

Policy Implementation of Regional Spatial Planning in Controlling Shrimp Pond Aquaculture Within a Conservation Area: A Case Study of Karimunjawa Islands, Indonesia

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ABSTRACT: This study examines the implementation of Regional Spatial Planning (RTRW) policy in controlling shrimp pond aquaculture within the conservation area of the Karimunjawa Islands, Indonesia. Although Regional Regulation No. 4 of 2023 formally designates Karimunjawa as a conservation and tourism-oriented zone, inconsistencies between regulatory objectives and field practices have generated significant governance challenges. Using a qualitative case study approach, data were collected through in-depth interviews, field observations, and document analysis, and analyzed through Merilee S. Grindle's policy implementation framework focusing on the content and context of policy implementation. The findings indicate that while the policy clearly prioritizes environmental protection and sustainable spatial governance, its implementation encounters substantial obstacles. From the content dimension, the policy produces an uneven distribution of benefits by emphasizing long-term ecological sustainability over the immediate economic interests of local communities dependent on shrimp aquaculture. From the contextual perspective, fragmented authority between local and central government, limited institutional capacity, inconsistent law enforcement, social resistance, and the absence of structured monitoring mechanisms significantly hinder effective implementation. Furthermore, the lack of viable sustainable economic alternatives weakens community compliance and policy legitimacy. The study concludes that effective spatial planning implementation in conservation-based coastal regions requires strengthened inter-institutional coordination, consistent enforcement mechanisms, enhanced administrative capacity, and the development of sustainable livelihood strategies to balance ecological protection and socio-economic stability in small island governance contexts.

KEYWORDS: policy implementation; spatial planning; coastal governance; shrimp aquaculture; conservation area; Karimunjawa Islands.

INTRODUCTION

Coastal and small island regions across the globe are increasingly facing spatial governance challenges due to the expansion of aquaculture, tourism, and infrastructure development that often exceed ecological carrying capacity. In many developing countries, shrimp aquaculture has become a significant driver of coastal economic growth, yet it simultaneously contributes to mangrove degradation, water pollution, and socio-spatial conflicts when not properly regulated (FAO, 2022). In Indonesia, the rapid growth of intensive shrimp farming over the past decade has intensified pressures on coastal ecosystems, particularly in conservation-oriented regions where economic interests intersect with environmental protection mandates (Andini et al., 2025). These dynamics highlight the critical role of spatial planning policies as regulatory instruments to balance environmental sustainability and local economic development. However, recent studies indicate that regulatory clarity alone does not guarantee effective implementation, especially in small island governance contexts characterized by limited institutional capacity and overlapping authority structures (Mdtf, n.d.; Nikijuluw & Vulpas, n.d.).

In Indonesia, spatial planning has been positioned as a strategic instrument to control land and coastal resource utilization through the Regional Spatial Planning (RTRW) framework, particularly after the enactment of Law No. 26/2007 and its subsequent reinforcement under the Job Creation Law reforms. Over the last five years, the government has emphasized risk-based spatial licensing and stronger zoning control to reduce environmental conflicts in coastal and marine areas (Mdtf, n.d.). Despite these regulatory advancements, implementation gaps remain significant at the local government level. Empirical evidence suggests that inconsistencies between formal zoning regulations and actual spatial practices continue to occur, especially in regions experiencing rapid aquaculture expansion (Rabbany & Butar, 2025). These discrepancies are often driven by economic pressures, fragmented institutional authority between central and local governments, and limited enforcement capacity.

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Consequently, spatial planning policies frequently struggle to function as effective control mechanisms in environmentally sensitive coastal zones.

Small island regions present unique governance challenges due to their ecological fragility, limited land availability, and high dependence on natural resource-based livelihoods. Recent studies emphasize that small islands are particularly vulnerable to environmental degradation when economic activities such as aquaculture and tourism expand without strict spatial control mechanisms (UNEP, 2021). In conservation-designated areas, spatial planning becomes even more critical because environmental damage may have irreversible impacts on biodiversity, fisheries productivity, and ecosystem services. In Indonesia, marine protected areas and conservation-based tourism islands frequently experience regulatory tension between preservation mandates and local economic demands (Andini et al., 2025). Governance complexity increases when overlapping authorities exist between national conservation agencies and local governments responsible for spatial planning implementation. As a result, policy implementation in small island conservation contexts often becomes a negotiation arena among ecological priorities, economic interests, and political considerations rather than a straightforward administrative process.

Shrimp aquaculture, particularly intensive vannamei farming, has been widely promoted in Indonesia as a strategic sector for export growth and coastal economic development. Over the past five years, national production targets have significantly increased under the blue economy agenda, encouraging expansion into new coastal areas (FAO, 2022; KKP, 2025). However, empirical studies indicate that rapid intensification of shrimp ponds has frequently resulted in mangrove conversion, nutrient loading in coastal waters, and social tensions over resource access when spatial regulations are weakly enforced. In conservation-oriented regions, these impacts are particularly problematic because aquaculture infrastructure often conflicts with zoning provisions that restrict land conversion and coastal modification. The tension between economic productivity and ecological sustainability thus becomes a central governance dilemma, especially in small island settings where environmental thresholds are relatively low and enforcement capacity is limited.

Over the last five years, Indonesia has experienced a substantial increase in shrimp aquaculture production alongside growing environmental concerns in coastal areas. National data indicate that shrimp production and pond expansion have continued to rise under the government’s aquaculture revitalization program, while reports on coastal ecosystem degradation have also increased (FAO, 2022; KKP, 2025). This dual trend illustrates a structural tension between economic expansion and ecological sustainability in coastal governance. Table 1 summarizes recent national trends in shrimp production and reported environmental pressures, demonstrating how rapid aquaculture growth has coincided with rising ecological vulnerability in coastal zones.

Table 1. Shrimp Aquaculture Growth and Coastal Environmental Pressure in Indonesia (2020–2024)

Year	National Shrimp Production (Million Tons)	Estimated Aquaculture Expansion (Ha)	Pond Reported Degradation Cases*	Coastal Environmental
2020	0.91	3,200	148	
2021	0.99	3,850	162	
2022	1.07	4,430	179	
2023	1.15	4,900	193	
2024	1.22	5,300	207	

*Environmental degradation cases include reported coastal pollution, mangrove conversion, and spatial violations in aquaculture zones.

