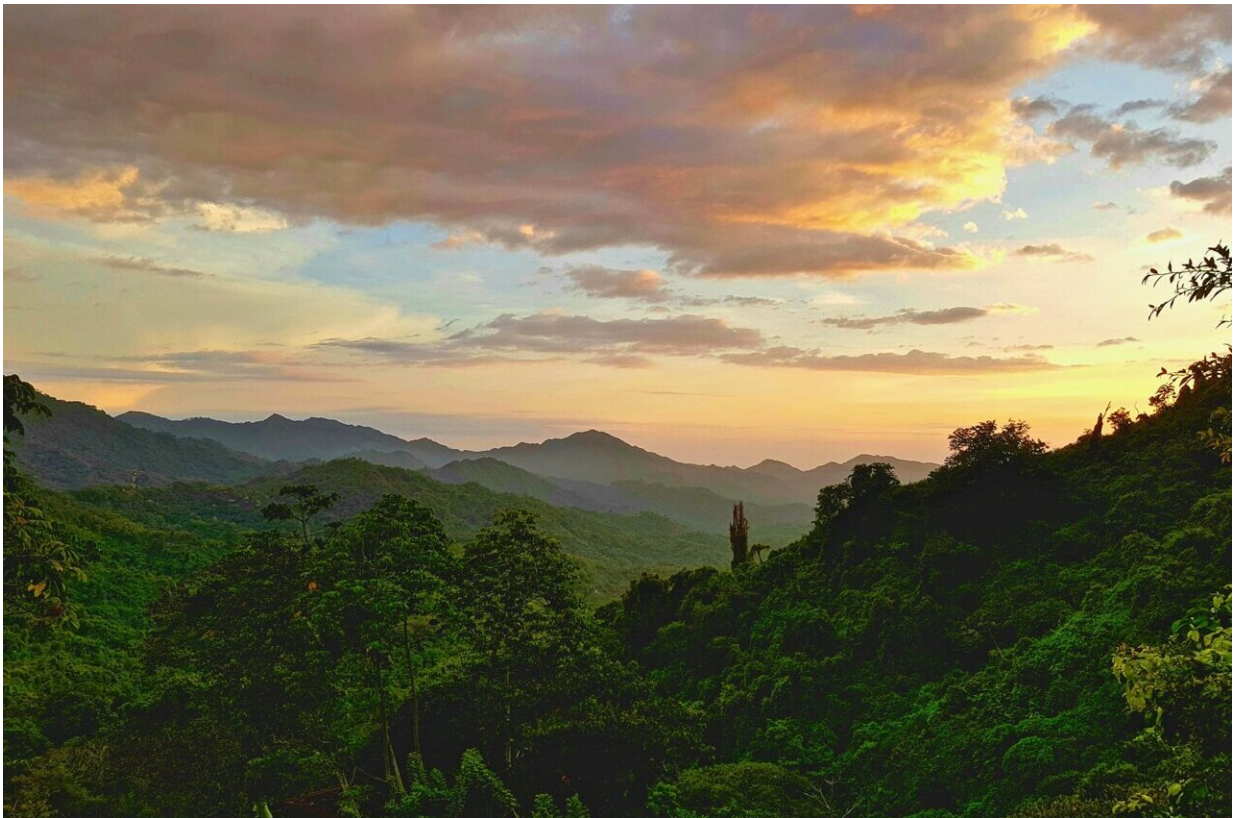


Colombia, a biodiversity hotspot, holds lessons for other countries trying to balance development with conservation

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Minca, Santa Marta, Magdalena, Colombia. Credit: Unsplash/CC0 Public Domain

Plants and animals do not respect legal boundaries, oblivious to the

policies that govern different jurisdictions. A new Stanford-led study highlights how policies in forestry, agriculture, and other sectors can fit together to govern biodiversity in a more coordinated and effective way. Published Feb. 6 in *Nature Ecology & Evolution*, the first of its kind analysis focuses on Colombia, one of the world's most biodiverse countries, finding that biodiversity is governed by almost 200 distinct policies that cover a variety of ecosystems, conservation approaches, scales, actors, and threats.

"We were surprised to see that biodiversity is governed by policies that aim to do many other things, such as alleviating poverty and ending civil conflicts," said lead author Alejandra Echeverri, a postdoctoral researcher at the Stanford Natural Capital Project.

Home to approximately 10% of the world's species, Colombia has the most birds of any country. It is also rich in [cultural diversity](#) with more than 170 Indigenous and ethnic groups who manage about a quarter of the land and waters there. The country's biodiversity faces pressing threats from farming, mining, and [invasive species](#), making it an ideal place to study how policies interact to govern biodiversity.

Tragedy of the commons

In Colombia and elsewhere, conserving biodiversity is a tragedy of the commons—its importance is widely recognized, but it is not the responsibility of one single agency. For that reason, species and ecosystems are governed through a mix of conventional policies like protections against certain activities in [natural areas](#), financial sanctions for polluting waterways, and corporate pledges, like cattle ranchers' promises to conserve forests.

The researchers analyzed nearly 200 biodiversity-related policies issued by government agencies, Indigenous peoples and [local communities](#), and

other actors in Colombia over the past six decades. They spanned instrument types, such as [economic incentives](#), taxes, and endangered species lists.

Over time, more actors and sectors have been added to the governance mix. For example, as the country has developed, policies that seek to end poverty and combat the ongoing civil war have incorporated [biodiversity conservation](#) as a secondary goal.

The researchers found policy gaps in the governance of invasive species, which contributed about 8% of the overall threat to national biodiversity, but less than 2% of the policy mix. They also found that relative to other topics, there are fewer policies that target the [illegal wildlife trade](#). Invasive species, such as the hippos introduced by drug kingpin Pablo Escobar, deplete local fisheries and jeopardize livelihoods by outcompeting native species. Unique species, such as parrots, macaws, and dart frogs, are traded illegally, which can decimate their numbers and drive them to extinction.

While the researchers found the [private sector](#) and banks that fund non-commercial development projects have become increasingly involved in biodiversity-related policymaking, they have largely avoided initiating such policies.

Focusing on policy mixes

Among the key takeaways: biodiversity-related policies can become increasingly difficult to coordinate as, over time, more policies get added and more actors take leadership roles. Adding new biodiversity goals without abandoning previous ones might create confusion. For example, there are policies that ban mining while others allow for mining as long as compensation for [biodiversity](#) happens elsewhere. As new sectors are added, this study points to the need for broader coordination across

sectors and actors.

"Discussions on environmental governance often focus on single policies," said study senior author Eric Lambin, the George and Setsuko Ishiyama Provostial Professor at Stanford and senior fellow at the Stanford Woods Institute for the Environment. "Our research demonstrates the importance of focusing instead on policy mixes: how multiple public and private interventions interact to reinforce or undermine each other, and may leave policy gaps despite their proliferation."

More information: Alejandra Echeverri, Colombian biodiversity is governed by a rich and diverse policy mix, *Nature Ecology & Evolution* (2023). [DOI: 10.1038/s41559-023-01983-4](https://doi.org/10.1038/s41559-023-01983-4).
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