

ETYMOLOGY, COSMOLOGY, AND MARINE STEWARDSHIP: THE SOCIO-ECOLOGICAL SIGNIFICANCE OF *HYGERALAI* IN LUANG ISLAND

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Abstract

This study examines *hygeralai* as a system of knowledge and socio-ecological governance practiced by the Indigenous community of Luang Island, Southwest Maluku, within the broader context of global climate change and increasing coastal development pressures. Against the backdrop of rising sea temperatures and ocean acidification that significantly affect coastal ecosystems, the study positions *hygeralai* not merely as a customary tradition, but as a normative and cosmological framework that structures sustainable human–nature relations. The research employs a qualitative ethnographic design grounded in ecological anthropology and the socio-ecological systems (SES) framework. Data were collected through in-depth interviews, participant observation, documentation, and spatial analysis using Geographic Information Systems (GIS). Sampling followed the principle of data saturation, reaching a saturation level exceeding 90%. Data analysis proceeded through domain, taxonomic, componential, and thematic stages to identify

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the normative, ecological, and social dimensions embedded in *hygeralai* practices. The findings indicate that *hygeralai* is rooted in linguistic transformation and local cosmology that conceptualize the sea as both a sacred domain and a communal resource. The system regulates seasonal harvesting closures and openings, restricts fishing gear, and institutionalizes collective responsibility for maintaining ecological balance. Coral reef conditions in the Luang region, including Metiamarang Island, remain relatively healthy, characterized by low levels of degradation and high biodiversity. Nevertheless, ecosystem sustainability faces internal challenges, such as unstructured waste management, as well as external threats including illegal fishing, destructive fishing practices, and the impacts of global climate change. The study demonstrates that *hygeralai* represents a spiritually grounded environmental ethic integrating historical, linguistic, and ecological dimensions within a community-based governance system. It contributes to the development of marine resource management models for Indonesia's outermost small islands by emphasizing the integration of local knowledge, institutional support, and adaptive policy responses to global environmental change.

Keywords: Hygeralai; ecological anthropology; socio-ecological systems; marine governance; outermost small islands; and climate change

Discipline: cultural anthropology

Absztrakt

ETIMOLÓGIA, KOZMOLÓGIA ÉS TENGERI GONDNOKSÁG: A HYGERALAI TÁRSADALMI-ÖKOLÓGIAI JELENTŐSÉGE LUANG SZIGETÉN

Jelen tanulmány a *hygeralai* jelenségét vizsgálja, mint a tudás és a társadalmi-ökológiai kormányzás olyan rendszerét, amelyet a Délnyugat-Malukuban található Luang-sziget őslakos közössége gyakorol, a globális klímaváltozás és a fokozódó part menti fejlesztési nyomás tágabb kontextusában. A növekvő tengervíz-hőmérséklet és az óceánok savasodásának háttérben – amelyek jelentős hatást gyakorolnak a parti ökoszisztémákra – a tanulmány a *hygeralai*-t nem pusztán hagyományos szokásként értelmezi, hanem olyan normatív és kozmológiai keretrendszerként, amely a fenntartható ember–természet viszonyokat strukturálja. A kutatás kvalitatív etnográfiai megközelítést alkalmaz, amely az ökológiai antropológia és a társadalmi-ökológiai rendszerek (SES) elméleti keretére épül. Az adatgyűjtés mélyinterjúk, résztvevő megfigyelés, dokumentáció, valamint térbeli elemzés (Geographic Information Systems – GIS) alkalmazásával történt. A mintavétel az adattelítettség elvét követte, amely meghaladta a 90%-os telítettségi szintet. Az adatelemzés domén-, taxonómiai, komponenciális és tematikus szinteken zajlott, lehetővé téve a *hygeralai* gyakorlatokba ágyazott normatív, ökológiai és társadalmi dimenziók feltárását. Az eredmények rámutatnak arra, hogy a *hygeralai* nyelvi átalakulásokban és helyi kozmológiában gyökerezik, amely a tengert egyszerre szent térként és közösségi erőforrásként konceptualizálja. A rendszer szabályozza az idényjellegű halászati tilalmak és engedélyezések rendjét, korlátozza az alkalmazható halászati eszközöket, valamint intézményesíti az ökológiai egyensúly fenntartásáért viselt kollektív felelősséget. A luangi térség korallzátonyainak állapota – beleértve Metiamarang szigetét is – viszonylag kedvező, alacsony degradációs szinttel és magas biodiverzitással jellemezhető. Mindazonáltal az ökoszisztéma fenntarthatóságát belső kihívások (például a strukturálatlan hulladékgazdálkodás), valamint külső fenyegetések (illegális halászat, romboló halászati gyakorlatok, valamint a globális klímaváltozás hatásai) egyaránt veszélyeztetik. A tanulmány megállapítja, hogy a *hygeralai* olyan spirituálisan megalapozott környezeti etikai rendszert képvisel, amely történeti, nyelvi és ökológiai dimenziókat integrál egy közösségi alapú kormányzási struktúrában. Hozzájárul Indonézia leg-külső kis szigeteire vonatkozó tengeri erőforrás-gazdálkodási modellek fejlesztéséhez azáltal, hogy

hangsúlyozza a helyi tudás, az intézményi támogatás és a globális környezeti változásokhoz való adaptív szakpolitikai válaszok integrációjának jelentőségét.

