

**Number of Locations:**

**Continuing decline in number of locations:** *Yes/ No/ Unknown*

**Qualification:** *Observed/Projected/Inferred/Estimated*

**Extreme fluctuations in the number of locations:** *Yes/No/Unknown*

**Justification:**

## Very restricted AOO or number of locations (triggers VU D2)

**Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period (e.g. within 1 or 2 generations) in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.**

**Very restricted in area of occupancy (AOO) and/or # of locations:** *Yes/No/Unknown*

**Justification:**

## Elevation / Depth / Depth Zones

**Elevation Lower Limit (in metres above sea level):**

**Elevation Upper Limit (in metres above sea level):**

**Depth Lower Limit (in metres below sea level):**

**Depth Upper Limit (in metres below sea level):**

**Depth Zone:**

- **Shallow photic (0–50m)**
- **Deep Photic (51–200m)**
- **Bathyl (201–4,000m)**
- **Abyssal (4,001–6,000m)**
- **Hadal (> 6,000m)**

## Map Status

| Map Status | How the map was created, including data sources/methods used: | Please state reason for map not available: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|---|
| | | | | | | |

## Biogeographic Realms

**Biogeographic Realm:** ☐ **Indo-Malayan** ☐ **Palearctic**

## Population

**Description:**

## Population Size information (applies to criteria A, B, C and D)

**Current Population Trend:** *Decreasing/ Increasing/ Stable/ Unknown*

**Current trend data derivation:** *Observed/ Estimated/ Inferred/ Suspected/ Not Applicable/ Unknown*

**Year of Population Estimate:**

**Number of mature individuals (=population size):**

**Extreme fluctuations? (in # of mature individuals):**

**Severely fragmented?** *Yes/ No/Unknown*

**Continuing decline in mature individuals?** *Yes/ No/Unknown*

**Continuing decline % in mature individuals within 1 generation or 3 years, whichever is longer (up to max. of 100 years in the future):**

**Continuing decline % in mature individuals within 2 generations or 5 years, whichever is longer (up to max. of 100 years in the future):**

**Continuing decline % in mature individuals within 3 generations or 10 years, whichever is longer (up to max. of 100 years in the future):**

**Subpopulation size information (applies to criteria B and C)**

**Extreme fluctuations in the number of subpopulations:**

**Continuing decline in number of subpopulations:** *Yes/ No/Unknown*

**All individuals in one subpopulation:** *Yes/ No/Unknown*

**Number of mature individuals in largest subpopulation:**

**Number of Subpopulations:**

## Population Reduction - Past

| Percent Change in past | Reduction or Increase Qualifier | Justification |
|---|---|---|
| | | |

| Basis? |
|---|
| (*sub-criteria*) |

| Reversible? |
|---|
| Yes/ No/ Unknown |
| **Understood?** |
| Yes/ No/ Unknown |
| **Ceased?** |
| Yes/ No/ Unknown |

## Population Reduction - Future

| Percent Change in past | Reduction or Increase | Qualifier | Justification |
|---|---|---|---|
| | | | |

| Basis? |
|---|
| (*sub-criteria*) |

**Percent Change in future:**

**Future Population Reduction Basis: (***apply sub-criteria***)**

## Population Reduction - Ongoing

**Both: Percent Change over any 10 year or 3 generation period, whichever is longer, and must include both past and future, future can't go beyond 100 years:**

**Both Population Reduction Basis:** (*apply sub-criteria*)

**Causes of both (past and future) reduction reversible?** *Yes/ No/ Unknown*

**Causes of both (past and future) reduction understood?** *Yes/ No/ Unknown*

**Causes of both (past and future) reduction ceased?** *Yes/ No/ Unknown*

**Breeding Populations:** *Yes/ No/ Unknown*

**Does the regional population experience any significant immigration of propagules likely to reproduce in the region?** *Yes/No/Unknown*