Sources: (FAO, 2022; KKP, 2025).

Within Indonesia’s national coastal governance framework, the Karimunjawa Islands represent a critical case of conservation-based spatial regulation. The archipelago, located in Jepara Regency, Central Java, is formally designated as the Karimunjawa National Park under the Ministry of Environment and Forestry, covering extensive marine and coastal ecosystems including mangroves, coral reefs, and seagrass beds (KKP, 2025). In recent years, however, the expansion of intensive shrimp aquaculture—particularly vannamei farming in Karimunjawa and Kemujan Islands—has generated increasing ecological pressure in areas adjacent to conservation zones. Empirical research conducted in the Karimunjawa-Jepara-Muria Biosphere Reserve demonstrates that intensive shrimp pond operations contribute to nutrient loading, water quality degradation, and environmental stress in coastal ecosystems, indicating growing tension between aquaculture expansion and conservation objectives (Purnomo et al., 2022). These developments have stimulated institutional and public debate concerning spatial conformity, zoning compliance, and the effectiveness of environmental regulation in small island contexts. Consequently, Karimunjawa provides a relevant empirical setting to examine how spatial planning policies are implemented in conservation-oriented coastal regions where environmental mandates intersect directly with local livelihood interests.

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Despite the formal designation of Karimunjawa as a conservation and tourism-oriented zone under Jepara Regency's Regional Spatial Planning (RTRW) Regulation No. 4 of 2023, discrepancies between spatial zoning provisions and actual land-use practices have persisted. The RTRW explicitly restricts intensive marine and brackish water aquaculture activities within conservation, tourism, and settlement zones in Karimunjawa. However, field observations and government reports over the last five years indicate that dozens of shrimp pond units were established prior to stricter enforcement, many operating without full compliance with spatial and environmental licensing requirements (Purnomo et al., 2022). These inconsistencies reveal a governance gap between regulatory formulation and practical enforcement. Rather than functioning solely as a preventive instrument, the spatial planning policy in this context has often been reactive, responding to conflicts after environmental impacts and social tensions had already emerged. This gap underscores the need to analyze not only the regulatory framework itself but also the broader implementation dynamics shaping policy outcomes in conservation-based coastal regions.

The spatial inconsistencies in Karimunjawa can be systematically observed through the mismatch between formal zoning provisions and aquaculture practices on the ground. While the RTRW framework clearly classifies Karimunjawa as a conservation-oriented and tourism-supporting area, several shrimp pond operations were developed in zones where such activities are explicitly restricted. Recent monitoring reports indicate that violations involve unauthorized inlet pipeline construction, mangrove land conversion, and wastewater discharge into marine waters adjacent to protected areas (KKP, 2025). These discrepancies illustrate that spatial planning regulations have not been fully internalized or consistently enforced. Table 2 summarizes the key forms of spatial non-compliance identified in the Karimunjawa Islands over the past five years.

Table 2. Spatial Planning Non-Compliance in Shrimp Aquaculture Activities in Karimunjawa (2020–2024)

Type of Violation	Spatial Description of Practice	Conflict with RTRW Provision	Reported Impacts
Mangrove Conversion	Clearing mangrove areas for pond construction	Mangrove designated as protected ecological buffer zone	Loss of coastal protection and biodiversity
Unauthorized Pipelines	Inlet Installation of seawater intake pipes crossing conservation waters	Construction restricted in conservation and tourism zones	Coral reef disturbance and sedimentation
Wastewater Discharge	Direct release of pond effluents into coastal waters	Environmental quality standards and zoning restrictions	Nutrient loading and water pollution
Incomplete Licensing	Operation without full spatial and environmental permits	Mandatory spatial conformity (KKPR) requirement	Administrative and legal non-compliance

Sources: (KKP, 2025).

The persistence of spatial violations in Karimunjawa indicates that the challenge lies not merely in regulatory design but in policy implementation dynamics. Although the RTRW regulation provides clear zoning classifications and legal prohibitions, its effectiveness depends on how policy content interacts with contextual factors such as institutional capacity, political commitment, enforcement mechanisms, and stakeholder compliance. Recent governance studies emphasize that implementation failure in coastal and environmental policies often stems from fragmented authority, limited monitoring systems, and uneven benefit distribution among affected groups (FAO, 2022). In conservation-based small island contexts, these factors are further intensified by socio-economic dependency on natural resources and heightened political sensitivity. Therefore, understanding spatial planning in Karimunjawa requires moving beyond normative legal analysis toward a comprehensive examination of implementation processes and institutional interactions that shape policy outcomes.

Although numerous studies in the past five years have examined coastal conservation management, marine protected areas, and sustainable aquaculture governance in Indonesia, limited attention has been given to the implementation of regional spatial planning policies as an analytical lens in small island conservation contexts. Recent research has focused on ecological impacts of aquaculture expansion (Fitria et al., 2024; Nurhayati & Oktavia, 2022), stakeholder participation in marine protected areas (Sri et al., 2022), and sustainable coastal development frameworks (Andini et al., 2025). However, these studies largely emphasize environmental outcomes or governance structures without systematically analyzing how spatial planning regulations are operationalized at the local level. In particular, empirical investigations integrating regulatory content and contextual implementation factors within a single analytical framework remain scarce. Consequently, there is a research gap in understanding how regional spatial planning policies function in practice when confronted with competing economic and conservation interests in small island governance settings such as Karimunjawa.

Against this backdrop, this study aims to analyze the implementation of the Regional Spatial Planning (RTRW) policy in controlling shrimp pond aquaculture within the conservation-based setting of the Karimunjawa Islands. Specifically, the research

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addresses three key questions: (1) how the RTRW policy is implemented in practice within the Karimunjawa conservation context; (2) what institutional, political, and socio-economic factors support or hinder its implementation; and (3) what strategic measures can enhance policy effectiveness in balancing ecological protection and local livelihoods. By applying Merilee S. Grindle's policy implementation framework, this study contributes theoretically by integrating policy content and contextual dimensions in the analysis of spatial governance in small island regions. Practically, the findings offer policy-relevant insights for strengthening institutional coordination, enforcement consistency, and sustainable livelihood transitions in conservation-oriented coastal governance. Through this analysis, the study seeks to advance understanding of how spatial planning policies can move beyond formal regulation toward effective and adaptive implementation in environmentally sensitive island settings.

