Easy Digest:
The Links between Climate Change & Biodiversity

IMPATIENCE EARTH

Summary

- Biodiversity and a stable climate are key foundations to a thriving natural world. Yet, humans are changing the climate and destroying biodiversity at unprecedented rates.
- The impacts of these two crises hit everyone, but marginalised communities most of all.
- Effective solutions must tackle climate change and biodiversity loss together.

Human activity is at the core of both climate change & biodiversity loss

The addition of carbon dioxide, methane and other 'greenhouse' gases into the atmosphere is heating up the planet's surface and oceans and changing our long-term weather patterns - otherwise known as **climate change.** The economic sectors emitting the most of these greenhouse gases are electricity production, land use, agriculture and food, industry (e.g. steel production), transport, and buildings (e.g. their construction and heating). Three quarters of the gases across these sectors come from the burning of fossil fuels. Most of the rest comes from disturbance of land including deforestation, soil erosion or food production systems. [1]

Global warming and the disturbance of land are also the main drivers of biodiversity loss. 46% of the land that was once covered by wild forests and grasslands has been turned into farmland with the growth of meat and dairy in diets being the main driver. Livestock production takes up nearly 80% of global agricultural land (an area the size of North America and Brasil combined) despite supplying less than 20% of the world's calories. These factors also multiply the impact of the other main threats to biodiversity: pollution, overexploitation of wild species and invasive alien species.

Photo: Farm Sanctuary

Both climate change and biodiversity loss are driven by one thing - human activity. Our lifestyles and appetites for land have already resulted in the earth warming by 1.1°C since the onset of the Industrial Revolution. We are currently on track to exceed 2°C of global warming by mid-century which would have devastating consequences for people and the planet.[2] Human activity has also resulted in a depletion in the variety of animals, plants, fungi, and even microorganisms like bacteria, that make up our natural world.

Climate change and biodiversity are intrinsically linked

Climate change has altered marine, terrestrial and freshwater ecosystems all around the world in three main ways [3]:

- **By changing relationships between species in ecosystems:** climate change is restructuring whole ecosystems by changing the availability of resources, such as nutrients and water, and creating more extreme environments. Some ecosystems are especially vulnerable. Even limiting global warming to the most ambitious of global targets (keeping the temperature rise below 1.5°C) would see 90% of coral reefs disappear.[4]

- **By forcing the migration of species:** As temperatures increase and rainfall and environments change, species that were native to certain ecosystems are forced to migrate in search of more habitable conditions. Scientists have found that around half of the 40,000 species they studied are being forced to seek out new areas with climate conditions they are able to tolerate. Those that can't move, face extinction. Breakthrough analysis by scientists shows that a 'middle of the road' scenario for the future climate would see 6% of plants and animals species disappear by 2050 and 13% by 2100. [5]

- **By changing the timings of key life events:** the timing of the annual cycles of plants and animals is extremely sensitive to changes in climate. This can disrupt the manner in which species interact and the way that ecosystems function overall. For example, plants may bloom before butterflies emerge to pollinate them, or caterpillars may emerge before migratory birds arrive to feed them to their young.

Photo: Unsplash/Hiroko Yoshiis

Biodiversity loss can exacerbate climate change

Most notably, by creating carbon emitters. Intact ecosystems are great stores of carbon in vegetation and soils. Many also add to this store over time - a phenomenon known as carbon 'sinks'. Through this process, ecosystems remove about half of all the carbon dioxide humans add to the atmosphere. When ecosystems are degraded or destroyed, such as through deforestation, they accelerate climate change by releasing some of the stored carbon as carbon dioxide and methane into the atmosphere. This happens as dead vegetation rots or is burnt and the carbon in soils is exposed to the air. Whilst some farming practices can also make farmland into carbon sinks, most farmland is a direct source of greenhouse gas emissions so the world gains a new source of emissions in place of a sink. This further accelerates the build-up of greenhouse gases and exacerbates climate change, which, in turn, drives biodiversity loss.