Kulcsszavak: *hygeralai*; ökológiai antropológia; társadalmi-ökológiai rendszerek; tengeri kormányzás; legkülső kis szigetek; klímaváltozás

Diszciplína: kulturális antropológia

Background

Global warming has emerged as one of the most pressing challenges in contemporary planetary governance. This phenomenon cannot be understood in isolation; rather, it is closely intertwined with demographic dynamics, economic pressures, and global patterns of production and consumption that intensify the exploitation of natural resources on both land and sea (IPCC, 2023). In addition, emissions and pollution generated by industrialized countries further accelerate climate change at the global scale. The roots of this crisis are frequently associated with an anthropocentric paradigm an epistemological orientation that positions humans at the centre of the living system (Moran, 2017; Steffen et al., 2011). In contrast, ecological perspectives emphasize that humans represent only one component within the broader web of planetary life (Di Paola, 2024; Tiberius, 2008).

Consequently, strategies grounded in adaptation, ecological harmony, and prudent environmental governance become essential foundations for cultivating reciprocal and sustainable relationships between human societies and the natural world (Dearing et al., 2015).

Contemporary efforts in environmental protection and natural resource management have become a shared agenda articulated through public policies, international regulatory frameworks, and modern governance instruments involving both governments and the private sector. Nevertheless, in many regions across both island and mainland settings local communities continue to maintain and practice traditional knowledge systems as the primary

foundation for their interaction with the environment. Within the Indonesian cultural context, this principle is reflected in the expression “*di mana bumi dipijak, di situ langit dijunjung*,” which conveys an ethical imperative to respect the lived environment and to align human behavior with the prevailing ecological order. The expression embodies a cosmological awareness that humans are an integral part of the ecosystem rather than its sole sovereign authority. A substantial body of research demonstrates that Indigenous communities in various parts of the world have long developed traditional mechanisms for managing coastal and marine resources, including in Sasa Village (Fong, 1994), the Solomon Islands and Vanuatu (Johannes, 1998), New Zealand (Ballantine, 1999), Brazil (Anaya & Espírito-Santo, 2018), Oceania (Aswani & Canela, 2011) and Indonesia (Brouwer, A., 1996; Harkes., 2000; Bagir et al., 2021). Although Indigenous peoples constitute only approximately 6% of the global population (World Bank Group, 2023), evidence indicates that they steward around 80% of the world’s biodiversity (International Labour Organisation, 2020; World Bank Group, 2023). This empirical reality underscores the strategic significance of local knowledge systems in advancing conservation efforts and ensuring long-term ecological sustainability. Indonesia is an archipelagic state with a substantial population. According to *World Population Review* (April 2024), Indonesia’s population has reached 279, 390, 258. Administratively, the country comprises 38 provinces, including eight island-based provinces, and is home to approximately 1,340 ethnic groups and 718 local languages (Nurasmawi & Ristiliana,

2021). Approximately 70% of Indonesia's territory consists of marine areas and 30% of land (Darajati, 2023; Maruf, 2024), encompassing more than 17,500 islands, including 111 outermost small islands. Indonesia also shares land and maritime boundaries with ten neighbouring countries (Arsana, 2007; Hamzah, 1984). This geographical configuration positions Indonesian waters as one of the world's centres of marine biodiversity (Randall, 1998; Roberts et al., 2002), while simultaneously rendering the country strategically significant in global discourses on climate change and marine resource governance.

As an archipelagic nation, Indonesia faces multidimensional consequences across political, economic, social, and cultural domains (Cribb & Ford, 2009). Within this diversity, customary-based environmental management practices have long constituted an integral dimension of local community life. Indigenous communities are generally understood as traditional collectivises (Malinowsky, 1932) that possess value systems and customary laws regulating their internal order (Berkes & Folke, 1998) and whose subsistence and continuity are closely tied to the ecological knowledge embedded in their surrounding environments (Radcliffe-Brown, 1952). Ecological knowledge transmitted intergenerationally has shaped distinctive adaptive systems within each community, both in upland and coastal regions (Geertz, 1983).

In this regard, Luang Island in Southwest Maluku Regency represents one of Indonesia's outermost small islands, characterized by distinctive ecological and social features. The coastal Indigenous community inhabiting this island has developed a body of local knowledge to regulate its relationship with the environment, long before the emergence of formal environmental governance policies and official recognition of Indigenous peoples. One of the local institutions that continues to be maintained is *hygeralai*. It may be understood as a system of traditional values and normative regulations gover-

ning the utilization of natural resources, particularly marine resources. It constitutes not merely a set of prescriptive norms, but a philosophical framework that guides the people of Luang Island in cultivating harmonious relationships with the natural world. As a socio-ecological system, *hygeralai* functions as a mechanism of collective regulation, reinforcing principles of sustainability through proportional resource use grounded in the limits of environmental carrying capacity.

