BIODIVERSITY

Biodiversity, derived from the Greek word bíos meaning 'life' and diversity referring to the variety of forms, is the immense variety of life on Earth, encompassing animals, plants, microorganisms, fungi and humans. This richness is not limited to individual species but extends to the ecosystems they inhabit, which range from lush rainforests to barren deserts. Biodiversity is fundamental to the health and stability of the planet, offering an intricate web of interdependencies that sustain life as we know it; for example, the health of forest ecosystems is dependent on particular types of plant and wildlife species that inhabit it, which are also simultaneously dependent on the forest ecosystem for survival. The preservation of biodiversity is critical not only for maintaining the beauty and balance of nature but also for the survival of all life forms, including human beings.

Types of biodiversity

Genetic diversity refers to the unique genetic makeup of individuals within a species, which is vital for their ability to adapt to changing environments and challenges, ensuring the survival and resilience of species.

Species diversity, which includes both the richness (variety) and abundance (number of individuals) of species in an ecosystem, is essential for maintaining ecosystem functions like nutrient cycling, pollination, and food supply.

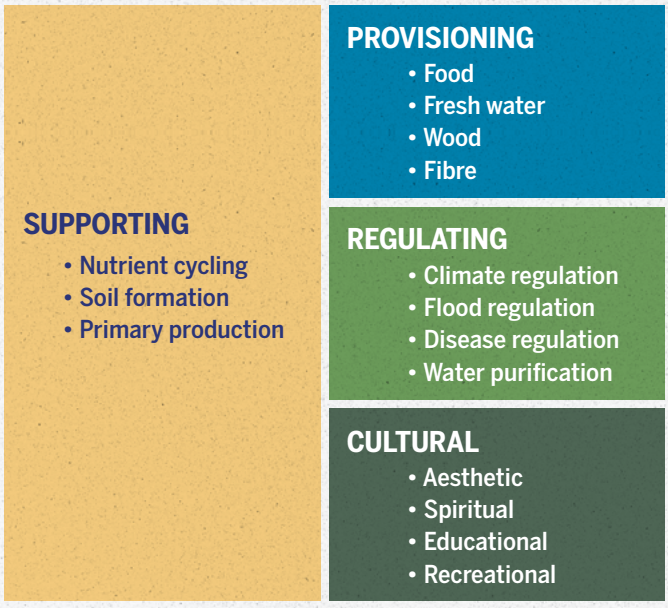
Ecosystem diversity reflects the variety of ecosystems in a region, each offering unique benefits, such as carbon sequestration, flood mitigation and providing habitats for wildlife. These diverse ecosystems support the flow of energy and nutrients, which are crucial for human survival and the well-being of all life on Earth. Within this, there is ecosystem functional diversity, which is the variation in processes – nutrient cycling, decomposition and species' interaction with these processes. Having high levels of functional diversity boosts ecosystem resilience.

Biodiversity's contributions to human wellbeing

Biodiversity plays a vital role in supporting economic growth by providing essential ecosystem services and resources for various industries. From agriculture and fisheries to tourism and pharmaceuticals, biodiversity is fundamental to many sectors, contributing to livelihoods and overall wellbeing.

>50%
of global GDP moderately/highly dependent on nature[1]

Figure 1: Biodiversity's contribution to the economy



Job creation: Many jobs and livelihoods are dependent on healthy biodiversity levels. Examples include work in ecotourism, farming, the flower industry, fishing and wild harvesting. In South Africa, biodiversity directly provides for 418 000 jobs; this is only 16 000 less jobs than the mining industry.

Provision of raw materials: Many industries significantly rely on the ongoing provision of raw materials, drawn from biodiversity. Sectors include construction, farming, clothing, paper, furniture, rope, rubber and fisheries. The construction industry uses 40% of all raw materials in the global economy, about 3 billion cubic tons a year.

Clean air and water: These are both determinants of good health. People need clean air and water to stay healthy enough to work.

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- **Provision of food:** About 75% of global food crops rely on insects and animals for pollination. Losing these species equates to US$577 billion of risk to the agricultural sector each year. Biodiversity also enhances resilience against pests, diseases and climate change.
- **Climate change mitigation and adaptation:** Genetic diversity and species richness support resilience, mitigation and adaptation.

