

Sustainable food – not more of it – needed as global hunger soars



LONDON – As global hunger swiftly rises – by more than a third last year – curbing it will require not growing more food but rethinking broader systems of trade and aid, farming’s heavy reliance on fossil fuels, food waste and meat eating, experts said.

Farmers today grow sufficient crops to feed twice the current population – but but nearly a third of food produced globally is spoiled or thrown away, said Philip Lymbery, the chief executive of Compassion in World Farming International.

At the same time, grain that could feed billions of people is instead fed to factory-raised food animals – suggesting a reduction in meat consumption is one clear way to cut hunger, he said at a conference on global food systems in London last

week.

In Europe alone, 60% of grain is now grown for animal food, said Tim Benton, a food systems expert at the London-based think tank Chatham House, which raises questions about whether scarce land could be better used.

As global leaders look for ways to keep food available and affordable, and prevent rising hunger, “it’s not about food scarcity because there’s no food scarcity,” Lymbery noted.

Surging hunger

Globally, hunger is surging, with 258 million people in nearly 60 countries facing acute food insecurity last year, a 33% jump from 2021, according to the Global Report on Food Crises 2023, released in March.

Problems are growing not just in traditional aid recipient countries such as Yemen, Somalia and Afghanistan but also in nations from Nigeria to the Democratic Republic of Congo, it showed.

The report, backed by agencies from the U.N. World Food Program to the World Bank, found that climate change impacts – from floods in Pakistan to drought in the Horn of Africa – were key contributors to the surge.

But conflicts – including Russia’s invasion of Ukraine, which slashed wheat exports from Ukraine and drove up the prices of energy and fossil fuel-based fertilizers – also played a major role, particularly in contributing to rising food prices.

“We depend more and more on a small number of countries for production of the major crops we depend on,” said Olivier De Schutter, co-chair of IPES-Food, an international expert panel on sustainable food systems.

That means when climate change slashes production in one or

more key producers, or a conflict breaks out in one, “global supply chains are disrupted ... (and) the whole global food system is impacted.”

In the wake of the Ukraine invasion, food costs also rose as speculators, hedge funds and a handful of big agribusiness companies that control most global food trade made profits, said De Schutter, who is also a U.N. special rapporteur on extreme poverty and human rights.

He suggested that finding ways to wean global agricultural production off its heavy reliance on fossil fuel-based fertilizers could be a key way to protect access to food from volatile oil and gas prices.

Helping poorer countries escape their often heavy debt burdens could also help them shore up their food security, allowing them to focus more on growing food for their own people rather than raising export crops to bring in the cash needed to service debt, De Schutter said.

Competing answers

Benton, of Chatham House, said two very different views of how to achieve future security are now competing.

In the first, the assumption that the world will need 50% more food by 2050 – in part to meet growing demand for meat and dairy as poor countries grow richer – demands much more intensive production from limited agricultural land.

That view assumes agriculture in the future will become much more technological and centralized, with heavy use of drones, satellites and the “internet of things” driving smarter production – and likely resulting in fewer farm jobs.

The second view, however, envisions farmers shifting to more ecologically friendly, smaller-scale and less fossil fuel-intensive agriculture, with food demand not growing

significantly because food waste is cut and meat-intensive diets decline.

“Everybody agrees food system transformation is needed” – just not what kind, said Molly Anderson, a food studies professor at Middlebury College in the United States.

Seth Watkins, a farmer in the U.S. state of Iowa, said at last week’s food conference that he had seen first-hand how intensive farming systems were damaging soil health, raising questions about the long-term viability of farming, especially as climate change impacts worsen.

“Often (a focus on) technology holds us back from the sustainable solutions we need to fix our food system,” he said, calling for a switch to more environmentally friendly and low-carbon ways of producing food.

Decisions made now are crucial because “it’s our own regeneration or extinction we’re talking about,” Watkins said.

Susan Chomba, director of the Vital Landscapes in Africa program for the World Resources Institute, said efforts to cut food waste were particularly crucial as key farm resources from available land to water grow scarcer.

“No matter how much we try to produce, if we can’t address what is lost and wasted it’s a counterproductive process,” she said in an interview.

A range of powerful vested interests stand in the way of shifting food systems to effectively manage growing hunger, climate threats and ecological decline, the analysts said.

Worsening disinformation and a rise in authoritarian governments around the world also are acting as a brake on change, they said.

But with hunger growing fast and new challenges appearing – from an expected drought-spawning El Nino weather pattern

emerging this June to new conflict in Sudan, adding to humanitarian burdens – public discontent and pressures on politicians for change are also likely to increase.

“Because we’re not tackling the environmental crisis, the disruptions we see are going to get bigger and bigger,” warned Benton of Chatham House.

Climate change continues to cause uncertainties for commodity prices



It can alter rainfall patterns, increase temperatures, and cause extreme weather. Climate played a major role in commodity prices last year and looks like doing so again in 2023.

Scorching heatwaves in the northern hemisphere hit production of wheat in the US and Europe in 2022, and climate change means that catastrophic weather events are becoming more frequent.

These include La Niña, which is stretching into an unprecedented third consecutive year and will be detrimental to maize and soybean production in the first half of 2023, in addition to other crops like sugar and coffee, according to Economist Intelligence Unit (EIU).

