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A Journey Through Environmental Degradation with Specific Reference to Biodiversity

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Abstract: This research study is on the Indian context approaching nature from a global perspective, with a focus on biodiversity using the IUCN's post-2020 Global Biodiversity Framework. This article is a secondary study that reviews the impacts on biodiversity up to 2020.
Keywords: Biodiversity, Sustainability, Forest Cover, Extinction, Flora, Fauna, Endangered species

I. INTRODUCTION

The term "biodiversity" (derived from the term "biological diversity") describes the variety of life on Earth at all scales, from genes to ecosystems, and can also encompass the ecological, evolutionary, and cultural processes that sustain life.

Biodiversity includes all living things, including people and creatures we know little about like bacteria, fungi, and invertebrates. It does not merely refer to rare, imperiled, or endangered species.

Why Biodiversity Matters: The majority of human lives are dependent on biodiversity. For several reasons, some of which are utilitarian and others that are intrinsic, we value biodiversity. Accordingly, we value biodiversity both for what it offers us and for its own sake. The many essential human requirements that biodiversity meets, such as food, fuel, shelter, and medicine, are all part of utilitarian values. Additionally, ecosystems carry out crucial tasks including pollination, seed dispersal, temperature regulation, water purification, nutrient cycling, and pest management. Additionally, biodiversity is significant for yet-to-be-discovered benefits like innovative treatments for diseases and other perhaps undiscovered services. People value biodiversity for cultural as well as religious or spiritual reasons.

Biodiversity has an inherent worth that is unrelated to its monetary value, which is known as its intrinsic value. It is possible to characterize this philosophical concept as the unalienable right to exist last but not least, we might view the value of biodiversity through the prism of the relationships we create and want to establish with one another and the rest of nature. Because it determines who we are, how we interact with one another, and societal norms, we might value biodiversity. These relational values are intertwined with people's feelings of connectivity, environmental responsibility, and individual or group well-being. The different values associated with biodiversity are important because they can influence the daily conservation choices that individuals make.

Threats to Biodiversity: Over the past century, humans have dominated the planet, causing rapid environmental change and a significant loss of species. As a result, some people call the era we are in now the "Anthropocene." Even though the Earth has always seen changes and extinctions, they are currently happening at a never-before-seen rate. Major direct risks to biodiversity include habitat loss and fragmentation, unsustainable resource use, invasive species, hunting, overexploitation, pollution, and global climate change. The major drivers of biodiversity loss, such as rising human populations and excessive consumption, are typically complex and the outcome of several interrelated factors.

Environmental sustainability: The responsibility to preserve natural resources and maintain global ecosystems for the sake of people's present and future health and well-being is known as environmental sustainability. One of the most important components of environmental sustainability is its forward-thinking nature because so many environmental acts don't have an immediate effect. Red List of IUCN: Since its creation in 1964, the Red List of Threatened Species maintained by the International Union for Conservation of Nature has developed into the most thorough database of knowledge available on the conservation status of all known animal, fungal, and plant species worldwide.

A crucial indicator of the state of biodiversity around the world is the IUCN Red List. It is much more than just a list of species and their conditions; instead, it is a potent tool for guiding and igniting policy reform and biodiversity conservation, both of which are essential for preserving the natural resources that are necessary for our survival.

It includes information on distribution, population size, habitat and ecology, usage and/or commerce, threats, and conservation initiatives to assist and guide conservation decisions.

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II. ENDANGERED SPECIES-COLLABORATIVE EFFORTS

International Union for Conservation of Environmental (IUCN): The IUCN is a global organization devoted to the preservation of nature and the wise use of natural resources. It works on research, field projects, advocacy, and teaching in addition to data gathering and analysis.

National Committee for India: In India, the Indian National Committee (INC) is a member organization of the IUCN. It received official recognition from the IUCN Council on November 14th, 2001, in IUCN HQ Letter No. IN/4/NC55. The Committee's goal is to coordinate IUCN members' work in India to create coordinated strategies for environmental protection. Members of the Committee contribute expertise and experience in a range of environmental protection fields. As a result, it is a forum with a collective understanding of issues concerning the conservation of nature and natural resources.

