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Forest Stewards Guild position on climate-smart forestry

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ABSTRACT

Climate-smart forestry is an increasingly important topic in forest policy and for practices. However, what does and does not constitute climate-smart forestry is subject of debate. At stake are billions of dollars of investment aimed at encouraging climate-smart forestry practices in the United States. As a leading voice for ecologically, economically, and socially responsible forestry, The Forest Stewards Guild (FSG) has produced a position statement based on the organization's vision, mission, and principles to guide conversations around climate-smart forestry for all interested stakeholders. This forest perspective presents and expands on the findings of the FSG position on climate-smart forestry. There are three common aspects in the multiple co-existing definitions of climate-smart forestry: 1) adapting forests to expected future climate conditions, 2) mitigating climate change by leveraging carbon sequestration and storage functions of forests, and 3) improving social outcomes. There are potential trade-offs with other benefits forests provide if climate-smart forestry is pursued without holistic consideration of forest ecosystems. We suggest that such trade-offs can be minimized if the goals of climate-smart forestry projects are communicated transparently, system boundaries are made as comprehensive as possible, potential trade-offs are assessed along with climate benefits, climate-smart practices are tailored to the social-ecological contexts, and uncertainty is recognized.

INTRODUCTION

Climate-smart forestry is used to describe a wide range of practices intended to mitigate and adapt to climate change. Climate-smart forestry practices are considered *nature-based solutions* to address climate change, and forest products generated with climate-smart forestry practices are *climate-smart commodities*. There is no single authoritative definition of climate-smart forestry and tensions exist at international, national, and local levels over what practices should be considered climate-smart forestry. At stake in these debates are climate and non-climate-related risks to economic outcomes, biodiversity, ecosystem services, intrinsic values attributed to forests, and the unique relationships people and communities have with forests.

Recent developments have propelled climate-smart forestry to the forefront of forest practice and policy in the United States. Specifically, President Biden's executive order, "Tackling the Climate Crisis at Home and Abroad"[1] and the passage of the Infrastructure Investment and Jobs Act[2] and the Inflation Reduction Act[3] have created the directive and financial support to expand and incentivize climate-smart forestry. As a result, more than a billion dollars is being invested by the US Department of Agriculture (USDA) and others to support projects aimed at production and marketing of climate-smart commodities and the monitoring and development of climate-smart agriculture and forestry practices[4]. Successful implementation of these incentives requires defining what projects and practices should qualify and how success is gauged.

Climate-smart forestry practices, like all forestry, are likely to result in trade-offs producing winners and losers with the potential for more or less equitable and just outcomes. In this context, the Forest Stewards Guild (FSG)[5], a non-profit organization that practices and promotes responsible forestry to sustain the integrity of forest ecosystems and human communities, is increasingly called on to weigh in on emerging climate-smart forestry practices, projects, and

[1] Refer to: https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/
[2] Refer to: https://www.fhwa.dot.gov/bipartisan-infrastructure-law/climate.cfm
[3] Refer to: https://www.nrcs.usda.gov/sites/default/files/2023-02/CSAF_Inflation Reduction Act 2022.pdf
[4] Refer for instance to the USDA Memorandum to the field for the natural resources conservation service concerning partnerships for climate-smart commodities (USDA-NRCS-COMM-22-NOFO0001139). USDA-NRCS-COMM-22-NOFO0001139, available at: https://www.usda.gov/sites/default/files/documents/partnerships-climate-smart-commodities-joint-memo-nrcs.pdf
[5] Refer to: https://foreststewardsguild.org/

policy. To make clear the FSG approach to climate-smart forestry, we wrote a Position Statement[6] and we highlight the findings of the statement in this forest perspective with the purpose of:

1) providing a brief overview of the current state of climate-smart forestry;

2) highlighting advantages and trade-offs associated with climate-smart forestry to facilitate more informed and robust dialog in the implementation of climate-smart forestry practices; and

3) stating our position on climate-smart forestry through the lens of the Guild's six .