Wheat, which was heavily affected by war-related supply disruptions in 2022, faces significant climate risks. In the US large swathes of the southern plains remain under drought conditions, and crops are in unusually poor condition heading into winter dormancy. Extremely dry, occasionally frosty weather in Argentina is causing damage across major producing provinces there, but Russia and Australia are on course for a second consecutive year of bumper crops, which, for the moment, is alleviating concerns about production in the western hemisphere.

Weather will loom large in energy markets as well, EIU noted. Europe's heatwave drove up demand last summer, causing gas and electricity prices to spike, especially as winds dropped to levels insufficient to generate enough power to meet Europe's electricity needs while drought affected hydropower generation in many countries.

These dry conditions, together with rising water temperatures, also hit nuclear power generation.

In addition, the severity of Europe's current energy crunch depends largely on how cold temperatures fall over the winter, not just in 2022/23 but in 2023/24 as well.

"The colder the winter, the more countries will have to draw down stockpiles built up over 2022. Below-normal temperatures will not only raise the spectre of energy rationing, but also put upward pressure on prices over the summer as Europe scrambles to refill reserves—this time without Russian supplies," EIU said.

Obviously, climate change can have significant impacts on

commodity prices by affecting their production, transportation, and demand for various goods.

Climate change can impact commodity prices by affecting crop yields, energy prices, water availability, and transportation costs.

It can alter rainfall patterns, increase temperatures, and cause extreme weather events like droughts and floods, which can reduce crop yields.

This can lead to lower supply and higher prices for commodities like wheat, corn, soybeans, and other agricultural products.

Climate change can also impact energy prices by affecting the production and transportation of oil, natural gas, and other energy resources.

For example, extreme weather events can disrupt oil and gas production and transportation infrastructure, leading to supply disruptions and higher prices.

Changes in rainfall patterns and increased water scarcity due to climate change can impact the availability of water for agricultural production and energy generation. This can result in higher prices for water-intensive commodities like meat, dairy, and processed foods.

Climate change can also affect transportation costs, particularly for goods that rely on sea or river transportation.

Rising sea levels and changes in ocean currents can disrupt shipping routes and increase shipping costs, which can lead to higher prices for imported goods. e weather events like droughts and floods, which can reduce crop yields

In defence of nature-based carbon markets



Voluntary markets for carbon offsets have recently come under fire, with critics questioning the efficacy of contracts that aim to reduce atmospheric carbon dioxide relative to what would have happened in the contract's absence. The biggest concerns are about "nature-based" projects involving various land-use changes – such as protecting forests, planting new ones (afforestation), and so forth.

But these instruments' imperfections are no secret. For well over two decades, ecologists and foresters have been working to develop more sophisticated methods to satisfy economists' faith in market instruments, and they have made good progress. Though offset schemes are still riddled with complexity, there is no question that they pay for something that matters.

Imagine seeing what the atmosphere sees. The Intergovernmental Panel on Climate Change's Sixth Assessment Report provides an outline of the planet's carbon cycle, which makes evident the

fundamental role of plants' conversion of CO₂ into cellulose and back on a massive scale. Terrestrial photosynthesis alone draws down 113bn tonnes of carbon every year. By comparison, humanity added about 11bn tonnes of carbon to the atmosphere last year.

The problem, of course, is that humans' cumulative contributions go in only one direction, whereas the carbon captured by vegetation is normally balanced by an equal, opposite flow from plant respiration and degradation. By interfering with the climate system, we have thrown this balance off, adding a net flow of about 5.9bn tonnes to the landscape and the ocean every year. In other words, the planet is drawing down only half of what we inject into the atmosphere.

Even a relatively small perturbation in this vast natural cycle can reach an enormous scale. That is why nature is such an attractive climate-mitigation option. Suppose we succeed in eliminating fossil-fuel combustion. Keeping global average temperatures within 1.5C or 2C of pre-industrial levels will still require substantial carbon removal. Estimates vary, but they are on the order of 200-300bn tonnes removed by plants before 2100.

Nor will the story end there. The atmosphere contains about 870bn tonnes of carbon in the form of CO₂ (one-third of which has been added since industrialisation), and the carbon cycle connects that atmospheric stock to vast reservoirs. The largest is the ocean, which holds 900bn tonnes at the surface and another 37tn tonnes deeper below. Terrestrial vegetation and soils also hold about 2.15tn tonnes, and permafrost contains another 1.2tn. As far as the atmosphere is concerned, losses from any of these reservoirs could easily exceed the carbon we burn (from the 930bn tonnes that are sequestered in fossil fuels).

Far from being a secondary concern, managing the stocks and flows of carbon through the planet's ecosystems is essential to keeping the entire Earth system in balance. But to carry out that task, we will need to think differently about the

landscape. Landscapes and seascapes are not just the backdrop to our life. They are public infrastructure, and like all infrastructure, they must be paid for and maintained.

Since the 19th century, however, we have known that paying for infrastructure by rewarding its marginal benefit (as offsets do for nature-based interventions) almost never covers the total cost. Because public-utility infrastructure like a highway or an airport tends not to command a high enough marginal value, taxation must cover the rest. Whom to tax then becomes the most important question.

To illustrate the point, consider Brazil, whose ecosystems contain some 60bn tonnes of carbon in above-ground biomass. One way to estimate how much this stock is worth is to assume that we value carbon at a given price, say, \$50 per tonne (halfway between the price in the regulated European market and nature-based offsets in voluntary markets). In this scenario, Brazil is home to ecosystems worth \$10tn, which is over six times the country's GDP and far greater than the value of its 13bn barrels of oil reserves.

