



Global Development and Environment Institute  
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## Climate Challenges after the Glasgow Conference: The Roles of Forests and Soils

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### **“Keeping 1.5 Alive”**

The latest stage in global efforts to respond to climate change was the 26<sup>th</sup> Conference of the Parties (COP26) in Glasgow in November 2021.<sup>1</sup> Delayed by one year because of the Covid-19 pandemic, the conference brought together delegations from 197 countries with the goal of achieving major progress towards implementation of the 2015 Paris Agreement on Climate Change.

The global context of COP26 was set by the sixth assessment of the Intergovernmental Panel on Climate Change (IPCC). Scientists warned that “Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions occur in the coming decades.”<sup>2</sup>

Exceeding 1.5°C would significantly increase projected and potentially catastrophic outcomes including: “increases in the frequency and intensity of hot extremes, marine heatwaves, and heavy precipitation, agricultural and ecological droughts in some regions, and proportion of intense tropical cyclones, as well as reductions in Arctic sea ice, snow cover and permafrost. . . Changes in several climatic impact-drivers would be more widespread at 2°C compared to 1.5°C global warming and even more widespread and/or pronounced for higher warming levels.”

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In addition the IPCC report indicates that “ice sheet collapse, abrupt ocean circulation changes, compound extreme events and . . . substantially larger warming cannot be ruled out.”<sup>3</sup>

Temperatures have already risen 1.1°C from the pre-industrial era, leaving little margin for error in attempting to achieve a 1.5°C target, now more widely accepted than the previous 2°C target as being essential to avoid unacceptable damage.

The COP26 conference took place at a time when the reality of climate change has already become evident through the increased prevalence of climatic events previously considered as “once-in-a-century” occurrences, but now being experienced at a much higher frequency and amplitude. Droughts, heat waves, mega wildfires destroying forests in Siberia, Australia, California, and elsewhere, as well as unusually strong hurricanes, typhoons, tropical storms, and floods have occurred particularly in 2020 and 2021, in the Global North as well as in the Global South, devastating entire regions and impacting millions of people.<sup>4</sup>

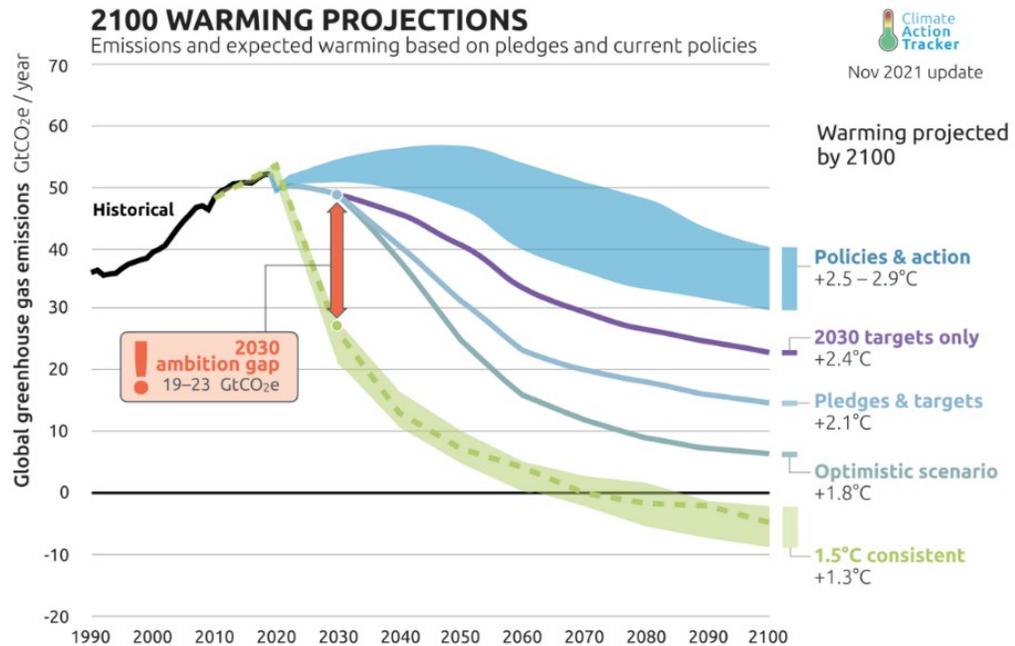
COP26 was branded from the start as the “last chance saloon” to save the world from runaway climate change<sup>5</sup> and the COP’s UK Presidency made “keep 1.5 alive” its rallying cry and its ultimate goal<sup>6</sup>. Heads of States shared the floor to declare their determination to take resolute action. President Biden apologized for the decision of the US previous administration to withdraw from the Paris Agreement and declared that the United States was fully and forcefully back.

