Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Environmental Policy Implementation and Sustainable Development in Timor-Leste: Challenges and Opportunities

Dircia Sarmento Belo[1]*, Joao da Silva Belo[2]
[1]Laudato Si' Movement de Timor-Leste, Dili, Timor-Leste
[2]Department of Public Administration, Faculty of Social and Political Sciences, Universidade Nacional de Timor Lorosa'e, Dili, Timor-Leste

*Coresponding author-email: ** zinhabelo@gmail.com

Abstract

Environmental policy effectiveness depends on translating formal commitments into coordinated, adequately resourced, enforceable action. Timor-Leste research spans environmental regulation, coastal management, fisheries, mangroves, carbon forestry, customary governance, and environmental law, but remains fragmented. This systematic literature review examines governance arrangements, implementation factors, policy gaps, and opportunities for sustainable development. Following PRISMA 2020 and PRISMA-S, Scopus served as the primary database and Google Scholar as a supplementary source for discovery and citation chaining. The review covered publications from 2002 to 2026 relevant to Timor-Leste. Empirical studies were appraised using the Mixed Methods Appraisal Tool (MMAT), while legal and doctrinal studies were assessed through a structured transparency checklist. Evidence was descriptively mapped and synthesized through hybrid deductive–inductive thematic analysis using the Environmental Policy Implementation–Sustainability Framework (EPI-SF). Eight themes emerged: policy design and implementation gaps; institutional coherence; community and customary governance; legal-regulatory integration; capacity, data, monitoring, and enforcement; marine and coastal resource governance; development–environment trade-offs and carbon governance; and cross-border, multi-level governance. The central finding is a persistent gap between formal policy adoption and effective implementation, associated with fragmented coordination, limited capacity, weak monitoring, uneven participation, legal and sectoral inconsistencies, and transboundary challenges. The review contributes a context-sensitive framework linking policy design, institutional arrangements, legal authority, community governance, implementation capacity, and socio-ecological context to sustainability outcomes. Policy priorities include clearer responsibilities, stronger coordination, monitoring, enforceable rules, and meaningful community participation. Given the heterogeneous evidence and inclusion of comparative studies, the findings provide an analytical synthesis rather than a causal estimate of policy effectiveness.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Keywords: Environmental Policy Implementation, Sustainable Development, Environmental Governance, Customary Governance, Timor-Leste

1. Introduction

Environmental sustainability increasingly depends not only on the existence of environmental policies but also on the extent to which policy commitments are translated into coordinated, adequately resourced, enforceable, and locally legitimate action. This issue is particularly important in low- and middle-income countries (LMICs), where environmental priorities must compete with development demands and institutional, financial, and implementation capacities are often uneven. Clube & Tomei (2026), based on a synthesis of 67 LMIC studies, demonstrate that implementation gaps arise from interacting factors related to policy content, institutional arrangements, resource availability, non-governmental actor participation, and political dynamics. Thus, policy effectiveness cannot be inferred from formal adoption alone; attention must also be given to how policies are interpreted, coordinated, financed, monitored, and enforced in practice.

Environmental policy implementation is also closely associated with policy coherence and institutional coordination because environmental objectives intersect with economic development, land use, infrastructure, agriculture, fisheries, forestry, waste, and coastal management. Fopa Tchinda & Talbot (2024), through a systematic review of 70 empirical studies, identify multiple barriers and enabling conditions affecting environmental policy coherence, highlighting relationships among policy goals, instruments, institutions, and stakeholders. Similarly, Akhtar-Schuster et al. (2024) emphasize that achieving the Sustainable Development Goals requires institutional arrangements capable of operationalizing the 2030 Agenda through coordinated and science-informed governance. Evidence from Southeast Asia reinforces this implementation perspective, as Abdul Aziz & Raja Ariffin (2024) identify political systems, resources, technology, public awareness, and participation as recurring factors affecting policy implementation. These insights are particularly relevant to Timor-Leste, where environmental governance encompasses forests, coastal and marine ecosystems, fisheries, and community resource use, requiring a cross-sector rather than single-issue perspective.

The emerging literature on Timor-Leste provides important but fragmented evidence across legal, ecological, sectoral, and community contexts. Santos et al. (2026) examine environmental regulation through constitutional and legal perspectives, while Palmer et al. (2026) show that Indigenous Timorese kinship, ritual, resource negotiation,

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

and customary authority shape carbon-forestry governance. Araujo et al. (2026) demonstrate that mangrove conservation in Metinaro is influenced by social and ecological conditions as well as participatory governance. In fisheries, Rehatta et al. (2025) identify ecological, technological, institutional, economic, and participation-related factors affecting tuna-fisheries sustainability in the Indonesia–Timor-Leste border area of the Ombai Strait. Dos Santos Maia et al. (2026) further highlight the importance of integrating maritime and environmental law in protecting marine and coastal ecosystems. Although these studies reveal important mechanisms of environmental governance, they remain dispersed across specific sectors, legal instruments, ecosystems, and cross-border settings.

A major gap therefore concerns how these dimensions interact throughout the policy cycle. Existing Timor-Leste studies commonly address a particular regulation, ecological resource, intervention, or governance arrangement, while the connections among policy formulation, legal design, institutional coordination, resource allocation, implementation, monitoring, enforcement, participation, learning, and adaptation remain insufficiently synthesized. The broader framework proposed by Clube & Tomei (2026) provides an important basis for understanding implementation gaps, but it is not specific to Timor-Leste. Likewise, Fopa Tchinda & Talbot (2024) establish the importance of policy coherence but do not explain how coherence operates within Timor-Leste's particular institutional, customary, and ecological context. Consequently, an integrated country-specific synthesis is needed to connect general implementation theory with the recent and increasingly diverse Timor-Leste evidence.