III. REVIEW OF LITERATURE

The goal of the Review of Biodiversity and Conservation Study in India Using Geospatial Technology by P. K. Yadav, Kiranmay Sarma, and Sumit Dookie is to investigate how geospatial approaches can be used to evaluate geospatial data for monitoring changes in the landscape, changes in land use and land cover, species distributions, and monitoring biodiversity losses.

In India, S.K. Jain is a pioneer worker on the subject of ethnobotany, (Mahekar, 2002) He made substantial contributions to pharmacognosy and ethnobotany. Ansari and Nayar (1978) investigated plants from the Western Ghats that may be used in the essential oil business. Tosh et al. (1988) investigated floral and ecological research on legumes from hilly parts of Pune and Satara districts, which added to our understanding of economic plant riches; Malhotra and Moorthy (1973) underlined the need and necessity for ethnobotany. Gadgil and Vartak (1980) were the first to investigate holy woods and their relationship to ethnobotany. Nayar investigated the endemic flora of Peninsular India and its importance (1980).

Tree species diversity has been reduced in human-impacted tropical evergreen forest habitats at Kolli Hills. Chittibabu and Parthsarthy (2000) researched the Eastern Ghats and recorded 3825 individuals and 78 species from 61 taxa and 36 families in an 8-hectare region. Simpson Hill, Shannon The diversity and evenness indices demonstrated a steady decrease in variety as disturbance increased in tree density from 1151 to 651 trees.

IV. FOREST COVER

India's Forest Cover: As of 2022, 7,67,589 square kilometers, or 21.71% of the country's total land area, were covered by forests. India's forest cover grew by 1,540 square kilometers between 2019 and 2021. Three distinct areas make up the woods.

All terrain is covered in a tree canopy that is at least 70% dense.

Moderately dense forest: The tree canopy density in All-Terrain ranges from 40% to 70%.

All-terrain open forest with a 10%–40% tree canopy density

Very Dense Forest	99,779 sq. km	3.04% of India’s area
Moderately Dense Forest	3,06,890 sq. km	9.33% of India’s area
Open Forest	3,07,120 sq. km	9.34% of India’s area
Total Forest Cover	7,13,789 sq. km	21.71% of India’s area

Top 5 states/UTs with the most forest cover in India

1) Madhya Pradesh: 77,493 sq. kilometer
2) Arunachal Pradesh: 66,431 sq. kilometer
3) Chhattisgarh: 55,717 sq. kilometer
4) Odisha: 52,156 sq. kilometer
5) Maharashtra: 50,798 sq. kilometer

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Forest Types in India:

Different types of forests in India with respect to the total land area available and its contribution in percentage.

Types of Forests	Area (sq.Kilometer)	Percentage of total forest
Tropical Wet Evergreen Forests	51,249	8.0
Tropical Semi-Evergreen Forests	26,424	4.1
Tropical Moist Deciduous Forests	2,36,794	37.0
Littoral & Swamp Forests	4,046	0.6
Tropical Dry Deciduous Forests	1,86,620	28.6
Tropical Thorn Forests	16,491	2.6
Tropical Dry Evergreen Forests	1,404	0.2
Subtropical Broadleaved Hill Forests	2,781	0.4
Subtropical Pine Forests	42,377	6.6
Subtropical Dry Evergreen Forests	12,538	2.5
Montane Wet Temperate Forests	23,365	3.6
Himalayan Moist Temperate Forests	12,012	3.4
Himalayan Dry Temperate Forests	312	0.0
Sub Alpine Forests	18,628	2.9
Total (Forest Cover + Scrub)	7,54,252	98.26
Grassland in different forest-type groups	13,329	1.74
Grand Total	7,67,581	100.00

Forest Cover per State:

Representing the percentage of forest cover with respect to the geographical area of the following states

