

# Sustainable Peatland Management: Community Empowerment and Social-Ecological Change

## *Pengelolaan Lahan Gambut Berkelanjutan: Pemberdayaan Masyarakat dan Perubahan Sosial-Ekologis*

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### Abstrak

Peatlands in Indonesia are strategic ecosystems vital for climate change mitigation and biodiversity conservation, yet they face ongoing degradation from land conversion, drainage, and fires. While restoration policies exist, they are often ineffective when local communities are not meaningfully involved. This article contends that the sustainable management of Indonesian peatlands fundamentally depends on empowering local communities within a stronger, more inclusive governance and legal framework. The analysis links community empowerment to improved governance, legal recognition, and achievement of Sustainable Development Goals (SDG 13 and SDG 15). Using a qualitative approach based on a critical literature review and case illustrations from South Sumatra and Central Kalimantan, the research examines how participation, local knowledge, and structural barriers shape outcomes in peatlands. Findings show that communities possess significant expertise in fire prevention, agroforestry, and restoration, but their impact is constrained by inconsistent policy, restricted resources, and inadequate legal support for their rights. The article argues that integrating community empowerment into adaptive, collaborative policy frameworks can maximize ecological benefits and strengthen social and economic resilience for Indonesia's peatland-dependent communities.

### Kata Kunci

Sustainable Peatland Management; Community Empowerment; Social-Ecological Systems; Peatland Governance; Local Communities.

### Abstract

Lahan gambut di Indonesia merupakan ekosistem strategis yang vital untuk mitigasi perubahan iklim dan konservasi keanekaragaman hayati, namun terus mengalami degradasi akibat konversi lahan, drainase, dan kebakaran. Meskipun kebijakan restorasi telah ada, kebijakan tersebut sering kali tidak efektif jika masyarakat lokal tidak dilibatkan secara berarti. Artikel ini berpendapat bahwa pengelolaan lahan gambut Indonesia yang berkelanjutan pada dasarnya bergantung pada pemberdayaan masyarakat lokal dalam kerangka tata kelola dan hukum yang lebih kuat dan inklusif. Analisis ini menghubungkan pemberdayaan masyarakat dengan peningkatan tata kelola, pengakuan hukum, dan pencapaian Tujuan Pembangunan Berkelanjutan (SDG 13 dan SDG 15). Dengan menggunakan pendekatan kualitatif yang mencakup tinjauan literatur kritis dan studi kasus dari Sumatera Selatan dan Kalimantan Tengah, penelitian ini mengkaji bagaimana partisipasi, pengetahuan lokal, dan hambatan struktural membentuk hasil di lahan gambut. Temuan menunjukkan bahwa masyarakat memiliki keahlian yang signifikan dalam pencegahan kebakaran, agroforestri, dan restorasi, tetapi dampak mereka dibatasi oleh kebijakan yang tidak konsisten, sumber daya yang terbatas, dan dukungan hukum yang tidak memadai untuk hak-hak mereka. Artikel ini berpendapat bahwa mengintegrasikan pemberdayaan masyarakat ke dalam kerangka kebijakan adaptif dan kolaboratif dapat memaksimalkan manfaat ekologis dan memperkuat ketahanan sosial dan ekonomi bagi masyarakat yang bergantung pada lahan gambut di Indonesia.

### Keywords

Pengelolaan Lahan Gambut Berkelanjutan; Pemberdayaan Masyarakat; Sistem Sosial-Ekologis; Tata Kelola Lahan Gambut; Masyarakat Lokal.