Now, how much should the world pay Brazil to keep that forest in trust for everyone? Assuming a 2% fee on the value of the assets (a reasonable rate for most asset managers), the country ought to receive \$200bn per year. On those terms, Brazil would almost certainly put a stop to deforestation in the Amazon.

But here we run into a sad truth. There is simply no evidence that the international community has any appetite to pay such sums. In 2022, total overseas direct assistance amounted to just \$186bn. For years, rich countries have failed to honour a 2009 pledge of mobilising \$100bn per year to help developing countries adapt to climate change.

By thinking of natural assets not as infrastructure but as service producers, we end up relying on the voluntary payments companies make at the margin in exchange for "offsetting" some other reduction that they cannot or will not carry out. But, for all this mechanism's shortcomings, at least it directs some money – albeit a drop in the ocean – toward carbon-

landscape management.

Of course, additional scrutiny of offsets is welcome for driving improvements. But it would be a fatal mistake to conclude that protecting forests or augmenting Earth's carbon sink is any less urgent than reducing fossil-fuel emissions. Nature-based offsets traded in voluntary carbon markets should be seen as merely a first step. In the end, we will need to do "all of the above": end fossil-fuel combustion, maintain ecosystems, and augment nature's capacity to draw down carbon, regardless of whether we can prove that such reductions would not have happened anyway.

The atmosphere does not care about our motivations, counterfactuals, or moral hazards. All it sees is carbon flowing in and out. Ecosystems store carbon and draw it from the atmosphere at scales that matter. All of us – taxpayers, consumers, and companies – must pay for this critical public good. – Project Syndicate

- *Giulio Boccaletti, an honorary research associate at the University of Oxford's Smith School of Enterprise and the Environment, is the author, most recently, of Water: A Biography (Vintage, 2022).*

Biden's Landmark Climate Bill Lures China's Clean Energy Giants



China's leading renewables firms are joining the rush to open factories in the US after Washington passed a landmark climate bill that supports local clean energy manufacturing.

Some of the nation's top solar panel makers are involved in setting up American plants, while the Chinese company that makes the world's largest wind turbine, Ming Yang Smart Energy Group Ltd., is exploring whether to establish production and research facilities there.

The building boom underscores how the US has rebuilt its credentials as a cleantech manufacturing hub after last year's Inflation Reduction Act. The bill, a signature achievement for the Biden administration, includes \$374 billion in new climate-related spending. That's drawn the attention of China's world-leading renewables industry despite deepening tensions between the two governments.

"The US is working on low-carbon, green development, has

plans, and has introduced many good policies and mechanisms – it is very attractive,” Ming Yang Chairman Zhang Chuanwei said in an interview last week at the Boao Forum for Asia on the island of Hainan, an event dubbed as China’s version of Davos.

The company hasn’t announced any US plans yet, but three of its clean energy peers are in the process of building their presence there: JA Solar Technology Co. in Arizona, Longi Green Energy Technology Co. in Ohio, and Jinko Solar Co. in Florida.

Chinese solar firms dominate global panel production, but have been stymied from shipping to the US because of a series of trade disputes and allegations of human rights abuses, which China has denied. Some of the firms have moved to expand exports from plants in southeast Asia to navigate curbs on US trade.

Biden’s climate policy is designed to boost domestic cleantech industries and reduce America’s reliance on imports. The bill extends to encouraging foreign firms to set up shop in the US, sparking a wave of new factory announcements since it was passed in August. But Chinese companies have been reticent about publicizing their investments.

That’s due to Washington’s increasingly adversarial approach to Chinese firms, according to Li Junfeng, managing director of the China Energy Research Society, a government-affiliated think tank. He cited the scrutiny faced by battery maker Contemporary Amperex Technology Co. over its recent tie-up with Ford Motor Co., as well as the furor linked to national security concerns that has erupted over social-media platform TikTok.

That’s left Chinese companies fearing they won’t get the same treatment as their South Korean or European counterparts, Li said.

“It isn’t enough for the US to just introduce the IRA bill. It

needs to give a clear expectation that companies will be treated equally,” he said. “If one day it says that solar panels are also national security issues, we won’t be able to talk reasonably anymore.”

Cleantech is assuming a strategic importance as it becomes the world’s biggest source of new energy. China’s advantage means that governments elsewhere are trying to chip away at its dominance by carving out their own supply chains. But Beijing is fighting its corner, albeit in ways that could undercut the industry’s pleas for fair treatment from US authorities.

The Chinese government has launched its own probe of the CATL-Ford deal, to ensure the battery giant’s core technology isn’t handed over to the US carmaker. It’s also considering an export ban that would help maintain its substantial lead in solar manufacturing.

Li said the proposed solar ban is only a draft, and has met objections from some companies. China has spent over 20 years building the world’s best solar industry, but it needs to balance local manufacturing capabilities with maintaining a robust global supply chain, he said.

China is scared of being cut off from key technologies, but other countries have the same fear, Li said. One answer is to “encourage Chinese companies to build factories abroad.”

Trade Barriers

Trade barriers in countries such as the US and India are raising the cost of clean energy, Gao Jifan, chairman of another Chinese firm, Trina Solar Co., told a panel at the Boao Forum. “We should build a mechanism that makes everybody feel safe, instead of building barriers,” he said.

Clean energy equipment should be manufactured where the cost is lowest, and it should be traded around the globe without any obstacles, Gao said. Trina is also willing to build

manufacturing capacity in the US, as well as Europe given the supportive policies there, he said.

