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Optimizing Sustainability: Exploring the Intersection of Carbon Trading and Social Forestry Initiatives

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ABSTRACT
Carbon trading has emerged as a novel approach to mitigating climate change impacts and promoting sustainable development. The emphasis on social forestry enhances this strategy by involving local communities in forest management and carbon trading. In the context of the climate crisis, this study examines how the combination of carbon trading and social forestry can promote sustainability. The adoption of social forestry practices, such as empowering communities and managing forests sustainably, aims to reduce carbon emissions and preserve ecosystem health. This approach offers dual benefits by fostering local economic growth through carbon trading and safeguarding biodiversity while addressing climate change impacts. The research delves into the opportunities and obstacles of integrating carbon trading into social forestry, laying the groundwork for comprehensive solutions to sustainability and climate change adaptation.
Keyword: Carbon Trading, Climate Change, Social Forestry.

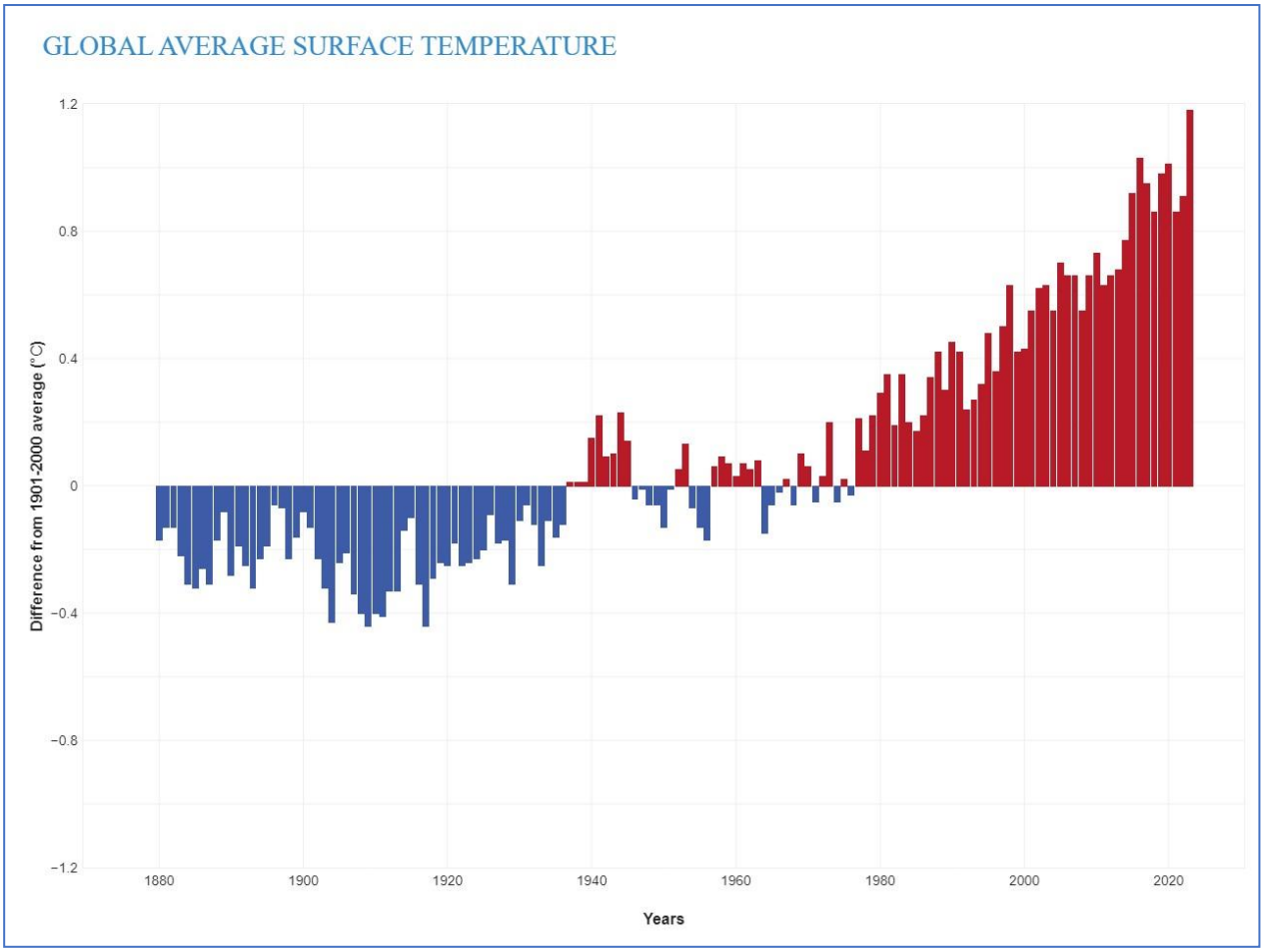
ABSTRAK
Perdagangan karbon telah muncul sebagai alat inovatif untuk mengurangi dampak perubahan iklim sambil mendukung pembangunan berkelanjutan. Fokus pada kehutanan sosial memperkuat pendekatan ini dengan mengintegrasikan partisipasi masyarakat lokal dalam pengelolaan hutan dan perdagangan karbon. Dalam konteks krisis iklim, penelitian ini mengeksplorasi bagaimana sinergi antara perdagangan karbon dan kehutanan sosial dapat menjadi dasar keberlanjutan. Implementasi praktik kehutanan sosial, termasuk pemberdayaan masyarakat dan pengelolaan hutan yang berkelanjutan, bertujuan untuk mengurangi emisi karbon dan menjaga keberlanjutan ekosistem. Konsep ini memberikan manfaat ganda dengan merangsang pembangunan ekonomi lokal melalui perdagangan karbon sambil melindungi keanekaragaman hayati dan mengurangi dampak krisis iklim. Penelitian ini memberikan wawasan mendalam tentang potensi dan tantangan integrasi perdagangan karbon dalam kehutanan sosial, menciptakan dasar untuk solusi holistik terhadap keberlanjutan dan adaptasi terhadap perubahan iklim.
Keyword: Perdagangan Karbon, Perubahan Iklim, Kehutanan Sosial