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## 1. Introduction

Peatlands in Indonesia play a crucial role in the global ecosystem, serving as the largest carbon sink, helping reduce greenhouse gas emissions and slow climate change (Taufik et al., 2020). Ecologically, peatlands also host extraordinary biodiversity (Minayeva et al., 2017), providing habitat for numerous rare and endangered plant and animal species (Bertrand et al., 2021). As highly sensitive ecosystems, peatlands play a role in regulating the water cycle (Ansari, 2011), preventing flooding (Zulkarnain & Djamaludin, 2021), and maintaining the quality of surrounding soil and water (Kechavarzi et al., 2010). Therefore, peatland sustainability is a crucial issue not only for Indonesia but also for global climate and ecosystem stability (Terzano et al., 2023). However, despite their high ecological value, peatlands in Indonesia face increasing pressure due to large-scale land conversion, particularly for oil palm, rubber, and other monoculture plantations (Numata et al., 2022). This practice often ignores the ecological characteristics of peatlands and the dependence of local communities on these ecosystems (Syahza et al., 2020). One of the most serious consequences of this conversion is peatland drainage, which leads to the loss of natural hydrological functions (de Waard et al., 2024) and increases the risk of large-scale peatland fires (Hein et al., 2022), which have widespread impacts on public health and environmental quality across regions and countries (Taufik et al., 2019; Uda et al., 2019).

The almost annual occurrence of peatland fires has made peatland one of the most persistent environmental problems in Indonesia (Hapsari et al., 2021). The impacts are not limited to ecosystem degradation but also have direct implications for the social and economic lives of communities dependent on peat resources (Suwito et al., 2020). This situation emphasizes that peatland issues cannot be understood solely as technical-ecological issues, but also as complex social, economic, and governance issues. Therefore, peatland mitigation, restoration, and management efforts require a more holistic and sustainable approach (Tan et al., 2022). In recent decades, local community empowerment has been increasingly recognized as a strategic approach in natural resource management, including peatlands (Azni et al., 2023b). Communities living around peat areas possess local ecological knowledge and traditional management practices developed through long-term interactions with their environment (Hardiansyah et al., 2022). This knowledge is often proven to be adaptive to the fragile and dynamic conditions of peat ecosystems. Therefore, local community empowerment not only has the potential to improve socio-economic well-being but also contributes to more sustainable, context-specific peatland management (Yunus et al., 2024).

However, various studies show that community empowerment in peatland management is often partial and not fully integrated into existing policy and legal frameworks (Atkinson & Alibašić, 2023; Rowland et al., 2023). Empowerment programs tend to emphasize improving community technical capacity, while structural factors such as legal uncertainty, limited access to resources, and power relations between the state, markets, and local communities receive less attention (Maskun et al., 2021; Zulkamaini et al., 2024). This situation often results in community participation being symbolic, rather than providing adequate space for community involvement in strategic decision-making related to peatland management. In this context, a sociological perspective of law is crucial for understanding the dynamics of peatland management. Legal sociology enables analysis of the relationships among legal structures, policy practices, and the social realities of local communities in natural resource management (Sumarni et al., 2023). This approach highlights how law

functions not only as a regulatory instrument but also as an arena for contestation of interests that can either strengthen or marginalize the role of local communities. Thus, sustainable peatland management requires a more inclusive, adaptive, and rights-based legal and governance framework (García, 2022; Masuda et al., 2022). Against this backdrop, this article analyzes the role of local community empowerment in sustainable peatland management in Indonesia, focusing on case studies in South Sumatra and Central Kalimantan. This analysis emphasizes the interrelationships between empowerment practices, governance structures, and legal frameworks in supporting the achievement of SDGs 13 and 15. With this approach, this article is expected to provide conceptual and policy contributions in formulating peatland management strategies that are oriented not only toward ecological restoration but also toward social justice and long-term sustainability.

