

RIO REPORT CARD

The world has failed to deliver on many of the promises it made 20 years ago at the Earth summit in Brazil.

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The tropical air was charged with hope and despair as the world's leaders descended on Rio de Janeiro for the United Nations' Earth summit in May 1992. Countries were buoyed by a string of successful environmental treaties in the 1970s and 1980s, capped by a landmark deal to save the ozone layer in 1987. Yet the Earth summit in Rio, which drew 178 nations and around 100 heads of state, was also rife with frustration and distrust. Diplomats had spent the previous two years drafting a pair of treaties intended to safeguard Earth's biodiversity and climate, but the talks had recently faltered as rich and poor countries split over who should pay for protecting the planet.

In the end, the leaders decided that they could not go home empty handed. They signed off on both the Convention on Biological Diversity and the Framework Convention on Climate Change, making broad pledges to solve some of the most complex problems facing humanity. Countries also agreed to a laundry list of goals spelled out in a document known as Agenda 21, which eventually spawned the Convention to Combat Desertification. Although the agreements lacked teeth, they created formal international processes that engaged almost the entire world and eventually led to more targeted accords (see 'Global awakening').

At the end of the summit, Richard Benedick, who had negotiated the ozone accord for the United States, told *The New York Times* that "the history books will refer back to this day as a landmark in a process that will save the planet from deterioration". But he and others warned that progress would not come quickly.

The pace turned out to be far slower than anticipated, however. Although nations have made some marginal advances, the three conventions have failed to achieve even a fraction of the promises that world leaders trumpeted two decades ago. Dismal grades dominate *Nature's* report cards on the Rio treaties, although the assessment also highlights some progress and offers pointers for the future. As diplomats and leaders prepare to converge on Rio this month for the UN Conference on Sustainable Development, or Rio+20, they will be looking back to consider how to do better.



RETURN TO RIO

For Earth Summit news:
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CLIMATE OF INACTION

The climate numbers are downright discouraging. The world pumped 22.7 billion tonnes of carbon dioxide into the atmosphere in 1990, the baseline year under the UN Framework Convention on Climate Change. By 2010 that amount had increased roughly 45% to 33 billion tonnes. Carbon dioxide emissions skyrocketed by more than 5% in 2010 alone, marking the fastest growth in more than two decades as the global economy recovered from its slump. And despite constant deliberations under the convention, the overall growth rate of global emissions hasn't changed much since 1970 (see 'Report card: UN Framework Convention on Climate Change').

"Plausibly we are a little better off than if we didn't have all of this diplomacy," says David Victor, director of the Laboratory on International Law and Regulation at the University of California, San Diego. "But the evidence is hard to find."

Ratified by 194 countries plus the European Commission, the treaty sought to stabilize emissions at a level that would "prevent dangerous anthropogenic interference with the climate system". Although there were no specific targets, wealthy countries agreed to take the lead and help poor countries with monetary and technological aid. In 1997, negotiators followed up with the Kyoto Protocol, which entered into force in 2005 and committed industrialized countries to reduce their collective emissions of all greenhouse gases by 5.2% (compared with 1990) by 2012.

Overall, industrialized countries are on track to surpass the Kyoto goal with a reduction of some 7%, but this is largely due to the demise of the Soviet Union and its inefficient factories, as well as to the industrial slump caused by the recent economic crisis, which is starting to reverse. The United States, the developed world's largest greenhouse-gas producer, never ratified the protocol and increased its greenhouse-gas output by 11% between 1990 and 2010. In the meantime, developing countries more than doubled their emissions, increasing their share of the global total from 29% to 54%.

In spite of the failure to rein in emissions, the climate treaty has performed better on many lesser goals. The international process it spawned encouraged investment in climate science and provided a venue for scientists and policy experts to showcase their work. Periodic scientific reports by the Intergovernmental Panel on Climate Change (IPCC) underpinned each major round of treaty talks. The negotiations also helped to raise awareness of climate change across the globe. Governments began working on climate adaptation, sustainable agriculture and reducing tropical deforestation, and Kyoto sparked experimentation with carbon markets and new ways of transferring money and technology to poor countries.

