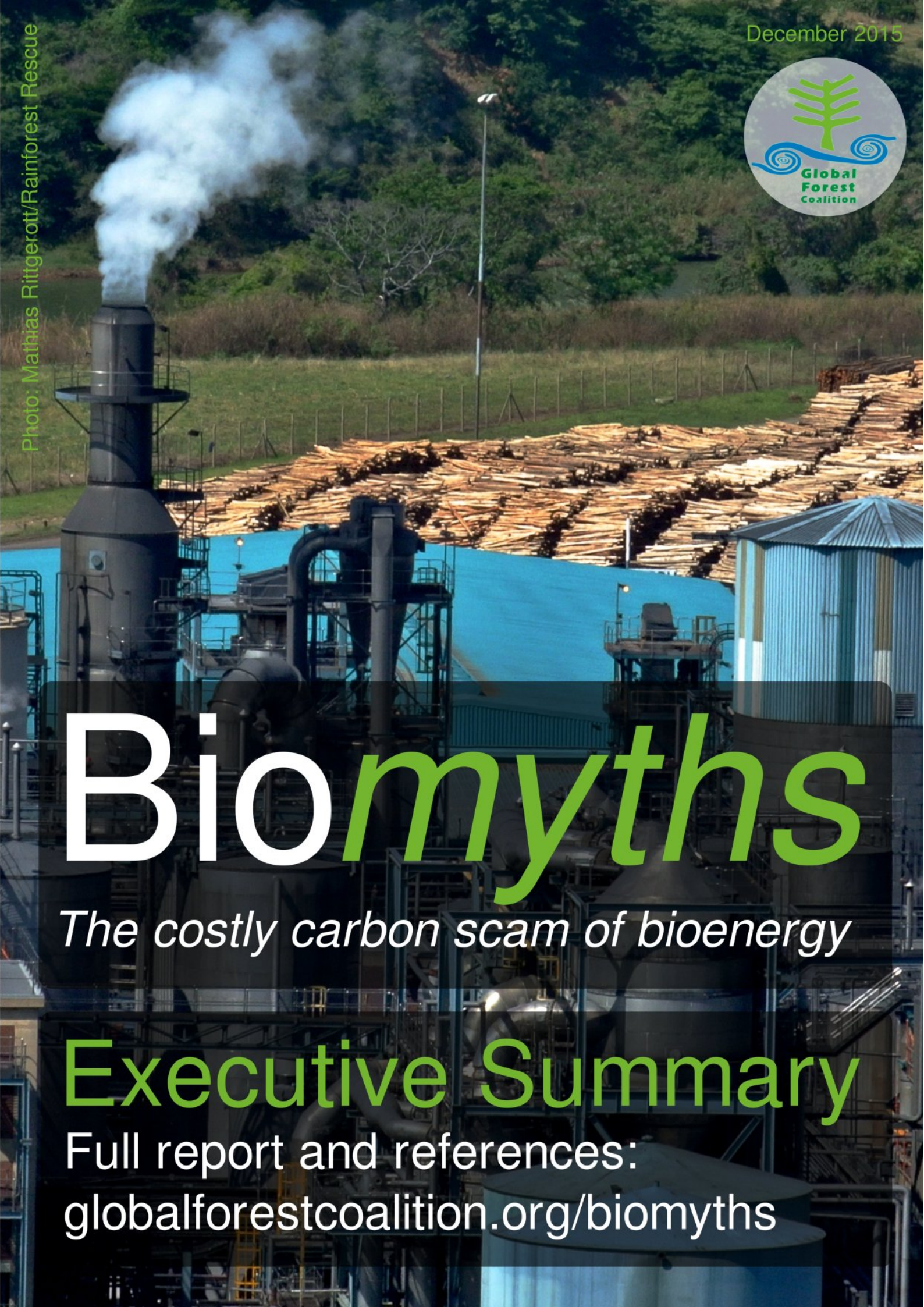

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Global Forest Coalition

Biomyths

The costly carbon scam of bioenergy

Executive Summary

Full report and references:
globalforestcoalition.org/biomyths

Executive Summary

The term 'wood-based bioenergy' refers to a range of different types of wood-based fuels, which are used in different ways and on different scales. On a smaller scale, wood, wood residues and charcoal are traditional fuels, and wood is still the main energy resource for poorer communities across the world. However, 'wood-based biomass' is now being promoted as a means of providing energy on an industrial scale, with potentially devastating consequences for forests and biodiversity, forest-dependent peoples, and climate change. Feedstocks for these power plants include forest residues, sawn wood offcuts, wood chips or sawdust. However, there is an increasing use of wood pellets, which are made from compressed, dry sawdust. These are more energy dense and easier to transport, facilitating international trade in addition to local production and consumption.