Despite the absence of Chinese President Xi, a surprise announcement occurred on day 10 of the COP, that the two biggest emitters of greenhouse gases pledged to boost climate cooperation on some key specific areas, such as cutting methane emissions and carbon emissions from transport, energy and industry.<sup>7</sup> This last minute announcement, although lacking details on this unexpected US-Chinese plan, boosted a Conference that was struggling to produce significant outcomes to measure up to the magnitude of the task.

Achieving the demanding goal of 1.5°C would require a significant strengthening of the national commitments first undertaken at COP21 in Paris, in 2015. According to the Paris Agreement, the Nationally Determined Commitments (NDCs), which are voluntary, are supposed to be updated every five years to reflect higher ambitions. COP26 represented the first such milestone for updating.

The strengthened national commitments announced by the end of COP26 still fall considerably short of the goal. According to Climate Action Tracker, a non-profit scientific organization, there is a large gap between what was additionally committed by the end of COP26 (which would lead to 2.4°C) and the commitments needed to put the world on a path to 1.5°C (see Figure 1).

## Figure 1: Projections of Global Greenhouse Gases, different scenarios



Source: Climate Action Tracker, November 2021 update  
<https://climateactiontracker.org/global/temperatures/>

The Climate Action Tracker’s analysis indicates that “Current policies presently in place around the world are projected to result in about 2.7°C warming above pre-industrial levels. NDCs alone will limit warming to 2.4°C. When binding long-term or net-zero targets are included warming would be limited to about 2.1°C.”<sup>8</sup> To reach a 1.5°C pathway, CO<sub>2</sub> emissions would need to be at least 20 Gigatons (billion tons, or Gt) less than what they are projected to be in 2030 with current NDCs commitments.

The coming decade is thus crucial to “keep 1.5°C alive”. As summarized on the last day of the COP by its President, Alok Sharma: “we have kept 1.5 °C within reach but its pulse is weak and it will only survive if we keep our promises, if we translate commitments into rapid action, and if we deliver on the expectations set out in this Glasgow Climate Pact to increase ambitions to 2030 and beyond, and if we close the vast gap that remains, as we must.”<sup>9</sup>

### COP26 Outcomes

The text of the Glasgow Climate Pact summarizing COP26 outcomes reflects for the first time a specific commitment to “phase down” fossil fuels. The delegation of India, supported by China, insisted on a last-minute change to replace the term “phase-out” of coal power with “phase-down” (see article 36 of the Glasgow

Climate Pact). The document also calls for the elimination of fossil fuel subsidies, and “rapidly scaling up the deployment of clean power generation and energy efficiency measures.”<sup>10</sup>

Another major outcome of COP26 is a requirement to update NDCs every year, instead of every five years, and to provide more ambitious plans starting with COP27 in Sharm El-Sheikh, Egypt in 2022.<sup>11</sup> COP26 also reaffirmed the obligation of developed nations to mobilize \$100 billion a year to support climate mitigation efforts in developing countries, despite this target having been missed in 2020, and to double funding for climate adaptation to \$40 billion by 2025.

In addition, at COP26 the world’s governments agreed on a set of rules for the global carbon market under the Paris Agreement’s Article 6. This enables international trading of carbon reduction credits, though important issues remain to be resolved to ensure that credits represent real carbon emissions reductions rather than “hot air”. Countries also agreed to standards for transparency in carbon accounting.

Other important areas saw agreements among subsets of the participants: 109 countries joined the Global Methane Pledge to slash methane emissions by 30% by 2030; 141 countries pledged to halt and reverse forest loss and land degradation by 2030; 46 countries made commitments to phase out domestic coal, and 29 more countries committed to ending new international public support for fossil fuels by the end of 2022 and redirecting this investment to clean energy. The EU, UK, France, Germany, and US pledged \$8.5 billion to help South Africa finance a quicker transition from coal, with a goal of preventing up to 1-1.5 gigatons of emissions over the next 20 years. Over 400 financial firms with over \$130 trillion in assets committed to **aligning their portfolios to net-zero** by 2030.<sup>12</sup>

