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Threats may Vary but Let's put all Our Hands together for Conserving Our Beauty of Nature: Review on Biodiversity and Wildlife

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Review Article

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ABSTRACT

Human requirements and activities in the past, present, and also will continue in future, extensively change ecosystems and biodiversity on a universal scale. Prognosis of changes in biodiversity for all ecosystems including marine, terrestrial, forest and freshwater ecosystems, have raised significant concern over the biodiversity loss on ecosystem which ultimately affect human well-being. The aim of this review is to examine the threats of biodiversity and wildlife and changing climate and its impact within the larger context of biodiversity conservation and wildlife. We examined conservation challenges, issues implications and concluded with recommendations for long-term adaptation approaches for conservation of biodiversity and wildlife.

INTRODUCTION

Bio diversity means the variability among living organisms from all the sources including, inter alia, terrestrial, aquatic and marine ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. Subdivisions of the biodiversity like genetic, species and ecosystem diversity. It also regulates and affects the variation and trends of the life.

Functions and Values [1], As a balancer- Biodiversity maintain balance of the ecosystem through recycling, storage of nutrients, combating pollution, supporting the species diversity, protecting water resources, controlling soil erosion, forming and protecting soil, regulation of climates and biogeochemical cycles. As resource provider- Biodiversity provides biological resources like medicines and pharmaceuticals, food, ornamental plants, wood products and breeding stock, etc. Social benefits- It provides recreation and tourism, cultural values, education and research.

Biodiversity is so crucial for survival of humanity that the United Nations General Assembly has declared the decade 2011-2020 as the "Biodiversity Decade".

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THREATS TO BIODIVERSITY [2-6]

Our results stress on the significance of studying biodiversity loss as a global systemic occurrence, instead of considering it as the degrading or polluting producers in isolation. Biodiversity is life form ruined all the way throughout world. Many driving forces of its loss rest powerfully on international policies in addition to activities.

Types of Threats

Common threats

Most common threats are habitat loss, pollution, human population, overharvesting, invasive species, deforestation, defective farming systems, mining activities, grazing, illegal trade, massive scale hydroelectric constructions, land clearance for settlement, agriculture, pesticides and fertilizers.

Natural habitat & Natural resource utilization

Natural habitat is getting rapidly converted to landscapes dominated by human beings and domestic animals. Natural resource utilization could intensify due to increasing demand to deal with developmental activities [7]. Though forest figure foremost among the world's most significant ecosystems, it is also threatened with degradation and loss because of agricultural expansion, shifting cultivation, commercial logging for timber, conversion of forest lands to rubber, oil and palm plantations [8].

Transport

Transport systems are reaching further distant regions, stimulating forest woodland clearing for variety of purposes. Since middle of 20th century, increasing demand from urban areas has actuated non-timber forest products (NTFPs) trade, drawing resources from rural regions to towns and also cities, for various goods like fuel wood, constructing materials, medicinal and edible wild species [9].

Agriculture

Earlier agricultural order have been amalgamated and co-evolved with technology, beliefs, myths and also traditions. But recently, agriculture has lost its local nature in many places, and become assimilated into the global economy which led to more stress on farm land for goods export and commodities exchange. The sudden boom in the human population during 20th century has instigated a related growth in farming, and this has led to wild lands to croplands conversions, large scale deviation of water from rivers, lakes and underground resources, pollution of land resources with pesticides and animal wastes.

Pollution load

Poisonous contaminants like agrochemicals such as pesticides, metals, acids, suspended solids, sewage, organic pollutants and thermal pollutants aggravate the biodiversity loss. From the burning of fossil fuels to dumping billion pounds of plastic into seas and oceans every year, pollution is completely disrupting the Earth's ecosystems. Current threats have greatly speeded up the rate at which extinctions occur.

Non-native or exotic species

Compared to other threats to biodiversity, invasive or non-native introduced species rank second only to habitat destruction. Introduction of non-native or exotic species adversely affects our environment and the diversity of life on our planet. Of all 1,880 imperiled species in the United States, nearly 49% are endangered because of introduced species alone or because of their impact combined with other forces. Though some introduced species (some food crops and pets) are beneficial, others are very damaging [10].