METHOD

This study employs a qualitative research design with a case study approach to examine the implementation of the Regional Spatial Planning (RTRW) policy in the Karimunjawa Islands, Jepara Regency, Indonesia. A case study design was selected to allow an in-depth exploration of policy implementation within its real-life governance context, particularly in a conservation-based small island setting where ecological, institutional, and socio-economic factors intersect. Data were collected through semi-structured in-depth interviews with key stakeholders, including local government officials (Regional Planning Office, Environmental Agency, and Civil Service Police Unit), sub-district authorities, conservation area managers, and representatives of local communities and shrimp pond operators. These primary data were complemented by field observations and document analysis of regulatory frameworks, spatial planning documents, environmental reports, and official government records from 2020–2024. The study focuses on examining both the formal regulatory content and the contextual factors influencing policy implementation.

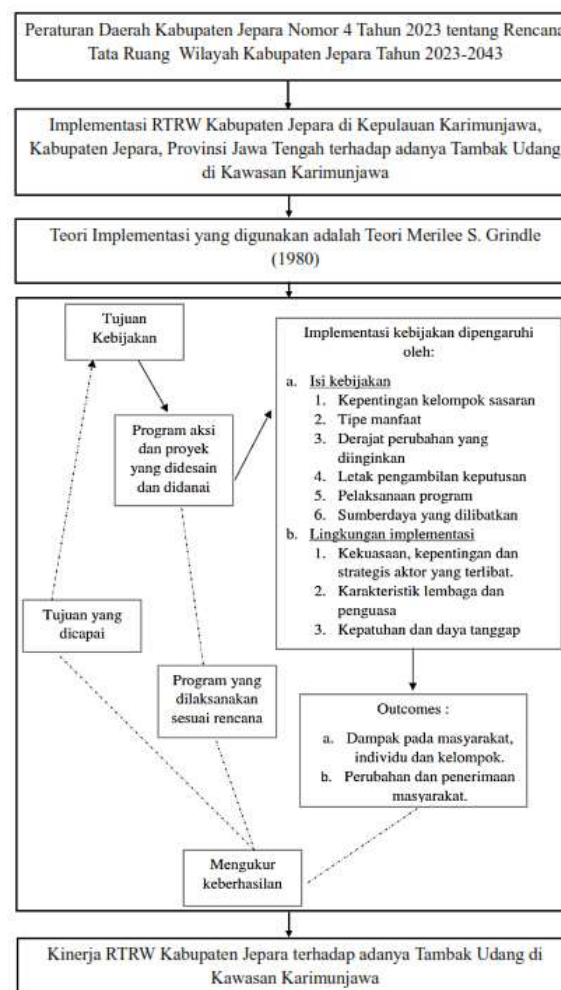


Figure 1. Conceptual Framework

Source: adapted from Merilee S. Grindle's implementation model theory

Data analysis followed the interactive model of Miles, Huberman, and Saldaña (2014), consisting of data condensation, data display, and conclusion drawing. The analytical framework is grounded in Merilee S. Grindle's policy implementation model,

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which distinguishes between the content of policy (policy objectives, benefits, decision-making structure, implementing actors, and resources) and the context of implementation (power relations, institutional characteristics, political environment, and target group compliance). This framework enables a comprehensive assessment of how regulatory provisions interact with institutional capacity and stakeholder dynamics in shaping policy outcomes. To ensure research credibility, data triangulation was conducted by cross-verifying interview findings with observational evidence and official documents. Through this methodological approach, the study aims to generate a nuanced understanding of spatial policy implementation in environmentally sensitive coastal regions.

RESULTS AND DISCUSSION

Overview of Karimunjawa Islands

The Karimunjawa Islands are an archipelagic cluster located in the Java Sea, administratively part of Jepara Regency, Central Java Province, Indonesia. The region consists of 27 small islands, with Karimunjawa and Kemujan being the main inhabited islands. The area is nationally recognized for its rich marine biodiversity and was designated as part of the Karimunjawa National Park, making it one of Indonesia's prominent marine conservation areas. Ecologically, the islands host coral reef ecosystems, seagrass beds, and mangrove forests that function as critical coastal buffers and fish nursery habitats. In addition to conservation status, Karimunjawa has also been positioned as a strategic tourism destination, contributing significantly to local revenue and regional development planning over the past decade.

Socio-economically, the majority of Karimunjawa's population depends on marine-based livelihoods, including capture fisheries, tourism services, and aquaculture activities such as shrimp pond farming. Over the last five years, tourism growth and aquaculture expansion have intensified land-use pressures on limited coastal space, particularly in areas adjacent to mangrove belts and shallow coastal waters. While conservation zoning aims to protect ecological integrity, economic dependency on natural resource utilization creates structural tension in spatial governance. This dual character—as both a conservation landscape and an economic livelihood space—makes Karimunjawa a critical case for examining how spatial planning policies are operationalized in small island settings where environmental mandates intersect directly with community survival strategies.

Development of Shrimp Aquaculture in Karimunjawa

Over the past decade, shrimp aquaculture—particularly intensive vannamei shrimp farming—has emerged as one of the most economically attractive activities in the Karimunjawa Islands. The relatively high market value of export-oriented shrimp, combined with increasing national production targets under Indonesia's aquaculture revitalization agenda, has encouraged local investors and community members to convert coastal land into brackish water ponds. In Karimunjawa and Kemujan Islands, pond development has generally been concentrated in low-lying coastal areas, including zones adjacent to mangrove ecosystems and shallow marine waters. Field findings indicate that many pond units were initially developed during periods of limited regulatory enforcement, creating a legacy of spatial arrangements that later conflicted with conservation-based zoning provisions under the updated Regional Spatial Planning (RTRW) framework.

