



**PLANTING TREE FARMS**  
**NO PANACEA FOR**  
**CLIMATE CRISIS**

**WHY MONOCULTURE TREE PLANTATIONS UNDERMINE**

**THE CLIMATE FIGHT AND CAUSE HAVOC ON BIODIVERSITY**

**GREENPEACE**

A tiger cub is the central focus of the image, lying down in a forest. The background shows a sunset with a bright sun low on the horizon, casting a warm, golden glow over the scene. The trees are silhouetted against the bright sky. The overall mood is somber and urgent.

# **HUMANITY FACES A DOUBLE CRISIS.**

We are witnessing the first mass extinction of species since the disappearance of the dinosaurs, while at the same time climate change is becoming a daily reality in most parts of the world. We urgently need to find solutions for both challenges, working with, not against, nature. Planting trees is now advocated by a wide range of stakeholders, often in the form of large-scale, monoculture tree plantations. In the current form, these will aggravate, not improve, the climate and biodiversity crises.



# THE NEED FOR NATURE

People around the world are already experiencing the dangerous impacts of the heating climate—including extreme weather and rising seas. In 2015, world governments committed to try to limit global temperature rise to within 1.5°C above pre-industrial levels. Research shows that even a modest increase to this would have catastrophic impacts for millions of people and countless species around the world.<sup>1</sup>

At the same time, more than 1 million species are considered to be at risk of extinction, more than at any time in human history.<sup>2</sup> The current rate of species extinction may be one hundred times higher than the average over the past 10 million years – driven mainly by habitat loss due to changes in land and sea use, followed by direct exploitation of organisms, impacts of climate change, pollution and invasion of alien species.<sup>3</sup>

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<sup>1</sup>IPCC (2018), Fig. SPM.2

<sup>2</sup>IPBES (2019)

<sup>3</sup>IPBES (2019)



The science is clear: To stay below 1.5°C temperature increase, we need to drastically cut emissions **AND** massively remove CO<sub>2</sub> from the atmosphere. The potential for natural ecosystems—particularly forests—to absorb this excess carbon is now widely recognized.<sup>4</sup> Protecting and restoring natural forests and other ‘Nature Based Solutions’ are a key part of most pathways to keep global average temperature below 1.5 degrees.<sup>5</sup>

Forests are the most important natural carbon sinks on land – even if this is starting to weaken in some regions due to deforestation, degradation and first impacts of climate change. Trees have an amazing ability to pull carbon from the air and store it in their trunks, branches and leaves, transferring part of it into forest soils. This has led some climate mitigation projects to focus on increasing the overall number of trees. But not all ‘Nature Based Solutions’ are created equal. Some tree planting initiatives are downright dangerous for climate, biodiversity, and human wellbeing.

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<sup>4</sup>Hubau et al (2020)

<sup>5</sup>IPCC (2018). p16



# THE **OFFSETTING** MYTH

One stark example is industry proposing to ‘offset’ their climate damaging activities with tree planting. Shell plans to plant millions of trees as part of a programme to reduce its net carbon footprint by 2-3%.<sup>6</sup> Other oil and gas giants like Total, Eni and BP, and airlines like Air France and EasyJet, also invest in tree planting to offset their fossil fuel emissions.<sup>7</sup>

But planting trees does not cancel out emissions from fossil fuels. There is a time lag of ten to twenty years from when forests are planted until they start building up significant amounts of biomass to absorb carbon from the atmosphere. Meanwhile, burning fossil fuels adds more carbon into the atmosphere today, during mission critical years to avoid the worst case climate scenarios.