But on the core challenge of overhauling the global energy industry and reducing emissions, the questions remain the same 20 years later: who must do what and who pays?

The original treaty introduced the notion of "common but differentiated responsibilities", with a heavier burden on wealthier countries, historically responsible for the largest share of greenhouse-gas emissions. That concept was put into practice through the Kyoto Protocol, when industrialized countries agreed to reduce emissions and provide aid to developing countries, which took on no formal obligations. But as the world changed and the proportion of emissions increasingly shifted towards developing countries, the treaty remained static.

The result has been a prolonged stand-off, with poor nations demanding that their wealthy neighbours do more and industrialized countries increasingly concerned about skyrocketing emissions among the rapidly emerging economies. In particular, the United States balked at the idea of moving forward without China, which is now the world's largest emitter, whereas China cited its lower per-capita emissions in questioning whether the United States is doing enough. Negotiators wrestled with those issues at the 2009 climate summit in Copenhagen, where China, Brazil, South Africa and other major developing countries promised for the first time to reduce emissions. Last December in Durban, South Africa, countries agreed to negotiate a new global climate treaty by

REPORT CARD

UN FRAMEWORK CONVENTION ON CLIMATE CHANGE

MAIN ASSIGNMENT

STABILIZE GREENHOUSE-GAS EMISSIONS

F

OTHER ASSIGNMENTS

TRACK GREENHOUSE-GAS EMISSIONS AND SINKS

The climate convention has helped to create national inventories of greenhouse-gas emissions, land-use trends and carbon uptake by forests.

A

PROMOTE AND DISPERSE CLIMATE-FRIENDLY TECHNOLOGIES

The Clean Development Mechanism allows industrialized countries to offset their emissions by paying for clean energy and other projects in developing countries, but the programme has been limited in both reach and effectiveness.

D

PROMOTE SUSTAINABLE LAND MANAGEMENT

The climate talks have encouraged efforts to advance sustainable agriculture and reduce tropical deforestation.

C

PREPARE FOR THE IMPACTS OF CLIMATE CHANGE

Many of the 194 countries that are party to the convention have only recently begun formulating plans to prepare for a warmer world.

C

ADVANCE CLIMATE RESEARCH AND POLICY ANALYSIS

The UN process has encouraged investments in climate science, energy technologies and social sciences.

A

ESTABLISH A DIPLOMATIC PROCESS

The annual 'Conference of the Parties' to the climate convention, or COP, has become an international roadshow for professional climate diplomats.

A

2015 that would include formal commitments from both developed and developing countries.

Climate negotiators will gather in Doha, Qatar, in November to begin the process of designing that new treaty, but scepticism remains. "The only way we are going to achieve significant emissions reductions is through technology," says Barry Brook, director of climate-change research at the University of Adelaide's Environment Institute in Australia. The fundamental barrier is the cost of clean-energy alternatives, he says. "A lot of this can't be driven by an international process."

Some argue that the climate talks might be more fruitful if the focus were on securing agreement within groups of major economic powers such as the G20, which is responsible for more than 80% of global emissions. But even if the cacophony of voices in the UN negotiations makes progress difficult, many believe that the process has helped to inspire countries, local governments and even corporations to tackle the issue of climate change in a more serious way.

"What we have today is nowhere near what the science says we need," says Manish Bapna, acting president of the World Resources Institute in Washington DC. "But is it closer than we would have been in the absence of climate negotiations? I would say the answer is an unequivocal yes."

BIODIVERSITY ON THE SIDELINES

“Let us have the courage to look in the eyes of our children and admit that we have failed.” That stark message came from Ahmed Djoghlaif in October 2010, when he addressed the 193 parties to the Convention on Biological Diversity (CBD) at a summit in Nagoya, Japan. As executive secretary of the CBD at the time, Djoghlaif lamented that countries were nowhere near to meeting the treaty’s chief goal of “significantly” cutting species loss by 2010 (see ‘Report card: Convention on Biological Diversity’). Instead, he said, “we continue to lose biodiversity at an unprecedented rate”.

Some 30% of amphibians, 21% of birds and 25% of mammal species are at risk of extinction, according to the International Union for Conservation of Nature (IUCN) based in Gland, Switzerland. The CBD has failed to slow the problem, say biodiversity scientists, because it did not set concrete and focused targets, and it provided no means to measure progress towards protecting wildlife and ecosystems.

