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An Overview on Endangered Resources and Its Application

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ABSTRACT:

The rate of population expansion in the world and its technological ability to use natural resources both accelerated in the second half of the 20th century to the point where human activity now affects every component of the biosphere. Human efforts to zealously maintain the remaining habitat have increased in tandem with the rate of habitat degradation by using ecological concepts to protect, regulate, assess, and manage fragile ecosystems and their dwindling species. Organizations that concentrate on the world's unique and endangered species or individuals whose work highlights the planet's fragile environments are two ways to approach global conservation. The World Conservation Union and the Man and the Biosphere Programme of UNESCO are the worldwide organizations that serve as examples of these two complimentary strategies.

KEYWORDS:

Applied Ecology, Biosphere Reserves, Conservation Efforts, Endangered Resources, Genetic Diversity.

I. INTRODUCTION

The rate of population expansion in the world and its technological ability to use natural resources both accelerated in the second half of the 20th century to the point where human activity now affects every component of the biosphere. Human efforts to zealously maintain the remaining habitat have increased in tandem with the rate of habitat degradation by using ecological concepts to protect, regulate, assess, and manage fragile ecosystems and their dwindling species. Organizations that concentrate on the world's unique and endangered species or individuals whose work highlights the planet's fragile environments are two ways to approach global conservation. The World Conservation Union and the Man and the Biosphere Programme of UNESCO are the worldwide organizations that serve as examples of these two complimentary strategies. The International Union for the Protection of Nature, or IUPN, was the precursor to the World Conservation Union and was established in October 1948 as a result of an international conference held at Fontainebleau, France.

In 1956, the group adopted the name International Union for Conservation of Nature and Natural Resources. In 1990, the group adopted the name World Conservation Union. As many people still refer to the Union by its abbreviation, IUCN, the entire name and the acronym are frequently used together. With the beginning of UNESCO's environmental research project in 1972, the topic of man and the biosphere gained international attention. It is an interdisciplinary project of environmental study that was started to build the foundation, within the natural and social sciences, for the sensible use and conservation of the biosphere's resources, as well as for the improvement of the world's human-environment interaction. The MAB Programme is distinguished by its interdisciplinary and holistic approach. Studies of the social sciences such as economics, human geography, and sociology as well as the natural sciences such as climatology, biology, soil sciences, and forestry are necessary to examine human impacts on a particular ecosystem, or the link between people and the environment [1], [2].

Man, and the Biosphere, or MAB, is the program's name. The IUCN Red List of Threatened Species, which is maintained by the World Conservation Union, is arguably best recognized for tracking the status of the world's species. However, it also promotes and advances conservation science, carries out this research in field projects all over the world, and then connects the research and outcomes to local, national, regional, and international policy by bringing together representatives from the public and commercial sectors for discussions. Building awareness of the various ways that human lives and livelihoods, particularly those of the poor, depend on the sustainable use of natural resources is a priority of the Union's current Programme (2005–2008). The Union uses sound ecosystem management in its initiatives to protect biodiversity and provide sustainable livelihoods for individuals who rely directly on natural resources. The Union is actively involved in enhancing people's lives, economies, and societies as well as managing and repairing environments. One of the most reputable and widely

acknowledged sources of information and reference on the environment is the Union's databases, evaluations, guidelines, and case studies, which are produced by its global membership, Commissions, and Secretariat.

The Union, which has the largest environmental knowledge network in the world, has aided more than 75 nations in developing and putting into action their own national conservation and biodiversity programmes. The Union is a recognized Observer at the General Assembly of the United Nations. The MAB initiative of UNESCO focuses on mountain ecosystems, dry areas, or humid tropical forests using an applied ecological approach. The Impact of human activities on mountain and tundra ecosystems was the topic of a meeting of experts in Salzburg, Austria, shortly after the program's April 1973 debut. Its duty was to further develop the scientific substance of initiatives that would be proposed as part of the MAB Programme. The panel suggested researching the following elements: High-altitude human settlements, the impact of alternative land uses on mountain ecosystems, the effects of large-scale technologies on mountain ecosystems, and the impact of tourism and recreation on mountain ecosystems. Later in 1973, a working group met in Lillehammer, Norway, to further clarify the purpose, goals, approaches, and potential outcomes of research in areas where issues had been identified.

