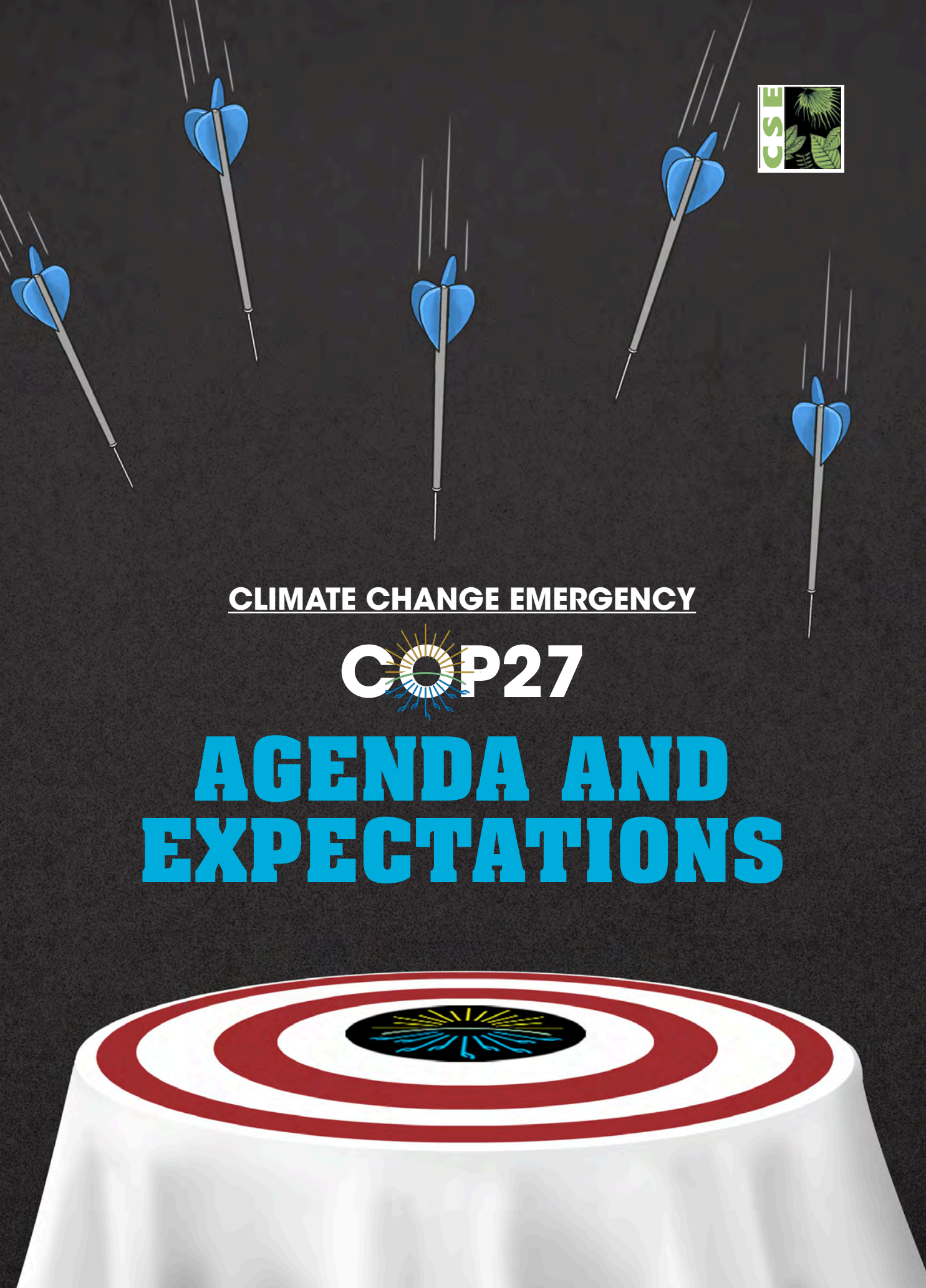
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INSIDE

ONLY TOGETHER CAN WE WIN

At COP 27, loss and damage must not to be pushed away with another puny promise of a fund that never materialises but be accepted as a legitimate demand of countries that need climate reparations

SUNITA NARAIN

It's a nightmare moment for climate change activists like me as we head for the next conference of parties (COP 27)—this time being organised in the coastal city of Sharm el-Sheikh in Egypt. The rich world, which has to act decisively to cut fossil fuel emissions and to finance transitions in the rest of the world, is going through its own economic crisis. Energy prices are high; this winter, it will be tough for households to stay warm. Climate change sceptics and the fossil fuel industry are close to taking a victory lap as they whip up public opinion against the needed energy transition—out of fossil fuel and into cleaner sources. The rich countries are already moving towards reinvestment in fossil fuels, although they say this is temporary and that they will go back to meeting their commitments to decarbonise. It's going to be a hard winter and beyond.

This is when every region has experienced the pain of extreme weather disasters—from floods to heatwaves, and from forest fires to the changing intensity and frequency of cyclones and hurricanes. We are seeing a glimpse of what awaits us as temperatures increase further—from the 1.1°C rise now since the pre-industrial era. It is the revenge-of-nature moment that we have brought on ourselves by years of procrastination.

The world has refused, again and again, to accept the basic principles that must guide action on climate change. First, climate change is a global problem and it requires cooperation

between all nations. Second, it needs rules that are fair and just, for the poor and the rich alike. Third, science is clear that humans are responsible for the global temperature rise and that this increase will lead to more and more variable and extreme weather events, much like what we are seeing now. Four, it is possible to estimate each country's responsibility for the stock of emissions already in the atmosphere—the historical cumulative emissions that have "forced" climate change impacts. And fifth, countries that have not yet contributed to the emissions will do so in the future, simply because the world has reneged on the need to make global rules that would apply fairly to all. This is not a tragedy of the commons. It is a monumental failure of collective leadership. Our failure.

At COP 27, we have an opportunity to repair this terrible mess we are in—not all of it, but at least to restore a semblance of trust. The world can do this by putting on the table the issue of loss and damage—the negotiations on the need to pay for damages that the countries of the South are experiencing because of climate change.

The issue of loss and damage is not new—the demand for this goes back to the time when the climate agreement was in the making in the 1990s. But it has been sidelined, openly rejected and dismissed. It made its way into the Paris Agreement only after the affected and vulnerable countries accepted that loss and damage would not become a basis for any "liability or compensation". This is when environmental jurisprudence demands that the polluters should pay. This global politics, where the rules are made by the rich and for the rich, as it would seem, needs to be addressed in the face of the catastrophic events that are breaking the backs of countries, making their people even more vulnerable to future shocks and forcing them to migrate out of homes that they call their own. We cannot just call these events new normal and turn the page. This is why loss and damage must be on the table—not to be pushed away with another puny promise of a fund that never materialises but to be accepted as a legitimate demand of countries that need reparations for damages they are enduring.

But this negotiation must be based on the agreement enshrined in the climate convention—that cumulative emissions of countries must be the basis of their responsibility to act. The numbers on the emissions—and which countries have appropriated the carbon budget of the world—are known and cannot be dismissed. This has to be the basis of who will be liable to pay compensation for the loss and damage. Given that the gentlemen-negotiators do not like to call a spade a spade, they can choose to avoid all the references to liability or compensation, but they must not erase the principle of why and who in the world must take this action.

The world must also go back to rule-based decisions and not base its decision on the whims and fancies of the powerful. I am saying this because facts show that China—part of the Group of developing countries—is now yesterday's US. Its annual emissions are double of what the US, the second highest (but historically largest), emits. By 2030, China will equalise its emissions on a per capita basis with the US and also its share of the already depleted carbon budget. This is why we need rules for all—what was proposed in 1992 and what the world has shunned and shirked. Had the US agreed to emission reductions based on its contribution, the same would have been applied to others—including China. But now, it's free for all.

This is not the regime that the world needs for loss and damage. There is enough evidence that while countries could have worked to reduce climate impacts, say, through better flood and drainage planning, the scale and ferocity of the extreme events are unprecedented and devastating. So, this climate nightmare moment can turn into a dream only if the world that gathers in Egypt has the courage to act differently and to realise that in this only one Earth of ours, we are interdependent.

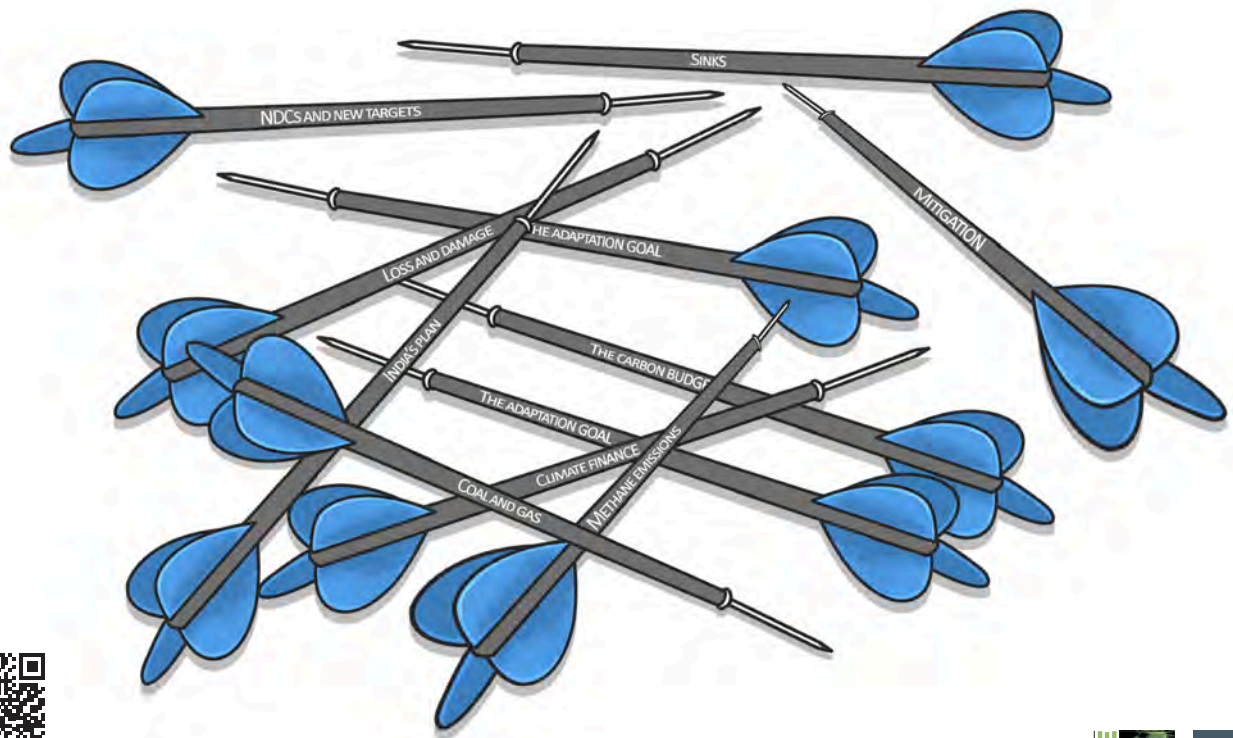
1

What is on the agenda at COP 27?

COP 27 is being held during a multipronged global crisis, but the imperative for its success is urgent

Climate finance and loss and damage will be key issues to watch out for

The developing world must be united with loud and clear demands to push for what is due to their countries



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What's on the Agenda at COP 27?

About 200 countries meet annually at a United Nations climate conference—known as the Conference of Parties (COP). The twenty-seventh such annual climate summit, COP 27, will take place in the Red Sea town of Sharm el-Sheikh in Egypt on November 7–18, 2022.

Many have already relegated COP 27 to being an 'in-between' COP, one in which no major milestones in the Paris Agreement are due to be observed. Set against the backdrop of devastating extreme weather events such as heatwaves and floods, the Russian war and a "generational" energy emergency, the summit faces the risk of being overshadowed by other elements of the current global polycrisis.

According to the Egyptian COP Presidency, this will be an "implementation COP", to put into action the Paris Agreement, since the Paris Rulebook was finalized at COP 26 in Glasgow last year (see *Box: Paris Rulebook*).[1] Being the first COP to be held in a developing country since COP 22 in Marrakech in 2016, there is hope that the issues key for the developing world such as adaptation, climate finance, and loss and damage will be centred.

According to the Egyptian COP Presidency, this will be an "implementation COP" to put into action the Paris Agreement

However, what is important to note is that now that the Paris Rulebook has been finalized, the underlying framework of the global agreement has been shifted. The 1992 Framework Convention on Climate Change (UNFCCC) was based on the principle of common but differentiated responsibilities so that there were two groups of countries—historical and current polluters, and the rest of the world. This meant that countries that were in the first group—contributors to the bulk of emissions in the atmosphere—had to take steps to combat climate change first. They had to drastically reduce emissions while the rest of the world had the right to development, but as this development would need to be climate-friendly, the United Nations Framework Convention on Climate Change (UNFCCC) provided for technology and funding to be made available from historical polluters to countries in the second group.

Paris Rulebook

At COP 24 in Katowice, the Paris Rulebook was adopted to develop the "rules, modalities and procedures" to flesh out the general provisions of the Paris Agreement. The rules agreed on how to report national targets or NDCs, how to report performance on those targets and how to report on finance promised and delivered.

Unfortunately, COP 24 rules on NDCs are much more detailed than the rules on finance. This is disappointing for developing countries that are now required to meet high standards of accountability for their national emissions but have few ways to hold developed countries accountable for finance that is supposed to be transferred.

The Rulebook also specifies how to go about the Global Stocktake (GST), a review of countries' performance every five years, starting in 2023. The Paris Agreement does not have a strong enforcement mechanism. The Rulebook limits the mechanism to evaluating performance against NDCs, while enforcing silence on whether the NDCs themselves are equitable, differentiated and ambitious. This makes it difficult to hold developed countries accountable for their historical responsibility for climate change.

Following years of disagreement since Katowice, rules on carbon markets were finalised at COP 26 in Glasgow. A key stumbling block was on the carryover of credits created by the Clean Development Mechanism under the Kyoto Protocol. Four billion of these credits are still available, representing 4 gigatonne of carbon dioxide equivalent. These are low-quality credits, created on the basis of underdeveloped accounting methods.

These Kyoto-era credits would destroy any new market, but many countries wanted to see them "transitioned" into the markets under the Paris Agreement. The world was divided on this. On the one hand, already industrialised countries wanted the buy the cheap credits to wipe out their national targets, and large developing countries like Brazil and India were eager to sell them to raise finance. On the other hand, there was the fear that these credits would not lead to real emission reductions. At COP 26 it was decided that 320 million Kyoto credits registered since 2013, each representing a tonne of CO_2, will be transferred to the Paris Agreement. The final deal at COP 26 also agreed that a share of proceeds from each trade will go to developing countries for adaptation. Article 6.4 of the Paris Agreement sets out that proceeds of the sale of carbon credits in the newly established market would also be used for adaptation in vulnerable countries.

But the 2015 Paris Agreement in 2015 rewrote this compact substantially; it erased the very idea of historical polluters and made it clear that "all countries" take action to combat climate change. Under the Paris Agreement all countries are required to submit their nationally determined contributions (NDCs) and to enhance their levels of ambition as a global response to climate change. It does say that the agreement will be guided by the principle of equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances, but by effectively removing the distinction between historical polluters and the rest of the world, it has made it difficult for the emerging world to establish the need for action and the requirement of finance that must flow based on the contribution to the emissions in the atmosphere. The Paris Rulebook, now finalized in 2021 at COP 26, signs off on this changed equation.

But the imperative for the summit to have substantial outcomes could not be more urgent. The UN's mid-year climate conference held this June in Bonn, Germany, set the tone for how the discussions in Egypt might unfold. In Bonn, developing countries voiced concern that talks were skewed towards climate mitigation—an issue favoured by developed countries—rather than a balance between both mitigation and adaptation.[2] There were also disagreements around specific programmes such as the Work Programme for urgently scaling up mitigation ambition, and the Glasgow Dialogue on loss and damage.

What then will be the hot topics at this COP summit? To begin with, there are the negotiations which lie at the core of the intergovernmental process.

At the negotiations

Reducing GHG emissions: Mitigation

The world is not on track to achieve the Paris Agreement's stated goal of limiting global temperature rise to 1.5 or 2°C. The latest NDC Synthesis report prepared by the UNFCCC finds that despite update to many country pledges

(Nationally Determined Contributions or NDCs), the world is still on track to cross the 1.5°C temperature threshold to about 2.1–2.9°C of warming by 2100.[3] Current levels of ambition in climate pledges are insufficient. Only 24 countries submitted more ambitious NDCs since COP 26.

At COP 26, there was a decision to "establish a work programme to urgently scale up mitigation ambition and implementation in this critical decade" to enhance ambition in NDCs. The Work Programme was discussed in Bonn in June and developing countries raised a number of concerns, such as its distinction from the Global Stocktake and the resistance of developed countries to enshrine the UNFCCC's principle of equity in the new programme. They viewed it as an attempt by developed countries to impose greater mitigation targets on all countries—rich and poor—rather than greater burden on historical emitters, in line with equity. The disagreements could not be resolved, and discussions on the Work Programme will essentially begin from scratch in Egypt.

Adapting to climate impacts: Global Goal on Adaptation

The Global Goal on Adaptation (GGA) was established under the Paris Agreement with major support from the African Group of Negotiators to drive adaptation action. At COP 26, the Glasgow–Sharm el-Sheikh (GlaSS) work programme was established till 2023 to define the GGA and set up robust tracking mechanisms. GlaSS workshops will take place at COP 27 as well, and there is hope that the discussions will advance equitable, locally led adaptation.

Money for mitigation and adaptation: Climate finance

Climate finance is expected to be a major issue at COP 27. At COP 26 in Glasgow, developed countries noted with "deep regret" that the US $100 billion target of climate finance, first determined in 2009, has not been delivered and is expected to be delivered only by 2023. The Organization for Economic Co-operation and Development's (OECD's) latest estimate suggests that US $83.3 billion in climate finance was mobilized in 2020, but this has been contested by

independent estimates. Oxfam estimates that the figure is one-third of this—around US $21–24.5 billion.[4]

Discussions will take place on a new goal beyond the US $100 billion, which will come into force from 2025, i.e. the New Collective Quantified Goal (NCQG) discussions. The figure of US $100 billion was not negotiated; it was simply put forth and has always been considered an underestimate since it is not line with actual mitigation and adaptation needs in the developing world. The hope is that the new figure that will be negotiated by 2025 will reflect these needs accurately. The Fourth Technical Expert Dialogue on the NCQG on Climate Finance will be held at COP 27 as well as a high-level ministerial dialogue.

Issues that developing countries are expected to raise are greater ease in accessing climate finance, more finance in the form of grants rather than loans, and a push for more adaptation finance. Whether or not climate finance will be prioritized by developed countries—many of whom have reduced their foreign aid budgets due to the war in Ukraine, inflation and the energy crisis—remains an open question.

Private finance changes course

Separate from the intergovernmental process, a private finance initiative known as the Glasgow Financial Alliance for Net Zero (GFANZ)—announced at COP 26 co-chaired by Mark Carney, a former Bank of England Governor—has run into issues recently. Entities with about US $130 trillion of assets signed on to GFANZ have promised to "align" their investments to net zero by 2050. But many banks are now shying away from this commitment due to high fossil fuel prices. According to Bloomberg, banks earned more than US $1 billion in revenue from fossil lending during the first three quarters, in line with 2021.[5] Another reason for their change of course might be a recent suggestion that binding targets should be applied to them to achieve net zero by 2050.

Money for irreparable climate damages that adaptation cannot prevent: Loss and damage

Will the issue of loss and damage (L&D) make or break COP 27?

It seems that it might, according to many. At COP 26, the G77 and China negotiating bloc—representing 80 per cent of the world's population—had united in their demand for a loss and damage (L&D) finance facility. The demand was pushed back by developed countries such as USA and Switzerland, and watered down to a compromise: to have a "dialogue" on future possible institutional arrangements to address L&D.[6]

Issues that developing countries are expected to raise are greater ease in accessing climate finance, more finance in the form of grants rather than loans, and a push for more adaptation finance

The Glasgow Dialogue commenced in Bonn this June and will end in June 2024. The Dialogue produced a landscape of issues on L&D during the discussions but amounted to no more than a talk shop with no concrete outcome. Blocs like the Alliance of Small Island States (AOSIS) and Least Developed Countries (LDCs) pushed to have L&D added to the COP 27 agenda as a formal item for negotiation. This was backed by G77. In September, at a Heads of Delegation meeting, there was consensus that L&D should be a formal agenda item at COP 27.[7] Whether this precipitates or not will be known on the first day of COP 27 in Egypt when the agenda is formally adopted by consensus. Developing countries, especially small island nations, have a clear demand—the establishment of an L&D finance facility. Without this, all signs suggest that they will consider COP 27 a failure. Developed countries have softened to the possibility of further discussions on this issue in the period June–October but are likely to uphold their traditional resistance to language around liability and compensation.

The report card: Global Stocktake

The 2015 Paris Agreement provided for a five-yearly assessment of progress on climate pledges. Known as the

Global Stocktake (GST), the assessment process is intended to understand how the world is doing on multilateral climate action, which areas need improvement, and where it is possible to ramp up ambition.

The first GST commenced in 2021 and will conclude in 2023. COP 27 falls within the "technical assessment" period of the GST, which commenced this June in Bonn, where the First Technical Dialogue on the GST took place. The second meeting of the Technical Dialogue will take place at COP 27, including roundtables on the issues of mitigation, adaptation, and means of implementation, and a "World Café" format of discussions to capture inputs. The process is driven by countries (Parties) but civil society can participate and contribute as well.

The GST is important to hold countries accountable, but also to establish that the principle of equity and climate justice must prevail in the negotiations.

Beyond the negotiations: Global events framing COP 27

The run-up to COP 27 has seen the effects of the Covid-19 pandemic wreaking havoc on economies, and Russia's war on Ukraine sending energy and food prices into an upward spiral. This was compounded by the fact that a record-breaking extreme weather event occurred in every month of 2022 in the form of heat and cold waves, heavy rainfall, tornadoes, cyclones and floods. The impacts are felt by the poorest countries who are already vulnerable owing to a legacy of injustice and extraction of resources by the Global North. The World Bank estimates that 58 per cent of the world's poorest countries are in debt distress or at high risk of it.[8] This hampers their ability to invest in vital areas such as healthcare and climate adaptation or mitigation. A 2021 report by the Jubilee Debt Campaign shows that lower income countries are spending over five times more on

Developing countries have a clear demand —the establishment of an L&D finance facility. Without this, they will consider COP 27 a failure

external debt payments than projects to protect people from the impacts of climate change.[9] The inequity of the 2015 Paris Agreement is now starker than ever due to its dilution of historical responsibility and climate justice. If negotiated as an equitable global climate agreement, it would have placed the burden of mitigation on the developed world and necessitated the financing of climate-friendly development in poorer countries. Instead, the developing world has seen equal—rather inequitable—expectations of mitigation placed on them at successive COPs, and a failure to deliver an already meagre sum of US $100 billion in climate finance. Tensions between the Global North and South are high as we head towards Sharm el-Sheikh.

The inequity of the 2015 Paris Agreement is now starker than ever due to its dilution of historical responsibility and climate justice

Moreover, COP 27 may be hosted by a developing country on a continent that is facing some of the worst impacts from climate change. But there is still no guarantee that the interests of the Global South will be championed, and that issues such as equity, climate justice, and human rights will be upheld. The hosts have partnered with the Coca-Cola Company as a major event sponsor, despite its status as one of the biggest plastic polluters in the world and particularly in Africa, and a major source of junk food.[10]

At COP 27, the role of natural gas will loom large owing to its contentious status as a fuel that is cleaner than coal in terms of CO_2 content, but one that leaks vast amounts of planet-warming methane. The energy crisis has spotlighted the vulnerability of countries reliant on natural gas, but has not deterred its use, with the US and other gas exporters eager to fill the void that Russian piped gas has left in the EU's energy supply. The EU has also been signing gas deals with various African countries such as Algeria, Angola and Egypt, who are keen to earn the revenue. According to analytics website Energy Monitor, about US $400 billion worth of gas infrastructure is under development across Africa, but most of it is being built for exports rather than

addressing domestic energy poverty.[11] This is despite the fact that, according to AP News, an estimated 600 million Africans lack access to electricity.[12] Countries like Egypt are reportedly "regulating air conditioning in shopping malls and lights on streets to save energy and sell it instead." The gas lobby group Gas Exporting Countries Forum (GECF) stated at a meeting in September 2022 in Doha that COP 27 is "the place to advocate for the extended role of natural gas in sustainable development and in the energy transitions."[13]

Despite the air of crisis, there are positive omens that must energize the negotiations rather than let despair set in. The Intergovernmental Panel on Climate Change (IPCC) published its third segment of the Sixth Assessment Report this year, which states with "high confidence" that several solutions to mitigate climate change are "technically viable, are becoming increasingly cost effective and are generally supported by the public." For example, the costs of low emissions technologies have fallen continuously since 2010. On a unit costs basis, solar energy has dropped 85 per cent, wind by 55 per cent, and lithium-ion batteries by 85 per cent.[14] According to International Energy Agency (IEA) analysis in October 2022, "global carbon dioxide (CO_2) emissions from fossil fuel combustion are expected to grow by just under 1 per cent this year, only a small fraction of

their increase last year, as a strong expansion of renewables and electric vehicles prevents a much sharper rise."[15]
And social movements have laid bare the inadequacies of behemoth institutions such as the International Monetary Fund (IMF) and World Bank that have the power to finance a global green transition or delay it, leading to calls for concessional funding for climate action and less funding for fossil fuels.

