

Biodiversity: what China's researchers can show the world

As China prepares to take on a crucial role in the governance of global biodiversity, its researchers need to be at the table.

Last week, the United Nations confirmed that the world has failed, again, to achieve its goals to protect nature. This grim conclusion was delivered in the fifth edition of the United Nations Global Biodiversity Outlook report.

The report from the UN Convention on Biological Diversity reviewed progress towards 20 biodiversity targets that the convention's participating countries set for themselves in Aichi, Japan, a decade ago (www.cbd.int/gbo).

None of the targets, which include making progress towards the sustainable harvesting of fish, controlling the spread of invasive species and preventing the extinction of threatened wildlife, will have been achieved by the deadline at the end of this year.

This is no time for regret or apology, but for urgency to act. Last year, an analysis by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services revealed that some one million plant and animal species are at risk of extinction. And the wildlife charity WWF's latest Living Planet Index, published earlier this month (see go.nature.com/32wzvdz), was similarly sobering, stating that vertebrate populations monitored between 1970 and 2017 have declined by an average of 68%.

All nations must do more, but some of the greatest responsibility now rests on the shoulders of China: the nation, along with the leaders of the UN biodiversity convention, will jointly host the next Conference of the Parties (COP) in Kunming next year. That summit, originally scheduled for this year, is where biodiversity targets for the next decade must be set.

As we have written before, the previous targets were destined to fail, in part because their format made progress hard to measure, and because countries did not need to report on what they were doing. This must now change. The targets, furthermore, need to be more closely aligned with the UN System of Environmental Economic Accounting, which is becoming the global standard for environmental reporting. Without these changes, the next set of biodiversity targets will almost certainly fail again.

At the same time, China's biodiversity scientists and policy researchers should be at the table, too, as plans for Kunming start to take shape. The country has decades of experience of studying how to – and how not to – balance

economic development with controlling species and ecosystems loss. The world needs to hear these stories, in all their complexity.

Learn from China

The Global Biodiversity Outlook report confirms that known species are on an accelerated path to extinction, with cycad and coral species among the groups most at risk. The report shows that, although deforestation has slowed in the past decade, forests are still being splintered by agriculture, tree-felling and urban growth. Such fragmentation will further harm biodiversity and increase carbon emissions.

Demand for food and agricultural production continue to be the main drivers of biodiversity loss. And governments are not helping. On average, they invest some US\$500 billion per year in initiatives that harm the environment – eclipsing financing for biodiversity projects by a factor of 6, the report says.

China has a set of experiences that could help the world learn valuable lessons. Its rapid economic growth lifted a generation out of poverty; however, this created a cascade of environmental problems, not least elevated pollution in the air and on land. People in China rightly questioned their leaders for underestimating – if not downplaying – the environmental and social impacts of its industrialization. Partly in response, China's authorities have been working with researchers from China and around the world to chart a greener way forward.

For example, national and local administrations have been devising and experimenting with environmental targets, and creating mechanisms for monitoring and reporting progress towards them – albeit with mixed success.

China's national biodiversity strategy includes creating what it calls 'redlines' – areas where human activities are restricted to protect biodiversity – across the country.

Then there's China's US\$6-trillion Belt and Road Initiative – a massive programme to build roads, ports and infrastructure, which will run through natural habitats across Asia, Europe and Africa. Much of this investment did not initially come with safeguards to mitigate environmental risks – but these are now being actively studied.

And last but not least, China has a large community of researchers working to quantify, in monetary terms, the value of natural capital and ecosystem services, so that people and policymakers can more clearly understand that nature's services to people do not come for free.

On 30 September, heads of governments will meet at the UN for a day of talks on biodiversity, ahead of next year's Kunming COP. *Nature* spoke to a number of representatives of national delegations who plan to attend this meeting, including researchers and non-governmental observers. All want the Kunming COP to succeed in bringing nations together and reaching an agreement on targets that are measurable and meaningful. But they expressed concern over the limited public engagement from China's government about its goals or strategy for Kunming – and the relatively limited involvement of its researchers in the process so far.