1. Introduction

Climate change has become an urgent global issue with serious impacts on ecosystems and human life. In recent years, much research has been conducted to address this challenge. Detailed information on the latest developments in understanding the impacts of climate change and the mitigation efforts that have been undertaken is needed. This change occurs due to the instant and massive lifestyle and technological needs of humans. Human lifestyles and environmentally damaging activities can result in a temperature increase. The

Intergovernmental Panel on Climate Change (IPCC) stated that within 15 years, from 1990 to 2005, there was a global temperature increase on Earth of around 0.15℃-0.3℃ (Mulyani, 2020).[1]

Table 1. Global Average Surface Temperature



(Source: Climate.gov)

Climate change has the potential to disturb the natural balance, leading to phenomena like storms caused by altered rainfall patterns, droughts due to rising temperatures, and water scarcity. According to the Royal Society and the US National Academy of Sciences, climate issues have been evident since the 1900s (Nuraisah and Kusumo, 2019).[2] The IPCC indicates that climate change, characterized by rising global temperatures, has profound effects on ecosystems and humans, leading to species extinction and marine biodiversity loss. This change has tangible consequences, with the global average temperature having increased by 1℃, resulting in a surge in natural disasters.

Carbon trading serves as a market-based approach to combat and adapt to climate change's impacts. Despite the 2015 Paris Agreement under the UNFCCC being an international legal framework related to carbon trading, there are currently no explicit regulations governing the establishment of global carbon prices.

The UNFCCC, focusing on climate change issues, aims to stabilize global greenhouse gas (GHG) concentrations to a level that prevents dangerous human-induced disruptions to the climate system.[3] As the

[1] Mulyani, AS 2020. Anticipate global warming by early detection of surface water temperatures using satellite data. CENTECH. 2(1):22–29.

[2] Nuraisah, G. and RAB Kusumo. 2019. The impact of climate change on rice farming in Wanguk village, Anjatan sub-district, Indramayu regency. AGRIBUSINESS MIMBAR: Journal of Scientific Community Thought with an Agribusiness Insight. 5(1):60–71

[3] UNFCCC, "What is the United Nations Framework Convention on Climate Change?," https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on- climate-change, accessed on January 15 2024.