There is plenty to fuel the narrative that COP 27 cannot achieve much in terms of ambitious multilateral climate action, and that the world has bigger problems to deal with. This narrative can be easily taken apart, and so it must be. The developing world must be united and clear and loud with its demands, particularly for financing. It is clear that there is a huge opportunity to transform the global economic and energy systems, and that these can be low-carbon. The political fight to accelerate this transition must progress at full steam in Egypt.

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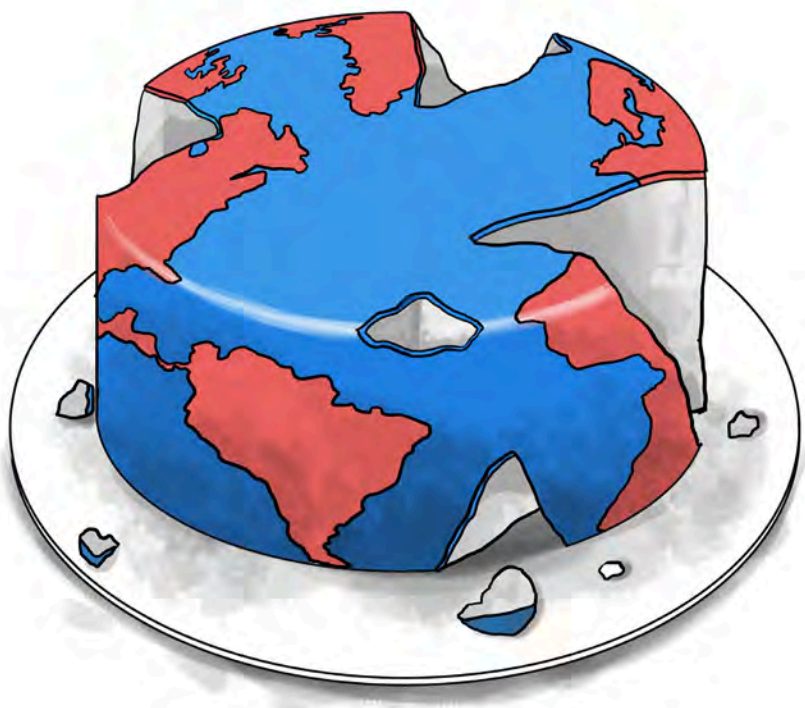
2

MITIGATION AMBITION AND JUSTICE

The world is not on track to reduce emissions in line with the 1.5°C temperature goal of the Paris Agreement

COP 27 must not dilute or erase climate justice in mitigation

COP 27 must discuss how countries will front-load emissions reduction by 2030 based on their cumulative historical emissions



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We are not on track to control planetary warming

The world is not on track to achieve the Paris Agreement's stated goal to "limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels." The new NDC Synthesis report released by the United Nations Framework Convention on Climate Change (UNFCCC) in October 2022 noted that the Nationally Determined Contributions (NDCs) pledged by countries to arrest climate change were insufficient. If implemented, the latest NDCs would lead to emissions of 52.4 gigatonne of CO_2 equivalent ($GtCO_2e$) of greenhouse gases (GHGs) in 2030.[1]

How does this impact the planet's temperature?

Four modelled estimates published in October 2022 suggest that we will breach the limit of a 1.5°C rise above pre-industrial levels even if all current NDCs are implemented. Announcing pledges is the easy part while there is no guarantee that they will be implemented and achieved within the timeframe of 2030 (see *Table 1: Estimates of temperature rise if NDCs are implemented*).

Table 1: Estimates of temperature rise if NDCs are implemented

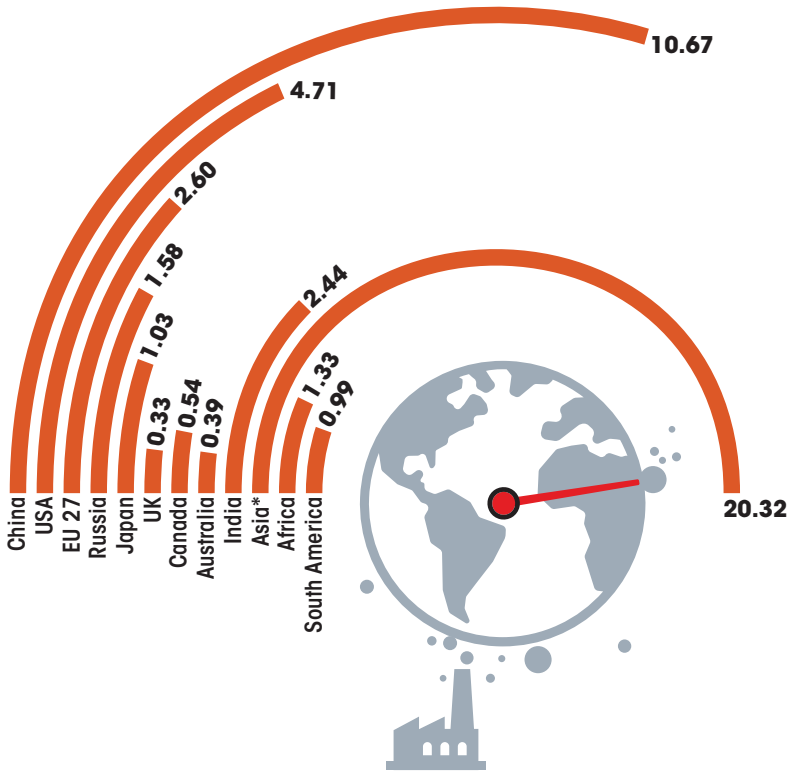
Report	Published by	Temperature rise if all 2030 NDCs are implemented
NDC Synthesis Report	UNFCCC	2.1–2.9°C
Emissions Gap Report 2022	UNEP	2.4–2.6°C
State of Climate Action 2022	Bezos Earth Fund, Climate Action Tracker, Climate Analytics, ClimateWorks Foundation, NewClimate Institute, the United Nations Climate Change High-Level Champions, and World Resources Institute	2.4–2.8°C
World Energy Outlook 2022	IEA	1.7°C

Current state: 2020 emissions

The Centre for Science and Environment (CSE) analysed carbon dioxide (CO_2) emissions data for 2020 published by the Global Carbon Project.[2]

ANNUAL CO_2 EMISSIONS IN 2020

China was the world's prime emitter in 2020, releasing more CO_2 than US, EU 27, Russia and Japan combined



All figures in gigatonne

Source: Our World in Data

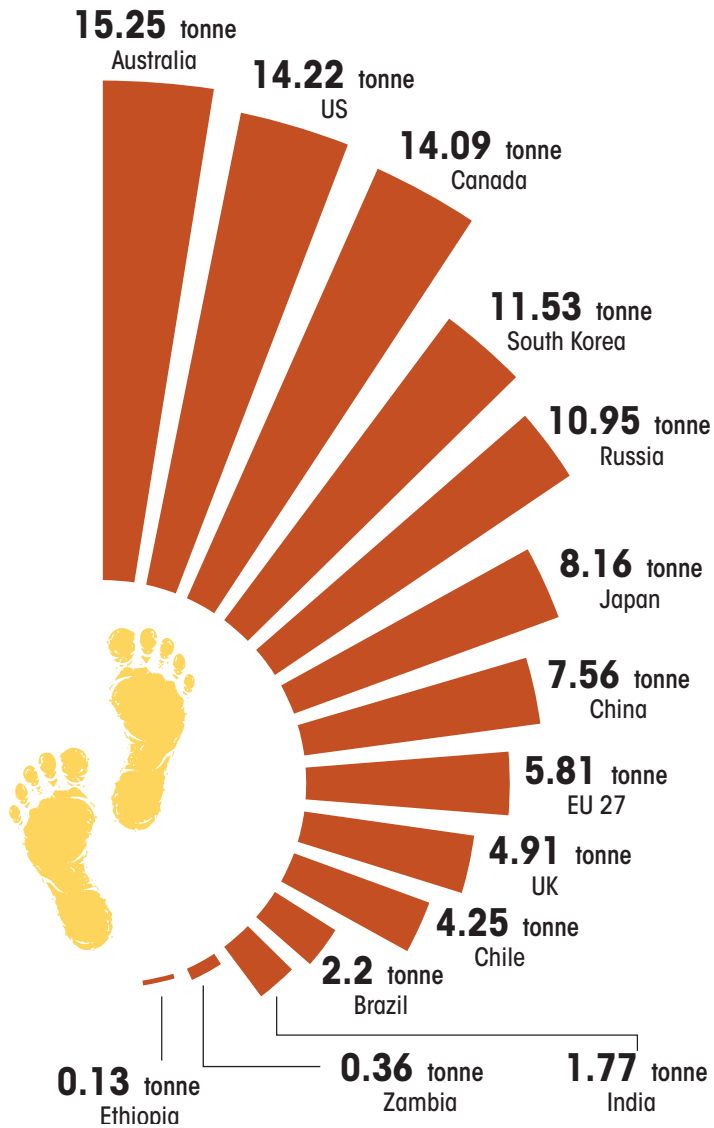
The world emitted 34.81 gigatonne (Gt) of CO_2 in 2020. This is only from the fossil fuel and cement sectors. China alone emitted 31 per cent of the world's total CO_2. Add the US and EU 27 (minus the UK), and the countries account for 52 per cent of the world's CO_2 emissions.

If we add Russia, Japan, UK, Canada and Australia, the share goes up to 62 per cent.

India, which is the fourth largest economy (third, if we do not account for EU 27 as a group), contributed some 2.44 Gt of CO_2 emissions in 2020—compared to China's 10.67 $GtCO_2$ and USA's 4.71 $GtCO_2$—and added 7 per cent to the world's CO_2 emissions in 2020. The entire continent of Africa, with 17 per cent of the world's population, contributed less than 4 per cent to global emissions in 2020.

2020 EMISSIONS PER CAPITA

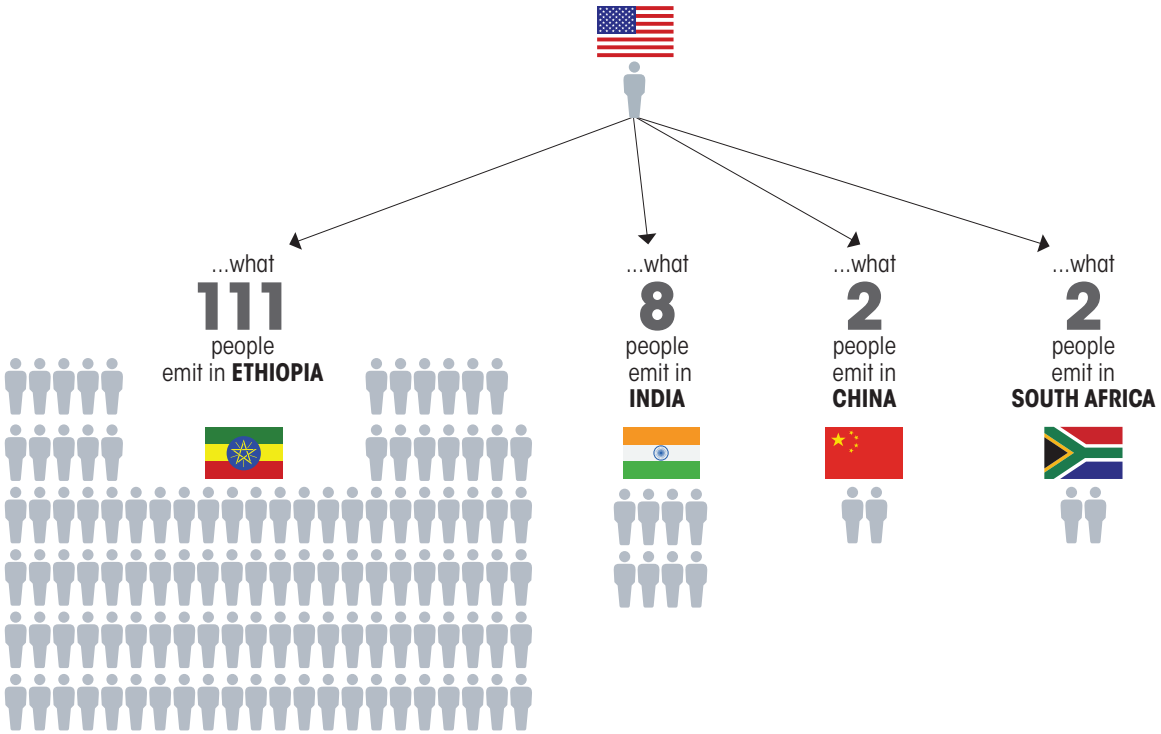
Per capita emissions of USA were eight times that of India in 2020



Source: Our World in Data and World Bank

Seen from another perspective, India and Africa are quite low in the human development index. They need to grow economically, provide energy to their people, industrialize and urbanize. All of this will add to the emissions because CO_2 emissions are still directly linked to a country's gross

WHAT ONE PERSON EMITS IN THE US IS EQUAL TO...



Source: Our World in Data and World Bank

domestic product. And this when the world is running out of the carbon budget—the IPCC 2021 report (Sixth Assessment Report [AR6]) has already declared "code red" and said that humanity is hurtling towards a climate catastrophe.[3]

We, therefore, have two choices: either accept the climate apartheid, or enhance efforts to ensure economic growth without pollution so that the developing world is given the right to develop. The latter option means funding the transformation in these nations at a scale never done before. In terms of per capita—how much is emitted by each person per year—the differences are even starker and indeed cannot be accepted in a civilized world.

NDC updates

Under the Paris Agreement, adopted in 2015 as an international treaty to limit and cut greenhouse gases,

countries agreed to provide voluntary targets—Nationally Determined Contributions (NDCs)—for how they will limit or reduce emissions. As per the agreement's "ratcheting mechanism", countries are expected to submit progressively more ambitious NDCs every five years. Accordingly, countries had to submit their second NDC by late 2020, but most parties to the Paris Agreement did not meet this deadline. The inadequate ambition shown by the countries led to a decision at the 26th Conference of Parties (COP 26) to the UNFCCC to revise them again in 2022, with a cutoff date of September 23, 2022. According to the UNFCCC's latest NDC Synthesis report published in October 2022, 39 countries have submitted new or updated NDCs since the previous report. Only 24 countries submitted new or updated NDCs after COP 26.

If the world achieves the enhanced and conditional NDCs, it would still be emitting close to double the amount of CO_2 the world should be emitting in 2030

CSE has projected emissions of 45 countries—a mix of developed and developing economies, including EU 27—for 2021–30.[4] Seventeen out of 45 countries made new NDC submissions to the UNFCCC since our previous analysis on September 21, 2021, up until October 28, 2022. Eleven countries enhanced their GHG emissions reduction targets, including India.

India submitted its upwardly revised NDC in August 2022, extending two of its previous NDC goals. As per an official press statement, "India now stands committed to reducing emissions intensity of its GDP by 45 per cent by 2030 from its 2005 levels, according to the updated NDC." The country will also target about 50 per cent of cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.

Australia, with its change of government, made a significant update to its NDC, extending their target from a 26–28 per cent reduction to a 43 per cent reduction of

greenhouse gas emissions by 2030 below 2005 levels, including land use, land-use change, and forestry (LULUCF).[5]

Brazil announced an NDC update in April 2022, committing to reduce emissions from 2005 levels by 37 per cent in 2025, and by 50 per cent in 2030. But its latest submission is a step-down in ambition compared to its original NDC[6] (see *Box: Brazil's NDC deception*).

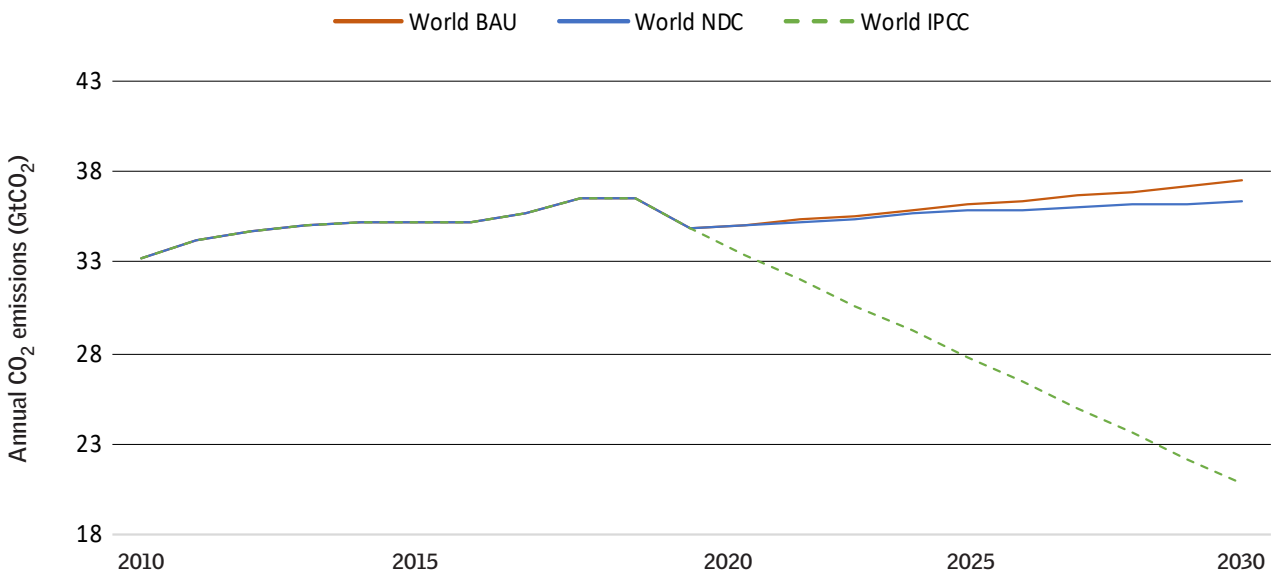
Our analysis reveals that if the world achieves the enhanced and conditional NDCs, it would be emitting 36.30 $GtCO_2$ in 2030. This is close to double the amount of CO_2 the world should be emitting in 2030. To put it another way, if the NDCs of these 45 countries are fully implemented, the world will emit 356.65 $GtCO_2$ in 2021–30 as against the

Brazil's NDC deception

According to the Climate Action Tracker, Brazil's original NDC, submitted in 2016, translated both emissions reduction targets into absolute emissions in 2025 and 2030: *"The latest updated NDC does not provide such a translation. Instead, it states that the base year emissions level of 2005 can be compared to the latest inventory, that is, the Fourth National Communication. Our calculations show that in comparison to the original NDC, the change in base year emissions data raises target emissions in 2025 and 2030 by over 70 $MtCO_2e$. Rather than enhancing Brazil's NDC, changes in the base year have weakened the original target."*

NOT NEARLY ENOUGH

The world will emit 37.46 $GtCO_2$ in 2030 in a business-as-usual (BAU) scenario



available carbon budget of 351.99 $GtCO_2$ (calculated after deducting 2020 emissions). Under business as usual (BAU), the world would emit 362.48 $GtCO_2$. Thus, the NDC scenario in 2021–30 is just 5.83 $GtCO_2$ lower than the BAU scenario.

According to the IPCC's Sixth Assessment Report (Working Group III), to achieve the 1.5°C goal the world must cut its emissions by 43 per cent compared to 2019 levels by 2030—this would be a 43 per cent reduction of 36.44 $GtCO_2$ in 2019, amounting to 20.77 $GtCO_2$ in 2030, if applied to fossil CO_2 emissions data published by the Global Carbon Project.[7] We are not on track for this.

Carbon budget

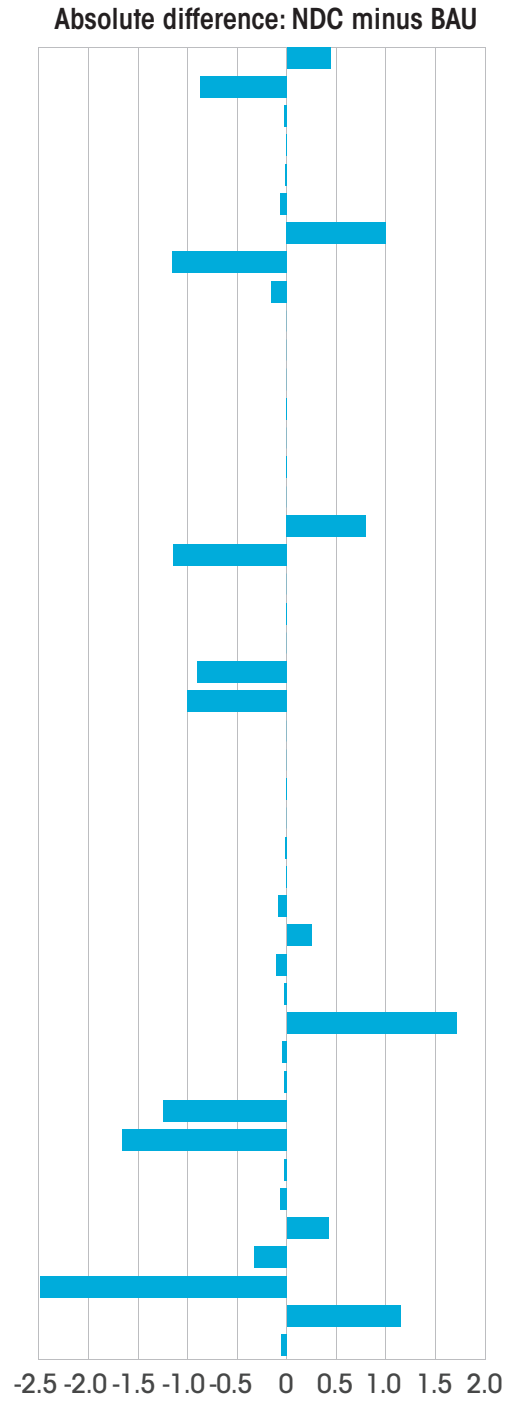
Most worrying is the impact on the carbon budget—a biophysical threshold of CO_2 that can be emitted to prevent global average temperatures from rising above a certain level. Carbon budgets are constructed on the premise that there is a near-linear relationship between rising global

PROJECTED EMISSIONS FOR THE DECADE

2021–30

Figures in $GtCO_2$

	BAU	NDC
Argentina	1.51	1.94
Australia	3.85	2.98
Azerbaijan	0.39	0.36
Belarus	0.61	0.60
Bosnia and Herzegovina	0.22	0.20
Botswana	0.12	0.05
Brazil	5.02	6.02
Canada	5.52	4.36
Chile	0.91	0.75
China	119.88	119.88
Colombia	0.95	0.95
Cook Islands	0.00	0.00
Costa Rica	0.08	0.07
Dominica	0.00	0.00
Equatorial Guinea	0.08	0.08
Eritrea	0.01	0.00
Ethiopia	0.23	1.03
European Union (27)	22.87	21.74
Grenada	0.00	0.00
Iceland	0.03	0.02
India	31.79	31.79
Japan	9.44	8.54
Kazakhstan	3.47	2.47
Liechtenstein	0.00	0.00
Marshall Islands	0.00	0.00
Mauritius	0.05	0.03
Micronesia	0.00	0.00
Moldova	0.06	0.04
Montenegro	0.02	0.02
New Zealand	0.35	0.25
Nicaragua	0.05	0.30
Norway	0.39	0.28
Oman	0.78	0.75
Russia	15.94	17.65
Serbia	0.46	0.41
Singapore	0.50	0.47
South Africa	4.85	3.60
South Korea	6.44	4.78
Switzerland	0.30	0.27
Tajikistan	0.16	0.08
Ukraine	1.90	2.32
United Kingdom	2.83	2.51
United States	41.74	39.25
Vietnam	3.67	4.82
Zambia	0.10	0.04



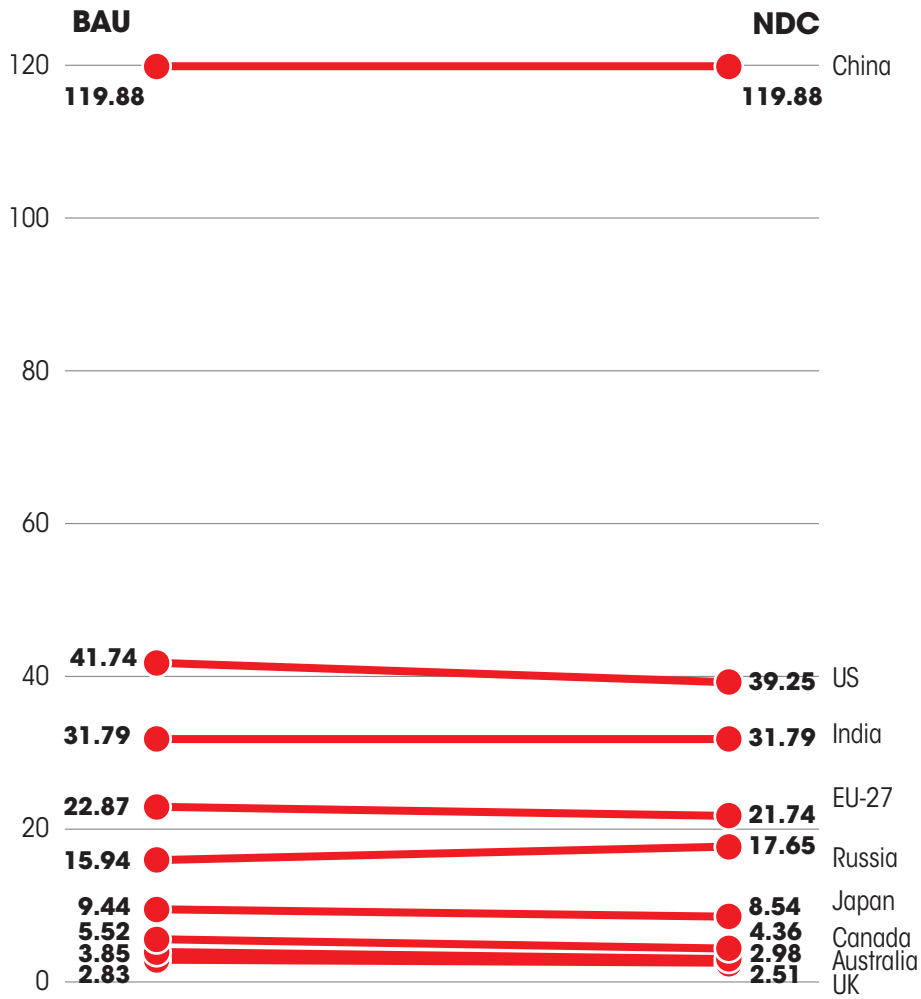
Note: We have assumed constant emissions in "business as usual" (BAU) and nationally determined contributions (NDCs) scenarios in the case of China and India as these countries do not have quantified targets for reduction.