Academic scholarship addressing environmental management practices among the Indigenous communities of Luang Island remains relatively limited. The island's remote geographical location and restricted transportation access constitute significant factors contributing to the scarcity of research in this area. This situation has resulted in a limited body of available information concerning the island's socio-ecological dynamics. Existing studies have generally concentrated on specific thematic domains, such as linguistics, belief systems, fisheries ecology, biodiversity surveys, or issues related to national strategic interests. Research conducted about examined belief systems in the Babar Islands, including Luang, analysed phonological and morphological aspects of the local language. Moreover, the distribution of language and culture and discussed *sasi* within the framework of traditional political economy. More recent studies) on marine ecosystems, the fish and sea cucumber species, local wisdom as a pedagogical resource, and the fish diversity within the Luang atoll.

In contrast to previous studies, this research conducted within the framework of the Applied Excellent Research Program positions *hygeralai* as a socio-ecological institution analysed through the lens of ecological anthropology. The study focuses on the existence and dynamics of *hygeralai* in the everyday life of the Indigenous community of Luang Island, including the ways in which environmental conditions shape patterns of thought, daily practices, and the socio-cultural structure of the

community. This research employs an ethnographic approach integrated with ecological anthropological analysis. The study aims to generate original and academically rigorous contributions to the development of scholarship on local institutions and environmental governance in Indonesia's outermost small islands.

Problem Statement

Building upon the foregoing background, this study is designed to examine in depth the relational patterns between the Indigenous community of Luang Island and the natural environment in which they reside. The central focus lies in understanding how this community constructs, maintains, and reproduces its ecological relationships through an intergenerationally transmitted system of local knowledge known as *hygeralai*. Accordingly, the principal concern of this research extends beyond acknowledging *hygeralai* as a cultural tradition; it seeks to analyze how this system functions in shaping and reinforcing the socio-ecological embeddedness of the Luang community within its lived environment. From this formulation emerges the primary research question: what contributions does *hygeralai* make in shaping the worldview, attitudes, and environmental practices of the Luang community? Addressing this question requires a systematic examination of the normative, ecological, and social dimensions embedded within *hygeralai*, as well as an analysis of how these values guide collective action in natural resource governance. This study places particular emphasis on assessing the functional significance of *hygeralai* for the sustainability of marine environments. The focus is directed toward identifying the mechanisms, principles, and ecological signals recognized by the community as guiding references in the prudent management of coastal and marine resources. At a subsequent stage, this focus is operationalized into specific research questions to be examined through an empirical methodological approach.

Research Objectives

This study aims to examine in a comprehensive and systematic manner the reciprocal relationship between the Indigenous community of Luang Island and its natural environment by positioning *hygeralai* as the principal analytical framework. Conceptually, the research seeks to understand how this intergenerationally transmitted system of local knowledge functions as a foundational structure for constructing, maintaining, and reproducing the community's socio-ecological relations with its living space. The focus extends beyond recognizing *hygeralai* as a cultural heritage; rather, it emphasizes its role as a normative institution encompassing a set of values, principles, rules, and action-guiding frameworks for natural resource governance, particularly within coastal and marine domains.

Furthermore, this study aims to analyze the concrete contributions of *hygeralai* in shaping the ecological worldview of the Luang community, including how the system influences attitudes, moral orientations, and everyday practices in environmental interaction. The research endeavors to trace how the values embedded in *hygeralai* are translated into social mechanisms, such as temporal regulation of resource use, limitations on exploitation, and the reinforcement of collective responsibility for ecosystem sustainability. In this regard, the study seeks to identify the integrated normative, ecological, and social dimensions embedded within *hygeralai* as a community-based regulatory system.

Specifically, the research also aims to assess the functional significance of *hygeralai* in sustaining marine environmental integrity as an integral component of the life system of Luang Island. This focus includes examining locally recognized ecological principles, environmental indicators interpreted by the community, and adaptive strategies implemented in response to environmental dynamics. Through an ethnography-based empirical approach combined with socio-ecological analysis, the study is expected to generate a comprehensive understanding of

hygeralai as a socio-ecological system that not only maintains ecosystem balance but also strengthens social cohesion and the cultural sustainability of the Indigenous community of Luang Island.

Method and Analysis

This study employs a qualitative approach with an ethnographic design (Creswell, 2012) situated within the framework of ecological anthropology and socio-ecological systems (SES) analysis. This approach is selected in order to facilitate an in-depth understanding of the reciprocal relationship between the Indigenous community of Luang Island and its natural environment, as mediated through *hygeralai* as a living system of local knowledge that is practiced and transmitted intergenerationally. Ethnography enables the researcher to capture meanings, values, symbols, and everyday practices within their specific social and ecological contexts (Spradley, 1980). In this regard, *hygeralai* is not treated merely as cultural heritage, but as a normative system functioning as a mechanism of ecological adaptation and community-based resource governance.