## 2. Research Methods

This research employs a qualitative literature-based analytical approach with case illustrations to examine the role of local community empowerment in sustainable peatland management in Indonesia. A qualitative approach was chosen because it allows for a deeper understanding of the social, institutional, and policy dynamics that shape peatland management practices, which cannot be fully explained through quantitative approaches. Case illustrations are used to contextualize and enrich the analysis by highlighting variations in peatland management practices across regions with distinct socio-ecological characteristics. The research data are sourced from a critical literature review of scientific publications, policy reports, and relevant documents discussing peatland management in Indonesia. The literature was selected based on its thematic relevance, the geographical context of tropical peatlands, and its contribution to discussions of community empowerment and peatland governance. This research focuses on two main regions, South Sumatra and Central Kalimantan, which were purposively selected because they are national priority peatland areas, have a long history of peatland degradation and fires, and have been the sites of various restoration and community empowerment programs. This selection of regions enables a comparative analysis of the dynamics of community empowerment across different policies, governance structures, and socio-ecological conditions. The selected literature was subsequently analyzed using a qualitative thematic synthesis to identify recurring patterns, key challenges, and governance dynamics related to community empowerment in peatland management.

Literature review is a key element of this research and is conducted systematically through a critical review of scientific articles, research reports, academic books, and policy documents relevant to peatland management, community empowerment, and sustainable development. The literature reviewed includes national and international publications discussing the impacts of climate change on peatlands, peatland restoration practices, natural resource management policies, and community-based approaches to environmental conservation and management. Furthermore, this research draws on lessons from other countries with peat ecosystems, such as Malaysia, Thailand, and several European countries, to enrich the analytical perspective (Charters et al., 2019; Roleček et al., 2020; Satraburuti et al., 2024). To strengthen analytical rigor, the literature review in this study was conducted as a critical qualitative review rather than a mere summary of previous research findings. The literature was analyzed with attention to the research context, the theoretical approach used, and the position of local communities within the peatland management framework. The analysis focuses on how the concept of empowerment is translated into practice, the extent

to which communities are involved in decision-making, and the structural barriers that influence the effectiveness of community empowerment in peatland management.

As part of a case study approach, this research also examines program reports and policy documents related to peatland management and restoration in South Sumatra and Central Kalimantan, including the national peatland restoration policy, the peatland care village program, and collaborative initiatives involving government, communities, and the non-state sector. This policy analysis aims to understand the alignment between policy design and implementation realities at the local level and its implications for community participation in peatland management. The research's analytical framework is built by integrating the perspectives of community-based natural resource management, participation theory, and a sociological approach to law. This perspective is used to analyze the relationship between legal structures, public policies, and community social practices in peatland management. Using a sociological approach to law, this research examines how law and policy function not only as regulatory instruments but also as arenas for power relations that can limit or expand the role of local communities in natural resource management (Ardiyanto et al., 2022; García, 2022).

Data analysis was conducted thematically by grouping literature and policy document findings into several main themes, including: (1) forms and levels of community empowerment in peatland management; (2) the role of local knowledge and traditional practices in peatland fire restoration and prevention; (3) policy, legal, and institutional barriers to the implementation of community empowerment; and (4) the implications of community empowerment for achieving the Sustainable Development Goals (SDG 13 and SDG 15). This thematic approach allows for an analytical synthesis that connects empirical findings to the conceptual framework. Through this methodological approach, the research is expected to provide a comprehensive understanding of the opportunities and challenges of local community empowerment in sustainable peatland management, and to produce more context-specific, inclusive, and rights-based policy recommendations to support the sustainability of peatland ecosystems and the well-being of local communities in Indonesia.

The analysis was guided by an analytical framework focusing on the interaction between community empowerment, governance arrangements, and social-ecological outcomes. This framework enabled the synthesis of findings across studies by examining how legal structures, institutional settings, and community practices jointly shape peatland management processes. Through this approach, the study identifies cross-cutting patterns rather than evaluating individual cases in isolation.

