

# International Journal Research Publication Analysis

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## BIODIVERSITY: IMPORTANCE, THREATS, AND CONSERVATION

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**\*Chernychko Yana, Forkosh Viktoriia, Oros Rikhard, Shosh Patrik Zholt, Birov  
Renata, Szikura Anita, Kohut Erzsébet**

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*Ferenc Rákóczi II Transcarpathian Hungarian University, Transcarpathia, Ukraine.*

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\*Corresponding Author: Chernychko Yana

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Ferenc Rákóczi II Transcarpathian Hungarian University, Transcarpathia, Ukraine.

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### ABSTRACT

Biodiversity, or biological diversity, refers to the variety of life on Earth, including diversity within species, between species, and across ecosystems. It includes all living organisms, from microorganisms to plants and animals, as well as the ecological systems they form. Biodiversity is essential for maintaining the balance of ecosystems and supporting life on the planet (Britannica, 2026; World Health Organization, 2025).

There are three main levels of biodiversity: genetic diversity, species diversity, and ecosystem diversity. Genetic diversity refers to the variation of genes within a species, which allows populations to adapt to environmental changes. Species diversity describes the variety of species within a region, while ecosystem diversity refers to the variety of habitats, ecosystems, and ecological processes. These levels are interconnected and contribute to the resilience and stability of natural systems (National Research Council, 1999).

Biodiversity plays a crucial role in supporting ecosystem services that are vital for human survival. These services include food production, pollination of crops, purification of water and air, and climate regulation. For instance, many medicines are derived from natural sources, and ecosystems such as forests help absorb carbon dioxide, reducing the effects of climate change. Additionally, biodiversity has cultural, aesthetic, and recreational importance, enriching human life in many ways (World Health Organization, 2025; BMC Biology, 2010).

Despite its importance, biodiversity is rapidly declining due to human activities. Major threats include habitat destruction caused by deforestation and urbanization, climate change, pollution, overexploitation of natural resources, and the introduction of invasive species.

Scientists estimate that current extinction rates are significantly higher than natural levels, with many species facing the risk of extinction (Britannica, 2026; World Health Organization, 2025).

To address these challenges, various conservation strategies have been developed. These include the creation of protected areas such as national parks and reserves, the sustainable use of natural resources, and the restoration of damaged ecosystems. Education and environmental policies also play an important role in promoting biodiversity conservation. Protecting biodiversity is essential not only for preserving nature but also for ensuring human well-being and sustainable development (ScienceDirect, 2013).

In conclusion, biodiversity is the foundation of life on Earth. Its conservation is critical for maintaining ecological balance and supporting future generations. Addressing biodiversity loss requires global cooperation, responsible environmental management, and increased awareness of its importance.

**KEYWORDS:** biodiversity, ecosystem, future generation.

## **INTRODUCTION**

In the introduction of the article “Biodiversity: Concept, Threats and Conservation”, U.S. Rawat and N.K. Agarwal present biodiversity as the complete variety of life existing on Earth, including plants, animals, microorganisms, genes, and ecosystems. The authors explain that biodiversity is the result of billions of years of evolution and forms the “web of life” on which humanity depends. They emphasize that biodiversity operates at three interconnected levels: genetic diversity, species diversity, and ecosystem diversity. The introduction also discusses the unequal distribution of biodiversity across the globe, particularly the richness of tropical ecosystems and marine environments. Through this opening discussion, the authors establish biodiversity not only as a scientific concept but as the biological foundation of environmental stability, ecological balance, and human survival (U.S. Rawat, 2015).