State/UT	Forest cover (sq. km)	Geographical area(sq.km)	forest cover percentage (geographical area)
Andhra Pradesh	29,784	1,62,968	18.28 %
Arunachal Pradesh	66,431	83.743	79.33 %
Assam	28,312	78,438	36.09 %
Bihar	7,381	94,163	7.84 %
Chhattisgarh	55,717	1,35,192	41.21 %
Nagaland	12,251	16,579	73.90 %
Gujarat	14,926	1,96,244	7.61 %
Haryana	1,603	44,212	3.63 %
Himachal Pradesh	15,443	55,673	27.73 %
Jharkhand	23,721	79,716	29.76 %
Karnataka	38,730	1,91,791	20.19 %
Kerala	21,253	38,852	54.70 %

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Tamil Nadu	26,419	1,30,060	20.31 %
Maharashtra	50,798	3,07,713	16.51 %
Manipur	16,598	22,327	74.34 %

Mangrove Forests:
Mangroves are an essential ecosystem that supports a diverse range of flora and wildlife. India has a total mangrove cover of 4,992 square km.
Top states that cover mangrove forests in India

a) West Bengal: 2,114 sq. km
b) Gujarat: 1,175 sq. km
c) Andaman and Nicobar Islands: 616 sq. km
d) Andhra Pradesh: 405 sq. km
e) Maharashtra: 324 sq. km
f) Odisha: 259 sq. km

Biodiversity Spread: The Western Ghats' tropical wet evergreen and semi-evergreen forests (Tamil Nadu, Kerala, and Karnataka) contain the greatest tree and shrub species, followed by the forests of North-east India. Karnataka has the most diverse tree species, followed by Tamil Nadu and Andhra Pradesh. The forest cover is assessed using the LISS III sensor on ISRO's Resources at-2 satellite. Many factors influence the accuracy of the data collected because the evaluation is done using satellites. The total forest and tree cover in India is 8,09,537 square kilometers, accounting for 24.62% of the entire geographical area.

V. IUCN RED LIST 2022 INDIA

India's Critically Endangered Species**:** According to the IUCN RED List 2021, 199 species in India are severely endangered. INDIA has 20 critically endangered species added to the IUCN RED LIST in 2021, including fourteen animal species and six plant species. These updates to the IUCN RED LIST are done in two rounds; in round one, 5 species were added, and in round two, which was announced on September 4, 2021. 15 additional Indian species have been added to the IUCN RED LIST of Critically Endangered Species. The names of the 20 Indian species included on the IUCN RED LIST as Critically Endangered.

A. Endangered Plants and Animals

According to the IUCN Official Website, as of March 2021, India has 12 severely endangered animals (mammals) and 6 plant species.

Common Name	Scientific Name	Species type	IUCN Status 2021
Asian Giant Softshell Turtle	Pelochelys cantorii	ANIMALIA	Critically Endangered
Assam Roofed Turtle	Pangshura sylhetensis	ANIMALIA	Critically Endangered
Bengal Guitarfish	Rhinobatos annandalei	ANIMALIA	Critically Endangered
Black Softshell Turtle	Nilssonia nigricans	ANIMALIA	Critically Endangered
Ganges Shark	Glyphis gangeticus	ANIMALIA	Critically Endangered
Leith's Softshell Turtle	Nilssonia leithii	ANIMALIA	Critically Endangered
Rhinophis goweri	Rhinophis goweri	ANIMALIA	Critically Endangered
Sand Tiger Shark	Carcharias taurus	ANIMALIA	Critically Endangered
Satara Gecko	Hemidactylus sataraensis	ANIMALIA	Critically Endangered
Shevaroy HilIs Earth Snake	Uropeltis shorttii	ANIMALIA	Critically Endangered
Shorttail Whipray	Maculabatis bineeshi	ANIMALIA	Critically Endangered
Smoothback Guitarfish	Rhinobatos lionotus	ANIMALIA	Critically Endangered
Tentacled Butterfly Ray	Gymnura tentaculata	ANIMALIA	Critically Endangered

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Chiratta-anjili	Dipterocarpus bourdillonii	PLANTAE	Critically Endangered
Cryptocarya sheikelmudiyana	Cryptocarya sheikelmudiyana	PLANTAE	Critically Endangered
Eeyakam	Hopea erosa	PLANTAE	Critically Endangered
Kathalekan Marsh Nut	Semecarpus kathalekanensis	PLANTAE	Critically Endangered
Machilus parviflora	Machilus parviflora	PLANTAE	Critically Endangered
Madhuca diplostemon	Madhuca diplostemon	PLANTAE	Critically Endangered