UNFCCC is a framework that requires operationalization, additional international agreements are necessary to enact its provisions. Consequently, during the 1992 UNFCCC Conference of the Parties (COP) in Kyoto, Japan, a more robust protocol was established. This protocol could implement emission reduction mechanisms outlined in the UNFCCC.[4]

Social forestry programs play a crucial role in fostering economic independence for communities while promoting forest conservation. Additionally, they can help resolve tenure issues and land conflicts, furthering sustainable development aligned with the Sustainable Development Goals (SDGs). Social forestry's sustainability in the context of carbon trading is underscored by several key factors.

Firstly, carbon emission reduction strategies, when implemented in collaboration with local communities, can yield significant benefits in terms of reducing carbon emissions. This includes practices like preventing deforestation, reforestation, and sustainable forest management.

Secondly, community empowerment is vital, as it provides opportunities for locals to actively participate in natural resource management. This fosters a sense of ownership and responsibility, crucial for long-term sustainability. Engaged communities are more likely to support conservation and emission reduction initiatives.

Thirdly, social forestry projects, as part of carbon trading efforts, can meet sustainable development criteria, encompassing economic, social, and environmental aspects. These projects can offer economic advantages to local communities through job training, creation, and infrastructure development.

Moreover, long-term sustainability is ensured by involving local communities, integrating their perspectives and needs into project planning and implementation. This approach increases the projects' potential for long-lasting positive impact.

Lastly, recognizing the rights and interests of indigenous peoples in social forestry is essential. Indigenous communities often possess traditional knowledge and sustainable practices in forest management. Upholding their rights is a crucial step towards achieving equitable and sustainable outcomes.

2. Method

In developing a methodology to address this topic comprehensively, a holistic and multidisciplinary approach is essential. A suitable method could involve qualitative research, focusing on in-depth analysis of academic literature, research reports, and relevant case studies within the fields of climate change, carbon trading, and social forestry. This approach would entail content analysis to identify patterns, themes, and emerging trends from the materials, as well as critical evaluation of the arguments presented. Additionally, incorporating in-depth interviews with experts, stakeholders, and practitioners in the field would provide diverse and profound insights into the issues at hand. This methodology aims to offer a deep and thorough understanding of the intricate interplay among carbon trading, social forestry, and climate change mitigation efforts.

3. Result and Discussion

3.1 Trading Carbon: Basic Concepts

Carbon trading involves the buying and selling of carbon credits with the goal of reducing carbon emissions, providing economic incentives for emission reduction, and supporting green projects to mitigate the impact of greenhouse gases. There are two main types of carbon trading schemes: Emissions Trading Scheme (ETS) and Carbon Offset Scheme, each with different approaches to quota allocation and emission reduction. By creating a market for carbon credits, carbon trading can generate economic opportunities and value, potentially making a substantial economic contribution. Additionally, it can be an effective tool in climate change mitigation efforts (Tungkot Sipayung; 2023).[5]

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[4] Andreas Pramudianto, "International Environmental Agreement Law; Implementation of International Agreement Law in the Environmental Sector in Indonesia," (Malang: Setara Press, 2014), pp. 149-150.

[5] https://palmoilina.asia/sawit-hub/apa-itu-perdagangan-carbon/

The concept of carbon trading encompasses more than just emissions reduction; it also aims to create economic and environmental benefits. The carbon market mechanism governs the trading of carbon credits, which represent emissions that can be reduced or offset. This mechanism includes the Emissions Trading System (ETS), a cap-and-trade system that regulates carbon emission quotas for entities such as companies or countries. Entities can buy carbon credits from others with surplus quotas or sell credits if they have a shortfall. Another component is the Carbon Offset Scheme, which regulates credits generated from green projects like renewable energy generation or reforestation. Entities can purchase these credits to offset their carbon emissions.