At present industrial-scale wood-based biomass consumption for energy is primarily located in the Northern hemisphere, mostly in the US and the EU. However, there is potential for this scenario to change. Investments in wood-based biomass facilities in Asia certainly indicate that Asian production and consumption of wood-based fuels are increasing rapidly. In general, bioenergy is already the world's largest source of 'renewable' energy. Total primary bioenergy supply stands at 50EJ, but the International Energy Agency (IEA) anticipates that this could more than triple by 2050, to 160EJ, with 100EJ of this being for the generation of heat and power.

Countries are supposedly switching away from fossil fuels and to biomass, including wood-based biomass, for three reasons: to ensure security of energy supply, to avoid the volatility of fossil fuel prices, and to mitigate climate change. The use of biomass as a key tool to combat climate change is based on the myth that it is carbon neutral. However, this is not the case.

Firstly, trees that are no longer standing are not available to continue carbon sequestration, meaning that atmospheric carbon concentration will be higher than it would have been if the trees had been left standing. Secondly, there is no guarantee that trees that are burned for bioenergy will actually be replanted, and that there will be replacement trees that will regrow and mature. Thirdly, it may be many decades before the carbon released is fully re-adsorbed by growing trees (the main argument used to promote biomass), but the time available to reduce carbon emissions before climate change reaches 'tipping point' is severely limited. Furthermore, harvesting trees and burning wood actually releases more carbon dioxide than burning coal, which is shocking given that coal is one of the dirtiest energy sources in use.

Finally, the IEA states that studies suggest that the increased demand could be met through wastes, residues and 'purpose grown energy crops' but even if this were possible, it does not mean that cheap timber from plantations would not be used. In the absence of any relevant regulations it will be the cost of relative wood-based feedstocks that determines which are used, not whether they are waste materials or not. Overall, this 'carbon neutral' accounting loophole is set to undermine progress towards climate change. It will permit power plants to go on pumping carbon emissions into the environment whilst countries falsely claim that they are reducing emissions.

Because wood pellet prices generally compare unfavourably with fossil fuel prices, many governments are using or have used a range of economic incentives to make the use of wood-based bioenergy attractive to industry. This transition away from fossil fuels is also driven by renewable energy targets in most countries. By mid-2015, 164 countries had at least one type of renewable energy target, up from 45 countries in 2005. Developing and emerging economies now account for 131 of those 164 countries. These targets range from government announcements and sectoral plans through to legally binding obligations.

For example, the EU's Renewable Energy Target requires at least 20% of energy use to be met from renewable sources by 2020, and the EU's 2030 new Climate and Energy Framework includes a target of 27% by 2030. By 2012, biomass and waste combined accounted for about two thirds of all renewable energy consumption in the EU, and forest biomass is now the main source of renewable energy in the EU. Most of the EU's biomass supply is domestic, with real and potential impacts for Europe's forests, biodiversity and food production.

The expansion of wood-based biomass in Sweden

Sweden is an example of the expansion of wood-based biomass use in the EU. The country has been using biomass, especially wood pellets, as a fuel since the 1980s, mainly to fuel district heating plants and combined heat and power plants for both heat and electricity production. Overall, Sweden has a higher proportion of its energy coming from renewables than any other country in the EU, and has already surpassed its target for 2020.

To drive this transition, Sweden uses a variety of measures including an energy tax, an electricity tax, a sulphur tax, a vehicle tax, and biofuels obligations. It provides some exemptions from the energy and carbon dioxide taxes including for 'CO_2-neutral fuels'. The government has also provided investment grants for producing electricity from biomass, wind power and small-scale hydropower. In 2011, however, the Swedish National Audit Office concluded that the tax exemption for biofuels is an expensive way of achieving the Swedish climate quality objectives. It also concluded that the tax exemption has not been conducive to sustainability or predictability.

Consumption of wood pellets has been steadily increasing in Sweden, and production capacity has almost doubled since 2004. Raw materials shortages are a recurring problem and several producers have difficulty in sourcing their feedstock because of high raw material prices. Thus Sweden also imports wood-based biomass, especially from Russia, Finland and the Baltic states (as well as exporting to Denmark and the UK). Investment in new power plants in Sweden continues, with an increasing focus on the use of forest biomass rather than waste. Sweden has at least ten power plants that are based solely on the use of wood (as opposed to wood waste or other organic materials), and major new investments include new biomass plants planned in Linköping and Stockholm. Swedish energy company Fortum also has its eye on the "fast-growing Asian energy markets".