From an economic perspective, shrimp pond operations have contributed to local employment opportunities and short-term income generation, particularly for households transitioning from traditional capture fisheries. However, the rapid and partially unregulated expansion of aquaculture infrastructure has also generated environmental concerns, including mangrove clearing, effluent discharge into coastal waters, and physical alterations to shoreline morphology. These environmental pressures have heightened scrutiny from conservation authorities and environmental agencies, leading to increasing tension between economic actors and regulatory institutions. Consequently, shrimp aquaculture development in Karimunjawa illustrates a classic policy dilemma: while economically beneficial at the micro level, its spatial and ecological implications challenge the sustainability objectives embedded in the conservation-oriented planning framework.

Content of Policy

Interests Affected

The Regional Spatial Planning (RTRW) policy in Karimunjawa directly affects multiple stakeholder groups with differing and often competing interests. At the macro level, the policy prioritizes ecological sustainability and conservation objectives aligned with the designation of the area as part of the national park and tourism development zone. These interests are primarily represented by environmental authorities and regional planning institutions seeking to ensure long-term spatial order and ecosystem protection. However, at the micro level, shrimp pond operators and workers perceive the regulation as a direct constraint on their primary source of income. One local shrimp farmer stated during an interview,

"We understand the conservation rules, but shrimp farming is our main livelihood. If ponds are restricted, we need clear alternatives, not just prohibitions" (Interview with Shrimp Pond Operator, Karimunjawa, March 2024).

This statement reflects the tension between regulatory intent and livelihood dependency, illustrating how policy content redistributes perceived benefits and costs unevenly among affected actors.

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Beyond local aquaculture actors, the RTRW policy also affects governmental and institutional stakeholders operating at different administrative levels. The local government, particularly the regional planning and environmental agencies, carries the responsibility of enforcing spatial conformity while simultaneously maintaining socio-economic stability in the island community. Meanwhile, conservation authorities emphasize ecological protection as a non-negotiable priority due to Karimunjawa's status as a protected marine area. This dual administrative structure creates institutional tension, especially when enforcement actions potentially reduce local income sources. A government official noted,

"We must implement the spatial regulation consistently, but enforcement cannot ignore the social impact on island communities" (Interview with Local Government Officer, Jepara Regency, April 2024).

This illustrates that the policy does not only redistribute economic interests but also reshapes institutional responsibilities and political accountability. Consequently, the RTRW policy affects not only private economic actors but also administrative actors who must balance regulatory compliance with social legitimacy.

Table 3. Stakeholders and Interests Affected by RTRW Policy in Karimunjawa

Stakeholder Group	Primary Interest	Perceived Impact of RTRW Policy	Nature of Influence
Shrimp Pond Operators	Income stability and business continuity	Operational restriction, licensing requirements	High (economic actor)
Pond Workers	Employment security	Risk of job reduction	Moderate
Local Government (Planning & Environment Office)	Spatial order and regional stability	Enforcement responsibility and political pressure	High (administrative authority)
Conservation Authority	Ecosystem protection and biodiversity preservation	Stronger justification for regulatory control	High (regulatory mandate)
Local Community (Non-pond households)	Environmental quality and tourism income	Potential long-term ecological benefits	Indirect

Source: Field Interviews (March–April 2024); Jepara Regency Government (2023); KLHK (2023); Ministry of Marine Affairs and Fisheries (2023).

The divergence of interests identified above significantly shapes the trajectory of policy implementation in Karimunjawa. From the perspective of Grindle's policy content dimension, the greater the disparity between expected benefits and perceived losses among target groups, the higher the likelihood of resistance or compliance challenges. In this case, shrimp pond operators and workers experience immediate economic risk, whereas the ecological benefits promoted by the RTRW policy are long-term and collectively distributed. This asymmetry creates a perception gap that complicates enforcement efforts. At the institutional level, local government agencies are positioned in a mediating role, navigating between conservation mandates and socio-economic realities. Consequently, the interests affected by the RTRW policy do not merely represent administrative categories but constitute dynamic power relations that influence negotiation, compliance, and enforcement outcomes. The findings suggest that without adaptive transition strategies—such as livelihood diversification programs or phased regulatory enforcement—the policy may face persistent resistance despite its normative legitimacy. Thus, within the content of policy dimension, "interests affected" emerge as a central determinant of implementation effectiveness in conservation-based small island governance.

Type of Benefits

From the perspective of Grindle's content of policy dimension, the type of benefits generated by the RTRW policy in Karimunjawa is predominantly collective and long-term rather than individual and immediate. The regulation primarily aims to ensure environmental sustainability, protect marine ecosystems, and support conservation-based tourism development. These benefits are structural in nature, including improved coastal resilience, preservation of biodiversity, and enhanced attractiveness of the region as a sustainable tourism destination. However, such benefits are not directly felt in the short term by shrimp pond operators who rely on daily production cycles for income. As one shrimp farmer expressed,

"Environmental protection is important, but we calculate benefits per harvest cycle. If we stop operating, the impact is immediate for our family income" (Interview with Shrimp Pond Operator, Karimunjawa, March 2024).

This statement illustrates the temporal gap between policy benefits and economic realities at the household level.

Beyond environmental preservation, the RTRW policy also generates indirect institutional and governance benefits. For the local government, the regulation strengthens administrative legitimacy by reinforcing spatial order and legal certainty in coastal land use. For conservation authorities, it provides a stronger legal basis to control environmentally harmful activities within protected zones. However, these governance benefits are institutional rather than distributive, meaning they enhance regulatory

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capacity without necessarily providing compensatory economic gains to affected aquaculture actors. A local government official noted, “The spatial regulation gives us a clearer legal foundation to act, but the challenge is ensuring that affected communities do not feel excluded from development” (Interview with Regional Planning Officer, April 2024). This indicates that while the policy produces regulatory clarity and environmental safeguards, it simultaneously creates perceived economic trade-offs for specific stakeholder groups. Thus, the type of benefits embedded in the policy is asymmetrical—collective and ecological in nature, yet individually restrictive for certain economic actors.

