JPPIPA 11(11) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Application of The Rules-in-Use Concept in the Analysis of Regulations on Forest and Land Rehabilitation (Reforestation)

Rizki Sukarman Sawaka[1*], Bramasto Nugroho[1], Iin Ichwandi[1], Budhy Setiawan[2]

[1] Forest Management Science, Faculty of Forestry and Environment, IPB University, Jalan Lingkar Akademik IPB Dramaga, Bogor, Indonesia.
[2] Department of Forestry, Faculty of Agriculture, University of Mataram, Mataram, Indonesia.

Received: July 26, 2025
Revised: October 25, 2025
Accepted: November 25, 2025
Published: November 30, 2025

Corresponding Author:
Rizki Sukarman Sawaka
sukarmanrizki46@gmail.com

DOI: 10.29303/jppipa.v11i11.8648

© 2025 The Authors. This open access article is distributed under a (CC-BY License)

Abstract: Indonesia faces the problem of forest degradation, with Forest and Land Rehabilitation (FLR) being one of the key efforts undertaken to address it. This study analyzes the formal institutional framework governing FLR implementation in Indonesia using the Institutional Analysis and Development (IAD) Framework, focusing on Ostrom's concept of rules-in-use. Content analysis was conducted on four main regulations: Law No. 41 of 1999, Government Regulation No. 26 of 2020, Minister of Environment and Forestry Regulation No. P.2 of 2020, and Minister of Environment and Forestry Regulation No. P.23 of 2021. The findings show that seven types of institutional rules, position, boundary, choice, aggregation, information, scope, and payoff rules, are included in these regulations, but they are not yet fully synchronized. The distribution of roles among actors remains overlapping, coordination mechanisms are weak, and incentive rules are not clearly defined. Moreover, the regulations tend to emphasize administrative and physical aspects of planting rather than ecological and social outcomes. Weaknesses in this rules-in-form structure create unstable action arenas and reduce policy effectiveness. This study highlights that the success of FLR is determined not only by technical aspects but also by the clarity and consistency of formal rules. Harmonization of regulations, strengthened cross-actor coordination, and transparency of information are needed to ensure that FLR implementation supports the sustainable restoration of the forest's ecological and social functions.

Keywords: Forest and Land Rehabilitation (FLR), Institutional Analysis and Development (IAD) Framework, Rules-in-use, Forest policy.

Introduction

Forests play an essential role as providers of habitats, resources, and protection for various forms of biodiversity. In addition, forests function to maintain water availability, reduce the risk of flooding, control erosion, and preserve soil fertility (Mawazin. et al., 2024). Forests are natural resources that have a vital role in multiple aspects of life, encompassing economic, social, cultural, and environmental dimensions (Wahyuni & Suranto, 2021). However, the sustainability of these primary forest functions is currently under threat due to degradation occurring in protected forest areas (Setiawan & Krisnawati, 2014). Changes within the ecological systems of forest areas can influence or even alter the fundamental characteristics of the ecosystem services they provide (B. Nugroho, 2010; P. Nugroho et al., 2020).

The main problem faced by Indonesia's forests is the decline in land quality and function (Gitahapsari & Rahman, 2016). One of the strategic efforts undertaken to address this issue is Forest and Land Rehabilitation (FLR), which aims to respond to environmental degradation (Faathir et al., 2025), with climate change becoming a limiting factor (Markum. et al., 2025). In recent decades, global attention toward forest ecosystem restoration has continued to increase (Attarik et al., 2024). Since 2003, the Indonesian government, through the National Movement for Forest and Land Rehabilitation, has launched a major program to combat forest degradation (Nawir et al., 2008). However, despite the issuance of various policies, the implementation of FLR has often failed to achieve the expected outcomes.

How to Cite:
Sawaka, R. S., Nugroho, B., Ichwandi, I., & Setiawan, B. (2025). Application of The Rules-in-Use Concept in the Analysis of Regulations on Forest and Land Rehabilitation (Reforestation). *Jurnal Penelitian Pendidikan IPA*, *11*(11), 725–734. https://doi.org/10.29303/jppipa.v11i11.8648

Program complexity, weak planning, lack of community participation, and managerial inefficiency have become the main factors behind the low effectiveness of implementation (Agustinus et al., 2013; Jatmiko et al., 2012; Sulastiyo et al., 2016).

This failure indicates that the main problem of Forest and Land Rehabilitation is not merely technical but institutional. FLR policies are often understood only as written regulations (rules on paper), rather than as living institutional systems that function to guide actors' behavior in the field. From an institutional perspective, policy serves as the rules of the game that structure relationships among actors and direct collective decision-making (Nugroho, 2016). However, Pareira et al. (2020) point out that ecosystem restoration regulations in production forests remain "inadequate" to support field implementation, meaning that formal regulations alone are insufficient. Similarly, Affandi et al. (2021) employ an institutional framework to analyze forestry regulations and find that formal rules alone do not guarantee effectiveness due to weak institutional practices at the field level.

Institutional strengthening and management require more coordinated efforts to enhance the overall sustainability of development (Lestari et al., 2023). To understand these institutional challenges, Elinor Ostrom's Institutional Analysis and Development (IAD) Framework offers a relevant analytical perspective. However, since this study focuses on the analysis of formal regulatory texts, its emphasis is not on rules-in-use (rules that are actually practiced), but on rules-in-form, namely the formal written rules that shape the structure of the action arena. Within the IAD framework, rules-in-form encompass seven types of rules that define the action situation, position, boundary, choice, aggregation, information, payoff, and scope rules, which collectively determine how a policy should be implemented. One of the key purposes of developing the IAD framework is to provide a common foundation that can integrate various policy components and analytical activities (Suwarno et al., 2014).