The governance context further indicates that environmental implementation cannot be understood through formal state institutions alone. Evidence from carbon forestry highlights the significance of Indigenous governance norms and locally embedded socio-ecological knowledge (Palmer et al., 2026), while mangrove research demonstrates the relevance of community identity, resource dependence, participation, policy support, and ecological processes (Araujo et al., 2026). Border fisheries research similarly shows that sustainability may extend beyond national jurisdictions and requires arrangements for shared resources and cross-border interactions (Rehatta et al., 2025). These studies point to an underexplored intersection among state policy, customary governance, community participation, transboundary resource management, and environmental outcomes. Moreover, Brincat & Barreto Soares (2026) note that research on Timor-Leste remains uneven in thematic, geographical, and institutional coverage, with constraints including fragmented research infrastructure, linguistic divisions, uneven funding, and externally driven research agendas. This fragmentation limits the ability to distinguish isolated project-level outcomes from broader patterns of implementation capacity, institutional learning, and policy coherence.

Against this background, this study conducts a Systematic Literature Review (SLR) to develop an integrated understanding of environmental policy implementation and

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

sustainable development in Timor-Leste. The review addresses four interrelated issues: the environmental policies and governance instruments examined in Timor-Leste; the institutional, political, financial, social, legal, and ecological factors shaping implementation; the recurring challenges associated with implementation gaps, weak enforcement, policy incoherence, limited participation, and coordination failures; and the opportunities identified for strengthening environmental governance and sustainable development. Rather than providing a descriptive inventory of environmental problems, the review seeks to synthesize the mechanisms connecting policy design, governance capacity, implementation, and sustainability outcomes.

The novelty of this review lies in integrating evidence that has largely been examined separately. First, it distinguishes policy adoption from implementation and implementation outcomes, allowing bottlenecks along the policy-to-practice pathway to be identified. Second, it combines the implementation-gap perspective with policy-coherence and institutional-arrangement approaches to create a governance architecture for interpreting Timor-Leste evidence across sectors. Third, it positions community and customary governance as substantive implementation mechanisms rather than merely contextual variables. Fourth, it connects environmental governance across forests and carbon, mangroves and coastal systems, fisheries, environmental law, and transboundary resource management. Finally, the review identifies recurring mechanisms, contextual conditions, and opportunity pathways that can guide future empirical research and policy design. In this way, the study addresses an under-synthesized area of the literature and advances a context-sensitive understanding of how environmental policy implementation can contribute to sustainable development in Timor-Leste.

2. Literature Review

The review uses an integrated analytical framework, termed the Environmental Policy Implementation–Sustainability Framework (EPI-SF), developed specifically for this review from the converging implementation and governance evidence in the selected literature. The framework is not treated as a pre-existing theory; rather, it functions as a transparent synthesis device for organizing heterogeneous evidence. Its central premise is that sustainable-development outcomes depend not simply on the existence of environmental rules but on the interaction between policy design, institutional arrangements, implementation capacity, actor engagement, political dynamics, and socio-ecological context.

The first dimension is policy design and policy coherence: clarity of objectives, consistency among sectoral instruments, regulatory alignment, and the degree to which environmental goals are compatible with wider development priorities. This dimension is informed particularly by research on environmental policy coherence and implementation gaps (Clube & Tomei, 2026; Fopa Tchinda & Talbot, 2024). The second

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

dimension is institutional implementation capacity, including administrative arrangements, vertical and horizontal coordination, resources, monitoring, and enforcement. The third dimension is actor configuration, covering community participation, civil society, private actors, donors, and customary institutions. The Timor-Leste literature is especially important here because recent studies highlight community participation in mangrove governance and the role of indigenous governance norms in carbon forestry (Araujo et al., 2026; Palmer et al., 2026).

The fourth dimension is political and legal embedding. Environmental implementation can be shaped by constitutional interpretation, regulatory authority, political interests, and the distribution of decision-making power. Recent Timor-Leste legal scholarship on environmental regulation and green constitutionalism, as well as comparative work on maritime and environmental law, is therefore coded as evidence of the formal governance architecture and potential implementation constraints rather than as proof of implementation performance (dos Santos Maia et al., 2026; Santos et al., 2026). The fifth dimension is socio-ecological context, including geographic remoteness, coastal and terrestrial resource dependence, customary practices, and local environmental conditions. Fisheries evidence from the Indonesia–Timor-Leste border and the Metinaro mangrove study illustrate why implementation needs to be interpreted within concrete resource systems and community settings (Araujo et al., 2026; Rehatta et al., 2025).

Sustainability outcomes constitute the final domain and are assessed across three linked dimensions: environmental integrity, social inclusion and livelihood resilience, and longer-term economic/resource sustainability. This outcome orientation is aligned with evidence that effective implementation requires institutional arrangements able to connect policy coordination, scientific knowledge, monitoring, stakeholder engagement, and resource allocation to sustainable-development action (Akhtar-Schuster et al., 2024). The framework therefore treats policy implementation as a mediating process between formal policy intent and sustainability outcomes, rather than assuming that policy adoption automatically produces sustainable-development benefits.

