

Biodiversity: Hotspots, Threats and Need for its Conservation

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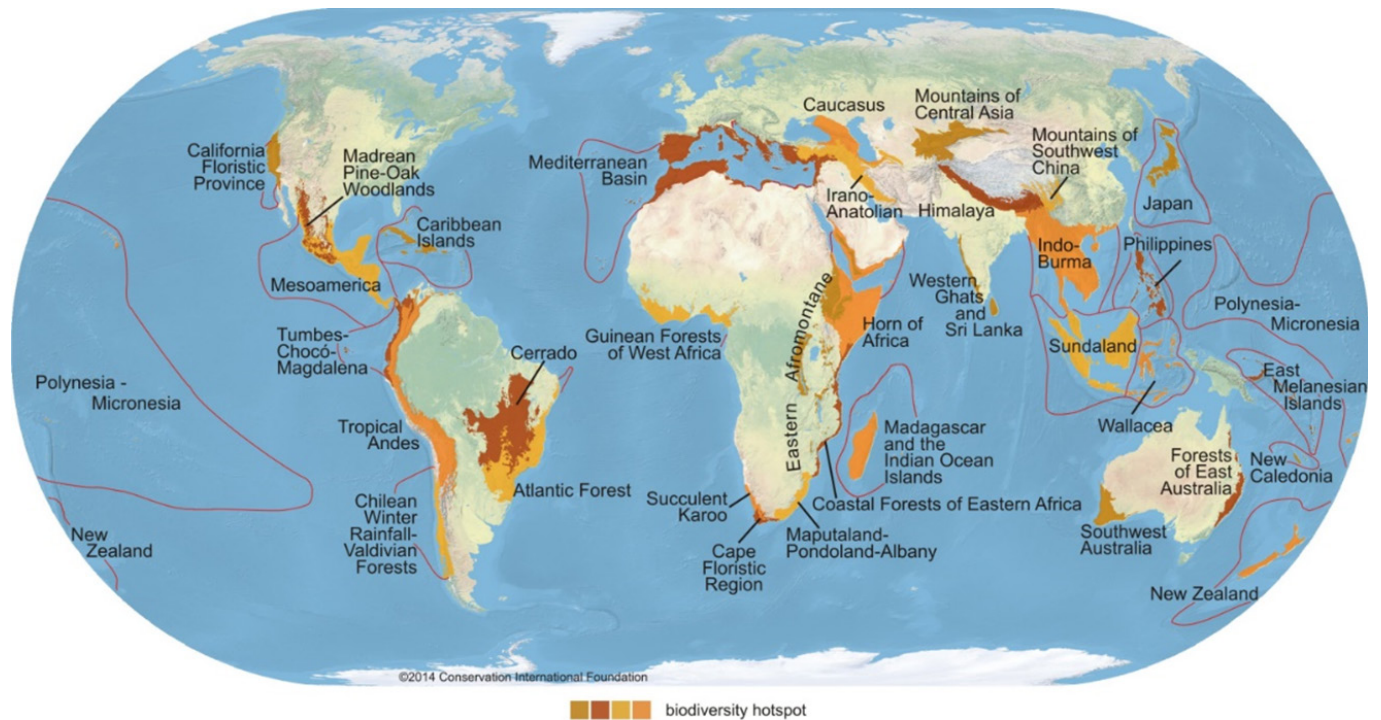
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Opinion

Biodiversity is the variety of life on Earth and refers collectively to variation at every level of biological organization. It contributes to many aspects of people's livelihoods and well-being, providing products, such as food and fibres, whose values are widely recognized. Biodiversity is severely threatened due to worldwide population growth and resource consumption, climate change and global warming, habitat conversion and urbanization, invasive alien species, over-exploitation of natural resources and environmental degradation [1-3]. Norman Myers (British biologist) coined the term "biodiversity hotspot" as a bio-geographic region characterized by exceptional habitat loss and plant endemism. Conservation International (CI) adopted Myers hotspot as its institutional blueprint in 1989 and 1996. CI is an American non-profit environmental organization located in Arlington, Virginia. It aims to conserve nature as a source of food, fresh water, livelihoods and a stable climate. CI recognized 25 biodiversity hotspots in the World in 1999 and published the book "Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions." In 2005, CI published an updated edition titled "Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions" and identifies 34 biodiversity hotspots which cover 2.3% of the Earth's land surface and more than 50% of the World's plant species and 42% of all terrestrial vertebrate endemic species [4]. The biodiversity hotspot is a biogeographic region with a significant biodiversity reservoir threatened by anthropogenic activities. In order to qualify as a biodiversity hotspot on the 'Myers 2000' edition of the hot spot map, a region must meet two strict criteria: [1].