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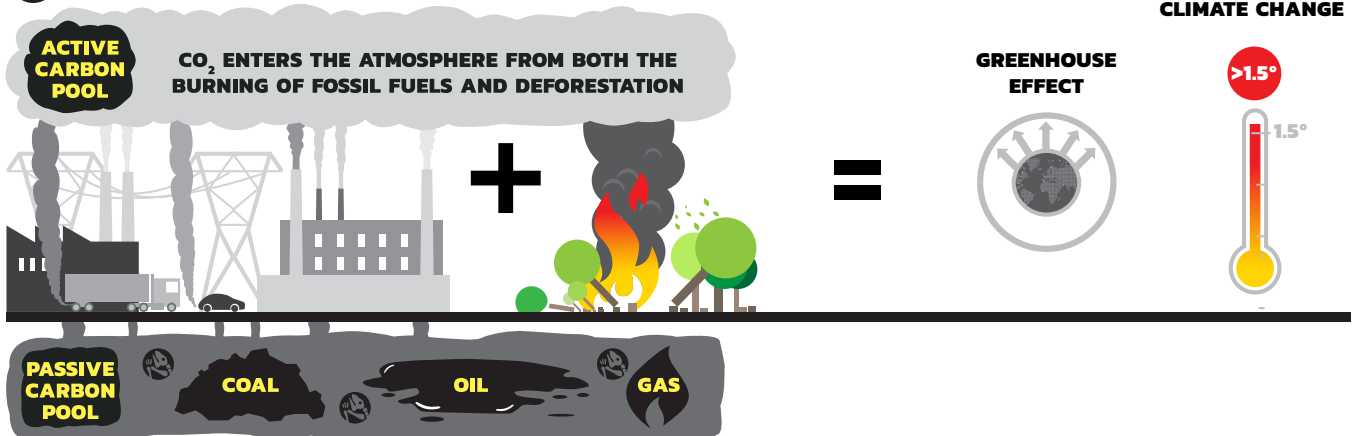
<sup>6</sup>Shell website

<sup>7</sup>Total website; The Guardian (2020); Air France website; EasyJet website

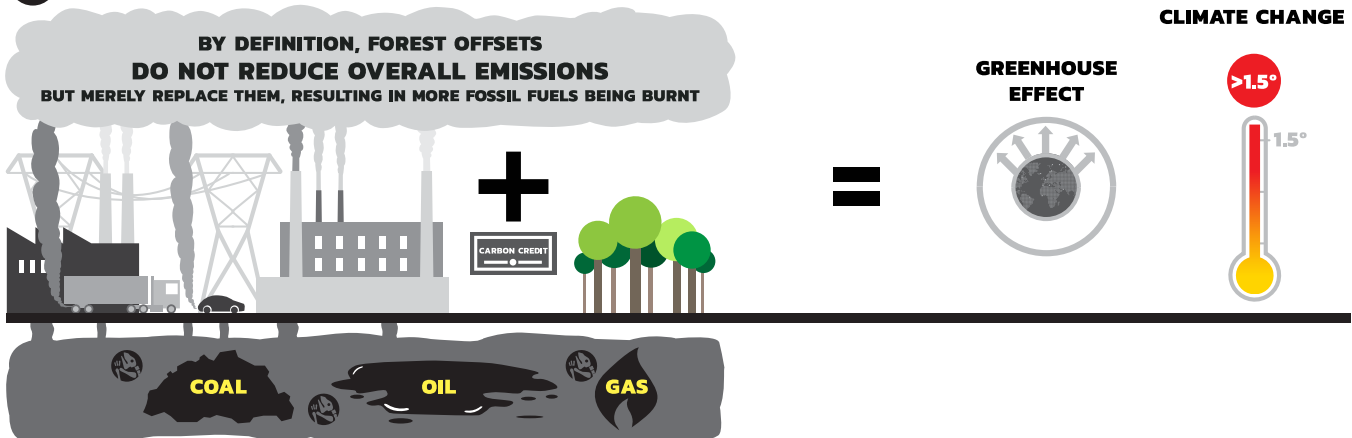
# THE PROBLEM WITH PLANTING TREES AND OFFSETS

Burning fossil fuels irreversibly transfers carbon stored for millennia in the passive carbon pool to the active carbon pool where it can contribute to climate change. Offsetting fossil fuel emissions with forest protection does not reduce carbon emissions. Only reductions in fossil emissions and protection of forests reduces the chance of catastrophic climate change.

