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## 2024 IPBES Nexus Assessment Primer

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The [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services](#) (IPBES, sometimes called the [IPCC](#) for biodiversity) will launch the Nexus Assessment – an exploration of the interlinkages between biodiversity, water, food, health and climate change – at its plenary meeting of the organisation’s 147 Member States ([IPBES 11](#)) on [17 December 2024](#) in Windhoek, Namibia. This report is a first-of-its-kind look into the ways that biodiversity, water, food, climate change and human health interact. It explores how crises in these areas impact each other, the hidden and profound costs of addressing them in siloes, and how public policy can respond in a more integrated way.

This report has been prepared by leading international experts through an [extensive review process](#) starting in 2021. Multiple rounds of external and internal reviews have been completed with researchers, Indigenous groups, civil society and businesses. This process will conclude at the plenary with a line-by-line review and negotiation between the Member States to draft the Summary for Policymakers.

**In preparation for the release of the IPBES Nexus Assessment and based on the current report [outline](#), this briefing covers some of the key existing evidence in the publicly available literature on the relationships between these five nexus elements and how they affect each other, as well as policy solutions.**

### 1. Biodiversity preservation is inseparable from climate, food, water and health

**The interlinkages between climate, food, water and health present both opportunities and trade-offs for how we respond to ongoing biodiversity loss.** Consider the fact that [75% of global freshwater supply comes from forested and mountain areas](#) and [tropical forest conservation lowers the costs of water treatment](#), together helping people get access to more, better quality water. Biodiversity can also contribute to the fight against climate change. Mangrove forests, seagrass beds and salt marshes, for example, are particularly [well known for their carbon sequestration abilities](#). Alongside intact reefs, these ecosystems have been shown to [protect against hazards induced by rising sea levels](#).

Conversely, intensive farming and land use change can negatively impact [biodiversity](#), increase emissions and drive [climate change](#). Worsening climate change has been linked to an exacerbation of infectious diseases and thus a degradation of human health. A study of 10 climate hazards resulting from greenhouse gas emissions found that [58% of infectious diseases](#) were at some point made worse due to these hazards. Certain climate change mitigation approaches can have negative consequences on food, water or land use. Some [carbon dioxide removal methods like tree planting](#) can have significant tradeoffs with food production, water and biodiversity. Likewise, [biodiversity is likely to suffer](#) significantly if more croplands are needed for bioenergy without consideration for nature. Addressing these issues and their tradeoffs together makes it more likely that we will [achieve international targets](#) like those set out under the UNFCCC and the Convention on Biological Diversity.

### 2. Integrated solutions can create ‘win-win’ outcomes

**Interventions that support nature can contribute both to climate change mitigation and food security, when properly planned.** Studies on biodiversity hotspots in South America – the [Argentinean](#)

[Dry Chaco](#) and the region's [Atlantic Forest](#) – show that by prioritising restoration areas and methods, it is possible to protect biodiversity, mitigate climate change, support food security and reduce costs.

Protecting nature and restoring ecosystems can also contribute to mitigating climate change and improving human health. For example, restoring 15% of global priority restoration areas would sequester around [14% of emissions](#) since the Industrial Revolution (299 gigatonnes of CO<sub>2</sub>). Taking action on nature also has economic benefits, as economic activity based on nature makes up over [half of global GDP](#), putting macroeconomic stability and livelihoods of much of the world's population at risk if no action is taken.

Place-based conservation approaches – including the Convention on Biological Diversity's [goal](#) to conserve 30% of land, waters and seas by 2030 – create trade-offs with human needs that require management. Actions that take us in the right direction include supporting more places that use [other effective area-based conservation measures \(OECMs\)](#) – areas that sustain biodiversity, particularly those managed by Indigenous Peoples. Another model involves using [efficiency as part of the criteria in determining which areas to protect](#) based on the interrelated impacts on biodiversity, food production and nature-based climate change mitigation.

**The fact that food systems are so deeply intertwined with other elements means that changing food systems can have wide-reaching impacts on multiple issues.** Reducing meat consumption and moving towards healthy, more plant-based diets could also have cascading benefits: improving [human health](#), [supporting biodiversity](#), and reducing agriculture, forestry and other land use ([AFOLU emissions by 45% to 58%](#)). Reducing food loss and waste can help avoid [the 8-10% of CO<sub>2</sub> emissions from this source](#). Of the many efforts needed on the demand side, public procurement guidelines can tackle the nexus of health and food security. For example, the [provision of school meals](#) can help students eat healthy foods, such as beans, increased consumption of which is [recommended as they are both healthy and sustainable](#). On the supply side, encouraging agroecology practices has been shown to [provide livelihood, climate and biodiversity benefits](#). Planting more drought-resistant crops can have the dual benefit of freeing up [freshwater for other purposes](#) and may also in some cases [increase yields](#).