## **MATERIALS AND METHODS**

The article is structured as a scientific review paper rather than an experimental investigation. Therefore, the materials and methods are based on the collection, analysis, and synthesis of previously published scientific literature, environmental reports, ecological studies, and international policy documents. The authors use information from organizations such as the

International Union for Conservation of Nature, Convention on Biological Diversity, Intergovernmental Panel on Climate Change, and other scientific sources to support their discussion. The methodology of the paper is conceptual and analytical, combining ecological theory, conservation biology, environmental policy, and real-world case studies. Examples such as mangrove carbon storage, pollinator decline, vulture extinction in India, and medicinal plant usage are incorporated to demonstrate the ecological and socio-economic importance of biodiversity. The authors also integrate data from national and international conservation programs to provide a broad overview of biodiversity conservation practices and challenges.

## **RESULTS AND EVALUATION**

The results and evaluation section of the paper focuses on demonstrating the immense ecological, economic, ethical, and social value of biodiversity while simultaneously highlighting the accelerating threats to its survival. The authors explain that biodiversity provides direct utilitarian benefits through agriculture, fisheries, medicine, and industrial resources. Wild species contribute genetic material for crop improvement, while microorganisms and plants have supplied many modern medicines, including antibiotics and cancer treatments. The article further evaluates biodiversity through the concept of ecosystem services, explaining how forests, wetlands, coral reefs, microorganisms, insects, and other organisms regulate climate, recycle nutrients, purify water, maintain soil fertility, and support pollination. Biodiversity is therefore presented as a functional system essential for maintaining planetary health.

The authors also examine the major threats responsible for biodiversity decline. Habitat destruction is identified as the leading cause, driven by deforestation, urbanization, agriculture, mining, dam construction, and infrastructure development. Additional threats discussed include overexploitation of biological resources, pollution, invasive species, climate change, rapid human population growth, and institutional policy failures. The paper presents powerful real-world examples, such as the dramatic decline of vultures in India caused by diclofenac contamination and the decline of house sparrows linked to environmental pollution and urbanization. Climate change is evaluated as a major future driver of species extinction and ecosystem instability because changing temperatures and environmental conditions alter migration patterns, reproduction, and habitat suitability. Overall, the evaluation provided in the article demonstrates that biodiversity loss is not an

isolated ecological issue but a global crisis directly connected to human activity and unsustainable development practices.

## **CONSERVATION AND DISCUSSION**

A substantial part of the article is devoted to biodiversity conservation strategies and policy responses. The authors discuss both *ex-situ* and *in-situ* conservation approaches. *Ex-situ* conservation includes zoos, botanical gardens, seed banks, gene banks, and captive breeding programs that protect species outside their natural habitats. *In-situ* conservation focuses on protecting species within natural ecosystems through national parks, biosphere reserves, and wildlife sanctuaries. The article highlights the importance of maintaining ecological interactions and evolutionary processes through habitat protection.

The discussion further emphasizes the importance of community participation in conservation. The authors argue that conservation programs cannot succeed without the involvement of local communities in planning, monitoring, and resource management. Joint Forest Management initiatives in India are presented as examples of participatory conservation practices. In addition, the article reviews international biodiversity agreements such as the Convention on Biological Diversity, Convention on International Trade in Endangered Species, and the Ramsar Convention. India's national biodiversity policies, including the Biological Diversity Act of 2002 and the establishment of the National Biodiversity Authority, are discussed as important institutional responses aimed at strengthening conservation and sustainable resource use.

## **SUMMARY AND CONCLUSION**

In conclusion, the article presents biodiversity as the essential life-support system of the Earth. The authors argue that biodiversity conservation is fundamentally linked to sustainable development, climate stability, ecological resilience, and human well-being. The paper successfully demonstrates that biodiversity is not limited to the preservation of rare species but includes the protection of ecological processes that sustain air quality, water purification, food production, medicine, and climate regulation. Through scientific evidence, ecological examples, and policy discussions, the authors conclude that human survival and environmental sustainability are inseparable from biodiversity conservation. The article ultimately calls for stronger conservation policies, sustainable resource management, public awareness, international cooperation, and community participation in order to ensure ecological balance and intergenerational equity for the future.

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