Forests function not only as ecological zones but also as living spaces and arenas of interest contestation, where various actors strive to gain access, control, and benefits from available resources. This complexity of interests demands clear formal rules as the foundation for forest management and rehabilitation program implementation. Therefore, this study aims to conduct a content analysis of several key regulations governing Forest and Land Rehabilitation implementation. The analysis seeks to identify how the seven types of rules (rules-in-form) are formulated within formal policies and to assess the extent to which these institutional structures can explain the gap between policy and field practice. The complexity of misaligned regulations cannot be resolved merely through policy adjustments but requires institutional reform (Muhtada & Diniyanto, 2021). As noted by Sumarjono & Purnomo (2016), coordination serves as a crucial factor in minimizing overlapping responsibilities and inconsistencies.

Policy is closely related to institutional theory, in which each regulation serves as a foundation for various processes, particularly in decision-making stages (Suwarno et al., 2015). The formulation of forestry policies should give greater attention to institutional issues (Kartodihardjo, 2006). Institutions are understood as the rules of the game that organize networks of actors through both formal and informal rules (Nugroho, 2016). In practice, institutions require organizations, the players of the game, to formulate, implement, and enforce these rules (Nugroho, 2010). A well-functioning institutional framework can facilitate effective relationships and coordination between the government and other stakeholders (Salaka et al., 2020).

One of the institutional analytical frameworks is the Institutional Analysis and Development (IAD) Framework proposed by Elinor Ostrom. Within this framework lies the concept of rules-in-use. According to Suwarno et al. (2015), this concept serves as a reference for conducting content analysis of regulations in relation to the structure of the action situation, which ultimately influences performance. Badi'ah. et al. (2022) further explain that rules are essential to understanding decision-making processes, and rules-in-use refer to the set of rules that guide and describe actors' actions.

The conceptual variable of rules-in-use related to Forest and Land Rehabilitation needs to be examined to reinforce the understanding of the currently prevailing regulations. As an initial step in implementing FLR programs, both government and private institutions must comprehend and internalize the implementation rules as a fundamental basis. Content analysis is expected to generate insights into the seven components of rules-in-use and serve as the foundation for analyzing various regulations governing FLR implementation. This effort is essential to provide a comprehensive perspective for the stakeholders involved, particularly land managers and implementers, in order to achieve successful FLR implementation and contribute valuable input for policy development.

Theoretically, this study contributes novelty by integrating a content analysis approach to regulatory texts with Ostrom's Institutional Analysis and Development (IAD) Framework, which is generally applied to analyze institutional practices (rules-in-use). This analysis is also expected to expand and deepen the utilization of the IAD framework (Cole, 2017). The IAD framework provides researchers with an analytical lens to examine how rules shape and influence dynamics within action situations (Lammers & Heldeweg, 2016). Practically, the findings of this study are expected to serve as a basis for improving the institutional design of

Forest and Land Rehabilitation, particularly in the formulation and harmonization of regulations to enhance the effectiveness of forest rehabilitation programs in Indonesia.

Method

This study employs the concept of rules-in-form as the basis for institutional analysis within the Institutional Analysis and Development (IAD) Framework developed by Ostrom (2005). This concept focuses on formal, written rules embedded in policy documents that normatively shape the structure of the action arena, where actors interact and make decisions. This approach was chosen because the study does not examine field practices (rules-in-use), but rather analyzes how the formal institutional structure of Forest and Land Rehabilitation is shaped through legal and regulatory frameworks. The IAD Framework serves as an analytical tool to articulate agreed-upon relationships and decision-making processes, as well as to examine the behavior of involved actors (Sabatiel et al., 2005; (Budiprakoso et al., 2021).

The method employed in this study is content analysis. Content analysis is a research method that focuses on an in-depth examination of the messages conveyed through written texts or printed media (Muyassaroh & Suyanto, 2023). This method is used to collect and analyze textual content in various forms, words, meanings, images, symbols, ideas, themes, or communicable messages (Calik & Sözbilir, 2014; Martono, 2016; Patonah et al., 2018 (Nabilah & Jumadi, 2022). This approach follows a systematic and structured process of content examination, implementing a step-by-step analytical procedure without hastily moving toward measurement (Sulistyowati et al., 2024).

The content analysis in this study was conducted through several stages, including formulating research questions, determining units of analysis, developing a sampling plan, constructing coding categories and recording sheets, performing coding, and collecting and analyzing data (Neuman, 2014). The analysis examines the textual content of the aforementioned regulations using the analytical lens of the *rules-in-use* concept. Each article related to these rules is analyzed to identify the roles of different actors and the benefits they obtain according to the respective regulations. Essentially, content analysis in this study aims to explain the actors involved and how their roles and interactions influence institutional performance outcomes.

The content analysis was conducted on four key policy documents that serve as the legal foundation for the implementation of Forest and Land Rehabilitation, namely: UU No. 41 of 1999 on Forestry; PP No. 26 of 2020 on Forest Rehabilitation and Reclamation; Permen LHK No. P.2 of 2020 on Procedures for Implementing Forest and Land Rehabilitation; and Permen LHK No. P.23 of 2021 on the Implementation of Forest and Land Rehabilitation.