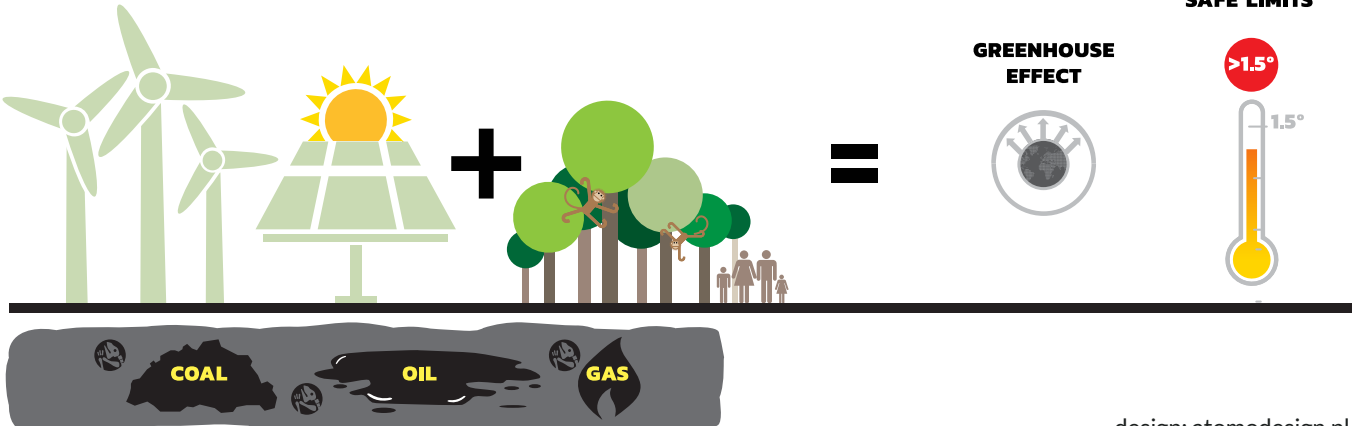
## 1 BURNING FOSSIL FUELS WITH DEFORESTATION



## 2 BURNING FOSSIL FUELS WITH FOREST OFFSETS

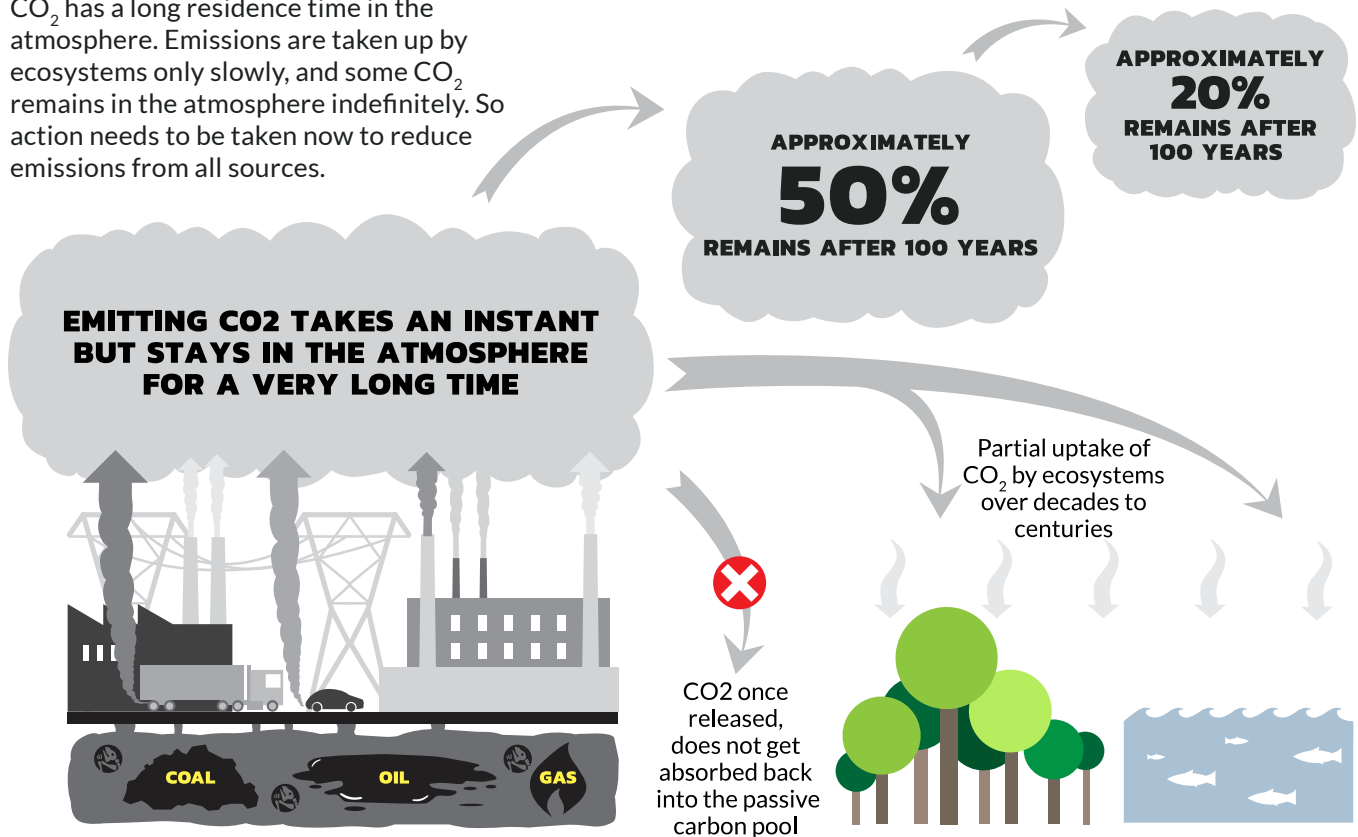


## 3 FOSSILS FUELS LEFT IN THE GROUND WITH ZERO DEFORESTATION AND FOREST RESTORATION



# LONG-LASTING CARBON DIOXIDE

CO<sub>2</sub> has a long residence time in the atmosphere. Emissions are taken up by ecosystems only slowly, and some CO<sub>2</sub> remains in the atmosphere indefinitely. So action needs to be taken now to reduce emissions from all sources.



design: atomodesign.nl

While fossil carbon is permanently locked up, this is not the case with carbon stored in vegetation and soil. Plants absorb CO<sub>2</sub> from the air when they grow, and release some of this carbon when they are harvested, burn or decompose. They do also transfer carbon into the soils where it can accumulate and be buried over time. But this carbon remains volatile, vulnerable to being released back into the atmosphere. Tree planting is no guarantee of long-term carbon storage. Only carbon in fossil fuel deposits is reliably locked away from contributing to climate heating.

We do need more forests for the long-term removal of the excess carbon already in the atmosphere. But tree planting cannot be used as justification for adding new emissions. We need profound cuts in fossil fuel use, an end to deforestation, and radical reforms to other carbon-intensive industries.

An aerial photograph showing a large-scale tree farm on the left, characterized by neat, parallel rows of young trees. A river flows through the center, separating the farm from a dense, natural forest on the right. The text 'TREE FARMS VS FORESTS' is overlaid in large, bold, white letters, with 'VS' in yellow.

# TREE FARMS VS FORESTS

Another challenge is that tree planting is often done in the form of large-scale, monoculture tree plantations. Under the Bonn Challenge, governments pledged to restore 350 million hectares of deforested areas and degraded lands by 2030.<sup>8</sup> According to recent analysis, nearly half (45%) of the area committed thus far will be vast, single-species tree plantations for the production of wood, fiber, rubber, etc. Just one third (34%) will be natural forests.<sup>9</sup>