Tabel 1. Integrated Environmental Policy Implementation–Sustainability Framework (EPI-SF)

Upstream conditions	Implementation mechanisms	Downstream outcomes
Policy design & coherence	Translation into rules, programmes, coordination and enforcement	Environmental integrity
Institutional capacity & resources	Administrative coordination, monitoring, learning and accountability	Social inclusion & local legitimacy

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Actors & participation	Community, customary institutions, NGOs, private sector and donors	Livelihood/resource resilience
Political & legal embedding	Authority, political interests, legal safeguards and continuity	Economic/resource sustainability

3. Research Method

This study employed a Systematic Literature Review (SLR) to identify, appraise, code, and synthesize scholarly evidence on environmental policy implementation and sustainable development in Timor-Leste. The review followed PRISMA 2020 and PRISMA-S to ensure transparent and reproducible procedures (Page et al., 2021; Rethlefsen et al., 2021; Snyder, 2019). Four research questions guided the review, focusing on environmental policies and governance arrangements, implementation gaps, interactions between formal and customary governance, and opportunities for sustainable development.

The study used secondary research data from published scholarly literature. Extracted information included bibliographic characteristics, environmental sectors, policy objectives and instruments, implementation mechanisms, institutional arrangements, enforcement, resources, stakeholder participation, customary governance, political dynamics, and sustainability implications. The publication was treated as the unit of analysis, while policy-implementation mechanisms and conditions represented the main analytical units.

Scopus was the primary bibliographic database, while Google Scholar was used as a supplementary source for literature discovery and citation chaining. Publisher and DOI pages were used to verify publication metadata and DOI accuracy. The review covered publications from 2002–2026 and prioritized English-language peer-reviewed journal articles and systematic or integrative reviews with substantive evidence on Timor-Leste. The principal Google Scholar, the complementary query is:

```
("environmental policy" OR "environmental governance" OR "environmental
management" OR "environmental regulation") AND ("policy implementation"
OR implementation OR enforcement OR "policy effectiveness" OR
"institutional capacity") AND ("sustainable development" OR
sustainability OR "environmental sustainability") AND ("Timor-Leste" OR
"East Timor")
```

Publication selection used purposive eligibility-based criteria rather than human respondent sampling. Eligible studies were required to address environmental policy, governance, management, regulation, or natural-resource governance and demonstrate

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

relevance to implementation, enforcement, institutional capacity, or sustainable development. Studies that merely mentioned Timor-Leste, together with editorials, book reviews, conference abstracts, theses, dissertations, corrigenda, and duplicates, were excluded.

The research instruments consisted of a search protocol, screening form, extraction matrix, and quality-appraisal form. Empirical qualitative, quantitative, and mixed-methods studies were assessed using the Mixed Methods Appraisal Tool (MMAT), while legal and doctrinal studies were assessed using a structured transparency checklist. This distinction helped preserve differences between empirical evidence and legal or normative analysis.

Data collection followed five stages: searching, export and deduplication, title and abstract screening, full-text assessment, and structured extraction with quality appraisal. The screening process was pilot-tested and, where feasible, independently checked by two reviewers. Disagreements were resolved through discussion or third-party adjudication, while the complete evidence-management trail was retained for reproducibility.

The analysis employed the Environmental Policy Implementation–Sustainability Framework (EPI-SF). The framework covers policy design and implementation gaps, institutional coherence, community and customary governance, capacity and enforcement, legal-regulatory integration, development–environment trade-offs, marine and coastal governance, and cross-border or multi-level governance. These dimensions were analyzed through descriptive evidence mapping, hybrid deductive–inductive coding, thematic synthesis, and convergence–divergence analysis.

Data credibility was strengthened through transparent search documentation, independent screening, methodological appraisal, sensitivity analysis, and source-to-claim traceability. Contradictory evidence was retained, and conclusions were classified as directly supported by Timor-Leste evidence, cautiously transferable from comparable contexts, or insufficiently supported. PRISMA counts will be reported only from actual database searches and screening records.

Tabel 2. Review Protocol at A Glance

Protocol element	Specification
Review design	Systematic Literature Review with thematic/narrative synthesis; PRISMA 2020 + PRISMA-S reporting.
Primary evidence base	Peer-reviewed journal articles indexed in Scopus; Google Scholar used only as a supplementary discovery and citation-chaining source.
Geographic scope	Timor-Leste / East Timor; country-specific evidence prioritized.
Publication window	2002–2026, aligned with the post-independence period; final search date must be the actual date of database execution.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Core concepts	Environmental policy; policy implementation/enforcement; environmental governance; sustainable development/sustainability; institutional capacity; actor/community participation.
Screening units	Unique publications, deduplicated by DOI, title, and author-year metadata.
Quality appraisal	MMAT 2018 for empirical qualitative/quantitative/mixed-methods studies; structured transparency appraisal for legal/doctrinal studies.
Synthesis	Descriptive evidence mapping + deductive/inductive thematic synthesis across policy design, institutions, resources, actors, political dynamics, socio-ecological context, and sustainability outcomes.