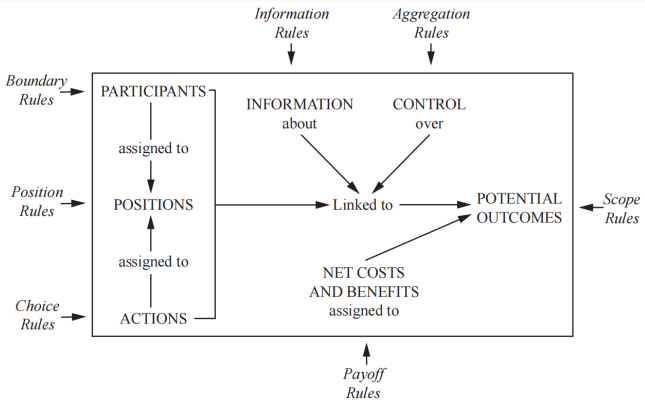

Figure 1. The relationship between rule-in-use with action situations

Several studies have applied the rules-in-use concept, such as Suwarno et al. (2015), who analyzed regulations on the establishment of Forest Management Units; (Siswantoro et al., 2021), who examined regulations on water utilization in conservation areas; and Badi'ah. et al. (2022), in their study titled "The Use of Ostrom's Concept on Rules-in-Use in the Analysis of Regulation of Natural Tourism Utilization in Gunung Gede Pangrango National Park." The rules-in-use concept helps reveal patterns of communication and interaction among actors in relation to the structure of the action situation within the FLR implementation process. According to Ostrom (2005), the rules-in-use framework consists of seven variables: position rules, boundary rules, choice rules, aggregation rules, information rules, scope rules, and payoff rules. Position rules, define the positions or roles that actors may occupy within the action arena, as well as the number of actors allowed in each position. Boundary rules, regulate the criteria or requirements for actors to enter or exit the action arena, including their rights and obligations. Choice rules, specify which actions are permitted, required, or prohibited for actors in particular positions. Aggregation rules, explain how decisions are made—whether individually, collectively, or through representative mechanisms. Information rules, determine what information can be accessed, shared, or must be communicated among actors within the action arena. Scope rules, define the outcomes or results of actions that are permitted, restricted, or prohibited within an action arena; in other words, they establish the scope of legitimate consequences according to the rules. Payoff rules, specify the rewards, incentives, or sanctions applied to actors as a result of the actions they take within the action arena.

Analytical Steps

The analysis procedure was carried out through the following stages: Identification of rule texts, each article and clause within the three regulations was thoroughly reviewed to identify provisions containing elements of position, authority, participation, information, or sanctions; Rule categorization, the identified text excerpts were then classified into the seven categories of rules-in-form according to Ostrom's framework; Institutional structure analysis, interpretation was conducted to examine the relationships among rules (for example, between position rules and choice rules) in order to assess the logical consistency and completeness of the formal institutional structure; and Evaluation of weaknesses or regulatory gaps, the rules were compared across different regulations (Law, Government Regulation, and Ministerial Regulations) to identify potential overlaps, ambiguities, or inconsistencies that may affect FLR implementation in the field.

This approach allows the researcher to assess the extent to which rules-in-form of FLR shape an effective action arena for forest rehabilitation implementation and to provide an empirical basis for improving future institutional policy design.

Result and Discussion

Based on the content analysis of several regulations governing the implementation of Forest and Land Rehabilitation, the findings derived from the rules-in-use concept can be presented as follows:

Position Rules

The implementation of Forest and Land Rehabilitation involves various institutions, governmental, private, and community-based. Within the governance structure, each position holds specific duties and responsibilities in FLR activities. Understanding the roles of these actors is essential to achieving the success of FLR programs. Fundamentally, FLR includes reforestation activities within forest areas and greening efforts outside forest areas. According to Law No. 41 of 1999, a forest area is defined as a designated and/or determined area by the government to be maintained as a permanent forest. The Minister, as stated in the Regulation of the Minister of Environment and Forestry (KLHK) No. P.23 of 2021, Article 1, point 30, is the official responsible for administering government affairs in the forestry sector. In this context, the Ministry of Environment and Forestry (KLHK), represented by the Minister, serves as the national coordinator and regulator in the implementation of FLR.

Position rules define the distribution of roles among actors. Law No. 41/1999 Article 41 and Government Regulation No. 26/2020 Article 11A establish key positions: the Minister of Environment and Forestry (MoEF) as the national coordinator and supervisor, local governments as implementers, and community groups as implementation partners. Meanwhile, Ministerial Regulation No. P.23/2021 emphasizes that the Forest and Land Rehabilitation (FLR) program is carried out through two schemes: self-management (implemented independently) and contractual (conducted by third parties).

PP No. 26 of 2020 stipulates in Article 51 that communities may participate in planning, implementation, monitoring, and financing of Forest and Land Rehabilitation (FLR) activities. The position of local communities is therefore crucial, as they must be empowered and actively involved in the FLR process. According to Lutfi et al. (2014), FLR initiatives should pay close attention to the presence and participation of local communities around the project areas, whose involvement must be encouraged. This aligns with the perspective that forests and forest areas are no longer viewed merely as sources of timber, but also as providers of diverse commodities and environmental services that deliver tangible benefits to local communities (Damanik & Purwoko, 2023).

However, Ministerial Regulation No. 2/2020 does not explicitly delineate the hierarchical authority among positions in the technical implementation of Forest and Land Rehabilitation (FLR). This ambiguity potentially leads to overlapping authority between Forest Management Units (Balai), provincial or district forestry offices (Dinas), and field implementers. Within the Institutional Analysis and Development (IAD) framework, such unclear position rules hinder the establishment of a stable action situation, as actors lack explicit guidance regarding their rights and responsibilities (Crawford & Ostrom, 1995; Ostrom, 2005). Therefore, clearer delineation of roles and responsibilities is needed, particularly concerning the approval process of contractual project designs between the Head of Balai and the Head of Dinas.