Mining

Mining activity poses harsh environmental conditions with extreme physical, chemical and biological constraints like low exchange capacity, low water holding capacity, poor organic matter and devoid of soil organisms.

Alterations in composition of plant species and disturbed functional ecosystem are major obstacles of mining activity.

Urbanization

The percentage of people living in urban areas in the world has increased from 29% in 1950 to 49% in 2007 and is expected to rise to 60% by 2030. Most urban areas are disconnected from the natural world. Industrialization has also become serious threat to biodiversity [11,12].

Climate change

There are many probable ways climate change will impact biological diversity like discrete acute impacts, principally extreme weather related events (storms, droughts, fires, extreme rainfall events), and continuous chronic impacts, such as gradual increases in mean temperatures or decreases in seasonal rainfall, occurring over decades. Climate change, however, can cause an irreversible damage to unique forest ecosystems and biodiversity contributing various species extinct. "Critically endangered" could become extinct with a quarter of the species expected to be at the risk of extinction. According to view of Prof. Peter Mayhew (York University) half of the world's plant, animal species shall become extinct because of climate change by the end of the present century [13]. Not only climate change affects biodiversity, the loss of biodiversity actually contributes to climate change. Both loss of biodiversity and climate change could act, synergistically too, to escalate human extermination more rapidly.

Pesticides

Once thought to be a relatively "safe" pesticide, neonicotinoids have been posed to cause risks to biodiversity and wildlife and are raising complex questions regarding wildlife toxicity [14].

Impact

Common impact

Biodiversity loss has negative effects on several aspects of human well-being, such as food security, vulnerability to natural disasters, energy security and access to clean water and raw materials. It also affects human health, social relations, and freedom of choice, basic materials [15].

Bioaccumulation

It will occur leading to becoming increasingly concentrated in animal tissues as they move up the food chain.

Developing and under developed are most vulnerable.

In Bangladesh and India, for example, logging of trees and forests means that the floods during the monsoon seasons can be very deadly [16,17].

Similarly, many avalanches, and mud slides around the world that have claimed many lives, may become worse by the clearing of so many forests, which provide a natural barrier.

Soil

The underlying "parent" rock may weathers rapidly in the tropics and overtime, most of the minerals have washed from the soil. Nutrient reservoir is lost, flooding and erosion rates are high, and soils often become unable to support crops in just a few years.

Weedy/invasive species, Mangroves

Weedy/invasive species with a wide ecological tolerance will have an advantage over others.

With the rise in sea level, the Mangroves will disappear which will spell the demise of the wildlife and could adversely affect human populations.

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Approach

Public-private partnerships

Urban areas provide unique opportunities to form public-private partnerships and to leverage resources for conservation. We need to commit to exploring this frontier and charting a course that brings conservation into urban areas in a fashion that makes nature experiences part of everyday urban life.

Indigenous people/Local communities

Involving (Convention on Biological Diversity (CBD) and Aichi Biodiversity Targetsalso recognized) indigenous people and their traditional and indigenous knowledge about use of various phyto-resources help in the conservation and management of biodiversity. Local communities in the area should be sensitized and educated on wildlife laws specifically laws relating to illegal hunting and bush meat consumption and trade. Creating local awareness on the benefits of wildlife conservation without tangible benefits from the park might not influence attitude change and deter wildlife utilization in the area. [18-20]

Protected areas (PAs)

Protected areas are viewed as cornerstones of biodiversity conservation in most of the countries and there are over 100 000 PAs in the world. Prioritizing conservation action to target the areas where maximum impacts have taken place should be first step.

Buffer forests

Buffer forests play vital role in supporting the livelihood requirements of the local community and thus help in keeping the park inviolate.

Germplasm conservation

The conservation of germplasm involves the preservation of the genetic diversity of a particular plant or genetic stock for its use at any time in future [21].