Tabel 3. Review protocol at a glance

Domain	Extraction fields	Analytical purpose
Bibliographic	Author; year; journal; DOI; database; citation information	Traceability and evidence mapping
Context	Location; ecological/social setting; sector; governance level	Contextual comparison
Policy	Policy/regulation; objectives; instrument type; coherence	Policy-design analysis
Implementation	Actors; institutional arrangements; resources; enforcement; coordination	Implementation-gap analysis
Participation	Community; customary institutions; NGOs; private sector; donors	Actor and governance analysis
Political/institutional	Political interests; administrative capacity; authority distribution; continuity	Political economy/institutional explanation
Outcomes	Environmental; social; economic; resilience/sustainability effects	Sustainability linkage
Evidence quality	Design; limitations; MMAT/structured appraisal; confidence notes	Credibility and sensitivity analysis

4. Result

4.1. Evidence landscape and thematic structure

The literature indicates that environmental policy in Timor-Leste is best understood as an implementation and governance problem rather than solely as a question of policy formulation. The supplied evidence spans environmental regulation, marine and coastal management, carbon forestry, fisheries, environmental law, community participation, policy coherence, and institutional arrangements for sustainable development. Across these sources, eight mutually reinforcing themes emerge: (1) policy design and implementation gaps; (2) institutional coherence and coordination; (3) community and

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

customary governance; (4) legal-regulatory integration; (5) capacity, data, monitoring, and enforcement; (6) marine, coastal, and natural-resource governance; (7) development–environment trade-offs and carbon governance; and (8) cross-border and multi-level governance. The synthesis is consistent with wider evidence that environmental policy implementation gaps in low- and middle-income countries arise through interacting policy, institutional, resource, stakeholder, and political factors rather than a single administrative failure (Clube & Tomei, 2026).

Tabel 4. Key themes emerging from the literature synthesis

No.	Theme	Core evidence pattern	Primary supporting literature
1	Policy design and implementation gaps	Formal environmental policies do not automatically translate into operational outcomes; clarity, feasibility, resources, enforcement, and political prioritisation shape the implementation gap.	Clube & Tomei (2026); Awewomom et al. (2024)
2	Institutional coherence and coordination	Cross-sector coordination and alignment between environmental, development, marine, and local policies determine whether policy instruments work coherently.	Fopa Tchinda & Talbot (2024); Akhtar-Schuster et al. (2024)
3	Community and customary governance	Local participation, place-based knowledge, kinship, customary norms, and community stewardship can function as implementation infrastructure rather than peripheral consultation.	Araujo et al. (2026); Palmer et al. (2026); Aranha et al. (2025)
4	Legal-regulatory integration	Environmental protection depends on the interaction of constitutional, environmental, maritime, impact-assessment, and enforcement mechanisms.	Santos et al. (2026); dos Santos Maia et al. (2026); Lucherini (2026)

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

5	Capacity, data, monitoring and enforcement	Implementation is constrained when institutions lack technical capacity, information, monitoring systems, resources, or consistent enforcement arrangements.	Clube & Tomei (2026); Abdul Aziz & Raja Ariffin (2024); Wu & Khaskheli (2024)
6	Marine, coastal and natural-resource governance	Fisheries and mangrove evidence shows that ecological outcomes are inseparable from livelihoods, participation, cross-boundary management, and governance quality.	Araujo et al. (2026); Rehatta et al. (2025); dos Santos Maia et al. (2026)
7	Development–environment trade-offs and carbon governance	Sustainability policy must navigate development pressures while avoiding environmental safeguards that are merely symbolic; carbon initiatives require social legitimacy and equity.	Palmer et al. (2026); Varkkey et al. (2026); Lucherini (2026)
8	Cross-border and multi-level governance	Environmental problems extend across administrative and national boundaries, requiring nested coordination and compatible rules across scales.	Rehatta et al. (2025); Varkkey et al. (2026); Aranha et al. (2025)

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

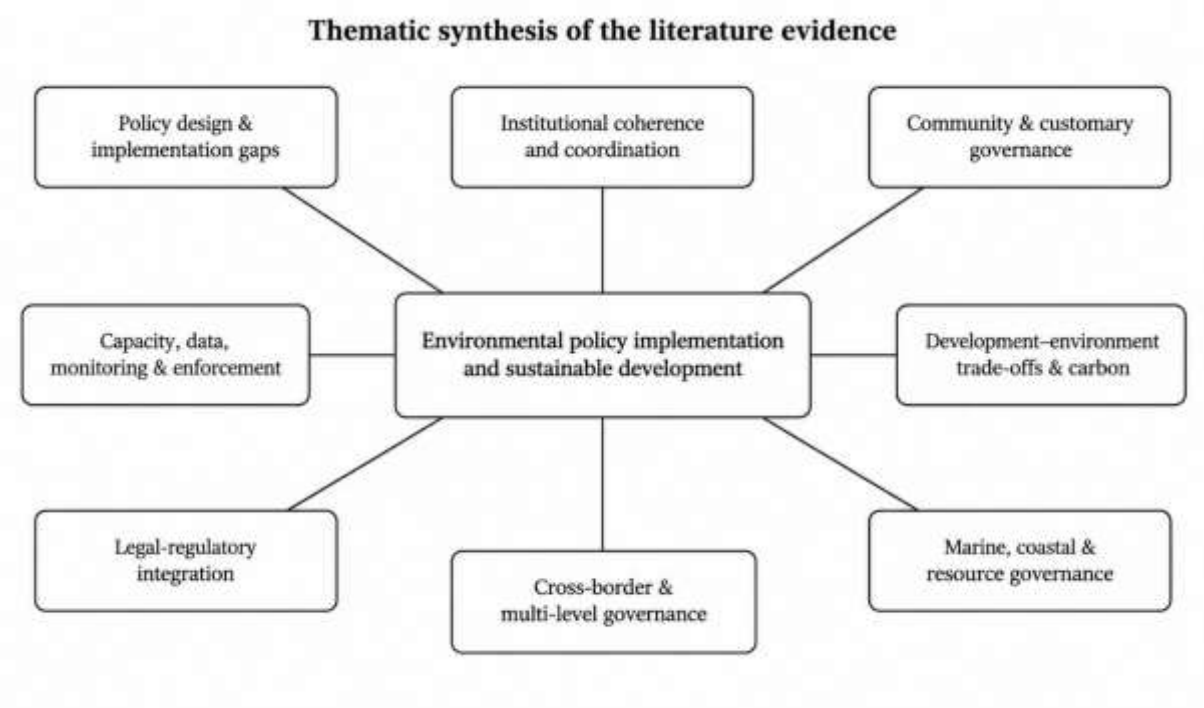


Figure 1 Thematic synthesis of environmental policy implementation and sustainable development in Timor-Leste