### 3. Our current governance system is bad at solving interlocking problems

**A wealth of literature suggests how to move forward, including [governance frameworks](#) and [institutional arrangements](#) to implement “[nexus thinking](#)” into practical policy changes.** Current governance systems are not equipped to manage [multiple objectives and stakeholder interests](#) at the nexus of climate, food, nature, water and health. Government bodies and institutions [tend to be siloed](#) – dealing with, for example, only agriculture – which can create conflicting goals and tradeoffs.

Without clear planning and coordination, unintended consequences can arise that are not properly assessed and mitigated. For example, research that modelled a stakeholder-driven, integrated multi-sector assessment of policies for Uruguay's top three agricultural exports to see how they affected the energy, water, land nexus, found that [coordination across sectors benefits policy design and implementation](#). In addition, policies and governance often fail to account for elements like population growth and GDP increases that have an indirect impact on biodiversity or climate: for example, since the start of human civilisation, [plant biomass has decreased around twofold](#).

### 4. Redirecting our financial system towards meaningful integrated solutions is a simple but effective solution

Every year, approximately [USD 500 billion](#) of public subsidies are put towards harmful activities like unsustainable agriculture and the production and use of fossil fuels. Average annual international public financing for biodiversity is equivalent to around 1% of that ([USD 4.9 billion bilateral and USD 1.2 billion multilateral flows between 2015 and 2017](#), while an additional average of USD 67 billion was raised and spent domestically). Solutions to address this misalignment include internalising environmental costs or embedding the cost of environmental harms like pollution in the price of goods and services. These costs totalled more than [USD 7 trillion annually in 2015](#) and are likely to have increased in the intervening

decade. New financing options, like [payments for ecosystem services](#), can also become a funding source for conserving nature.

## 5. Prioritising equity and inclusion, particularly for Indigenous People, is non-negotiable

**Marginalised groups and those in lower and middle-income countries are more likely to be exposed to risks created by [climate change](#) and [health](#)**, for example, pointing towards the need for policies that are sensitive to these disparities. Rights-based approaches can help ensure people have [equitable access to food, water and health, within healthy environments](#). In particular, Indigenous groups tend to live in areas with [significant environmental pollution which brings with it exposure to health risks](#). [Ongoing failures](#) to acknowledge Indigenous Peoples' role in conservation and include Indigenous Peoples in conservation projects can lead to severe negative impacts, including the loss of livelihoods and even extrajudicial killings.

**Successful intervention on biodiversity is not possible without the involvement of Indigenous Peoples.** [40% of protected land areas](#) are managed or controlled by Indigenous Peoples, and Indigenous land contains a high number of [well-preserved biodiversity hotspots](#). Indigenous Peoples also support restoration efforts. [Indigenous co-design of restoration projects](#) generally improves the long-term maintenance of these areas. Specific support given to Indigenous Peoples will thus have positive cascading effects.

## 6. Further reading: Explainers and scientific papers

The list below summarises some of the important commentaries and scientific papers. It is not a comprehensive review of the scientific literature; think of it as a start. To explore the specific topics further, please refer to the reference lists within these publications.

### 1. Biodiversity preservation is inseparable from climate, food, water and health

#### Explainers and reports

- [This is what climate change is doing to our fresh water](#) (International Institute for Sustainable Development, 2024)
- [Climate change and agrifood systems](#) (International Food Policy Research Institute, 2023)
- [Enhancing alignment of biodiversity and climate action at COP28 and beyond](#) (Institute for Sustainable Development and International Relations, 2023)
- [Climate change and land](#) (Intergovernmental Panel on Climate Change, 2019)
- [Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services](#) (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019)

#### Selected academic research studies and reviews

- [Impact of climate change and biodiversity collapse on the global emergence and spread of infectious diseases](#) (Journal of Paediatrics and Child Health, 2021)
- [Pollinator deficits, food consumption, and consequences for human health: A modeling study](#) (Environmental Health Perspectives, 2022)
- [The global syndemic of obesity, undernutrition, and climate change: The Lancet Commission report](#) (The Lancet, 2019)
- [The nexus across water, energy, land and food \(WELF\): Potential for improved resource use efficiency?](#) (Current Opinion in Environmental Sustainability, 2013)
- [Trends in global agricultural land use: Implications for environmental health and food security](#) (Annual Review of Plant Biology, 2018)
- [Understanding the role of biodiversity in the climate, food, water, energy, transport and health nexus in Europe](#) (Science of the Total Environment, 2024)

