Climate Action Network

Position Paper on Forest and Land Restoration – Natural Ways of Limiting Temperature Rise to Below 1.5°C

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Climate Action Network (CAN) is the world's largest network of civil society organizations working together to promote government action to address the climate crisis, with more than 1100 members in over 120 countries. www.climatenetwork.org

Summary

CAN acknowledges and encourages the outstanding role of carbon sequestration in natural ecosystems in the struggle to limit global warming to 1.5° C, as enshrined in the Paris Agreement. CAN urges all governments to protect primary forests, halt deforestation and peatland degradation, and restore lost and degraded forests in a sustainable and participatory manner, while strengthening the rights of indigenous peoples and local communities. CAN believes that the global, rapid and deep decarbonisation required to meet the 1.5°C challenge must comprise both maximum emissions reductions in the energy and industry sectors as well as steep and ambitious efforts to store carbon in natural ecosystems.

Background and problems to be overcome

The Paris Agreement sets a goal of "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels". Rapid investment in transformative change is required to reach this goal. According to the Intergovernmental Panel on Climate Change's (IPCC's) Fifth Assessment Report (AR5, 2014), a huge effort will be required to stand a good chance (better than 66%) of staying below 2°C, while limiting temperature rise to 1.5°C requires even greater action over a shorter time period.

In 2011 the remaining global carbon budget that would have a good chance (>66%) of staying below 2°C was about 1,000 $GtCO_2$.[1] Given that emissions have continued at a rate of about 35-40 $GtCO_2$ each year since 2011, the budget is now roughly 750-800 GtCO2. The inclusion of other greenhouse gas emissions further reduces the carbon budget. The global carbon budget is even less to have a good

[1] Specifically, the IPCC said "Multi-model results show that limiting total human-induced warming to less than 2°C relative to the period 1861–1880 with a probability of >66% would require cumulative CO2 emissions from all anthropogenic sources since 1870 to remain below about 2900 GtCO2 (with a range of 2550 to 3150 GtCO2 depending on non-CO2 drivers). About 1900 GtCO2 had already been emitted by 2011." Climate Change Synthesis Report 2014, Summary for Policymakers, page 10, IPCC, 2014.

chance of reaching 1.5°C, at about 160 $GtCO_2$ according to some research. At current emission levels, this budget will be used up in a few years.

Although global CO_2 emissions were broadly flat in the period of 2014-2016, an increase of about 2% is anticipated in 2017. We are thus far from achieving the steep decline in emissions necessary for meeting the Paris climate goals. Moreover, there are emissions from some human activities that are complex and costly to abate at present and which are `survival emissions` such as methane from staple paddy rice production in developing countries which need to continue.

The vast majority of IPCC scenarios indicate that it is unlikely to be possible to sufficiently reduce emissions rapidly to stand a good chance of staying below 2°C without actively removing CO_2 from the atmosphere. Limiting temperature rise to 1.5°C appears impossible without such removals. The amount of CO_2 removal needed will be strongly determined by emission cuts in sectors like energy, where fossil fuels emit about 70% of all global GHG emissions. The earlier, faster and deeper the GHG emission cuts, the less CO_2 removal will be needed for a given level of temperature rise or accepted risk.

Options for large-scale carbon removal from the atmosphere

Many methods have been proposed for removing carbon dioxide from the atmosphere. Some of these involve the conservation, enhancement and restoration of the natural systems -- such as forests, peatlands and coastal ecosystems which have always removed carbon dioxide from the atmosphere. These approaches can be called carbon sequestration in natural ecosystems. Beyond these natural approaches there are artificially engineered methods for carbon sequestration, which are known as negative emission technologies (NETs). Some of these methods are entirely artificial, such as direct air capture (DAC), which employs chemical reactions to remove carbon dioxide from the air. The carbon dioxide is then sequestered in deep underground geological formations. Other types of NETs are artificial but build upon natural systems, such as afforestation (usually monoculture plantations of alien tree species), bioenergy with carbon capture and storage (BECCS), biochar, and enhanced weathering (EW) of minerals.

It is clear that the use of negative emission technologies to remove significant amounts of carbon dioxide from the atmosphere would require large-scale deployment. In the case of BECCS and afforestation, which are used in 87% of the 2°C scenarios reviewed in the IPCC AR5, this would require a vast amount of land - the most extreme, wildly unrealistic case would use nearly half of the earth's land surface area. The impacts of such actions would have negative consequences for a wide-range of issues, including food security, land tenure, ecosystem stability, and biodiversity. Many NETS are also energy and water intensive, presenting additional challenges. Some, such as direct air capture, are also extremely expensive. As the IPCC puts it in AR5 (2014), "The availability and scale of these [BECCS and afforestation] and other Carbon Dioxide Removal (CDR) technologies and methods are uncertain and CDR technologies and methods are, to varying degrees, associated with challenges and risks (*high confidence*)."[2]

It should also be stressed that many scenarios which employ NETs are cost minimisation models that tend to be deployed in countries where the cost are lowest (likely many developing countries) but which are perhaps not best equipped to implement the technologies. They may bring significant negative social and environmental costs, for example where these approaches may create conflicts

[2] IPCC AR5 WG III Summary for Policy Makers, p 12, 2014.

over land and natural resources and threaten communities' land tenure, livelihoods and food security.

