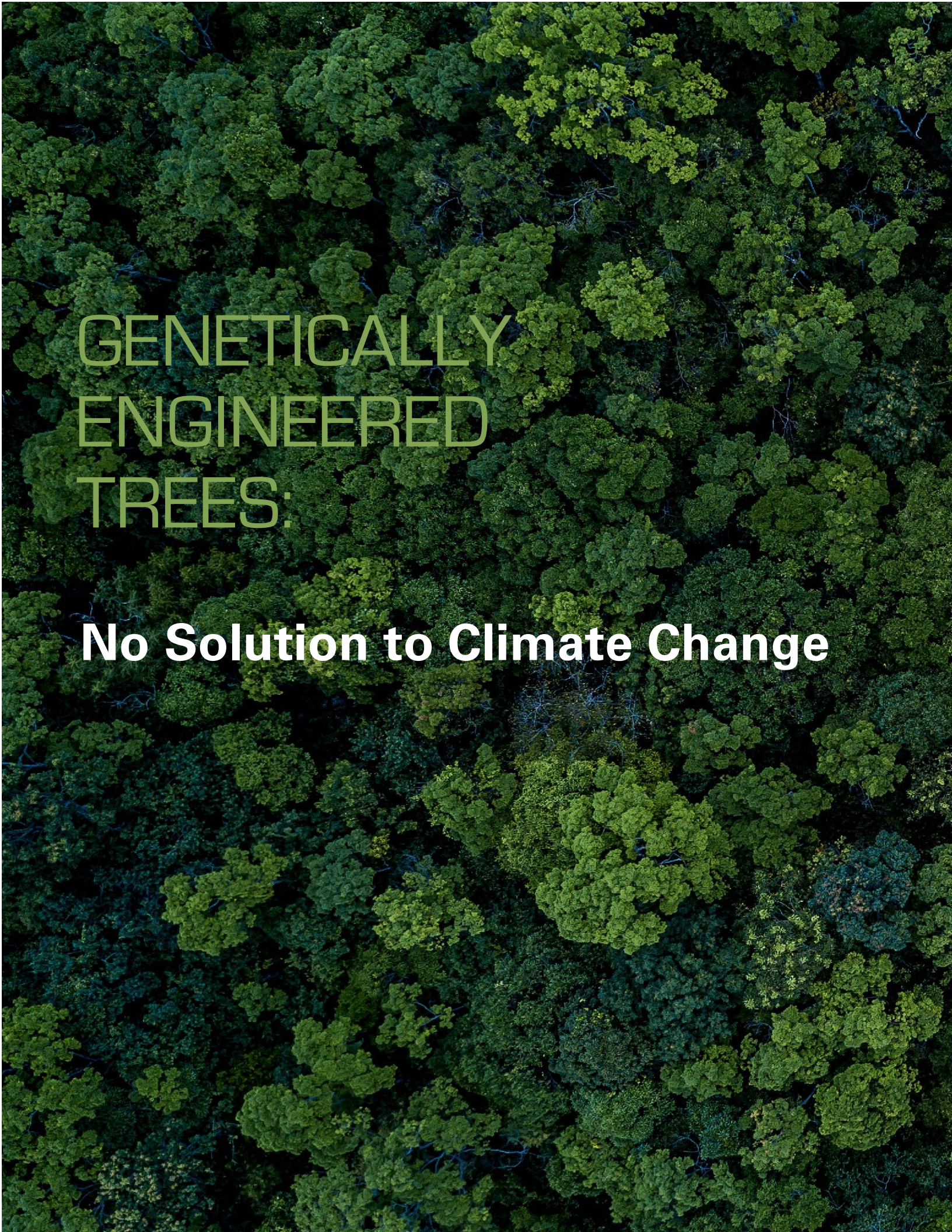

GENETICALLY ENGINEERED TREES:

No Solution to Climate Change

As concern about the climate crisis intensifies, so does rhetoric surrounding the role of forests, trees and carbon storage in climate mitigation. The science is clear that halting destruction of forests, which includes respecting the territorial rights of communities and peoples who depend on forests, is among the most effective, proven, and available means of removing carbon from the atmosphere,[1] and that undisturbed forests with diverse species, rich intact soils and deadwood store far more carbon than industrial tree plantations.[2]

Despite this established science, the tree biotechnology industry and its allies in academia are cynically capitalizing on the climate crisis to promote their genetically engineered (GE) trees as a climate "solution," arguing their GE trees will sequester "more carbon." Additionally, GE trees are being designed specifically to be cut on short rotations and to provide a rapid supply of wood to bioenergy, biochemicals and bioplastics, wood for construction, alternatives to concrete, and many other purportedly "green" uses.

