

Indigenous ecological wisdom as civic virtue: The Tiaytiki practice in Papua, Indonesia

Yakob Godlif Malatuny * 

* Sekolah Tinggi Agama Kristen Protestan Negeri Sentani, Indonesia

godlifmalatuny15@gmail.com

Hermi Nanci Yaroseray 

Sekolah Tinggi Agama Kristen Protestan Negeri Sentani, Indonesia

herminanelciyaroseray@gmail.com

*Corresponding Author

Article Info

Article History

Submitted:

21 September 2025

Revised:

20 October 2025

Accepted:

31 October 2025

Keywords

civic ecology, civic virtue, ecotheology, Tiaytiki, Yapase

Abstract

This research explores the local wisdom of Tiaytiki of the Yepase community in Jayapura Regency, Papua, as a form of citizen virtue in caring for and maintaining the sustainability of marine ecology. The ancestors have passed Tiaytiki down to the current community, which serves to preserve marine resources through zoning mechanisms, prohibitions on overexploitation, and the application of customary sanctions. Rooted in local beliefs and cosmology, Tiaytiki is not only a technical customary rule but also a substantial moral expression that emphasises collective responsibility, social solidarity, and spiritual awareness to live in harmony with nature. The research has been conducted qualitatively using the case study method. Research data were collected through in-depth interviews, participatory observation, and documentation. The analysis shows that there are five dimensions of civic virtue in Tiaytiki: spiritual, social, educational, marine-ecological, and institutional, which can serve as a model for caring for nature. This model not only serves as a mechanism for marine conservation but also as an educational tool to instil ecological character in the younger generation. The findings confirm that Tiaytiki is the intersection of civic ecology and civic virtue, and that it contributes to the development of contextualised civic education oriented towards environmental sustainability.

Article Link: <https://journal.uny.ac.id/index.php/civics/article/view/90302>

Introduction

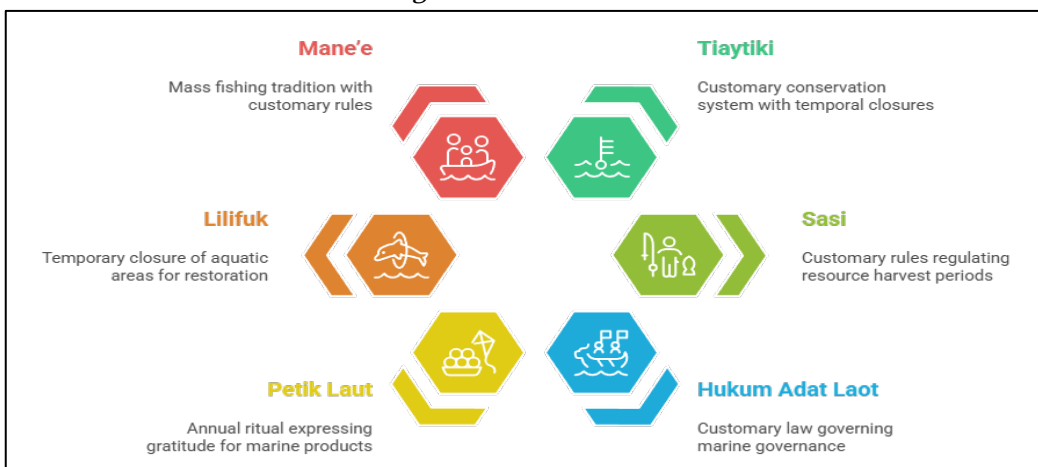
Papua, one of Indonesia's regions with the highest biodiversity, faces enormous pressure from deforestation, mining, pollution, and land conversion (Kartikasari et al., 2012; Rahman et al., 2023; Yarisetou, 2009). Ecological damage in Papua has resulted in the loss of biodiversity, a decline in the quality of life of indigenous peoples, and threats to vital ecosystem services. Deforestation statistics and trends show that Papua lost approximately 9,062 km² of forest cover between 2001 and 2021, with higher deforestation rates in semi-urban and urban areas. Although the threat of deforestation in Papua is lower than in other provinces, land conversion for plantations and mining is predicted to increase in the future (Abood et al., 2015; Austin et al., 2019; Margono et al., 2014; Pramudya et al., 2023). Deforestation also causes a decline in biodiversity and significant carbon emissions (Margono et al., 2014; Murdjoko et al., 2022).