However, wood-based biomass imports are increasing. In 2010 2.7 million tonnes of wood pellets were imported into the EU. In 2013, this figure stood at 4.3 million. By 2020 it is expected to be some 15-30 million tonnes, with serious implications for forests and biodiversity in both Europe itself and exporting countries, such as the US and Russia.

Figures from the UK tell a similar story: UK wood pellet imports increased almost 15-fold between 2008 and 2014, when nearly 4.8 million tonnes were imported and the use of wood pellets in the UK's major power stations accounted for more than 22% of all renewable energy sources and 36% of bioenergy fuels used to generate electricity. In 2008 both of these figures were less than 0.5%. According to UK government data, net imports supplied more than 95% of the wood pellets used by the main power stations between 2011 and 2014.

Another myth underpinning the growing use of wood-based biomass is that it is an efficient use of land to produce what is essentially solar energy. This has been roundly rebuffed by calculations from the World Resources Institute, which show that meeting the target proposed by the International Energy Agency— of supplying 20% of the world's energy from bioenergy in 2050—would actually require biomass equivalent to the "the entirety of human plant harvests in the year 2000"—including crops, plant residues, harvested wood and grazing land. In comparison solar photovoltaic (PV) systems use land 30-70 times more efficiently than biomass (Searchinger, & Heimlich, 2015).

Furthermore, the use of raw materials for bioenergy has various environmental, social and economic impacts, both in terms of the production of bioenergy feedstocks, and related to their eventual conversion into energy, either in unventilated houses or in power plants. The fact that increased imports of wood-based feedstocks seem to be an inevitable requirement means that these impacts will be felt both in countries producing for local consumption and in countries exporting biomass for energy.

Impacts include deforestation (to produce cheap biomass and to make way for tree plantations), loss of biodiversity, land grabbing, water contamination, reduced water availability, and loss of food security and soil fertility, especially in the tropics and sub-tropics. Specifically with respect to climate change, deforestation and forest degradation result in loss of carbon stocks in vegetation and soil, as well as affecting water retention and micro-climate regulation.

As production and use are primarily in the US, the EU and Russia at present, these are clearly where the impacts are being felt first. For example, new data indicates a 150% increase in wood pellets from the US in the last three years, primarily bound for Europe, and further increases are expected to intensify ecosystem damage in 'wood sourcing hotspots' in southeastern US.

In the EU it seems that meeting demand for forest biomass for the EU's bioenergy needs in 2020 will require more intensive forestry operations or the addition of tens of millions of hectares of land for forestry. This would mean losing

land that is being used for other purposes at the moment, or a reduction in the many benefits that natural forests currently provide. For example, forests' role in regulating hydrological systems is likely to be compromised by more intensive forestry practices. Biodiversity will also be affected by the removal of forest residues that various species depend upon, such as beetles, flies and wasps, with consequent impacts on species higher up the food chain, such as woodpeckers. In addition the monoculture plantations that would probably be planted as quick growing energy feedstocks have a low biodiversity value, require much more water, and are more vulnerable because they are at more risk of being attacked by pests.

A report prepared for the European Parliament anticipates that in the future, biomass, including woody biomass, may also be imported to the EU from countries in West and Central Africa and Latin American countries, especially Brazil. Thus it is also possible to anticipate that the impacts already being experienced as a result of expanding monoculture plantations—including land grabbing, deforestation, and long term impacts on local food and energy security—will be exacerbated in these countries in the future.

There is some evidence of foreign investors acquiring land in Africa, South America and Southeast Asia specifically to produce biomass for energy, indicating that these changes may already be underway. On the other hand, wood, even in pellet form, is relatively expensive to transport long distances, and there are examples of projects focused on international trade that seem to be failing, indicating that the situation with respect to anticipated demand and prices is also highly volatile, and that local opposition to such projects can be vocal and effective.

For example, companies already operating in Africa include the subsidiary of a Canadian business, which runs a eucalyptus plantation in Congo that supplied around 350,000 tonnes of wood chips to Europe in 2009. Another example is that of old rubber plantations in Ghana and Liberia being replanted to produce woodchips for export to Europe (although Vattenfall's project in Liberia collapsed in 2012, seemingly due to political opposition relating to energy access in Liberia). In Brazil, local communities have opposed the development of new eucalyptus and acacia plantations to export wood pellets to the EU. In the Philippines a new company was established in 2011 specifically to "produce sustainable biomass feedstock" using "idle land" in the Philippines. There is also evidence of land grabs for monoculture tree plantations in Africa and Brazil being justified by companies who are citing the growing EU biomass demand, even though the timber may actually be used for other purposes.