Boundary Rules

Membership in the team responsible for preparing Forest and Land Rehabilitation (FLR) project plans is established by the Head of the Forest Management Unit (Balai), as stipulated in Permen LHK No. P.105/2018 Article 6, Paragraph 2, and includes representatives from the Balai, area stakeholders, provincial forestry offices, and universities. Additionally, a control team is formed by the Head of Balai, comprising members from the Provincial Forestry Office, Balai, and area stakeholders (P.105/2018 Article 67, Paragraphs 2–3). At the highest level, according to Permen LHK No. P.2/2020 Article 67, there is a revision whereby the Minister assigns the Director General (Dirjen) to establish the control team, which consists of representatives from the Provincial Forestry Office, Balai, and area managers/stakeholders.

Permen LHK No. 2/2020 Article 5 stipulates that FLR implementers may come from government agencies, community groups, or service providers. However, the regulation does not include clauses explaining the mechanisms for entry and exit within the implementation arena or the qualification criteria for implementing institutions. Nevertheless, through these two schemes, self-management or service provider, the composition of FLR implementers is adjusted accordingly. In both schemes, the local community is involved as laborers for planting activities, which in practice requires ongoing supervision and oversight.

This weakness has the potential to create uncertainty in actor legitimacy. Membership rules determine who is entitled to participate in the action arena and under what conditions. Gaps in boundary rules can reduce accountability and create a closed arena that excludes community participation (McGinnis, 2010). Such shortcomings also affect the sustainability of FLR, as effective implementation requires order in carrying out tasks and functions. Moreover, the FLR mechanism serves as a foundation for participation, providing clear provisions for those involved in activities such as project planning, preparation, seedling provision, planting, and maintenance.

Choice Rules

Choice Rules regulate what actions actors may, must, or must not perform. According to Government Regulation No. 26/2020 Article 17, Paragraph 5, the Minister establishes the annual FLR plan, while Ministerial Regulation No. 2/2020 grants authority to the Forest Management Unit (Balai) and provincial forestry offices (Dinas) to prepare the technical plan. In P.2/2020 Article 44, the Contract Signing Officer (PPK) reports budget and physical activity realizations to the Head of the Work Unit, who then compiles and reports to the Director General (Dirjen) with copies to the Director, Head of Provincial Forestry Office, and Area Stakeholders or Managers. Implementers, whether under the self-management or service provider scheme, submit activity results to the PPK, who forwards them to the Budget User Authority and ultimately to the Minister. During FLR implementation, monitoring and evaluation are required. As stipulated in Permen LHK No. P.23/2021 Article 20, FLR activities must have supervisors and evaluators who prepare weekly, monthly, and annual reports with documentation, which are submitted to the PPK, then reported to the Head of Balai, and finally to the Director General.

However, there is an inconsistency in terminology between "Contract Signing Officer" and "Commitment-Making Officer" across the two regulations. Neither regulation clearly defines the duties, functions, or distinctions between these positions. This inconsistency indicates weak rule clarity, which negatively affects cross-level coordination. Conceptually, ambiguity in choice rules reduces predictability within the action arena (Crawford & Ostrom, 1995). The Commitment-Making Officer (PPK) holds a strategic role in government procurement processes, as no government agency can enter into contracts that have consequences for the state or regional budgets (APBN/APBD) without the involvement of this officer (Putra & Harahap, 2024). Meanwhile, the Contract Signing Officer is the person or entity assigned to execute the contract.

Every individual actually has an obligation to participate in forest rehabilitation. According to Law No. 41 of 1999 Article 43, Paragraph 1, "any person who owns, manages, and/or utilizes critical or unproductive land is required to carry out forest rehabilitation for protection and conservation purposes." This implies that forest rehabilitation is a shared responsibility for anyone managing land. Furthermore, Article 70, Paragraph 1 of Law No. 32 of 2009 emphasizes that communities have equal and broad rights to actively participate in environmental protection and management efforts (Handitya & Rufaida, 2020). It is essential to recognize that forest rehabilitation should not be seen solely as a government program, whether at the central or regional level, but rather as a process of restoring forests, not merely planting trees.

Aggregation Rules

Across the four regulations, there is no explicit mechanism governing collective decision-making among actors in the planning or evaluation of activities. Strategic decisions remain hierarchical and administrative. Regarding position and authority rules, the planning stage is assigned to consultants for contractual schemes, while the Head of Balai and Head of Dinas form teams for self-management or service provider schemes. During the drafting stage, responsibility is fully delegated to the consultants and teams, following the procedures already established.

The absence of aggregation rules weakens the principles of deliberation and collaboration among actors required in environmental and forestry policies (Ostrom, 2005). This explains why FLR implementation tends to be top-down and not adaptive to local conditions. Findings by Tanjung et al. (2017) indicate that when some community members are excluded from forest management, it reduces the participation levels of other community members involved in managing Hutan Nagari. Resource management at the local level is often based on traditional knowledge and practices, so government regulations need to be aligned with local dynamics and management needs. As reflected in Damanik et al. (2024), through daily interactions and activities, customary forests contribute to maintaining ecological balance while also strengthening social bonds in Desa Setungkup, Kecamatan Ketungau Hilir.