Worse still, large-scale mining operations such as Grasberg have caused the loss of 138 kilometres of forest and pollution of the Ajkwa River, impacting the ecosystem and indigenous communities (Apner Krei, 2024; Samosir, 2019). The mangrove and seagrass ecosystems on the coast of Papua have declined in function due to waste, land conversion, and development. This has reduced fish catches, food sources, and the cultural value of indigenous communities such as those in Youtefa Bay (Apner Krei, 2024; Tijjani et al., 2021; Unsworth et al., 2018).

In fact, this local wisdom plays a strategic role not only in increasing fishermen's catches and incomes but also in preserving the social and cultural values that are alive and deeply rooted in the community. One of them is the Tiaytiki local wisdom practice, which is the ancestral wisdom possessed by the indigenous people in Teluk Tanah Merah, Depapre, Jayapura Regency, as a local wisdom-based conservation system that is scientifically in line with the general principles of conservation as stipulated in laws and regulations—covering the management, utilisation, preservation of natural resources, and zoning—even though these rules have not been formalised in written law (Sujarta, 2015). Tiaytiki is the practice of temporal “open-closed” management for a specific area of the sea. The Tiaytiki area is an authority or rights of certain indigenous peoples and clans (Paulangan et al., 2021).

Figure 1.
Local Wisdom in Resource Management



Source: Research Data, 2025.

The practice of Tiaytiki as a form of civic virtue in caring for ecology, such as the practice of local wisdom in several regions including: ‘sasi’ in Maluku, as a customary rule that regulates the management and utilization of natural resources in the sea and on land, whose rules are made based on customary agreements, and only apply to the customary territory area of a country (Gaspersz & Saiya, 2019; Karepesina et al., 2013; Sairiltiata, 2023; Saiya et al., 2017; Xiuping et al., 2010). ‘Hukum Adat Laot’ in Aceh, which was enforced by the Aceh fishing community to maintain order in fishing and the life of the fishing community on the coast (Muslihin et al., 2022; Puspita, 2017; Rizqi et al., 2018; Suriyani & Hayati, 2023). ‘Petik Laut’ in East Java, as a combination of local wisdom and religion for fishermen in expressing gratitude and asking God for salvation help (Juliana et al., 2023; Qomariyah et al., 2024). ‘Lilifuk’ in East Nusa Tenggara, which creates seawater ponds by closing certain areas for several months to one year for ecosystem recovery. During this period, there was no fishing activity or other disturbances in the area (Boikh et al., 2021; Hasriyanti et al., 2021; Surbakti & Leonak, 2020). ‘Mane’e’ in North Sulawesi is a tradition of catching fish *en masse* and working together using traditional fishing gear. Accompanied by customary rules such as the prohibition of fishing in certain areas (*Eha*) to maintain fish stocks (Reppie, 2015; A. Satria, 2016; K. A. Satria, 2016).

However, uniquely, in practice, Tiaytiki involves concrete actions such as periodically closing off marine areas to protect coral reef ecosystems and marine habitats. These closures are preceded by traditional ceremonies that reinforce collective awareness of the importance of protecting creation. In addition to its ecological function, Tiaytiki also fosters social solidarity by distributing customary rights to the sea and applying traditional sanctions against violators of the rules, thereby creating shared responsibility for resource use. Another advantage is the integration of local wisdom and scientific approaches, as seen in the use of environmentally friendly fishing gear aligned with modern conservation principles.

Previous research has found that violations of Tiaytiki culture in Tanah Merah Bay, Jayapura, have caused significant damage to the marine ecosystem. Environmentally unfriendly practices, such as the use of bombs and tuba roots in fishing, threaten the survival of marine life and destroy natural habitats (Yarisetou, 2009). The community that should be protecting and preserving marine resources is instead engaging in destructive activities that run counter to the principles of Tiaytiki local wisdom, which emphasises sustainable management. In addition, the younger generation, who lack understanding and do not fully implement Tiaytiki practices, are exacerbating the situation, further eroding the preservation of local wisdom.