B. Government Protective Measures for Wildlife and Their Habitats

Violations of the Wild Life (Protection) Act of 1972 is punishable with severe penalties. The Act also permits the seizure of any tools, vehicles, or weapons used to conduct wildlife offenses (s). The Great Indian Bustard, Gangetic Dolphin, Tiger, Snow Leopard, and Dugong are just a few of the rare and endangered species found in India that have been placed on Schedule-I of the Wild Life (Protection) Act, 1972, giving them the highest level of protection.

To better safeguard animals, especially fragile species, and their habitat, Protected Areas, such as National Parks, Sanctuaries, Conservation Reserves, and Community Reserves, have been developed around the country.

The State/Union Territory Governments are monetarily assisted by the Centrally Sponsored Scheme of "Integrated Development of Wildlife Habitats" for improved wildlife protection and habitat development.

Eco-development programs that help forestry authorities preserve wildlife involve residents in conservation activities.

The Wild Life Crime Control Bureau (WCCB) works in concert with State/UTs and other law enforcement organizations to compile information regarding the illegal trade in wild animals and animal products as well as poaching.

The appropriate state and federal authorities received notifications and cautions from WCCB regarding poaching and illegal wildlife trade to take precautionary measures.

Shri Ashwini Kumar Choubey, Minister of State for Environment, Forests, and Climate Change submitted this information in a written reply to the Rajya Sabha.

S. No.	Critically Endangered Birds Common Name
1	Baer's Pochard
2	Forest Owlet
3	Great Indian Bustard
4	Bengal Florican
5	Siberian Crane
6	Spoon-billed Sandpiper
7	Sociable Lapwing
8	Jerdon's Courser
9	White-backed Vulture
10	Red-headed Vulture
11	White-bellied Heron
12	Slender-billed Vulture
13	Indian Vulture
14	Himalayan Quail
15	Pink-headed Duck

Endangered Birds in India: On June 10, 2021, in a written reply in the Rajya Sabha, Union Minister for Environment and Forests Dr. M. Veerappa Moily provided facts on Critically Endangered Bird Species in India.

C. Steps Taken by the Government of India to save Endangered Birds

The Indian government has taken a variety of steps to preserve the remaining ecosystems in the country's wetlands, grasslands, forests, and river systems, as well as the species that rely on them. State governments receive financial and technical assistance to preserve and maintain protected areas and other forests through Centrally Sponsored Schemes. India is a party to several significant international agreements on the management and protection of wildlife, including those protecting endangered bird species. The Convention on Biological Diversity (CBD), the CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the Convention on the Conservation of Migratory Wild Animals (CMWA) are these (CMS)

The Wild Life (Protection) Act was established by the Central Government in 1972 to protect wildlife, especially birds. The Act mandates the creation of Protected Areas to preserve wildlife. Additionally, it permits the imposition of fines for shooting specific species, including the birds mentioned in schedules I through IV.

Under the Wild Life Act of 1972, significant bird habitats have been classified as Protected Areas.

To protect wetlands in the states that are important bird habitats, the Wetland (Conservation and Management)Rules 2010 were created.

States are assisted in managing wetlands, including Ramsar areas, via the Centrally Sponsored Scheme of the National Plan for Conservation of Aquatic Ecosystems.

The Wildlife Crime Prevent Bureau was created by the Indian government to combat the illegal trafficking of wildlife, particularly endangered bird species and items manufactured from their components.

Through recognized research organizations like the Wildlife Institute of India, the Bombay Natural History Society, and the Salim Ali Centre for Ornithology and Natural History, the government supports bird study and monitoring.