Global plant medicine market valued at **US$83 billion** in 2019[2]

Biodiversity's contribution to society

Biodiversity contributes significantly to societal wellbeing in various ways, supporting health, culture, livelihoods and overall quality of life. Some of its key contributions include:

- **Health and medicine:** Many modern medicines are derived from natural sources, such as plants, animals and microbes. Biodiversity provides the raw materials for essential treatments, vaccines and pharmaceuticals, directly supporting public health. In Southern Africa, up to 100 million people use traditional plant medicines. Just in South Africa, the market value of this is up to R1 billion in the informal market.
- **Food security and nutrition:** Biodiversity ensures the availability of a wide range of food, from diverse crops and livestock to fish and wild plants. It also supports agricultural systems by maintaining soil health, water regulation and pollination, all of which are essential for food production.
- **Cultural and recreational benefits:** Natural landscapes and ecosystems play an important role in cultural identity, spiritual practices and recreational activities. Biodiversity supports eco-tourism, outdoor recreation and the preservation of cultural heritage tied to the natural world.
- **Mental and emotional wellbeing:** Access to nature and natural spaces has been shown to improve mental health, reduce stress and enhance overall quality of life. Green spaces in urban environments provide places for relaxation, socialising and physical activities, promoting community cohesion and personal wellbeing.

Biodiversity under threat

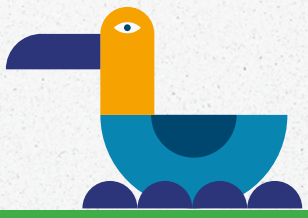


Figure 2: Status of biodiversity in the world

GLOBAL RESOURCE USE AND WASTE[3]

Global extraction of biomass, fossil fuels, minerals and metals **grew sixfold** from 1970

>80% of global wastewater discharged into nature with no treatment

300-400 million tons of heavy metals, solvents, toxic sludge and wastes dumped in world's water

ECOSYSTEM HEALTH[4]

75% of land is **degraded**

40% of marine environment **degraded**

50% of rivers and streams **degraded**

RISKS TO SPECIES[5]

Average size of monitored wildlife populations **shrunk by 73%**

Freshwater populations **shrunk by 85%**

Land species **shrunk by 69%**

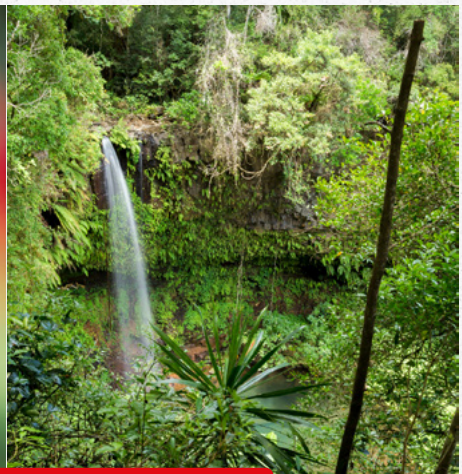
Marine populations **shrunk by 56%**

1. World Wildlife Fund. 2024. Living Planet Report. https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5gc2qerb1v_2024_living_planet_report_a_system_in_peril.pdf.
2. Nath, R., Kitaniya, S., Nath, D. et al. 2023. An extensive review on medicinal plants in the special context of economic importance. DOI. 10.22159/ajpcr.2023.v16i2.46073.
3. IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. https://doi.org/10.5281/zenodo.3831673
4. IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. https://doi.org/10.5281/zenodo.3831673
5. World Wildlife Fund. 2024. Living Planet Report. https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5gc2qerb1v_2024_living_planet_report_a_system_in_peril.pdf.

Drivers of biodiversity loss

Table 1: Indirect and direct drivers of biodiversity loss

Indirect drivers of biodiversity loss	Direct drivers of biodiversity loss
Values & cultures: How we view our relationship with nature	**Expanded land-use:** Conversion of land for housing, industry, mining & development
Technology: Can increase efficiency but also degrade ecosystems	**Pollution:** Air, water & soil degraded due to harmful chemicals & bad waste management
Economic policies: Affects resource use across sectors and countries	**Direct exploitation:** Over-extraction of raw materials, including wildlife, fish, etc.
Population growth: Can increase pressure on natural resources	**Invasive species:** Outcompete local species & can use more resources, like water
Governance: Inappropriate systems can compound biodiversity loss	**Climate change:** Shifting rainfall patterns, warming temperatures and more extreme events



What can we do to stop biodiversity loss and to enhance it

Individuals and businesses alike can take meaningful steps to stem biodiversity loss and enhance biodiversity levels. On an individual level, actions such as supporting sustainably sourced products, reducing single-use plastics, planting native species and conserving water and energy can make a significant impact.

Businesses have a key role in promoting biodiversity through their operations and supply chains. Adopting sustainable sourcing practices, ensuring the protection of ecosystems and supporting biodiversity-friendly agriculture are essential steps. Implementing green infrastructure, committing to carbon neutrality and supporting ecological restoration projects further enhance a company's impact on biodiversity. Reducing the use of harmful chemicals, minimising waste and publicly reporting on sustainability goals also ensure that businesses contribute positively to the environment. By taking these actions, both individuals and businesses can collectively create a more sustainable future for biodiversity.

Listen to the podcast on *Biodiversity.*