THRIVING ECOSYSTEMS, THRIVING COCOA

How investing in biodiversity today secures tomorrows cocoa

The demand for cocoa is unwavering. Meeting this demand, however, is becoming more and more challenging in times of climate crisis and biodiversity loss.

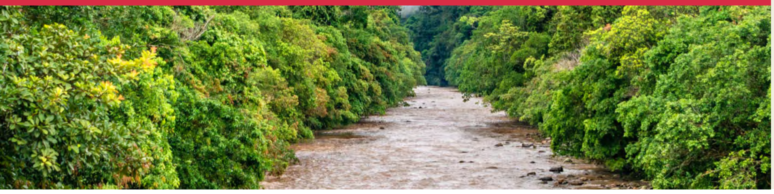
Cocoa expansion, often for full-sun monocultures, has contributed to tropical forest loss across multiple regions, including within protected areas and other high-value ecosystems. When forests disappear, so do many of the ecosystem services that biodiversity-rich regions provide. For instance, cocoa is highly dependent on tiny midge pollinators.

> Shade-rich cocoa agroforests can retain bird diversity levels close to those of nearby natural forests, especially when canopy cover exceeds 30% and tree-species richness is high.[1]

Biodiversity-friendly landscapes with structurally diverse shade, living soils and connected natural habitats tend to deliver more reliable yields and quality[2], and are better able to withstand heat, drought and extreme weather than full-sun monocultures[3].

Halting deforestation and conversion is non-negotiable for climate and biodiversity. The global framework for this is set by the Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework (GBF), which call for the protection and restoration of nature. At EU level, the EU Deforestation Regulation (EUDR) requires companies placing cocoa on the EU market to ensure that their products are deforestation-free and can be traced back to the plot of land where they were produced. This reinforces the ongoing shift toward greater transparency and accountability across the sector. Investing in diversified agroforestry, farmer incomes and landscape governance delivers triple wins: biodiversity, climate resilience and a reliable long-term supply. The result is resilient producer incomes and sourcing security or companies.

WHAT IS BIODIVERSITY AND WHY IT MATTERS FOR COCOA



Biodiversity is the variety of life—from genes to species to ecosystems—and the web of interactions that keep landscapes functioning. It is crucial for all the services agriculture relies on: pollination, nutrient cycling and soil formation, natural pest regulation, water storage and purification, and climate buffering.

The current picture

Where cocoa grows:
Cocoa is cultivated across the humid tropics mainly in Africa, but also Latin America and Asia. A small number of countries provide a large share of supply. Global production is roughly 4–5 million tonnes per year.

Why biodiversity is at risk:
Forest conversion for cocoa, simplification of shade canopies, and high pesticide use reduce habitat complexity, fragment landscapes and degrade soils and water.

Market shift:
Buyers increasingly require deforestation-free, traceable cocoa. Meeting these requirements while improving farmer livelihoods and creating resilient sustainable cultivation systems will determine the sector's future.

Cocoa at risk:
The cocoa supply chain faces a growing crisis, creating major risks for both smallholders and businesses. Drivers include climate change, unsustainable farming systems, and disease pressures such as cocoa swollen shoot virus.

How cocoa production affects biodiversity

Forest conversion and fragmentation:
Replacement of tropical forests and riparian vegetation with cocoa fields reduces species richness and disrupts ecological connectivity and leads to a significant loss of habitat for many species.[4]

Loss of shade and tree diversity:
Cultivation in monoculture with sparse or no shade instead of multi-strata shade reduces habitat for birds, bats, insects and epiphytes; pest regulation and microclimate buffering decline.[5]

Loss of diversity in cocoa varieties:
Loss of diversity in cocoa varieties is caused by factors like the replacement of diverse, native strains with high-yielding, commercial clones, the expansion of monoculture, and the impacts of climate change. This genetic impoverishment increases vulnerability to pests and diseases and reduces the resilience and rich flavour profiles that diverse varieties offer.

Pollination bottlenecks:
Most cocoa varieties rely on insect pollination, primarily by tiny midges. Low litter moisture, limited understory and pesticide exposure can suppress pollinator abundance and fruit set.[6]

Agrochemical pressures:
Routine insecticides and herbicides reduce natural enemies of pests, degrade soils and affect aquatic biodiversity downstream.[7]

WHAT WORKS: BIODIVERSITY-FRIENDLY PRACTICES

The economy plays a key role in implementing the Convention on Biological Diversity (CBD) and the Global Biodiversity Framework (GBF), as businesses are both drivers of biodiversity loss and essential actors in its protection. Through sustainable business models and supply chains, transparent reporting, and nature-positive investments, companies can significantly contribute to achieving global biodiversity goals. The following section provides an overview of measures that can be taken along the whole cocoa supply chain.