### **3. Results and Discussion**

#### **3.1. The Role of Local Community Empowerment in Peatland Management**

Sustainable peatland management in Indonesia cannot be separated from the role of local communities as actors who interact directly with peatland ecosystems in their daily lives. In this context, community empowerment is understood not only as increasing technical capacity but also as a social process that determines the extent to which communities have space for participation, control, and influence in peatland management. The literature shows that the successes and limitations of community-based peatland management depend heavily on the form of empowerment implemented, institutional support, and the alignment between local policies and practices (Arisanty, Hastuti, Rajiani, et al., 2024; Budiningsih et al., 2020). The following subsections outline various forms of local community

empowerment through empirical experience in South Sumatra and Central Kalimantan. Sustainable peatland management in Indonesia, particularly in South Sumatra and Central Kalimantan, relies heavily on local community empowerment. Community involvement in various management activities and programs has demonstrated significant challenges and successes in both regions (Arisanty, Hastuti, Rajiani, et al., 2024; Budiningsih et al., 2020). The success of this empowerment can be seen in several areas, including fire management (Huntsman et al., 2021), the implementation of sustainable agricultural practices (Abobatta & Fouad, 2024), and stakeholder engagement in conservation efforts (Gornish & Roche, 2018).

In the Fire Management and Prevention section of Central Kalimantan, local community empowerment has proven highly effective in fire prevention (Arisanty, Hastuti, Aristin, et al., 2024). Tumbang Nusa Village, known for its fire-resistant land management practices, has utilized local resources and infrastructure to reduce reliance on fire for land clearing. Activities such as fish farming, agroforestry, and purun plant development have raised community awareness of fire hazards and encouraged active participation in fire prevention. This reflects the importance of local knowledge-based approaches implemented by communities to maintain a sense of community ownership of their environment (Akbar et al., 2021). However, in South Sumatra, community empowerment in fire management remains limited to volunteer groups, with broader community involvement in decision-making and implementation suboptimal (Budiningsih et al., 2020). This highlights the need for expanded community participation in fire management and for more inclusive policies that encompass diverse elements of society (Rochmayanto et al., 2024).

### 3.1.1. Agroforestry and Sustainable Practices

In Central Kalimantan, agroforestry systems implemented in villages such as Tumbang Nusa and Kalampangan have successfully restored degraded peatlands (Jaya et al., 2022). This agroforestry practice combines tree planting with intercropping, providing economic benefits through sustainable agricultural yields and contributing to ecological restoration (Maftu'ah et al., 2021). Communities involved in agroforestry earn more stable incomes while maintaining the ecological function of peatlands (Jaya et al., 2022). Although the adoption rate of sustainable agricultural practices remains low, this success demonstrates that empowered communities can contribute significantly to more environmentally friendly peatland management (Premono et al., 2024).

### 3.1.2. Stakeholder Engagement

Local community empowerment involves communities and other stakeholders, such as government, NGOs, and the private sector. In Central Kalimantan, village heads play a crucial role in coordinating fire prevention and peatland management efforts (Rochmayanto et al., 2024). However, broader community involvement in decision-making processes remains limited by policy constraints and the threat of sanctions (Januar et al., 2021). This creates tension between government policies and local needs, hindering the effectiveness of empowerment programs (Arlotti et al., 2021). In Kubu Raya, West Kalimantan, a more structured approach involving multiple stakeholders has been identified as a critical element of sustainable peatland management, where stakeholders work together to avoid conflicts of interest and encourage collaborative action (Sanudin et al., 2023).

### 3.1.3. Livelihood Revitalization

Programs such as the Independent Peat Care Village program in Central Kalimantan aim to control peatland degradation by building community capacity and promoting sustainable livelihoods (Mendham et al., 2024). This program has demonstrated considerable success in creating economic resilience through environmentally friendly peatland management. This underscores the importance of sustained community engagement and collaboration with government agencies and relevant sectors to create programs that support sustainable peatland management (Terzano et al., 2022). The findings in this section indicate that local community empowerment has made significant contributions to peatland management, particularly through fire prevention, agroforestry practices, and livelihood strengthening. However, variations in success rates across regions confirm that empowerment's effectiveness is strongly influenced by the extent to which communities are involved in decision-making and supported by inclusive policies. These findings provide an important foundation for understanding the role of local knowledge and traditional practices in peatland management, which will be discussed in the next subsection.