WHAT IS CLIMATE-SMART FORESTRY?

The term *climate-smart forestry* evolved from *climate-smart agriculture*, which aims to sustainably increase the productivity and resilience of agricultural systems while increasing their potential to reduce or remove atmospheric greenhouse gasses (Asfaw et al. 2010; FAO 2015). Climate-smart forestry, similarly, refers to different strategies in the forestry sector to adapt to and mitigate climate change. The term was first proposed by Nabuurs et al. (2015; 2017; 2018) to describe a targeted approach for increasing climate benefits of forests and the forest sector to meet European Union climate targets and was conceived as an extension of *sustainable forest management* intended to adapt to and reduce the impacts of climate change (Bowditch et al. 2020; Nabuurs et al. 2017). Multiple, sometimes conflicting, definitions of climate-smart forestry co-exist in policy documents and the scientific literature (Cooper and MacFarlane, 2023). Nabuurs et al. (2017) model their definition closely after climate-smart agriculture by identifying three main objectives: "(i) reducing and/or removing greenhouse gas emissions; (ii) adapting and building forest resilience to climate change; and (iii) sustainably increasing forest productivity and incomes." Other definitions focus more on ecosystem integrity, functions, and continuous delivery of ecosystem services without explicitly seeking increases in forest productivity or economic growth (Bowditch et al. 2020). An older and closely related idea of *climate-smart conservation* has no reference to productivity and only acknowledges the need for economic feasibility, not growth (Hansen et al. 2010). While many definitions exist, each with important nuance, there are

[6] Refer to: https://foreststewardsguild.org/wp-content/uploads/2024/02/Position_Statement_Climate_Smart_Forestry_extended_2024.pdf

three dimensions of climate-smart forestry consistently included in policy documents and literature: 1) climate-smart forestry helps forests ***adapt*** to future climate conditions, 2) climate-smart forestry ***mitigates*** climate change by reducing emissions and sequestering and/or storing carbon, 3) climate-smart forestry produces desirable ***social outcomes***.

Adapt

Multiple strategies can lead to forests that are better adapted to climate that is increasingly deviating from historical conditions. Various adaptation frameworks have been proposed (e.g., Lynch et al. 2021; Millar et al. 2007; Nagel et al. 2017; Schuurman et al. 2022) which generally describe three types of active strategies: 1) making forest ecosystems more *resistant* to climate change and climate-induced disturbances, 2) making forest ecosystems more *resilient*, and 3) *transitioning* forest ecosystems from historical conditions into ecosystems better suited for the climate of the future. Specific forest practices for adapting to climate change will vary based on the region, forest type, objectives, and social-ecological context (Himes et al. 2023). A common practice to increase resistance is thinning to reduce stand density and increase water availability for residual trees (D'Amato et al. 2013; Young et al. 2023). Increasing tree species diversity (Messier et al. 2021) and retaining old, large trees for their contributions to ecosystem functions, preservation of mycorrhizal networks and genetic diversity (Lutz et al. 2018; Mildrexler et al. 2023) are examples of strategies suggested to improve forest resilience. Assisted migration is one way to transition forest ecosystems to be more adapted to anticipated climate of the future (Dumroese et al. 2015; Gustafson et al. 2023; Nagel et al. 2017).