The following are some of the regional and theme issues that need further research as a result of this meeting: Resources and human settlements in high tropical mountains above 2500 m and between latitudes 30° north and 30° south, such as the tropical Andes, the mountain ranges of South Asia, and the highlands of East Africa and Ethiopia; tourism, technology, and land use in temperate mountains in the middle latitudes (roughly between latitudes 30° and 60° north and south), where there are distinct winter and summer seasons and land-use issues in high-latitude mountains. The working group in Lillehammer suggested potential minimal research needs for both natural sciences such as climatology and soil sciences and social sciences such as sociology and economics in order that study techniques and outcomes may be compared.

It was deemed crucial that the outcomes of local mountain studies in one location may be contrasted with those in other regions in a global context. Air temperature, precipitation, and wind velocity are a few examples of the simple and obvious variables that have been discovered for study in mountainous environments. But within the framework of an intergovernmental scientific initiative, significant efforts were made to reach international consensus on a uniform and consistent methodology for mountain ecosystem study. Conceptually, the creation of this list of minimal research requirements was a significant advancement for global collaborative research [3], [4]. As a result, numerous case studies were conducted across the globe within the MAB Programme, particularly in the Andes and the Alps.

II. DISCUSSION

A decision made by the MAB International Co-Coordinating Council, the program's governing body, saw the MAB Programme begin a new phase in the early 1990s. Building scientific capability, studying biological diversity and ecological processes, and promoting the World Network of Biosphere Reserves are the three new primary initiatives. The third project was very successful, and there are now 352 biosphere reserves in 87 nations, with more than 40% of them being in mountainous areas. The preservation of ecosystems and their biodiversity is linked with the sustainable use of natural resources for the benefit of local communities in biosphere reserves, which are areas of terrestrial and coastal/marine ecosystems. This is accomplished through suitable zoning patterns and land management.

As a result, they stand in for a significant tool for putting Agenda 21's the Convention on Biological Diversity's (CBD), and other international accords' concerns into practice. The term biosphere reserve connotes environmental preservation, academic inquiry, and sustainable growth. The goal of managing biosphere reserves is to demonstrate how environmental protection can be used to advance sustainable development based on discoveries from scientific study and cooperation with the local population. This is made possible by a particular land-use system that considers the topographic, biological, economic, and socio-cultural aspects of each site. There are three distinct but related uses for biosphere reserves:

Conservation: In order to preserve the biological diversity of the earth, biosphere reserves protect native species, ecosystems, and landscapes as well as their genetic resources.

Development: Biosphere reserves work together with local residents, utilizing their traditional knowledge, indigenous goods, and effective land management in an effort to balance conservation concerns with sustainable resource use.

Networking: A worldwide network connects biosphere reserves, which offer resources for local research, monitoring, teaching, and training programmes as well as comparative research and monitoring initiatives at an

international or regional scale. Although the relative importance of these three fundamental tasks will vary from situation to situation, it is the combination of these tasks that makes biosphere reserves unique. A zonation pattern translates the definition of these responsibilities on the ground. A core area that are strictly protected in accordance with pre-established conservation objectives is included in this. A designated buffer zone surrounds or is next to the core region, and only activities that are permissible under the conservation goals are permitted there. The core and buffer regions are encircled by a less defined transition area, where sustainable resource management techniques and interaction with the local population are developed.

Scope: The study of endangered resources in applied ecology covers a wide range of topics, including the management of ecosystems and the conservation of biodiversity. The following essential elements are included in the definition of endangered resources in applied ecology:

