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THE ROLE OF INDIGENEOUS PEOPLE MOVEMENT IN THE RESTORATION OF JAVA FORESTS

Bernadia Linggar Yekti Nugraheni[1]
Shresta Purnamasari[2]
Amrizarois Ismail[3]

[1]Accounting, Faculty of Economic and Busineess, Soegijapranata Catholic University, Indonesia
[2]Management, Faculty of Economic and Busineess, Soegijapranata Catholic University, Indonesia
[3]Infrastructure and Environmental Engineering, Faculty of Science and Environmental Engineering, Soegijapranata Catholic University, Indonesia

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Abstract

Social forestry has emerged as a transformative approach to address forest degradation in Java by granting indigenous and local communities the rights to manage state-owned forests. This study investigates the ecological, social, and cultural contributions of social forestry initiatives to forest restoration and carbon reduction. Using a mixed-methods approach, we combined quantitative biomass absorption measurements with qualitative interviews and focus group discussions (FGDs). The findings reveal that reforestation programs involving Balsa, Sengon, and Teak trees absorb approximately 11.31 tons of CO_2 annually (≈22,000 pounds), demonstrating the significant role of community-led initiatives in mitigating greenhouse gas emissions. Vegetation diversity analysis using the Shannon-Wiener index (H') indicates a low but increasing diversity, reflecting the gradual recovery of degraded forest areas through continuous replanting efforts. Moreover, indigenous knowledge and cultural rituals, such as Sedekah Bumi and Nyadran, strengthen community stewardship and reinforce ecological care. Policy frameworks, moral responsibilities, and socio-economic benefits further drive local participation, shifting the paradigm from "poor forests, poor people" to "rich forests, rich people." Overall, the study concludes that indigenous movements and community-based forestry provide an effective model for ecological restoration, carbon reduction, and sustainable socio-economic development.

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BACKGROUND

Social Forestry (SF) represents a bold initiative introduced by the President of Indonesia to grant local communities the rights to manage and utilize forests. This policy was designed to address widespread forest degradation, particularly in Java, where more than one million hectares of state-owned forests are classified as damaged or idle (BPKH XI, 2003; Aprianto, 2013). Satellite imagery of Regional XI of State-Owned Forestry shows that out of 2,442,101 hectares, only 67.8% remained as forests, while 32.2% had been degraded or left idle. Through the social forestry scheme, indigenous and local people have been empowered to rehabilitate these lands, shifting the paradigm from "poor forests, poor people" to "rich forests, rich people." Picture 2 shows the before and after of the rehabilitation.

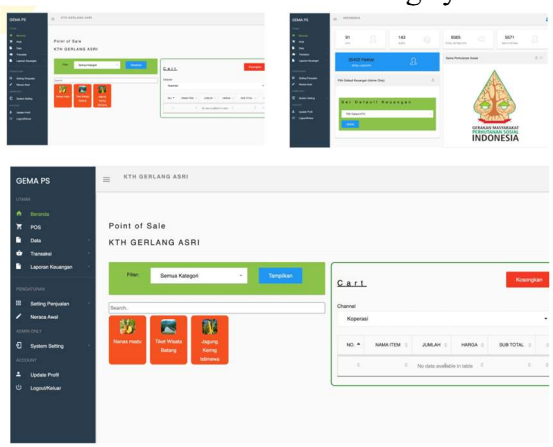
Picture 1. The Social Forestry Gathering

Picture 2. The Environmental impact of SF

This transformation highlights two contrasting knowledge constructions of forest management: conventional forestry and social forestry. Conventional forestry has historically emphasized nature conservation with a strong ecological focus, while social forestry integrates ecological, social, and economic dimensions. As Awang (2010) notes, forestry management in Indonesia has shifted from being "timber-oriented" to adopting a broader Forest Ecosystem Management (FEM) approach. Similarly, the management model has transitioned from a "security approach," centered on state-owned control, toward a "prosperity approach" that emphasizes community welfare. Importantly, the active involvement of younger generations has further supported innovation and sustainability within forest management practices.

Equally important is the empowerment of local communities through governance improvements. Social forestry initiatives have enhanced organizational structures, accountability systems, and financial record-keeping. Cooperatives have been strengthened, while networking with markets, off-takers, and government institutions has increased trust in social forestry communities. These developments have not only provided recognition from the Presidential Office and the Ministry of Environment and Forestry but also contributed to the financial, social, and environmental sustainability of forest-dependent populations.

Picture 3. The SF's recording system



METHODOLOGY

This study adopts a mixed-methods approach, combining quantitative and qualitative techniques to analyze the environmental and social impacts of social forestry in Java. The primary objective is to evaluate how reforestation and community-led management contribute to carbon emission reduction, ecological restoration, and social empowerment.