In fact, the damage to nature not only affects biodiversity but also threatens the livelihoods of communities that depend on marine resources. Violations of Tiaytiki local wisdom not only damage the environment but also threaten the survival of communities that depend on marine ecosystems. The local wisdom practices of the Papuan community for managing the sea (ethno-marine conservation) are gradually weakening and degrading. There is a need to transfer Tiaytiki knowledge to the next generation to ensure the ecosystem remains intact (Sujarta et al., 2021). Without this transfer of knowledge, valuable ecological heritage is at risk of disappearing over time, even though it holds the key to sustainable living that the experience and wisdom of our ancestors has tested.

In the view of the local community, the boundaries of Tiaytiki are not only a social agreement, but also a sacred fortress. Its influence is believed to be genuine, as it helps maintain order in the village. Residents refer to this manifestation of power as *“nauna mire”* or *“klaume”*—natural human figures that represent the spirits that guard the area. The presence of these spirits is believed to confer magical powers, which can be invoked through a shaman or *‘sondo’*, a person believed to have the ability to wield supernatural powers, even to harm others (Yarisetou, 2009).

Tiaytiki aligns with the idea of shifting from an anthropocentric to a non-anthropocentric perspective. The belief that supernatural forces protect nature and that violations will bring disaster demonstrates an awareness of the connections between humans, nonhuman entities, and their ecosystems. This aligns with the concept of the ‘ecological self’, which recognises the deep relationship between humans and the nonhuman world (Delorme et al., 2024; Hannis, 2015; Hess, 2024).

This approach fosters ecological virtues such as mindfulness, humility, and ecological reflexivity (Delorme et al., 2024; Pickering, 2019), which, in the context of Tiaytiki, manifest in compliance with customary prohibitions and in respect for nature as a living entity that must be cared for. Tiaytiki can be seen as a meeting point between civic ecology and civic virtue. It emphasises that ecological citizenship is not only built through state legal instruments, but also through local wisdom that combines faith, cosmology, and practical practices in caring for the environment.

This study aims to explore the Tiaytiki practices of the Yepase community in Papua as a form of civic virtue in caring for the ecology, highlighting the cultural values that underpin ecological awareness. Specifically, this study seeks to identify the principles of virtue inherent in Tiaytiki, analyse its contribution to marine and terrestrial environmental conservation, and reveal its role in shaping citizens' collective awareness of ecological responsibility. Furthermore, this study aims to formulate the relevance of Tiaytiki within the framework of civic ecology practices and its implications for the development of contextual, critical, and environmentally sustainable civic education.

Method

This research has been conducted in the indigenous community of Yepase, Papua, using a case study-based qualitative approach to explore in depth the meanings, values, and social practices associated with Tiaytiki local wisdom in the context of citizenship virtue formation. The qualitative approach is used to explore and understand in depth the meanings individuals or groups give to social or human phenomena that have occurred (Creswell, 2015). The research process was conducted from January to September 2025, with research data including primary sources in the form of experiences and narrations about the practice of Tiaytiki from 1 Ondoafi, 5 Tribal Chiefs, 3 Religious Leaders, 10 Community Leaders, 10 Youth Leaders, 3 Yepase Village Government Employees, and 25 Fishermen selected by purposive sampling. The research informants are very relevant because they have in-depth knowledge and direct experience in implementing and preserving Tiaytiki. By involving these key informants, this research can fully capture the dimensions and values of Tiaytiki.

The lattice of data-collection instruments, consisting of an interview lattice on the various dimensions of civic virtue contained in the Tiaytiki teachings, can serve as a model for caring for nature.

Observations related to ecological care, social responsibility, solidarity, cooperation, and adherence to customary institutions. Documentation was taken in the form of Village Regulation documents on Customary Regulations and Management of Land, Coastal, and Marine Natural Resources in 2022, as well as photos, symbols, and signs of Tiaytiki.

Data collection techniques include in-depth interviews, participatory observation, and documentation studies that enrich holistic understanding. The lattice of data-collection instruments, consisting of interviews on the various dimensions of civic virtues contained in the teachings of Tiaytiki, can serve as models for caring for nature. Observations on concrete actions related to ecological care, social responsibility, solidarity, gotong royong, and adherence to customary institutions. Documentation was taken in the form of Village Regulations on Customary Regulations and Management of Land, Coastal and Marine Natural Resources in 2022, as well as photos, symbols, and signs of Tiaytiki.