On farms (agroforestry design and management)

Maintain diverse shade:
aim for a multi-strata canopy with native and useful trees (timber, fruit, nitrogen-fixing, biomass production, soil cover).

Protect and regenerate trees:
retain remnant forest trees; plant native species; allow natural regeneration where safe; keep standing deadwood where feasible for biodiversity.

Create pollinator-friendly microhabitats:
conserve leaf litter and moist, shaded patches; avoid unnecessary drainage; keep small water bodies and coarse woody debris.

Organic:
Transition to more agroecological and organic cocoa production, apply organic pest control and pruning; avoid chemical controls; prohibit broad-spectrum and highly hazardous pesticides, and never apply pesticides during flowering.

Soil health:
mulch with cocoa husks and prunings; add compost/manure; reduce bare soil with groundcovers; maintain contour planting and infiltration strips to protect streams.

Illustration: Luisa Sirvent

WHAT WORKS: BIODIVERSITY-FRIENDLY PRACTICES

At landscape scale

No conversion of natural forests and other natural ecosystems, High Conservation Value (HCV) and High Carbon Stock (HCS) areas; enforce protection in and around protected areas.

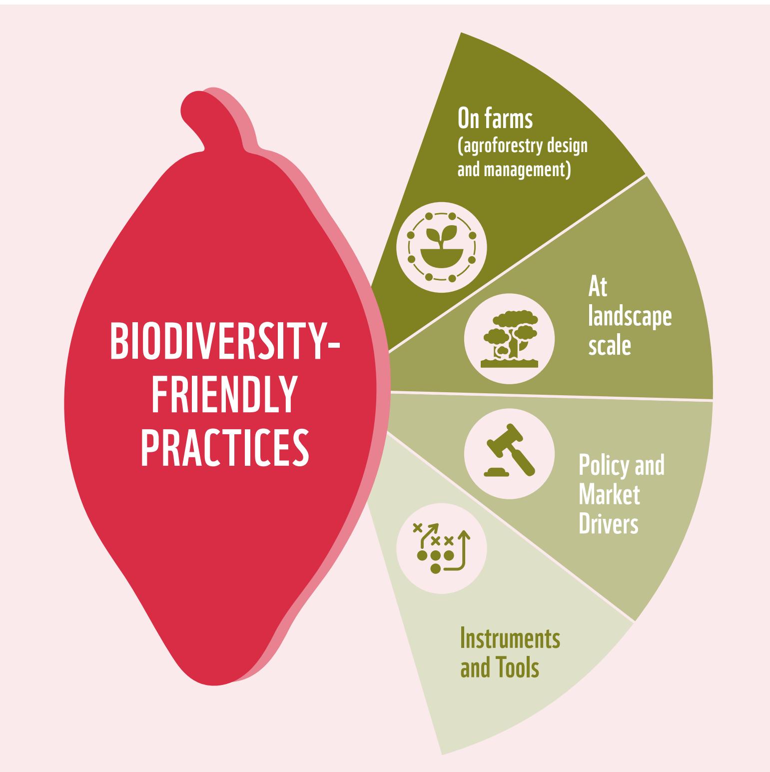
Restore riparian vegetation, corridors and degraded forest patches to reconnect habitats and stabilize microclimates.

Traceability and monitoring:
map farms with polygons; monitor canopy cover and forest loss; verify deforestation-free supply; integrate community-based patrolling and grievance mechanisms.

Policy and Market Drivers

EU Deforestation Regulation (EUDR):
requires geolocation of plots and due diligence to place deforestation-free cocoa on the EU market (with phased application by company size). Align farm mapping, supplier risk assessments and grievance procedures now.

Cocoa and Forests Initiative (CFI):
public-private commitment in Côte d'Ivoire, Ghana and Colombia to end cocoa-driven deforestation and scale restoration.



Instruments and Tools

WWF Biodiversity Risk Filter:
A science-based tool that helps companies identify and manage biodiversity-related risks in their supply chains and investment portfolios. It enables prioritization of actions at farm, landscape and sourcing region levels.

Farm and Landscape Monitoring Platforms:
Tools such as Global Forest Watch for real-time forest monitoring and Trase for supply chain transparency support tracking of forest loss, traceability, and compliance with EUDR requirements.