Epistemologically, the research is grounded in an interpretive paradigm that conceives social reality as a construct emerging from human-environment interactions. Community experiences, perceptions, and social practices constitute the primary sources for analytical interpretation. Accordingly, the analysis is directed toward identifying three integrated dimensions embedded within the practice of *hygeralai*: the normative dimension (values, principles, and rules), the ecological dimension (environmental conditions, dynamics, and resource characteristics), and the social dimension (collective mechanisms, community structure, and the distribution of responsibilities). These three dimensions are examined simultaneously to elucidate how *hygeralai* operates as a coherent socio-ecological system.

The analytical framework follows ethnographic methods, the analytical process begins with ethno-

graphic data collection through in-depth interviews, participant observation, and documentation. This stage generates narrative accounts, social practices, and symbolic representations associated with the implementation of *hygeralai* in the daily life of the Luang Island community. The subsequent stage involves domain analysis, which entails identifying primary categories of meaning emerging from the field data. At this stage, key concepts are mapped, including temporal regulation of resource use, prohibitions and restrictions, collective responsibility, and locally recognized ecological indicators. The objective of this phase is to delineate the foundational structure of meaning within the *hygeralai* system.

This is followed by taxonomic analysis, through which identified domains are organized into more detailed classificatory structures. This analysis elucidates how the Luang community categorizes the environment and natural resources within its local knowledge framework. The next stage, componential analysis, aims to identify differences in meaning and attributes across categories. For instance, distinctions are examined between areas permitted and prohibited for use, variations in rules according to seasonal or specific ecological conditions, and differentiated responsibilities among social groups. This phase clarifies the interrelationships among the normative, ecological, and social dimensions embedded in the *hygeralai* system. The final stage involves thematic analysis, which synthesizes all categories to identify overarching cultural themes that integrate the system as a whole. Emergent themes such as ecological balance as a guiding principle, collective morality in marine governance, adaptation grounded in local knowledge, and the sacred relationship between humans and the sea collectively frame *hygeralai* as an integrated socio-ecological system. Through these analytical stages, the study generates a comprehensive understanding of how *hygeralai* operates as a community-based regulatory mechanism that sustains ecosystem balance while simultaneously reinforcing social cohesion and the cultural

continuity of the Indigenous community of Luang Island.

Sampling Framework

The sampling strategy employed in this study is guided by the principle of data saturation as articulated by Morse (1995), which emphasizes the adequacy and depth of information rather than the numerical size of respondents. Within this framework, participant selection is not determined by large sample numbers but by the extent to which the collected data comprehensively address the research focus. The sampling strategy is therefore directed toward achieving conceptual sufficiency relevant to the study of *hygeralai*, as the research does not seek statistical generalization but rather an in-depth understanding of the phenomenon under investigation. Informants were selected purposively based on their level of knowledge, experience, and involvement in the practice of *hygeralai* and environmental governance. The participants included village heads, customary leaders, religious leaders, youth leaders, school principals, women leaders, and children aged 5–13 years from two villages on Luang Island. These groups were chosen on the basis of their representational capacity to elucidate the values, meanings, and environmental implications of *hygeralai* as an ancestral legacy. The sampling process remained flexible and evolved throughout the research, with subsequent informants identified based on insights obtained from prior participants.

Data saturation was considered achieved when the information obtained became repetitive, no longer generated new categories or themes, and all dimensions related to the environmental implications of *hygeralai* had been sufficiently elucidated. The identification of saturation was conducted through systematic coding procedures, constant comparative analysis of responses, and component-based data grouping to assess consistency and thematic patterns. Responses to 148 research questions were analyzed and tabulated to measure the degree of

similarity across participants. Based on established saturation criteria, data consistency exceeding 70% was regarded as indicative of saturation. The analysis demonstrated that the saturation level in this study exceeded 90%, indicating that both sample adequacy and data sufficiency had been achieved. Consequently, data collection was concluded, as the information obtained had reached a stable and comprehensive level sufficient to address the research objectives in an academically rigorous and systematic manner.

Data Collection

Data collection in this study was designed to generate a comprehensive understanding of the function of *hygeralai* in shaping the socio-ecological relations between the Indigenous community of Luang Island and its natural environment. The data collection strategy was systematically structured through the integration of ethnographic techniques, in-depth interviews, participant observation, Focus Group Discussions (FGDs), and documentation. These methods were employed to capture the normative, ecological, and social dimensions embedded in the practice of *hygeralai*.

Primary data were obtained through in-depth interviews with key informants who possess substantial knowledge of and direct involvement in the practice of *hygeralai*. Informants included customary leaders, village heads, religious leaders, women leaders, youth leaders, fishers, seaweed cultivators, and children as the next generation of local knowledge bearers. Interviews were conducted in a semi-structured format to allow for in-depth exploration of the values, principles, rules, and action-guiding frameworks embodied in *hygeralai*. The interviews focused on the community's ecological worldview, mechanisms for regulating marine resource use, limitations on exploitation, and forms of collective responsibility for ecosystem sustainability.