Source triangulation involves testing data across multiple informants. Source triangulation can enhance data trustworthiness by checking the data obtained during the research across multiple sources or informants, so that a conclusion is drawn from data analysed across various sources by researchers. Source triangulation is a cross-check of data by comparing facts from one source with other sources (Sugiyono, 2016). The researcher compared information on the implementation of Tiaytiki across different categories of informants: Ondoafi, Tribal Chiefs, Religious Leaders, Community Leaders, Youth, Village Officials, and Fishermen.

Triangulation of techniques, meaning using different data collection methods to get data from the same data source (Sugiyono, 2014). Researchers used participant observation, in-depth interviews, and documentation as data sources simultaneously for the implementation of Tiaytiki. Time triangulation tests credibility by checking data through observation, interviews, or other techniques at different times or in different situations and is repeated until the data are certain (Sugiyono, 2014). Researchers repeated the observation and interview process at different times during the January-September 2025 research.

Results and Discussion

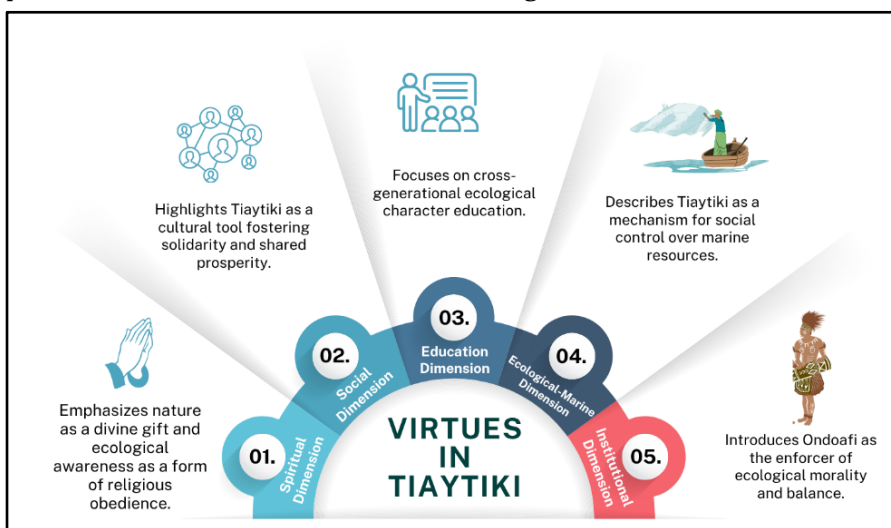
The Dimension of Civic Virtue in Tiaytiki

There are five dimensions of civic virtue in Tiaytiki: spiritual, social, educational, marine-ecological, and institutional, which were discovered through research and serve as a model for caring for nature.

The spiritual dimension is reflected in the awareness of the Yapase indigenous people, who regard nature as a gift from God. Tiaytiki is practised by them not only as a customary rule but also as a form of 'living faith', and it teaches them to care for the land, sea, and forest as a religious observance. Customary prohibitions governing marine or forest resources are not intended to limit the freedom to take their products, but rather to maintain the continuity of life for present and future generations.

Figure 2.

Spiritual, Social, Educational, Marine Ecological, and Institutional Dimensions in Tiaytiki



Source: Research Data, 2025.

Yapase people embody Tiaytiki as virtues, including gratitude, loyalty to faith, and respect for God's creation, as moral actions. In the Yapase Village document on Village Regulations on Customary Regulations and Management of Land, Coast and Marine Natural Resources in 2022, it is written that the potential of land, coastal, and marine natural resources is a gift given by God; therefore, it must be managed and preserved for the benefit of present and future generations. Their ecological spiritual awareness can foster personal responsibility and a moral duty to respect natural ecosystems. People with open and sensitive hearts can see, experience, and enjoy nature as a gift from God (Lane, 2023; Ranja et al., 2023). Spirituality can strengthen a sense of responsibility towards nature, making caring for nature a moral duty (Dodlek, 2022; Omoyajowo et al., 2023).