Table 4. Classification of Policy Benefits under RTRW Implementation in Karimunjawa

Type of Benefit	Beneficiary Group	Time Horizon	Nature of Benefit
Ecosystem protection (mangrove & coral reefs)	Wider community & future generations	Long-term	Collective
Improved tourism sustainability	Local tourism actors & regional economy	Medium–Long term	Collective–Economic
Strengthened legal certainty in spatial governance	Local government & conservation authority	Immediate–Medium term	Institutional
Business continuity of shrimp ponds (restricted under policy)	Shrimp pond operators	Short-term	Individual–Economic (Reduced)

Source: Field Interviews (March–April 2024); Jepara Regency RTRW Regulation No. 4/2023; KLHK (2023); Ministry of Marine Affairs and Fisheries (2023).

The asymmetric distribution and temporal orientation of policy benefits significantly influence stakeholder responses to the RTRW implementation. In Grindle’s framework, when policy benefits are collective, long-term, and indirect—while the costs are immediate and concentrated—the probability of resistance among affected groups increases. In the Karimunjawa context, environmental sustainability and tourism resilience represent strategic public goods; however, shrimp pond operators experience direct economic constraints without immediate compensatory mechanisms. This imbalance contributes to selective compliance, negotiation attempts, and demands for transitional support. Furthermore, the absence of structured livelihood substitution programs intensifies perceptions of distributive injustice, even when the policy is legally justified. Therefore, the type of benefits embedded in the RTRW policy not only shapes economic outcomes but also affects legitimacy, compliance behavior, and enforcement dynamics. These findings indicate that effective spatial policy implementation in conservation-based small island regions requires aligning long-term collective benefits with short-term adaptive support to reduce implementation friction and enhance policy acceptance.

Degree of Change Envisioned

The degree of change envisioned by the RTRW policy in Karimunjawa is structural rather than incremental. The regulation does not merely introduce administrative adjustments but requires substantive transformation in coastal land-use practices, particularly the restriction, relocation, or operational modification of intensive shrimp aquaculture within conservation-designated zones. In practical terms, this implies a shift from economically driven coastal utilization toward environmentally controlled spatial governance. Such a transformation demands not only compliance with licensing requirements but also behavioral adaptation from economic actors who have long operated under relatively flexible enforcement conditions. A shrimp pond operator stated,

“If the regulation requires pond closure or relocation, it is not a small adjustment. It means changing our entire business system” (Interview with Shrimp Pond Operator, March 2024).

This illustrates that the policy expects a high level of structural adjustment at the local economic level.

From an institutional perspective, the policy also envisions stronger inter-agency coordination and consistent enforcement mechanisms. Local government agencies are required to enhance monitoring capacity, ensure spatial conformity (KKPR), and enforce environmental standards more strictly than in previous years. One environmental officer noted,

“Previously, enforcement was more persuasive. Now, we are required to ensure strict compliance with spatial zoning and environmental permits” (Interview with Environmental Agency Official, April 2024).

This indicates that the expected change is not limited to community adaptation but extends to administrative culture and enforcement style. Therefore, the RTRW policy envisions transformation across both societal and institutional dimensions.

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Table 5. Scope of Structural Changes Envisioned by RTRW Policy in Karimunjawa

Dimension of Change	Previous Condition	Expected Condition under RTRW	Level of Change
Coastal Land Use	Flexible aquaculture expansion	Strict zoning compliance	High
Licensing System	Partial or incomplete permits	Mandatory spatial conformity (KKPR)	High
Environmental Management	Limited wastewater control	Regulated effluent standards	Moderate–High
Institutional Enforcement	Persuasive and reactive approach	Consistent and preventive enforcement	High
Livelihood Structure	Dominance of shrimp aquaculture income	Diversified economic activities	High

Source: Field Interviews (March–April 2024); Jepara Regency RTRW Regulation No. 4/2023; KLHK (2023).

The high degree of structural change envisioned by the RTRW policy significantly influences the complexity of its implementation. In Grindle’s framework, policies demanding fundamental transformation—rather than incremental adjustment—tend to encounter greater implementation resistance, especially when adaptive capacity is limited. In Karimunjawa, the regulation requires economic restructuring, stricter environmental compliance, and a shift in enforcement culture simultaneously. Such multidimensional change increases transaction costs for both implementing agencies and target groups. Without phased implementation strategies, compensation mechanisms, or livelihood transition programs, the magnitude of expected change may exceed local adaptive capacity. As a result, compliance tends to be negotiated rather than fully internalized, and enforcement may fluctuate depending on political and social pressure. These findings indicate that the RTRW policy embodies a high transformative ambition, yet its effectiveness depends heavily on institutional readiness, stakeholder engagement, and the availability of socio-economic transition pathways. Therefore, within the content of policy dimension, the degree of change envisioned becomes a critical determinant of implementation feasibility in conservation-based small island governance contexts.

Site of Decision Making

The site of decision making in the implementation of the RTRW policy in Karimunjawa is characterized by a multi-level governance structure involving both local and central authorities. Formally, spatial planning authority at the regency level lies with the Jepara Regency Government, particularly the Regional Planning Agency (Bappeda) and related technical offices responsible for zoning enforcement and spatial conformity permits (KKPR). However, because Karimunjawa is also designated as part of a national marine conservation area, the Ministry of Environment and Forestry (KLHK) retains authority over conservation management and environmental protection standards. This overlapping jurisdiction creates a complex decision-making environment in which policy implementation requires coordination across institutional boundaries. A regional official explained,

“We have the authority to enforce the RTRW, but for conservation matters, coordination with the national park authority is mandatory” (Interview with Regional Planning Officer, April 2024).

In practice, this shared authority structure sometimes generates delays and ambiguity in enforcement actions. For example, decisions related to shrimp pond licensing, environmental impact compliance, or operational suspension may require consultation between local environmental agencies and conservation authorities. A conservation officer noted,

“When violations occur, we cannot act alone. Administrative enforcement must involve local government, and sometimes the process takes time” (Interview with Conservation Authority Representative, April 2024).

This indicates that decision-making is not centralized within a single institution but distributed across multiple governance levels, increasing procedural complexity. Consequently, the effectiveness of policy implementation depends not only on regulatory clarity but also on inter-institutional coordination and political alignment.