Local and institutional actions under the banner of the “Race to Zero Campaign” included **over 1,000 cities** and local governments joining the Cities Race to Zero to raise climate action to limit global temperature rise to 1.5 degrees C. And around 41 cities, 34 countries and 11 major automakers pledged to work toward selling only zero-emission vehicles globally by 2040.<sup>13</sup>

### Natural Climate Solutions

Despite progress at COP26, there remains a substantial gap between pledged and needed emissions reductions, as shown in Figure 1. This emphasizes the importance of increasing carbon removal from the atmosphere in addition to reducing emissions. Natural systems including forests, wetlands, and soils currently remove about 3 gigatons (Gt) of carbon (33% of annual emissions) from the atmosphere, while oceans absorb an additional 2.6 Gt of carbon. Enhancing natural carbon sinks has great potential to close the emissions gap, but had not been given as much prominence in COPs prior to COP26.

Article 38 of the Glasgow Climate Pact “*emphasizes* the importance of protecting, conserving and restoring nature and ecosystems to achieve the Paris Agreement temperature goal, including through forests and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and by protecting biodiversity, while ensuring social and environmental safeguards”.<sup>14</sup>

In addition to acting as greenhouse gas sinks, these ecosystems offer many other ecosystem services (biodiversity, freshwater supply, prevention of droughts and floods, prevention of erosion, and other vital functions). As noted by Laurence Tubiana, one of the architects of the Paris Agreement and the CEO of The European Climate Foundation “it is impossible to distinguish between climate and biodiversity. They’re two parts of the same problem.”<sup>15</sup>

Despite acknowledging the critical importance of natural systems, the Glasgow conference made only limited progress towards specific policy actions to promote preservation and expansion of natural ecosystems. The conferences also struggled with differences over how to define natural climate solutions. The term “nature-based solutions” was removed from early drafts of the pact due to objections from indigenous people’s representatives who feared that these so-called solutions might be packaged in ways that could be misused by big business and contribute to the commodification of nature and the displacement of indigenous communities.

According to Jing Corpuz, an Igorot indigenous leader from the Philippines, “Our position is that indigenous governance is the quintessential nature-based solution. Therefore, indigenous peoples’ governance should be recognized and supported as a nature-based solution. For other nature-based solutions projects, there should be safeguards and full respect for indigenous peoples’ rights.”<sup>16</sup>

On forests, as noted above, the conference did achieve an agreement among 141 countries to halt and reverse forest loss and land degradation by 2030. Specific policy commitments, however, were lacking. And despite a claim that COP26 saw “significant progress on issues related to agriculture”, this progress mainly consisted of extending a series of discussions initiated at COP23 in 2017, with an intention to achieve a more definitive resolution at COP27 in 2022.<sup>17</sup>

We review here the major issues involved in achieving substantive progress on forests, soils, and other ecosystems, with the perspective that this will be a more crucial component of future national and international climate policy.

## **Forests**

Previous COPs established a structure known as “Reduction of Emissions from Deforestation and Degradation” or REDD, expanded and updated to REDD+ in 2007. The REDD+ mechanism has encouraged countries to protect their forests by offering them credits for maintaining the carbon stored in forests.

This framework has drawn criticism from indigenous peoples and environmental advocates, who argue that it considers nature’s preservation merely as a mean to reach negative emissions, and a way to offset the greenhouse gases emissions of big polluters, be they countries or corporations. In particular, corporations can buy up forested land in countries of the South because the carbon stored in the trees would earn them income from the REDD+ mechanism, while the customary rights of indigenous peoples on these forests could be ignored and even erased.

Some analysts argue that these problems are not inherent to the design of the REDD+ policies and could be resolved if the mechanism was monitored and managed at the national scale, with the proper safeguards to protect and respect indigenous rights<sup>18</sup>. This approach could be compatible with the Glasgow Climate Pact’s larger definition of protection of natural ecosystems, acknowledging their roles as natural carbon sinks but also as hosts of biodiversity, and also acknowledging the key role of indigenous people in the preservation of nature and ecosystems.<sup>19</sup>

Scientists have mapped out key ecosystems, especially the carbon-rich forests and peatlands, that humanity cannot afford to destroy if climate catastrophe is to be avoided. These areas store 139 Gigatons of Carbon in trees, plants, and soils, which are “irrecoverable”, meaning that natural regeneration would not be able to compensate for their loss by 2050. During the last decade 4 Gigatons of this irrecoverable carbon has been released into the atmosphere through wildfire, logging, and farming. The major stores of carbon are in forests and peatlands in the Amazon Forest, Russia, the Congo Basin, Canada, and Australia.<sup>20</sup>