Participant observation was undertaken to understand everyday practices within the context of direct

interaction with coastal and marine environments. The researcher engaged in activities such as fishing, seaweed cultivation, and customary events associated with the implementation of *hygeralai*. Through this direct involvement, empirical data were generated not only from verbal narratives but also from concrete practices reflecting ecological values in action. This approach facilitated the identification of locally recognized ecological indicators, including natural signs used by the community to determine appropriate timing for resource utilization.

FGDs were conducted to confirm and deepen individual findings, particularly regarding the historical development of *hygeralai*, its spatial scope of implementation, customary territorial boundaries (*petuanan*), and collective perceptions of environmental change. These group discussions functioned as a form of social triangulation to ensure data consistency and enrich interpretive analysis. Secondary data were collected through literature review of scientific reports, policy documents, prior research, and archival materials related to the ecological and social conditions of Luang Island. All collected data were analysed thematically through systematic coding and categorization processes to identify patterns, relationships, and socio-ecological mechanisms embedded in *hygeralai*. This approach enabled the production of a thick description of how this local knowledge system functions as a community-based regulatory instrument that sustains marine environmental integrity while simultaneously rein-

forcing social cohesion and the cultural continuity of the Indigenous community of Luang Island.

Findings

Research Site

Luang Island (see Figure 1) is one of the administrative areas within Southwest Maluku Regency, Maluku Province, Indonesia. Geographically, the island forms part of the Luang Archipelago situated in the Banda Sea, within the broader region of eastern Indonesia. To the west, the area lies in close proximity to Timor-Leste, while to the south it shares maritime boundaries with Australia. This location positions Luang Island as both strategically significant and peripheral within the broader geopolitical and regional oceanographic context.

As a small tropical island, Luang Island exhibits distinctive physical characteristics. The island is surrounded by extensive shallow waters composed of large coral heads that become exposed during low tide. This shallow zone covers approximately 264.58 km² and forms a highly productive coastal ecosystem, including coral reefs and seagrass meadows (see Figure 2). These ecosystems provide critical habitats for a wide range of economically valuable marine species, such as reef fish, sea cucumbers (*nyawi*), and naturally occurring seaweed, which constitute the primary sources of livelihood for the local community.

Figure 1.(A) Luang Island, (B). bordering with Timor Leste & Australia. Source: Researcher, 2025

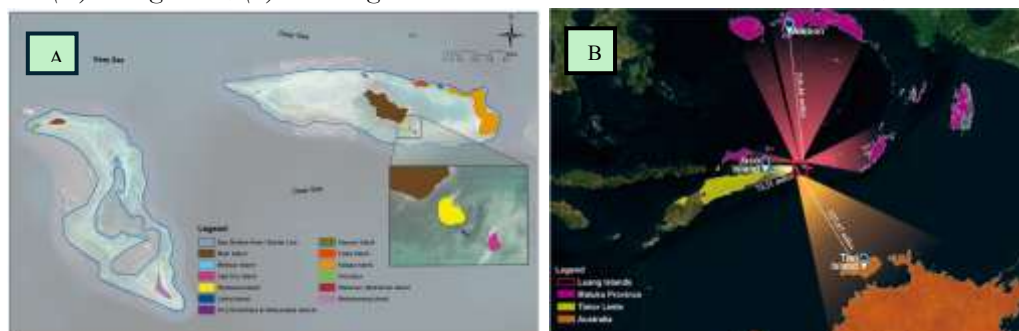
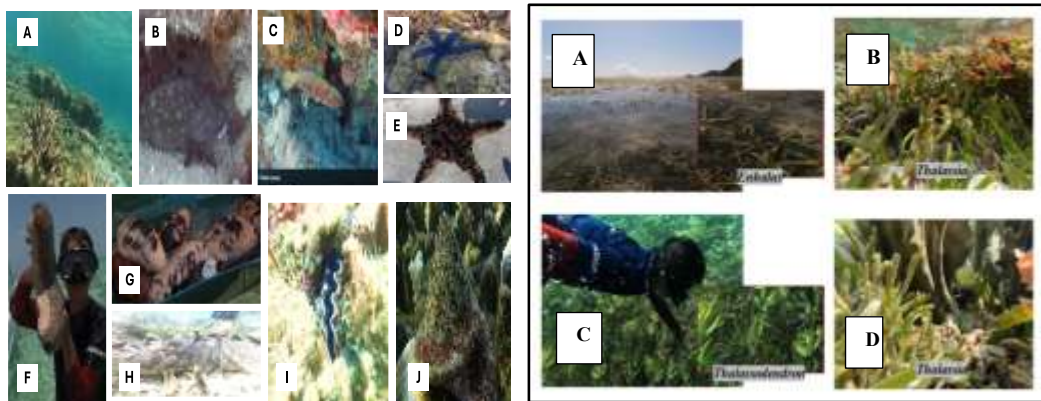


Figure 1. Marine ecosystem conditions on Luang Island. Source: results of the 2025 underwater survey conducted on Luang Island.