Ming Yang's Zhang said the company could buy parts and equipment from local firms if it does decide to set up in America. And the nation's infamously hurricane-prone coastal areas will also benefit from deploying its turbines because they're designed to resist extreme winds.

"The US, like China, is a massive renewable energy market," he said. "We are willing to enter the US, and we hope that the US will create a fair, inclusive, and predictable environment."

The High Cost of Carbon Pricing



Amid the growing enthusiasm for carbon border taxes, Western policymakers have largely ignored the negative impact on the world's poorest countries. For carbon-pricing policies to succeed, developed countries must show their commitment to

shared prosperity by enabling knowledge-sharing and fostering equitable climate finance.

NEW DELHI – Carbon pricing is all the rage these days, at least in the developed world. But while global leaders and experts – most of them from rich countries – increasingly embrace the idea of putting the “right price” on carbon, the concept remains vague and ill-defined. Worse, its growing acceptance and increasingly protectionist bent may have the perverse effect of impeding efforts to decarbonize the global economy.

The idea of carbon pricing seems like a no-brainer. Meeting even the least ambitious climate goals requires decarbonizing developed and developing economies alike. Changing the relative prices of carbon-intensive activities would encourage investors to finance renewable sources of energy and the technological innovation needed to achieve net-zero emissions.

Fossil fuels account for most of the world’s greenhouse-gas emissions, so hydrocarbons seem like a good place to start. But how? Should policymakers consider the relative price of fossil fuels, or production based on consuming them?

The two most commonly discussed forms of carbon pricing – cap-and-trade schemes and carbon taxes – are based on the carbon intensity of production. A cap-and-trade system is designed to limit greenhouse-gas emissions by dividing the total target amount into allowances that can be traded among high and low emitters. While this supposedly establishes a market price for carbon dioxide emissions, it does not consider their negative social and environmental externalities. A carbon tax, by contrast, sets a price on carbon by taxing emissions-heavy activities.

But these two models reflect a very narrow (and possibly even distorted) view of how carbon should be priced into the economic system. A 2017 report by the High-Level Commission on

Carbon Prices, chaired by Joseph E. Stiglitz and Nicholas Stern, provided a much more nuanced analysis. In addition to cap-and-trade and carbon taxes, the report recommended reducing or eliminating fossil-fuel subsidies and creating new financial incentives for low-carbon projects; offsetting the negative distributional impact of carbon pricing by using the proceeds to finance policies to protect poor and vulnerable populations; and complementary policies, such as investment in public transport and renewable power. Perhaps most important, the authors noted, countries must be able to choose instruments that fit their specific circumstances, resources, and needs.

Amid the growing enthusiasm for carbon pricing and border adjustment measures, policymakers and experts have largely ignored these points. The European Union's Carbon Border Adjustment Mechanism is a case in point. When the CBAM takes effect in October, it will impose a tax on carbon-intensive imports in order to "put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU" and to "encourage cleaner industrial production in non-EU countries" (emphasis added).

The CBAM will initially apply to imports of cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen. At first, firms will simply have to report the (direct and indirect) emissions embedded in the goods they import. But, beginning in 2026, the EU will impose tariffs on these emissions based on the weekly average auction price of cap-and-trade allowances.

The stated purpose of this measure is to eliminate so-called "carbon leakage" and ensure that the EU's climate efforts are not undermined by production moving to countries with lower emission standards. Effectively, it protects European firms from competitors in such countries.

By taxing imports to the EU, the CBAM imposes on exporters in

other countries the nearly impossible task of measuring emissions. Most developing countries (and many developed ones) lack granular data on firm-specific emissions, not to mention the ability to track the emissions of all the inputs used. Even if such data were available, the costs of collecting and analyzing it over time would be enormous. As the United Nations Conference on Trade and Development noted in 2021, the CBAM attempts “to impose on developing countries the environmental standards that developed countries are choosing.”

The EU wants to be viewed as a global leader on climate change, but it is difficult to see the CBAM as anything but a protectionist device. While the CBAM purports to encourage countries outside the bloc to reduce emissions by imposing their own carbon taxes, the EU has done nothing to help exporting countries attract new green investment or gain access to new technologies. In fact, it has persistently reneged on its (paltry) promises on climate finance and the commitments European leaders made as part of the 1992 Rio Agreement, restricting access to green technologies controlled by EU-based companies.

For decades, advanced economies have exported their emissions to developing countries by offshoring carbon-intensive production and then importing those goods. Now that greener technologies are available to (and largely controlled by) Western companies, developed countries promote reshoring without sharing knowledge or finance, thereby undermining low- and middle-income countries’ economic prospects and ability to achieve a green transition.

In February, Republican US Senator Bill Cassidy said he would unveil an emissions tariff bill in the coming months, following similar proposals by Senate Democrats. Meanwhile, lawmakers on both sides of the Atlantic have done little to limit fossil-fuel production and trade – by far the biggest sources of CO₂ emissions. The CBAM does not cover trade in

fossil fuels, and neither would the proposed tariffs in the United States. If decarbonization is the real goal, rather than protecting domestic industries, then regulation and reducing direct and indirect fossil-fuel subsidies are far more promising policies.

For carbon pricing to succeed, developed countries must demonstrate their commitment to shared prosperity by enabling knowledge-sharing and fostering equitable climate finance. If they continue to focus on border taxes on goods produced (mostly) in developing countries, their carbon-pricing efforts will fail. Worse, they will exacerbate global inequality and reinforce the perception that all their lofty rhetoric about the need for international cooperation to fight climate change is merely a fig leaf for cynical and self-serving policies.