STAKEHOLDER RECOMMENDATIONS

For companies

- Adopt a **no-conversion policy** and align sourcing with HCV/HCS screening.
- Ensure **polygon mapping**, implement risk-based due diligence, and invest in the **transition to agroforestry and more agroecological cocoa systems** (seedlings, nurseries, extension services, finance).
- Reward **biodiversity-friendly and sustainable cultivation**, for example through price premiums or preferential sourcing.
- **Pay for ecosystem services** such as tree maintenance, riparian buffers and connectivity initiatives, and support living-income strategies that reduce expansion pressure.
- **Engage at the landscape level**, through corporate participation in multi-stakeholder platforms and restoration efforts.
- **Align with EUDR requirements early**, to secure market access and demonstrate leadership on deforestation-free supply.

For governments

- Strengthen **protected area** governance and law enforcement; clarify tree tenure to reward on-farm tree protection.
- Scale **restoration** in cocoa landscapes (native species, riparian buffers, corridors) and align subsidy/credit schemes with biodiversity outcomes.

For producers and cooperatives

- Diversify shade canopies with **native trees**; maintain litter and moist microhabitats; avoid pesticide use and apply organic pest control.
- Track inputs and yields; test small-plot **agroforestry designs** to find locally optimal shade and species mixes.
- Engage in local and national **biodiversity monitoring** programs.

CASE SNAPSHOT: COLOMBIA—FROM THE COLOMBIAN AMAZON TO WORLD

Colombia is not only one of the most biodiverse countries on Earth, but also home to a large selection of fine-flavour cocoa varieties. Cocoa itself originates from the Amazon—one of the planet's most biodiverse rainforests. At the same time, Colombia has endured decades of armed conflict.

Cocoa cultivation has emerged as a productive alternative to coca cultivation that not only provides legal economic income, but also reduces pressure on forests, and contributes to the implementation of the peace agreement.

In the project, Amazon Cocoa & Peace nine cocoa associations, supported by WWF and ALISOS, produce fine-flavour cocoa under sustainable practices in diversified agroforestry systems across the departments of

1_Guaviare, 2_Caquetá and

3_Putumayo.

The project "Cocoa for Conservation" advocates for biodiversity-friendly cocoa farming in Colombia and promotes the exchange between the cocoa associations and European companies.

WHAT WE SEE

Wildlife monitoring, carbon storage and livelihoods

The project Amazon Cocoa & Peace* provides a tangible example of how biodiversity-friendly cocoa can be grown while contributing to landscape restoration and creating secure and diversified incomes for farmers. Cocoa-based agroforestry can store significant carbon while remaining economically viable since diversified trees and crops offer additional income streams.

To monitor biodiversity, the cocoa cooperatives take individual measures in these three departments, focusing on bird species and other fauna and flora. In addition, the basis for key performance indicators to monitor biodiversity at farm and landscape level will be developed.

Governance link and market access

The project arises in response to the commitments established in the 2016 Peace Agreement between the Colombian Government and the FARC, specifically the points related to comprehensive rural reform and the solution to illicit drugs. Additionally, Colombia's Zero-Deforestation Cocoa commitment (Iniciativa Cacao, Bosques & Paz (CB&P)) align producers, companies and government on deforestation-free production and restoration.

The activities are supplemented by the project "Cocoa for Conservation: Strengthening deforestation-free and nature positive supply chains"**. The project advocates for biodiversity-friendly cocoa farming in Colombia to be promoted and embedded in policy, for example through a national law on agroecology. WWF is also advocating for the Colombian government to include the cocoa sector in its biodiversity strategies and action plans (NBSAPs) for the Global Biodiversity Framework (GBF) and the Convention on Biological Diversity (CBD). In addition, the basis for key performance indicators to monitor biodiversity at farm and landscape level will be developed for Colombian cocoa cultivation. WWF is committed to promoting exchange between cocoa associations and European companies as well as pointing out opportunities for a sustainable cocoa supply chain to European companies.

ENDNOTES

1 Bennet et al. (2021). *Impact of cocoa agricultural intensification on bird diversity and community composition.* Conservation Biology

2 Edelstein et al. (2025). *Effects of functional diversity on ecosystem services in cocoa agroforestry systems.* Frontiers in Sustainable Food Systems.

3 Niether, W. et al., 2018. *Shade trees and tree pruning alter throughfall and microclimate in cocoa (Theobroma cacao L.) production systems.* Annals of Forest Science.

4 Kalischek, N. et al., 2023. *Cocoa plantations are associated with deforestation in Côte d'Ivoire and Ghana.* Nature Food.

5 Niether, W. J. et al., 2020. *Cocoa agroforestry systems versus monocultures: a multi-dimensional meta-analysis. Environmental Research Letters.*

6 Lander, T.A. et al., 2025. *Global chocolate supply is limited by low pollination and high temperatures.* Communications Earth & Environment.

7 Wainaina, P. et al., 2021. *A review of the trade-offs across different cocoa production systems in Ghana.* Sustainability.

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