International Journal for Multidisciplinary Research
International Conference on Multidisciplinary Research & Studies 2023
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Climate Changes in Biodiversity

**Mr Tushar Mohite**

( M.A Geography) Guided By Mr. Chandrashekhar Thakre

**Abstract:**

Climate is a long term, usual prevailing weather condition in a specific area of earth. Climatic conditions in different areas determined by rainfall intervals, amount of precipitation, wind velocity, wind pressure, humidity percentage, sunshine, cloud formation and others meteorological events such as thunderstorms, windstorms and snowstorms. These all events collectively responsible for determining the climatic condition. Climatology basically related with the geographical position of area on earth. Geographic location include distance from ocean, sea or coast, altitude, latitude, and also mountain ranges which are also responsible for changes in wind direction. Variety of flora growth, development, morphology and reproduction are visible sign for specific climatic conditions. Climatic conditions also responsible for adaptations. Animals lived in different areas behave differently and adapt different ways for living, feeding, and reproducing. Climatic conditions strongly affects the human lives and also determine the different cultures and traditions in areas. So we can say that climate affect each aspect of plants, animals and human lives. Basically six major climate discussed on earth.

## *1.* Introduction

Biodiversity reflects the number, variety and variability of living organisms.
It includes diversity within species, between species, and among ecosystems. The concept also covers how this diversity changes from one location to another and over time. Indicators such as the number of species in a given area can help in monitoring certain aspects of biodiversity.

Biodiversity is everywhere, both on land and in water. It includes all organisms, from microscopic bacteria to more complex plants and animals. Current inventories of species, though useful, remain incomplete and insufficient for providing an accurate picture of the extent and distribution of all components of biodiversity. Based on present knowledge of how biodiversity changes over time, rough estimates can be made of the rates at which species become extinct.

Biodiversity plays an important role in the way ecosystems function and in the many services they provide. Services include nutrients and water cycling, soil formation and retention, resistance against invasive species, pollination of plants, regulation of climate, as well as pest and pollution control by ecosystems. For ecosystem services it matters which species are abundant as well as how many species are present. Ecosystem services are the benefits people obtain from ecosystems.

Biodiversity provides many key benefits to humans that go beyond the mere provision of raw materials. 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.

Society tends to have various competing goals, many of which depend on biodiversity. When humans modify an ecosystem to improve a service it provides, this generally also results in changes to other ecosystem services. For example, actions to increase food production can lead to reduced water availability for other uses. As a result of such trade-offs, many services have been degraded, for instance fisheries, water supply, and protection against natural hazards. In the long term, the value of services lost may greatly exceed the short-term economic benefits that are gained from transforming ecosystems.

Unlike goods bought and sold in markets, many ecosystem services are not traded in markets for readily observable prices. This means that the importance of biodiversity and natural processes in providing benefits to humans is ignored by financial markets. New methods are being used to assignmonetary

values to benefits such as recreation or clean drinking water. Degradation of ecosystem services could be significantly slowed down or reversed if the full economic value of these services were taken into account in decision-making.

Over the last century, some people have benefited from the conversion of natural ecosystems and an increase in international trade, but other people have suffered from the consequences of biodiversity losses and from restricted access to resources they depend upon. Changes in ecosystems are harming many of the world's poorest people, who are the least able to adjust to these changes.

## 2.Current trends in biodiversity

Virtually all of Earth's ecosystems have been dramatically transformed through human actions and ecosystems continue to be converted for agricultural and other uses.The current loss of biodiversity and the related changes in the environment are now faster than ever before in human history and there is no sign of this process slowing down. Many animal and plant populations have declined in numbers, geographical spread, or both.Species extinction is a natural part of Earth's history. Human activity has increased the extinction rate by at least 100 times compared to the natural rate.

Comparing different types of measurements of biodiversity loss is not simple. The rate of change in one aspect of biodiversity, such as loss of species richness, does not necessarily reflect the change in another, such as habitat loss. Moreover, some aspects of biodiversity loss are not easily measured, for instance the fact that the same species are increasingly found at different locations on the planet and that overall biodiversity is decreasing.The Living Planet Index, compiled by the WWF, provides an indication of the declines in the overall abundance of wild species

## 3. Biodiversity loss

Biodiversity is declining rapidly due to factors such as land use change, climate change, invasive species, overexploitation, and pollution. Such natural or human-induced factors – referred to asdrivers – tend to interact and amplify each other.