Climate, ice sheets and sea level: The news is not good



PARIS – Parts of earth's ice sheets that could lift global oceans by metres will likely crumble with another 0.5 deg C of warming, and are fragile in ways not previously understood, according to new research.

The risk, which will play out over centuries, may also be greater than expected for a significant portion of the world's population in coastal regions.

New research suggests that the number of people threatened by sea-level rise has been underestimated by tens of millions because of poorly interpreted satellite data and a lack of scientific resources in developing countries.

Ice sheets in Greenland and Antarctica have shed more than half a trillion tonnes annually since 2000 – six icy Olympic pools every second.

These kilometres-thick ice cubes have replaced glacier melt as the single biggest source of sea-level rise, which has accelerated three-fold over the last decades compared with most of the 20th century.

A 20cm increase since 1900 has boosted the destructive wallop of ocean storms made more powerful and wide-ranging by global warming, and is driving salt water into populous, low-lying agricultural deltas across Asia and Africa.

Up to now, climate models have underestimated how much ice sheets will add to future sea-level rise because they mostly looked at the one-way impact of rising air temperatures on the ice, and not the complicated interaction between atmosphere, oceans, ice sheet and ice shelves.

Using so-called active ice sheet models, scientists from South Korea and the United States projected how much ice sheets would raise global oceans by 2150 under three emissions scenarios: swift and deep cuts as called for by the United Nation's Intergovernmental Panel on Climate Change, current climate policies, and a steep increase in carbon pollution.

Looking only at a 2100 horizon is misleading, because oceans will continue to rise for hundreds of years no matter how quickly humanity draws down emissions.

If rising temperatures – up 1.2 deg C above pre-industrial levels so far – can be capped at 1.5 deg C, the additional impact of ice sheets will remain very small, they found.

Doomsday glacier

But under current policies, including national carbon-cutting pledges under the 2015 Paris Agreement, Greenland and Antarctica would add about half a metre to the global watermark.

And if emissions increase – from human or natural sources – under a “worst-case” scenario, enough ice would melt to lift oceans 1.4m.

Perhaps the most striking finding from the study, published this week in Nature Communications, was a red line for runaway

ice sheet disintegration.

“Our model has a threshold between 1.5 deg C and 2 deg C of warming – with 1.8 deg C as a best estimate – for acceleration of ice loss and sea-level increase,” co-author Fabian Schloesser from the University of Hawaii told Agence France-Presse.

Scientists have long known that the West Antarctic and Greenland ice sheets – which together could lift oceans 13m – have “tipping points” beyond which complete disintegration is inevitable, whether in centuries or millennia. But pinpointing these temperature trip wires has remained elusive.

A pair of studies this week in Nature, meanwhile, showed that Antarctica’s Thwaites “doomsday glacier” – a slab the size of Britain sliding towards the sea – is fracturing in unsuspected ways.

Thwaites is one of the fastest moving glaciers on the continent, and has retreated 14km since the 1990s. Much of it is below sea level and susceptible to irreversible ice loss.

But exactly what is driving the march to the sea has been unclear for lack of data.

Misinterpreted data

An international expedition of British and US scientists drilled a hole the depth of two Eiffel towers (600m) through the thick tongue of ice Thwaites has pushed out over the Southern Ocean’s Amundsen Sea.

Using sensors and an underwater robot, called Icefin, threaded through the hole, they examined the ice shelf’s hidden underbelly.

There was less melting than expected in some places, but far more in others.

The stunned scientists discovered up-side-down staircase formations – like an underwater Escher drawing – with accelerated erosion, along with long fissures being forced open by sea water.

“Warm water is getting into the cracks, helping wear down the glacier at its weakest point,” said Dr Britney Schmidt, lead author of one of the studies and an associate professor at Cornell University in New York.

A fourth study, published last week in the American Geophysical Union journal *Earth's Future*, found that rising oceans will destroy farmland, ruin water supplies and uproot millions of people sooner than thought.

“The time available to prepare for increased exposure to flooding may be considerably less than assumed to date,” Dutch researchers Ronald Vernimmen and Aljosja Hooijer concluded.

The new analysis shows that a given amount of sea-level rise – whether 30cm or 300cm – will devastate twice the area projected in most models to date.

Remarkably, a misinterpretation of data is mostly to blame: Radar measurements of coastal elevations used until recently, it turned out, often mistook tree canopy and rooftops for ground level, adding metres of elevation that were not in fact there.

Most vulnerable will be tens of millions of people in the coastal areas of Bangladesh, Pakistan, Egypt, Thailand, Nigeria and Vietnam.

Earlier research taking into account more accurate elevation readings found that areas currently home to 300 million people will be vulnerable by mid-century to flooding made worse by climate change, no matter how aggressively emissions are reduced. AFP

The global climate finance challenge



The world will not avoid dangerous levels of climate change without a significant increase in investment. This commentary presents three priorities for climate finance for the achievement of Paris targets and protection of the world's most vulnerable communities.

The dust has now settled after the United Nations climate change conference (COP27) in Egypt, but there are still many unanswered questions about how to finance emissions reductions and adaptation. The world will not avoid dangerous levels of climate change without a significant increase in investment in developing countries. If these countries lock in dependency on fossil fuels and dirty technologies, they will be largest

source of emissions growth in the coming decades.