- a) It should contain at least 0.5% or 1,500 species of vascular plants as endemics.
- b) It has to have lost at least 70% of its primary vegetation or original habitat. Hotspots are classified according to continent
 - i. Africa (group of 8 hotspots)
 - ii. Asia-Pacific (group of 13 hotspots)
 - iii. Europe and Central Asia (group of 4 hotspots)
 - iv. North and Central America (group of 4 hotspots)
 - v. South America (group of 5 hotspots). There are 35 hotspots present throughout the World (Figure 1).



Conservation International (conservation.org) defines 35 biodiversity hotspots — extraordinary places that harbor vast numbers of plant and animal species found nowhere else. All are heavily threatened by habitat loss and degradation, making their conservation crucial to protecting nature for the benefit of all life on Earth.

Figure 1: The World's biodiversity hotspots [1].

The increasing population, urbanization, and over-exploitation of resources increase the risk or threats to the biodiversity of plants and animals. The significant risks or threats to decreasing biodiversity are habitat loss, pollution, climate change, natural calamities, forest fire, invasive species, over-exploitation of biotic resources, overfishing, hunting and poaching, oil spills, shifting cultivation, urbanization activities and other developmental activities, introduction of exotic or alien species of plants and animals in new habitat, acid rain, population growth and shrinkage of natural habitats in both aquatic as well as in terrestrial ecosystems [4,5]. The significant destruction of biotic communities occurred during the last century due to the massive growth in the human population. The increasing human population requires more space and food from biotic resources to sustain their life, and this increasing demand creates potential threats to biotic communities. Humans occupy their natural habitat for houses and activities. More than 50% of the wildlife habitat has been destroyed in 49 out of 61 old-world tropical countries [6]. Several activities, such as the production of food, fibre, and fodder, logging of wood, increased agriculture, and increased human habitation, have led to the destruction of forests and the pollution of rivers. Environmental pollution activities like the emission of harmful gases, chemicals, pesticides, acid rain, water pollution and eutrophication in terrestrial and aquatic communities cause the death of several susceptible species [7].

Climate change is another challenge and growing threat to biodiversity. Climate change alters the climatic patterns of different

ecosystems in which several species of plants and animals have evolved and on which they depend. By changing the temperature and rain patterns species have become accustomed to, climate change is changing the traditional ranges of species. This forces species to either move to find other favourable conditions or adapt to new climates. While some species may be able to keep up with the changes created by climate change, others will be unable to do so. Biodiversity in the mountain and polar regions is especially susceptible and vulnerable to climate change [3]. Conservation of biodiversity actions is seriously taken worldwide, which involves protection, upliftment and scientific management of animal and plant biodiversity of communities to maintain it at its threshold level and derive sustainable benefits for the present and future generation [4,8,9]. At the 1992 Earth Summit in Rio de Janeiro, the world leaders accepted a comprehensive strategy for sustainable development, meeting our demands while ensuring we leave a healthy and viable biodiversity for future generations. One of the key agreements adopted at Rio was the Convention on Biological Diversity. The Convention sets three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of utilizing genetic resources. The diverse features and climatic conditions have created a variety of ecosystems, such as forests, grasslands, wetlands, and deserts, coastal and marine ecosystems, which harbour and sustain high biodiversity and contribute to human well-being. Thus, the conservation and protection of biodiversity are not only essential for meeting current social and economic needs but also to give a guarantee of its services for future generations.

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