Yet GE trees and plantations threaten forests, communities and health, and they divert resources from proven effective and equitable solutions. GE trees will not solve climate change but exacerbate it by interfering with efforts to protect and regenerate forests.

Not only have carbon markets and industrial tree plantations proven to be ineffective climate solutions, overblown hype about the potential for GE trees threatens to distract and divert investment and capacity from real solutions, while introducing new risks.

For example, a poplar tree has been genetically engineered to supposedly grow faster and store more carbon, with the aim to make it profitable for carbon markets.[3] It is also engineered to resist decay - allegedly making the wood suitable for carbon storage in wood products (construction materials, furniture, etc.). But impeding decay by engineering a tree to be toxic to microbes and fungi raises the potential for toxic impacts on insects, mosses, lichens and ferns as well as soil microbiomes fundamental to healthy forest ecosystems. Deadwood and decaying organic matter are, after all, fundamental to nutrient recycling and biodiversity in forest ecosystems.[4]

In engineering trees for the wood-based "bioeconomy", biotechnology researchers are aiming to transform the very composition of wood itself to facilitate production of bioplastics, biochemicals and cellulosic ethanol. This requires first breaking down lignin, a critically important structural component of wood, to access the tree's sugars. Industry is seeking a solution to the lignin "problem" through genetic engineering, including through the use of genome editing techniques such as CRISPR. However, transforming or breaking down lignin would alter the fundamental structure of wood with potentially profound impacts on tree growth, soils and biodiversity. Ironically, low-lignin trees would also impact carbon storage, as low-lignin trees rot more quickly.[5]

These tree engineering efforts introduce risks, but assessing those risks is simply not possible given that trees are long lived and may respond in unpredictable ways to environmental stressors, including pests and pathogens, extreme weather, fires and droughts over many decades.[6]

Additionally, cross contamination of GE trees with wild relatives could result in serious harm. For example, if the trait for altered lignin spread to forests, it could have devastating consequences given the fundamental role of lignin in protecting trees from pests, pathogens and environmental stressors.[7]

Outside of controlled laboratory conditions genetically engineered traits may not remain stable over time since gene expression is influenced by environmental conditions. This adds even more threats.[8]

Most GE trees are being developed for production in industrial plantations. Documented impacts of industrial tree plantations include water depletion and/or contamination with toxic chemicals, destruction of biodiversity, and loss of traditional livelihoods.[9] Additionally, development of plantations leads to a wide range of negative impacts on communities and the ecosystems they depend on, including forests, grasslands and savannas, and can lead to intense conflicts with these communities, which can also include forced relocations.[10] The global expansion of industrial tree plantations to include GE trees will worsen these impacts.

In the United States, for example, absentee ownership or control of large-scale timber plantations by Timber Investment Management Organizations, venture capital, and pension funds drives community conflicts, including the displacement of smaller-scale, diverse producers, who feed families and communities, know how to care for the land, and contribute substantively to local economies. The demand of many communities living with these consequences is to stop tree plantations altogether.[11]

In many cases, the Indigenous, rural, and agricultural communities that have long opposed industrial tree plantations for their devastating social, ecological and cultural impacts are also on the front lines experiencing the devastating impacts of climate change. For them, the prospect of genetically engineered trees and plantations developed for false solution climate schemes is a lose-lose proposition.

Equity and justice must be the foundational basis of any genuine or effective strategy for tackling the climate crisis.

Genetically engineered trees are not a climate solution. They are a dangerous distraction, and a threat to forests and communities that will worsen the climate crisis rather than fix it.

Statement written by The Campaign to STOP GE Trees

Statement Endorsed by: Biofuelwatch, Global Justice Ecology Project, World Rainforest Movement, GE Free New Zealand, Rural Coalition, RADA (Red de Acción por los Derechos Ambientales), ETC Group, Indigenous Environmental Network, Canadian Biotechnology Action Network, Dogwood Alliance, ActionAid USA, OLCA (Observatorio Latinoamericano de Conflictos Ambientales)

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