Table 6. Distribution of Decision-Making Authority in RTRW Implementation in Karimunjawa

Policy Component			Primary Decision-Making Authority	Supporting Institution	Level of Governance
Spatial (RTRW)	Zoning	Regulation	Jepara Regency Government	Regional Planning Agency (Bappeda)	Local
Spatial (KKPR)	Conformity	Permit	Jepara Regency Government	Environmental Agency	Local
Conservation Area Management			Ministry of Environment and Forestry (KLHK)	National Park Authority	Central
Environmental Monitoring	Compliance		Environmental Agency (Regency)	Conservation Authority	Shared

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Policy Component	Primary Decision-Making Authority	Supporting Institution	Level of Governance
Enforcement & Sanctions	Civil Service Police Unit (Satpol PP)	Environmental Agency & KLHK	Shared

Source: Field Interviews (March–April 2024); Jepara Regency RTRW Regulation No. 4/2023; KLHK (2023).

The fragmented site of decision making significantly influences the pace and consistency of RTRW policy implementation in Karimunjawa. Within Grindle’s framework, dispersed authority structures often increase coordination costs and create potential gaps between regulatory intention and enforcement outcomes. In this case, the coexistence of local spatial authority and central conservation jurisdiction generates procedural interdependence that may delay corrective actions and dilute accountability. While shared governance can enhance checks and balances, it may also produce institutional hesitation when political or socio-economic sensitivities arise. The need for cross-level consultation in licensing, monitoring, and sanctioning processes demonstrates that policy execution is contingent upon inter-agency alignment rather than unilateral decision making. Therefore, the effectiveness of spatial planning implementation in Karimunjawa is shaped not only by regulatory content but also by how decision-making authority is structured and coordinated across governance levels. Strengthening formal coordination mechanisms and clarifying operational mandates are thus critical to reducing ambiguity and improving enforcement consistency in conservation-based small island governance contexts.

Program Implementers

The implementation of the RTRW policy in Karimunjawa involves multiple program implementers operating at the local level, primarily the Regional Planning Agency (Bappeda), the Environmental Agency (DLH), and the Civil Service Police Unit (Satpol PP) of Jepara Regency. These institutions are responsible for ensuring spatial conformity, monitoring environmental compliance, and enforcing administrative sanctions in cases of zoning violations. In addition, the Karimunjawa National Park Authority plays a crucial role in supervising conservation areas and coordinating environmental oversight. Although the regulatory framework clearly defines institutional roles, field findings reveal that operational responsibilities often overlap, particularly in monitoring and enforcement activities. A local enforcement officer stated,

“We conduct field inspections, but environmental technical assessments still depend on the Environmental Agency and sometimes coordination with the National Park authority” (Interview with Satpol PP Officer, April 2024).

This demonstrates that implementation relies on interdependent institutional action rather than isolated authority.

At the operational level, implementers face practical constraints related to manpower, geographic dispersion of islands, and monitoring logistics. Karimunjawa’s archipelagic character requires field supervision across multiple islands, increasing transportation and coordination demands. An environmental agency representative explained,

“Monitoring coastal activities here is not the same as in mainland areas. Limited personnel and distance between islands affect inspection frequency” (Interview with Environmental Agency Officer, April 2024).

This indicates that although program implementers possess formal authority, their effectiveness is mediated by administrative capacity and resource availability. Consequently, the quality of policy implementation is strongly influenced by institutional coordination, technical expertise, and operational support mechanisms.

Table 7. Key Program Implementers and Operational Responsibilities in RTRW Enforcement

Implementing Institution	Core Responsibility	Operational Challenges	Level of Influence
Regional Planning Agency (Bappeda)	Spatial zoning coordination and policy alignment	Cross-sector coordination complexity	High
Environmental Agency (DLH)	Environmental compliance monitoring and licensing	Limited technical personnel	High
Civil Service Police Unit (Satpol PP)	Enforcement of zoning violations and sanctions	Limited field mobility	Moderate–High
Karimunjawa National Park Authority	Conservation supervision and ecological monitoring	Overlapping jurisdiction	High
Sub-district Administration	Local facilitation and mediation	Limited regulatory authority	Moderate

Source: Field Interviews (March–April 2024); Jepara Regency Government (2023); KLHK (2023).

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The effectiveness of RTRW implementation in Karimunjawa is closely linked to the institutional capacity and coordination patterns among program implementers. In Grindle's framework, even well-designed policies may experience implementation gaps when implementing actors lack sufficient administrative, technical, or logistical capacity. In this case, although formal responsibilities are clearly distributed across agencies, practical constraints such as limited personnel, geographic dispersion, and overlapping authority reduce enforcement consistency. Furthermore, coordination dependence among agencies may slow response time when violations occur. The findings indicate that policy implementation is not constrained by regulatory ambiguity, but rather by operational readiness and inter-institutional synchronization. Strengthening technical staffing, enhancing monitoring infrastructure, and formalizing coordination protocols between local government and conservation authorities are therefore critical to improving implementation performance. Thus, within the content of policy dimension, program implementers serve as a decisive factor translating regulatory intent into tangible governance outcomes in small island conservation contexts.

Resources Committed

The implementation of the RTRW policy in Karimunjawa is closely dependent on the availability and adequacy of resources committed by implementing institutions. These resources include financial allocations, human resources, technical expertise, monitoring infrastructure, and political support. Although the RTRW regulation provides a formal mandate for enforcement, field findings indicate that resource allocation remains limited relative to the geographic and operational demands of small island governance. Budget allocations for environmental monitoring and spatial supervision are integrated within broader regional administrative expenditures, rather than being specifically earmarked for coastal zoning enforcement. As one regional official noted,

"We have budget support for supervision activities, but it must be shared across many sectors. Coastal monitoring is only one among several priorities" (Interview with Regional Planning Officer, April 2024).

This suggests that financial resources, while available, are not proportionally aligned with the intensity of spatial enforcement required in a conservation-based island setting.

Human resources and technical capacity also constitute critical implementation constraints. Environmental monitoring requires personnel with technical expertise in water quality testing, spatial mapping, and compliance verification. However, staffing levels remain limited compared to the number of operational shrimp ponds and the spatial dispersion of islands. A representative from the Environmental Agency stated,

"Ideally, monitoring should be conducted regularly, but limited staff and equipment make it difficult to cover all locations intensively" (Interview with Environmental Agency Officer, April 2024).