In addition to its spiritual dimension, Tiaytiki also embodies a social dimension that binds indigenous people in solidarity, brotherhood, and an orderly life in caring for nature. In practice, when a certain area of the sea is "closed", all Yapase indigenous people, in accordance with the prohibition, refrain from collecting marine products. When the prohibition period ends, sea products are "opened" for moderate consumption to fulfil the needs of the family, traditional events, and the community. The "open-close" system of a certain area at a certain time to provide opportunities for certain biota to breed, such as fish, sea cucumbers, lola, and various other economic biota (Indriana et al., 2023).

Tiaytiki creates order in the community. They already know when and how the seafood is taken. There is no fighting over resources and no conflict between families. It serves as a cultural instrument that encourages people to care for one another, live in harmony, and maintain family ties. The practice of Tiaytiki, carried out through customary prohibitions, fosters collective awareness of the importance of working together to conserve natural resources. These virtuous values emphasise that peaceful, orderly, and just living in the community cannot be separated from environmental management practices. In other words, Tiaytiki unites citizens in a vision of shared prosperity, so its social virtues lie in continued solidarity, justice, and order.

In addition, Tiaytiki passes on educational values to the younger generation, taught through ancestral stories, sacred symbols, and parental advice. The next generation is taught not only about cultural prohibitions but also about the meaning of living in harmony with nature. In this dimension, Tiaytiki becomes a means of ecological character education, instilling discipline, simplicity, and environmental awareness. The younger generation learns that obeying Tiaytiki is the path to blessings, constancy, and protection in life. The educational values embodied in Tiaytiki include the ability to instil ecological awareness and social solidarity in a sustainable way, ensuring their relevance in building a balanced and civilised society. Children and young people also learn from their parents about which fishing gear can and cannot be used, as well as the ethical reasons behind this. This knowledge is not transmitted through formal classes, but rather through traditional rituals and daily practices. This aligns with the concept of ecological citizenship education, which emphasises the importance of community and environment-based learning as a space for developing ecological awareness (Krasny et al., 2014).

In the Village Regulation on Customary Regulations and Management of Land, Coastal and Marine Natural Resources in 2022, Section 2, article 20, it is written that: Tiaytiki activities carried out in certain locations must be given a prohibition sign in the form of young sago leaf shoots (*finday*), wooden branches, or bamboo. Prohibition signs are issued by the *Ondoafi* (Tou Yarise), or Tribal Chief (Yaro), together with the indigenous community, and are coordinated with the Yapase Village Customary Council.

The next generation of Yapase learned that these signs are not just objects, but also moral warnings. Children are also taught by their parents that customary tenure over the sea includes the '*akadame*' area, which extends from the low tide line to the high tide line and is 12 metres deep. The '*kia-kia*' part of the sea that is 12-25 metres deep, the '*nau koti*' part of the sea that is 25-100 metres deep, and the '*beta nau*' part of the sea that is 100 metres deep up to the Pacific open ocean zone. In Yarisetou (2009), it was explained that *akadame*, *kia-kia*, and *nau koti* are considered customary rights areas where Tiaytiki can be applied. Fish and all marine life can safely breed in this area, creating a haven from ocean currents. While *Beta Nau* is a free sea zone that does not fall under Tiaytiki customary rules, it is free for everyone to take its products.

In the ecological-maritime dimension, there is community surveillance of the sea. Bans on destructive fishing gear, such as fish bombs or poisons, reflect public concern for the ecological future and future generations. This concern aligns with the concept of 'marine citizenship', which emphasises that current human actions will determine the sustainability of marine ecosystems in the future

(McKinley & Fletcher, 2012). Tiaytiki is not just a ritual, but an instrument of civic virtue that maintains ecological balance

The value of responsibility is evident in the practice of Tiaytiki. Each indigenous group has an obligation to preserve the marine environment in accordance with agreed rules. The principle that 'rights are always balanced with obligations' that prevails in Yapase demonstrates an ecological ethics grounded in collective responsibility. The theory of maritime citizenship reinforces this: true citizens not only demand their right to utilise resources but also assume the responsibility to take care of them (Garcia-Vazquez et al., 2023). This mutual awareness strengthens the community's ethos in facing the threat of excessive exploitation.