4.2. Policy design-to-implementation gaps as the central finding

Across the literature, the most consistent pattern is a distinction between the existence of environmental policy and the capacity to convert policy intent into routine implementation. Clube & Tomei (2026), in a systematic review of low- and middle-income countries, identify five interacting sources of implementation gaps: policy content; institutional arrangements and interactions; resource availability; engagement of non-governmental actors; and political interests and dynamics. This framework provides a strong interpretive lens for Timor-Leste because the country-specific studies in the supplied set repeatedly emphasise the operational conditions around environmental governance rather than policy text alone. Awewomom et al. (2024) similarly position preventive environmental management as dependent on the practical connection between environmental policy and control mechanisms. The result is a finding of policy translation: environmental governance performance depends on whether policy objectives are sufficiently clear, institutionally owned, resourced, monitored, and enforceable.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

4.3. Institutional coherence and coordination across policy domains

A second theme concerns policy coherence. Fopa Tchinda & Talbot (2024) show in a systematic review that environmental policy coherence is shaped by enabling and constraining factors across policy systems, indicating that contradictions between policy domains can undermine environmental objectives even when individual policies are well designed. The Timor-Leste evidence suggests that the relevant problem is therefore not only vertical implementation but also horizontal coordination among environmental regulation, fisheries, coastal management, development planning, infrastructure, and legal oversight. Akhtar-Schuster et al. (2024) add a broader sustainable-development perspective: national SDG implementation requires institutional arrangements capable of operationalising commitments through coordination and science-informed governance. Taken together, the findings suggest that sustainable development in Timor-Leste is weakened when environmental priorities remain embedded in separate sectoral silos rather than treated as a cross-government implementation architecture.

4.4. Community, customary, and place-based governance as implementation infrastructure

The third theme is the role of local institutions and socio-ecological knowledge. Araujo et al. (2026) integrate household evidence and participatory DPSIR mapping in Metinaro and explicitly connect ecological processes with place identity, resource dependence, policy support, participation, and governance responses. Palmer et al. (2026) show that carbon forestry in Timor-Leste is not merely a technical intervention: Indigenous Timorese practices of kinship, ritual, resource negotiation, and ethics of care shape how environmental governance and carbon commodification are interpreted and enacted. This finding extends the conventional policy implementation model by treating customary institutions and community norms as active implementation mechanisms. The literature therefore supports a shift from consultation-oriented participation toward co-production, in which local actors contribute knowledge, legitimacy, monitoring, conflict management, and stewardship capacity.

4.5. Legal-regulatory integration and the problem of implementation authority

Legal studies in the supplied reference set point to a further layer of implementation complexity: the effectiveness of environmental policy depends on how legal authority is distributed and used. Santos et al. (2026) examine presidential veto power in Timor-Leste as a constitutional mechanism relevant to environmental regulation and green constitutionalism. dos Santos Maia et al. (2026) highlight the need for integration between maritime and environmental law in protecting marine and coastal ecosystems, particularly through preventive mechanisms such as environmental impact assessment. Lucherini (2026) provides a comparative constitutional perspective by distinguishing weaker sustainability commitments from stronger institutional embedding of ecological

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

limits within constitutional governance. Across these studies, the result is that environmental implementation is not simply an administrative execution stage; it is also a question of legal hierarchy, institutional mandate, procedural safeguards, and the capacity of enforcement institutions to make ecological objectives operational.

4.6. Capacity, data, monitoring, technology, and enforcement

The literature further reveals that implementation quality is inseparable from operational capacity. Clube & Tomei (2026) identify resource availability and institutional interactions as recurrent determinants of implementation gaps, while Abdul Aziz & Raja Ariffin (2024) show in the Southeast Asian waste-policy literature that political systems, resources, technology, public awareness, and participation affect policy effectiveness. Wu & Khaskheli (2024) extend this logic to marine governance by highlighting systems thinking and the potential role of digital technologies in policy monitoring and implementation. For Timor-Leste, this suggests that data systems and monitoring technology should not be treated as independent technical upgrades; they are enabling conditions for accountability, adaptive management, and enforcement. The key finding is therefore an implementation-capacity chain linking institutional resources, information quality, monitoring, enforcement, and observable environmental outcomes.

4.7. Marine, coastal, fisheries, and natural-resource governance

Marine and coastal evidence provides some of the clearest examples of why environmental policy implementation should be analysed through coupled human–environment systems. Araujo et al. (2026) show that mangrove conservation in Metinaro involves ecological pressures alongside community dependence, place attachment, participation, and governance responses. Rehatta et al. (2025) demonstrate that sustainable tuna management in the Indonesia–Timor-Leste border area requires balancing resource availability with fishing use in a shared marine setting. dos Santos Maia et al. (2026) further emphasise the preventive protection of marine and coastal ecosystems through integration of maritime and environmental law. The resulting theme is that sector-specific conservation policy is unlikely to be sufficient where ecosystems, livelihoods, and governance jurisdictions intersect.