Mitigate

Mitigation refers to the ability of forests to reduce atmospheric greenhouse gas concentrations, particularly carbon dioxide (CO_2). Trees sequester carbon through photosynthesis as they grow and store carbon in wood. Forests also store considerable carbon in their soils. The rate of sequestration (growth) and duration of carbon storage before it returns to the atmosphere through combustion or decomposition contribute to how much forests mitigate climate change. Young, intensively managed forests tend to sequester carbon from the atmosphere at a rapid rate, but old forests tend to store more carbon. Mitigation is further complicated by the fact that some forest products also store carbon for a long time (e.g., wood used in building houses) while others release stored CO_2 back to the atmosphere quickly (e.g., paper decomposing in a landfill or biomass that

is burned). Forest management activities also tend to emit greenhouse gases directly, for instance, as diesel-burning equipment is used to harvest and transport timber. Indirect factors also affect the mitigation potential of forests. For instance, if wood products, like mass timber, replace other materials like steel and concrete that release large amounts of greenhouse gas to the atmosphere when they are made (Churkina et al. 2020; Himes and Busby 2020; Oliver et al. 2014), or if woody biomass used to generate energy can reduce dependence on fossil fuels (Nabuurs et al. 2017). Further, reducing harvests to increase carbon storage in one place can lead to importing more wood products from further away, increasing transportation-related greenhouse gas emissions and potentially resulting in no change in forest carbon storage at the global level (often called leakage) (Gan and McCarl 2007). Scientific tools, like remote sensing and sophisticated models, are allowing researchers to better understand how all of these factors interact to assess the mitigation potential of different forest management approaches (e.g., Diaz et al. 2018; Law et al. 2018; Peng et al. 2023) but there remains much uncertainty and argument over the appropriate assumptions and system boundaries (Badgley et al. 2022; Cowie et al. 2021; Giuntoli et al. 2020; Howard et al. 2021; Wells et al. 2023).

Social outcomes

Social outcomes of climate-smart forestry are wide-ranging. Often, economic outcomes are emphasized, specifically through jobs for local communities, increased production of forest products and/or payments for other ecosystem services like carbon storage (Gežík et al., 2021; Shephard et al., 2022; Verkerk et al., 2020). However, social outcomes may also include impacts like the health and well-being of local people and non-monetary ways forests contribute to a good life through recreation, aesthetics, spiritual experiences, connectedness with the natural world, sense of place, and identity (Cooper and MacFarlane 2023; Raymond et al. 2023). Some of these other values associated with forests may depend on treating them as important for their own sake and not only for their utility to people. Some aspects of desirable social outcomes will depend on the local community, their values, and worldviews. Others, like contributions to the global economy and meeting demand for wood products have much wider impacts. Determining the overall benefit or cost of forest practices in terms of social outcomes requires assessing the diverse ways people value and depend on forests, considering who benefits and who might suffer, and acknowledging inequity in power dynamics and historical treatment of some groups, for example, Indigenous peoples and minoritized communities (Cooper and MacFarlane 2023).

Synergies, complications, and tradeoffs

Some definitions of climate-smart forestry suggest that practices must improve adaptation, mitigation, and social outcomes all at the same time while others imply improvements in one or more areas are sufficient. Some practices may make forests more adapted to future changes but reduce their mitigation potential; for example, reducing stocking levels or transitioning to more drought-adapted but slower-growing tree species could reduce carbon sequestration rates and storage. Other practices may increase climate adaptation and mitigation but have undesirable social outcomes. For instance, shifting timber production-oriented forests toward lower densities, mixtures of species, and longer rotations to increase carbon storage and forest resilience may result in fewer harvesting opportunities, negatively impacting local economies. Useful tools exist to help navigate some of these complications. For instance, Ontl et al. (2020) propose a practitioner's menu of adaptation strategies and approaches for forest carbon management that suggests different strategies based on the landowner goals that are concurrent with climate adaptation. Ideally, incentives will encourage practices that synergistically support adaptation, mitigation, and social outcomes, but climate-smart forestry, like all forest practices, will result in trade-offs. Because people have diverse values and different priorities for forests there is the potential for conflicts. Even forest management strategies that seem like climate-smart forestry will have winners and losers. We encourage practitioners of climate-smart forestry to be mindful of the trade-offs associated with their practices and transparent about limitations.