### 3.2. Challenges in Implementing Community Empowerment

Although local community empowerment is increasingly recognized as a strategic approach to sustainable peatland management, its implementation on the ground faces various structural, institutional, and social challenges. These challenges relate not only to community capacity but also reflect tensions between formal policies, prevailing governance systems, and socio-ecological practices at the local level. The literature indicates that failures or limitations in community empowerment often stem from a lack of contextual policy support, the marginalization of local knowledge, and poorly managed conflicts over social and economic interests (Harun et al., 2022; Osaki et al., 2016; Sumarni et al., 2023). The following subsections outline these challenges based on empirical experience in South Sumatra and Central Kalimantan.

Sustainable peatland management is one of Indonesia's main challenges in environmental conservation efforts, particularly in South Sumatra and Central Kalimantan (Harun et al., 2022; Osaki et al., 2016). Peatlands, which are crucial for storing carbon and supporting biodiversity, often experience severe degradation due to agricultural activities and land burning (Tarigan et al., 2021). Empowering local communities is one approach increasingly recognized as key to addressing this issue. With their traditional knowledge and dependence on peat ecosystems, local communities have great potential to engage in sustainable peatland management and restoration (Hardiansyah et al., 2022). However, implementing this empowerment is faced with various challenges, such as low adoption of sustainable practices (Dushkova & Ivlieva, 2024), policy inconsistencies (Adamson & Bromiley, 2013), and frequent social conflicts at the community level (Adeyanju et al., 2023). Nevertheless, various efforts have shown positive results, such as the development of alternative livelihoods and capacity building (Azni et al., 2023a), and stakeholder collaboration (AL-Falahi et al., 2023). In this context, local community empowerment is not only about providing knowledge but also involves the formulation of supportive policies and the active participation of communities in decision-making regarding the management of their environment (Alam et al., 2022).



### 3.2.1. Low Adoption of Sustainable Practices

One of the main challenges in empowering local communities in Central Kalimantan is the low level of adoption of sustainable agricultural practices by farmers. In Kalamangan, Central Kalimantan, many farmers remain reluctant to shift from traditional farming methods despite regulatory pressure and market demands for low-carbon products. This is due to several factors, including uncertainty about the long-term benefits of sustainable practices and limited knowledge and resources to adopt new technologies (Abubakar et al., 2022). This problematic transition reflects resistance to change, which calls for a more intensive, locally driven empowerment approach (Al-Emran & Griffy-Brown, 2023).

### 3.2.2. Challenges in Governance and Policy Implementation

Existing governance structures in Central Kalimantan often limit restoration actors' ability to respond to emerging challenges in peatland management (Januar et al., 2021). Existing policies are not always flexible enough to adapt to dynamic field conditions, thus impacting the effectiveness of peatland restoration policies (Irwani et al., 2022). One example is the implementation of the Independent Peat Care Village program, which demonstrates moderate sustainability. Despite efforts to control peat degradation, the strategies implemented still require refinement and better implementation. Administrative constraints, inter-agency coordination, and inconsistent regulations are key obstacles hindering improved peat management (Lestari et al., 2021).

### 3.2.3. Marginalization of Indigenous Peoples' Practices

In Indonesia, a legal system that prioritizes state land ownership has marginalized indigenous peoples and their traditional land management practices. This has rendered existing peatland management policies ineffective and often fails to consider the importance of peat ecosystems to indigenous peoples (Sumarni et al., 2023). Peatland management based on local knowledge and traditional practices is often not incorporated into government policies, which favor market-based management models or formal regulations. This creates a gap between existing policies and the needs and rights of indigenous peoples in managing their environment (Lees et al., 2023).

