All it Takes is "Just-us": A Discussion on Climate Justice Through the Lens of Forest Management

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Human consumption is an assault on the world's resources, exacerbating climate change and crushing biodiversity underfoot. Earth's forests are at the forefront of this war and it is at these battlegrounds that we can turn the tide. From snow forests to rainforests, every kind can help mitigate, and even reverse, the effects of climate change through carbon sequestration and the replacement of carbon-intensive materials. However, reversing climate change is not purely an ecological matter, it is also a human one. Protecting our future with climate justice begins with forest conservation and we must look to solve this problem using both science and ethics. Current forest management does not adequately balance the economic and cultural needs of the endemic populace, nor does it mitigate climate change to the extent needed to secure our future. To fight climate change, forest owners, legislatures, corporations, and international organizations must work together to set global policies to effectively manage forests, without disproportionately affecting the cultural and economic needs of local populations. Forests world-wide can meet this goal with site-specific planning and zoning, coupled with the right tools and techniques to carry out those plans within the socio-cultural limits of the locale.

Evidence of Efficacy of Forests for Carbon Sequestration

Like specialized soldiers, forests play a key role in the fight against anthropogenic climate change. They have a unique property, called carbon sequestration, that is one of our best weapons to use against climate change. Forests and forest management are some of the most available and affordable technologies for combating carbon emissions today (Kramer, D. 2020). For example, northern boreal forests have been dubbed the "second lung of the planet" for their ability to capture carbon dioxide and recycle it into biomass, which when harvested provide excellent alternatives

to non-wood products and fuels (Pohjanmies, et al, 2017 & Gustavsson, et al., 2021). This link in the carbon cycle is critical, as growing evergreen forests act as a carbon dioxide sink of approximately 500–600 gC m−2 year−1 (Kosugi et al, 2013). Rainforests are even better at squirreling away carbon, with established rainforests sequestering as much as 0.5–1.0 Pg C yr−1 (Anderson-Teixeira, et al. 2016). There is a huge opportunity to counter, and reverse, anthropogenic net carbon emissions through forest sequestration. Unfortunately, the problem is not as simple as trying to just "grow more forests". There is a finite amount of arable land and if we are to meet the needs of humans, biodiversity, and the environment, managing the utilization of this land is our best bet.