Scientists in China have been central to their country's

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conservation and economic-development journey. Their collective experience on what works, and what doesn't, can provide important learning opportunities for countries as they look to slow down and eventually reverse biodiversity and ecosystem loss. These researchers are in the academy of sciences; in universities; in the academy of environmental planning; and in the community of Chinese and international non-governmental organizations.

Many are also active in the China Council for International Cooperation on Environment and Development, an organization located in both Canada and China, which last week concluded a two-day conference presenting its latest research outputs. This important but little-known advisory body, now nearly three decades old, has been instrumental in connecting China's environmental-science and environmental-policy communities with international counterparts.

Next year will be the first time that China has hosted an international environmental meeting – similar to the 2015 Paris climate accords – where the stakes are too high to fail. It must draw on its rich diversity of talent and experience. Other nations' researchers must be equally forthcoming with their knowledge. All sides must put aside political differences to agree on ambitious targets, ways to achieve them and methods to measure that progress.

The best way to preserve and revive biodiversity is to acknowledge where we've all failed it before, to learn from that and to try again, together.

The education revolution must be equalized

The switch to online learning risks widening educational inequalities.

Every day, hundreds of millions of students, teachers and support staff, are participating in a learning revolution: the COVID-19 pandemic has upended the centuries-old tradition that students travelled to a physical institution to learn. Now, in many places, school and university classrooms are on laptops and smartphone screens, and the Internet has replaced physical books.

It's been an extraordinary – and extraordinarily fast – transition, affecting everyone from the youngest children entering school right up to young adults in universities. Researchers are starting to study its full impact and its implications – for students, for staff and for the organizations that create and supply educational-technology platforms.

Tertiary education has been venturing into online education for some time. Long before the pandemic, universities

around the world were offering massive open online courses (MOOCs) as a supplement to face-to-face teaching and learning. Now, as online courses become more central to university teaching, it will be important to rigorously assess the impact of this change.

We already knew that this educational revolution presents significant risks. Before the pandemic, countries were making good progress towards ensuring that by 2030 children would at least complete a primary-school education – one of the few United Nations Sustainable Development Goals potentially within reach. That might no longer be the case – a prospect that should worry us all.

As of this week, a staggering 850 million children and young adults – half of those enrolled in schools, colleges and universities worldwide – are not in education or training because of COVID-19, according to the UN science and education organization UNESCO. The agency is also tracking closures of schools up to secondary level daily and, although schools are reopening in many places, they remain closed in 52 countries.

The majority affected are in the southern half of the globe, encompassing many low- and middle-income countries. That means that students there are much less likely to be taking part in the online revolution. Internet penetration in this hemisphere is low – and some 360 million young people do not have access, according to the International Telecommunications Union. Many countries are using terrestrial television and radio to broadcast lessons as a lower-cost alternative to broadband.

While the pandemic continues, reopening educational institutions in poorer parts of the world – including deprived areas in high-income countries – is often not possible. Overcrowding prevents social distancing, and funding isn't available to make schools COVID-19 secure.

All this means that students from the poorest families, without Internet access, are more likely to be denied education – widening already deep educational inequalities. Because education is strongly linked to later jobs, income and health, setbacks now will last a lifetime.

In universities, the transition to online education is enabling institutions to reach out to students from under-served areas and under-represented communities. But paradoxically, if children from these communities are unable to access earlier schooling, fewer will be able to proceed to higher education.

The pandemic will force a large number of institutions will remain closed, and online learning will substitute for the real thing. But if broadband and laptops are the equivalent of the teacher, the library and the laboratory, it cannot be acceptable that these are available to only a fraction of students.

If online education is to become more inclusive, public educational institutions – and those that fund them – must do more to ensure that more learners can benefit from new technologies. That includes prioritizing access to broadband, smartphones and laptops – something that is increasingly affordable in many countries.

It's a small price to pay now for an educated and resilient population decades down the line.



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