Technically, the selection of plant species should be adapted to and consider the preferences of local communities; however, it is also important to ensure land suitability, including physical conditions and environmental characteristics at the FLR implementation site. Surtiani & Budiati (2015) found that community participation in decision-making at each stage of FLR remains very low, with the government acting as the highest decision-making authority. Similarly, Hamidah et al. (2023) noted that communities, as actors interacting directly at the local level, are still insufficiently involved in FLR implementation. Therefore, involving communities from planning through implementation and monitoring-evaluation is crucial, as they possess in-depth knowledge of field conditions and provide diverse information that can serve as a reference and foundational framework for planning and carrying out FLR activities.

Information Rules

Ministerial Regulation No. 23/2021 Articles 14–15 stipulate the types of data and reports that must be prepared; however, there are no provisions ensuring public transparency of the data resulting from FLR implementation. The regulation details the information required for drafting project plans as a reference for implementation based on the annual plan, covering various stages such as identification of physical, social, economic, and cultural conditions, preparation of supporting facilities and infrastructure, seedling provision (from nurseries or procurement), planting and maintenance, and evaluation.

Information rules determine the extent to which participants have access to information to monitor the behavior of other actors. The absence of formal transparency rules weakens monitoring and sanctioning mechanisms, which in turn reduces institutional accountability (Basurto et al., 2010). General information about FLR implementation is provided through websites, such as the NTB Provincial Environmental and Forestry Office (DLHK) website and the local government program NTB Satu Data; however, more detailed information on FLR, such as project locations, periodic planting and maintenance reports, budgets, and plant survival rates is not openly shared. These reports should be made publicly accessible to foster mutual trust. According to Nugroho (2010), information regarding forest resources, activity processes, outcomes, performance, and budget reports should be communicated in a relevant, accurate, and timely manner to serve as a basis for decision-making.

Scope Rules

Law No. 41/1999 Article 41, Paragraph 2 restricts FLR implementation to areas outside of nature reserves and national park core zones. Ministerial Regulation No. 23/2021 sets the success indicator as a plant survival rate of ≥75%. Government Regulation No. 26/2020 Article 4, Paragraph 2 emphasizes that FLR implementation should adhere to principles of transparency and accountability, clear authority, sustainable budgeting, participation, community empowerment and institutional capacity, understanding of tenure systems, cost-sharing, and incentives. This indicates that FLR implementation is intended to be open and accessible, allowing anyone to access the results of its execution.

However, the focus on physical indicators (outputs) without assessing ecological function recovery (outcomes) indicates that the scope rules of FLR remain narrow. Within Ostrom's framework, this limits the potential for social-ecological sustainability, as the regulated outcomes do not reflect the ultimate ecosystem goals (Agrawal & Gibson, 1999; Ostrom, 2005). Serrano & Ramos (2015) emphasize that measuring ecological outcomes (e.g., natural habitat condition, resilience) at the local level is often neglected, making the scope rules too narrow and less adaptive to system conditions.

Payoff Rules

Funding for FLR activities comes from the state budget (APBN), regional budgets (APBD), and other legitimate sources (Ministerial Regulation No. 23/2021, Article 25). However, rules regarding post-planting incentives and benefit sharing have not been detailed. During FLR implementation, incentives are provided in the form of facilitated services and rewards as stipulated in P.105/2018 Article 58. Facilitated services include access to capital, infrastructure, site provision, information, guidance, and permits. Meanwhile, rewards are given to FLR supervisors, pioneers, mentors, and others in the form of subsidies or assistance, prizes, certificates, and trophies, as determined by the Minister, Governor, or Regent/Mayor according to their respective authority.

Rahmawati & Elias (2024) emphasize that a successful rehabilitation method is one that integrates productive-economic components with ecological programs, implicitly indicating that economic benefits (payoff) are a crucial element for sustainability. The absence of clear payoff rules means that field implementers lack economic or social incentives to ensure the continuity of planted trees after handover. This reduces the effectiveness of the self-enforcement mechanisms necessary for rules to be followed without strict government supervision (Poteete et al., 2010). Weaknesses in these rules lead to low compliance and the emergence of social-ecological conflicts at the local level. Providing incentives is an important strategy to increase community motivation for active participation

in environmental management (Insusanty & Sadjati, 2017).

Implications for FLR Implementation

There is a need for clarity regarding roles, authorities, and task boundaries, which must be explicitly defined in legislation to prevent gaps in understanding and ensure public awareness. All positions, from the Minister to FLR implementers whether through self-managed, provider-based, or contractual schemes must uphold integrity in performing their duties and functions, while sanctions should be prepared and enforced. In institutional terms, effectiveness is achieved when rules are respected, sanctions exist and are enforceable, and organizations or institutions are held accountable.

Greater attention should be given to all potential future scenarios regarding decision-making patterns and schemes. Moreover, achieving the success rate indicator (75% survival) should not be treated as the sole benchmark for FLR implementation; instead, the focus should be on how the FLR process contributes to forest building and ecological function restoration, necessitating a transformation in both mindset and practice. In terms of aggregation rules or decision-making processes, not all aspects are fully regulated in legislation. Certain decisions remain mandatory, such as the selection of plant species, which is clearly defined with specific criteria. Even though some practical decisions are adjusted to community preferences, they should also be adapted to the physical and ecological conditions of the FLR site.

Transparency regarding the progress of FLR implementation to the public is essential as a form of collective commitment and responsibility in overseeing activities, and budget allocation transparency is crucial and must be communicated. Current policies focus primarily on short-term outcomes, whereas the goal of FLR, to restore or build forest functions is inherently long-term and must be prioritized. Therefore, after the handover of FLR results (short-term/3 years), a strong commitment and consistency are required to continue forest development through ongoing activities supported by budget allocations. Consequently, the government should also allocate funding for continued maintenance to ensure the sustainability of FLR efforts.