Due to the Indian government's prohibition on the use of diclofenac in veterinary medicine, the quantity of Gyps vultures has dramatically decreased in the Indian Subcontinent. The Bombay Natural History Society has implemented conservation breeding programs to protect these vulture species in Pinjore (Haryana), Buxa (West Bengal), Rani, and Guwahati (Assam)

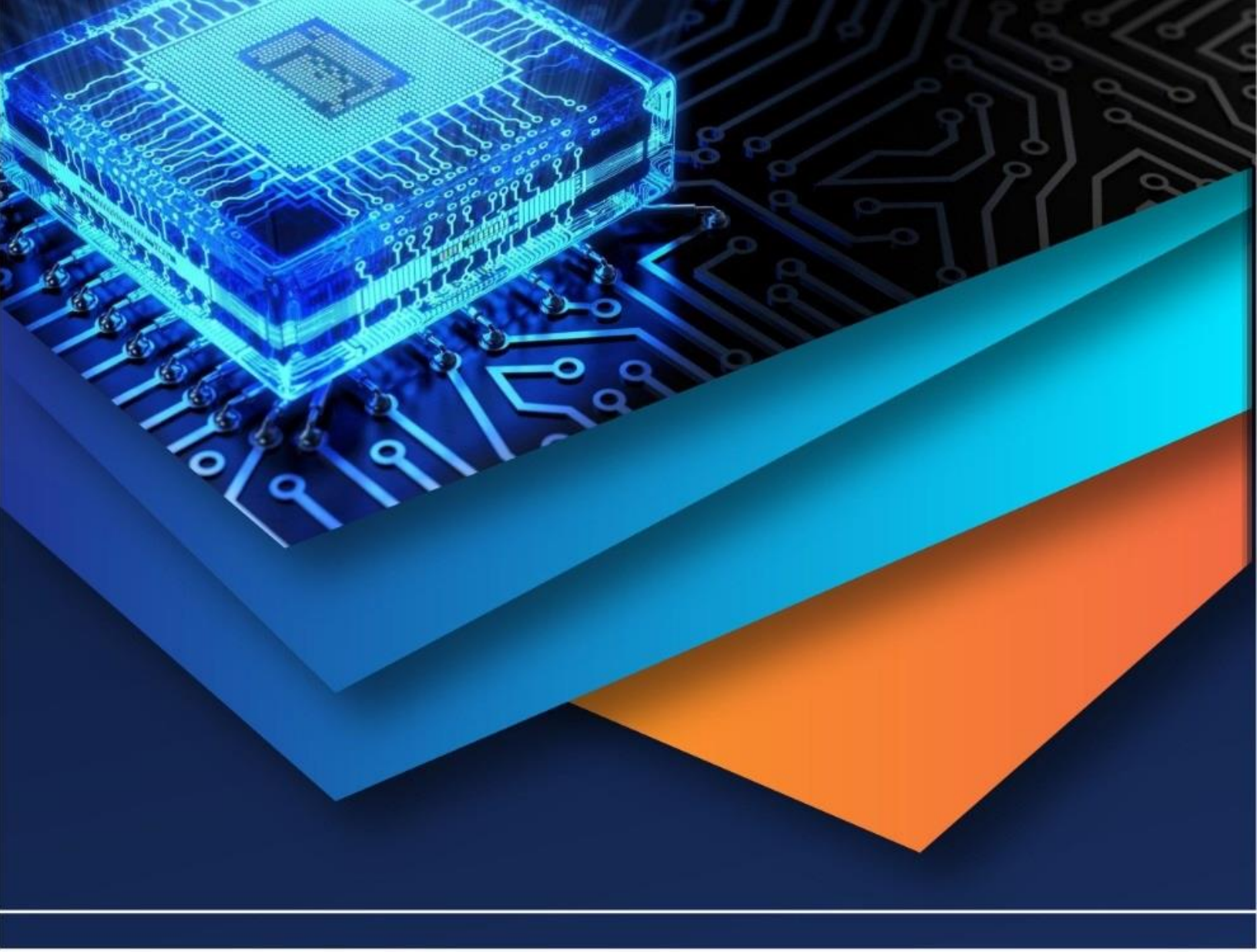
VI. CONCLUSION

In conclusion, many critically endangered species in India are fighting an uphill battle to live. While some things may be taken to aid these creatures, many different sectors of society will need to work together. We all must work together to safeguard these animals and their habitats so that future generations might enjoy their grandeur.

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