The Voluntary Carbon Market operates without government regulation, while the Mandatory Carbon Market is government-regulated. A mandatory carbon market helps meet government-set emission targets like the Nationally Determined Contribution (NDC) or net zero emission targets. Carbon trading can occur through direct transactions between entities or via carbon exchanges, such as shares or futures securities. This mechanism allows entities to create economic incentives for reducing carbon emissions and supporting green projects. Additionally, it can benefit the development of clean technology, renewable energy, and sustainable development in alignment with the Sustainable Development Goals (SDGs).

Carbon trading offers various benefits, including creating economic incentives for reducing greenhouse gas emissions, encouraging investment in clean technology and renewable energy, and promoting green projects while controlling the impact of greenhouse gases. It also creates a market for carbon credits, providing economic value and potentially significant economic contributions. However, challenges such as determining fair and effective carbon credit prices, the risk of fraud and market manipulation, and a lack of awareness and participation from the public and market players exist. Additionally, carbon trading can lead to negative impacts on society and the environment, such as land conflicts and neglect of indigenous peoples' rights. To ensure that carbon trading operates effectively and provides optimal benefits, strict supervision and regulation are necessary.

3.2 *Social Forestry: Concepts and Implementation*

Social forestry is a forest management approach that involves local communities reliant on forest resources for their livelihoods. Its primary aim is to fulfill the basic needs of these communities, such as fuel, food, wood, and income, while also providing environmental services. This approach seeks to create a sustainable flow of production and benefits for society, including on public and private land, with a focus on increasing access to forest land for community use. By addressing poverty in forest communities, social forestry aims to conserve biodiversity while enhancing it.

One notable success story in social forestry is the Customary Forest Case in Gajah Bertalut Village, West Kalimantan, Indonesia. This village, located in Ketapang Regency, relies heavily on forests for sustainable living and livelihoods. The journey towards social forestry in this village involved several key steps:

a) Recognition of Community Rights: In 2009, the Indonesian government, through the Ministry of Forestry, recognized the rights of the Gajah Bertalut Village community to their customary forests, granting them full control over forest management and conservation.
b) Establishment of a Customary Institution: The community formed the "Indigenous Community Institute" (LMA) to manage their customary forests. LMA collaborates with governments and NGOs to develop sustainable forest management plans.
c) Development of a Customary Forest Management Plan: With support from various stakeholders, the community created a management plan focusing on forest conservation, sustainable resource use, and economic diversification.
d) Active Community Participation: The success of social forestry in Gajah Bertalut Village is attributed to the active involvement of community members in forest management. They participate in decision-making, monitoring, and reporting related to customary forest activities.

1. Success and Positive Impact

a. Forest and Biodiversity Conservation: Through customary forest management, the Gajah Bertalut Village community has succeeded in maintaining biodiversity and forest ecosystems. Traditional conservation practices are integrated with a scientific approach to create a good balance between ecological sustainability and community needs.
b. Community Economic Empowerment: Through the economic diversification proposed in customary forest management plans, communities can reduce their dependence on detrimental forest exploitation and shift to more sustainable economic activities.
c. Improving Community Quality of Life: With customary forest management rights, communities can maintain their traditions and lifestyle which are closely related to the forest. This has a positive impact on the welfare and cultural identity of the community.
d. Collaboration with External Parties: The success of social forestry in Gajah Bertalut Village is also related to support from external parties, including the government, NGOs and international institutions. This collaboration strengthens local capacity in forest management and provides access to additional resources and knowledge. This case study shows that social forestry can be a successful sustainability model when involving local communities, recognition of their rights, and support from external parties to realize conservation and economic sustainability goals.

2. Challenges and Potential of Social Forestry

a. Lack of Resources and Capacity: Many local communities involved in social forestry face limited resources and capacity. They may need training and mentoring to effectively manage forests and implement sustainable practices.
b. Conflicts of Interest and Land Rights: Conflicts often arise due to shifting land rights and disagreements regarding the use of forest resources. There is competition between economic interests, conservation and traditional community rights.
c. Legal Uncertainty: Some countries may not yet have a clear or supportive legal framework relating to social forestry. Legal uncertainty can hinder the implementation of social forestry projects.
d. Economic Pressure and Climate Change: Economic pressure often drives local communities to make decisions that are detrimental to the environment in order to meet their living needs. Additionally, climate change can also affect forest sustainability and create additional challenges.
e. Misappropriation and Injustice: There is a risk of abuse in the implementation of social forestry, where decisions or benefits do not always reach the community fairly. This can create inequality in the distribution of benefits.