Source: Analysis by the Centre for Science and Environment, Delhi, based on data from Climate Watch and Our World in Data

PROJECTED EMISSIONS OF TOP EMITTERS 2021–30

Business as usual (BAU) *v* if Nationally Determined Contributions (NDCs) are achieved

Figures in $GtCO_2$



Source: Analysis by the Centre for Science and Environment, Delhi, based on data from Climate Watch and Our World in Data

temperatures and the level of cumulative atmospheric CO_2. The latest IPCC report (AR6) says that starting in 2020, the world is left with a total carbon budget of 400 $GtCO_2$ for a 67 per cent chance of limited temperatures to 1.5°C.[8] This carbon budget includes emissions from land use, land-use

REMAINING CARBON BUDGET WILL BE EXHAUSTED IN THIS DECADE

Figures in $GtCO_2$

World CO_2 emissions (Fossil fuel and cement)	1870–2020	1676.50
	BAU 2021–30	362.48
	NDC 2021–30	356.65
Remaining IPCC AR6 budget to stay on the 1.5°C trajectory 2020 onwards*		386.80

*We assume that land-use, land-use change and forestry (LULUCF) emissions account for 3% of CO_2 emissions and reduce the 400Gt budget accordingly for this analysis; BAU: business and usual; NDC: Nationally Determined Contributions

Source: Our World in Data, IPCC and CSE analysis

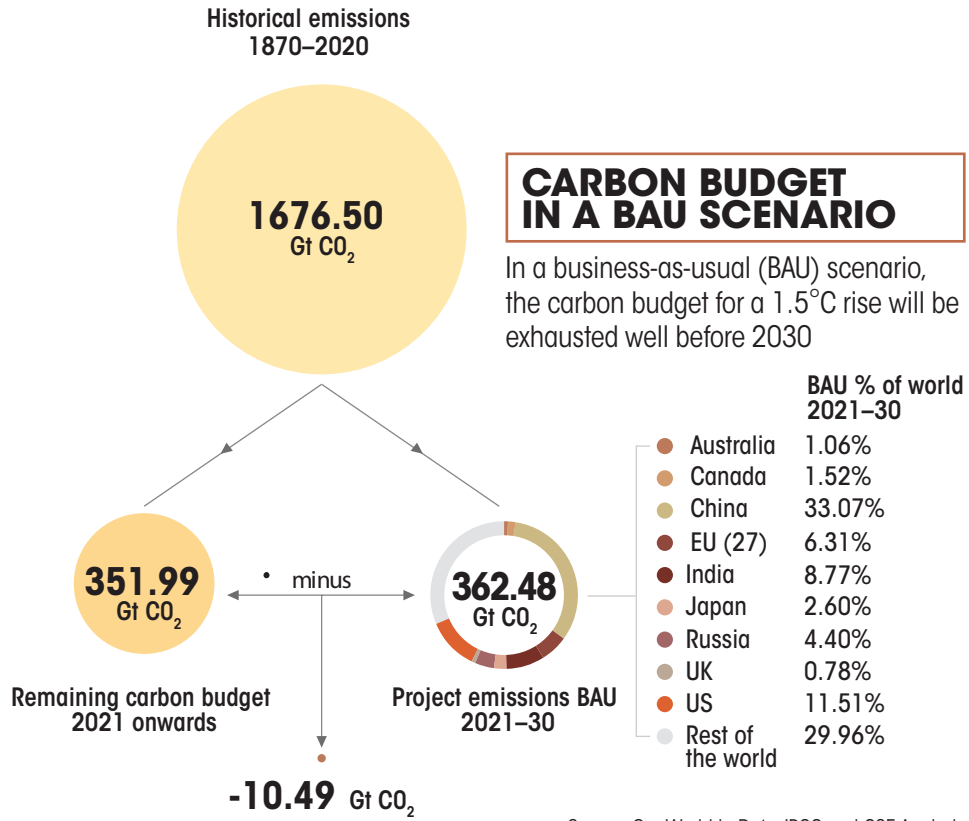
change and forestry (LULUCF) of roughly 3.3 per cent. If this is deducted, then the world has a remaining carbon budget for fossil fuel emissions of 387 gigatonne (Gt) from 2020 to keep the temperature rise to 1.5°C, as per AR6. This means that once we cross this threshold—whenever we cross it—we are headed towards a temperature rise of more than 1.5°C. It should not be a surprise to learn that the world will exhaust the remaining carbon budget before 2030—even assuming the implementation of the full NDCs by countries.

Our analysis suggests that the remaining carbon budget of 351.99 $GtCO_2$ starting from 2021 (deducting 2020 emissions of 34.81 $GtCO_2$) will be depleted by 2030 in both a business-as-usual (BAU) scenario and a scenario in which NDCs are implemented.

In a BAU scenario, we exceed the carbon budget by 10.49 $GtCO_2$ by 2030, and by 4.66 $GtCO_2$ in a NDC scenario by 2030.

Politics of mitigation at COP 27

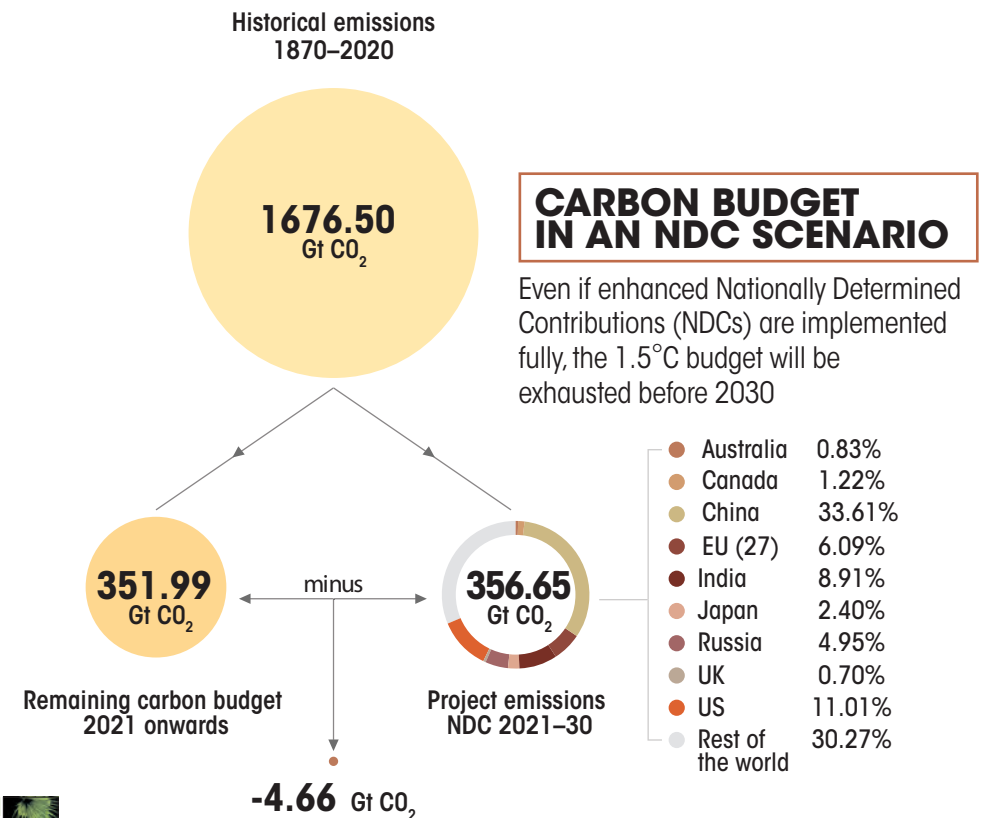
The problem is not even a theoretical or moralistic idea. The fact is that roughly 30 per cent of the carbon budget is



CARBON BUDGET IN A BAU SCENARIO

In a business-as-usual (BAU) scenario, the carbon budget for a 1.5°C rise will be exhausted well before 2030

Source: Our World in Data, IPCC and CSE Analysis



CARBON BUDGET IN AN NDC SCENARIO

Even if enhanced Nationally Determined Contributions (NDCs) are implemented fully, the 1.5°C budget will be exhausted before 2030

Source: Our World in Data, IPCC and CSE Analysis

available for the vast numbers of people in the world who still do not have access to energy and are way down on any human development indicator. Now unless we can tell these billions to stop breathing, or stop development, or stop everything that we know today makes the world economy prosperous, they will emit. As a result, the world will breach the guardrail of 1.5°C.

This is why equity is a prerequisite to an ambitious and effective climate agreement. It is not something that can be diluted, discarded or erased. Dissect, dice and slice the data any which way and the conclusion will be the same—a few countries have appropriated the carbon budget and their accumulated emissions are the cause of the temperature increase, which is taking the world towards catastrophe.

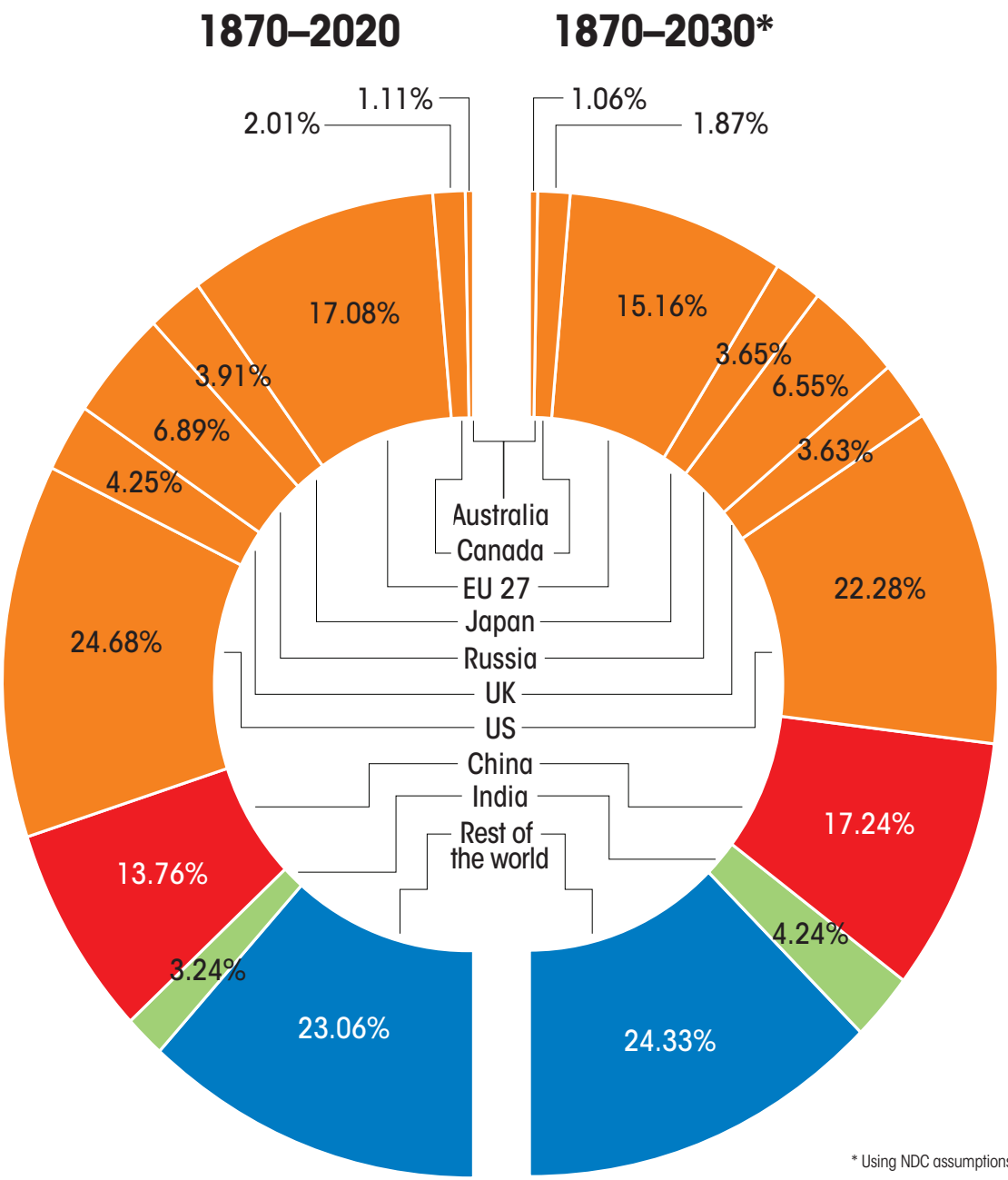
To achieve the 1.5°C goal the world must cut its emissions by 43 per cent compared to 2019 levels by 2030

There is the other inconvenient truth that if the rich (including China) polluted yesterday and today, then the remaining world (roughly 70 per cent of the world still needs right to development). This part of the world cannot be wished away, it cannot be shouted and screamed at and bullied into a low-carbon pathway. This transformation—growing but with the emissions that will further jeopardize the world—will need huge funding and technology support. This is not about charity, but about fixing, in the interests of all, what has been broken.

At COP 27, the focus will rightly be on issues such as climate finance, loss and damage (L&D), and adaptation. In a year of devastating extreme weather events and increasing suffering borne by the developing world from a crisis that they have contributed little to, attention must be paid to correcting historical wrongdoing via increased financing from developed countries, and better adaptation to climate impacts. But the issue of mitigation cannot be sidelined—rather, it must be reinforced through the UNFCCC's principle of common but differentiated responsibilities (CBDR).

APPROPRIATION OF WORLD EMISSIONS

% of total world emissions for the given period



* Using NDC assumptions

Source: Analysis by *Down to Earth* and the Centre for Science and Environment, Delhi, based on data from Climate Watch and Our World in Data

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ANNEXURE 1: CO_2 Emissions of 2021–30 in a BAU scenario (all emissions are in gigatonne CO_2)

Country	2020	2020 % of world	2021	2022	2023	2024
Argentina	0.16	0.45%	0.16	0.15	0.15	0.15
Australia	0.39	1.13%	0.39	0.39	0.39	0.39
Azerbaijan	0.04	0.11%	0.04	0.04	0.04	0.04
Belarus	0.06	0.17%	0.06	0.06	0.06	0.06
Bosnia and Herzegovina	0.02	0.06%	0.02	0.02	0.02	0.02
Botswana	0.01	0.02%	0.01	0.01	0.01	0.01
Brazil	0.47	1.34%	0.47	0.48	0.49	0.49
Canada	0.54	1.54%	0.54	0.54	0.54	0.55
Chile	0.08	0.23%	0.08	0.08	0.09	0.09
China	10.67	30.65%	10.89	11.12	11.36	11.60
Colombia	0.09	0.26%	0.09	0.09	0.09	0.09
Cook Islands	0.00	0.00%	0.00	0.00	0.00	0.00
Costa Rica	0.01	0.02%	0.01	0.01	0.01	0.01
Dominica	0.00	0.00%	0.00	0.00	0.00	0.00
Equatorial Guinea	0.01	0.03%	0.01	0.01	0.01	0.01
Eritrea	0.00	0.00%	0.00	0.00	0.00	0.00
Ethiopia	0.01	0.04%	0.02	0.02	0.02	0.02
European Union (27)	2.60	7.47%	2.54	2.48	2.42	2.36
Grenada	0.00	0.00%	0.00	0.00	0.00	0.00
Iceland	0.00	0.01%	0.00	0.00	0.00	0.00
India	2.44	7.02%	2.56	2.68	2.81	2.94
Japan	1.03	2.96%	1.01	1.00	0.98	0.97
Kazakhstan	0.29	0.84%	0.30	0.31	0.32	0.33
Liechtenstein	0.00	0.00%	0.00	0.00	0.00	0.00
Marshall Islands	0.00	0.00%	0.00	0.00	0.00	0.00

2025	2026	2027	2028	2029	2030	BAU 2021-30	% of world BAU 2021-30
0.15	0.15	0.15	0.15	0.15	0.15	1.51	0.42%
0.39	0.38	0.38	0.38	0.38	0.38	3.85	1.06%
0.04	0.04	0.04	0.04	0.04	0.04	0.39	0.11%
0.06	0.06	0.06	0.06	0.06	0.06	0.61	0.17%
0.02	0.02	0.02	0.02	0.02	0.02	0.22	0.06%
0.01	0.01	0.01	0.02	0.02	0.02	0.12	0.03%
0.50	0.50	0.51	0.52	0.52	0.53	5.02	1.38%
0.55	0.55	0.56	0.56	0.56	0.56	5.52	1.52%
0.09	0.09	0.09	0.10	0.10	0.10	0.91	0.25%
11.84	12.09	12.35	12.61	12.87	13.15	119.88	33.07%
0.09	0.09	0.10	0.10	0.10	0.10	0.95	0.26%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
0.01	0.01	0.01	0.01	0.01	0.01	0.08	0.02%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
0.01	0.01	0.01	0.01	0.01	0.01	0.08	0.02%
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00%
0.02	0.02	0.03	0.03	0.03	0.03	0.23	0.06%
2.31	2.26	2.20	2.15	2.10	2.05	22.87	6.31%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01%
3.08	3.22	3.38	3.54	3.71	3.88	31.79	8.77%
0.95	0.94	0.92	0.91	0.89	0.88	9.44	2.60%
0.34	0.35	0.36	0.37	0.39	0.40	3.47	0.96%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%

CONTINUED...

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Country	2020	2020 % of world	2021	2022	2023	2024
Mauritius	0.00	0.01%	0.00	0.00	0.00	0.00
Micronesia	0.00	0.00%	0.00	0.00	0.00	0.00
Moldova	0.01	0.01%	0.01	0.01	0.01	0.01
Montenegro	0.00	0.01%	0.00	0.00	0.00	0.00
New Zealand	0.03	0.10%	0.03	0.03	0.03	0.03
Nicaragua	0.01	0.01%	0.01	0.01	0.01	0.01
Norway	0.04	0.12%	0.04	0.04	0.04	0.04
Oman	0.06	0.18%	0.06	0.07	0.07	0.07
Russia	1.58	4.53%	1.58	1.58	1.59	1.59
Serbia	0.04	0.12%	0.04	0.04	0.04	0.05
Singapore	0.05	0.13%	0.05	0.05	0.05	0.05
South Africa	0.45	1.30%	0.46	0.46	0.47	0.48
South Korea	0.60	1.72%	0.61	0.61	0.62	0.63
Switzerland	0.03	0.09%	0.03	0.03	0.03	0.03
Tajikistan	0.01	0.03%	0.01	0.01	0.01	0.01
Ukraine	0.21	0.61%	0.21	0.20	0.20	0.20
United Kingdom	0.33	0.95%	0.32	0.31	0.30	0.29
USA	4.71	13.54%	4.61	4.51	4.41	4.31
Vietnam	0.25	0.73%	0.27	0.29	0.31	0.33
Zambia	0.01	0.02%	0.01	0.01	0.01	0.01
Total of 45	27.34	78.55%	27.55	27.77	28.01	28.26
Rest of the world	7.47	21.45%	7.52	7.56	7.58	7.58
World	34.81		35.06	35.32	35.58	35.84

2025	2026	2027	2028	2029	2030	BAU 2021-30	% of world BAU 2021-30
0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.01%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
0.01	0.01	0.01	0.01	0.01	0.01	0.06	0.02%
0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01%
0.03	0.03	0.03	0.04	0.04	0.04	0.35	0.10%
0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01%
0.04	0.04	0.04	0.04	0.04	0.04	0.39	0.11%
0.08	0.08	0.08	0.09	0.09	0.09	0.78	0.22%
1.59	1.60	1.60	1.60	1.61	1.61	15.94	4.40%
0.05	0.05	0.05	0.05	0.05	0.05	0.46	0.13%
0.05	0.05	0.05	0.05	0.05	0.05	0.50	0.14%
0.48	0.49	0.49	0.50	0.51	0.51	4.85	1.34%
0.64	0.65	0.66	0.67	0.67	0.68	6.44	1.78%
0.03	0.03	0.03	0.03	0.03	0.03	0.30	0.08%
0.01	0.02	0.02	0.02	0.02	0.02	0.16	0.04%
0.19	0.19	0.18	0.18	0.18	0.17	1.90	0.52%
0.29	0.28	0.27	0.26	0.26	0.25	2.83	0.78%
4.21	4.12	4.03	3.94	3.85	3.77	41.74	11.51%
0.35	0.37	0.40	0.42	0.45	0.48	3.67	1.01%
0.01	0.01	0.01	0.01	0.01	0.01	0.10	0.03%
28.54	28.83	29.14	29.47	29.82	30.19	287.56	79.33%
7.57	7.55	7.50	7.44	7.36	7.26	74.92	20.67%
36.11	36.37	36.64	36.91	37.18	37.46	362.48	100.00%