4.8. Development–environment trade-offs and carbon governance

The literature indicates that sustainable development requires active management of trade-offs between economic development and ecological limits. Palmer et al. (2026) illustrate this tension through carbon forestry, where market-oriented carbon objectives interact with Indigenous governance norms and ethics of care. Varkkey et al. (2026), using Southeast Asian evidence, report that nature-based-solution implementation is uneven across scales and that weakly institutionalised governance can create problems of legitimacy, equity, and benefit sharing. Lucherini (2026) likewise frames strong

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

sustainability as the structural embedding of ecological limits rather than the simple coexistence of environmental safeguards with unrestricted growth objectives. In the Timor-Leste context, the finding is that environmental policy should be assessed not only by whether development continues, but by whether ecological limits, community rights, and distributional consequences are institutionally incorporated into development pathways.

4.9. Cross-border and multi-level governance

A final theme concerns scale. Rehatta et al. (2025) provide direct evidence from the Ombai Strait that fisheries sustainability spans the Indonesia–Timor-Leste border. Varkkey et al. (2026) similarly show across Southeast Asia that carbon and nature-based governance are shaped by nested relationships among international, national, and local institutions. Aranha et al. (2025), in a systematic review of sanitation governance across Global South and Global North territories, emphasise the importance of multi-level participation, particularly in rural and traditional communities. These findings indicate that Timor-Leste environmental implementation cannot be fully understood within a single ministry, locality, or national boundary. Policy effectiveness depends on how rules and responsibilities are coordinated across levels and jurisdictions.

Tabel 5. Evidence-to-theme matrix for the selected literature

Study	Context / focus	Finding relevant to the review	Theme linkage
Clube & Tomei (2026)	LMIC environmental policy implementation	Implementation gaps are produced by interacting policy, institutional, resource, actor, and political factors.	1–2, 5
Fopa Tchinda & Talbot (2024)	Environmental policy coherence	Coherence depends on factors that can create synergies or contradictions across policy systems.	2
Araujo et al. (2026)	Mangroves; Metinaro, Timor-Leste	Community participation, place attachment, dependence, policy support, ecological drivers, and governance responses are interconnected.	3, 6
Palmer et al. (2026)	Carbon forestry; Timor-Leste	Indigenous norms, kinship, ritual, and care shape environmental governance and carbon practices.	3, 7

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Santos et al. (2026)	Environmental regulation; Timor-Leste	Constitutional veto authority can operate as a safeguard in environmental regulation.	4
dos Santos Maia et al. (2026)	Marine/coastal law; Timor-Leste–Indonesia	Environmental and maritime law need integration for preventive ecosystem protection.	4, 6, 8
Rehatta et al. (2025)	Tuna fisheries; Ombai Strait	Sustainability requires balancing fish-resource availability and fishing use in a border area.	6, 8
Abdul Aziz & Raja Ariffin (2024)	Southeast Asian solid waste policy	Political systems, resources, technology, awareness, and participation shape implementation effectiveness.	5
Akhtar-Schuster et al. (2024)	National SDG institutions	Institutional arrangements are central to operationalising national sustainable-development commitments.	2, 5
Wu & Khaskheli (2024)	Marine policy; BRI countries	Systems thinking, environmental law, and digital technologies can support implementation and sustainability.	5, 6
Varkkey et al. (2026)	Southeast Asian carbon/NbS governance	Nested governance is uneven; inclusion and benefit-sharing affect legitimacy and equity.	3, 7, 8
Lucherini (2026)	Comparative constitutional sustainability	Strong sustainability requires institutional embedding of ecological limits in governance.	4, 7

5. Discussion

5.1. From policy presence to implementation performance

The first interpretive implication is that environmental policy implementation should be conceptualised as a translation process between policy intent and socio-ecological outcomes. The evidence does not support a simple binary distinction between a country having or not having environmental policy. Instead, implementation performance depends on a chain of translation involving policy clarity, institutional ownership, resources, inter-organisational coordination, actor engagement, monitoring, and enforcement. This interpretation directly aligns the Timor-Leste literature with the broader LMIC synthesis of Clube & Tomei (2026), while retaining the country-specific

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

insight that environmental governance operates through local institutions, marine resource users, and legal mechanisms. The novelty of the present review is therefore not another inventory of environmental laws, but a systematic interpretation of why policy instruments may produce uneven outcomes after formal adoption.

5.2. Policy coherence must become operational coherence

Existing policy-coherence scholarship generally focuses on the alignment or contradiction of policy objectives. The present synthesis advances this logic by distinguishing normative coherence from operational coherence. A policy system may appear coherent in legal or strategic documents while remaining operationally fragmented because institutions possess different mandates, resources, data systems, incentives, and enforcement capacities. Fopa Tchinda & Talbot (2024) establish the importance of coherence factors, while the Timor-Leste-specific studies suggest that environmental, marine, resource, and development governance must be linked in implementation practice. This leads to a key analytical proposition for the review: sustainable-development performance depends on the degree to which policy objectives, institutional responsibilities, information flows, and enforcement routines are aligned across sectors and levels.

5.3. Indigenous and community institutions are implementation mechanisms, not contextual variables

One of the strongest substantive contributions of the literature is the repositioning of community and customary governance. Araujo et al. (2026) connect participation and place-based socio-ecological relationships with conservation governance, while Palmer et al. (2026) demonstrate how Indigenous norms and ethics of care shape carbon-forestry practice. These findings challenge implementation models in which communities appear only as beneficiaries or consultees. Instead, local institutions can supply legitimacy, monitoring, knowledge, social enforcement, conflict mediation, and stewardship. The contribution to the wider sustainability literature is to treat local institutions as part of the implementation architecture itself. For Timor-Leste, this is particularly important because environmental governance operates across formal state institutions and locally embedded social systems.