3. Potential of Social Forestry:

a. Conservation and Preservation: Social forestry has great potential to support forest conservation and preservation. Involving local communities in management can increase their understanding and awareness of the importance of conserving biodiversity and forest ecosystems.
b. Community Empowerment: Involving local communities in forest-related decision making increases their empowerment. This includes granting rights to manage resources and supporting local economic development.
c. Carbon Emission Reduction: Sustainably managed forests can make a major contribution to reducing carbon emissions. Appropriate management practices can help reduce deforestation and support carbon sequestration.
d. Knowledge and Technology Transfer: Social forestry can be a platform for transferring knowledge and technology between local communities, government agencies and international partners. This can increase local capacity to better manage forests.

e. Sustainable Economic Development: With the right social forestry approach, local communities can develop sustainable economic models, for example through the development of non-timber forest products, forest-based tourism, or agroforestry practices.
f. The Importance of Local Wisdom: Social forestry creates opportunities to recognize and utilize local wisdom in forest management. Integrating traditional knowledge can help improve forest sustainability and resilience.

While social forestry holds significant promise, several challenges must be addressed to ensure its successful and sustainable implementation. One crucial aspect is the need for collaboration among government agencies, local communities, non-governmental organizations (NGOs), and the private sector. This collaborative effort can help overcome challenges such as land tenure issues, lack of technical expertise, limited access to markets, and insufficient funding. Additionally, raising awareness and providing capacity-building support to local communities can enhance their participation and ensure the long-term success of social forestry initiatives.

3.3 *The Relationship Between Carbon Trading and Social Forestry*

Although Carbon Trading and Social Forestry have different focuses, they are related and have the potential to support each other in achieving sustainability goals and climate change mitigation. The following is the relationship between the concept and objectives of Carbon Trading and Social Forestry:

a) Reduction of Carbon Emissions
   Trading Carbon: The main goal of carbon trading is to reduce greenhouse gas (GHG) emissions in an efficient and economical way. Companies or entities that succeed in reducing their emissions below the set limits can sell the remainder of their carbon quota to other parties.
   Social Forestry: Sustainable forest management practices in social forestry can help reduce deforestation and associated carbon emissions. Involving local communities in forest conservation and management can make a positive contribution to reducing carbon emissions.
b) Community Empowerment
   Trading Carbon: Although indirect, carbon trading can provide financial incentives to companies or countries to engage communities in sustainable practices and reduce emissions.
   Social Forestry: Community empowerment is the main goal of social forestry. Involving local communities in decision making regarding forest management can create sustainability and provide economic and social benefits.
c) Environmental and Economic Sustainability
   Trading Carbon: Carbon trading can be an instrument to support sustainable projects, such as renewable energy projects or emissions reduction projects.
   Social Forestry: Environmental and economic sustainability are central goals of social forestry. Local communities are directed to manage forests in a sustainable way to ensure long-term benefits and maintain biodiversity.
d) Transfer of Knowledge and Technology
   Trading Carbon: Carbon trading involves entities from various sectors and geographic locations. This creates opportunities for the transfer of knowledge and technology related to reducing emissions.
   Social Forestry: Implementation of social forestry can facilitate knowledge exchange between local communities, government institutions and international partners regarding sustainable forest management practices.
e) Sustainable Forest Management
   Trading Carbon: Carbon trading encourages companies and entities to adopt cleaner and more sustainable practices in order to sell or earn carbon credits.
   Social Forestry: The aim of social forestry is to manage forests in a sustainable way, maintaining ecological functions and providing economic benefits to local communities.

Overall, carbon trading and social forestry can work together to achieve sustainability objectives, decrease carbon emissions, and empower local communities. Combining the two approaches can offer a more comprehensive solution to combating climate change and conserving forests.