Solutions

For long-term sustainable development, CAN proposes to exclude or at least minimise the use of artificial NETs. Part of the solution is to reduce emissions sooner and more rapidly so that less CO_2 removal is needed. The climate models that employ removals on the largest scale assume that decarbonisation rates will be slow over the next few decades and that NETs will need to be introduced later at a large scale to compensate for overshooting the carbon budget. Early and rapid emission reductions coupled with the immediate protection and restoration of natural ecosystems would considerably reduce the total amount of artificial carbon removals required later.

Emissions from agriculture, forestry and other land use (AFOLU) currently account for about a quarter of all human-induced emissions. About half of these emissions are from deforestation, forest degradation and peatland degradation. As an immediate and extremely important set of national actions by governments, halting the destruction and degradation of forests and peatlands would reduce these emissions to zero, cutting about 10% of global emissions.

As well as halting deforestation and forest degradation, an additional set of solutions is needed to conserve natural sinks and reservoirs of carbon. In their biomass, terrestrial ecosystems store at least a carbon equivalent of 1650 $GtCO_2$, their soils and litter store at least another 5500 $GtCO_2$ and wetlands and permafrost soils together store at least 6000 $GtCO_2$.[3] This is a huge amount of carbon - far more than in the entire atmosphere (about 3000 $GtCO_2$) or the global carbon budgets for going to 1.5°C or 2°C (160 and 750 $GtCO_2$). We must therefore conserve existing carbon stocks, especially in forests and peatlands. Continuing to release even a small part of these carbon stocks into the atmosphere would significantly reduce land-based resilience to climate change and carbon storage potentials and would very much negatively impact biodiversity.

Biodiversity confers resilience on carbon stocks in primary and other natural forests. Focusing forest regeneration and restoration efforts on buffering and reconnecting areas of primary forest offers the best prospect of securing long lived, resilient carbon stocks, in both the existing forest and restored areas and is the least risk pathway to keeping forest carbon out of the atmosphere and sequestering more carbon.

Enhancement of natural sinks and reservoirs, such as ecological restoration of degraded and secondary forests combined with the reforestation of lost forests could potentially remove up to about 480 $GtCO_2$ cumulatively over the coming decades.[4]

CAN Position

Artificial negative emission technologies (NETs) pose many potential problems. Although the precise impacts vary by technology, NETs are particularly concerning due to their potentially excessive use of land. In addition, many NETs are expensive and require large amounts of water, energy, or nutrients. The large-scale employment of some NETs could have devastating impacts for food security, land tenure, ecosystem stability, and biodiversity. The technologies are also largely untested

[3] IPCC, AR5, WG1, Chapter 6, page 470, IPCC, 2014.
[4] Kartha, S. and Dooley, K., "The Risks of Relying on Tomorrow's 'Negative Emissions' to Guide Today's Mitigation Action." SEI-WP-2016-08.

at the scale that they would need to be deployed and could take many years to be viable. Given the negative repercussions of these technologies, it would be wise either to not use or at least minimise the use of artificial NETs in removing carbon dioxide from the atmosphere.

CAN urges governments and all other actors to implement the following actions to help the world to stay within the 1.5°C boundaries:

- All land-based carbon sequestration from the protection and restoration of forests and other natural ecosystems must be done in parallel with full and rapid decarbonisation of the energy and industrial sector.
- While carbon dioxide removal will certainly be required to meet the Paris Agreement goal, all or a large part of this could and should be achieved by the conservation and enhancement of natural sinks and reservoirs, such as forests, peatlands, and grasslands. These natural solutions could be deployed more rapidly than negative emissions technologies generally and at lower cost. Like any form of carbon dioxide removal, their effectiveness will depend upon a rapid reduction in emissions from all other sources, particularly because land-based sinks may release stored carbon as the climate changes.
- The protection of natural ecosystems that function as carbon reservoirs and sinks, such as intact forests and peatlands and the restoration of degraded lands, have a host of co-benefits. These include, but are not limited to, biodiversity protection, maintenance of stable groundwater tables, sources for new medical products, local food security and pastoral services. Primary forest protection and restoration therefore offers the prospect of delivering multiple mitigation, adaptation, social, and biodiversity benefits in line with the goals of the Paris Agreement.
- To restore degraded land/forests and prevent further deforestation, policy incentives should be put in place to ensure that the drivers of deforestation are addressed, while respecting traditional and indigenous agricultural livelihoods. The drivers include large scale cattle, soy and palm oil production and could be addressed, amongst many other means, by dietary shifts away from emissions-intensive animal products, and reductions in food waste.
- Any technology, measure or intervention to restore and protect carbon in ecosystems should avoid negative impacts on food security, land use rights by small farmers, and shall empower women, and avoid the violation of human rights.
- The rights of forest-dependent peoples, and particularly indigenous peoples and local communities should be protected and strengthened. They should be supported for maintaining and restoring ecosystem services and benefits. Those who are responsible for forest conservation have a right to the benefits associated with forest preservation and carbon sequestration services.