Large monoculture tree farms under the guise of ‘forest restoration’ cannot be considered a solution to climate change. Natural forests continue to remove carbon from the atmosphere for decades or even centuries. In contrast, plantations are harvested at regular intervals, “which means almost all the carbon stored in the trees goes back into the atmosphere, as the plantation waste and wood products—mostly paper and chipboard—decompose.”<sup>10</sup>

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<sup>8</sup>The Bonn Challenge website

<sup>9</sup>Lewis et al (2019)

<sup>10</sup>Lewis & Wheeler (2019)





A recent study modelling forest restoration commitments under the Bonn Challenge concluded that if all of these areas would be dedicated to naturally regenerating forests, they would hold 40 times more carbon than short rotation monoculture plantations.<sup>11</sup>

Recent research suggests that, even in the absence of these different management practices, species-rich forests show stronger carbon accumulation compared to monoculture tree plantations.<sup>12</sup> Plantations are also more susceptible to pest outbreaks and fire, which result in greater carbon emissions from tree decay and burning.<sup>13</sup>

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<sup>11</sup>Lewis et al (2019)

<sup>12</sup>Huang et al (2018); Osuri et al (2020)

<sup>13</sup>Domec et al (2015); Munnion (2018)



# BIODIVERSITY 'DESERTS'

The Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) stresses that nature based climate change mitigation activities like forest restoration can be 'effective and support conservation goals'. However, it warns that large-scale plantations pose added threats to biodiversity.<sup>14</sup>

Tree farms are planted in places where other, more diverse ecosystems once grew. Natural forests, grasslands or savannas provide homes to countless plant and animal species. Tree plantations do not have the structure or the composition of a natural forest, essential to fulfill a forest's full ecological function. Plantations generally support far fewer species than natural ecosystems, as species that depend on specific habitat conditions may not survive.<sup>15</sup> Some tree plantations rely on a heavy input of pesticides, which further threatens species' health and survival.