Quantitative methods focus on calculating biomass absorption to measure the carbon sequestration potential of social forestry initiatives. This involves estimating the carbon stored in mixed plantations, including standing forest stocks and cash crops. These measurements provide insight into the role of reforestation in mitigating greenhouse gas emissions.

Picture 4. The study field

Qualitative methods, on the other hand, involve in-depth interviews and focus group discussions (FGDs) with local communities engaged in social forestry. These discussions capture community perspectives on forest restoration practices, governance structures, and cultural approaches to forest management. By integrating both qualitative and quantitative data, the research provides a comprehensive understanding of how social forestry initiatives transform degraded forests into productive ecosystems while simultaneously improving community welfare.

RESULT AND DISCUSSION

The analysis of vegetation diversity using the Shannon-Wiener diversity index (H') indicates that the overall diversity level remains low, with values below 1. According to the classification, a value between 1 and 3 represents moderate diversity, while values above 3 indicate high diversity. The low index reflects the degraded state of many forested areas in Java. However, continuous reforestation efforts under social forestry programs have demonstrated a gradual increase in diversity. As trees grow

and plantations mature, the diversity index is expected to rise, signaling a positive ecological transition from damaged forests to reforested landscapes.

Table 1. The Diversity Index

Vegetation details	Frequencies	Density	Domination	Relative Frequencies (%)	Relative Density (%)	Relative Domination (%)	Vegetation Coefficient (INP)	Diversity Index (ID)
Balsa	0,070671378	0,057071378	0,061538462	0,070671378	0,057116032	0,07079646	0,19858387	0,078055196
Sengon	0,222614841	0,379251036	0,192307692	0,222614841	0,379547766	0,221238938	0,823401545	0,154115951
Teak tree	0,706713781	0,562895786	0,615384615	0,706713781	0,563336202	0,707964602	1,978014585	0,11926885

The carbon emission calculation (Table 2) shows that the three sampled vegetation types—Balsa, Sengon, and Teak—collectively absorb **11.31 tons of CO_2 per year**. To put this in perspective, this value is equivalent to approximately **22,000 pounds of CO_2 annually**, which demonstrates the important contribution of social forestry reforestation programs to mitigating greenhouse gas emissions.

Table 2. Estimation of total emission

No	Vegetation	Vegetation in Habitat	Volume			Wet weight (Kg/m³)	Dry weight (Kg/m³)	Mass (Kg/m³)	Carbon Emission in the sample (Kg CO2)	Total Emission of the forest group (ton CO²/year)
			R/R test (m³)	T/height (m³)	Total Volume (m³)					
1	Balsa	740	0,06	6,5	0,07354286	42,2	33,76	459,052059	39,46544	3,946544
2	Sengon	4851	0,075	7	0,12375	35	21	169,69697	24,549	2,4549
3	Teak Tree	7200	0,08	4,05	0,08146286	56	42	515,572391	49,098	4,9098
Total										11,311244

Qualitative findings from focus group discussions (FGDs) with four forest farmer groups further enrich the understanding of social forestry practices. Participants emphasized that their activities are not only driven by economic incentives but also by policy frameworks and cultural values. From a policy perspective, government programs require communities to restore degraded forests, while regulations clearly stipulate that forests are allocated for tree planting and not for housing development. These obligations reinforce a strong sense of stewardship among local communities.

Moral responsibility also emerged as a key theme, with farmers acknowledging their duty to plant, care for, and eventually harvest trees in a sustainable manner. Indigenous knowledge plays a central role in guiding these practices, particularly through traditional Javanese rituals. Two notable rituals are Sedekah Bumi and Nyadran. Sedekah Bumi is a ceremonial expression of gratitude to nature for providing abundant resources through forests, often performed in conjunction with planting new trees. Nyadran involves collective activities such as cleaning the environment around forests and maintaining sacred spaces, reinforcing the community's long-term commitment to forest care.

These findings highlight the integration of ecological restoration, policy obligations, and cultural traditions in shaping forest management under the social forestry scheme. The combination of scientific reforestation approaches and

indigenous cultural practices demonstrates how communities are transforming degraded landscapes into more resilient and biodiverse forest ecosystems.

CONCLUSSION

This study demonstrates that local communities and grassroots movements play a crucial role in addressing environmental challenges, including forest degradation and carbon emissions. Social forestry initiatives in Indonesia highlight how collective action, supported by both government policy and cultural traditions, can transform degraded landscapes into productive and sustainable ecosystems.

Local people are not only motivated by ecological concerns but also by socio-economic benefits that forests provide. Their eagerness to maintain sustainability stems from a dual awareness: ensuring ecological resilience while simultaneously improving livelihoods. This synergy between environmental stewardship and economic empowerment makes community-based forestry a highly effective model for advancing both climate action and social development.

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