While changes in biodiversity are more clearly linked to direct drivers such as habitat loss, they are also linked to indirect driversthat are at the root of many changes in ecosystems. The main indirect drivers are changes in human population, economic activity, and technology, as well as socio-political and cultural factors.

Different direct drivers have been critically important in different ecosystems over the past 50 years. For example, in terrestrial ecosystems, the main driver has been land cover change such as the conversion of forest to agriculture. In marine systems, however, fishing, and particularly overfishing, have been the main drivers of biodiversity loss.

Overall, the main factors directly driving biodiversity loss are: habitat change, such as fragmentation of forests; invasive alien species that establish and spread outside their normal distribution; overexploitation of natural resources; and pollution, particularly by excessive fertilizer use leading to excessive levels of nutrients in soil and water.

Recent changes in climate have already had significant impacts on biodiversity and ecosystems in certain regions. As climate change will become more severe, the harmful impacts on ecosystem services are expected to outweigh possible benefits, such as a longer growing season, in most regions of the world. Climate change is expected to exacerbate risks of extinctions, floods, droughts ,population declines, and disease outbreaks.

Many drivers affecting biodiversity are stronger today than they were in the past and are also occurring together. Because exposure to one threat often makes a species more susceptible to another, multiple threats may have unexpectedly dramatic impacts on biodiversity. Drivers of extinction range from local to global in scope and from immediate to long-term in their effects. For example, the extinction of species due to habitat loss can be rapid for some species, while it may take hundreds of years for others.

**4. Biodiversity change in the future**

The Millennium Ecosystem Assessment developed four plausible scenarios to explore the future of biodiversity and human well-being until 2050 and beyond. The different scenarios are based on either increased globalization or increased regionalization, and an either reactive or proactive way of addressing environmental issues.

Overall, in all four scenarios, agricultural land will expand and forest cover will shrink, particularly in developing countries. This will lead to a continuing decline in local and global biodiversity, mainly as a result of habitat loss. More proactive approaches to the environment will be more successful in slowing these trends.

Aquatic biodiversity and specific fish populations are expected to decline due to factors such as excessive levels of nutrients, overharvesting, invasion by alien species, and pollution.

Human well-being will be affected by biodiversity loss both directly and indirectly. Direct effects include an increased risk of sudden environmental changes such as fisheries collapses, floods, droughts, wildfires, and disease. Changes will also affect human well-being indirectly, for instance in the form of conflicts due to scarcer food and water resources.
Though the average income per person (GDP) is projected to rise in all scenarios, this can mask increased inequity for instance in terms of food security. Major decisions will have to address trade-offs between competing goals, for instance between agricultural production and water quality, or between water use and aquatic biodiversity. Policies that conserve more biodiversity are also promoting higher overall human well-being by preserving multiple benefits obtained from ecosystems.

**. 5 Actions can be taken to conserve biodiversity**

**Protected areas** are an essential part of conservation programs, but they are not sufficient by themselves to protect the full range ofbiodiversity and can be difficult to enforce. To be successful, sites for protected areas need to be carefully chosen, ensuring that all regionalecosystems are well represented, and the areas need to be well designed and effectively managed.

**Market tools**, such as direct payments for ecosystem services or transfers of ownership rights to private individuals, can provide economic incentives to conserve biodiversity and to use ecosystem services sustainably.

Prevention and early intervention have proven to be the most successful and cost-effective way of tacklinginvasive species. Once aninvasive species has become established, its control and particularly its

eradication through the use of chemicals or through the introduction of other species is not necessarily effective and is extremely difficult and costly.

To be conserved, biodiversity must be **integrated** into the agriculture, fishery, and forestry sectors. These sectors are directly dependent on biodiversity and affect it directly. The private sector can make significant contributions, for example by adopting certain agricultural practices. Many companies now show greater corporate responsibility and are preparing their own biodiversity action plans.
**Strong institutions** at all levels are essential to support biodiversity conservation and thesustainable use of ecosystems. International agreements need to include enforcement measures and take into account impacts on biodiversity and possible synergies with other agreements. Most direct actions to halt or reduce biodiversity loss need to be taken at local or national level. Suitable laws and policies developed by central governments can enable local levels of government to provide incentives for sustainable resource management.