1. **Conservation of Species:** Threatened and endangered plant and animal species are included in the category of endangered resources. Understanding these species' ecological needs, population dynamics, and threats is the subject of applied ecology. It entails putting conservation strategies into action to save their ecosystems, control their populations, and encourage their recovery. This might entail population trend monitoring, captive breeding programmes, habitat restoration, and reintroduction initiatives.
2. **Conservation:** Conservation and restoration of habitats are important because many threatened species depend on certain environments to survive. These environments, which might include forests, wetlands, grasslands, coral reefs, and more, are the focus of applied ecology. The scope includes determining risks, evaluating habitat conditions, creating management plans, and putting conservation and restoration measures into action.
3. **Genetic Diversity and Conservation:** The long-term survival and adaptability of species depend on their genetic diversity. In order to adopt strategies to conserve and improve genetic diversity, applied ecology focuses on comprehending the genetic makeup and health of threatened resources. This covers genetic evaluations, captive breeding initiatives, genetic management plans, and tracking the genetic well-being of wild populations [5], [6].
4. **Ecosystem Functioning and Services:** Endangered resources frequently have a significant impact on how well an ecosystem works and offer important ecosystem services. The effects of their decline on ecological processes, species interactions, and ecosystem services are investigated through applied ecology. Understanding the ecological functions of threatened resources, evaluating their contributions to ecosystem services like pollination, seed distribution, and nutrient cycling, and putting these ideas into practice are all included in the scope.
5. **Threat Assessment and Mitigation:** Applied ecology looks into the dangers and factors that are causing resources to become endangered. This entails locating and evaluating numerous elements, including invasive species, disease, habitat loss, pollution, climate change, and human activities. Researching the effects of these risks, coming up with mitigation plans, and putting conservation measures in place to lessen or eliminate them are all included in the scope.
6. **Endangered Species:** Participation and collaboration among stakeholders are frequently necessary for the conservation of endangered resources. These stakeholders include local people, indigenous groups, landowners, policymakers, and non-governmental organizations. Stakeholder involvement, participatory methods, and incorporating customary knowledge and practices are all included in applied ecology. It acknowledges the value of forming alliances, encouraging local support, and incorporating society values and viewpoints into conservation efforts. Applied ecology addressing threatened or endangered species contributes to efforts in policy development and advocacy. In order to support policy decisions at many levels, from local to international, it offers scientific facts, professional perspectives, and conservation recommendations. The area of focus includes promoting sensible conservation measures, influencing legislation, and educating decision-makers, stakeholders, and the general public on the value of preserving threatened and endangered species.

Application of Endangered Resources

The study, conservation, and management of vulnerable or endangered species, habitats, and ecosystems are all part of the application of endangered resources in applied ecology. It seeks to comprehend the elements causing their deterioration and create plans to lessen risks and encourage their recovery. Here are some significant uses of threatened and endangered species in applied ecology:

1. Applied ecologists create conservation plans for resources that are in danger of becoming extinct. This entails determining the priority species and ecosystems for conservation, figuring out what they need ecologically, and creating management plans to preserve and restore them. Planning for conservation

efforts may entail establishing protected areas, carrying out habitat restoration projects, and starting captive breeding or reintroduction programmes.

2. Restoration and management of habitats are the main areas of interest for applied ecologists who work with endangered species. This entails evaluating the state and quality of habitats, determining the variables affecting their viability, and putting restoration strategies into action. Reforestation, wetland development, invasive species removal, and the adoption of sustainable land management techniques are some examples of habitat restoration actions that can be done to enhance habitat appropriateness and connectivity.
3. Threat Assessment and Mitigation: To determine the hazards facing endangered resources, applied ecologists do study and monitoring. They pinpoint elements that contribute to their decline, such as habitat loss, pollution, climate change, invasive species, and human activities. These analyses can be used to generate mitigation solutions, such as putting conservation measures in place, enhancing land-use techniques, and enforcing laws to lessen adverse effects on endangered resources.
4. Applied ecologists use a variety of strategies to monitor the populations of endangered resource types. To do this, it is necessary to survey the population, analyses demographic data, monitor mobility, and evaluate reproductive performance. Development of efficient management plans is made possible by population monitoring, which provides information on the condition and trends of endangered resources. In order to increase population viability, population management may involve interventions like captive breeding, translocation, and predator control.
5. Applied ecologists concentrate on genetic management to maintain the genetic variety of threatened resources. This entails evaluating the genetic structure and health of populations, determining the dangers of inbreeding, and creating plans to preserve or improve genetic diversity. Techniques for genetic management that help minimize inbreeding depression and guarantee the long-term survival of threatened resources include captive breeding programmes, genetic rescue, and habitat corridors [7], [8].
6. Engaging Stakeholders and Educating Them. Applied ecologists understand the need of involving stakeholders and educating the public about the need to protect endangered resources. They collaborate with neighborhood groups, landowners, decision-makers, and the general public to foster awareness of and support for conservation initiatives. Fostering collaboration, exchanging information, and incorporating local perspectives into conservation planning and decision-making processes are all aspects of stakeholder involvement.
7. Applied ecologists help to promote laws and rules that safeguard threatened and endangered species. They cooperate with organizations and policymakers, provide scientific information to support policy development, and promote the value of protecting endangered resources. Applied ecologists contribute to the development of a legal framework that encourages the preservation and sustainable management of endangered resources by pushing for efficient conservation laws.
8. Using endangered resources in applied ecology entails a variety of tasks, such as stakeholder engagement, conservation planning, habitat restoration and management, threat assessment and mitigation, population monitoring and management, genetic management, threat assessment and mitigation, and threat mitigation. Applied ecologists work to safeguard and restore threatened resources, ensuring their long-term existence and advancing biodiversity conservation, by applying ecological principles and scientific knowledge.