### 3.2.4. Knowledge Gaps and Community Engagement

Significant knowledge gaps regarding peatland functions and management at the local community level also pose a significant challenge (Hardiansyah et al., 2022). Many community members lack an adequate understanding of the ecological and economic importance of peatlands. This lack of knowledge hinders the implementation of sustainable practices and effective management (Yunus et al., 2024). Furthermore, the absence of environmental aspects in village development planning and budgeting further complicates the integration of peatland restoration efforts at the community level (Sujai et al., 2021). Sustainable peatland restoration will remain elusive without adequate understanding and support for ecosystem-based planning (Sanudin et al., 2023).

### 3.2.5. Social and Economic Conflict

Policies such as the Megarice Rice Project and the no-burn policy have created social conflict within Indigenous communities, disrupting their livelihoods and leading to resistance to new initiatives (Ansori, 2019). Policies that are insensitive to local economic needs are often perceived as threatening traditional livelihoods and social sustainability. This conflict hinders



active community participation in peatland conservation and restoration programs, which slows the achievement of sustainability goals (Syahza et al., 2024). The findings in this section indicate that challenges in empowering local communities in peatland management are not isolated but interconnected, encompassing policy, governance, and socio-economic relations at the local level. Low adoption of sustainable practices, limited policy flexibility, and the marginalization of indigenous knowledge and practices limit communities' ability to operate as actors in peatland management. This situation demonstrates that empowerment focused solely on increasing technical capacity is inadequate without the support of an institutional and legal framework that recognizes the rights, knowledge, and interests of local communities. Therefore, the effectiveness of community empowerment in peatland management depends heavily on the policy's ability to bridge ecological needs, local economic interests, and social justice.

### 3.3. Successes and Lessons From Peatland Management Cases in the Study Area

Peatland management in South Sumatra and Central Kalimantan has achieved several important outcomes, including ecological restoration and strengthening the role of local communities (Arisanty, Hastuti, Rajiani, et al., 2024). One crucial aspect of these efforts is proper hydrological management, given that peatland water management significantly determines fire risk and the sustainability of natural vegetation (Harun et al., 2022). Approaches that place hydrological restoration at the foundation of peatland management have been shown to increase ecosystem stability and reduce environmental stress. In Central Kalimantan, canal blocking has been an effective practice in restoring peatland hydrology previously disrupted by excessive drainage (Novitasari et al., 2018). This intervention has enabled groundwater levels to rise, thereby reducing land vulnerability to fire and improving the condition of natural vegetation that supports peat ecosystem function (Yuwati et al., 2021). These findings confirm that water management restoration is a key prerequisite for successful peatland restoration. To summarize the community-based peatland management practices and outcomes discussed in this section, Table 1 compares the main successes and key lessons from the interventions.

**Tabel 1. Key Achievements and Lessons From Community-Based Peatland Management Practices**

Management Aspect	Practices/ Interventions	Key Outcomes	Lessons Learned
Peatland hydrology	Canal blocking and rewetting	Reduced fire risk; improved peat moisture	Hydrological management is a prerequisite for peatland restoration
Revegetation	Planting native peatland species (e.g. <i>Shorea balangeran</i> )	Improved vegetation recovery and soil stability	Native species are more adaptive to peatland conditions
Agroforestry systems	Mixed cropping and agroforestry practices	More stable household income	Economic incentives support sustainable land use
Fire prevention	Community-based fire monitoring and prevention	Decreased fire intensity and frequency	Local knowledge strengthens fire prevention efforts
Livelihood integration	Paludiculture and wetland-based enterprises	Reduced dependence on land burning	Restoration must be linked to viable livelihoods