Conclusion

Analysis across rule types reveals weak vertical interactions between choice rules, aggregation rules, and payoff rules. Ambiguity in authority undermines coordination mechanisms (aggregation), while weak incentive rules (payoff) reduce motivation for post-implementation sustainability. Institutionally, this reflects an institutional misfit between formal design and the goal of sustainable FLR. By clarifying position and payoff rules and strengthening information transparency, FLR governance can progress toward a more adaptive and cooperative institutional form.

Acknowledgments

The author would like to thank the thesis supervisor and one of the unram forestry lecturers during his undergraduate days who have provided criticism, suggestions and input into this paper. The author would also like to thank his parents and relatives who have encouraged the author to complete the writing.

Author Contributions

The author played an active and important role in this scientific writing, including generating ideas, designing research, collecting and analyzing data, drafting the manuscript, writing the article, and revising.

Funding

This research purely uses personal funds without any funding from anywhere.

Conflicts of Interest

The author declares no conflict of interest in this research.

References

Affandi, O., Kartodihardjo, H., Nugroho, B., & Ekawati, S. (2021). Institutional analysis of forest governance after the implementation of Law Number 23/2014 in North Sumatra Province, Indonesia. *Forest and Society*, *5*(2), 304–325. https://doi.org/10.24259/fs.v5i2.8755

Agrawal, A., & Gibson, C. C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development*, *27*(4), 629–649. https://doi.org/10.1016/S0305-750X(98)00161-2

Agustinus, I., B., & Mujahiddin, D. E. (2013). Implementasi Kegiatan Penghijauan dalam Program Rehabilitasi Hutan dan Lahan (RHL) di Kecamatan Sekolaq Darat Kabupaten Kutai Barat. *Jurnal Agrifor*, *12*(2), 110–115. https://doi.org/10.31293/af.v12i2.329

Attarik, N., Pamoengkas, P., Rachmat, H. H., & Susilowati, A. (2024). Potential Use of Shorea leprosula for Rehabilitation of Degraded Tropical Production Forest Ecosystems. *Jurnal Sylva Lestari*, *12*(2), 519–531. https://doi.org/10.23960/jsl.v12i2.861

Badi'ah., K., H., N., B., & Supriyanto, B. (2022). The Use of Ostrom's Concept on Rules-in-Use in the Analysis of Regulation of Natural Tourism Utilization in Gunung Gede Pangrango National Park. *IOP Conference Series: Earth and Environmental Science*, 1–10. https://doi.org/10.1088/1755-

1315/950/1/012069

Basurto, X., Weible, C. M., & Kingsley, G. (2010). A Systematic Approach to Institutional Analysis: Applying Crawford and Ostrom's Grammar. *Political Research Quarterly*, *63*(3), 523–537. https://doi.org/10.1177/1065912909334430

Budiprakoso, B., Ichwandi, I., & Rusdiana, O. (2021). Institutional Analysis of Protection Forest Area's Land Use Pattern in the North Bandung Area, Bandung Regency. *Journal of Natural Resources and Environmental Management*, *11*(3), 463–473. https://doi.org/10.29244/jpsl.11.3.463-475

Cole, D. H. (2017). Laws, Norms, and the Institutional Analysis and Development Framework. *Journal of Institutional Economics*, *13*(4), 829–847. https://doi.org/10.1017/S1744137417000030

Crawford, S. E. S., & Ostrom, E. (1995). A grammar of institutions. *American Political Science Review*, *89*(3), 582–600. https://doi.org/10.2307/2082975

Damanik, E. M., Hardiansyah, G., & Roslinda, E. (2024). Partisipasi Masyarakat Dalam Pengelolaan Hutan Adat di Desa Setungkup Kecamatan Ketungau Hilir Kabupaten Sintang. *Jurnal Lingkungan Hidup Tropis*, *3*(4), 623–631. Retrieved from https://jurnal.untan.ac.id/index.php/jlht/article/view/92868/0

Damanik, S. E., & Purwoko, A. (2023). Planning Counseling Methods in Supporting Sustainable Forestry Development in Simalungun Regency. *Jurnal Penelitian Pendidikan IPA*, *9*(4), 2164–2172. https://doi.org/10.29303/jppipa.v9i4.3145

Faathir, L. A. M., Santoso, N., & Putri, E. I. K. (2025). Key Drivers of Mangrove Rehabilitation Success in Ujungalang Village, Indonesia: A MICMAC-Based Stakeholder Analysis. *Jurnal Penelitian Pendidikan IPA*, *11*(8), 141–152. https://doi.org/10.29303/jppipa.v11i8.11581

Gitahapsari, D., & Rahman, A. Z. (2016). Implementasi Program Rehabilitasi Hutan dan Lahan Melalui Kegiatan Hutan Rakyat di Desa Kalisidi Kecamatan Ungaran Barat Kabupaten Semarang. *Jurnal Management & Public Policy*, *5*(3), 447–460. https://doi.org/10.14710/jppmr.v5i3.12561

Hamidah, R. H., Adhya, I., Deni, H., Y., S., T., H., N., I., A.Y., & Nurlaili, A. (2023). Peran Masyarakat terhadap Rehabilitasi Hutan dan Lahan: Sudi di Desa Dukuhdalem, Jepara, Kuningan. *Jurnal Penelitian Universitas Kuningan*, *14*(2), 122–134. https://doi.org/10.25134/logika.v14i02.7843