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<sup>14</sup>IPBES (2019)

<sup>15</sup>Gardner (2007)



IPBES mandates restoring natural habitats as a key measure to slow down species loss. This should be applied at landscape level, support the natural regeneration of ecosystems, and foster local and endemic species. Reconnecting fragmented primary and natural forests is important, as well as allowing secondary forests to become more natural.

Intact and naturally regenerating forests have many more benefits than carbon sequestration and biodiversity: they clean the air and water, help prevent soil erosion and coastal flooding, and are more resilient to extreme weather.<sup>16</sup>

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<sup>16</sup>Mongabay (2017); Watson et al (2018)



# LAND RIGHTS AND DISPLACEMENT

Indigenous Peoples traditionally own, manage, use or occupy at least a quarter of global land area.<sup>17</sup> They play a vital role in maintaining and restoring ecological health to landscapes, notably through Indigenous science, knowledge and land stewardship. Lands where Indigenous Peoples live and practice stewardship are shown to deteriorate at a slower pace,<sup>18</sup> but are facing growing pressure from resource extraction, commodity production, mining, transport and energy infrastructure.<sup>19</sup>

Many of the most promising projects for forest protection and restoration are under the legal or customary ownership of local forest-dependent peoples.<sup>20</sup> However, when natural forests are replaced by plantations under the guise of restoration, Indigenous communities often lose access to land and vital services: food, medicine, shelter, income opportunities, cultural traditions, spiritual values and more.

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<sup>17</sup>IPBES (2019)

<sup>18</sup>Walker (2020)

<sup>19</sup>IPBES (2019); Gonzales (2019)

<sup>20</sup>Oxfam, International Land Coalition, Rights and Resources Initiative (2016)



Local communities may also suffer when agricultural lands, needed to ensure food sovereignty, are converted to plantations. Tree farms that rely on heavy pesticide use may also threaten the health and drinking water of surrounding communities.

Large tree-planting projects may assume that lands in Africa, East Asia and elsewhere are unoccupied and free to be planted. But most natural and cultivated landscapes are already in use by local peoples. At the expense of whose homes or in lieu of which other natural environments should these tree-planting schemes take place?



A close-up photograph of a tree trunk with green leaves in a forest setting. The tree trunk is the central focus, showing a rough, textured bark. Several green leaves are visible, some in the foreground and some further up the trunk. The background is dark and out of focus, suggesting a dense forest. The overall lighting is somewhat dim, with a focus on the textures of the bark and the vibrant green of the leaves.

# RECOMMENDATIONS

The starting point for natural solutions to climate change and species loss must be a focus on rights-based protection and restoration of natural ecosystems.

Indigenous Peoples must play a decisive role in landscape-level land-use planning. Social justice must underpin all efforts to achieve environmental security. Forest restoration will only be successful when good governance of forests is practised, ensuring meaningful participation of local communities in decision-making.



To restore nature, we must end deforestation, protect intact forests from being degraded, allow forests to grow back in historically deforested areas, apply responsible forest management, and allow managed forests to grow back to a semi-natural state.



Only where natural regeneration cannot achieve results, and as a last tool to be used, can planting trees be a useful measure. Planting should focus on areas where forests grow naturally, using a broad mix of native species.<sup>21</sup>

Replacing forests with tree plantations threatens biodiversity and increases emissions, potentially over long time scales. Monoculture tree plantations can be very harmful for the environment and people.

Tree plantations must not be financed by any funding mechanisms set up to mitigate climate heating and species loss. Funding and development assistance should shift to clean and renewable energies, rights-based ecosystem conservation and restoration, ecological farming, and community-based economic options.

Carbon accounting rules must also be changed. Natural forests and monoculture tree plantations must be differentiated. Net gains in forest cover cannot be counted against gross losses in natural forests.<sup>22</sup> Separate targets must be used for short term gross emission cuts vs. long-term carbon sequestration.

Ultimately, the protection and restoration of natural ecosystems has tremendous potential to fight global heating and biodiversity loss. But planting tree farms will only deepen the crisis.