This indicates that resource commitment is sufficient at a regulatory level but constrained at an operational level. Therefore, the effectiveness of policy implementation depends not only on the existence of legal authority but also on the adequacy of institutional resources to sustain monitoring and enforcement activities.

Table 8. Resource Allocation Supporting RTRW Implementation in Karimunjawa

Resource Dimension	Existing Condition	Implementation Implication
Financial Budget	Integrated within general regional budget	Limited dedicated funding for coastal enforcement
Human Resources	Limited technical personnel for monitoring	Reduced inspection frequency
Technical Equipment	Basic monitoring tools available	Limited real-time environmental surveillance
Transportation & Logistics	Dependent on periodic field visits	High operational cost due to island dispersion
Political Support	Formal commitment to conservation	Enforcement influenced by socio-economic considerations

Source: Field Interviews (March–April 2024); Jepara Regency Government Budget Report (2023); KLHK (2023).

Within Grindle's framework, resource commitment functions as a foundational determinant of implementation feasibility. In Karimunjawa, while regulatory authority and political acknowledgment of conservation priorities are formally established, operational resources remain constrained relative to policy ambition. The combination of limited technical personnel, dispersed geography, and non-dedicated budget allocation creates a structural gap between regulatory expectation and field execution. Consequently, enforcement tends to rely on periodic supervision rather than continuous monitoring, potentially reducing deterrence effectiveness. These findings indicate that strengthening fiscal allocation, enhancing technical staffing, and investing in monitoring infrastructure are essential for transforming regulatory mandates into sustained governance practice. Thus, in the content of policy dimension, resources committed represent the practical backbone of spatial planning implementation in conservation-based small island regions.

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Context of Policy

Power, Interests, and Strategies Involved

The implementation of the RTRW policy in Karimunjawa is strongly influenced by the distribution of power among actors and the strategic behavior they employ in response to regulatory change. Unlike the content dimension, which focuses on regulatory design, the context dimension reveals how political authority, economic leverage, and social influence shape implementation outcomes. In Karimunjawa, power is not monopolized by a single institution; rather, it is dispersed among local government authorities, conservation agencies, shrimp pond operators, and community groups. While the local government holds formal regulatory authority to enforce spatial zoning, economic actors—particularly established shrimp pond operators—possess informal influence through their contribution to local employment and economic circulation. One local official acknowledged,

“Enforcement decisions are not purely technical. We must consider social stability and economic impacts before taking firm action” (Interview with Local Government Officer, April 2024).

This statement illustrates how power operates not only through legal mandates but also through socio-economic considerations.

In response to stricter spatial enforcement, shrimp pond operators have adopted adaptive and negotiation-based strategies rather than outright confrontation. Some operators attempt to regularize their permits, adjust operational practices, or lobby for gradual enforcement rather than immediate closure. A shrimp pond owner stated,

“We are willing to follow regulations, but there should be a transition period. Closing operations suddenly is not realistic” (Interview with Shrimp Pond Operator, March 2024).

Meanwhile, conservation authorities employ regulatory strategies by strengthening monitoring and emphasizing environmental risk narratives to justify stricter enforcement. This dynamic interaction reflects a strategic balancing process, where actors leverage their respective power positions to influence the speed and intensity of policy implementation.

Table 9. Distribution of Power and Strategic Responses in RTRW Implementation

Actor	Source of Power	Core Interest	Strategy Employed
Local Government	Formal regulatory authority	Spatial order & political stability	Gradual enforcement & coordination
Conservation Authority	Legal mandate for ecosystem protection	Environmental preservation	Strengthened monitoring & compliance pressure
Shrimp Pond Operators	Economic contribution & employment generation	Business continuity	Negotiation & permit adjustment
Local Community	Social legitimacy & electoral influence	Income security & environmental quality	Selective support or resistance
Civil Service Police (Satpol PP)	Enforcement authority	Regulatory compliance	Administrative sanction enforcement

Source: Field Interviews (March–April 2024); Jepara Regency Government (2023); KLHK (2023).

Within Grindle’s contextual framework, the interaction of power and strategy significantly determines policy implementation trajectories. In Karimunjawa, enforcement is shaped by a negotiated equilibrium between formal authority and socio-economic influence. The presence of economic dependency on shrimp aquaculture tempers immediate regulatory action, while conservation mandates strengthen environmental oversight narratives. This dynamic results in adaptive implementation characterized by gradual enforcement, consultation, and selective sanctioning rather than abrupt regulatory intervention. Therefore, policy outcomes are not solely dictated by legal provisions but are co-produced through strategic interactions among actors operating within a politically sensitive and economically interdependent island governance system. Understanding these power configurations is essential to explaining why implementation evolves incrementally despite clear regulatory mandates.

Institutional Characteristics and Governing Authority

The institutional characteristics shaping the implementation of the RTRW policy in Karimunjawa reflect a decentralized governance structure operating within a centralized conservation regime. Formally, Indonesia’s regional autonomy framework grants local governments authority over spatial planning and land-use regulation at the regency level. However, Karimunjawa’s designation as a national marine conservation area places it simultaneously under the regulatory oversight of the central government through the Ministry of Environment and Forestry (KLHK). This dual structure creates a hybrid institutional environment in which local autonomy coexists with centralized environmental control. As one regional planning official explained, “Spatial planning is under our authority, but conservation management remains under the national government. We

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must align decisions with both mandates” (Interview with Regional Planning Officer, April 2024). This institutional configuration requires constant vertical coordination and can slow decision-making processes when policy priorities differ between levels of government.

In addition to vertical complexity, horizontal institutional coordination also presents challenges. Local implementing agencies operate within bureaucratic routines that are often procedural and compliance-oriented rather than adaptive and proactive. Enforcement actions must follow administrative hierarchies, documentation requirements, and inter-agency consultation processes. A conservation authority representative noted, “Technically, we can identify violations quickly, but administrative processes require formal coordination before sanctions are imposed” (Interview with Conservation Authority, April 2024). These characteristics reflect a rule-bound institutional culture that prioritizes procedural legitimacy but may reduce responsiveness. Furthermore, political considerations—particularly concerns over social stability and economic impact—can influence enforcement intensity. Therefore, institutional characteristics in Karimunjawa combine decentralized administrative authority, centralized conservation oversight, and procedural bureaucratic norms that collectively shape the pace and consistency of policy implementation.