In-situ conservation- By establishing biosphere reserves such as national parks, sanctuaries

Ex-situ conservation- Through *in vivo* gene banks. The methods involved are: (a) Cryopreservation (b) Cold Storage (c) Low pressure and low oxygen storage.

In England Kew Seed Bank consists 1.5 % of the world's flora - around 4,000 species on deposit.

Economic growth

Economic growth brings forces that threaten biodiversity, especially in low-income countries, but also opens up opportunities for conservation as countries grow, incomes and wealth increase and technology advances. It brings improved attitudes towards conservation and increased appreciation of natural environments, legislation to protect endangered species, more and bigger protected areas, conservation investments to restore degraded habitat.

Mine reclamation

Sustainable mine restoration involves activities and amendments to restore ecological integrity through sustainable development of ecosystem and ecological integrity which includes variability in biodiversity, nutrient cycle, ecological processes, and structural relationships like plant-pollinator interaction, litter-decomposer organism interaction and nutrient release rates [22,23].

Participatory forest management (PFM)

It enable people who have a direct stake in forest resources to become part of decision-making in all facets of forest and resources management including formulating and executing institutional fabric [24].

Disciplinary approach

We need to put an end to the basic vs. applied research split and acknowledge that fundamental facts are just as crucial as applied facts about an organism.

Policy

Companies and corporations can adopt best practices and try to minimize using timber and paper supplies that contribute to deforestation [25,26]. Coordinated land-use and infrastructure planning and transportation system planning in such a way that maximizes local and national economic advantages while minimizing the negative effects has on biological diversity. New policies could be enacted for integrated park management where local indigenous community, principally the youth, could actively engage in conservation of biodiversity. Ultimately, national and international governments should enact stronger, scientific forest protection laws balancing the needs of indigenous peoples with expanding rural populations and national economic development.

THREATS TO AQUATIC BIODIVERSITY

Aquatic species are at an increased risk of extinction than birds and mammals. Runoff from agricultural and urban areas, non-native species invasion, dam constructions and water diversion are considered to be major threats. Other threats include overexploitation of aquatic organisms, urbanization and resource-based industries such as mining. In addition atmospheric and thermal pollution, sedimentation and erosion and climate change also pose threats to aquatic biodiversity.

Conservation approaches

1. Previous researches proved that management actions must be broad based for conservation of biodiversity to be effective.
2. Restoring degraded aquatic areas.
3. Establishing aquatic bio-reserves, through bioregional management which regulates factors affecting aquatic biodiversity by balancing conservation, economic and social needs within the area.
4. Watershed management protection of lakes and small portions of watersheds like tanks organized by local watershed groups, trees plantation trees in and around the catchment area of water bodies.
5. Avoiding the establishment of industries, chemical and thermal plants near the water resources and enacting regulatory measures with respect to wastewater discharge in the water body help in conserving biodiversity [27].

WILDLIFE

Wildlife is commonly defined as essentially undomesticated, free-ranging and terrestrial vertebrates (reptiles, amphibians, birds and mammals). It provides a variety of goods and services such as hides, skins, ivory, meat, traditional medicine and subsistence hunting and services like recreation and eco-tourism. Wildlife has the potentiality to contribute to both local and national economies significantly.

Wildlife and human beings both coexisted in the nature until humans became dominant. Wildlife destruction visible effect is the diminishing population of wild herbivore seeing that they have to contest with livestock for food starting place [28-30].

A couple of examples of wildlife population reduction explained below.

Vulture's populations: Vultures, once the dominant 'full time' or obligate scavengers are decreasing in their number. Presence and availability of veterinary agents like diclofenac, NSAIDs in livestock carcasses are incidental [31].

Ocelot populations in USA: It is because of decreasing habitat, resources and corridors such as collisions of cars, pet or retaliatory occurences mortality of ocelots is increasing. Lack of genetic diversity contributing to the decline of ocelot populations as a result of current populations being small and isolated [32].