Fortunately, such investment can not only reduce emissions and build resilience; it can also drive a new form of growth and development that is much more attractive than the dirty and destructive paths of the past. It is therefore in developed countries' own interests to help these countries accelerate the transition to sustainable, inclusive and resilient economies.

We were commissioned by the Egyptian COP27 Presidency and the British COP26 Presidency to conduct an independent analysis of the financing that developing countries (other than China) will need by 2030 in order to realize the goals outlined in the Paris climate agreement. Our report, published during the first week of COP27, concluded that these countries' annual investment in climate action needs to increase immediately, from about \$500 billion in 2019 to \$1 trillion by 2025 – and to \$2.4 trillion by 2030. That investment will not only deliver on the Paris Agreement; it will also drive this new form of growth and advance progress toward achieving the UN Sustainable Development Goals.

We identified three investment priorities for climate finance. First, financing should go toward accelerating the energy transformation, particularly the deployment of renewables, as this is essential to keeping the Paris Agreement's targets within reach.

Second, we need increased investments in resilience to protect lives and livelihoods – particularly among the world's poorest communities – against the increasingly devastating effects of climate change, as well as effective, properly-funded mechanisms for addressing Loss and Damage (defined as costs that cannot be prevented by mitigation or adaptation).

And third, we urgently need to enhance biodiversity and conserve the ecosystems on which we all depend. Investments in

nature represent vital contributions to both resilience-building and emissions reductions.

About half the financing for these investments could be met from domestic public and private sources in developing countries, and an additional \$1 trillion or so per year could come from outside sources. While public sources of finance, both internal and external, will be essential, the largest share can come from the private sector, which will invest in order to secure attractive returns from the growing market for zero-emissions and climate-resilient goods and services, provided that the risks can be reduced and managed.

A stronger partnership between the private and public sectors can unlock new investment opportunities, manage risk, reduce the cost of capital and mobilise the necessary financing at a much larger scale. But this funding must come from the right kinds of sources, such as philanthropic foundations, the International Monetary Fund's special drawing rights (the IMF's reserve asset), or the sale of carbon credits.

Furthermore, grants and low-interest loans by developed-country governments should increase from \$30 billion in 2019 to \$60 billion in 2025. This funding will represent only a small share of the overall sums required, and it should be carefully targeted at priorities that will not attract significant investments from the private sector. To put this in perspective, \$60 billion would represent only about 0.1% of developed countries' projected economic output in 2030, or about 0.7% of the \$9 trillion that rich countries allocated over the past two years to cope with COVID-19.

Finally, the World Bank and other multilateral development banks have a critical role to play in achieving the Paris targets. Their annual investments in climate action will need to triple to \$180 billion by 2025, from about \$60 billion today, to realise co-financing with the private sector on the necessary scale, combined with support for public

infrastructure.

The decision at COP27 to create new Loss and Damage funding arrangements recognises that additional investment by developed-country governments is needed to help developing countries to limit the harm from more frequent and severe extreme-weather events, rising sea levels, desertification and other climate-driven problems. All countries are already suffering Loss and Damage from climate change, but the social and economic consequences can be far more devastating for developing countries, which face not only repair and reconstruction costs but also severe reductions in economic output, employment and living standards.

Loss and Damage also increases the risk that people in vulnerable and highly exposed parts of developing countries will be forced to migrate, further jeopardising social and political stability. If poor countries can become more resilient to climate impacts, and can recover from them more quickly and effectively, they will be able to invest more in low-carbon development and they will pose less of a risk to regional and global security and stability. Again, while developing countries have long argued, with justification, that rich countries should provide separate financing to developing countries as compensation for the Loss and Damage related to past emissions, doing so is also in rich countries' interest.

The 2020s are the crucial decade in the fight against climate change. Further delay would be profoundly dangerous. But all countries will need to advance the transition to carbon neutrality. The rich world must not only do much more to reduce its own emissions. It must also generate the financing needed to help others and to protect the world's poorer countries from a problem they did not create.

Green power is the first domino



As world leaders convene at the UN Climate Change Conference (COP27), it is obvious to all that bolder action is needed to avert disaster. The UN warns that global efforts to reduce greenhouse-gas (GHG) emissions remain insufficient to limit temperature increases to 1.5C, relative to pre-industrial levels.

To meet this target, decarbonising the power sector is critical. Electricity accounts for about 25% of the world's GHG emissions, and it also will play a critical role in decarbonising other sectors, such as buildings, transportation, and manufacturing. The challenge, then, is to achieve “24/7 carbon-free energy” (24/7 CFE): the total elimination of carbon from the electricity sector – at every hour of every day, in every grid around the world.

Research in the United States and Europe has shown that 24/7 CFE strategies have a greater impact on the decarbonisation of

electricity systems than the current practice of purchasing electricity from renewable sources to match annual consumption patterns. Recent International Energy Agency modelling for India and Indonesia shows that hourly matching strategies lead to more diverse technology portfolios, with the clean, dispatchable generation and storage needed for net-zero transitions in the power sector. Critically, this approach helps electricity systems shift away from fossil fuels by accelerating uptake of the full suite of carbon-free technologies needed to deliver around-the-clock clean power. Decarbonising energy systems worldwide is possible, but it will require collective action to accelerate the development and deployment of advanced clean-energy technologies. New investments, supportive public policies, and partnerships among stakeholders are all part of the solution. That is why the UN, Sustainable Energy for All (SEforALL), Google, and a diverse group of signatories launched the 24/7 CFE Compact in 2021. The compact represents a growing global community of stakeholders that are committed to providing the support, tools, and partnerships needed to make 24/7 CFE a reality everywhere.