It's a vicious cycle. As the planet warms, biodiversity is lost through degraded ecosystems and the loss of species. As ecosystems are degraded, climate change is exacerbated through the release of warming gases and through the reduced potential for carbon sequestration.

The current impacts and future threats of these interlinked challenges are so serious that the World Economic Forum now ranks extreme weather, biodiversity loss and a failure to stop climate change as the three most severe risks facing the world over the next decade. [6]

Photo: Ulet Ifansasti/Greenpeace

These twin crises impact the most vulnerable people the most

- The impacts of these two crises hit everyone but marginalised communities most of all. They tend to be more directly dependent on the natural environment for basic services such as clean water, live in parts of the world where climate change is more extreme and have the least resources to adapt to the impacts. [7] More than 70% of the world's poor depend directly on biodiversity and ecosystems for their subsistence.

- In addition, where nature is intact, it supports climate resilience by buffering people from the shocks of climate change. For example, well-managed mangrove ecosystems allow the maintenance of fish stocks at a high level, whilst protecting the coast from erosion. [8]

- These effects are happening now: 36 million people in the Horn of Africa are facing a severe drought. The World Bank estimates that climate change could push over 130 million people into extreme poverty by 2030, and force 216 million people to migrate by 2050.

Conclusion

Climate change and biodiversity loss must be tackled together. Given the interconnectedness between climate change and biodiversity, there is a growing call amongst stakeholders for both crises to be tackled together. Last year, fifty of the world's top climate and biodiversity experts mapped out the potential for actions to tackle climate change to positively, and negatively, impact biodiversity and vice versa. [9] Their report concluded that these actions were the best ways to mitigate climate change and protect and restore biodiversity in one go:

1. Stopping the loss and degradation of carbon- and species-rich ecosystems
2. Restoring carbon- and species-rich ecosystems
3. Increasing sustainable agricultural and forestry practices
4. Enhancing and better-targeting conservation actions, coordinated with, and supported by, strong climate adaptation and innovation

Another group of scientists point to the power of dietary shifts - especially away from beef and dairy - to free up great areas of farmland for nature.

Addressing climate change and biodiversity together avoids problems that address one crisis but worsen the other. For example, a climate change solution to plant more trees as a means of increasing carbon stores can be harmful to biodiversity if the trees planted are monocultures.

What does this mean for climate philanthropy?

Climate and biodiversity goals can go hand in hand. Philanthropy can play a critical role in changing our impacts on the natural world. It has a unique mix of resources, influence and flexibility which can support the development and implementation of the bold and innovative solutions needed to tackle these twin challenges. Philanthropy can;

- **Broaden the approach to climate funding by incorporating biodiversity and vice versa.** By focusing on strategies that address both climate change and biodiversity loss, philanthropy can tackle a wider range of issues more holistically than purely through a climate lens.
- **Prioritise support for vulnerable communities:** it's crucial for climate philanthropy to fund initiatives that bolster the resilience of communities disproportionately affected by both biodiversity loss and climate change. Solutions should be co-designed using local knowledge and skills.
- **Review investments and operations** to ensure investment portfolios are not inadvertently supporting businesses and practices contributing to climate change or undermining biodiversity and critical ecosystems.

Photo: Dan Meyers

References

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[2] Carbon Brief (2020)Analysis: When might the world exceed 1.5C and 2C of global warming? Available here

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[4] Carbon Brief (2018) In-depth Q&A: The IPCC's special report on climate change at 1.5C. Available here

[5] The Guardian (2022) More than 1 in 10 species could be lost by the end of the century, study warns. Available here

[6] The World Economic Forum (2023) *Business and biodiversity: It's time to broaden our focus beyond just climate change*. Available here

[7] The World Bank (2012) Social dimensions of climate change. Available here

[8] Climate adaptation platform (2020) Climate adaptation and mitigation through mangrove conservation in South East Asia. Available here

[9] IPBES (2021) *Tackling Biodiversity & Climate Crises Together and Their Combined Social Impacts*. Available here