ANNEXURE 2: CO_2 emissions of 2021–30 if NDCs are implemented

Country	NDC	2020	2021	2022	2023	2024
Argentina	Cap net emissions of 349 $MtCO_2e$ in 2030	0.16	0.16	0.17	0.18	0.18
Australia	43% reduction of greenhouse gas emissions by 2030 below 2005 levels	0.39	0.37	0.36	0.34	0.32
Azerbaijan	35% reduction in GHG emissions by 2030 compared to 1990	0.04	0.04	0.04	0.04	0.04
Belarus	Reducing its emissions by 35% by 2030 compared to 1990 levels (unconditional), and 40% by 2030 compared to 1990 levels (conditional)	0.06	0.06	0.06	0.06	0.06
Bosnia and Herzegovina	Reduce emissions by 12.8% (unconditional) and 17.5% (conditional) by 2030; 50% (unconditional) and 55% (conditional) by 2050, compared to 2014 levels	0.02	0.02	0.02	0.02	0.02
Botswana	15% reduction in GHG emissions by 2030 compared to 2010	0.01	0.01	0.01	0.01	0.01
Brazil	Reduce emissions from 2005 levels by 37% in 2025, and by 50% in 2030	0.47	0.49	0.52	0.54	0.57
Canada	-40-45% GHG below 2005 by 2030	0.54	0.52	0.50	0.48	0.46
Chile	A goal of 95 $MtCO_2eq$ by 2030 excl. LULUCF	0.08	0.08	0.08	0.08	0.08
China	Carbon intensity, peak emissions, non fossil energy and forest stock	10.67	10.89	11.12	11.36	11.60
Colombia	Maximum of 169.44 $MtCO_2e$ in 2030	0.09	0.09	0.09	0.09	0.09
Cook Islands	38% reduction by 2020 (unconditional) and 81% reduction by 2030 (conditional) in GHG emission from electricity generation compared to 2006	0.00	0.00	0.00	0.00	0.00
Costa Rica	2030 cap of 9.11 $MtCO_2e$ net-emissions and a maximum net-emissions budget of 106.53 $MtCO_2e$ from 2021 to 2030	0.01	0.01	0.01	0.01	0.01
Dominica	Reducing its greenhouse gas emissions by 45% below 2014 levels by 2030	0.00	0.00	0.00	0.00	0.00
Equatorial Guinea	20% reduction in emissions by 2030 compared to 2010 levels, in order to acheive a 50% reduction by 2050	0.01	0.01	0.01	0.01	0.01
Eritrea	The government of Eritrea is committed to reduce the CO_2 emissions from fossil fuels by 4.2% in 2020, 6.2% by 2025 and 12.0% by 2030 compared to the projected BAU of the reference year of 2010. If additional support is availed, it can further be reduced by 12.6% in 2020, 24.9% by 2025 and 38.5 by the year 2030.	0.00	0.00	0.00	0.00	0.00
Ethiopia	Reduce GHG emisssions by 14% (unconditional) and 68.8% (conditional) by 2030 compared to BAU	0.01	0.03	0.05	0.06	0.08
European Union (27)	-52.8% GHG below 1990 by 2030 excl LULUCF	2.60	2.52	2.44	2.37	2.29
Grenada	40% reduction of the 2010 emissions levels by 2030	0.00	0.00	0.00	0.00	0.00
Iceland	"Economy-wide net reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990"	0.00	0.00	0.00	0.00	0.00
India	Emissions intensity, non fossil power, sink	2.44	2.56	2.68	2.81	2.94
Japan	-46% GHG below 2013 by 2030	1.03	1.00	0.97	0.93	0.90
Kazakhstan	15% (unconditional) to 25% (conditional) reduction in GHG emissions by 2030 compared to 1990	0.29	0.28	0.28	0.27	0.26
Liechtenstein	40% reduction in GHG emissions by 2030 compared to 1990	0.00	0.00	0.00	0.00	0.00
Marshall Islands	GHG reduction of at least 45% below 2010 levels by 2030.	0.00	0.00	0.00	0.00	0.00

2025	2026	2027	2028	2029	2030	NDC 2021-30	% of world NDC 2021-30	BAU 2021-30	% of World BAU 2021-30	Absolute difference NDC-BAU 2021-30
0.19	0.20	0.20	0.21	0.22	0.23	1.94	0.01	1.51	0.42%	0.44
0.31	0.29	0.27	0.25	0.24	0.22	2.98	0.01	3.85	1.06%	-0.87
0.04	0.04	0.03	0.03	0.03	0.03	0.36	0.00	0.39	0.11%	-0.03
0.06	0.06	0.06	0.06	0.06	0.06	0.60	0.00	0.61	0.17%	-0.01
0.02	0.02	0.02	0.02	0.02	0.02	0.20	0.00	0.22	0.06%	-0.02
0.01	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.12	0.03%	-0.07
0.59	0.61	0.64	0.66	0.69	0.71	6.02	0.02	5.02	1.38%	1.00
0.45	0.43	0.41	0.39	0.37	0.35	4.36	0.01	5.52	1.52%	-1.16
0.08	0.07	0.07	0.07	0.07	0.07	0.75	0.00	0.91	0.25%	-0.16
11.84	12.09	12.35	12.61	12.87	13.15	119.88	0.34	119.88	33.07%	0.00
0.09	0.10	0.10	0.10	0.10	0.10	0.95	0.00	0.95	0.26%	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
0.01	0.01	0.01	0.01	0.01	0.01	0.07	0.00	0.08	0.02%	-0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
0.01	0.01	0.01	0.01	0.01	0.01	0.08	0.00	0.08	0.02%	-0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00%	0.00
0.10	0.11	0.13	0.14	0.16	0.18	1.03	0.00	0.23	0.06%	0.80
2.21	2.13	2.06	1.98	1.90	1.83	21.74	0.06	22.87	6.31%	-1.14
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.03	0.01%	-0.01
3.08	3.22	3.38	3.54	3.71	3.88	31.79	0.09	31.79	8.77%	0.00
0.87	0.84	0.81	0.77	0.74	0.71	8.54	0.02	9.44	2.60%	-0.90
0.25	0.24	0.24	0.23	0.22	0.21	2.47	0.01	3.47	0.96%	-1.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00

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Country	NDC	2020	2021	2022	2023	2024
Mauritius	Reduce GHG emissions by 40% by 2030 compared to BAU (6900 $ktCO_2e$)	0.00	0.00	0.00	0.00	0.00
Micronesia	28% (unconditional) up to 35% (conditional) reduction in GHG emissions by 2025 compared to 2000	0.00	0.00	0.00	0.00	0.00
Moldova	70% (unconditional) and up to 88% (conditional) reduction in GHG emission in 2030 compared to 1990	0.01	0.00	0.00	0.00	0.00
Montenegro	Economy-wide GHG emission reduction target of 35% by 2030 compared to base year (1990) emissions, excluding LULUCF	0.00	0.00	0.00	0.00	0.00
New Zealand	Reduce net greenhouse gas emissions to 50% below gross 2005 levels by 2030	0.03	0.03	0.03	0.03	0.03
Nicaragua	69 $MtCO_2e$ in 2030 or 10% reduction compared to BAU (77 $MtCO_2e$)	0.01	0.01	0.01	0.02	0.02
Norway	At least 50% and towards 55% reduction in greenhouse gas emission by 2030 compared to 1990 levels	0.04	0.04	0.04	0.03	0.03
Oman	Oman commits to reduce GHG Emissions by 4% (unconditional) and 7% (conditional) by 2030 compared to BAU (125.254 $MTCO_2e$)	0.06	0.06	0.07	0.07	0.07
Russia	-24% GHG below 1990 by 2030 excl LULUCF	1.58	1.61	1.65	1.68	1.71
Serbia	13.2% reduction in GHG emissions by 2030 compared to 2010	0.04	0.04	0.04	0.04	0.04
Singapore	Singapore's NDC is an economy-wide absolute GHG emissions limitation target to peak its GHG emissions at 65 $MtCO_2e$ around 2030. Singapore's GHG emissions in 2030 are expected to amount to no higher than 65 $MtCO_2e$.	0.05	0.05	0.05	0.05	0.05
South Africa	In 2030, annual GHG emissions will be in a range from 350-420 Mt CO_2-eq	0.45	0.44	0.42	0.40	0.39
South Korea	Reduce GHG emissions by 40% by 2030 compared to 2018 levels (727.6 $MtCO_2e$)	0.60	0.58	0.55	0.53	0.51
Switzerland	Reduce greenhouse gas emissions by at least 50% by 2030 compared to 1990 levels	0.03	0.03	0.03	0.03	0.03
Tajikistan	Not exceeding 80-90% (amounts to 1.7-2.2 tCO_2e per capita) (unconditional) of 1990 level by 2030; achieve 65-75% (amounts to 1.2-1.7 tCO_2e per capita) (conditional) of 1990 level by 2030	0.01	0.01	0.01	0.01	0.01
Ukraine	65% reduction below 1990 levels by 2030	0.21	0.22	0.22	0.22	0.23
United Kingdom	-69% GHG below 1990 by 2030 excl LULUCF	0.33	0.32	0.30	0.29	0.27
USA	-43-50% GHG below 2005 by 2030 excl LULUCF	4.71	4.57	4.43	4.28	4.14
Vietnam	Reduce total GHG emissions by about 9% compared to the BAU scenario	0.25	0.30	0.34	0.38	0.42
Zambia	Zambia commits to reduce its GHG emissions conditionally by at least 25% (under limited international support) and towards 47% (with substantial international support) compared to 2010 levels	0.01	0.01	0.01	0.01	0.00
Total of 45		27.34	27.46	27.59	27.73	27.88
Rest of the world		7.47	7.52	7.56	7.58	7.58
World		34.81	34.98	35.14	35.30	35.46

2025	2026	2027	2028	2029	2030	NDC 2021-30	% of world NDC 2021-30	BAU 2021-30	% of World BAU 2021-30	Absolute difference NDC-BAU 2021-30
0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.01%	-0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.06	0.02%	-0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.01%	-0.01
0.03	0.02	0.02	0.02	0.02	0.02	0.25	0.00	0.35	0.10%	-0.09
0.03	0.03	0.04	0.04	0.05	0.05	0.30	0.00	0.05	0.01%	0.25
0.03	0.03	0.02	0.02	0.02	0.02	0.28	0.00	0.39	0.11%	-0.11
0.07	0.08	0.08	0.08	0.08	0.09	0.75	0.00	0.78	0.22%	-0.03
1.75	1.78	1.82	1.85	1.89	1.92	17.65	0.05	15.94	4.40%	1.71
0.04	0.04	0.04	0.04	0.04	0.04	0.41	0.00	0.46	0.13%	-0.05
0.05	0.05	0.05	0.05	0.05	0.05	0.47	0.00	0.50	0.14%	-0.03
0.37	0.35	0.34	0.32	0.30	0.28	3.60	0.01	4.85	1.34%	-1.25
0.49	0.47	0.45	0.42	0.40	0.38	4.78	0.01	6.44	1.78%	-1.66
0.03	0.03	0.03	0.02	0.02	0.02	0.27	0.00	0.30	0.08%	-0.03
0.01	0.01	0.01	0.01	0.01	0.01	0.08	0.00	0.16	0.04%	-0.07
0.23	0.23	0.24	0.24	0.24	0.25	2.32	0.01	1.90	0.52%	0.42
0.26	0.24	0.23	0.21	0.20	0.19	2.51	0.01	2.83	0.78%	-0.33
4.00	3.85	3.71	3.57	3.42	3.28	39.25	0.11	41.74	11.51%	-2.49
0.46	0.50	0.54	0.59	0.63	0.67	4.82	0.01	3.67	1.01%	1.15
0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.10	0.03%	-0.06
28.04	28.21	28.40	28.60	28.81	29.03	281.73	0.79	287.56	79.33%	-5.83
7.57	7.55	7.50	7.44	7.36	7.26	74.92	0.21	74.92	20.67%	0.00
35.61	35.76	35.90	36.04	36.17	36.30	356.65	1.00	362.48	100.00%	-5.83

ANNEXURE 3: Per capita emissions

Country	Population 2020	Population 2030	Emissions 2020 in tonne
Argentina	45,376,763	49,237,000	156,978,063
Australia	25,693,267	28,062,000	391,891,928
Azerbaijan	10,093,121	10,654,000	37,720,462
Belarus	9,379,952	9,160,000	57,445,417
Bosnia and Herzegovina	3,280,815	3,127,000	21,417,961
Botswana	2,351,625	2,774,000	6,518,934
Brazil	212,559,409	223,852,000	467,383,500
Canada	38,037,204	40,925,000	535,822,990
Chile	19,116,209	19,458,000	8,117,1490
China	1,411,100,000	1,430,161,000	10,667,887,453
Colombia	50,882,884	53,417,000	89,104,941
Cook Islands			
Costa Rica	5,094,114	5,468,000	7,907,389
Dominica	71,991	73,000	139,250
Equatorial Guinea	1,402,985	1,874,000	10,265,267
Eritrea			
Ethiopia	114,963,583	144,944,000	14,664,773
European Union (27)	447,479,493	442,626,000	2,598,575,259
Grenada	112,519	116,000	294,834
Iceland	366463	389000	2,935,990
India	1,380,004,385	1,503,642,000	2,441,792,313
Japan	126,261,000	119,584,000	1,030,775,384
Kazakhstan	18,755,666	20,660,000	291,335,929
Liechtenstein	38,137	39,000	141,012
Marshall Islands	59194	65,000	151,282
Mauritius	1,265,740	1,266,000	3,979,358
Micronesia	115,021	127,000	147,500

Emissions BAU 2030 in tonne	Emissions NDC 2030 in tonne	Per capita 2020	Per capita BAU 2030	Per capita NDC 2030
145,377,200.4	225,134,640	3.46	2.95	4.572
379,226,016	220,312,668.8	15.25	13.51	7.851
40,061,673.2	33,765,657.25	3.74	3.76	3.169
63,389,345.78	62,213,826.6	6.12	6.92	6.792
22,002,779.82	18,831,279.3	6.53	7.04	6.022
1,9282,291.44	3,855,879.65	2.77	6.95	1.390
53,1007,730.6	711,880,000	2.20	2.37	3.180
564,832,183.6	354,507,195.4	14.09	13.80	8.662
99,941,534.65	70,300,000	4.25	5.14	3.613
13,146,367,772	13,146,367,772	7.56	9.19	9.192
99,118,233.3	9,928,6561.54	1.75	1.86	1.859
8,042,118.111	6,741,400	1.55	1.47	1.233
171,136.888	96,729.6	1.93	2.34	1.325
7,165,709.44	5,493,068.8	7.32	3.82	2.931
31,800,990.73	175,380,000	0.13	0.22	1.210
2,051,877,787	1,825,720,939	5.81	4.64	4.125
392,346.8267	156,086.4	2.62	3.38	1.346
2,747,571.067	1,011,511.35	8.01	7.06	2.600
3,881,578,021	3,881,578,021	1.77	2.58	2.581
876,870,144.2	709,939,619.5	8.16	7.33	5.937
397,651,028.9	210,910,464.8	15.53	19.25	10.209
100,967.5881	119,380.8	3.70	2.59	3.061
196,154.0871	74,562.4	2.56	3.02	1.147
5137,717.161	3,063,600	3.14	4.06	2.420
227,727.0411	83,356	1.28	1.79	0.656

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Country	Population 2020	Population 2030	Emissions 2020 in tonne
Moldova	2,620,495	2,480,000	5,146,876
Montenegro	621,306	616,000	2,309,894
New Zealand	5,090,200	5,429,000	33,475,158
Nicaragua	6,624,554	7,392,000	5,073,650
Norway	5,379,475	5,803,000	41,283,000
Oman	5,106,622	5,936,000	62,162,570
Russia	144,073,139	140,864,000	1,577,136,041
Serbia	6,899,126	6,465,000	43,135,397
Singapore	5,685,807	5,801,000	45,503,904
South Africa	59,308,690	65,956,000	451,957,087
South Korea	51,836,239	51,435,000	597,605,055
Switzerland	8,636,561	9,139,000	32,298,333
Tajikistan	9,537,642	11,557,000	9,447,656
Ukraine	44,132,049	41,195,000	213,908,873
United Kingdom	67,081,000	69,421,000	329,578,911
USA	331,501,080	348,075,000	4,712,770,573
Vietnam	97,338,583	104,164,000	254,303,169
Zambia	18,383,956	24,326,000	6,572,938

NOTES

The above 45 countries have been selected since their NDCs have percentage reduction targets of emissions for 2030 and are quantifiable.

BAU emissions for 2021-–30 have been projected based on the median annual rate of change of the past decade (2010–20).

This analysis uses only annual production-based carbon dioxide (CO_2) emissions from the burning of fossil fuels for energy and cement production published by the Global Carbon Project. Land use change and consumption emissions are not included.

DATA SOURCES

CO_2 emissions: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

NDCs

Climate Watch: https://www.climatewatchdata.org/ndcs/country/ARG/full?document=second_ndc-EN

Climate Action Tracker: https://climateactiontracker.org/climate-target-update-tracker-2022/

UNFCCC NDC Registry: https://unfccc.int/NDCREG

Emissions BAU 2030 in tonne	Emissions NDC 2030 in tonne	Per capita 2020	Per capita BAU 2030	Per capita NDC 2030
6,476,887.896	3,333,484.68	1.96	2.61	1.344
2,173,857.898	1,245,062.65	3.72	3.53	2.021
35,404,599.28	18,785,519.5	6.58	6.52	3.460
5,356,069.083	51,060,000	0.77	0.72	6.907
37,170,928.95	17,837,269.63	7.67	6.41	3.074
93,265,631.19	86,199,802.8	12.17	15.71	14.522
1,608,346,151	1,919,223,274	10.95	11.42	13.625
48,860,984.75	39664,497.77	6.25	7.56	6.135
53,070,246.68	48,100,000	8.00	9.15	8.292
512,516,106.4	284,900,000	7.62	7.77	4.320
683,698,235.2	380,960,440.8	11.53	13.29	7.407
28,401,370.61	22,518,754.71	3.74	3.11	2.464
22,360,756.52	7,093,153.9	0.99	1.93	0.614
171,409,633.5	247,040,497.2	4.85	4.16	5.997
249,082,868.2	186,148,644.4	4.91	3.59	2.681
3,765,039,514	3,280,562,742	14.22	10.82	9.425
480,247,594.1	668,220,000	2.61	4.61	6.415
13,742,123.22	1,358,166.34	0.36	0.56	0.056

AGENDA FOR CLIMATE ACTION

SUNITA NARAIN

Climate justice is not a theoretical or moralistic idea. The fact is that roughly 30 per cent of the carbon budget is available for the vast numbers of people in the world, who still do not have access to energy and are way down on any human development indicator. Now unless we can tell these billions to stop breathing, or stop development, or stop everything that we know today makes the world economy prosperous, they will emit. As a result, the world will breach the guardrail of 1.5°C.

This is why equity is a pre-requisite to an ambitious and effective climate agreement. It is not something that can be diluted, discarded or erased. Dissect, dice and slice the data any which way and the conclusion will be the same—few countries have appropriated the carbon budget and their accumulated emissions are the cause of the temperature increase, which is taking the world towards catastrophe.

There is the other inconvenient truth that if the rich (including China) polluted yesterday and today, then the remaining world (roughly 70 per cent of the world still needs right to development).

Agenda for effective and ambitious climate action

First, not to work to erase the reality of climate injustice, but to embrace it for the future. In 1992, at the Rio Conference, when the UN Framework Convention on Climate Change was agreed upon, it was built on the principle of common but differentiated responsibility. This simply meant that the already rich countries would reduce, create space for the emerging world to grow and the emerging world would grow differently with enabling funds and technology. But in the next 30 years, the single biggest effort has been to undermine,

and to finally erase, the principle of equity from climate negotiations. The 2015 Paris Agreement, which was lauded by all, removed the last vestige of historical responsibility from the text. Climate justice was relegated to a footnote.

The second agenda is to stop proselytization about net zero emissions—it only deepens inequity and delays action. IPCC says the world must be net zero by 2050 and halve the emissions by 2030 over its 2010 levels to stay below 1.5°C. If the world has to be net zero by 2050, then the differential must apply, and the industrialised must be net zero by 2030 at the very latest. We need clear plans for 2030 from all, particularly from the emitters of the past and the present.

The third agenda has to be about turning the spotlight on China. For long, China has hidden behind the Group of 77—developing countries—and not made its real intention clear. In this coming decade, China will occupy 30 per cent of the available carbon budget; it has no absolute emissions reduction target. In this long game, its intent is to gain "equivalence" with the rest of the big polluters by 2030. This means there is no space left for the rest of the world to grow. This is unacceptable. China today is yesterday's US and it is difficult to see how the world will call it out.

The fourth agenda is finance—real, tangible and at the scale of the transformation needed. For long this promise has been lost in the imagery. This is what has led to the breakdown in trust between countries. This agenda is linked to discussions on market-based mechanism. Currently the effort is to the find creative ways to "buy" cheap emission reductions from the developing world. It is a redo of the disastrous Clean Development Mechanism, but the intent is the same. This will only add to the crisis of climate change.

The fact is today the world—including India and countries in Africa—need to act to reduce emissions. Instead of cheap carbon offset options, the market mechanism must formulate a way to fund transformational and expensive options in these countries. This means it needs to be

designed, with a floor on the price of the cost of abatement that this mechanism will fund. This means not just talking the talk, but running the walk.

The fifth agenda is the near-stuck discussion on "loss and damage". We are seeing huge devastations, caused by weird weather events. With each repeated disaster, people lose their ability to cope—to live in their repeatedly hit and devastated region; they get increasing impoverished; and increasingly desperate. This adds to their insecurity and to the insecurity of the world. Climate change is a great leveler. So, it is time for an effective agreement to underwrite the losses and damages and to hold the polluters responsible. It's time for polluters to pay.

Agenda for India

The question is what do we do in India. We are victims of climate change impacts—we know this and IPCC reconfirms that we will see the worst of the devastation of this increasingly warming world. We are the world's third highest emitter of greenhouse gases (fourth if we take EU-27 as a group) but the scale of our past, current and future emissions is not comparable to the big polluters—not in terms of total amount or in terms of per capita.

India can and must ramp up our actions to combat climate change—because we have the advantage of doing things differently and also, we have the reason to do this for our own benefit—clean air and clean energy. We must be strident on the need for global action; stress on the inequity of inaction; and show leadership in not just walking, but running the talk. It is a tall order given the fact that emissions of carbon dioxide are still directly linked to economic growth. But it is the order of the times we live in.

Climate change is an existential threat. We know that now. It is time we acted with this knowledge, in the interests of all.

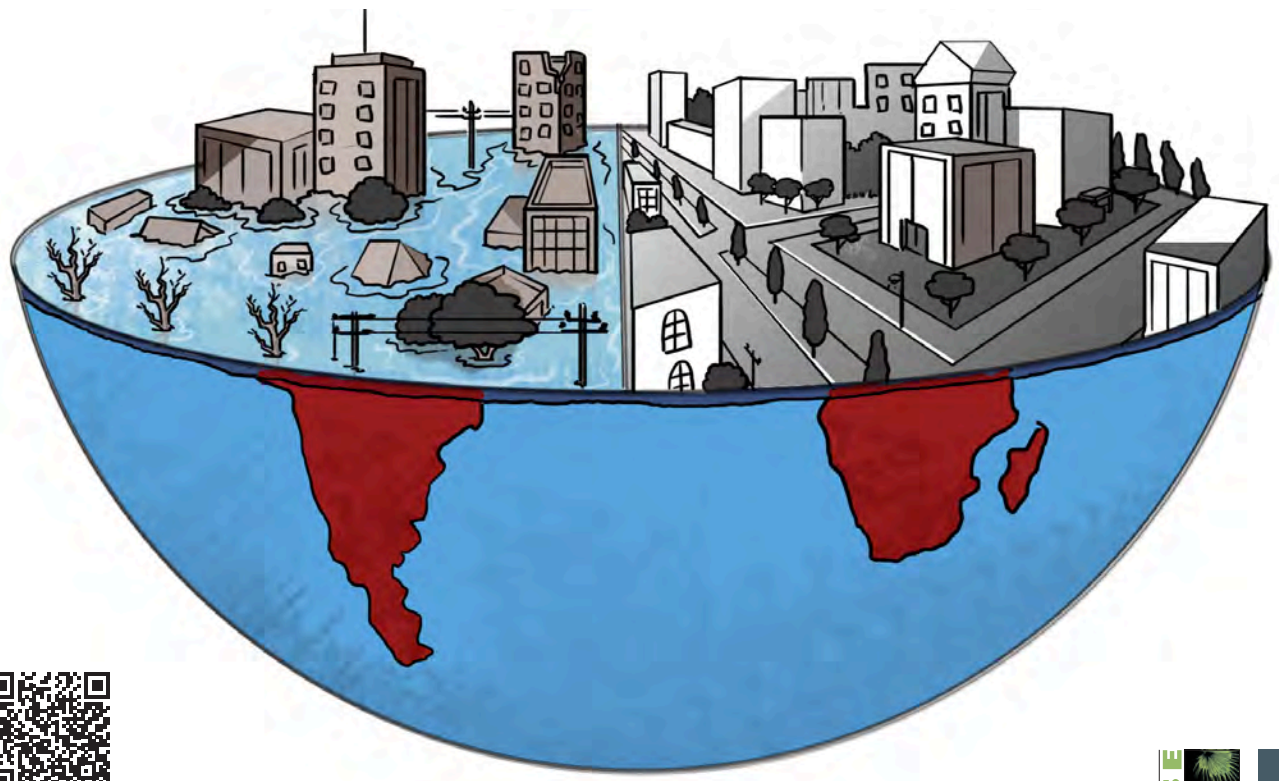
3

ADAPTATION GOAL

Adaptation is a global necessity because losses from both rapid and slow extreme climatic events are mounting rapidly

Adaptation must be equitable and locally led

Countries must ensure the setting up of an ambitious adaptation goal with robust tracking mechanisms



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What is adaptation and why is it necessary?