Among the most recent to join the 24/7 CFE Compact is the Scottish government. "Scotland was the first country in the United Kingdom to declare a climate emergency, and indeed among the first in the world to recognise the importance of taking immediate and bold action," notes Scottish First Minister Nicola Sturgeon. "Governments must hold themselves to account in limiting global temperature rise to 1.5C. We are committed to putting accountability at the centre of all that we do. Our position is clear that unlimited extraction of fossil fuels is not consistent with our climate obligations." Similarly, just last month, Google and C40, a network of almost 100 cities, launched a first-of-its-kind 24/7 CFE programme focusing on regional electricity grids. With urban areas accounting for over half the world's population and more than 70% of global carbon dioxide emissions, cities have a critical role to play in driving the changes needed to tackle

the climate crisis.

Developing and emerging economies will need more energy to bridge energy-access gaps, and to support economic growth and development. But as capacity expands, it must be clean. A 24/7 CFE approach can serve both purposes, providing both greater access and cleaner energy. We therefore must move faster to make 24/7 CFE cheaper and more accessible globally. According to the latest IEA data, the number of people living without electricity will rise by almost 20mn in 2022, reaching nearly 775mn. Most of that increase will be in Sub-Saharan Africa, where the size of the cohort lacking access has nearly returned to its 2013 peak.

The world cannot achieve net-zero emissions without first ensuring universal electricity access. That will require annual investments of at least \$30bn – two-thirds of which will need to go to Sub-Saharan Africa – between now and 2030. Fortunately, not only is 24/7 CFE a moral imperative, but it also represents the most cost-effective option for connecting underserved populations.

Many of these populations will otherwise continue to rely on dirtier sources of energy. Small island developing states such as Nauru, Palau, the Bahamas, and Trinidad and Tobago, for example, all have electricity grids that depend heavily on inefficient, carbon-intensive technologies such as diesel generators. These countries' experience shows why 24/7 CFE must not be framed merely as a European or North American issue. It is a global one, and it has become increasingly urgent for developing countries on the front lines of climate change.

Implementing 24/7 CFE strategies globally will require not only funding but also measures to scale up the deployment of advanced technologies, to create more favourable market conditions, and to share best practices and data. If we can fully decarbonise our grids, the rest of the green transition should become cheaper and easier.

The 24/7 CFE Compact provides an opportunity to drive the much-needed policy change, investment, and research in this

crucial next phase of climate action. We invite all governments, companies, and organisations to join us and help chart a more sustainable path toward a net-zero future. – Project Syndicate

COP27: Financing for climate damages gets a foot in the door



AFP/Sharm El-Sheikh

UN climate negotiations yesterday offered a sliver of hope and “solidarity” for developing countries battered by increasingly costly impacts of global warming, in agreeing to discuss the thorny issue of money for “loss and damage”.

Countries least responsible for planet-heating emissions – but hardest hit by an onslaught of weather extremes – have been ramping up the pressure on wealthy polluting nations to

provide financial help for accelerating damages.

But in a sign of how contentious the issue is among richer nations fearful of open-ended climate liability, the issue was only added to the formal agenda to the UN's COP27 climate summit in the Egyptian resort town of Sharm el-Sheikh after two days of last-ditch negotiations.

This "reflects a sense of solidarity and empathy for the suffering of the victims of climate induced disasters," Egypt's Sameh Shoukry, the COP27 president, said to applause.

At last year's UN summit in Glasgow, the European Union and the United States rejected calls for a separate financial mechanism.

Instead, negotiators agreed to start a "dialogue" extending through 2024 on financial compensation.

The issue has grown ever more urgent in recent months as nations were slammed by a crescendo of disasters, such as the massive flooding that put a third of Pakistan under water in August.

Senegal's Madeleine Diouf Sarr, who represents the Least Developed Countries negotiating bloc, said climate action across the board had been far too slow.

"Lives are being lost. Climate change is causing irreversible loss and damage, and our people carry the greatest cost," she said, adding that an agreement on funding arrangements must be reached in Egypt.

Appeals for more money are bolstered by a field known as event attribution science, which now makes it possible to measure how much global warming increases the likelihood or intensity of an individual cyclone, heat wave, drought or heavy rain event.

"Today, countries cleared an historic first hurdle toward acknowledging and answering the call for financing to address increasingly severe losses and damages," said Anil Dasgupta, head of the World Resources Institute, a climate policy think tank.

But he said that getting negotiators to agree to discuss the issue was only an initial step.

"We still have a marathon ahead of us before countries iron out a formal decision on this central issue for C027," he said.

Wrangling over loss and damage has unfolded against the backdrop of an unmet promise by rich nations to provide \$100bn a year starting in 2020 to help the developing world green their economies and anticipate future impacts, called "adaptation" in UN climate lingo.

That funding goal is still \$17bn short. Rich nations have vowed to hit the target by the end of 2023, but observers say the issue has severely undermined trust.

The UN Environment Programme has said the goal – first set in 2009 – has not kept up with reality, and estimates that funding to build resilience to future climate threats should be up to 10 times higher.

Meanwhile, countries are far off track to reach the Paris deal goal of limiting global warming to 1.5 degrees Celsius.

The UN says the world is currently heading to 2.8C of warming, or a still-catastrophic 2.4C even if all national pledges under the Paris treaty are fulfilled.