Handitya, B., & Rufaida, K. K. (2020). Revitalisasi Ketentuan Tindak Pidana Pencegahan dan Pemberantasan Perusakan Hutan. *Jurnal Masalah-Masalah Hukum*, *49*(3), 272–279. https://doi.org/10.14710/mmh.49.3.2020.272-279

Insusanty, E., & Sadjati, E. (2017). Sistem Insentif Jasa Lingkungan di Hutan Larangan Adat Rumbio Kabupaten Kampar, Riau. *Wahana Forestra: Jurnal Kehutanan*, *12*(1), 56–75. https://doi.org/10.31849/forestra.v12i1.203

Jatmiko, A., Sadono, R., & Faida, L. R. W. (2012). Evaluasi Kegiatan Rehabilitasi Hutan dan Lahan Menggunakan Analisis Multikriteria (Studi Kasus di Desa Butuh Kidul Kecamatan Kalikajar, Kabupaten Wonosobo, Jawa Tengah. *Jurnal Ilmu Kehutanan*, *6*(1), 30–44. https://doi.org/10.22146/jik.3307

Kartodihardjo, H. (2006). Masalah Kelembagaan dan Arah Kebijakan Rehabilitasi Hutan dan Lahan. *Jurnal Analisis Kebijakan Kehutanan*, *3*(1), 29–41. Retrieved from https://shorturl.asia/k81LZ

Lammers, I., & Heldeweg, M. A. (2016). Smart Design Rules for Smart Grids: Analysing Local Smart Grid Development Through an Empirico-Legal Institutional Lens. *Journal Energy, Sustainability and Society*, *6*(36), 1–15. https://doi.org/10.1186/s13705-016-0102-z

Lestari, P., Rachmansyah, A., Efani, A., & Koentjoro, M. P. (2023). Sustainability Analysis of Farming Roads for Increased Food Security (Case Study on Woro Village, Kepohbaru Subdistrict, Bojonegoro Regency. *Jurnal Penelitian Pendidikan IPA*, *9*(Special Issue), 1316–1327. https://doi.org/10.29303/jppipa.v9iSpecialIssue.6420

Lutfi, A., Atmosoemarto, M., & Supriono, B. (2014). Persepsi dan Partisipasi Masyarakat dalam Kegiatan Rehabilitasi Hutan dan Lahan di Kabupaten Bogor (Studi Kasus Pembangunan Kebun Bibit Rakyat di Kecamatan Pamijahan. *Jurnal Nusa Sylva*, *14*(1), 32–42. https://doi.org/10.31938/jns.v14i1.139

Markum., S., T., I., M.H., A., I.M.L., F., M.Y., & Rahman, F. A. (2025). Agroforestry Practices and Community Resilience to The Impact of Climate Change in Sesaot Forest Area, Lombok, Indonesia. *Jurnal Penelitian Pendidikan IPA*, *11*(5), 849–859. https://doi.org/10.29303/jppipa.v11i5.11258

Mawazin., P., P., D., Heriansyah, & Dewi, R. (2024). Restorasi 15 Tahun: Analisis Komposisi, Potensi, dan Keanekaragam Jenis di Taman Nasional Gunung Gede Pangrango Jawa Barat. *Jurnal Penelitian Hutan Tanaman*, *21*(2), 115–124. https://doi.org/10.59465/jpht.v21i2.399

McGinnis, M. D. (2010). An Introduction to IAD and he Language of the Ostrom Workshop: A Simple Guide to a Complex Framework for the Analysis of Institutions and their Development. *Policy Studies Journal*, *39*(1), 169–183. https://doi.org/10..1111/j.1541-0072.2010.00401.x

Muhtada, D., & Diniyanto, A. (2021). Penataan Regulasi di Indonesia Melalui Lembaga Independen. *Jurnal Penelitian Ilmu Hukum*, *16*(2), 278–290.

https://doi.org/10.15294/pandecta.v16i2.31866

Muyassaroh, & Suyanto, S. (2023). Content Analysis of YouTube Videos Knowledge of Biology for Class XI SMA on the GIA Academy Channel. *Jurnal Penelitian Pendidikan IPA*, *9*(12), 11936–11942. https://doi.org/10.29303/jppipa.v9i12.5160

Nabilah, R. S., & Jumadi, J. (2022). A Study of Content Analysis: Trends of Educational Research for Physics Courses in Indonesia. *Jurnal Penelitian Pendidikan IPA*, *8*(1), 393–400. https://doi.org/10.29303/jppipa.v8i1.1293

Nawir, A. A., Murniati, & Rumboko, L. (2008). *Rehabilitasi Hutan di Indonesia, Akan Kemanakah Arahnya Setelah Lebih dari Tiga Dasawarsa*. Bogor: CIFOR.

Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches*. United States: Pearson Education Limited.

Nugroho, B. (2010). Pembangunan Kelembagaan Pinjaman Dana Bergulir Hutan Rakyat. *Jurnal Manajemen Hutan Tropika*, *16*(3), 118–125. https://doi.org/10.7226/jtfm.16.3.%25p

Nugroho, B. (2016). *Kelembagaan, Karakteristik Sumberdaya, dan Perilaku Aktor: Analisis Kritis Kebijakan Pengelolaan Hutan Indonesia*. Orasi Ilmiah Guru Besar. IPB University.

Nugroho, P., Numata, S., & Aprilianto, N. A. (2020). Jasa Ekosistem Berbasis Hutan yang Diterima dan Sikap terhadap Rehabilitasi Hutan: Studi Kasus di Hulu Daerah Aliran Sungai di Jawa Tengah, Indonesia. *Jurnal Ilmu Kehutanan*, *14*(1), 185–197. https://doi.org/10.22146/jik.61402

Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton: Princeton University Press.