Overall it seems that Asia will be the next region to become heavily engaged in energy-related wood-based biomass production and consumption. Demand for wood pellets to feed biomass power plants in Japan is encouraging biomass production and consumption across Asia, and creating demands for imports from further afield, as evidenced, for example, by a contract between Sumitomo, who will build a 50MW biomass facility in Northern Japan, and French utility company Engie, formerly GDF Suez, which has been contracted by Sumitomo to supply one million tons of wood pellets between 2018 and 2028.

The situation in countries in Sub-Saharan Africa is rather different, in that household use of wood for energy, especially from charcoal, is still the dominant form of wood-based bioenergy use, whilst industrial-scale bioenergy production tends to focus on biofuels. The number of people relying on wood-based biomass energy in this way in Sub-Saharan Africa is expected to reach almost one billion by 2030.

The general governmental and intergovernmental focus in Africa is on improving the efficiency with which this wood-based biomass, especially charcoal, is used at the domestic level, as well as promoting low-carbon growth strategies and energy access. Carbon offsetting is being promoted: it is argued, for example, that one ton of 'sustainable charcoal' would offset one ton of non-sustainable charcoal or nine tons of carbon dioxide. This erroneous approach brings together the flaws associated with carbon offsetting (including the fact that short-term carbon sequestration in plants is wrongly equated with long-term underground storage of fossil fuels) and the 'carbon neutral' myth (described above). This approach is being incorporated into proposed climate-related forestry project proposals in Africa under, for example, REDD+ and Forest Investment Program.

In Latin America the situation is different yet again. There is widespread use of wood-based bioenergy for local and even national consumption, and charcoal production for industrial and/or urban use has had a devastating impact on forests, indigenous peoples and local communities in countries like Paraguay. There seems to be scant evidence of wood-based biomass being exported to other continents at the moment, although this situation could change in the future as the development of the Pinnacle Green resources wood pellet mill in Guyana indicates. At the moment, however, the focus is on the domestic and commercial use of charcoal. South America is second only to Africa in total and per capita charcoal use. Wood chips are also used extensively for pulp and paper production, rather than energy generation, and countries in South America, including Brazil, are ramping up pulp and paper production capacities, with most wood expected to be used locally.

The consumption-based impacts of burning wood-based biomass are also problematic. The health impacts resulting from the domestic use of biomass in small unventilated houses, especially in Sub-Saharan Africa, are well documented and programmes to improve cookstoves are underway. For example, a partnership between the World Bank and the Global Alliance for Clean Cookstoves aims to "spur a transition to clean cooking for 100 million households." However, in practice public-private partnerships such as these tend to work to improve corporate profits and corporate control over the domestic energy sector.

There is also increasing concern about impacts on the health of communities living around power plants burning biomass. The health impacts of any particular power station depend on the particular pollutants being emitted, pollution regulations in force, and the underlying health of the population affected (especially since research shows that the plants may often be located in areas with high levels of deprivation). Typical impacts related to air pollution include bronchitis, asthma, heart disease, stroke,

cancer, and reproductive problems including birth defects.

Given the fact that the use of wood-based biomass is based on a set of myths, it is clear that a new and radically different approach is needed in order to mitigate climate change effectively and meet the 2030 Sustainable Development Agenda goals, which include reaching ‘zero deforestation by 2020’.

This new approach should focus on keeping fossil fuels in the ground, addressing the drivers of deforestation by slashing consumption, and promoting agroecology and agroforestry as win-win ways of mitigating and strengthening resilience to climate change, at the same time as promoting food sovereignty and protecting biodiversity. It also entails ending trade and investment liberalisation agreements that fuel deforestation, rejecting monoculture tree plantations, and recognising land rights. It should ensure that:

• Bioenergy, including wood-based biomass, is no longer treated as carbon neutral and no longer classed as a renewable energy source, implying it is removed from all national and international renewables targets.

• Subsidies provided to fossil fuels and/or biomass providers are redirected to real solutions to climate change, especially community-based, small-scale wind and solar power initiatives, in order to drive a real and rapid transition to a genuine carbon-free future.

• Forests are redefined to exclude plantations, recognising their true and unmatched potential in terms of regulating climate change and protecting biodiversity, and their value for forest-dependent peoples.

• Climate change mitigation proposals intended to increase forest cover focus on community-led reforestation initiatives using native species.

Photo: Mathias Rittgerott/Rainforest Rescue

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