Forest protection was emphasized from the start of COP26 as one of its key priorities. An announcement was made on its second day, through the Glasgow Declaration on Forests and Land Use<sup>21</sup>, signed by 100 countries representing 85% of the world’s forested land, pledging to end deforestation by 2030<sup>22</sup>. These commitments build on the tools and methodologies of the REDD+ framework, which has been so far implemented by 54 countries.<sup>23</sup>

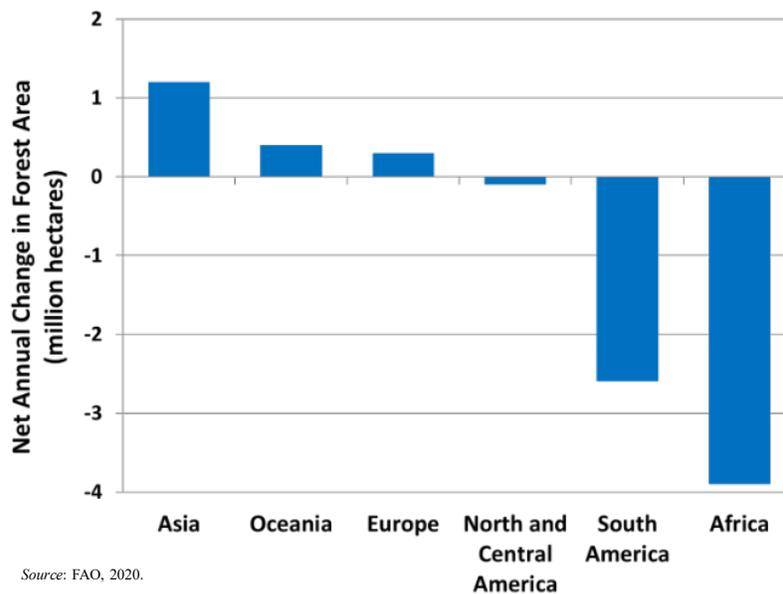
This declaration was backed by financial commitments made both by nation-states and by the global financial sector. In the COP26 Global Forest Finance Pledge, 12 countries (including the United States and several European nations, as well as the EU) will be collectively providing \$12 billion for forest-related climate finance between 2021 and 2025. This includes \$1.7 billion specifically dedicated to support Indigenous Peoples and Local Communities.<sup>24</sup>

The financial sector is joining the effort through a coalition of 30 leading financial institutions, (collectively with over \$8.7 trillion in assets under management), which have pledged \$7.2 billion to the Global Forest Finance Pledge, and to eliminate agricultural commodity-driven deforestation from their portfolios by 2025.<sup>25</sup> If followed through, this redirecting of global investments away from some of the main causes of deforestation (cattle ranching, logging, soy production, palm

oil, cocoa, and other extractive uses of forest land), could have a significant impact in slowing down deforestation rates.

The rate of net forest loss declined from 7.8 million ha per year in the decade 1990–2000 to 5.2 million ha per year in 2000–2010 and 4.7 million ha per year in 2010–2020. The Glasgow Declaration aims at slowing down that rate to zero by the 2030s. Spokespeople for environmental NGOs and indigenous peoples, however, have expressed their doubts that these declared intentions will result in the kind of urgent measures that are necessary, given the extent of current forest destruction and assessments that the Amazon Forest is already on the brink of turning into a net carbon emitter.<sup>26</sup>

**Figure 2: Net Change in Forest Area, 2010-2020**



It should be noted that the aggregate of 4.7 million ha per year of loss of forest area in the past decade hides a very diverse situation when comparing different continents (see Figure 2).<sup>27</sup> Africa’s annual rate of net forest area was 3.9 million hectare in the 2010s, that rate of loss has been steadily increasing since the 1990s. South America’s annual rate of net forest loss was 2.6 million hectares, half of what it was in the prior decade , but the rate of deforestation of the Amazon Forest has increased again in the last few years under the Bolsonaro government in Brazil. Despite the fact that Brazil is a signatory to the Glasgow Declaration, forest defenders and indigenous peoples in Brazil have demanded real action and not mere declarations from the Brazilian government.

North and Central America have experienced a net loss of 0.1 million hectare in the 2010s, down from a net gain in forested area of 0.2 million hectare the decade

prior: that trend particularly reflects the deforestation underway in the primary forests of the Southeastern United States, where old growth trees are cut and made into wood chips exported as biofuel to the European Union<sup>28</sup>. All other continents have experienced a net gain in their forested area: 0.3 million ha in Europe, 0.4 million ha in Oceania, and most notably a gain of 1.2 million hectares in Asia, mainly due to afforestation programs in China.