Table 10. Institutional Characteristics Influencing RTRW Implementation in Karimunjawa

Institutional Dimension	Characteristic	Implementation Implication
Governance Structure	Decentralized spatial authority with centralized conservation oversight	Requires vertical coordination
Administrative Culture	Procedural and compliance-oriented	Slower enforcement response
Inter-Agency Coordination	Formal consultation required before sanction	Increased implementation delay
Political Sensitivity	Consideration of socio-economic impact	Gradual enforcement approach
Legal Framework	Clear zoning regulation (RTRW No. 4/2023)	Strong normative basis but dependent on institutional capacity

Source: Field Interviews (March–April 2024); Jepara Regency RTRW Regulation No. 4/2023; KLHK (2023).

Within Grindle’s contextual dimension, institutional characteristics and regime configuration significantly influence implementation outcomes. In Karimunjawa, the coexistence of decentralized spatial authority and centralized conservation control creates structural interdependence that both strengthens legal oversight and complicates operational execution. Bureaucratic procedural norms ensure formal legitimacy but may reduce adaptive responsiveness in dynamic coastal environments. Moreover, political considerations embedded within local governance structures encourage incremental enforcement rather than abrupt regulatory shifts. These findings demonstrate that policy implementation is not merely a technical process but is deeply embedded within institutional architecture and governing culture. Strengthening inter-level coordination mechanisms and enhancing adaptive administrative capacity are therefore essential to improving policy effectiveness in conservation-based small island contexts.

Level of Compliance and Responsiveness of Target Groups

The level of compliance and responsiveness among target groups—particularly shrimp pond operators and local communities—reflects a pattern of conditional and adaptive acceptance rather than full regulatory internalization. While most operators formally acknowledge the existence of the RTRW regulation, compliance tends to depend on the perceived strictness of enforcement and the availability of transitional alternatives. Several operators have attempted to adjust their administrative permits or modify operational practices to align partially with regulatory requirements. However, full compliance—such as voluntary cessation of operations in restricted zones—remains limited. As one shrimp pond operator stated, “We try to follow the rules, especially regarding permits, but closing the ponds completely is not easy without other income sources” (Interview with Shrimp Pond Operator, March 2024). This statement indicates that compliance is pragmatic and economically conditioned rather than normatively driven.

Community responsiveness also varies depending on livelihood dependency and environmental awareness. Households not directly involved in aquaculture tend to support stricter enforcement due to concerns over water pollution and long-term tourism sustainability. Conversely, families economically dependent on shrimp ponds demonstrate cautious or resistant attitudes toward abrupt enforcement measures. A community member explained, “If enforcement is gradual and there is support for alternative businesses, people will accept it. But sudden closure creates tension” (Interview with Local Resident, April 2024). These findings suggest that compliance behavior is closely linked to perceived fairness, economic security, and participatory communication

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processes. Therefore, target group responsiveness is not static but dynamically shaped by enforcement style and policy communication.

Table 11. Compliance Patterns among Target Groups in RTRW Implementation

Target Group	Compliance Level	Type of Response	Determining Factors
Shrimp Pond Operators	Partial	Permit adjustment, negotiation	Economic dependency
Pond Workers	Low–Moderate	Concern over job security	Income vulnerability
Non-Aquaculture Residents	Moderate–High	Support for environmental protection	Tourism & environmental awareness
Tourism Actors	High	Support zoning enforcement	Long-term sustainability interest
Local Community Leaders	Conditional	Mediation between actors	Social stability considerations

Source: Field Interviews (March–April 2024); Jepara Regency Government (2023); KLHK (2023).

Within Grindle’s contextual framework, the level of compliance and responsiveness among target groups functions as a decisive determinant of implementation effectiveness. In Karimunjawa, compliance is largely instrumental rather than value-based, meaning that adherence increases when enforcement pressure is consistent and when adaptive alternatives are available. The absence of structured livelihood transition programs limits voluntary compliance and fosters negotiation-based responses. Furthermore, selective enforcement may inadvertently reinforce perceptions of regulatory inconsistency, reducing normative legitimacy. These findings demonstrate that effective spatial policy implementation in conservation-based small island contexts requires not only regulatory clarity and institutional capacity but also sustained engagement, economic transition support, and transparent communication strategies. Thus, compliance and responsiveness emerge as dynamic outcomes shaped by the interaction of economic vulnerability, enforcement credibility, and participatory governance mechanisms.

CONCLUSION

This study demonstrates that the implementation of the Regional Spatial Planning (RTRW) policy in the Karimunjawa Islands is shaped by the interaction between regulatory design and contextual governance dynamics. From the content of policy dimension, the RTRW regulation provides clear conservation-oriented zoning, envisions substantial structural change, and distributes authority across multiple implementing institutions. However, the type of benefits generated by the policy is predominantly long-term and collective, while the economic costs are immediate and concentrated among shrimp aquaculture actors. The policy demands a high degree of transformation in land-use practices, administrative enforcement culture, and livelihood structures, thereby increasing implementation complexity.

From the context of policy dimension, implementation outcomes are influenced by multi-level governance arrangements, overlapping authority between local and central institutions, and negotiated power relations among actors. Enforcement practices tend to be gradual and adaptive rather than abrupt, reflecting socio-economic sensitivity and political considerations. Target group compliance is largely conditional and economically driven, with responsiveness improving when regulatory enforcement is consistent and accompanied by transitional support mechanisms. These findings indicate that policy implementation in conservation-based small island contexts cannot rely solely on normative regulatory clarity but must integrate institutional coordination, adequate resource allocation, and socio-economic transition strategies.

The study contributes to policy implementation theory by illustrating how Grindle’s content and context dimensions interact dynamically in environmentally sensitive coastal governance settings. Practically, the findings highlight the importance of strengthening inter-institutional coordination, enhancing monitoring capacity, allocating dedicated enforcement resources, and developing sustainable livelihood alternatives to reduce resistance and improve long-term compliance. Ultimately, effective spatial planning in Karimunjawa requires balancing ecological protection with adaptive economic transition to ensure both environmental sustainability and social stability in small island governance.

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