## 2. Integrated solutions create 'win-win' outcomes for nexus issues

### Explainers and reports

- [Understanding the water-energy-food nexus in a warming climate](#) (Carbon Brief, 2019)
- [Agroecological practices support climate change resilience](#) (Zero Carbon Analytics, 2024)
- [The IPBES assessment report on land degradation and restoration](#) (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2018)
- [Protecting climate by protecting nature](#) (International Union for Conservation of Nature, 2018)

### Selected academic research studies and reviews

- [Country-specific dietary shifts to mitigate climate and water crises](#) (Global Environmental Change, 2020)
- [Which practices co-deliver food security, climate change mitigation and adaptation, and combat land degradation and desertification?](#) (Global Change Biology, 2019)
- [Embedding ecosystem services in coastal planning leads to better outcomes for people and nature](#) (PNAS, 2015)
- [Making protected areas effective for biodiversity, climate and food](#) (Global Change Biology, 2023)

## 3. Our current governance system is bad at solving interlocking problems

### Explainers and reports

- [Seeking synergy solutions: policies that support both climate and SDG action](#) (Stockholm Environment Institute, 2024)
- [Integrated land-use planning: From silos to synergies in climate, biodiversity and land](#) (Post 2020 Biodiversity Framework, 2023)
- [An adaptive and context-driven approach to the water, energy and food nexus](#) (European Centre for Development Policy Management, 2021)

### Selected academic research studies and reviews

- [Closing the governance gaps in the water-energy-food nexus: Insights from integrative governance](#) (Global Environmental Change, 2017)
- [Governing for transformative change across the biodiversity–climate–society nexus](#) (BioScience, 2022)
- [Integrated governance for the food–energy–water nexus – The scope of action for institutional change](#) (Renewable and Sustainable Energy Reviews, 2018)
- [Stakeholder participation for environmental management: A literature review](#) (Biological Conservation, 2008)
- [The water-energy-food nexus: An integration agenda and implications for urban governance](#) (Political Geography, 2017)

## 4. Redirecting our financial system towards meaningful integrated solutions is a simple but effective solution

### Explainers and reports

- [Finding economic value in nature beyond carbon](#) (Zero Carbon Analytics, 2024)
- [Why fossil fuel subsidies are so hard to kill](#) (Nature, 2021)
- [The economics of biodiversity: The Dasgupta Review](#) (HM Treasury, UK Government, 2021)
- [Just nature: How finance can support a just transition at the interface of action on climate and biodiversity](#) (Grantham Research Institute on Climate Change, 2022)
- [Increasing returns on investment opportunities by applying a nexus approach](#) (International Union for Conservation of Nature, 2019)
- [Repurposing agricultural policies and support: options to transform agriculture and food systems to better serve the health of people, economies, and the planet](#) (World Bank Group, 2022)

### Selected academic research studies and reviews

- [Biodiversity targets will not be met without debt and tax justice](#) (Nature Ecology & Evolution, 2021)
- [How to pay for saving biodiversity](#) (Science, 2018)

## 5. Prioritising equity and inclusion, particularly for Indigenous People, is non-negotiable

### Explainers and reports

- [Five considerations for a just transition for Indigenous communities and ethnic minorities](#) (Stockholm Environment Institute, 2022)
- [Indigenous people are the world's biggest conservationists, but they rarely get credit for it](#) (Vox, 2021)
- [Indigenous knowledge and values: key for nature conservation](#) (International Institute for Environment and Development, 2021)

### Selected academic research studies and reviews

- [A spatial overview of the global importance of Indigenous lands for conservation](#) (Nature Sustainability, 2018)
- [Considering the needs of Indigenous and local populations in conservation programs](#) (Conservation Biology, 2016)
- [Exploring the nexus: Bringing together sustainability, environmental justice and equity](#) (Space and Polity, 2010)
- [Global patterns of adaptation to climate change by Indigenous Peoples and local communities. A systematic review](#) (Current Opinion in Environmental Sustainability, 2021)
- [The role of Indigenous knowledge in climate change adaptation in Africa](#) (Environmental Science and Policy, 2022)
- [The sustainability assessment of Indigenous and local knowledge-based climate adaptation responses in agricultural and aquatic food systems](#) (Current Opinion in Environmental Sustainability, 2023)