5.4. Legal integration and multi-level coordination are conditions for effective enforcement

The legal evidence shows that implementation depends on the interaction of legal instruments rather than on isolated statutes. Constitutional safeguards, environmental regulations, maritime law, impact-assessment procedures, and administrative enforcement must form a workable chain. Santos et al. (2026) and dos Santos Maia et al. (2026) illuminate the importance of legal authority and integration, while Lucherini

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

(2026) provides a broader conceptual argument for embedding ecological limits within governance. The review therefore identifies a legal-institutional opportunity: Timor-Leste can strengthen environmental policy performance by improving the connectivity among rule-making, preventive assessment, permitting, monitoring, enforcement, and remedies. This moves the debate from "having environmental law" to building an enforceable legal implementation system.

5.5. A systems-oriented model of sustainable development in Timor-Leste

Taken together, the findings support a systems view in which environmental policy implementation is embedded in a network of interacting ecological, institutional, social, legal, economic, and technological conditions. Marine and coastal cases illustrate feedbacks among ecosystems and livelihoods; carbon governance highlights interactions among markets, local institutions, and global climate agendas; and policy-coherence research shows that sectoral interventions can reinforce or undermine one another. Wu and Khaskheli (2024) provide a systems-thinking orientation for marine environmental governance, while Akhtar-Schuster et al. (2024) emphasise institutional arrangements for SDG implementation. The novel synthesis proposed here is an implementation-centered sustainability architecture in which policy design, institutions, community governance, legal authority, monitoring capacity, and cross-border coordination are treated as interdependent components rather than separate variables.

5.6. Research novelty and contribution to the body of knowledge

The literature reveals three gaps that the present review addresses. First is a geographic gap: Timor-Leste-specific environmental research exists but remains thematically and institutionally uneven, consistent with the broader observation that contemporary Timor-Leste scholarship has uneven coverage of ecology and other fields (Brincat & Barreto Soares, 2026). Second is a conceptual gap: studies often examine individual environmental domains, mangroves, fisheries, carbon forestry, environmental law, without a unified implementation lens connecting policy design to institutional performance and sustainability outcomes. Third is a governance gap: formal state regulation and local/customary governance are frequently studied separately even though implementation occurs at their interface. The review's contribution is therefore a cross-domain implementation framework that integrates policy coherence, legal authority, institutional capacity, community/customary governance, ecological-resource management, and cross-border coordination. This framework provides a basis for interpreting both implementation challenges and actionable opportunities for sustainable development in Timor-Leste.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

5.7. Opportunities for strengthening implementation

The synthesis indicates several opportunity areas without reducing the issue to a single policy prescription. First, policy design can incorporate implementation feasibility, measurable responsibilities, resource requirements, and monitoring pathways from the outset (Clube & Tomei, 2026). Second, inter-sectoral coordination can be strengthened through explicit institutional arrangements that connect environmental policy with sustainable-development planning (Akhtar-Schuster et al., 2024). Third, community and customary institutions can be incorporated as partners in monitoring, stewardship, and benefit-sharing rather than treated as consultation targets (Araujo et al., 2026; Palmer et al., 2026). Fourth, legal integration between environmental and marine regimes can reinforce preventive protection and enforcement (dos Santos Maia et al., 2026). Finally, multi-level and cross-border governance can be strengthened where ecosystems and resources exceed administrative boundaries, as illustrated by fisheries and regional carbon governance evidence (Rehatta et al., 2025; Varkkey et al., 2026). These opportunity areas provide a coherent agenda for future empirical research and policy implementation evaluation.

Synthesis statement. The literature portrays Timor-Leste environmental governance as a multi-level socio-ecological implementation system in which formal policy, institutional coordination, local/customary authority, legal integration, resource and data capacity, ecological management, and cross-border relations jointly condition sustainable-development outcomes. The core novelty is the integration of these domains into a single implementation-centered interpretive framework, rather than treating environmental policy as a purely legal or sector-specific domain.

6. Conclusion

This systematic literature review demonstrates that environmental policy implementation in Timor-Leste is shaped not merely by the existence of formal regulations but by the institutional, legal, social, and operational conditions through which policy commitments are translated into practice. The central finding is a persistent implementation gap associated with fragmented institutional coordination, limited administrative and technical capacity, inadequate monitoring and enforcement, inconsistencies across policy and legal domains, and uneven stakeholder participation. The reviewed literature also highlights the importance of community and customary institutions in strengthening local legitimacy, mobilizing place-based knowledge, and supporting environmental stewardship. Evidence from marine, coastal, fisheries, and carbon governance further indicates that environmental sustainability requires coordination across sectors, governance levels, and national boundaries.

The principal contribution of this review is the Environmental Policy Implementation–Sustainability Framework (EPI-SF), an integrative analytical

IJIS
Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

framework developed to synthesize relationships among policy design, institutional coherence, legal authority, implementation capacity, actor participation, and socio-ecological conditions. By connecting these dimensions to environmental integrity, social inclusion, livelihood resilience, and economic sustainability, the framework provides a structured basis for understanding why formal policy commitments may not translate consistently into sustainability outcomes. It also advances the analysis of environmental governance by conceptualizing community and customary institutions as potential implementation mechanisms rather than merely contextual factors. The framework should, however, be understood as a synthesis-based analytical proposition that requires further empirical assessment.

