

Biodiversity COP risks failure without global leadership

As the COP15 biodiversity summit opens, it's clear more must be done to protect nature – but money and top-level support are lacking.

The Paris climate agreement, signed in December 2015, ranks as one of the most momentous global treaties ever negotiated, setting a crucial goal to seek to limit warming to 1.5–2 °C above pre-industrial levels. At the time, the opening ceremony of the COP21 climate-change conference that led to the agreement also held the record for the largest number of world leaders ever to attend a United Nations event in a single day – more than 150. The two things are probably more than coincidence.

Now biodiversity is hoping for its Paris moment. The long-delayed COP15 conference, starting on 7 December in Montreal, Canada, aims to seal a bold new international deal committing countries to precise targets to curb species loss and to protect and restore nature.

Many factors suggest the time is ripe. The problem of biodiversity loss is more prominent than ever before. As ecologist Sandra Díaz wrote in *Nature* last week, researchers have assembled the strongest evidence base yet ahead of COP15, the Fifteenth Conference of the Parties to the Convention on Biological Diversity (S. Díaz *Nature* 612, 9; 2022). Initiatives such as the Dasgupta Review, commissioned by the UK government, have made plain that the protection of biodiversity is an economic necessity (see go.nature.com/2om5hho).

There is also much greater public awareness of how pollution and habitat destruction threaten the health of ecosystems on which we depend for food, clean water and disease prevention, and a better understanding of nature's crucial role in mitigating climate change – for example, by storing carbon in soils and trees – as well as in helping us to adapt to its impacts. Mangrove forests, for instance, are hugely effective in stopping influxes of seawater from tsunamis and sea-level rise.

But when it comes to getting stalled negotiations motor-ing again, the scale of support by world leaders that was a feature of climate's road to Paris is currently lacking.

Change cannot come too soon. Nature is on the brink. Of 20 decadal targets to preserve nature that were set in Aichi, Japan, in 2010, not a single one had been fully met by 2020. That, coupled with underfunding and lack of regard for the rights of Indigenous peoples who steward much of the world's remaining biodiversity, means more species than ever are at risk of extinction. Serious impacts on human wealth and health from biodiversity loss loom

ever larger. Yet over the past three years, four difficult rounds of negotiations aiming to agree on a framework to replace Aichi have not yielded results. Hundreds of issues remain unresolved.

Many experts worry that the lacklustre progress made at COP27, the climate summit held last month in Sharm El-Sheikh, Egypt, augur badly for the biodiversity meeting. But there is also reason for hope. The agreement made at COP27 to establish a 'loss and damage' fund to compensate low- and middle-income countries (LMICs) for climate impacts indicates that richer nations are open to talking about funding, which has also been a major sticking point in biodiversity negotiations.

Global funding for biodiversity is severely in the red. A UN estimate published last week suggests that only US\$154 billion per year flows to 'nature-based solutions' from all sources, including government aid and private investment – a number the UN says needs to triple by 2030. Many LMICs – which are home to much of the world's remaining biodiversity – would like rich nations to put fresh finance into a new multilateral fund. One option is that such a fund could compensate LMICs for biodiversity loss and associated damages driven by the consumption of products in rich nations through international trade.

A second major sticking point is how to fairly and equitably share the benefits of digital sequence information – genetic data collected from plants, animals and other organisms. Communities in biodiversity-rich regions where genetic material is collected have little control over the commercialization of the data, and no way to recoup financial or other benefits. A multipurpose fund for biodiversity could provide a simple and effective way to share the benefits of these data and support other conservation needs of LMICs.

Another reason to hope for a breakthrough is the forthcoming change in Brazil's leadership. Conservation organizations such as the wildlife charity WWF have accused the world's most biodiverse nation of deliberately obstructing previous negotiations, holding up agreement on targets such as protecting at least 30% of the world's land and seas by 2030. But Brazil's incoming president, Luiz Inácio Lula da Silva, has signalled that the environment is one of his top priorities. Although he does not take over until January 2023, he is thought to be sending an interim team of negotiators to Montreal.

All negotiators face a Herculean task to get a deal over the line at COP15, with many issues in the text still unresolved and contested. What's needed above all is global leadership to empower national negotiators to reach a strong deal, including a new fund of some kind for biodiversity. More than 90 heads of state and heads of government have signed a pledge to tackle the nature crisis. At the time of writing, only Justin Trudeau, the host nation's prime minister, has confirmed that he is to attend in person.