From a terrestrial geomorphological perspective, Luang Island is primarily characterized by low hills, with a topography that ranges from narrow coastal plains to more elevated interior zones. The island's rocky and relatively dry soil conditions constrain agricultural potential, limiting the development of large-scale farming activities (see Figure 3). As a consequence of these ecological constraints, the local population relies predominantly on marine-based livelihoods, particularly small-scale capture fisheries and customary marine resource management practices.

Figure 2: Morfology condition in Luang Island



Luang Island is composed of two villages Luang Barat and Luang Timur both of which are situated along the coastal strip of the island. Beyond these primary settlement areas, the Luang community holds customary territorial rights (*petuanan*) over several surrounding small islands, including Liakra, Kapoeri, Tiaata, Nowlauna, Po'u Romkihiera, Watuwelada, Upasrui, Metutun, Metiamarang, Wekenau, and Tamta/Kalapa. Collectively, these territories form an interconnected ecological and social unit that constitutes an integral component of the local knowledge system and customary institutional framework of the Luang people (Kissiya & Biczó, 2024).

Administratively and socially, the island's two villages extend longitudinally along the coastline, reflecting a settlement pattern closely aligned with marine-based livelihoods. The broader customary domain encompassing the adjacent small islands functions not merely as an extension of territorial space but as a living socio-ecological landscape. It serves as the spatial arena in which local knowledge systems and customary governance institutions are enacted and maintained.

Spatially, Luang Island's location in the southern Banda Sea renders it relatively remote within the

administrative structure of Southwest Maluku Region. Despite this geographic peripherality, its position within the global Coral Triangle confers considerable ecological significance. The region functions as a marine biodiversity corridor in the southern part of eastern Indonesia (Kissiya & Biczó, 2023) thereby holding strategic ecological value in terms of marine conservation and sustainable resource management. However, geographic isolation also constrains transportation and communication access, reinforcing the community's reliance on localized governance systems. In this context, *Hygeralai* plays a central role as a customary regulatory mechanism that governs marine resource utilization while simultaneously maintaining ecological balance within the coastal environment.

Main Points of *Hygeralai*

Hygeralai is a local knowledge system of the Luang community that encompasses a set of values, principles, norms, and strategies for the management of marine resources oriented toward sustainability and environmental protection. As a customary institution, *Hygeralai* regulates the use of natural resources through rules and practices that have become institutionalized and deeply internalized in the everyday life of the community. In the context of Luang Island, the sea is understood as a communal resource; accordingly, its governance is grounded in the principle of collectively recognized customary ownership.

The defining characteristic of this system lies in its recognition of customary rights and traditional tenure arrangements that frame marine resource governance. Regulation is shaped not only by ecological norms but also by the community's social structure, including social status, institutional roles, and genealogical background, all of which influence the distribution of authority and responsibility. *Hygeralai* thus operates simultaneously as a mechanism of ecological control and as a reflection of an

organized customary social order within the Luang community.

The rules embedded in *Hygeralai* are unwritten and transmitted across generations through social conventions embedded in lived community practices. The system serves as the primary foundation for marine resource governance, particularly in regulating the harvesting period of *nyawi* (sea cucumber), which is implemented through a periodic open-close mechanism in shallow coastal waters. In certain circumstances, such as collective needs related to religious activities or village interests, harvesting schedules may be adjusted through communal agreement. Beyond temporal regulation, *Hygeralai* also defines the rights and obligations of stakeholders, decision-making procedures, mechanisms for information dissemination, and systems of sanctions for violations. These practices are often accompanied by customary rituals and the use of traditional communication media to ensure collective compliance. Even the types of fishing gear permitted during harvesting periods are regulated as part of broader efforts to maintain marine ecological balance. In this way, *Hygeralai* constitutes a communal governance system that integrates ecological, normative, and social dimensions within a cohesive customary institutional framework.

Etymology and Historical Transformation of *Hygeralai*

The oral traditions preserved by the community of Luang Island constitute a significant historical archive through which the origin and development of the term *hygeralai* can be analytically reconstructed. These intergenerational narratives indicate that *hygeralai* did not emerge as an instantaneous cultural construct; rather, it evolved through a long historical process, reflecting linguistic shifts intertwined with broader social and cultural transformations within Luang society. Although not all episodes of Luang's historical trajectory are directly linked to the etymology of the term, its gradual transformation from

a linguistic marker into a core component of Traditional Ecological Knowledge (TEK) demonstrates its enduring cultural and institutional significance.

Local accounts recount that the origin of *hygeralai* is associated with the journey of three men from Luang Island who sought to establish new settlement sites. Each individual marked the selected territory using a distinct symbolic sign (*gheralyai*) to assert spatial claims and identity. The first individual constructed a stone altar (*watu*) as a ritual marker. The second embedded a spear (*welabra*) into the ground as a sign of territorial authority. The third figure, Tonulu Takrulu, created a territorial marker in the form of a woven *koli* leaf ornament (*hgerlarkuhi*), which was suspended at the tip of a wooden pole. These symbolic acts functioned not merely as indicators of spatial possession but also as expressions of social identity and spiritual affiliation.