Advantages of Endangered Resources

The use of threatened resources in applied ecology has various benefits for the preservation of biodiversity and the management of ecosystems. The following are some major benefits of including threatened and endangered species in applied ecology:

1. Endangered resources constitute distinctive and frequently irreplaceable elements of biodiversity. In order to preserve species diversity, genetic diversity, and ecosystem functioning, applied ecology focuses on the protection and management of these resources. By preserving ecological resilience and balance, endangered resource protection helps keep important species and the ecological functions they play from going extinct.
2. Resources under danger of extinction frequently play important roles in supplying ecosystem services. Pollination, seed dissemination, nutrient cycling, pest management, and water purification are some of these services. Applied ecology helps to maintain these vital services, enhancing both human well-being and ecosystem function, by protecting and restoring threatened resources.
3. Endangered resources are crucial research subjects for the field of ecology. Insights into ecological processes, population dynamics, species interactions, and ecosystem functioning can be gained from

research on these species and their environments. A valuable body of scientific knowledge is produced by applied ecology when it comes to endangered resources. This knowledge can be used to improve management techniques, guide conservation efforts, and advance ecological understanding.

4. Endangered resources are frequently used as indicators of the health and integrity of ecosystems. Their deterioration or regrowth can reveal important details about the condition of ecosystems and the success of conservation efforts. Encouraging broader ecosystem conservation and sustainability, monitoring and managing endangered resources can help identify environmental changes and address underlying ecological problems.
5. Applying ecology to the study of endangered species offers chances for both education and public awareness-building. These assets pique public attention and support, acting as the face of larger conservation initiatives. Their conservation narratives can be used to inform members of the public, decision-makers, and other interested parties about the value of biodiversity, ecological processes, and the necessity of taking conservation action.
6. Collaborative conservation efforts are frequently necessary for the preservation of endangered resources. These stakeholders include scientists, conservation groups, governmental organizations, local communities, and indigenous peoples. Collaboration, knowledge exchange, and community involvement are encouraged by applied ecology concerning threatened or endangered resources. It encourages collaboration and a sense of shared responsibility, which results in more potent conservation tactics and a rise in support for biodiversity preservation.
7. Endangered resources frequently receive legal protection and conservation attention, as well as policy influence. The creation of policies and decision-making processes can be influenced by applied ecology by concentrating on the conservation and management of these resources. Regulations, protected areas, and conservation strategies can be developed at local, regional, and worldwide levels using scientific data and conservation activities involving endangered resources.
8. The use of endangered resources in applied ecology has benefits such as the preservation of biodiversity, the maintenance of ecosystem services, the advancement of ecological research, the identification of indicator species, education and awareness-raising, cooperative conservation efforts, and influence over policies and legal protection. Applied ecology aids in the sustainable management and preservation of biodiversity and ecosystems by placing a high priority on the conservation of endangered resources.

In applied ecology, endangered resources are defined as species, habitats, and ecosystems that are in danger of going extinct or experiencing a major decline. Applied ecologists concentrate their management and conservation efforts on these resources. Here are some instances of applied ecology's threatened resources. Endangered species are those that face a serious threat of extinction in the wild. They might be endangered due to dwindling populations, constrained geographic ranges, or unique threats. The Sumatran tiger, black rhinoceros, Hawaiian monk seal, and Amur leopard are some examples. Understanding these species' biological needs, keeping tabs on their populations, putting conservation strategies into action, and assisting in their recovery are all tasks carried out by applied ecologists. Threatened species are those that run the risk of going extinct if no conservation measures are implemented.

Although they suffer serious dangers and have diminishing populations, they are not currently in grave danger. The orangutan, polar bear, green sea turtle, and African elephant are some examples. Applied ecologists research the dangers these species face, create conservation plans, and try to lessen those dangers to stop further population decrease. Ecosystems and ecological groups that are in danger or undergoing serious degradation are referred to as endangered habitats. These ecosystems support a variety of species and offer essential resources. Examples include mangroves, coral reefs, tropical rainforests, and native grasslands. The work of applied ecologists is centered on preserving and repairing these ecosystems, addressing the root causes of deterioration, and putting protective and beneficial measures in place to preserve and improve their ecological integrity [8], [9].