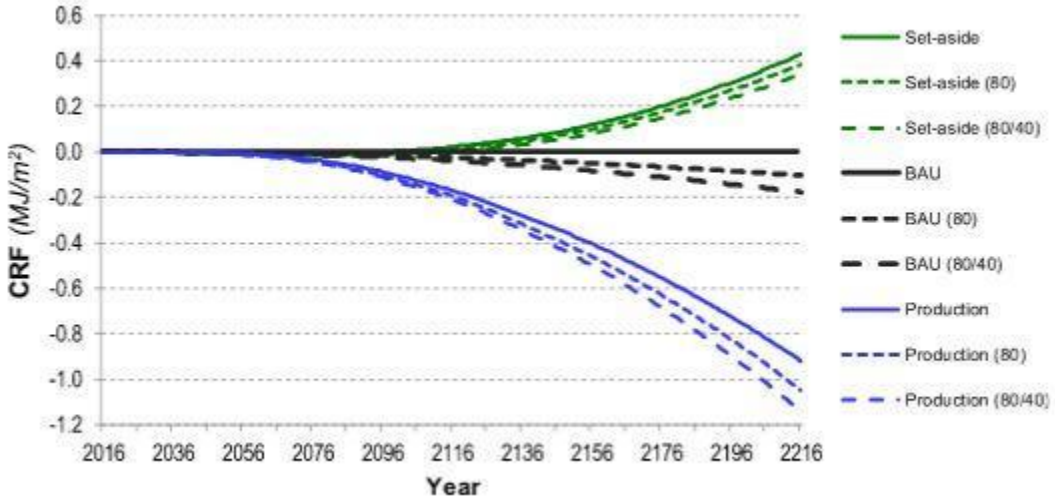
Management Models and Techniques

The importance of utilizing forests to aid in mitigating anthropogenic climate change is of increasing interest to a wide audience, including policymakers, NGOs, and land managers. By analyzing three scenarios for forestry, bioenergy, and wood construction, conducted in Kronoberg County in Sweden, we begin seeing how effective forest management models and techniques are crucial. One of the scenarios is described as the Business-as-usual (BAU) model, because it is the status-quo for forest management. This technique is currently used in Sweden, where 11.3% of forest land is set aside to balance the needs of the forest with the needs of the local populace (Gustavsson, et al., 2021). The second scenario, the Production model, builds off of the BAU model. In this model 11.3% of the forest land is set aside, while improving productivity by 40% with better management techniques (Gustavsson, et al., 2021). The last, and most extreme, of the three scenarios is known as the Set-Aside technique. In this scenario, 50% of productive forestry land is set aside, and results in nearly the same amount of Carbon storage as the Production technique after a 201-year period model, with the Production model capturing slightly more

(Gustavsson, et al., 2021). These models and techniques prove that utilizing forest management can outperform unmanaged forest production in terms of both commercial gain and biomass yield by utilizing carbon storage sequestration (Gustavsson, et al., 2021).

Figure 1.

Graph of CRF Results



As seen above, the long-term pattern of cumulative radiative forcing (CRF), which is an indicator used to measure the change in surface temperature, is most effective when using the Production model. By utilizing the Production technique of forest management, it is possible to not only allow for the use of the forest without completely disregarding the needs of the local population, but it is feasible that allowing the use of the forest in a properly managed way can actually result in a reduction of surface temperature through the capture of carbon in the forest. By properly managing the forest ecosystem, those that depend on the environment will not be negatively affected in an attempt to combat climate change. Instead, allowing use of the forest in a smart way will actually combat climate change, while still allowing locals to live their lives.

Considerations for Forestry Planning

Endemic populations rely heavily on forest ecosystems for commercial and cultural needs and must be considered in management models. Human populations that live among and near forested environments are distinct and complex due to their different worldly views and cultural perspectives which may vary by region. In some cultures, people choose to establish themselves through ownership of land, focusing on development or resource use for economic benefit. For example, some forest landowners will capitalize natural resources such as timber or wood. On the other hand, some people place value on the environment's aesthetics or cultural value it may provide. To translate, people all over the world place a special importance on the forests in our communities through history, medicine, art, religion, and other sociocultural aspects. For example, some people believe that forest trees may be sources of evil or power, or even contain the spirits of ancestors (Food and Agriculture Organization of the United Nations, 2014). It is imperative that forest managers consider the sociocultural and economic value forest may have to the local landowners, land stewards, and stakeholders. Some management practices may conflict with the economic, social, or cultural values of the local human populations (Pohjanmies, et al, 2017), even if the practices are beneficial for the forest or environment. For example, the lumber industry is a large driver of deforestation, with emphasis on economic gains, but many of the forest owners, stewards, and stakeholders place a higher value on aesthetic, sentimental, and socio-cultural values (Siiskonen, H. 2007). Furthermore, deforestation is responsible for 15% of all global greenhouse gas emissions on Earth (World Wildlife Fund, n.d.). According to some estimates, logging in violation of national laws accounts for approximately 8 to 10% of global production and trade in forest products (World Wildlife Fund, n.d.). Natural forests across the globe cannot sustainably meet the soaring global demand for timber products under current forest management practices. Consideration of the socio-cultural and economic value of the forest ecosystem will help ensure

that any project of reforestation, selective harvest, or development will respect local population environmental worldviews and perspectives. Taking these considerations into account in forest management planning will help ensure a streamlined process by minimizing interference and objection from the community, landowners, and other stakeholders.

Conclusion

Climate change is threatening the elements needed to maintain life on earth like natural resources, food supply, biodiversity and ecosystem services, to name a few. However, through reformation of current forest management practices, humans can work towards reversing climate change by wielding the enormous potential of our planet's forests. Forests' natural ability to pull carbon from the atmosphere and sequester it away represents one of our greatest opportunities to offset carbon emissions. However, fighting climate change does not mean simply planting more trees, it requires forest owners, legislators, business organizations, and government bodies to work together to prioritize best management practices that focus on balancing conservation, preservation, and economic gain. If planned and modeled cautiously, with consideration to socio-cultural influence forest ecosystems have on local communities, forest management can effectively be utilized to alleviate the advancement of climate change.

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