**Is the immigration expected to decrease?** *Yes/ No/ Unknown*

**Is the regional population a sink?** *Yes/ No/ Unknown*

**Justification:**

**Visiting Populations:** *Yes/ No/ Unknown*

**Are conditions outside the region deteriorating?** *Yes/ No/ Unknown*

**Are the conditions within the region deteriorating?** *Yes/ No/ Unknown*

**Can the breeding population rescue the regional population should it decline?** *Yes/ No/ Unknown*

**Justification:**

## Quantitative Analysis

**Probability of extinction in the wild within 3 generations or 10 years, whichever is longer, maximum 100 years:**

**Probability of extinction in the wild within 5 generations or 20 years, whichever is longer, maximum 100 years:**

**Probability of extinction in the wild within 100 years:**

## Habitats and Ecology

**Description:**

**Habitat Types:**

**Breeding/Foraging Behaviour:**

**Reproductive Behaviour:**

**Is the species endemic to India? (Yes/No):**

## IUCN Habitats Classification Scheme

| Habitat | Season | Suitability | Major Importance? |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## Continuing Decline in Habitat

| Continuing decline in area, extent and/or quality of habitat? | Qualifier | Justification |
|---|---|---|
| | | |

## Life History

| Generation Length | Justification | Data Quality |
|---|---|---|
| | | |

## Plant and Fungal Growth Forms Classification Scheme

**Wild relative of a crop?** *Yes/ No/ Unknown*

**Selections for Plant and Fungal Growth Forms:** *Please refer to Plant and Fungal Growth Forms Classification Scheme Version: 1.1*

☐ **Tree – size unknown** ☐ **Tree – large** ☐ **Tree – small** ☐ **Shrub - size unknown** ☐ **Shrub – large** ☐ **Shrub – small** ☐ **Forb or Herb**

☐ **Annual** ☐ **Graminoid** ☐ **Geophyte** ☐ **Vines** ☐ **Hydrophyte** ☐ **Parasite** ☐ **Epiphyte** ☐ **Lithophyte** ☐ **Succulent - form unknown**

☐ **Succulent – annual** ☐ **Succulent – shrub** ☐ **Succulent – tree** ☐ **Fern** ☐ **Cycad** ☐ **Fungus** ☐ **Moss** ☐ **Lichen**

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## Use and Trade

### General Use and Trade Information

**Species not utilized:**

**No use/trade information for this species:**

| Subsistence: | Rationale: | Local Commercial: | Further detail including information on economic value if available: |
|---|---|---|---|
| | | | |

**National Commercial Value:**

**International Commercial Value:**

| End Use | Subsistence | National | International | Other (please specify) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

**Is there harvest from captive/cultivated sources of this species?**

**Trend in level of total offtake from wild sources:**

**Trend in level of total offtake from domesticated sources:**

**Harvest Trend Comments:**

## Non- Consumptive Use

**Non-consumptive use of the species?**

**Explanation of non-consumptive use:**

## Threats

### Threats Classification Scheme

**No past, ongoing, or future threats exist to this species.**

**The threats to this species are unknown.**

| Threat | Timing | Timing score | Scope | Severity | Impact Score | Impact Category |
|---|---|---|---|---|---|---|
| | | | | | | |
| Stresses | | | | | | |
| | | | | | | |
| Stresses | | | | | | |
| | | | | | | |

## Conservation

*Description*

## Conservation Actions In- Place

| Action Recovery Plan | Note |
|---|---|
| | |
| **Systematic monitoring scheme** | **Note** |
| | |
| **Conservation sites identified** | **Note** |
| | |
| **Occur in at least one PA** | **Note** |
| | |

**Percentage of population protected by PAs (0–100):**

| Area based regional management plan | Note |
|---|---|
| | |

**Invasive species control or prevention:**

| Harvest management plan | Note |
|---|---|
| | |

| Successfully reintroduced or introduced benignly | Note |
|---|---|
| | |

| Subject to ex-situ conservation | Note |
|---|---|
| | |

| Subject to recent education and awareness programmes | Note |
|---|---|
| | |

| Included in international legislation | Note |
|---|---|
| | |

| Subject to any international management/trade controls | Note |
|---|---|
| | |

## Important Conservation Actions Needed

| Conservation Actions | Note |
|---|---|
| | |

## Research Needed

| Research | Note |
|---|---|
| | |

## National Red List Assessment

- **Preliminary National Red List Category and Criteria:**
- **Criteria Met:**
- **Global Red List Status:** *Category, criteria*
- **Proportion of Global Population in India:**
- **Final National Red List Category and Criteria:** *Category, criteria* (*Justification/ Assessment Rationale section is at the beginning of the datasheet*)

## Bibliography

## NOTES