It is now clearer than ever that the world will have to adapt to climate change. It is not enough to just talk about mitigation; extreme weather events are happening with such rapidity and force that countries and people have to find ways of coping and managing the fallout of the calamities. But what must the world do together?

Article 7 of the Paris Agreement establishes a Global Goal on Adaptation (GGA)—*of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change*. The core components of the goal are interconnected and overlapping. A "global stocktake" will assess their progress every five years under the provisions of the Paris Agreement's Article 14.

Adaptation is necessary because both rapid and slow extreme climatic events have increased in frequency in the last few years

Under the GGA, countries have to develop National Adaptation Plans (NAPs), which would identify activities that need support. These are then recorded in a public registry by the UN Framework Convention on Climate Change (UNFCCC).

In April 2021, the Adaptation Committee, set up under UNFCCC, brought out a technical paper on how it would review the overall progress made in achieving the GGA. It set down in detail the many challenges of doing this at the global and national levels.[1]

The paper concluded that a collation of local efforts spread spatially, rather than just aggregating numbers from these locations to come up with a national total, is a far better approach for the assessment of adaptation activities. The paper defines collation as bringing "together different pieces of written information so that the similarities and differences can be seen." This would allow adaptation efforts to be judged in their necessary local contexts.

The fact is there is no clear definition of what the world means by "adaptation" and perhaps there can never be. This is why the work of the Adaptation Committee is becoming highly technical, so much so that it will be difficult for countries to apply this on the ground to measure impacts and monitor the programmes for implementation.

Adaptation at COP 26 and beyond

At COP 26 in Glasgow, the two-year comprehensive Glasgow–Sharm el-Sheikh (GlaSS) Work Programme on the GGA was established. Developed nations were also urged to double their provisions for adaptation finance.

EU has instituted an adaptation preparedness scoreboard and its adaptation goal is to become resilient to unavoidable impacts of climate change by 2050

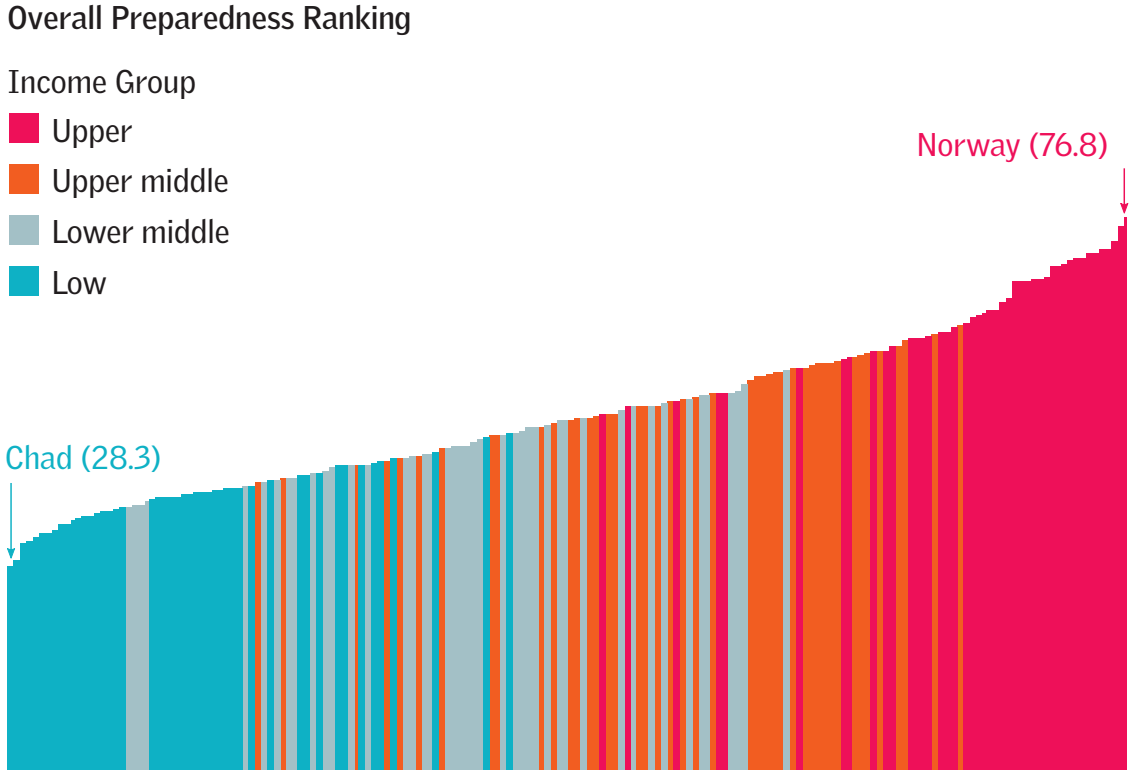
The first workshop under GlaSS on "Enhancing understanding of the global goal on adaptation and reviewing progress towards it" was organised on June 8–9, 2022. Relevant examples of targets and goals at different levels were discussed by participants: Canada uses 200 different indicators to assess progress on adaptation action. While 21 of these are at the national level, the rest are at the regional and local levels. EU has instituted an adaptation preparedness scoreboard and its adaptation goal is to become resilient to unavoidable impacts of climate change by 2050. Tunisia's nationally determined commitment (NDC) integrates gender, land use planning and natural disaster risk reduction. The UK's measurement framework is in the form of a grid, with one axis showing the quality of planning and the other indicating outcomes.[2]

The second workshop under GlaSS on "Enhancing adaptation action and support" was held on August 30–31. Participants discussed enabling conditions such as institutional frameworks and governance, including the private sector. They also identified gaps in adaptation support, especially finance, and discussed how to fill them.[3]

In September 2022, the UNFCCC secretariat released a technical paper on GGA, building on the earlier technical paper by the Adaptation Committee based on the inputs given by various UN-related agencies such as the United Nations Environment Programme (UNEP), Intergovernmental Panel on Climate Change (IPCC), Agenda for Sustainable Development, etc. This paper synthesised indicators, approaches, targets and metrics that could be relevant for reviewing overall progress towards achieving the GGA. It also offered possible lines of questioning for future consideration on the topic. These were taken up at the third workshop under GlaSS held on October 17 and 18 and will also be taken up at the upcoming fourth workshop at COP 27.[4]

Notre Dame Global Adaptation Index

More vulnerable countries are less ready to adapt to the impacts of climate change



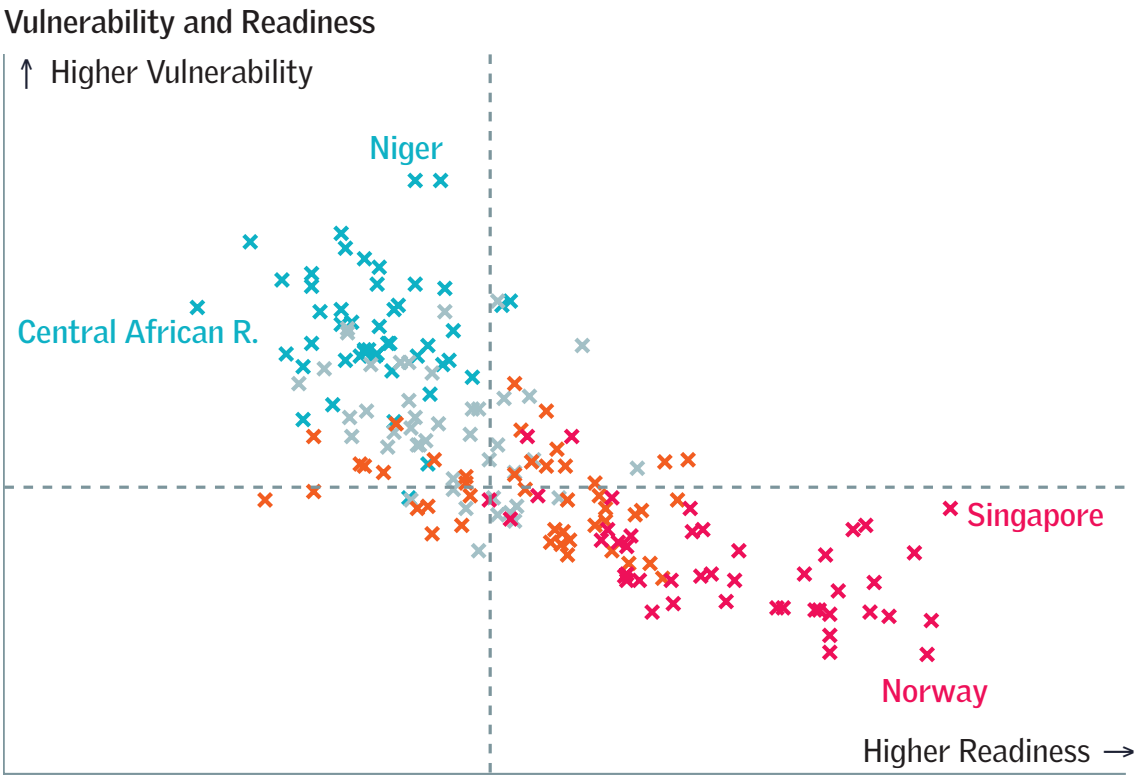
Data: University of Notre Dame (ND-GAIN). Graphic: Aon (Catastrophe Insight)

In this way, adaptation—or what needs to be done to urgently address the issue of building resilience and coping abilities of the poorest in a fast-warming world—has been reduced to a series of meetings and metrics.

What's on the table at COP 27 on the Global Goal on Adaptation?

In the GlaSS workshop which will be held at COP 27, countries are expected to work out how to operationalise the adaptation goal with robust tracking mechanisms. This would need to include an account of the quantity and quality of finance reaching local communities.

The real issue—the endangered elephant in the room—is finance, or the lack of it. The cost of building resilience



against weather related devastation is massive. It needs revamping of existing infrastructure to withstand storms and floods; building of advanced forecasting and early warning systems for cyclones and extreme weather events; and then, of course, development with speed to build resilience. This will need huge investments, not just in research but in supporting communities when disasters hit. We know that a disaster is not a single day event, but that it cripples local economies and takes away the development dividend.

The *Adaptation Gap Report 2021*, released by the UNEP in November 2021, states that the adaptation finance gap is not closing—not by a long shot. The annual adaptation costs in developing countries alone are currently estimated to reach the upper range of US $140–300 billion by 2030 and US $280–500 billion by 2050.[5] This is possibly a gross underestimate of the costs which countries are already incurring with increased frequency of extreme weather events. Aon, a UK-based insurance broker, has estimated that in 2021, the world suffered economic losses of US $343 billion from weather-related disasters, most of it uninsured and unprotected.[6] Aon has also estimated that just in the first three quarters of 2022, the total losses from such disasters has amounted to US $227 billion.[7] Countries are paying the bill for this and it is costing them dearly.

The annual adaptation costs in developing countries alone are currently estimated to reach the upper range of US $140–300 billion by 2030 and US $280–500 billion by 2050

The Adaptation Fund, which was set up in 2001 to fund projects in developing countries, was financed with a share of the proceeds from the Clean Development Mechanism (CDM), established under the Kyoto Protocol. With CDM now dormant and defunct, the fund, though little, continues to be in operation under the Paris Agreement.

At COP 26, countries pledged additional finances of US $350 million for the Adaptation Fund. It was also decided that around 5 per cent of the proceeds from the international carbon market mechanism under Article 6.4 of the Paris Agreement would go towards adaptation finance but these are woefully inadequate.[8] It's a game of shells. More needs to be done to finance adaptation efforts and initiatives.

The issue of adaptation—the goal to make the world less vulnerable and more resilient—needs to be addressed urgently. This is the real agenda for the 2022 UN Climate Change Conference at Sharm el-Sheikh.

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4

CLIMATE FINANCE

In 2009, developed countries committed to jointly mobilise US $100 billion in climate finance annually

Wealthy nations have repeatedly failed to meet their own US $100 billion target

Calls for ramping up climate finance are high, as the debt crisis and climate change threaten the future of the developing world

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Finance: A contentious issue

The United Nations Climate Change Conference in Egypt this year (COP 27) is all set to be a battleground for developing and emerging economies. They will be fighting for resources needed to reduce greenhouse gas emissions and adapt to climate change. These nations have contributed little to the current climate crisis, yet, they are the least equipped to protect themselves from the rising threat of climate change.

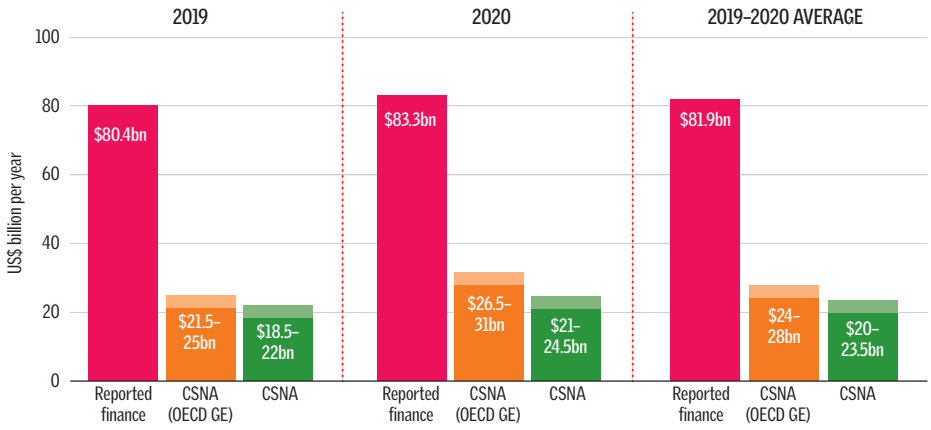
At COP 15 held in 2009, an important decision was made. Developed countries committed to jointly mobilise US $100 billion in climate finance annually to aid climate action in the developing world. The United Nations Convention on Climate Change (UNFCCC) defines climate finance as "local, national or transnational financing to support mitigation and adaptation actions to address climate change". It can be drawn from public, private and alternative sources of financing. Article 9 of the Paris Agreement also stipulates that developed country parties provide financial resources to assist developing country parties in mitigation and adaptation measures. But these wealthy nations have repeatedly failed to meet the US $100 billion target. There is also a question of what is being accounted as climate finance.

Oxfam has estimated that climate assistance provided to developing countries was one-third of the estimates provided by the OECD

According to data from the Organization for Economic Co-operation and Development (OECD), an intergovernmental body consisting of wealthy nations, some US $52.5 billion was mobilised in 2013.[1] After dropping to US $44.6 billion in 2015, the finance flow has steadily increased. In 2020, the developed countries raised US $83.3 billion, a jump from US $80.4 billion in 2019.

Some reports, however, have questioned these figures (*see Graph 1: Reported climate finance versus Oxfam's estimates of climate-specific net assistance).* The charity organisation Oxfam has estimated that climate assistance provided to

Graph 1: Reported climate finance versus Oxfam's estimates of climate-specific net assistance (2019, 2020 and 2019–20 average)



Note: This graph compares climate finance estimates between OECD (red bar) and Oxfam (orange and green bars). Oxfam has used two different methodologies to calculate climate-specific net assistance (CSNA): OECD Grant Equivalent (CSNA OECD-GE) and CSNA in 2019 and 2020. The green bar is calculated using a more robust methodology. The graph captures the difference between what is claimed and actual climate finance.

Source: T. Carty and J. Kowalzig (2022) Climate Finance Short-changed: Methodology note. Oxfam

developing countries was found to be around US $21–24.5 billion which amounts to one-third of the OECD's estimates for 2020. Oxfam arrived at these figures after excluding US $13.1 billion mobilised in private finance and US $1.9 billion in export credits from the OECD numbers, arguing that they do not count as climate finance.[2] Though the remaining US $68.3 billion was raised as public money, a major chunk was given as loans at market value. The Oxfam analysis, therefore, included only concessional loans (low-interest loan financing).

The disparity in estimates from OECD and Oxfam stems from the fact that the world has not consensually agreed on a definition of climate finance. For example, there is no clarity on the kind of financial instruments (traditional loans, grants, debt swaps, national climate funds, carbon markets, and insurance instruments) that could be used and the types of projects that could be counted as eligible for climate finance.

The issues arising from this lack of definition of climate finance are highlighted in a joint 2022 study by researchers from the Switzerland-based ETH Zurich and and the Germany-based Potsdam Institute for Climate Impact Research published

in the journal, *Nature Climate Change*.[3] The report focused on bilateral climate finance projects and financial flows from 32 donor countries to 141 countries across continents, from 2000 to 2019.

The analysis found that bilateral climate finance is overreported—roughly 40 per cent less than what countries report. It is likely that the lack of an independent vetting mechanism also contributed to the reported inconsistencies.

Germany, France, Norway, the United Kingdom, the United States and Japan were the top contributors to bilateral climate finance. According to the report, India, Morocco, Mexico, Vietnam and Indonesia were the top recipients.

There is little clarity about the quality and quantity of the World Bank's climate financing

The United States, the United Kingdom, Canada, Sweden and Switzerland prioritize adaptation finance. But France, Germany and Japan invested more in mitigation. Mitigation finance primarily went to middle-income countries such as Brazil, India, Mexico and Indonesia. According to the *Nature Climate Change* report, Egypt and Morocco—countries with high potential for renewable energy—also attracted significant mitigation finance.

Another major funding channel is multilateral climate financing, which includes multilateral development banks (MDB) and multilateral climate funds. They contributed US $36.9 billion in climate financing in 2020, according to the OECD data. Further, the *Delivery Plan Progress Report*[4] released by Canada and Germany found that many Multilateral Development Banks lack an adaptation finance goal.

World Bank is one of the largest multilateral financiers of climate action in developing countries, accounting for 56 per cent of the total flow from all multilateral development banks combined. It delivered a record US $31.7 billion in the fiscal year 2022. This accounts for a 19 per cent increase from

US $26.6 billion in 2021 which was then considered an all-time high, according to the World Bank.[5]

The Bank reported US $17.2 billion climate finance in the fiscal year 2020; but another Oxfam report titled *Unaccountable Accounting* has raised questions on this.[6] The report says the number could be either higher or lower by 40 per cent. Oxfam has noted that there was little clarity about the quality and quantity of financial flows. This lack of disclosure was of concern as other financiers could follow suit.

A growing chorus of voices is calling for a reform of the World Bank. In October 2022, Germany, the United States and other major economies put together a proposal to help developing economies fight global challenges such as climate change. German Development Minister Svenja Schulze said World Bank's loans could be made more attractive by providing targeted budget support for governments. The Bank is expected to present a roadmap before the end of 2022 to show how it can gear its vision, incentive structure, operational approach and financial capacity towards addressing global challenges.

Private investment largely flowed into middle-income countries that have enabling environments and low-risk profiles

In October this year, Secretary of the US Treasury, Janet L Yellen noted that even if these reforms were successful, there is only so much that multilateral banks could do. She urged individual countries to make important policy reforms, calling for quality financing. She also said that the private sector needs to ramp up investments and technology needed to address the rising threats.

Private sector disinterest

The private sector channelled US $13.1 billion in climate finance in 2020. In 2019, it was US $14.4 billion. The OECD in its *Disaggregated analysis for 2016 to 2020* pointed out that contributions from the private sector were lower than

anticipated. Their investments majorly flowed into middle-income countries that had relatively conducive, enabling environments and low-risk profiles.

The world needs to mobilise US $3–6 trillion to transition to net-zero emissions and become climate-resilient by 2050. To make this goal a reality, experts believe that it is crucial to tap into private finance—a task that is proving to be a challenge.

The COVID-19 pandemic and the Russia-Ukraine war have pushed as many as 54 countries into a debt crisis

According to the *Global landscape of climate finance: a decade of data*, the growth rate of private climate finance was slower (4.8 per cent) than that of the public sector.[7] A 2021 study published in the *Journal of Sustainable Finance & Investment* reported that the lion's share of climate funds flow into mitigation projects such as renewable energy and energy efficiency while adaptation is sidelined.[8] This is because mitigation provides greater financial returns to investors than adaptation.

Green projects have not attracted sufficient investments because they often accompany high upfront costs, multiple technical challenges, and unproven business models. According to New York based news agency, Bloomberg, with coal and gas markets emerging stronger, global lending by top private bankers, including the likes of JP Morgan, Bank of America, and Morgan Stanley, went up 15 per cent to over US $300 billion in the first nine months of this year compared to the same period in 2021.[9] These entities made more than US $1 billion in revenue during the same period from financing fossil fuel. More than 500 financial sector entities pledged that their banks would reach net-zero carbon emissions by 2050 through the Glasgow Financial Alliance for Net Zero (GFANZ). But this recent surge in fossil fuel investment suggests that this goal could be far off.

The *Delivery Plan Progress Report* recommended that developed countries honour their pledge using only public

resources at COP 27. Else, uncertainty and delay will continue to plague climate finance efforts, it added.

Cancelling debt

The call for ramping up climate finance is getting louder. According to a paper published by the United Nations Development Programme in October 2022, the COVID-19 pandemic and the Russia-Ukraine war have pushed as many as 54 countries into a severe debt crisis.[10] These nations represent a little more than 3 per cent of the global economy and 18 per cent of the world's population. Of the 54 countries, 28 rank among the 50 most climate-vulnerable countries in the world. Sub-Saharan Africa constituted the largest geographical group with 25 countries, followed by Latin America, and the Caribbean with 10 countries.

The combined onslaught of debt and climate change is also putting the future of Small Island Developing States (SIDS)—tiny islands that dot the world's oceans—in peril; 31 SIDs face a critical debt crisis. These nations were given US $1.5 billion in climate finance, from 2016 to 2020. However, according to a recent analysis by the European Network on Debt and Development (Eurodad), 22 of the SIDs paid more than US $26.6 billion to their external creditors during the same period.[11] Overall, these nations have spent 18 times more in debt repayments than they received in climate finance. It also does not help that government expenditure in these nations is predicted to decline in the next three years. This will adversely impact investment in public services, climate action and other economic measures.

Small Island Developing States (SIDs) have spent 18 times more in debt repayments than they received in climate finance

These island nations are highly vulnerable to climate change. People residing in the Maldives, the Marshall Islands, Kiribati and Tuvalu may be forced to relocate if sea levels rise above a metre. According to the World Bank report, *360°*

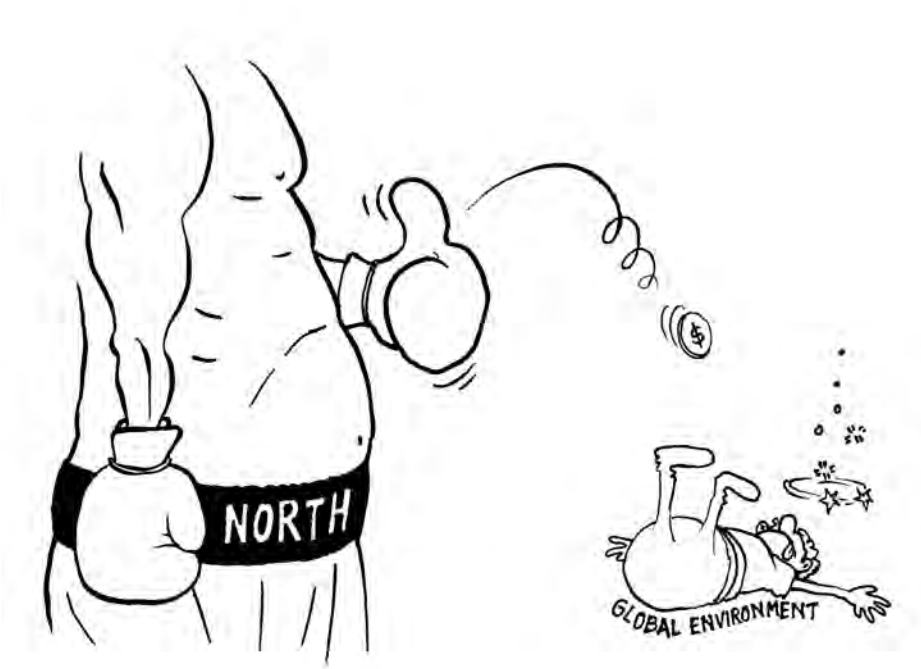
Resilience, in the Caribbean alone, hazards, including those brought on by climate change, have caused an estimated US $12.6 billion per year in damage.[12] These nations had access to only US $1.5 billion out of the US $100 billion climate finance pledge in 2019. In October 2022, former Maldives President Mohamad Nasheed suggested that the 20 most vulnerable countries should stop making debt repayments amounting to US $685 billion in protest if lenders continue to be indifferent to their problems.