Depending on how deeply the world slashes carbon pollution, loss and damage from climate change could cost developing countries \$290-580bn a year by 2030, reaching \$1-1.8tn in 2050, according to the Grantham Research Institute on Climate Change and the Environment in London.

The World Bank has estimated the Pakistan floods alone caused \$30bn in damages and economic loss. Millions of people were displaced and two million homes destroyed.

Simon Stiell, the UN's climate change executive secretary, said vulnerable countries are "tired" and "frustrated".

"Here in Sharm el-Sheikh we have a duty to speed up our international efforts and turn words into action to catch up with their lived experience," he said.

Up to now, poor countries have had scant leverage in the UN wrangle over money. But as climate damages multiply, patience is wearing thin.

The AOSIS negotiating block of small island nations told AFP

that they would like to see the details for a dedicated loss-and-damage fund worked out within a year.

“There’s not enough support for us to even to begin to prepare for the loss and damage that we are expected to face,” said AOSIS lead negotiator on climate finance Michai Robertson.

China is doubling down on coal despite its green ambitions



Bloomberg / Beijing

China is building a vast array of new coal-fired power stations, potentially more than the operating capacity of the US, even though it knows the plants will probably never be fully used.

The puzzle of why the world’s leading installer of clean energy is investing so much in the worst polluting – and

increasingly expensive – fossil fuel shows the depth of Beijing's concern over the global squeeze in energy supplies. But it also reflects planning for a gradual relegation of coal's role, from prime power source to a widely available but often idle backup to China's rapidly expanding renewables fleet.

Work on at least 165 gigawatts of plants powered by coal should begin by the end of 2023, the National Development and Reform Commission told executives at a meeting in September, according to state-backed Jiemian News. The chairman of China Energy Engineering Corp, meanwhile, has forecast the country could add a total of 270 gigawatts in the five years to 2025 – more than currently exists in any other nation.

New coal permits have already increased, and while the final extent of the ramp-up isn't known, adding 270 gigawatts could cost 568bn to 766bn yuan (\$79bn to \$106bn), according to a calculation based on BloombergNEF data. Excluding China, the rest of the world's pipeline of coal power projects stands at about 101 gigawatts, data compiled by Global Energy Monitor show.

China's strategy is designed to avoid the pitfalls that have hobbled parts of the US and Europe, which stopped investing in fossil fuel production and infrastructure before renewables were ready to take over. That's led to an over-reliance on imports in some places, and in others a dependence on grids that can fall prey to the unreliability of sunshine and wind.

At the recent party congress, President Xi Jinping laid out how China's energy transition would be different by following "the principle of building the new before discarding the old." In practice, that means adding both clean power and more coal to try and eliminate economy-crippling power shortages and create a buffer against volatile global fuel prices, while at the same time advancing the country's long-term climate goals. As China's economy grows, it requires ever more power, and it has said it plans to peak coal consumption only by the middle of the decade.

But even as new plants are built, the intention is for them to

be used less and less as they're displaced by increasing amounts of clean energy.

In the context of global energy insecurity, it's not surprising that China would ramp up its coal capacity, said Yan Qin, an analyst in Oslo, Norway, at Refinitiv. "But the push to add more clean energy to the grid hasn't slowed down, meaning that growing renewables will squeeze the running hours of coal plants," she said.

The plan carries big risks. Coal financiers are directing capital to investments that are almost designed to be stranded. If they protest because their projects are being underutilised, it could slow the decarbonisation of the planet's worst polluter. And the world's carbon budget is finite, which means that any coal burned at all in China increases the chances of missing targets to avoid catastrophic warming.

The NDRC's proposal is already facing some pushback from utilities and local lenders, according to a person familiar with the matter. Many coal power generators are losing money amid high fuel prices and aren't enthusiastic about funding and running plants that would only be used during times of peak demand, the person said, declining to be identified because the talks are private.

Still, it's clear that the regulator's tone on coal power has changed since last year's energy crisis, according to the person. More plants will be built in areas that are reliant on hydropower, and near the massive wind and solar farms being built in the desert interior, to ensure reliable supply when intermittent renewables generation stalls, the person said.

China is also making efforts to lessen the burden on coal power generators, in large part by leaning on miners to boost output to record levels and keep the Chinese market well below sky-high international prices. The government has also given utilities leeway to charge higher rates to industrial customers. And, it's making progress in developing a mechanism that would compensate coal plants that sit idle while on backup duty, Refinitiv's Qin said.

In any case, the rate at which clean energy is added will probably be more instructive than power plant spending in determining when coal burning starts to dwindle, said Dave Jones, a lead analyst at the climate think tank Ember in London.

Once renewables are installed they're basically free to produce, which means they'll be prioritised over coal. The moment that new clean energy generation outpaces new power demand is when coal use begins to fall, he said.

China is by far the world's largest renewables market, and its expansion continues to accelerate. Spending in the first half of this year more than doubled to \$98bn, compared to \$12bn in the US. As wind, solar and hydropower all charted strong growth over the period, mostly coal-based thermal power generation dropped 3.5%.

Although the historic drought in the summer curtailed hydropower so much that coal is back on track for a year-on-year increase, it won't be long before new clean energy capacity puts the fuel into permanent decline, Jones said.

"There is so much wind and solar being built and generating clean electricity," he said. "As long as China's not inventing a whole new use for thousands of terrawatt-hours of power, then from a demand perspective it's got to be reducing coal power, because there's nowhere else for that electricity to go."