At the Nagoya meeting, countries agreed on a set of 20 goals — the Aichi targets — which include halving the rate of loss of natural habitats, one of the biggest threats to biodiversity, by 2020. Another target seeks to protect 17% of the world’s land area in nature reserves by 2020. In addition, the CBD parties put money towards developing better indicators for measuring progress.

The 20 Aichi targets are a step in the right direction but they still miss the mark, warn scientists and conservationists. “The Aichi targets are still not very focused and they add no obligations on countries to comply with them. There is an unwillingness among countries to accept obligations,” says Stuart Harrop, a wildlife-management lawyer and director of the Durrell Institute of Conservation and Ecology at the University of Kent in Canterbury, UK.

Another long-standing problem with the CBD has been that it lacked a dedicated body, similar to the IPCC, that would provide scientific advice and help it to define quantifiable targets. The CBD gained an equivalent scientific arm only two months ago, when the Intergovernmental Platform on Biodiversity and Ecosystem Services was launched. “It has not been a science-based convention,” says Anne Larigauderie, a plant ecologist and executive director of DIVERSITAS, an international biodiversity research programme headquartered in Paris.

In addition, countries lack the observational infrastructure to track the state of their national biodiversity. The CBD currently relies on data compiled by conservation groups, including the IUCN’s Red List of threatened species. Poor investment in observation systems means that there are still large gaps in the data on local and global biodiversity, says Larigauderie.

Lack of funding for biodiversity conservation has also constrained progress, says Cyriaque Sendashonga, a zoologist and director of global policy at the IUCN. In Nagoya, countries agreed to report on their biodiversity spending at the CBD summit this October in Hyderabad, India. They will also discuss ways to boost spending, including redirecting

REPORT CARD CONVENTION ON BIOLOGICAL DIVERSITY

MAIN ASSIGNMENT

REDUCE THE RATE OF BIODIVERSITY LOSS

F

OTHER ASSIGNMENTS

DEVELOP BIODIVERSITY TARGETS

Nations have only just started to establish focused targets for biodiversity and ways to assess it.

D

PROTECT ECOSYSTEMS

At least 10% of the world’s ecologically valuable regions on land was protected by 2010, but only about 1% of those in the oceans.

C

SHARE GENE WINDFALL

The Nagoya Protocol on the sharing of commercial benefits derived from the collection and use of genetic material has been signed by 92 countries, but is not yet in force. Only a few companies so far have shared such benefits with the source country.

E

RECOGNIZE INDIGENOUS RIGHTS

Nations are very variable in honouring the rights of indigenous people, especially in creating protected areas within their territory.

D

PROVIDE FUNDING

Countries have made many commitments but honoured few of them.

F

REGULATE GENETICALLY MODIFIED ORGANISMS

The Cartagena Protocol, signed by 103 countries, is designed to help regulate the movement of genetically modified organisms between countries, and came into force in 2003.

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current subsidies that are harmful to the environment towards conservation actions. This could generate US\$50 billion annually for biodiversity, says Sendashonga.

In the end, progress on preserving global biodiversity has stalled

GLOBAL AWAKENING

The treaties that emerged from the 1992 Rio summit followed several major environmental agreements and spawned a series of subsequent accords.

1992 RIO SUMMIT

1972 The United Nations Conference on the Human Environment in Stockholm is the first major international meeting devoted to environmental problems.

1987 The Montreal Protocol on Substances that Deplete the Ozone Layer requires nations to eliminate chemicals that harm stratospheric ozone.

UN FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

1992 Adoption of general climate treaty without specific targets.

1997 The Kyoto Protocol limits greenhouse-gas emissions from industrialized countries.

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

1992 Agreement on convention to conserve biological diversity.

2000 The Cartagena Protocol on Biosafety regulates the transport of genetically modified organisms.

UN CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

1994 Treaty signed to prevent and reverse land degradation.

because “the political will is just not there”, she says. In large part because public awareness is limited, politicians have not felt compelled to address the issue, she says, and, as a result, “biodiversity does not feature prominently at Rio”.