According to Debt Justice, a UK-based campaigning organization, the situation in Africa is also dire. African governments owe three times more debt to western banks, asset managers and oil traders than to China. Yungong Theo Jong, Head of Programmes at the African Forum and Network on Debt and Development (Afrodad), has noted that western nations pin the blame on China for debt crises in Africa. But this analysis paints a different picture.

The Global South is currently spending five times more on debt repayments than on addressing the impacts of the climate crisis

Sub-Saharan Africa recorded a total external debt stock of US $702.4 billion in 2020, compared to US $380.9 billion in 2012. Experts estimate that the energy and food crisis triggered by the Russia-Ukraine war could take a further toll on the debt-ridden region. A report from Debt Justice and Climate Action Network International states that if wealthy nations do not provide adequate climate finance, the debt of Sub-Saharan African countries may reach almost US $1 trillion over the next 10 years.[13]

Africa is highly vulnerable to climate change. The continent requires US $2.8 trillion between 2020 to 2030 to meet its Paris Agreement goals. But it receives only US $30 billion annually as climate finance according to a 2022 report on Landscape of Climate Finance in Africa.[14] The largest gaps in investments were recorded in Central and East Africa while North Africa faces the lowest climate investment gaps. Still, the



finance demands exceed flows by three to six times. The private sector, too, has contributed only 14 per cent of total climate finance in Africa, much lower than it has in South Asia, East Asia and Pacific, and Latin America and the Caribbean. The report calls for an increase in private capital as governments' budgets have been hit by the COVID-19 pandemic and Russia-Ukraine war.

Asia received 25 per cent of global climate finance despite being home to roughly 60 per cent of the world's population, according to the briefing paper, *Climate Finance in Asia*. Much of the flow went as loans, increasing financial burdens and forcing already indebted countries to cut public services to repay debts. Laos and Myanmar are now at high-risk of debt distress.[15] Only 17 per cent of bilateral climate finance and six per cent of multilateral climate finance to Asia came in the form of grants.

High interest rates are an added pressure. Vulnerable countries are often charged high interest rates owing to their vulnerability. A report from the UK-based non-profit, Debt Justice, notes that these countries may have to shell out a whooping US $168 billion over the next decade.[16] The Global

South is currently spending five times more on debt repayments than on addressing the impacts of the climate crisis. Additionally, the rising value of the US dollar has exacerbated the problem. The dollar is now at its strongest since the early 2000s.

Against this backdrop, nations are looking beyond conventional financing tools such as grants and loans. One such solution is debt-for-climate swaps, where the recipient nation commits to investing the savings from debt forgiveness into climate adaptation or mitigation. The International Monetary Fund (IMF) and Green Climate Fund, a multilateral funding body, have shown interest in deploying debt-for-climate swaps to address the problem. The approach is inspired by "debt-for-nature" or "debt-for-development" swaps. Over 100 debt swaps have been recorded, but the transactions have been small, according to a working paper from the IMF. The largest swap was recorded 30 years ago, in 1992, between Poland and a group of creditors and had a total value of US $580 million.

Along with climate finance, the New Collective Quantified Goal (NCQG) will be on the table for deliberations at COP 27

The IMF suggests that blending public and private finances could help de-risk investments for private sector capital. Under blended finance, the public sector could invest in equity which bears much of the investment risk if an asset becomes unprofitable. Alternatively, they could enhance credit to improve the creditworthiness of the projects. Multilateral Development Banks, too, can do the same to harness more private capital. This approach could also help developing and emerging markets which are already saddled by heavy debt burdens.

The other novel innovative financing mechanisms include the Pay-As-You-Go (PAYG) solar finance model. One of the major hurdles in widespread adoption of clean energy in the developing world is the upfront cost of solar products. The PAYG mechanism allows off-grid customers to pay for high-quality

solar products in small monthly installments. According to a study published in the Energy for Sustainable Development, this model has been a huge success in Sub-Saharan Africa where Kenya pioneered it as a cost-competitive modern alternative for kerosene.[17]

Expectations from COP 27

Climate finance deadline was set for 2020. It has been extended through 2025. A delivery plan released at COP 26 suggested that it is unlikely that the developed world would fulfil its goal until 2023. Along with climate finance, the New Collective Quantified Goal (NCQG) will be on the table for deliberations. Signed in 2015 as part of the Paris Agreement, member states agreed that NCQG should be set from a floor of US $100 billion per year before 2025, after considering the needs and priorities of developing countries.

Deliberations at COP 27 would clarify whether the NCQG will deal with financial flows from developed to developing countries or whether it will include all flows. There is also a need to define whether NCQG will focus on a single global goal or multiple sub-goals such as adaptation and mitigation. It also includes capacity-building, technology

development and transfer. Loss and damage finance, and finance for a just transition are other sub-goals. The other topics of discussion would be about quantifying the sub-goals, updating them in response to changing needs of the developing world, and deciding on how NCQG could support the goal of making financial flows consistent with the Paris Agreement, according to a policy brief from Climate Service Advisory Service, an initiative delivered by a consortium of experts led by Germanwatch e.V. and funded by Climate and Development Knowldge Network (CDKN).[18] The report also highlighted that NCQG should address the question of transparency, unlike the current finance goal.

In 2022, three technical dialogues were held to discuss different aspects of NCQG. But the policy brief stated that the first and the second meetings failed to provide a clear and concrete roadmap through 2024.

The initial discussions on the new climate goal did not take off well. With little time left, stakeholders have to ensure that mistakes made while framing climate finances are not repeated.

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5

EXTREME WEATHER EVENTS

February 2022 was the first month since 1988 when three storms made landfall in Madagascar in a single month

The heat wave in Antarctica set a new record for the largest temperature excess (38.5°C) above normal

Flooding in Pakistan has killed 1,700 people and affected another 33 million; it has led to economic losses of US $30 billion

Scan for free download of Extreme Weather report

EXTREME WEATHER EVENTS

WHAT IS AN EXTREME WEATHER EVENT?

The IPCC defines extreme weather events as events that are "rare at a particular place and time of year." These include heat and cold waves, heavy rainfall, tornadoes, cyclones and floods.

The increase in frequency and intensity of extreme weather events has been attributed by scientists—including those who are part of the World Weather Attribution (WWA) initiative—to global warming and resultant climate change.

A record-breaking extreme weather event occurred in every month of 2022.

A record-breaking extreme weather event, attributed by scientists to climate change, occurred in every month of 2022

JANUARY

In January, Argentina suffered from intense heat waves with 50 cities recording temperatures above 40°C. In some cities such as Buenos Aires, temperatures were up to 10°C more than normal. The heat wave made an ongoing drought in Argentina even worse, triggered wildfires, decreased agricultural production and even affected the electrical supply of Buenos Aires briefly.

FEBRUARY

Four tropical storm systems battered Madagascar with extremely heavy rains in January and February—tropical storm Ana in the last week of January; cyclone Batsirai in the first week of February; tropical storm Dumako on February 15; and cyclone Emnati that made landfall on February 23. According to the US's National Oceanic and Atmospheric Administration (NOAA), February 2022 was the first month since 1988 when three storms made landfall in Madagascar in a single month.[1]

According to the United Nations Office for the Coordination of Humanitarian Affairs, six tropical weather systems—including tropical storm Gombe on March 8 and tropical storm Jasmine on April 26—affected Madagascar between January and April causing 214 deaths and affecting 0.96 million people.[2]

MARCH

The heat wave in Antarctica set a new record for the largest temperature excess above normal, 38.5°C, ever measured at an established weather station, at Antarctica's Dome C on March 18. This led to Antarctica's second lowest sea ice extent on record.

Early heat waves in South Asia affected northwest India and adjoining areas of Pakistan. According to scientists at WWA, global warming has made these early and intense heat waves over India and Pakistan 30 times more likely.[3]

This month was the hottest March on record for India. Between March 11 and June 6, 17 Indian states suffered from heat waves ranging from normal to severe. This included some states which have historically not been prone to heat waves at all. Himachal Pradesh experienced heat waves in March, April and May for the first time on record.

The month also witnessed 210 tornadoes in the USA, which is the most on record for March.

APRIL

In April, south-western USA witnessed multiple wildfires while South Africa's eastern parts suffered from record breaking extreme rainfall and floods from April 9–13. According to weather attribution scientists, such extreme rainfall was made two times more likely by global warming.[4]

MAY

The month of May was the driest and warmest on record for France, while the rest of western, central and southern Europe also experienced record-breaking temperatures.

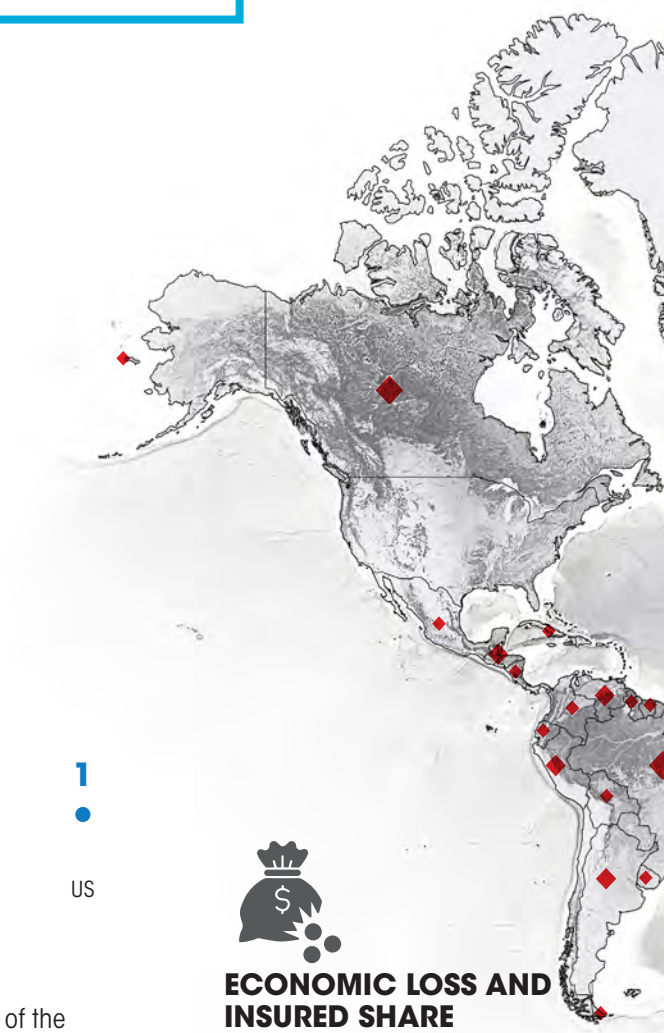
In June, extreme rainfall triggered floods in India, Bangladesh and China. Some places in southern China received their highest rainfall in 60 years

JUNE

Europe recorded its second hottest June this year with Tromso, the largest city in Norway, breaking its all-time June temperature record.

LOST AND DAMAGED

While all regions have incurred losses due to extreme weather events, developed countries remain the least affected and most insured from the shocks



◆ **Countries with extreme weather events between January 1 and October 10, 2022**

COUNTRIES AFFECTED

At least 95 nations have suffered losses due to extreme weather events this year

Africa, Europe and West Asia	Americas	Asia Pacific	US
52	19	23	1

POPULATION AFFECTED

Asia and Africa are home to almost 94 per cent of the 75.4 million people affected by extreme events this year

Africa, Europe and West Asia	Americas	Asia Pacific	US
19.99 million (19.17 million in Africa)	**3.96 million**	**51.45 million** (51.31 million in Asia)	**3,975**

DEATHS

The two continents account for 87 per cent of the 10,000-odd deaths caused by extreme weather events this year

Africa, Europe and West Asia	Americas	Asia Pacific	US
4,338 (4,052 in Africa)	**984**	**4,699** (4,669 in Asia)	**82**

ECONOMIC LOSS AND INSURED SHARE

The US reported the highest economic losses and insured share, indicating better preparedness

Africa, Europe and West Asia
23.6 US $billion
47% share loss insured

Americas
9.6 US $billion
25% share loss insured

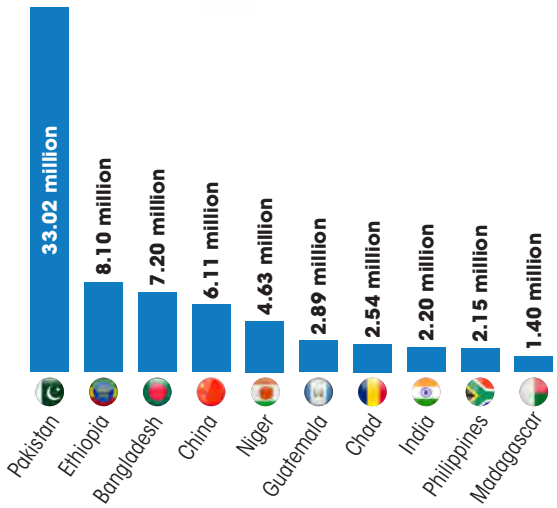
Asia Pacific
21.5 US $billion
31% share loss insured

US
27.4 US $billion
69% share loss insured

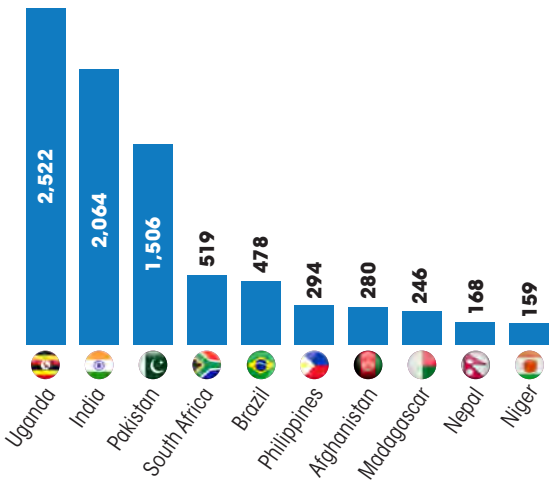
EXTREME WEATHER EVENTS

None of the top 10 worst affected countries, in terms of population or deaths, are located in **Europe or North America**

HIGHEST AFFECTED POPULATION



MOST DEATHS



SOURCE: Extreme weather events considered for total deaths, people affected and countries includes wildfire, drought, extreme temperature, flood, landslide and storm. The data has been sourced from EM-DAT database, United Nations Office for the Coordination of Humanitarian Affairs, International Organization for Migration, as on October 7, 2022; Extreme weather events considered for total economic loss include EU windstorm, tropical cyclone, flooding, Severe convective storm, drought, winter weather, wildfires and others. The data has been sourced from Catastrophe Insight published by financial services firm AON, as on October 10, 2022

INFOGRAPHICS: SANJIT / CSE

Extreme rainfall triggered floods in northeast India, Bangladesh and southern China. Some places in the south of China received their heaviest rainfall in 60 years.

JULY

All through July and August, there were simultaneous heat waves in at least 33 countries—across Asia, Africa, South America, Europe and North America—which broke temperature records and caused droughts, dried up rivers and led to widespread wildfires. Droughts have become up to six times more likely in the northern hemisphere due to global warming.

Nineteen European countries experienced heatwaves and in most of them, monthly or all-time temperature records were broken in the last two weeks of July. The most severe heatwaves were in the UK, France and Spain. Almost all the weather stations in the UK recorded highest-ever temperatures on July 18–19, with Coningsby in the eastern UK recording the country's highest temperature at 40.3°C on July 19.

There were two heatwave spells in China, from July 5 to 17 and from July 23 to the first week of August. Between July 15 and 26, temperature records were broken in as many as 71 weather stations across the country. The heatwaves and dry conditions led to a crippling drought in the country, especially in Wuhan. The Yangtze River was at its driest in 150 years.

AUGUST

According to a report by the Copernicus Climate Change Service (C3S) of the EU, the continent experienced its warmest summer and August on record.[5] While the heat was mostly in the western and southern regions in June and July, the eastern part of the continent suffered the brunt of the heat in August.

Flooding, which began in Pakistan in June, intensified in July and became catastrophic in August. As of October, it has killed 1,700 people, affected another 33 million and led to economic losses of US $30 billion. Fifty per cent of the increase in intensity of rainfall in August was attributed to global warming.

SEPTEMBER

The North Atlantic hurricane season threw up a few surprises. The first was category 4 hurricane Fiona which made landfall in Puerto Rico and Dominican Republic on September 18. In Puerto Rico, one-third of the population was left without access to water and the flooding was the worst since hurricane Maria in 2017. After that, hurricane Fiona tracked north up to the eastern coast of Canada to make landfall in Nova Scotia. It was the most intense and costliest of all the hurricanes that have ever made landfall in Canada. The total destruction cost attributed to Fiona was around US $700 million. According to climate scientists, such tracking of a hurricane so up north was highly unusual.[6]

The second surprise was hurricane Ian which led to record breaking rainfall, storm surges and inundation in many regions of south-western Florida after knocking out the power supply of the entire country of Cuba. On September 28, when the hurricane made landfall on the island of Cayo Costa, it dumped up to 430 mm of rain and caused an unprecedented storm surge of 3.7–5.5 metres. The track of the cyclone was also unique with multiple intensifications and one stretch of rapid intensification as well.

OCTOBER

Heat waves in China continued into autumn—as late as early October—after which there was a complete reversal of temperatures from extremely hot to extremely cold. For instance, in Xiangyang in Hubei province, the temperature dropped from 37.7°C (highest ever for the first 10 days of October) on October 2 to 6.6°C (almost the lowest for the same period) on October 4. In the rest of Asia, there were heatwaves in Russia, Iran, Turkmenistan, Uzbekistan, Tajikistan, Kazakhstan, Turkey and Taiwan.

Nigeria has been hit by one of the worst floods in recent history. The flood, which has spread across all 36 states, has led to over 600 deaths, affected 2.5 million people, and destroyed more than 200,000 homes and large swathes of farmland. Nigeria's meteorological agency has warned that flooding could continue until the end of November in some states. Although the country is used to seasonal flooding, this year has been significantly worse and the government has said unusually heavy rains and climate change are to blame.

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6

LOSS AND DAMAGE

L&D finance must be provided under the broader climate justice and equity framework

Developed countries must take responsibility for L&D caused by climate change due to their historic emissions

A failure on L&D negotiations at COP 27 could lead to disintegration of trust in the UNFCCC process

Scan to read the Down To Earth Special Edition on Loss and Damage

WHAT IS LOSS AND DAMAGE?

The negative economic, non-economic and ecological impacts of climate change—both due to rapid onset extreme weather events such as floods and tropical cyclones and slow onset changes such as sea level rise and droughts—are termed as loss and damage (L&D).

In 2022 alone, extreme weather events have led to more than 10,000 deaths and affected over 75 million people. The overall L&D to human lives, livelihoods, agricultural production, private and public infrastructure, and social and cultural systems will continue to rise as the frequency and intensity of these events increase. According to current estimates, by 2030 the total L&D for developing countries from all the impacts of climate change could be anywhere between US $290–580 billion. This could increase to US $1–1.8 trillion by 2050.[1]

In 2022 alone, extreme weather events have led to more than 10,000 deaths and affected over 75 million people

The World Weather Attribution (WWA) initiative has attributed many events in the past few years to climate change caused by greenhouse gases that are already in the atmosphere and were mostly emitted by countries that led the industrial revolution. Even though attribution science is established, fixing accountability to historic polluters and calculating compensation remain a challenge.

HOW IS LOSS AND DAMAGE ESTIMATED?

Some limiting but established ways of estimating L&D are from Rapid Needs Assessments (RNAs) and the more-detailed Post-Disaster Needs Assessments (PDNAs) of extreme weather events. They are led by the governments of affected countries, with support from global bodies such as OCHA, UNDRR, Asian Development Bank and European Civil Protection and Humanitarian Aid Operations, among others.

The purpose of RNAs, conducted just after a natural disaster strikes, is to perform a broad-based assessment

that can help governments identify the critical impact and resulting priority needs and interventions in a matter of days. PDNAs, on the other hand, are conducted over a longer period.

The methodology for both assessments is similar and agreed upon globally. It consists of four main elements. First, understanding pre-disaster social, economic, cultural, financial and political conditions for comparability. Second, assessing the effects of the disaster, such as damage to physical infrastructure, disruption of access to goods and services, hindrances in the exercise of citizenship, increased risks and vulnerabilities, etc. After this assessment, economic losses due to these effects are calculated.

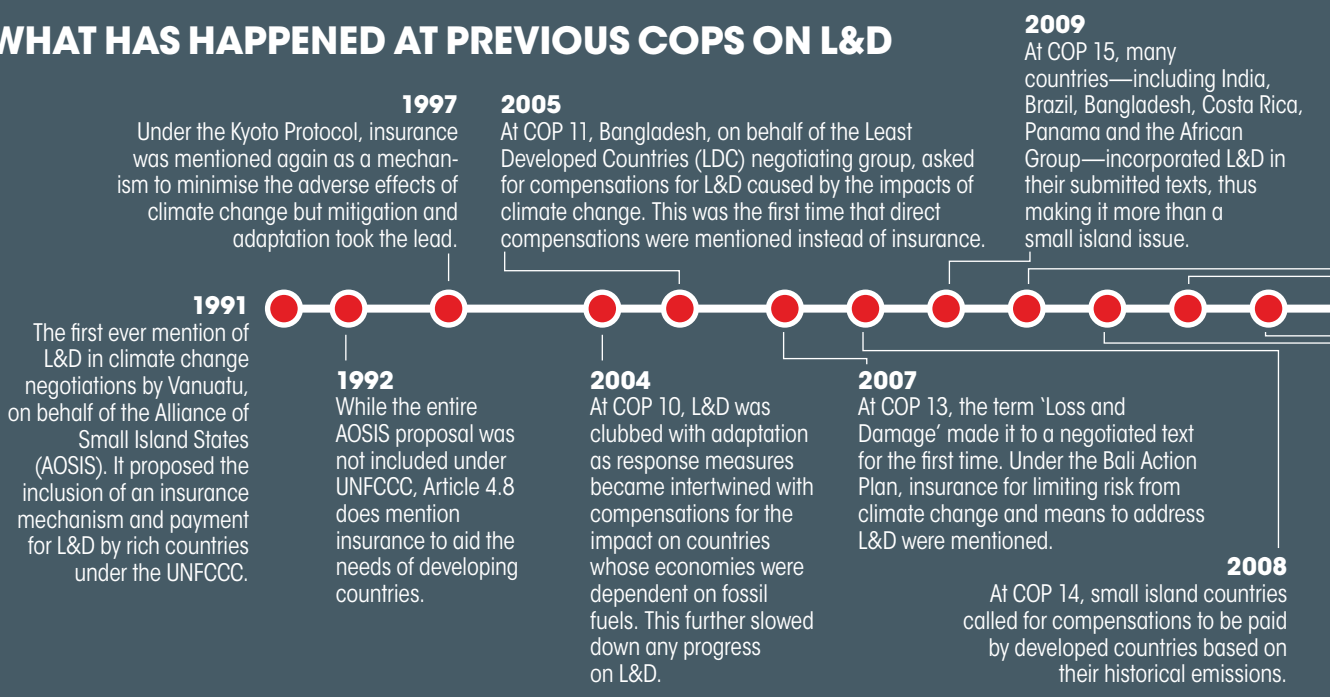
Third, calculating effects on quality of life, and macro and micro economic impacts such as lack of access to fuel leading to increase in food prices and general inflation, impairment of household income, and increase in unemployment. This analysis, which also considers existing development plans, learnings from past experiences and new emerging risks, becomes the basis of the fourth element, which is a recovery strategy for short-, medium-, and long-term needs.

The current methodology does not account for the full scale of long-term damages, such as displacement and unemployment, not only due to floods and cyclones but also from slow-onset events such as long-term droughts, desertification and rise in sea levels. Also not taken into account are historical socio-economic vulnerabilities and non-economic impacts such as loss of cultures, traditions, languages and even entire communities.

There are also differences in L&D between developed and developing countries. In the former, economic losses are more from infrastructural damage and therefore the immediate figures are much higher than in developing countries, where losses are more in terms of human lives and livelihoods. The losses from environmental destruction can be calculated from natural capital accounting, but only one example of such a study exists from Vanuatu in the case of the Severe Tropical Cyclone Harold.[2]

FACTSHEET
LOSS AND DAMAGE

WHAT HAS HAPPENED AT PREVIOUS COPS ON L&D



WHAT ARE THE FINANCING MECHANISMS FOR LOSS AND DAMAGE REPARATIONS?