The no-shows send the wrong signal. It's also true at the time of writing that neither Canada nor China – the original intended host of COP15 and still the meeting's chair – has issued formal invitations. But leaders have regularly attended climate COPs for more than a decade. This shows

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in the ambition of climate agreements, if not in their implementation. Research communities and civil society must continue to pressure leaders to engage similarly with the biodiversity agenda. Otherwise, the world risks failing to grasp this opportunity to secure the kind of ambitious deal that nature – and humanity – desperately needs.

How to make an economy circular

Changing our wasteful way with resources will require input from governments, businesses and research.

Producing a laptop computer that weighs a few kilograms takes around one tonne of raw metal, plastic and silicon. Between 2000 and 2015, global clothing production doubled, but the number of times the average garment was worn before being discarded decreased by 36%. The body of a modern car contains more than a dozen steel and aluminium alloys, putting up huge barriers to recycling it.

These are just three of many stark statistics that illustrate the wastefulness of our current ‘linear’ economic model, which is based on extracting virgin resources, processing them, consuming them and dumping them when they are no longer useful. This unsustainable approach is bad for the climate, for nature and for human health – and ultimately hits us in the wallet. One estimate by the global consultancy Accenture in 2015 suggested that US\$4.5 trillion of extra value could be unlocked by creating products using ‘waste’ as a resource.

That is the grand vision of a ‘circular economy’, in which materials are recirculated and maintain the highest value possible, and as much waste as possible is eliminated. As detailed in a series of editorials this year and in a *Nature Outlook* on the circular economy published last month (see go.nature.com/3uctjyc), innovations in materials and processes are making circularity a more realistic proposition in many sectors. Many businesses are making enthusiastic noises, too, scenting both new revenue streams and a public-relations win.

Yet practical implementations of circular principles so far amount to tinkering at the edges. Some serious thinking is needed about what must happen to make circularity a universal guiding principle. The answer is: a lot.

Some places are ahead of the game. China has been adopting circular-economy policies since the late 2000s. Its latest iteration of a circular-economy action plan, valid until 2025, sets ambitious targets for using scrap steel and construction waste, among other refuse. Its ban on importing plastic and other waste, implemented in 2018, has forced countries to rethink their own waste strategies.

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The European Union announced a circular-economy action plan in 2020, and is looking towards implementing policies around substantiating sustainability claims by business, controlling packaging and incentivizing the use of recycled materials in manufacturing. Chile’s road map for a circular economy by 2040 involves targets for waste reduction and the creation of more than 100,000 jobs.

And there are smaller-scale, sector-specific initiatives. Since 2009, Japan has required manufacturers to collect and recycle the large home appliances that they make, although the costs are mostly borne by consumers. In Kawasaki, reusing industrial and municipal waste to make cement has caused greenhouse-gas emissions to fall by about 15% since 2009, saving 272,000 tonnes of material each year.

Such success stories must be learnt from, and governments across the world must implement legislation and regulations to incentivize investment in circularity. But there’s more to it than that. Circularity requires a complete rethink of our perception of resources – and how we build our economic activities around them.

Circularity can only work if the link between a company producing more stuff and making more money is broken. Businesses need to be designed from the start (or redesigned) to be circular. The inherent value in resources needs to be recognized – for example, by dismantling and repurposing mobile phones or laptops for markets in which the latest models are not required. Price structures need to change to incentivize the production of items that can be usefully reused – so that resources retain their value through more than one cycle of use.

Governments and international authorities must underpin this with serious conversations about how to mandate standardization without stifling innovation. For example, electric-vehicle batteries aren’t interchangeable, creating a huge problem for their disassembly and reuse. The Battery Passport initiative, instigated by the World Economic Forum, aims to address this by establishing a circular model for battery use by 2030.

The circular economy can itself be a wellspring of innovation. There are big opportunities for innovators to create businesses that offer solutions, whether software that helps others to make the shift to circularity, or companies that offer services for rental and return, rather than purchase and disposal: car-sharing, rather than car ownership, for instance. That transition isn’t going to be easy. There will be hurdles to overcome, including refurbishment costs and setting fair leasing prices.

Last but not least, basic science has a part to play. As the father of the circular-economy idea, Walter Stahel, wrote in *Nature* in 2016, “Excellence in metallurgical and chemical sciences is a precondition for a circular economy to succeed” (W. R. Stahel *Nature* **531**, 435–438; 2016). Ultimate recyclability lies in learning how to disassemble materials at the atomic level, splitting up molecules to recycle atoms. Funding agencies should be scanning the horizon for promising approaches, in areas from metal alloys to plastics.

There’s a lot to do to get the wheels of the circular economy truly turning. The movement has started – but it must accelerate.