FOREST STEWARDS GUILD POSITION ON CLIMATE-SMART FORESTRY

The Forest Stewards Guild holds that forest ecosystems have an effect on and are influenced by climate change and forest management has potential to both contribute to and combat global warming.[7] Climate-smart forestry is a concept that has the power to engage, educate, inspire, stimulate, and motivate foresters and society more broadly to pursue forest practices, leading to more resilient forests and communities capable of withstanding future conditions and preventing more extreme climate change. However, like all forest practices, climate-smart forestry can result

[7] Refer to the full Forest Stewards Guild Policy Statement on Climate Change and Forests: https://foreststewardsguild.org/wp-content/uploads/2019/12/Policy_Climate_Change.pdf.

in trade-offs between forest goods, services, and values (Bradford and D'Amato 2012; Himes et al. 2020). While climate change is a defining issue of our generation, the Forest Stewards Guild holds that forestry should holistically engage forests as complex ecological and social systems and, as such, avoid narrowly focusing on a single objective, be it timber production or climate, without broader consideration for the whole system (Puettmann et al. 2009). Responsible stewardship calls on us to take thoughtful actions that address other crises of our time, specifically unprecedented loss of biodiversity and the challenge of achieving more just and equitable futures (Pascual et al. 2023). To this end, the goals of climate-smart forestry ought to be matched with the holistic acknowledgement of the diverse challenges facing forest management and the multiple responsibilities we have to the forest and to future and current generations of people who depend on it. As members of the Forest Stewards Guild, we believe it is helpful to assess impacts of climate-smart forestry adaptation, mitigation, and social dimensions using the metric of the Guild's six principles discussed below. We believe that criteria and indicators of climate-smart practices developed to certify climate-smart forest commodities or determine allocation of subsidies for climate-smart forest practices are more likely to support socially just, economically equitable, and ecologically sound outcomes If they align with these principles. Below is a brief discussion of considerations for climate-smart forestry practices through the lens of each of the Guild's six guiding principles:

1. *The well-being of human society is dependent on responsible forest management that places the highest priority on the maintenance and enhancement of the entire forest ecosystem.*

   This principle is well aligned with the adaptation pillar of climate-smart forestry but prioritizes holistic forest ecosystem outcomes over climate mitigation. In most cases, maintenance and enhancement of forest ecosystems will mitigate climate change and have positive social outcomes. Still, not all climate-smart forest practices may be ecologically appropriate, e.g., planting trees in "understocked" forest ecosystems that have historically been open woodlands maintained by frequent fire (Domke et al. 2020; Hanberry et al. 2020).

2. *The natural forest provides a model for sustainable resource management; therefore, responsible forest management imitates nature's dynamic processes and minimizes impacts when harvesting trees and other products.*

   Climate-smart forestry practices will likely represent a spectrum of approaches, from establishing and maintaining novel ecosystems of intensively managed plantations of fast-growing exotic species for bioenergy and carbon capture to extending rotations and

increasing retention of live trees and deadwood during harvest to establishing forest carbon reserves where no timber harvesting is permitted. The degree to which a particular climate-smart forestry project aims to maintain or enhance natural forest ecosystem processes in projected future climate conditions may be a good basis for assessing how well a project or practice aligns with this Guild principle. In some cases, it may be prudent to consider deviating from strictly emulating historical disturbance regimes and species composition if they are no longer viable under projected climate change (Klenk et al. 2009; O'Hara 2016). Some intensive plantations may also be compatible with Guild principles if they are sited on marginal agricultural land and contribute to the overall ecological function of the forest landscape (Messier et al. 2019).

3. *The forest has value in its own right, independent of human intentions and needs.*

   The term climate-smart forestry is often used in contexts where forests are viewed narrowly through the lens of benefits they provide people. This does not mean that climate-smart forestry is incompatible with forest values that are independent of human intentions and needs, but it does mean for climate-smart forestry practices to align with Guild principles, other types of values (i.e., intrinsic and relational values) should be considered alongside the instrumental values of forests (Himes and Muraca 2018).