**Informing all of society** about the benefits of conserving biodiversity, and explicitly consideringtrade-offs between different options in an integrated way, helps maximize the benefits to society.Ecosystem restoration is generally far more expensive than protecting the original ecosystem, but is becoming increasingly important as more areas become degraded

Direct and indirect drivers of biodiversity loss must be addressed to better protect biodiversity andecosystem services. Possible actions include eliminating harmful subsidies, promoting sustainableintensification of agriculture, adapting to climate change, limiting the increase in nutrient levels in soil and water, assessing the full economic value of ecosystem services, and increasing the transparency of decision making processes.

## 6. Conclusion

The Millennium Ecosystem Assessment (MA) highlights a series of main findings regarding biodiversity.

Human actions are often contributing to irreversible losses in terms of diversity of life on Earth. Changes in biodiversity have been more rapid in the past 50 years than at any time in human history and are expected to continue at the same pace or even to accelerate.

Biodiversity contributes directly or indirectly to many aspects of human well-being, for instance by providing raw materials and contributing to health. Over the past century, many people have benefited from the conversion of natural ecosystems to agricultural land and from the exploitation of biodiversity. However, these changes have increased poverty among some social groups.

Although many individuals benefit from activities that lead to biodiversity loss and ecosystem change, the full costs borne by society often exceed the benefits. This is revealed by improved valuation techniques and growing knowledge about ecosystems. Even when the benefits and costs of ecosystem changes are not entirely known, a precautionary approach may be justified when costs could be high or changes irreversible.
Factors such as habitat change, climate change, and a growing population and consumption will continue to cause losses in biodiversity and changes in ecosystem service at the present pace or even faster.

Many of the actions that have been taken to conserve biodiversity and promote its sustainable use have been successful in limiting biodiversity loss. Overall the losses are now occurring more slowly than they would have in the absence of these actions taken by communities, NGOs, governments, as well as business and industry. To achieve greater progress towards biodiversity conservation, it will be necessary – but not sufficient – to strengthen a series of actions that focus primarily on the conservation and sustainable use of biodiversity and ecosystem services.

Unprecedented additional efforts would be needed to achieve a significant reduction in the rate of biodiversity loss at all levels by 2010.

**References**

1. Akhter R, Arshad M (2006) Arid rangelands in the Cholistan desert (Pakistan). Science et changements planétaires/Sécheresse 17(1):210–217
**Google Scholar**
2. Aldrich PR, Hamrick JL, Chavarriaga P, Kochert G (1998) Microsatellite analysis of demographic genetic structure in fragmented populations of the tropical tree Symphonia globulifera. Mol Ecol 7(8):933–944
**CrossRef CAS PubMed Google Scholar**
3. Antipodes Subantarctic Islands tundra. Terrestrial ecoregions. World Wildlife Fund. Retrieved 2009-11-02
**Google Scholar**
4. Aristarain AJ, Jouzel J, Lorius C (1990) A 400 years isotope record of the Antarctic Peninsula climate. Geophys Res Lett 17(13):2369–2372
**CrossRef CAS Google Scholar**
5. Arnell NW, Livermore MJ, Kovats S, Levy PE, Nicholls R, Parry ML, Gaffin SR (2004) Climate and socio-economic scenarios for global-scale climate change impacts assessments: characterising the SRES storylines. Glob Environ Chang 14(1):3–20
**CrossRef Google Scholar**
6. Bahre CJ, Shelton ML (1993) Historic vegetation change, mesquite increases, and climate in southeastern Arizona. J Biogeogr 20:489–504
**CrossRef Google Scholar**
7. Besnier F, Kent M, Skern-Mauritzen R, Lien S, Malde K, Edvardsen RB, . . . Glover KA (2014) Human-induced evolution caught in action: SNP-array reveals rapid amphi-atlantic spread of pesticide resistance in the salmon ecotoparasite Lepeophtheirus salmonis. BMC Genomics 15(1):937
**Google Scholar**
8. Bodansky D (1993) The United Nations framework convention on climate change: a commentary. Yale J Int Law 18:451
**Google Scholar**
9. Bradford A (2018) Deforestation: facts, causes & effects
**Google Scholar**
10. Broecker WS (1975) Climatic change: are we on the brink of a pronounced global warming? Science 189(4201):460–463
**CrossRef CAS PubMed Google Scholar**
11. Brun LA, Maillet J, Richarte J, Herrmann P, Remy JC (1998) Relationships between extractable copper, soil properties and copper uptake by wild plants in vineyard soils. Environ Pollut 102(2–3):151–161
**CrossRef CAS Google Scholar**
12. Chilali M, Gahinet P, Apkarian P (1999) Robust pole placement in LMI regions. IEEE Trans Autom Control 44(12):2257–2270