Pareira, M. Y. P., Kartodihardjo, H., & Bahruni. (2020). Ecosystem Restoration Policy in Production Forest and Its Implementation in Indonesia. *Jurnal Manajemen Hutan Tropika*, *26*(3), 201–211. https://doi.org/10.7226/jtfm.26.3.201

Poteete, A. R., Janssen, M. A., & Ostrom, E. (2010). *Working Together: Collective Action, the Commons, and Multiple Methods in Practice*. Princeton University Press. https://doi.org/10.1515/9781400835157

Putra, B., & Harahap, M. R. (2024). Kewenangan Pejabat Pembuat Komitmen dalam Penandatanganan Kontrak Pengadaan Barang dan Jasa Pemerintah. *Milthree Law Journal*, *1*(3), 390–410. https://doi.org/10.70565/mlj.v1i3.26

Rahmawati, A. D., & Elias. (2024). Studi Literatur Metode Rehabilitasi Lahan Hutan di Indonesia. *Jurnal ForestrIndo*, *2*(1), 174–191. https://journal.ipb.ac.id/forestrindo-journal/article/view/62211

Salaka, F. J., Alviya, I., Suryandari, E. Y., Nurfatriani, F., & Muttaqin, M. Z. (2020). Efektivitas Kelembagaan Pengelolaan Hutan Tanaman Rakyat di Tingkat Lokal. *Jurnal Analisis Kebijakan Kehutanan*, *17*(1), 75–92. https://doi.org/10.20886/jakk.2019.17.1.75-92

Serrano, M. D. M. D., & Ramos, P. A. (2015). Making Ostrom's Framework Applicable to Characterise Social Ecological Systems at the Local Level. *International Journal of the Commons*, *9*(2), 808–830. https://doi.org/10.18352/ijc.567

Setiawan, O., & Krisnawati. (2014). Pemilihan Jenis Hasil Hutan Bukan Kayu Potensial Dalam Rangka Rehabilitasi Hutan Lindung (Studi Kasus Kawasan Hutan Lindung KPHL Rinjani Barat, Nusa Tenggara Barat. *Jurnal Ilmu Kehutanan*, *8*(2), 89–99. https://doi.org/10.22146/jik.10165

Siswantoro, R. D., Kartodihardjo, H., Hendrayanto, & Darusman, D. (2021). Penggunaan Konsep Rules-In-Use Ostrom dalam Analisis Peraturan Pemanfaatan Air di Kawasan Konservasi: Studi Kasus Taman Nasional Gunung Gede Gede Pangrango. *Jurnal Analisis Kebijakan Kehutanan*, *18*(2), 91–104. https://doi.org/10.20866/jakk.2021.18.2.91-104

Sulastiyo, D., Kartodihardjo, H., & Soedomo, S. (2016). Efektivitas Implementasi Kebijakan Rehabilitasi Hutan dan Lahan. *Jurnal Silvikultur Tropika*, *7*(3), 181–187. https://doi.org/10.29244/j-siltrop.7.3.181-187

Sulistyowati, D., Hernani., S., A., F., A., & Aulia, A. (2024). Sustainability Development in the Context of Edible Coating for Fruits and Vegetables in Chemistry Learning: Qualitative Content Analysis. *Jurnal Penelitian Pendidikan IPA*, *10*(10), 8263–8275. https://doi.org/10.29303/jppipa.v10i10.8846

Sumarjono, E., & Purnomo, H. (2016). Tumpang Tindih Kepentingan Lahan Kehutanan dan Pertambangan Antara Peraturan dan Pelaksanaannya. In *Prosiding Seminar Nasional: Managemen Energi Untuk Pembangunan Berkelanjutan di Indonesia. (10th RETII)* (pp. 252–261). Retrieved from https://shorturl.asia/vAwD7

Surtiani, Y., & Budiati, L. (2015). Evaluasi Rehabilitasi Hutan dan Lahan (RHL) di Daerah Aliran Sungai (DAS) Juwana pada Kawasan Gunung Muria Kabupaten Pato. *Jurnal Pembangunan Wilayah Dan Kota*, *11*(1), 117–128. https://doi.org/10.14710/pwk.v11i1.8662

Suwarno, E., Kartodihardjo, H., Kolopaking, L. M., & Soedomo, S. (2014). Institutional Obstacles on the Development of Forest Management Unit: The Case of Indonesian Tasik Besar Serkap. *American Journal of Environmental Protection*, *2*(2), 41–50. https://doi.org/10.12691/env-2-2-3

Suwarno, E., Kartodihardjo, H., Kolopaking, L. M., & Soedomo, S. (2015). Penggunaan Konsep Rules-In-Use Ostrom dalam Analisis Peraturan

Pembentukan Organisasi Kesatuan Pengelolaan Hutan. *Jurnal Analisis Kebijakan Kehutanan*, *12*(1), 13–26. https://doi.org/10.20886/jakk.2015.12.1.13-26

Tanjung, N. S., Sadono, D., & Wibowo, C. T. (2017). Tingkat Partisipasi Masyarakat dalam Pengelolaan Hutan Nagari di Sumatera Barat. *Jurnal Penyuluhan*, *13*(1), 14–30. https://doi.org/10.25015/penyuluhan.v13i1.12990

Wahyuni, H., & Suranto. (2021). Dampak Deforestasi Hutan Skala Besar terhadap Pemanasan Global di Indonesia. *Jurnal Ilmiah Ilmu Pemerintahan*, *6*(1), 148–162. https://doi.org/10.14710/jiip.v6i1.10083