4. *Human knowledge of forest ecosystems is limited. Responsible management that sustains the forest requires a humble approach and continuous learning.*

   Global climate change is pushing forests and people into unexplored territory. Climate and forest science can provide valuable information about likely trajectories, but it is essential to recognize uncertainty in both climate and ecosystem responses (Puettmann 2014; Wells et al. 2023). A humble approach to climate-smart forestry requires monitoring so that successes and shortcomings can be documented and shared. To that end, experimentation should be nurtured and a failure to deliver desired outcomes expected and tolerated as long as it furthers our understanding and leads to better approaches.

5. *The practice of forestry must be grounded in field observation and experience as well as in the biological sciences. This practical knowledge should be developed and shared with both traditional and non-traditional educational institutions and programs.*

   To this end, adaptive and flexible approaches to climate-smart forestry are encouraged, which allow foresters to learn and modify approaches based on new information, knowledge, and experience. Other ways of knowing, like Traditional Ecological Knowledge, should be acknowledged and incorporated because they may have been developed over millennia of intergenerational experience (Minahan 2023).

6. *Our first duty is to forests and their future. When confronted with circumstances that threaten the integrity of the forest and conflict with the Mission and Principles of the Forest Stewards Guild, members must respond through education, advocacy, or, where*

necessary, disassociation. Guild membership signifies a commitment to the highest forest stewardship ethic.

This principle guides our response to climate-smart forestry proposals that conflict with the other principles discussed above.

In addition to consulting the Guild's six guiding principles, we also make the following specific recommendations for engaging in climate-smart forestry projects and to guide the development and/or implementation of climate-smart forestry criteria and indicators:

1. When parties with potentially differing interests engage with each other over climate smart forestry, all people involved clearly articulate their understanding of what climate smart forestry is and their priorities for the project.
2. Assessing the overall mitigation potential of a specific climate-smart forestry project should consider as many factors as possible. System boundaries should be clearly defined and made transparent. Whenever possible, sensitive analysis should be conducted to understand the impact of different assumptions, and stochastic factors should be considered.
3. We encourage practitioners of climate-smart forestry to be mindful of the trade-offs associated with their practices and transparent about limitations of what climate-smart forestry can achieve in the practical conditions and processes of their projects.
4. Climate-smart forestry practices should be place-specific. They should be sensitive to the local social context and be ecologically appropriate for the forest and soil type and forest condition where they are implemented.
5. In recognition of uncertain future conditions, we recommend that climate-smart forestry practices include the goal of increasing forests' adaptive capacity, focus on guiding trajectories of forest structural development and ecological processes instead of dictating precise outcomes, and incorporate monitoring procedures and flexibility to learn and adapt to the unexpected.

CONCLUSIONS

Climate change is the defining issue of our time, and it is imperative that we mitigate its impacts and adapt to future conditions with considerations for improving social outcomes. To that end, a climate-smart forestry is an admirable approach to practicing forestry. However, divergent opinions about what practices should be considered climate-smart and the potential trade-offs with other benefits that may arise from forest management aimed at mitigating or adapting to climate change can lead to tensions between stakeholders and other interested parties. Blank approaches

to climate-smart forestry should be avoided in favor of approaches tailored to the particular ecologies and cultural contexts of the places they are implemented. A myopic pursuit of climate-smart forestry without consideration of the diverse contributions of forests and the multitude of ways people value them may result in undesirable and unnecessary trade-offs. Thus, we recommend that climate-smart forestry be pursued as one part of a more holistic approach in which forests are recognized as complex social-ecological systems.

CONFLICTS OF INTEREST

The authors confirm there are no conflicts of interest.

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[8] The official position statement is available at https://foreststewardsguild.org/wp-content/uploads/2024/02/Position_Statement_Climate_Smart_Forestry_extended_2024.pdf.

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