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<sup>21</sup>Dooley et al. (2018)

<sup>22</sup>The FAO definition of 'Forest'; see: FAO (2012)



# REFERENCES

Air France website. 'Est-il possible de compenser les émissions de CO2 avec Air France?', accessed 11 March 2020. <https://www.airfrance.fr/FR/fr/common/faq/a-propos-d-air-france/est-il-possible-de-compenser-les-emissions-de-co2-avec-air-france.htm>

Domec et al (2015). 'Conversion of natural forest to managed forest plantations decreases tree resistance to prolonged droughts', *Forest Ecology and Management* 355:58-71 355, 58–71

Dooley et al. (2018) 'Missing Pathways to 1.5°C: The role of the land sector in ambitious climate action', Climate Land Ambition and Rights Alliance. [www.climatelandambitionrightsalliance.org/report](http://www.climatelandambitionrightsalliance.org/report)

EasyJet website. 'Leading the industry on sustainable travel', accessed 11 March 2020. <https://www.easyjet.com/en/sustainability>

FAO (2012) FRA 2015 Terms & Definitions, The United Nations Food and Agriculture Organisation, Rome, 2012. <http://www.fao.org/3/ap862e/ap862e00.pdf>

Gardner (2007) 'The Value of Primary, Secondary, and Plantation Forests for a Neotropical Herpetofauna', *Conservation Biology* 21, 775–787. <https://doi.org/10.1111/j.1523-1739.2007.00659.x>

Gonzales (2019) 'Amazon infrastructure puts 68% of indigenous lands / protected areas at risk', 28 June 2019. Mongabay Environmental News. <https://news.mongabay.com/2019/06/amazon-infrastructure-puts-68-of-indigenous-lands-protected-areas-at-risk-report/>

Huang et al (2018) 'Impacts of species richness on productivity in a large-scale subtropical forest experiment', Science 362, 80–83. <https://doi.org/10.1126/science.aat6405>

Hubau et al (2020) 'Asynchronous carbon sink saturation in African and Amazonian tropical forests', Nature 579, 80–87. <https://doi.org/10.1038/s41586-020-2035-0>

IPBES (2019): 'Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services', Díaz et al (eds.). IPBES secretariat, Bonn, Germany. 56pp

IPCC (2018) 'Global Warming of 1.5 °C - Summary for Policymakers', Intergovernmental Panel on Climate Change, Incheon, Korea.

Lewis et al (2019) 'Restoring natural forests is the best way to remove atmospheric carbon', Nature 568, 25–28. <https://doi.org/10.1038/d41586-019-01026-8>

Lewis & Wheeler (2019) 'The scandal of calling plantations 'forest restoration' is putting climate targets at risk', 4 April 2019. The Conversation. <http://theconversation.com/the-scandal-of-calling-plantations-forest-restoration-is-putting-climate-targets-at-risk-114858>

Mongabay (2017) 'Intact forests crucial to Amazon ecosystem resilience, stable climate', 28 Aug 2017. Mongabay Environmental News. <https://news.mongabay.com/2017/08/intact-forests-crucial-to-amazon-ecosystem-resilience-stable-climate/>

Munnion (2018) 'Fire and Plantations in Portugal', Science for the People Magazine, 2018 <https://magazine.scienceforthepeople.org/fire-plantations-portugal/>

Osuri et al (2020). 'Greater stability of carbon capture in species-rich natural forests compared to species-poor plantations', Environ. Res. Lett. 15, 034011. <https://doi.org/10.1088/1748-9326/ab5f75>

Oxfam, International Land Coalition, Rights and Resources Initiative (2016)

Common Ground. Securing Land Rights and Safeguarding the Earth. Oxford: Oxfam.

Shell website (2019) 'Shell invests in nature as part of broad drive to tackle CO2 emissions', Shell Global, 8 April 2019 <https://www.shell.com/media/news-and-media-releases/2019/shell-invests-in-nature-to-tackle-co2-emissions.html>

The Bonn Challenge, see <https://www.bonnchallenge.org/content/challenge>

The Guardian (2020). 'BP sets net zero carbon target for 2050', 12 Feb 2020. <https://www.theguardian.com/business/2020/feb/12/bp-sets-net-zero-carbon-target-for-2050>

Total website. 'Total compte investir dans la protection des forêts', accessed 11 March 2020. <https://www.total-proxi-energies.fr/particuliers/actualites/total-compte-investir-dans-la-protection-des-forets>

Walker (2020) 'The role of forest conversion, degradation, and disturbance in the carbon dynamics of Amazon indigenous territories and protected areas', PNAS 117, 3015–3025. <https://doi.org/10.1073/pnas.1913321117>

Watson et al (2018) 'The exceptional value of intact forest ecosystems', Nat Ecol Evol 2. 599–610. <https://doi.org/10.1038/s41559-018-0490-x>