These figures only describe total area. Afforesting degraded land or reforesting formerly deforested land does not compensate for destroying primary old-growth forests. Aggregate figures conceal this vital difference. China has been reforesting millions of hectares, often by planting hundreds of millions of the same cloned trees, which are monocultures called “green deserts” by scientists, which cannot host biodiversity, as they lack by design the characteristics of real forests which are complex ecosystems of many different tree species and plants.

In terms of biodiversity, the loss of primary forests has immeasurable consequences, as the loss of habitats is the driving force of what has been called the 6<sup>th</sup> global extinction of species. In terms of carbon storage, old trees store more carbon than 70% of logged and replanted forests.<sup>29</sup> “Keeping trees in the ground” is far more effective in terms of carbon storage than replanting young trees that will take decades to store as much carbon as the trees they are replacing.<sup>30</sup>

The term “proforestation,”<sup>31</sup> referring to a deliberate policy of keeping trees in the ground, has been proposed by Professor William Moomaw to capture the value of protecting and expanding forests: “the most effective thing that we can do is to allow trees that are already planted, that are already growing, to continue growing to reach their full ecological potential, to store carbon, and develop a forest that has its full complement of environmental services.”<sup>32</sup>

It remains to be seen whether the Glasgow Declaration on Forests and Land Use, and the Global Forest Finance Pledge that accompanies it, are sufficient tools to curb the current trends of deforestation, especially that of primary forests. Ending deforestation by 2030 would make a massive contribution to climate change mitigation, as well as to protecting biodiversity, but as with other areas of the Glasgow Climate Pact, there remains a huge gap between declared goals and actual policy.

## **Soils**

Soils are the main carbon sink on earth, storing about 2300 Gigatons of carbon, about three times as much as the atmosphere. Although soils have never been a part of the COP’s mainstream discussions, they have received growing attention since COP21 in 2015, where the topic of soil health and its connection to food security and to carbon storage became a main feature of the COP’s side events. COP23 in 2017 adopted the ‘Koronivia Joint Work on Agriculture’ (KJWA) which provides a road map to address issues related to agriculture and soils.<sup>33</sup>

An independent international effort, which originated in Paris at COP21, is the 4per1000 initiative for food security and climate, with hundreds of member groups including countries, regions, academic institutions, farmers organizations and NGOs.<sup>34</sup> The name “4 per 1000” derives from the principle that an annual growth rate of 0.4% in soil carbon stocks, or 4 parts per thousand per year, in the first 30-40 cm of soil, would significantly reduce the CO<sub>2</sub> concentrations in the atmosphere due to human activities.

The initiative promotes the key role of healthy soils, seeking to advance forms of agriculture and grazing that regenerate soils and naturally enrich them in organic carbon. These approaches create a double win-win, in terms of long-term soil fertility and sustainability with higher yields, and in terms of carbon capture, as a natural solution to climate change.<sup>35</sup>

Professor Rattan Lal, a world-renowned soil scientist and a co-founder of the 4per1000 initiative, defines soil health in these terms: “Soil’s capacity, as a dynamic and biologically active entity, within natural and managed landscapes, to sustain multiple ecosystems services including net primary productivity, food and nutritional security, biodiversity, water purification and renewability, carbon sequestration, air quality and atmospheric chemistry and elemental cycling for human wellbeing and nature conservancy.”<sup>36</sup>

According to Lal’s estimates, the technical potential of carbon sequestration in the terrestrial biosphere (soils and vegetation) is between 1.45 to 3.44 Gigatons of Carbon per year. By the end of the 21<sup>st</sup> century, there would be a potential for all planetary soils to absorb 178 Gigatons of Carbon, and for all planetary vegetation to absorb an additional 155 Gigatons of Carbon, which would amount to a total of 333 Gigatons of Carbon. This is equivalent to 157 parts-per-million CO<sub>2</sub> in the atmosphere.