These patterns suggest that community empowerment contributes to improved peatland outcomes not merely through participation, but by enabling local decision-making, strengthening compliance with management practices, and enhancing the legitimacy of governance interventions. As a result, social acceptance of peatland management measures increases, which in turn reduces environmentally harmful practices such as land burning. These restoration efforts are strengthened through revegetation activities, such as planting native species, including Meranti Rawa (*Shorea balangeran*), which have shown positive results in post-fire peatlands (Adinugroho et al., 2024). Native vegetation plays a role in restoring damaged peat soil structure and supporting ecosystem regeneration (Rocco et al., 2018). Furthermore, the implementation of agroforestry systems that combine forest plants and food crops is also developing in South Sumatra and contributing to environmental recovery and improving community welfare (Lestari & Winarno, 2023). Agroforestry approaches not only strengthen the ecological functions of peatlands but also provide a more stable source of income for local communities (Zada et al., 2022). Community involvement in paludiculture and agroforestry practices has proven critical to the success of restoration, as these approaches align with economic needs while maintaining the ecological characteristics of peat (Ortega-Álvarez et al., 2022). In areas such as Kalampangan and Tumbang Nusa Village, communities play an active role in fire prevention and peatland management, supported by training and capacity-building programs that enhance farmers' understanding of sustainable practices (Hutasuhut et al., 2024).

The integration of economic aspects into restoration projects has also shown promising results. The Katingan-Mentaya Project in Central Kalimantan, for example, successfully linked peatland restoration efforts with the development of alternative livelihoods, thereby reducing communities' dependence on land burning (Darusman et al., 2021). In South Sumatra, agroforestry systems produce wood and non-wood products that support ecosystem recovery while providing economic benefits to local communities (Lestari & Winarno, 2022). This approach confirms that sustainable peatland restoration requires a balanced integration of ecological objectives and local economic needs. Beyond these achievements, the experiences of peatland management in both regions also provide several important lessons. One fundamental issue is the limited understanding of peat hydrological dynamics, which directly impacts the success or failure of restoration interventions (Dohong & Tanika, 2021). The failure of the Mega Peatland Project in Central Kalimantan is a clear example of the negative impacts of excessive drainage carried out without a thorough understanding of peatland ecosystems. This experience underscores the importance of a scientifically informed approach and local context before implementing large-scale projects.

The high risk of fire on degraded peatlands also remains a serious challenge (Kusin et al., 2020). Peat fires have widespread impacts on air quality, public health, and biodiversity. Therefore, land rewetting and community-based fire prevention strategies should be core components of sustainable peat management (Sutikno et al., 2020). Although community-based fire prevention practices have demonstrated effectiveness, expanded implementation and strengthened policy support are still needed to achieve broader impacts. Another important lesson relates to the socio-economic dimensions of peat restoration. Restoration that ignores community economic needs tends to trigger resistance and risks implementation failure (Maier et al., 2018). Therefore, restoration policies need to be accompanied by adequate economic incentives and market access for agroforestry products and other restoration outcomes (Lestari & Winarno, 2022). Furthermore, coordination between

stakeholders involving the government, communities, NGOs, and the private sector is a determining factor in successful peatland management (Bonsu et al., 2019). An adaptive management approach that allows strategic adjustments to field dynamics is necessary for effective and sustainable peatland restoration (Galatowitsch & Bohnen, 2021).

### 3.4. Local Community Empowerment in Peatland Management: Navigating the Interplay Between Legal Frameworks and Local Practices

Legal frameworks shape local community participation in peatland management. In practice, laws and policies often limit or marginalize established local practices, rather than empower communities. This tension between legal norms and social realities influences the effectiveness of community empowerment. Table 2 summarizes the relationship between legal frameworks, empowerment practices, and socio-ecological implications in peatland management. In this context, legal and governance arrangements shape social–ecological outcomes by mediating the extent to which community empowerment translates into sustained management practices and long-term environmental benefits.