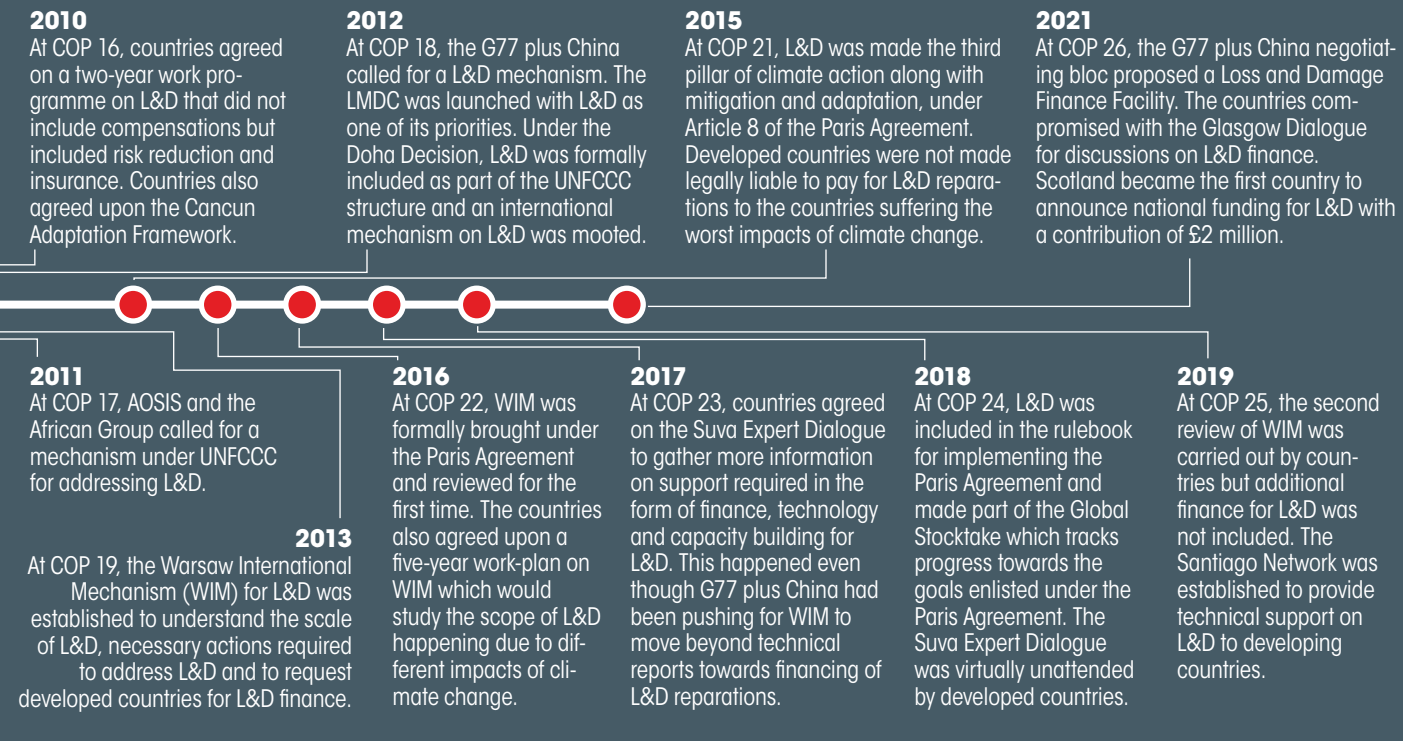
There is currently no accepted mechanism under the UNFCCC process for making reparations for these losses. Whatever money does come is limited to humanitarian aid from individual countries, international financial organisations such as the World Bank and the International Monetary Fund, and insurance payments by private companies.

One way of fixing historical responsibilities of polluters and calculating compensations for L&D is via weather attribution science. This involves calculating the effect of climate change on a particular extreme weather event and apportioning that to countries in accordance with their historical greenhouse gas emissions. But, gaps still remain in the scope and capacity of weather attribution science, and developed countries neither accept their historical responsibilities nor are they legally accountable to make these payments.

There are proposals for financing L&D outside the UNFCCC process through initiatives such as an International Solidarity Fund proposed by the Heinrich Böll Foundation which would

FACTSHEET

LOSS AND DAMAGE



bring together public and private ways of financing. Under this they envisage developed countries contributing US$ 150 billion by 2030. They predict that this public fund would then mobilise additional funding of up to US $150 billion every year from alternative and innovative sources.[3]

A 4 per cent annual decrease in fossil fuel subsidies by G20 countries could raise US $245 billion till 2030. Financial transactions tax could add another US $297 billion a year. A climate damages tax of US $5 per tonne of CO_2 equivalent emitted from burning of coal, oil and gas would add another US $210 billion per year in the beginning. As the taxation rate is increased with time, the funds generated would also increase proportionally.

There is also a proposal to make a mechanism for raising reconstruction grants and reform institutions like the World Bank and IMF to "secure long-term funding" for poor and vulnerable nations through a greater redistribution of special drawing rights, greater investment in climate resilience and the development of long-term instruments that can mobilise US $3–4 trillion in finance for carbon-cutting projects. Debt-

for-Climate-Swaps have been proposed to provide debt relief in exchange for climate investment. Pledges from countries like Denmark, which committed DKK 100 million in September for L&D, create a precedent for other wealthy countries.

HOW HAVE CLIMATE NEGOTIATIONS ON LOSS AND DAMAGE FARED SO FAR?

At COP 26 in Glasgow, the Group of 77 (G77) and China united in their demand for a Loss and Damage Finance Facility to disburse funding to rebuild the lives of communities facing the worst impacts of the climate crisis. Their demand was pushed back by developed countries such as the US and Switzerland, and watered down to a compromise: To set up the non-binding Glasgow Dialogue to explore possible institutional arrangements to address L&D in the future.

A 4 per cent annual decrease in fossil fuel subsidies by G20 countries could raise US $245 billion till 2030

The Glasgow Dialogue commenced at the UN's mid-year climate change conference (the 56th meeting of the Subsidiary Bodies or SB56) in Bonn, Germany this June and will end in June 2024. It took forward action items announced at COP 26 last November and advanced some of the more technical and operational discussions in time for COP 27. At SB56, the G77 put forth a request to add two items to the official conference agenda—one, on the Global Goal on Adaptation and the other on the Glasgow Dialogue on L&D finance. While adaptation was eventually added to the formal agenda, L&D was dropped.

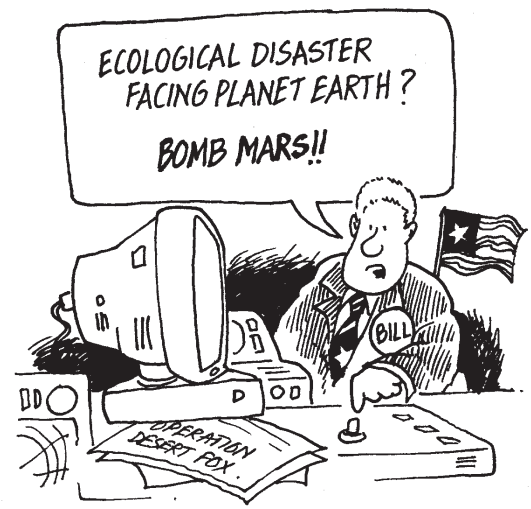
Article 8 of the Paris Agreement of 2015 acknowledges L&D, stating: "Parties recognize the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change." It needs to be clarified that "averting" refers to climate mitigation and "minimizing" refers to climate adaptation. "Addressing" means "paying for L&D" and it remains a key issue as currently no financing exists for this under the financial mechanism of UNFCCC.

Developed countries like Switzerland insisted that they make large contributions to the International Red Cross and other forms of developmental and humanitarian aid, which are not counted as L&D finance. The US and Canada also brought up humanitarian assistance as an example of finance already being provided, with Canada noting that a funding arrangement for L&D need not be under UNFCCC alone. The risk here is that the accountability created by the UNFCCC will be lost.

Humanitarian aid is not designed to address L&D based on the polluter pays principle. Therefore, a mechanism where contributions are mandatory, not voluntary, is required to finance reparations for victims of climate change. Developed countries also raised the question of how to define the "most vulnerable", but such language can be strategically used to narrow the scope of responsibility and eliminate many victim countries from being eligible for finance.

WHAT IS ON THE TABLE AT COP 27?

G77 plus China proposed to place L&D as a sub-item under agenda 10 of COP 27 and to let the Glasgow Dialogue continue as a parallel process. In August, L&D was included in the provisional agenda for COP 27 and there was consensus to establish it as a formal agenda item. Developed countries have highlighted that their citizens would not buy the historical polluter argument today as they are worried about crises in their own countries.



Many developing countries are of the view that funds structured around liability and historical responsibility are an unachievable pipe dream. Therefore, some of them are willing to accept a political commitment to establish a facility at COP 27, as a starting point. They want the Glasgow Dialogue to have clear linkages to the decision-making process. They would also like assured funds for L&D under the Adaptation Fund or the Green Climate Fund.

The question arises: Is a vague political commitment to set up a new facility for climate finance enough at this stage? According to at least one developing country negotiator, a failure on L&D negotiations at COP 27 would lead to disintegration of trust in the UNFCCC process.

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7

ENERGY

Fossil fuel is fossil fuel. Can it be called clean?

Also, what about the question of climate equity when it comes to natural gas from Africa?

Scan for free download of this factsheet and other CSE COP 27 publications

Our energy-guzzling world is at a cusp. It could find a way to leverage the current crisis of energy scarcity and rising prices to reinvent the fossil-fuel-based system. Or it could reinvest in the same carbon-intensive energy system, as people in the already-rich countries get increasing desperate for reliable and affordable power to light and heat their homes this winter. This is an important moment in time and one that makes the actions to combat climate change even more contested and even more urgent.

Let us be clear that in this moment, the already-developed countries—we point to them because these countries have already burnt massive amounts of carbon dioxide for energy to build their economies—are faced with a real energy conundrum. They have already overused their share of the atmospheric space as emissions from burning fossil fuels—first coal and then natural gas and oil—and have brought the world to this precipice point. They need to invent their energy systems and they said in their many pronouncements that they would move away from fossil to cleaner renewable energy systems. The question is—today, when the rubber has hit the road—will they?

Energy disruption has provided the much-needed vault to the beleaguered fossil fuel industry; it has given it a new lease of life

It is a double-punch moment as well. On the one hand, these countries—from Europe to USA—are battered because of a fast-heating planet; temperatures have gone through the roof; droughts and extreme weather events are hitting them as well. They know that climate change is a great equaliser and that as emissions stock up in the atmosphere, temperatures will increase and make for an untenable future. On the other hand, ordinary people across Europe are worried—not just because of climate change, but because of lack of energy to heat their homes this coming winter. In the UK, energy prices have spiralled—also because of the lack of regulatory control on the domestic gas production—and it is making for a tense polity.

The fact is that this energy disruption has provided the much-needed vault to the beleaguered fossil fuel industry; it has given it a new lease of life. Today, governments have changed their tune; they are asking this industry to dig more, to drill more, to supply more. Europe has baptized natural gas a fossil fuel—less polluting than coal, but still a major emitter of carbon dioxide—as "clean". Norway and UK have rebooted their oil and gas drilling; Germany and others in Europe are looking for new suppliers of liquefied natural gas (LNG) from every distant shore and building infrastructure to pipe and pump this. The US has passed a climate bill (called the Inflation Reduction Act) which will invest in renewable energy, but this is conditional to spends on oil and gas in Alaska and the Gulf of Mexico, and the opening up of millions of acres of federal land for drilling. This renewed interest in fossil fuels must remain temporary and transient. However, given the nature of economies, once the investment has been made in this new infrastructure for LNG terminals or increased supply of fossil fuel from new oil and gas discoveries, it will be difficult to wean off.

China accounted for roughly half, India 12.5 per cent, US and the EU 11 per cent each, and Africa just 2.62 per cent of the world's coal consumption in 2021

The question is what is if natural gas—also a fossil fuel—can be called green now?

Let's look at the basic energy facts:

Coal and gas contribute half of the world's primary energy consumption; the rest is mainly oil (largely for transport) and biomass fuel that is used by poor women in the world to cook food.

Coal consumption in 2021 was some 44,473 TWh, of which China consumed 23,936 TWh— roughly half—India 5,580 TWh (12.5 per cent), US and EU 11 per cent each and the whole of the African continent consumed just 2.62 per cent.

Gas consumption in 2021—40,375 TWh—was notching up to coal consumption of which the US consumed 20 per cent and Russia and the EU 10 per cent each.

In 2021, according to the International Energy Agency, total energy- related greenhouse gas emissions from coal was 15.27 gigatonne of CO_2 equivalent ($GtCO_2e$), roughly 29 per cent of global greenhouse gas emissions. Natural gas contributed roughly half, i.e. 7.49 $GtCO_2e$ (14 per cent of global emissions). This is because natural gas emits roughly 50 per cent less CO_2 than coal when it is burnt.

But the question is if this "accounting" of emissions is dependable. The fact is that natural gas comprises 70–90 per cent methane, which is an even more potent greenhouse gas. And the problem is that the world does not have adequate monitoring of methane emissions from the energy sector, particularly because of leakages in pipelines, which are difficult to detect and control. It is estimated that leakage could be in the range of 1–10 per cent—this would add to the emissions from natural gas. This means that this so-called cleaner fossil fuel could be not so clean—or could be even as dirty as coal.

It is estimated that gas leakage could be in the range of 1–10 per cent—this would add to the emissions from natural gas

The question then is: What is the cost of abatement of these two fossil fuels? Clearly, you would assume that as coal has double the CO_2 emissions, the cost of cleaning it will also be higher, i.e. double of gas. However, this may not be so accurate, partly because of abatement technologies that are based on the concentration of CO_2 in flue gas and the fact that methane abatement would also need to be factored into natural gas. The cost of carbon capture technology, estimated by Harvard Kennedy School,[1] was US $20–132 per tonne of CO_2 against natural gas, which was in the range of US $49–150 per tonne of CO_2. Clearly this needs further work as burning fossil fuel is the biggest problem when it comes to the climate emergency.

African gas: Who should use?

The question is whether the already industrialised world should also get the "benefit" of using this somewhat cleaner fossil fuel. The fact is the carbon budget has already been appropriated by a few countries for their growth. These countries need deep decarbonisation, which would mean a transition to renewables and other non-fossil energy sources. They cannot reinvest in fossil fuels and call it clean and green.

The problem is not just that these countries will take up more of the carbon budget because of their continued use of fossil fuel. It also means that the price of energy transition will go up—already, LNG is being diverted to Europe, which has a higher capacity to pay the costs. This will mean that countries like India will find it difficult to get out of the coal trap. This is cheaper fuel, however dirty, and because it is under our ground it has a higher quotient for the energy security experts. It takes us backwards. It makes the entire world unsafe and insecure.

Today, countries in the EU have also started exploring energy source options other than Russia. The environment ministers of EU 27 have visited Norway, Qatar, Azerbaijan and especially North African countries such as Algeria and Egypt. Africa's natural gas reserves are vast and hence it is being seen by the EU as a prominent source of energy. A new gas liquefaction project on the west coast of Africa, near Senegal and Mauritania's coastline, is expected to have 15 trillion cubic feet of gas annually, which is five times what Germany used in 2019.

With a large gap in its own energy access and security, how justified is it for Africa to export large portions of its gas to the EU?

Algeria and Egypt accounted for 60 per cent of the gas production of the continent in 2020. Algeria produced 120 billion cubic metre of gas of which 70 per cent was consumed by Algeria itself. Although Algeria already has two gas pipelines going into Italy and Spain, it exported around 31.8 billion tonnes billion cubic metre of gas.

The concern here is that with gas exports, can the domestic demand of the country be met in the future. More than 60 per cent of Egypt's gas is used for its own power requirements and it is sending most of its LNG exports to Asian markets. Egypt's prime minister has been quoted in newspaper reports[2] saying that by rerouting 15 per cent of its domestic gas usage to Europe, his country will earn an additional US $450 million every month.

It is estimated that out of 1.4 billion people living in the African continent, 600 million don't have electricity, and 900 million lack access to cleaner cooking fuels.[3] With a large gap in its own energy access and security, how justified is it to export large portions of its gas to the EU? Will this push the African continent towards cheaper and dirtier fuels? Will it add to the energy poverty of its people—this when we know that the cost of clean energy transformation is high and often unaffordable by poorer nations.

It is clear that the moral imperative is that historical polluters like the EU accelerate their transition from fossil fuels such as gas rather than getting entrapped in new infrastructures that would push them towards dependence on fossil fuels for the coming decades. And the available carbon budget—and the use of fossil fuels, like gas—should be the right of emerging and poorer nations.

Two, and this is linked to the first caveat, is that these countries are not entitled to more use of fossil fuels in our world of shrunk carbon budgets. They need to reduce emissions drastically and leave whatever little carbon budget space is remaining for poorer countries to use—this in real terms remains not using fossil fuels, but letting the continent of Africa or countries like India to use the available cleaner fossil fuels to drive economies and reduce local air pollution. It is not just a moral imperative, but a prerequisite for a world that has a chance to keep spiralling temperatures under check. This is what we need to keep in mind as countries reconcile their energy supply options with climate change.

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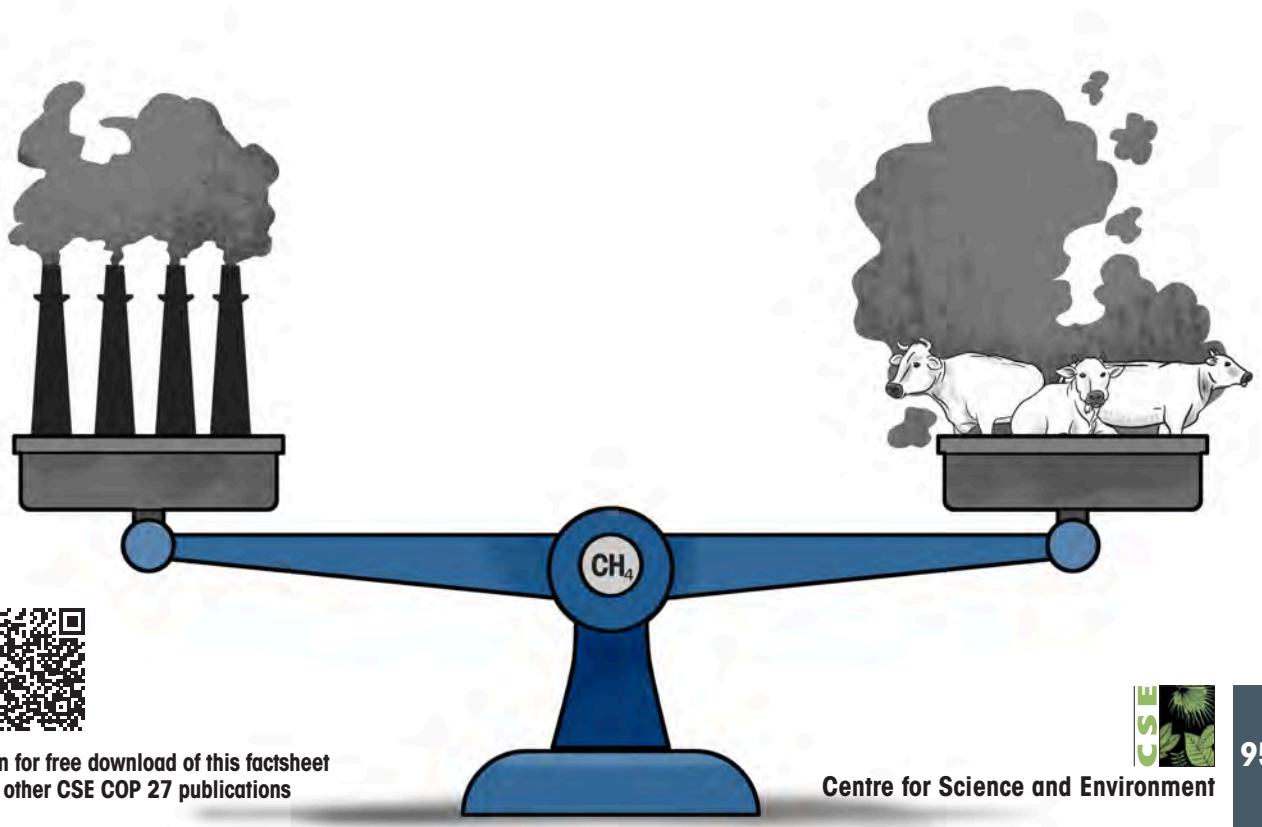
8

METHANE EMISSIONS

Methane emissions have a higher warming impact on the planet than CO_2 but they remain in the atmosphere for comparatively lesser time

Attempts to curb methane emissions from agriculture may impact farmer livelihoods and incomes in the Global South

Methane emissions from oil and gas sector can be reduced with existing technologies by regulating infrastructure



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Why focus on methane emissions?

Methane has been the focus of climate mitigation policy ever since it was discovered that methane emissions have a higher warming impact on the planet than carbon dioxide (CO_2).[1] In the first 20 years of its release into the atmosphere, the warming impact of methane has been found to be 81.2 times stronger than CO_2, and 27.9 times stronger than CO_2 over a 100-year period.[2] In 2019, the global level of methane emissions was 9.8 gigatonne of carbon dioxide equivalent ($GtCO_2e$), which was 25 per cent higher than it was in 1990 (7.8 $GtCO_2e$).[3]

While agriculture is the largest source of methane emissions, the biggest and cheapest opportunities to cut methane lie in the fossil fuel sector

Reducing methane emissions is frequently termed as a 'low-hanging fruit' in climate change mitigation. Methane lasts in the atmosphere for about a decade before breaking down, unlike CO_2 which lasts for over 100 years. According to scientists, reducing methane emissions also lowers its atmospheric concentration simultaneously, thus reducing its warming impact almost immediately.[4] In comparison, even if CO_2 emissions reach zero or net zero, the accumulated CO_2 in the atmosphere will continue to warm the planet over the course of its lifetime. Moreover, the methods and technologies to reduce methane emissions, particularly in the fossil fuel sector, are mature and cheap, further strengthening the case for an immediate cutback.

It is possible to reduce methane emissions by half within this decade

According to the United Nations Environment Programme (UNEP), methane emissions caused by humans could be reduced by approximately 180 million metric tonnes per year (Mt/yr) within this decade. This could avert nearly 0.3°C of global warming by 2045, helping to limit the global temperature rise to 1.5°C. This would make the targets set by the Paris Agreement more achievable.[5]

Where is methane emitted from?

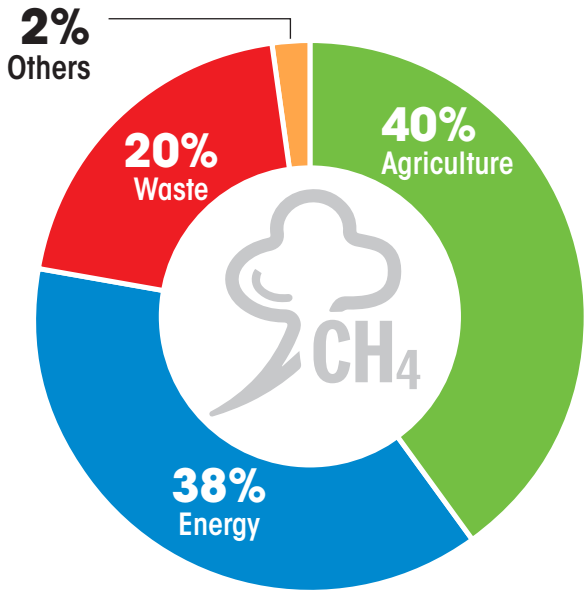
Methane emissions from agriculture come from livestock production—enteric fermentation in ruminant animals and manure management—and rice cultivation.[6] Livestock production contributes one-third of the total global anthropogenic methane emissions, making it the largest single source (see *Graph 1: Anthropogenic sources of methane emissions).*

Flooding of paddy fields for rice production cuts off oxygen to the soil allowing methane-producing microbes to thrive.[7] This leads to about eight per cent of global anthropogenic methane emissions, and is concentrated heavily in Asia—mainly India and China.

Methane emissions from the waste sector originate from landfills and wastewater handling, and constitute about 12 per cent of global anthropogenic methane emissions.