Scientists such as Dr. James Hansen have suggested that to stabilize planetary temperatures will require a long-term reduction in atmospheric CO<sub>2</sub> concentrations to a level of about 350 ppm.<sup>37</sup> Given that the current CO<sub>2</sub> concentration is 420 ppm, and accepting a long-term target of lowering this to 350ppm, Lal’s calculations imply that over the course of the next 80 years, the terrestrial biosphere would have the capacity to return atmospheric carbon accumulations to a safe level of 350 ppm, provided that the total of all greenhouse gases emissions in the next 80 years did not overshoot 87 ppm (the current increase being 2.4 ppm per year). Realizing this enormous potential of carbon absorption would require a drastic effort to rebuild the capacity of soils to hold soil organic carbon.

More soil organic carbon also means more yields: on average, adding 10 tons of organic carbon per hectare of land<sup>38</sup> increases agronomic yield by 400 to 1000kg (depending on the type of crop). A global effort to increase soil carbon would thus contribute both to climate stabilization and to food security.

This increase in soil organic carbon can be achieved by many techniques and processes. Climate resilient agriculture operates on a principle of never leaving the soil bare, using cover crops, replanting hedges and trees in the fields, and nourishing the soil with manure, compost, or biochar. More innovative forms of agriculture include the eco-intensification of cultures (cultivating a maximum number of species of plants in the same area, in contrast to current practices of monoculture), and permaculture, which has so far been used mainly on small farms but is increasingly being experimented with at larger scales.

To contribute to the necessary paradigm shift in agriculture, several international initiatives have emerged in recent years. The FAO has initiated a program to mapping organic carbon in soils, establishing which areas have the greatest potential for increased carbon storage, including restoring degraded soils.<sup>39</sup>

Other global coalitions of different stakeholders include the “Coalition of Action 4 Soil Health” (CA4SH), that emerged from the UN Food Systems Summit,<sup>40</sup> which boosts existing initiatives that promote soil health, business investment in soil regeneration, financial support for farmers working to adopt agroecological methods, and platforms for best practice exchange among farmers, researchers, and policymakers. (An example of such an exchange platform is the Northeast Healthy Soil Network<sup>41</sup>).

One of the main challenges to the agriculture transition towards more regenerative practices is to find the necessary funds to sustain farmers financially while their transition is underway. At COP26 two types of funding initiatives were discussed, one that is driven by the private sector investing in the food sector, and one that is powered by crowdsourcing channeled through networks of diverse stakeholders at all levels, local, regional, and global.

An example of private sector interest in the regenerative transition of agriculture is the REGEN 10 network, an initiative of the World Business Council, which “seeks to work with over 500 million farmers to apply regenerative production methods and transform agricultural systems, as well as ensure roughly USD\$60 billion per year is deployed to finance the transition.”<sup>42</sup>

Grassroot-led efforts that would help channel funds through crowdfunding efforts would likely not be able to mobilize billions of dollars in the way the Regen10 initiative seeks to do, but would better ensure that the voices of small-scale farmers is heard, and their needs are put at the core of any project funded by such initiatives.

The 4per1000 initiative proposed at COP26 the “Twin Regions” initiative that matches two territories, one in the industrialized world, and one in the developing world<sup>43</sup>. The concept is proposed as a civil societal engagement towards carbon neutrality, where the community in the North (city or region) has a high level of carbon emissions but a low capacity to sequester carbon in its soils and ecosystems, whereas its twinned rural community in the South has very low carbon emissions, and a very high potential to sequester biological carbon in its

ecosystems, through forestation and regenerative practices. The Northern twin also has the financial means to help its Southern twin directly, without going through national or international institutions.

### **Conclusion: Natural climate solutions are key to achieving 1.5°C target**

The primary focus of COP26, as of previous COPs, has been the need for drastic greenhouse emissions reductions. But it is increasingly evident that carbon removal from the atmosphere is equally important to achieve a 1.5°C target.

Some attention has been directed to technologies for artificial carbon removal. But while artificial carbon removal technology is expensive and is unlikely to prove scalable to the degree necessary, there is a known and huge potential for carbon removal through natural systems, relying on the power of forests, plants, soils, and ecosystems to store carbon.<sup>44</sup>

In addition to being the least expensive option for carbon removal, natural climate solutions have many other win-win features, including biodiversity conservation, improving watershed protection, and increasing water security, reducing soil erosion and air pollution, and improving human nutrition and health.

Following COP 26, one major issue is the strengthening of national commitments to reduce emissions. But in addition, the COP process has now recognized the importance of natural solutions. Pledges and policies undertaken so far in this area are only a small start on what is needed. A focus on the need for policies to implement much more sweeping natural climate solutions will grow in importance in future COPs, as well as in national policies aiming to achieve net zero emissions.

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