**Tabel 2. Legal Frameworks, Community Empowerment Practices, and Social-Ecological Implications in Peatland Management**

Legal Dimension	Policy or Legal Arrangement	Implications for Local Communities	Social-Ecological Implications
Access to resources	State-centered land tenure regulations	Restricted community access to peatlands	Increased conflicts and land degradation
Participation mechanisms	Predominantly top-down programmes	Procedural rather than substantive participation	Limited sustainability outcomes
Recognition of local practices	Limited legal recognition of local knowledge	Marginalization of traditional practices	Loss of adaptive management strategies
Collaborative governance	Multi-stakeholder coordination mechanisms	Expanded dialogue and negotiation spaces	More adaptive peatland governance
Legal flexibility	Adaptive and context-sensitive regulations	Increased scope for local innovation	Enhanced social-ecological resilience

From a sociological perspective, local community empowerment rests on changes in the legal structures governing access to resources, the recognition of rights, and participation in decision-making (Sumarni et al., 2023). Normative regulations have created space for community participation, such as through village-level authority in environmental management. However, limited implementation, weak oversight, and planning that fail to fully integrate environmental factors often hinder the achievement of these goals. This situation reflects a gap between legal norms and local-level peatland management practices. The sociology of law emphasizes that law cannot be understood solely as a set of formal rules, but as a social process that operates within a specific cultural, economic, and power-relations context (García, 2022). When peatland management policies are formulated without considering local communities' social dynamics, the law risks losing legitimacy and effectiveness. Consequently, community empowerment tends to be procedural and fails to strengthen the community's position as the primary actor in peatland management.

The conflict between economic interests and environmental protection is also a crucial dimension in the legal framework for peatland management. Large-scale economic activities,

such as oil palm plantations, often conflict with efforts to preserve peat ecosystems (Pennisi, 2022). In this context, the law faces the challenge of balancing economic interests with ecological needs. When the law favors short-term economic interests, the space for empowering local communities to maintain peatland sustainability becomes increasingly limited (Mahmutović, 2024). In addition to formal law, local community practices and knowledge are crucial elements that are often overlooked in policy formulation. Local communities possess experience and practices in peatland management developed through long-term interactions with their environment, such as agroforestry systems and community-based water management. Recognizing and integrating local knowledge into legal and policy frameworks is a crucial prerequisite for strengthening community empowerment and improving the sustainability of peatland management. Collaborative approaches involving government, communities, and the private sector can help bridge the gap between local laws and practices. Inclusive policy dialogue, such as that developed in several peatland management areas, enables more adaptive and responsive decision-making processes that respond to local community needs (Nakamura et al., 2024; Wiharja et al., 2024). These findings confirm that the success of peatland management is determined not only by the existence of regulations, but also by the law's ability to adapt to social dynamics and local community practices.

#### 4. Conclusion

Peatland management in South Sumatra and Central Kalimantan demonstrates that sustainability is not solely determined by technical interventions, but is highly dependent on the social, legal, and economic position of local communities within the overall peatland governance landscape. Community empowerment has been shown to play a crucial role in supporting hydrological restoration, fire prevention, and sustainable livelihood development. However, the effectiveness of such empowerment is strongly influenced by the policy context, legal structure, and the extent to which communities are meaningfully involved in decision-making. The findings of this study demonstrate that successful peatland management tends to emerge when ecological approaches are combined with socio-economic strategies relevant to local needs. Practices such as agroforestry, paludiculture, and community-based management have significant potential to maintain peat ecosystem functions while strengthening community economic resilience. Conversely, top-down, non-adaptive approaches that ignore local knowledge risk weakening policy legitimacy and triggering social conflict. From a sociological perspective, peatland management in Indonesia still faces a gap between legal norms and on-the-ground practices. Existing regulations have not fully balanced ecological, economic, and social interests. Weak implementation, limited recognition of local community rights and practices, and the dominance of certain economic interests indicate that environmental law needs to be reinterpreted as a social process rather than a mere normative instrument. This study contributes to the understanding of peatland governance by demonstrating that community empowerment functions as an integral governance mechanism rather than a supplementary policy component. The analysis shows that social-ecological outcomes in peatland management are shaped by the interaction between legal frameworks, institutional arrangements, and locally grounded practices. By highlighting these interactions, the study provides an analytical basis for explaining why community-based approaches are more effective when supported by adaptive and context-sensitive governance structures.

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