According to the IPCC AR6 WG III report, in 2019, global methane emissions from energy supply, primarily fugitive emissions from the production and transport of fossil fuels, accounted for about 18 per cent of global greenhouse gas (GHG) emissions from energy supply, 32 per cent of global methane emissions, and six per cent of global GHG emissions.

Graph 1: Anthropogenic sources of methane emissions (2019)



Source IEA

According to the Global Energy Monitor (GEM), coal mines emit 52.3 million tonnes of methane per year.[8] According to the Global Methane Budget, leaks in coal mining occur during post-mining handling, processing and transportation.

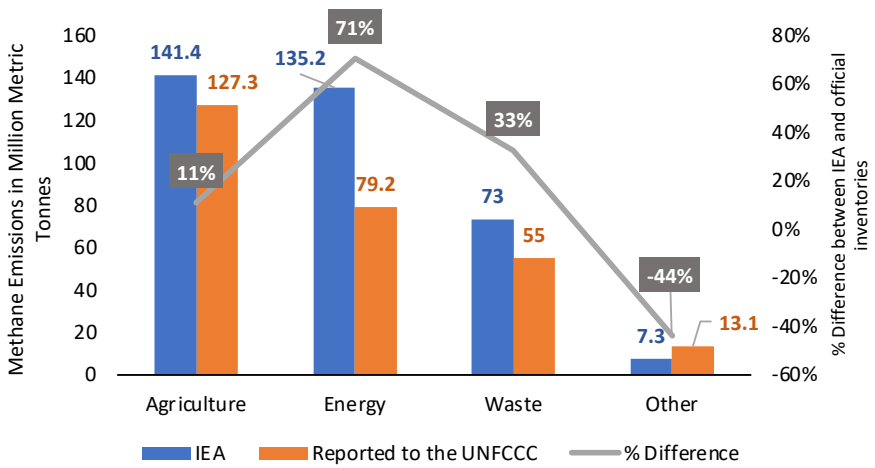
Methane is also emitted throughout the process of natural gas extraction and use.[9] Additionally, the fuel used during the process is itself composed primarily of methane. The Global Methane Tracker 2022, published by the International Energy Agency (IEA), stated in its headline statement that methane emissions from the global energy sector are 70 per cent higher than official figures, indicating that national inventories are under-reporting methane emissions[10] *(see Graph 2: Methane emissions vary)*.

Sources differ on which countries have the highest methane emissions. The top five emitters produced close to half of global methane emissions in 2019, with China leading the list *(see Table 1: Top five countries with the highest methane emissions –2019)*. However, as the methane estimations from oil and gas is understood to be underreported, this data needs further work.

Policy action on methane: survival vs luxury emissions

As of October 2021, among the total number of countries that submitted Nationally Determined Contributions (NDCs) under

Graph 2: Methane emission estimates vary



Source: Compiled by CSE; adapted from Global Methane Tracker 2022. International Energy Agency. Accessed at: https://www.iea.org/reports/global-methane-tracker-2022

Table 1: Top five countries with the highest methane emissions – 2019

Source	Country	Annual methane emissions (GtCO2e)	% of world's annual methane emissions	Source	Country	Annual methane emissions (GtCO2e)	% of world's annual methane emissions
PBL 2020	China	1.18	14%	CAIT	China	1.62	16%
	United States	0.75	9%		India	0.87	9%
	Russia	0.69	8%		United States	0.68	7%
	India	0.66	8%		European Union	0.61	6%
	Brazil	0.44	5%		Brazil	0.54	5%

Source: Compiled by CSE; data from 1) Olivier J.G.J. and Peters J.A.H.W. (2020), Trends in global CO2 and total greenhouse gas emissions: 2020 report. Report no. 4331. PBL Netherlands Environmental Assessment Agency, The Hague, and 2) Our World in Data based on Climate Analysis Indicators Tool (CAIT)

the Paris Agreement to the UNFCCC, 63.4 per cent had referenced methane.[11] In the same month, the UNEP and EU launched the International Methane Emissions Observatory at the G20 Summit, to produce a global public dataset of empirically verified methane emissions, starting with the fossil fuel sector.

In November 2021, at COP 26 in Glasgow, the Global Methane Pledge was announced by the US and EU where signatories promised to reduce their methane emissions by 30 per cent by 2030. The Pledge claimed to reduce warming by 0.2˚C by 2050. As of October 2022, the Pledge has 122 signatories and has the potential to take important steps in achieving short-term climate benefits of methane reductions. However, scientists believe that the Pledge must go further and aim for cuts of around 50 per cent if it hopes to meet its target.[12] Moreover, the Pledge is non-binding, and the reduction targets are global with no specific national targets.

China, Russia and India did not join the Pledge. Australia—a major source of livestock, coal mining and gas-based methane emissions—did not participate in the Pledge under Prime Minister Scott Morrison's leadership. However, in October 2022, Anthony Albanese's government announced that Australia would join the Pledge.

At the individual country level, the European Union (EU) communicated its methane reduction strategy in 2020.[13] The following year, the EU drafted legislation to reduce methane emissions by forcing oil and gas companies to report their output, and find and fix methane leaks.[14] New Zealand plans to "reduce biogenic methane emissions by 10 per cent by 2030, and 24–47 per cent by 2050, both relative to 2017 levels," while Nigeria and Cote d'Ivoire

have committed to reducing methane emissions from oil and gas sectors by 45 per cent by 2025 and 60–75 per cent by 2030 respectively.[15]

In 2016, the United States, under the Presidency of Barack Obama, sought to control methane emissions from the oil and gas sector by announcing new emission standards, and leak detection and repair requirements.[16] However, these were rolled back in 2019, under the Presidency of Donald Trump, who proposed eliminating regulatory requirements for oil and gas companies.[17] The Trump administration also proposed diluting some of the air pollution regulations for the oil and gas industry. This course has been reversed, at least in intention, by his successor Joe Biden, who announced a target for reducing methane emissions by more than 50 per cent by 2030 during COP 26 in Glasgow.This would require certain upgrades, restrictions and monitoring parameters to be put in place for the industry.[18]

Annual investment of around US $13 billion would be required to mobilise methane abatement measures in the oil and gas sub-sector

While agriculture is the largest human-driven source of excess methane, its association with livelihood and nutrition, particularly in the Global South, makes it a tricky sector to tackle. Moreover, according to the IPCC, mitigation of methane in the agriculture sector is "still constrained by cost, the diversity and complexity of agricultural systems, and by increasing demands to raise agricultural yields, and increasing demand for livestock products."

In response to a query in the Lok Sabha (lower house of the Parliament) in December 2021, member of Parliament Ashwini Kumar Choubey mentioned that enteric fermentation and paddy cultivation are the primary sources of methane in India, and the Pledge could impact small farmer incomes.[19] According to Choubey, in the context of food security, India's methane emissions were 'survival' emissions as opposed to luxury emissions. Since India is one of the largest producers and exporters of rice, attempts to

Cheapest methane abatement options lie in the fossil fuel sector

While agriculture is the largest source, the biggest opportunities to cut methane lie in the fossil fuel sector. Oil and gas are the only sectors for which most emissions can be reduced in a cost-effective manner with technologies that exist today. On fossil fuel methane emissions, the IPCC's AR6 WG III report asserts that, "about 50–80 per cent of CH_4 emissions from these fossil fuels could be avoided with currently available technologies at less than USD50 tCO_2-eq-1."

The IEA suggests that it is technically possible to avoid around three-quarters of today's methane emissions from global oil and gas operations. Annual investment of around US $13 billion would be required to mobilise all methane abatement measures in the oil and gas sub-sector, it adds, which is less than the total value of the captured methane that could be sold. Thus, methane emissions could be reduced by almost 75 per cent at an overall savings to the global oil and gas industry. Technologies include leak detection, installing emissions control devices, and replacing components and devices that emit methane in their normal operations.

curb agricultural methane emissions could impact farmers' incomes, agricultural production, and India's trade and economic prospects.

Wealthy nations like the US and EU who have rallied support for methane reduction in recent years, are still deeply dependent on natural gas as a fuel. In its methane report, the UNEP clearly states that "without relying on future massive-scale deployment of unproven carbon removal technologies, expansion of natural gas infrastructure and usage is incompatible with keeping warming to 1.5°C."

Scientific consensus points to the fact that the oil and gas sector can cut methane emissions at the lowest costs using technologies that are readily available today. But these measures cannot be limited to plugging leaks in oil and gas equipment. Instead, it requires a complete shift away from oil and gas, and towards zero-carbon renewable energy, initially for countries who can afford it, and gradually for the Global South.

As journalist Amy Westervelt pointed out in the New York based magazine, *The Nation* in November 2021, intentional flaring and venting is much more common in the natural gas drilling, refining and distribution process, than accidental leaks. And the industry has not proved reliable when it comes to curbing these releases. Thus, the only reliable solution to the methane problem is to end new permits and regulate existing infrastructure.[20]

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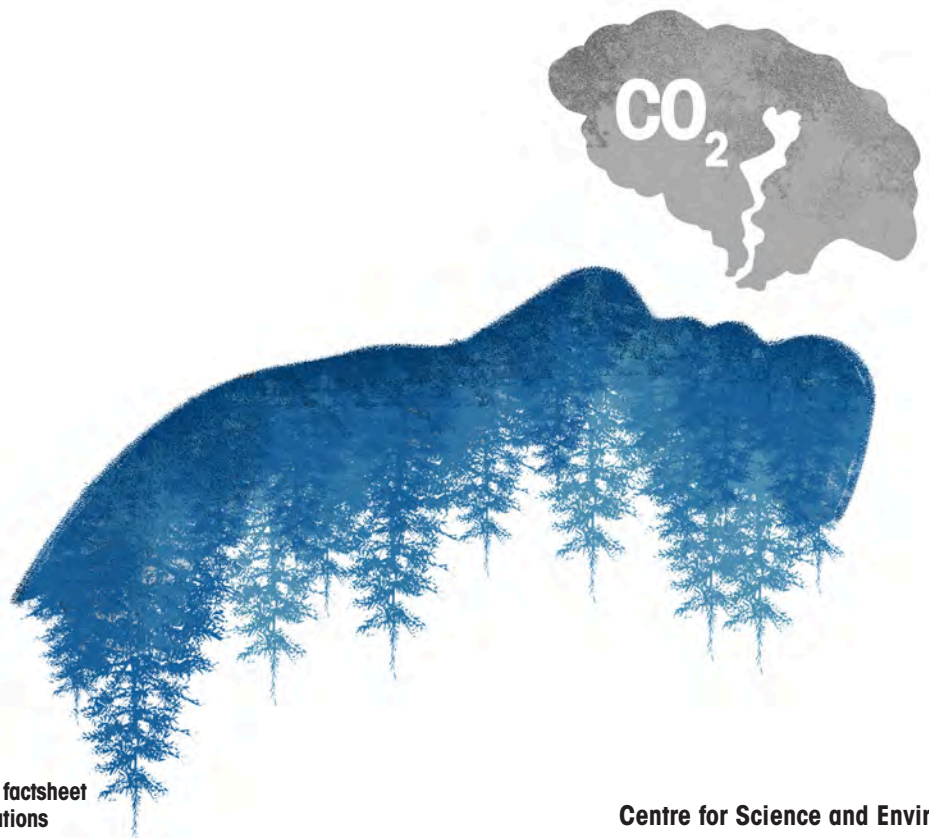
9

FORESTS AS CARBON SINKS

The world's forests sequestered twice as much carbon dioxide (CO_2) as they emitted between 2001 and 2019

Tropical forests store the most carbon, but they also have the highest emissions due to deforestation

Excess dependence on afforestation for climate change mitigation can disregard existing users and dwellers of these lands



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FORESTS AS CARBON SINKS

Why are forests important for combatting climate change?

Forests will play a critical role in the world's desperate fight to combat climate change. Research published in the *Nature Climate Change* journal in 2021 found that the world's forests sequestered about twice as much carbon dioxide (CO_2) as they emitted between 2001 and 2019. It is estimated that global forests removed around 15.6 Gigatonne carbon dioxide equivalent ($GtCO_2e$) each year while emissions from deforestation and other disturbances averaged 8.1 $GtCO_2$ annually. This meant that global forests were a net sink—soaking in some 7.6 $GtCO_2$ each year—a little less than the total CO_2 emissions of China in 2020 (roughly 10 $GtCO_2$), and more than the total annual CO_2 emissions of the US.[1]

Global forests have functioned as a net sink, soaking in 7.6 $GtCO_2$ each year

This is corroborated by the Intergovernmental Panel on Climate Change's (IPCC) *Special Report on Climate Change and Land 2019* (SRCCL), which estimates that between 2007 to 2016, land use accounted for 13 per cent of anthropogenic CO_2 emissions. But it also provided a net sink of around 11.2 $GtCO_2$ per year, equivalent to 29 per cent of total CO_2 emissions within the same period.[2]

The world is not on track to reduce greenhouse gas (GHG) emissions at the scale needed to avert a temperature rise of 1.5°C. The solution then is to find ways in which emissions can be removed from the atmosphere. Growing trees is a part of the solution. It is also clear that restoring land and adding to forests can benefit local people as environmental degradation impacts livelihoods and impoverishes communities. However, the questions that emerge here are—how will these forests be grown and on whose lands? Additionally, we must address who pays the price and who the beneficiaries are of this endeavour. It is also important to understand the costs of protecting nature—especially in areas that are inhabitated by poorer communities—and what this means for their future.

Where are the major sinks?

Tropical forests store the most carbon, the largest of which are in the Amazon, Congo River Basin and Southeast Asia. But they also have the highest emissions due to deforestation (78 per cent of gross emissions), even though they sequester more carbon (55 per cent of gross removal) than boreal and temperate forests combined.[3] The Food and Agriculture Organization's (FAO) data also points to this; findings state that from 2010–20, the top three countries with average annual net loss of forest area were Brazil, Democratic Republic of the Congo and Indonesia.[4] Consequently, the major global net sinks lie in temperate forests (47 per cent) and boreal forests (21 per cent) due to lower emissions, compared to the tropics (31 per cent).

Recent studies point to the fact that the Amazon may be close to its tipping point—it is today a 'net' source of emissions and not a sink. In July 2021, Luciana Gatti at the National Institute for Space Research in Brazil, along with other researchers, found that the Amazon rainforest, particularly the southeastern section, is now emitting more CO_2 than it is absorbing. Its net emissions amount to 1 $GtCO_2$ per year, caused mainly by fires deliberately set to clear land for beef and soy production. These are made worse by hotter temperatures and droughts.[5]

One-third of the world's tropical deforestation is driven by international trade, mainly in beef and oilseeds

According to Florence Pendrill at the Chalmers University in Sweden, one-third of the world's tropical deforestation is driven by international trade, mainly beef and oilseeds.[6] In Brazil, one-third of the deforestation is driven primarily by the expansion of pasture land to raise cattle for beef production. This is followed by cropland expansion for soybean and palm oil, and tree plantations in native forests for paper and wood products. The annual forest loss rate in the Brazilian Amazon reached a 12-year high of 1.11 million hectares in 2019 and 2020.

FORESTS AS CARBON SINKS

At COP 26, two announcements were made—the Glasgow Leaders Declaration to halt forest loss, and the FACT (Forest, Agriculture and Commodity Trade) Dialogue on sustainable trade. Such voluntary commitments are unlikely to be effective, unless domestic policies to protect and restore forests are strengthened significantly. In Brazil, for example, environmental laws have been weakened by former President Jair Bolsonaro, further encouraging illegal deforestation.[7]

Where is the renewed interest in forest sinks coming from?

Policy interest in using forest sinks to sequester carbon dates back to the 1990s. The role of land (forests and agricultural land) as a mitigation pathway to reduce CO_2 emissions was recognized by the United Nations Framework Convention on Climate Change (UNFCCC) in 1992.

In recent years there has been a proliferation of global calls to action—the New York Declaration on Forests in 2014, the '1 trillion tree' initiative at the World Economic Forum in 2020, and the LEAF (Lowering Emissions by Accelerating Forest Finance) Coalition announced by the US, UK, and Norway in 2021.

The setting of 'net zero' targets by countries and private entities following the IPCC's *Special Report on Global Warming of 1.5°C (SR 1.5)* in 2018, is also heavily dependent on the sequestration of carbon through tree-planting projects.

Parallely, with the SR 1.5's statement on achieving net zero by 2050, several scientific studies have been published

Since 2009, introduction of the term "nature-based solutions" by the International Union for Conservation of Nature (IUCN) at COP 15, using forests to absorb CO_2 is now covered under many new umbrella terms, each with varying nuances: **nature-based solutions, natural climate solutions, forest restoration, tree planting, afforestation/reforestation, land-based mitigation, land use, land use change and forestry (LULUCF) solutions.**

providing estimates of the CO_2 mitigation potential of land/forests. The Centre for Science and Environment (CSE) reviewed 14 such studies from 2017 to 2022 in its paper, *Forests and Climate Change: The Facts, Science and Politics*. The studies vary widely in their findings, but most agree that forests offer a low-cost solution to sequester CO_2. Several among them also offer overtly optimistic estimates of how much additional CO_2 forests can capture. For example, in May 2021, the World Economic Forum published a report, *Nature and Net Zero*, in collaboration with McKinsey and Company, stating that natural climate solutions have "a practical potential of close to 7 $GtCO_2$ per year" in sequestration, and can achieve about one-third of the target set by the SR 1.5 to reduce global net emissions by about 50 per cent by 2030. It claims that these are "typically low-cost sources of carbon abatement," costing between US $10 and US $40 per tonne of CO_2 with variations between geographies and project types.[8]

The extent of the land carbon sink is not fully understood even by climate scientists running global atmospheric models

Spurred on by optimistic scientific estimations of what forests can do for climate change, about 66 per cent of countries have included forests and land sinks in their Nationally Determined Contributions (NDCs), according to IUCN.

Confidence in forest sinks has also bolstered carbon offset markets, with a focus on forest-based offsets that trade as some of the cheapest credits (US $4–50/tonne CO_2e according to IHS Markit). They rose from five per cent of all credits in 2010 to 40 per cent in 2021 (80 per cent of forestry offsets are from the REDD+ programme). McKinsey estimates that by 2030 more than half of carbon offsets will come from forest and other nature-based projects. These projects are disproportionately located in the Global South—Asia, Latin America, and Africa—the regions with the densest tropical forests and the poorest people.

Can forests really soak up all our excess CO_2 emissions?

But banking on forest sinks to soak up our excess emissions is not easy. The extent of the land carbon sink is not fully understood even by climate scientists running global atmospheric models, and wide disagreements exist between models and methods. The overoptimistic studies of sink potential referenced earlier are contradicted by equally assertive research which finds that even if the amount of vegetation that all the land in the world can hold is maximised, it would only sequester enough carbon to offset about 10 years of GHG emissions at current rates. Beyond this there will be no additional carbon storage on land, according to Bonnie Waring, an ecologist at the Imperial College in London.[9]

Some research says that even if the amount of vegetation that all the land in the world can hold is maximised, it would only sequester enough carbon to offset about 10 years of GHG emissions at current rates

The former NASA (and current Columbia University) scientist James Hansen has estimated that the soil and biosphere can store a maximum additional limit of 100 Gt of carbon (367 $GtCO_2$) via improved agricultural and forestry practices, and no more.[10]

Differences between the top-down global estimates from models, and the bottom-up estimates by countries from their GHG inventories muddy the waters further. A paper published in 2021 in *Nature Climate Change* by Giacomo Grassi, a senior scientific officer at the Joint Research Centre of the European Commission, finds that there is a missing gap of some 5.5 $GtCO_2$ per year between the land emissions estimates from global models and country inventories. This accounting discrepancy complicates efforts to determine how natural sinks can fit into mitigation plans, since countries claim large reductions to their annual emissions from the land use and forestry sector and get a free pass on their CO_2 emissions from fossil fuel use.

FORESTS AS CARBON SINKS

Countries such as Russia, Canada, Brazil, the US and China that have large forests and happen to be large emitters of CO_2 have the most to gain from 'net accounting'—the deduction of CO_2 absorbed by a country's sinks from its total emissions to arrive at a possibly lower net figure. In the US, of the 6.6 $GtCO_2e$ total emissions in 2019, some 0.789 $GtCO_2e$ was reduced by 'sinks', leaving net emissions of 5.8 $GtCO_2e$—roughly a 12 per cent reduction.[11] According to domestic authorities, Russia's forests can offset up to 38 per cent of its GHG emissions—i.e., about 0.55 $GtCO_2$ attributed to its sink in 2018—despite being the fourth highest GHG emitter. This obscures the actual need for Russia to enhance its NDC ambition and take meaningful measures to curb its fossil CO_2 emissions.

Data shows that the intact tropical forest carbon sink has saturated, while European forests are heading towards carbon sink saturation as well

Moreover, forests can be destroyed by fire and deforestation: they are impermanent and their sink strength may be reducing due to climate change itself. If business-as-usual emissions continue, the strength of the global land sink could be cut by nearly 50 per cent by 2040.[12] In its first instalment of the Sixth Assessment Report (AR6) published in 2021, the IPCC stated that sinks are under threat from increasing cumulative CO_2 emissions:

"While natural land and ocean carbon sinks are projected to take up, in absolute terms, a progressively larger amount of CO_2 under higher compared to lower CO_2 emissions scenarios, they become less effective, that is, the proportion of emissions taken up by land and ocean decrease with increasing cumulative CO_2 emissions. This is projected to result in a higher proportion of emitted CO_2 remaining in the atmosphere."[13]

Data shows that the intact tropical forest carbon sink has saturated[14], while European forests may be heading towards carbon sink saturation as well.[15]

FORESTS AS CARBON SINKS

India's carbon sink target must account for the needs of the poorest

In its NDC to the Paris Agreement, India has pledged to 'create an additional (cumulative) carbon sink of 2.5–3 gigatonnes of carbon dioxide equivalent ($GtCO_2e$) through additional forest and tree cover by 2030'. According to the *India State of Forest Report (ISFR) 2021,* the total forest and tree cover is 24.62 per cent of the geographical area of the country – an increase of 0.28 per cent since the last assessment in 2019.

Increase in forest cover has happened outside the area classfied in land records as 'forests'. It has also happened mainly in forests that are defined as 'open'—with canopy cover between 10–40 per cent. This shows that forests are growing because people are planting trees on their individual lands, including plantations of rubber, coconut or eucalyptus—non-forest species. According to the *Indian State Forest Report (ISFR) 2021,* close to 40 per cent of the carbon stock is in the "trees outside forest" category

About 15 per cent of India's carbon dioxide emissions in 2016 were removed from the atmosphere by the LULUCF sector, according to the *Third Biennial Update Report (BUR)* submitted to the United Nations Framework Convention on Climate Change (UNFCCC). India has not officially announced a baseline year from when this additional forest sink would be measured. But MOEFCC officials say that 2005 is the base year, while the carbon stock between 2005 and 2010 was used as a trend to arrive at the goal of 2.5–3 Gt by 2030. The only publicly available official roadmap to achieve India's sink goal is the FSI's *Technical Information Series* (Volume I, No 3, 2019). The report concludes that the most cost-effective solution would be restoration of degraded forest lands which can contribute up to 60 per cent of the additional carbon sink to be achieved by 2030. It is critical for India's afforestation strategy to account for the needs of the poorest who live on forest lands.

On the one hand, there is a need for enhanced protection of the remaining forests for ecological security; and on the other hand, there is a crucial need to build resilience of communities who live in these habitats. And all this needs to be done in times of increased risk because of climate change.

Excess reliance on forest sinks threatens homes, livelihoods, and food security

Excess dependence on afforestation for climate change mitigation can disregard the existing users and dwellers of these lands, leading to the appropriation of land and resources for planting trees and add to the marginalisation of the poorest in the world. At least 293 Gt of carbon is stored in the collective forestlands of indigenous peoples and local communities, according to the North America-based non-profit Rights and Resources Initiative. Limited recognition of their tenure rights would continue to expose them to relocation and loss of livelihood from land-use schemes (including environmental schemes). In fact, deforestation rates are significantly lower in indigenous and tribal territories, where governments have formally recognised collective land rights.[16]

It is speculated that the demand for carbon offsets from the private sector could increase 15-fold by 2030. This will exacerbate all the above issues—human rights, competition for land, proliferation of monoculture plantations.

This then raises critical issues of how lands will be protected and forested—particularly in the densely populated and poor tropical regions—and who will pay the opportunity cost of this protection and to whom?

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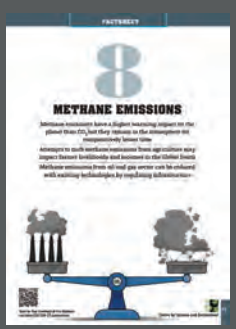

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