In practical terms, strengthening environmental governance in Timor-Leste requires greater alignment between policy objectives and implementation arrangements. Priority measures include clarifying institutional mandates, improving interagency coordination, allocating adequate financial and human resources, strengthening environmental data and monitoring systems, and ensuring consistent enforcement. Meaningful participation of community and customary institutions should be integrated into planning, monitoring, conflict resolution, and benefit-sharing mechanisms. Environmental, maritime, fisheries, and development policies should also be coordinated where ecological systems and resource use extend across administrative or national boundaries.

These conclusions must be interpreted in light of the limited and heterogeneous country-specific evidence, variations in research designs and outcome definitions, potential publication and database biases, and the use of comparative regional studies. Accordingly, this review provides an integrative interpretation rather than a causal estimate of policy effectiveness. Future research should empirically examine the proposed implementation pathways through longitudinal and mixed-methods studies, comparisons across municipalities and ecosystems, assessments of budgets and enforcement capacity, and investigations of interactions between statutory environmental law and customary governance. Such research would help establish the applicability of EPI-SF and identify the institutional conditions under which environmental policy implementation can contribute more effectively to sustainable development in Timor-Leste.

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

References

Abdul Aziz, M. F., & Raja Ariffin, R. N. (2024). A systematic literature review of solid waste management policy implementation in Southeast Asia. *Journal of Sustainability Science and Management*, *19*(4), 151–169. https://doi.org/10.46754/jssm.2024.04.012

Akhtar-Schuster, M., Stringer, L. C., & Barger, N. (2024). Fast-tracking action on the Sustainable Development Goals by enhancing national institutional arrangements. *PLOS ONE*, *19*(3), e0298855. https://doi.org/10.1371/journal.pone.0298855

Aranha, S., Ferreira, M. L., Sakurai, C. A., da Silva Rocha, R., de Oliveira, N. C., & Fontana, C. F. (2025). Lessons and challenges of sanitation governance in different territories of global South and North: A systematic review. *GeoJournal*, *90*(3), 148. https://doi.org/10.1007/s10708-025-11417-2

Araujo, N. G. de, Ihsan, Y. N., Syamsuddin, M. L., Herawati, T., Sunarto, Yuniarti, M. S., & Dyer, J. (2026). Community SoP and DPSIR-based assessment: Implications for mangrove ecosystem conservation and coastal management in Metinaro, Timor-Leste. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *36*(1), e70288. https://doi.org/10.1002/aqc.70288

Awewomom, J., Dzeble, F., Takyi, Y. D., Ashie, W. B., Ettey, E. N. Y. O., Afua, P. E., Sackey, L. N. A., Opoku, F., & Akoto, O. (2024). Addressing global environmental pollution using environmental control techniques: A focus on environmental policy and preventive environmental management. *Discover Environment*, *2*(1), 8. https://doi.org/10.1007/s44274-024-00033-5

Brincat, S., & Barreto Soares, L. M. (2026). Understanding Timor-Leste today: Beyond scholarly and practical limitations in existing research. *Global Discourse*, *16*(3), 288–311. https://doi.org/10.1332/20437897Y2026D000000116

Clube, R. K. M., & Tomei, J. (2026). Environmental policy without implementation? A review of factors contributing to implementation gaps in low- and middle-income countries. *Environmental Policy and Governance*, *36*(3), 611–635. https://doi.org/10.1002/eet.70068

dos Santos Maia, F., Monteiro, S., & Saputra, R. (2026). Integration of maritime law and environmental law in the protection of marine and coastal ecosystems: A comparative study between Indonesia and Timor Leste. *Journal of Law, Environmental and Justice*, *4*(3), 832–859. https://doi.org/10.62264/jlej.v4i3.350

Fopa Tchinda, A., & Talbot, D. (2024). Barriers and enablers of environmental policy coherence: A systematic review. *Environmental Policy and Governance*, *34*(1), 77–92. https://doi.org/10.1002/eet.2057

Lucherini, F. (2026). Sustainable development in comparative constitutional design. *The American Journal of Comparative Law*, *74*(2), 266–308. https://doi.org/10.1093/ajcl/avag001

Immortalis Journal of Interdisciplinary Studies
ISSN: 3123-3600 https://immortalispub.com/ijis
Vol. 2 Issue 4, October 2026, pp. 245-265

Palmer, L. R., Jackson, S. E., Head, L. M., Guterres, L., Guterres, E., & Luis, J. (2026). Lisan matters: Carbon forestry, embodied care and Indigenous governance norms in Timor-Leste. *Geoforum*, *169*, 104529. https://doi.org/10.1016/j.geoforum.2025.104529

Rehatta, B. M., Paulus, C. A., Gana, F., Merryanto, Y., & Ninef, J. S. R. (2025). Status of sustainability tuna fisheries management in the border areas of Indonesia and Timor Leste in the Ombai Strait. *International Journal of Conservation Science*, *16*(1), 253–266. https://doi.org/10.36868/IJCS.2025.01.17

Santos, J. G., Sulistiyono, A., & Mulyanto, M. (2026). Constitutional interpretation through veto power in Timor-Leste's environmental regulation as internalization of green constitutionalism. *Journal of Law, Environmental and Justice*, *4*(1), 68–93. https://doi.org/10.62264/jlej.v4i1.245

Varkkey, H., Miller, M. A., & Taylor, D. (2026). Nested carbon governance in Southeast Asia: Towards just nature-based solutions? *Environmental Policy and Governance*. https://doi.org/10.1002/eet.70130

Wu, X., & Khaskheli, M. B. (2024). Systems thinking of marine policies in promoting environmental law, sustainability, and digital technologies: Social challenges in Belt and Road Initiative countries. *Systems*, *12*(10), 400. https://doi.org/10.3390/systems12100400