“We have been talking about how to implement the CBD for 20 years. At this rate, we will still be talking about it at Rio+80,” says Sendashonga.

THE DESERTED CONVENTION

Of the three treaties that came out of Rio, the UN Convention to Combat Desertification (UNCCD) is the poor relation. This treaty, which aims to prevent and reverse land degradation and to mitigate the effects of drought, has received scant attention by governments and paltry funding, say desert scientists. Progress towards its goals has been even more elusive than for climate and biodiversity (See ‘Report card: UN Convention to Combat Desertification’).

Dryland ecosystems cover more than one-third of the world’s land area and are vulnerable to overexploitation and degradation, which threaten the food security of around a billion people, according to the Food and Agriculture Organization of the United Nations in Rome. And the situation is getting worse: the percentage of land area that is degrading jumped from 15% in 1991 to 24% in 2008, the most recent global figures available. Developing regions are the most susceptible because poor farmers lack access to the more productive agricultural land and often do not have the knowledge or money to use farming techniques that preserve the soil.

For their part, rich nations neglected the convention because they do not view desertification as an acute concern. Until recently, they have found it easy to expand agricultural production by opening up new areas at home or buying up land in other countries, says William Dar, director-general of the International Crops Research Institute for the Semi-Arid Tropics in Andhra Pradesh, India.

The convention has also been constrained financially. It is “the most underinvested of all conventions”, says Dar, who served from 2007 to 2009 as chairman of the committee on science and technology that provides advice to the UNCCD. In 2011, the Global Environment Facility, an international organization that provides funding to help countries implement the Rio conventions, spent just \$369 million on UNCCD projects, about 10% of the money it directed towards biodiversity.

It took countries until 2009 to agree on a set of 11 impact indicators to measure progress towards combating desertification and land degradation. Beginning in 2012, parties to the convention must submit national reports that include two of the indicators: the proportion of the population in vulnerable areas that is living above the poverty line; and the area of land covered by vegetation. This will begin to provide a baseline from which to measure progress.

Yet even such basic requirements will strain poorer nations, which lack the scientific knowledge and technical capacity to track the

REPORT CARD UN CONVENTION TO COMBAT DESERTIFICATION

MAIN ASSIGNMENT

REVERSE DESERTIFICATION AND LAND DEGRADATION

F

OTHER ASSIGNMENTS

DEVELOP INDICATORS

It took until 2009 for nations to agree on a set of metrics by which to measure progress.

D

BUILD SCIENCE CORPS

Countries have lagged in training scientists on this issue, particularly in developing nations.

F

PROVIDE FUNDING FOR DEVELOPING NATIONS

The United Nations Global Environment Facility fund has given less than \$400 million for efforts to preserve land and build scientific and technical capacity in poorer nations that are most affected by land degradation.

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growth of deserts, says a desert scientist and former employee of the UNCCD, who asked not to be named. Last year, nations agreed to establish a fellowship programme, starting this year, to support post-graduate students and young scientists from developing countries to study and train at specialized institutions on land degradation and desertification.

Ultimately, though, the problem of land degradation cannot be solved in isolation because it is intrinsically tied to the other issues that brought leaders to Rio in 1992 — how to foster economic development without ruining the planet. The task for negotiators this month is to figure out a way to deal more successfully with the related concerns of energy, environment, poverty and resources.

“This is a call to action for Rio,” says Dar. “We need to tie the conventions together.” ■ [SEE EDITORIAL P.5](#)

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2005 The Kyoto Protocol enters into force without the United States, which declines to ratify it.

2009 China, India and other major developing nations agree to limit their greenhouse-gas emissions.

2011 In Durban, South Africa, parties to the UNFCCC agree to negotiate a new climate treaty by 2015.

2002 Parties to the CBD set a goal to halt the decline in biodiversity by 2010.

2010 The ‘Aichi targets’ set specific goals for reducing threats to biodiversity.

2012 The Intergovernmental Platform on Biodiversity and Ecosystem Services is launched to provide scientific input to the CBD.

2009 Nations agree on 11 indicators to measure progress towards the goal of reducing land degradation.

2012 National reports due on indicators of land degradation.