Fragmented Ecosystems: Due to human activities including habitat conversion, urbanization, and infrastructure development, natural habitats can become isolated or smaller. By interfering with ecological processes, species interactions, and gene flow, fragmentation can cause population reduction and biodiversity loss. To help endangered species move around and exchange genes, applied ecologists try to reduce the effects of habitat fragmentation, promote habitat connectivity, and restore biological corridors.

Endangered Ecosystem Services: In applied ecology, ecosystem services including pollination, seed distribution, water purification, and carbon sequestration that are provided by endangered resources are also referred to as endangered resources. The services that these species and habitats provide may be jeopardized if they are threatened or declining. Applied ecologists concentrate on maintaining and reestablishing the ecological interactions and processes required for the delivery of these services.

Genetic Diversity: Within populations of animals, endangered resources also include genetic diversity. For a species to be adaptable, resilient, and long-lived, genetic variety is crucial. Genetic diversity can be diminished in small, isolated populations, raising the risk of inbreeding depression and lowering adaptive potential. Through genetic management techniques including captive breeding programmes, genetic rescue attempts, and habitat connectivity projects, applied ecologists strive to preserve and improve genetic diversity.

III. CONCLUSION

The scope of endangered resources in applied ecology includes stakeholder involvement and participation, policy formulation, habitat protection and restoration, genetic diversity, ecosystem functioning and services, threat assessment and mitigation, and policy creation. By focusing on these elements, applied ecology attempts to safeguard and replenish threatened resources, preserving biodiversity and promoting the sustainable management of ecosystems. In applied ecology, endangered resources are defined as species, habitats, and ecosystems that are in danger of going extinct or experiencing a major decline. Applied ecologists concentrate their management and conservation efforts on these resources.

REFERENCES

[1] L. R. Gerber et al., "Endangered species recovery: A resource allocation problem," Science (80-.)., 2018, doi: 10.1126/science.aat8434.

[2] G. Yoshizaki and S. Lee, "Production of live fish derived from frozen germ cells via germ cell transplantation," Stem Cell Res., 2018, doi: 10.1016/j.scr.2018.03.015.

[3] A. Anastasopoulos, M. Lekakou, J. Quer, E. Zimianiti, J. DeBenedetto, and D. Chiang, "Part-of-speech tagging on an endangered language: A parallel Griko-Italian resource," in COLING 2018 - 27th International Conference on Computational Linguistics, Proceedings, 2018.

[4] C. R. Huang, S. K. Hsieh, L. Prévot, P. Y. Hsiao, and H. Y. Chang, "Linking basic lexicon to shared ontology for endangered languages: A linked data approach toward formosan languages," J. Chinese Linguist., 2018, doi: 10.1353/jcl.2018.0009.

[5] Y. Y. Zhang, E. Shi, Z. P. Yang, Q. F. Geng, Y. X. Qiu, and Z. S. Wang, "Development and application of genomic resources in an endangered palaeoendemic tree, parrotia subaequalis (Hamamelidaceae) from eastern China," Front. Plant Sci., 2018, doi: 10.3389/fpls.2018.00246.

[6] T. Fukuda et al., "Expression of human mutant cyclin dependent kinase 4, Cyclin D and telomerase extends the life span but does not immortalize fibroblasts derived from loggerhead sea turtle (Caretta caretta)," Sci. Rep., 2018, doi: 10.1038/s41598-018-27271-x.

[7] S. Sharma, K. Arunachalam, D. Bhavsar, and R. Kala, "Modeling habitat suitability of Perilla frutescens with MaxEnt in Uttarakhand—A conservation approach," J. Appl. Res. Med. Aromat. Plants, 2018, doi: 10.1016/j.jarmap.2018.02.003.

[8] H. A. Lewin et al., "Earth BioGenome Project: Sequencing life for the future of life," Proceedings of the National Academy of Sciences of the United States of America. 2018. doi: 10.1073/pnas.1720115115.

[9] M. Di Li, X. Wu, J. J. Wu, X. Zhou, R. H. Wang, and Z. C. Qi, "Characterization of the complete chloroplast genome of summer snowflake (Leucojum aestivum, Amaryllidaceae)," Mitochondrial DNA Part B Resour., 2018, doi: 10.1080/23802359.2018.1501309.