Integration of Carbon Trading and Social Forestry holds promise for achieving sustainability objectives. Here are some integration opportunities that could be maximized:

a) Forest Based Emission Reduction Projects:
   Opportunity: Building forest-based emission reduction projects that are integrated with carbon trading. For example, forest conservation projects involving local communities can generate carbon credits that can be traded on carbon markets.
   Benefit: Local communities can gain economic benefits from carbon trading, while forests remain protected and contribute to reducing carbon emissions globally.
b) Community Empowerment and Economic Sustainability Program
   Opportunity: Integrate community empowerment programs with sustainable economic activities based on environmental values, such as agroforestry or sustainable forest management.
   Benefit: Local communities can be actively involved in forest resource management and experience financial benefits from sustainable activities, while this project can have a positive impact on reducing emissions.
c) Sustainable Business Model Development:
   Opportunity: Building a sustainable business model that combines social forestry practices with carbon trading. This could involve involving the private sector in sustainable projects.
   Benefit: Implementing sustainable business models can create financial and operational sustainability, while carbon trading provides additional sources of income.
d) Use of the REDD+ Approach (Reducing Emissions from Deforestation and Forest Degradation):
   Opportunity: Integrating REDD+ approaches in social forestry to create effective mechanisms for reducing carbon emissions from deforestation and forest degradation.
   *Benefite*d+ can be the basis for creating tradable carbon credits, while a social forestry approach ensures local community participation in project implementation.
e) Environmental Counselling and Education:
   Opportunity: Combining environmental outreach and education activities in social forestry with carbon trading promotion efforts to increase public awareness and understanding of the positive impacts of sustainable practices.
   Benefit: Increased awareness can support public acceptance of carbon trading projects and create greater support.
f) Multi-Party Partnership:
   Opportunity: Building multi-stakeholder partnerships between government, private sector, non-governmental organizations and local communities to support social forestry projects integrated with carbon trading.
   Benefit: These partnerships can increase the capacity, resources and support needed to run these projects more effectively and sustainably.

This integration necessitates effective coordination, meticulous planning, and dedication from all stakeholders. Leveraging the synergy between carbon trading and social forestry can lead to the development of a comprehensive sustainability model that empowers local communities.

4. Conclusion

Extreme climate variations, including significant temperature spikes, sharp drops, and increased rainfall, are expected to escalate due to climate change, leading to substantial societal and ecological repercussions. Regarded as the most pressing global health menace of the 21st century, climate change's indirect impacts on water, food security, and the frequency of extreme weather events are particularly concerning. This modern

era's climate change, fueled predominantly by human activities like energy consumption and urban expansion, is poised to persist for centuries, causing disruptive effects.

Human-induced greenhouse gas emissions, chiefly from fossil fuel combustion, agriculture, deforestation, and industrial operations, stand as the primary drivers of climate change. An understanding of carbon's role in social forestry can enable comprehensive and sustainable endeavors to safeguard forests, curtail carbon emissions, and enhance the well-being of local communities. Carbon serves as a catalyst for fostering ecological and social sustainability in regions reliant on forests. The significance of carbon in the realm of social forestry is underscored by several factors: its role in climate change, the imperative of managing carbon emissions, its contribution to ecosystem equilibrium and biodiversity, its potential as a revenue source through carbon trading, its role in upholding the rights of local communities, and its role in developing a sustainable development framework.

To effectively implement carbon trading within the context of social forestry, a meticulous and strategic approach is essential to ensure both ecological and social sustainability. Several recommendations can guide the integration of carbon trading in social forestry: fostering local community engagement and consultation, managing risks and uncertainties, implementing sustainable forest management practices, instituting robust monitoring, verification, and certification mechanisms, enhancing local capacity, ensuring community economic viability, maintaining transparency and accountability, promoting multi-stakeholder partnerships, developing community-based models, fostering education and awareness, and enhancing resilience to climate change. By adhering to these recommendations, the integration of carbon trading in social forestry can emerge as a potent tool for achieving comprehensive sustainability and forest conservation objectives.

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