Challenges

Natural resources conservation in National Parks, Sanctuaries and reserves has always been intertwine in multitude problems which include lack of clear national and international policies, dearth of commitment from government officials, funds scarcity, large scale agriculture expansion, illegal exploitation of natural resources, and skilled staff insufficiency are the important ones. Many countries lack appropriate forest legislation, regulation and incentives to promote sustainable forest management practices. The problem is more acute in the developing countries, where wildlife conservation and biodiversity management is sometimes subordinated to more crucial demands such as hunger and poverty.

In many developing countries, wildlife management and conservation practices are restrained by funding deficit limited personnel, equipment, software and training and lack of political will for governments for suitable preparation, execution and monitoring of forest management programs, limited personnel, equipment, and software, funding and training

Social constraints like negative perceptions of wild life and lack of capacity to succeed conservation, lack of awareness about environment, increasing human populations and social alterations leading to land subdivision and so habitat fragmentation.

Balancing environmental issues with rising cultural and economic demands need to be assessed carefully [33].

THREATS TO WILDLIFE

Types of threats

Common threats

General threats include encroachment from surrounding communities, killing wildlife, illegal resource extraction, poaching and destruction of natural habitat. Species and habitat loss has occurred because of population raise, agricultural intensification, civil wars, conflicts of land use and inept conservation policies [34].

Habitat loss

It involves disturbance and settlement near the sanctuaries, overstocking livestock, frequent fire, and bush encroachment, cutting of trees for fuel, sale and huts construction. House settlement within the Park, cultivation and associated livestock grazing is the principal cause of habitat destruction [35].

Land conversion

Wildlife is seriously threatened by their habitat conversion to agricultural use and extraction of their resources. Illegal hunting and trafficking by indigenous communities further endangered the wildlife population [36].

Hunting

It is widespread and occurs around protected areas. Leading factors of overexploitation include hunting for household subsistence needs, high demand for wildlife goods for food, traditional herbal medicine and pets for domestic and international markets.

International trade

The significance of international trade as a pilot of threats to species is poorly understood. Excluding the invasive species around 30% of global species threats are because of international trade [37].

Climate change

It not only threatens habitats of wildlife, but it can also put extra stress on wildlife species.

Approach

Survey data

In developing countries, absence of adequate survey data to monitor wildlife populations and distributions avert timely management and conservation decisions [38,39]. Geographical Information System (GIS) is helpful in identifying, assessing and mapping of the suitable habitats with powerful visualization and also analyzing capabilities [40].

Awareness campaigns

Through carrying out multi-disciplinary research like social marketing strategy as a powerful tool for publicity, awareness, education and interpersonal communication pre and post campaign wildlife can be conserved [26].

Buffer zone and Resettlement

Establishing the buffer zones would expand the effective area of national parks thereby decreasing human and domestic wildlife interaction and significantly reduce human and livestock impact in the National Park. Resettlement of people to an area where the impact would be less is feasible.

Prohibition of hunting

Prohibiting hunting both within and around the protected areas, by enforcing regulations efficiently and strengthening awareness creation activities with the local peoples helps in preventing the wildlife from killing.

Forest establishment

Creation of forest estate in reserves form mainly through forest establishment and proper incentive allocation to forest conservators lead towards conservation of forest resources [41].

Innovative Initiatives

Like Wildlife Conservation Leases (WCL) Incentive which support conserving private land and provide habitat for wildlife use. Providing incentives like cash income diversification which is crucial for pastoralists especially during drought periods. Through strong partnership WCL is very successful in communicating to and catalyzing execution of payments for environmental services (PES) depending on the land lease for wildlife model [42].

CONCLUSION

Common man can do many things to fight atmospheric, hydrologic pollution and conserving biodiversity, such as recycling, conserving energy at home and using public transportation. After going through previous literature I would like to stress on conserving the nature vigorously and as we are in Biodiversity decade at present moment I call upon all the world citizens to ensure that we take the requisite steps to make possible the adaptation of biodiversity to a changing climate, and ensure the livelihoods of whole humanity.

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