Among these markers, the woven *koli* leaf created by Tonulu Takrulu possessed the greatest variability in form and the widest territorial reach. Over time, this particular symbol became linguistically and culturally elaborated, eventually giving rise to the term *hygeralai*. Its evolution reflects a process of semantic expansion whereby a material marker of territorial identification transformed into a culturally embedded concept. In its contemporary understanding, *Hygeralai* extends beyond its original symbolic function to encompass a normative framework regulating marine resource use, communal responsibility, and ecological stewardship.

Thus, the etymological development of *Hygeralai* illustrates the dynamic relationship between language, territoriality, spirituality, and ecological governance in Luang society. The term's transformation from a spatial symbol into an institutionalized component of local environmental management underscores how oral tradition operates as both historical memory and a mechanism for sustaining socio-ecological order.

The term *hygeralai* is linguistically derived from two

lexical elements in the Luang language (*Lgona Ltier*), namely *hgeralyai*, meaning “stone or spear marker,” and *hgerlarkuhi*, referring to a “*koli* leaf marker.” In the phonetic practice of the Luang community, the first element undergoes articulatory adjustment: the consonantal cluster *b + ger* is realized as “hyger,” while the sequence *ly+ai* contracts into “lai,” resulting in the transformation of *hgeralyai* into *Hygeralai*. The terminal vowel “i” is absorbed from *hgerlarkuhi*, indicating that the contemporary term represents a phonological and semantic fusion of two distinct lexical forms. This process reflects an allophonic phenomenon, namely a phonetic variation that does not alter the fundamental meaning of a lexical item (Keraf, 2016). The formation of *hygeralai* thus illustrates how linguistic evolution operates not only at the level of sound articulation but also through semantic integration within a specific cultural context.

Conceptually, *hygeralai* embodies the cosmological worldview of the Luang community, in which both terrestrial and marine spaces are understood as sacred domains under the guardianship of ancestors and spiritual forces. The *koli* leaf marker created by Tonulu Takrulu did not merely signify territorial claim; it simultaneously encoded an ethical obligation toward environmental continuity. This reflects a relational ontology (Descola, 2013) wherein humans and non-human entities are situated within a balanced network of reciprocal relationships. Within such a cosmological framework, violations of *hygeralai* principles are believed to disrupt cosmic harmony, potentially resulting in ecological degradation as well as spiritual consequences.

Accordingly, *hygeralai* functions as a set of socio-ecological norms that regulate resource utilization through customary provisions, symbolic expressions, and ritual practices. Over time, the system has undergone gradual transformation through two principal stages, marking a shift from a predominantly cosmological-animistic mode of governance toward a more hybrid ecological governance model. This transformation does not indicate a rupture

with its cosmological foundations; rather, it demonstrates adaptive continuity, whereby traditional symbolic structures are rearticulated within evolving social and ecological conditions.

In line with the perspectives advanced by (Dinneen, 1995) and (Halverson, 2013) continuity of the Luang language manifested, among other forms, in the sustained use of the term *hygeralai* cannot be understood merely as an effort to preserve a linguistic system. Embedded within this continuity is a broader endeavour to maintain horizons of meaning, orientations toward life, and constructions of collective identity. For the Luang community, language is not simply a communicative instrument; it is a medium that carries values, norms, and the ethical structure of the community. Consequently, *hygeralai* transcends its status as a lexical term or customary institution; it functions as a symbolic representation of cultural identity as well as an articulation of ecological ethics.

Taken as a whole, *hygeralai* reflects a synthesis of linguistic dynamics, historical experience, and spatial governance grounded in local cosmology. It encompasses a normative dimension that regulates human relations with the environment and frames resource use within a moral order. The persistence of the term and its associated practices across generations demonstrates the close interweaving of oral tradition, linguistic transformation, and ecological practice. Through this process, an indigenous knowledge framework emerges one that integrates humans, nature, and ancestors within an enduring and cohesive value system.

Coherence in the *Hygeralai* Social–Ecological System within an Ecological Anthropology Framework

The ecological dimension of *hygeralai* refers to the biophysical conditions, natural dynamics, and characteristics of coastal-marine resources that constitute the foundation of livelihood sustainability for the community of Luang Island in Southwest

Maluku Regency. Ecologically, this region is situated within the Coral Triangle, globally recognized as the area with the highest marine biodiversity in the world (Veron et al., 2009). Coral reefs, seagrass meadows, and shallow coastal waters function as the primary pillars of food security, subsistence economy, and social identity for small-island coastal societies. However, as emphasized by the (IPCC, 2023), tropical marine ecosystems are currently under significant pressure due to rising sea surface temperatures, ocean acidification, and the increasing intensity of extreme weather events. In small-island contexts, ecological vulnerability is further amplified by limited terrestrial carrying capacity, high dependence on local natural resources, and geographic isolation (Nurse et al., 2014).

Within this setting, understanding ecological conditions such as reef health, fish stock availability, and the reproductive cycles of marine species becomes a crucial component of the *hygeralai* system. The institution operates by internalizing seasonal environmental dynamics, including monsoonal wind patterns (east–west monsoons), fish migration routes, and phases of resource regeneration, as the basis for determining temporary closures and seasonal openings. This approach aligns with principles of resource governance grounded in ecological limits and collective-choice arrangements, as discussed in the literature on common-pool resource management (Ostrom, 2009). Thus, ecological knowledge is not peripheral but constitutive of institutional regulation.

The social dimension of *hygeralai* concerns the collective mechanisms, customary institutional structures, and distribution of responsibilities that sustain ecological regulation. From the perspective of common-pool resource theory, long-term sustainability depends on clearly defined rules, internal monitoring mechanisms, and legitimate social sanctions (Ostrom, 1990). *hygeralai* fulfills these criteria through a customary governance structure endowed with normative and symbolic authority to

declare periods of closure and opening, regulate fishing gear, and conduct ritual processes that reinforce collective compliance. Resource governance in this context is not merely administrative but embedded within local cosmology, kinship relations, and customary hierarchies. In ecological anthropology, human–environment relations are understood as culturally institutionalized systems of reciprocity and regulation (Kottak, 1999). Accordingly, the collective mechanisms of *hygeralai* do not simply regulate economic behaviour; they cultivate an ecological ethic grounded in communal responsibility.

The distribution of responsibilities within *hygeralai* is socially differentiated yet collectively integrated. Customary leaders exercise normative authority; clan-based groups maintain territorial rights and monitoring roles; and families transmit ecological values across generations. Social control thus operates primarily through the internalization of norms and horizontal accountability rather than through formalized bureaucratic enforcement. This embeddedness of ecological governance within social structure enhances compliance and strengthens social cohesion.

The integration of ecological and social dimensions enables *hygeralai* to function as a coherent socio-ecological system (SES). SES scholarship emphasizes that sustainability emerges from adaptive interactions between ecological processes and social institutions through non-linear feedback mechanisms (Berkes & Folke, 1998). In this case, local ecological knowledge is translated into social norms that constrain exploitation in accordance with natural regenerative rhythms. When ecological disturbances occur such as declining fish catches or habitat degradation the community may collectively respond by tightening regulations or extending closure periods. Such responses reflect adaptive capacity, defined in resilience theory as the ability of a system to maintain its core functions while adjusting or transforming in response to changing conditions.

Therefore, *Hygeralai* should not be understood merely as a customary tradition, but as an adaptive governance institution that integrates ecological knowledge, social legitimacy, and cosmological norms within a coherent regulatory framework. Its coherence lies in the mutually reinforcing relationship between environmental limits and social organization, ensuring that resource sustainability and community cohesion are maintained simultaneously over time.

Conclusion

Based on the overall historical, linguistic, ecological, and ethnographic findings, it can be concluded that *Hygeralai* constitutes a system of knowledge and socio-ecological governance deeply rooted in the cosmology, oral history, and linguistic structure of the Luang Island community. The term emerged through a process of linguistic transformation reflecting the community's historical experiences and evolved into a normative framework regulating human relations with terrestrial and marine spaces within an ecologically grounded spiritual ethic. In this regard, *hygeralai* functions not merely as a customary institution but as an expression of local epistemology that integrates cultural, moral, and environmental dimensions.

From an ecological perspective, the waters surrounding Luang Island and its adjacent island cluster including Metiamarang Island demonstrate relatively healthy ecosystem conditions, characterized by the dominance of hard corals, significant atoll formations, and high levels of marine biodiversity. Scientific survey data, geospatial mapping, and field observations indicate that coral reefs, seagrass beds, and associated marine biota remain in good condition across several zones, particularly in areas experiencing minimal anthropogenic pressure. These ecosystems exhibit interdependent dynamics, with coral reefs functioning as foundational ecological structures that sustain fisheries productivity while simultaneously protecting shorelines from

currents and wave action.

Nevertheless, the sustainability of this socio-ecological system faces multidimensional challenges. Internally, inconsistencies persist in coastal waste management, largely due to the absence of a structured waste disposal system. Population growth, settlement expansion, coastal reclamation, and seaweed processing activities further intensify pressures on natural habitats. Externally, illegal fishing practices and the use of destructive methods by fishers operating beyond customary territorial boundaries pose significant threats to marine ecosystem integrity.

Community responses indicate the presence of strong adaptive capacity. Village authorities, in collaboration with youth organizations, women's groups, religious institutions, and educational bodies, have developed cross-sectoral initiatives to strengthen conservation awareness, enforce customary sanctions, and integrate environmental education into school curricula. These efforts reflect an understanding of ecological sustainability not merely as a technical matter, but as a moral and spiritual responsibility transmitted across generations.

Overall, *hygeralai* represents a community-based model of socio-ecological governance with considerable potential to support sustainability in small island contexts. The continued effectiveness of this system depends on consistent internal compliance, strengthened waste and coastal management frameworks, and protection against external pressures. The integration of local knowledge, institutional support, and responsive policy frameworks remains essential to ensuring the long-term resilience and sustainability of the marine ecosystems of Luang Island.

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