Solidarity is also a key value that binds the Yapase community through Tiaytiki. The prohibition of fishing in certain zones during the holy period is observed not only by the locals but also by visitors. This collective solidarity shows a moral consensus to protect the ocean for the common good. According to Buchan et al. (2023), solidarity in maritime citizenship requires collective action, whether through campaigns, education, or participation in policymaking. In other words, Tiaytiki teaches ecological solidarity that goes beyond personal interests for the sake of collective well-being.

In other words, Tiaytiki teaches ecological solidarity that transcends self-interest in favour of collective well-being. Harmony with nature is also evident in the way the Yapase people treat the marine ecosystem. The use of traditional fishing gear such as rowboats, hooks, and small nets reflects a balanced relationship between humans and nature: taking only what is needed, not too much. This harmony is reminiscent of the concept of *'thalassophilia'* or emotional attachment to the sea, which encourages residents to preserve the ecosystem as part of their identity (Buchan et al., 2023). In other words, the ocean is not only an economic resource, but also part of a community's spiritual and cultural existence. Community involvement in complying with ecological restrictions demonstrates active participation in the management of shared resources. For example, when Tiaytiki is enforced, the whole community works together to monitor the marine area to ensure the ban is not violated. This confirms the view of Reysen and Katzarska-Miller (2013) that social participation and community education can strengthen people's ecological identity. Tiaytiki becomes a place for ecological citizenship learning that forms a collective habitus.

The findings also show how customary institutions, through the authority of the Ondoafi, play a central role in enforcing Tiaytiki rules. This authority not only regulates relations between indigenous peoples but also ensures the continuity of human relations with ancestral spirits and nature. This customary authority reinforces collective compliance, as customary norms are considered more binding than formal state regulations. Within the framework of maritime citizenship theory, customary authority can be understood as effective community governance in building citizens' ecological awareness (Buchan et al., 2024).

The spiritual, social, educational, marine-ecological, and institutional values make Tiaytiki a meaningful practice of civic ecology. It not only conserves ecological resources, but also moulds ecologically minded, critical, and sustainability-oriented citizens. Ocean citizenship theory supports these findings by emphasising that true citizenship extends beyond formal legal compliance to encompass moral commitment and collective action to protect the ocean. Tiaytiki should be understood as local wisdom that brings the virtues of ecological citizenship to life in Papua.

The virtues of Tiaytiki are strongly reflected in the spiritual awareness of the Yapase people, who regard nature as a gift from God. Tiaytiki is understood not merely as customary rules, but as a 'living faith' that teaches the community to care for the land, sea, and forests as a form of religious obedience. Customary prohibitions governing the harvesting of marine resources or the use of forests are not intended to restrict freedom, but rather to preserve the continuity of life for present and future generations. Tiaytiki embodies virtues such as gratitude, loyalty to faith, and respect for God's creation as noble moral and spiritual actions.

In addition to its spiritual dimension, Tiaytiki also embodies social virtues that bind communities together in solidarity, brotherhood, and orderly living. It serves as a cultural instrument that encourages communities to care for one another, live harmoniously, and maintain family ties. Tiaytiki practices, which are carried out through customary prohibitions, foster a collective awareness of the importance of working together to preserve natural resources. These virtuous values emphasise that peaceful, orderly, and fair living in the community cannot be separated from environmental stewardship

practices. In other words, Tiaytiki unites citizens in a vision of shared prosperity, so that its social virtues lie in solidarity, justice, and sustainable order.

In addition, Tiaytiki passes on educational values to the younger generation through ancestral stories, sacred symbols, and parental advice. The next generation is not only taught about cultural prohibitions, but also about the meaning of living in harmony with nature. In this dimension, Tiaytiki becomes a means of ecological character education, instilling discipline, simplicity, and environmental awareness. The younger generation learns that obeying Tiaytiki is the path to blessings, steadfastness, and protection in life. Thus, the educational virtues contained in Tiaytiki are the ability to instil ecological awareness, spirituality, and social solidarity sustainably, so that its values remain relevant in building a balanced and civilised civilisation.

Furthermore, research findings in Yapase indicate that the practice of Tiaytiki functions as a social control mechanism that regulates citizens' behaviour towards the sea. The prohibition of destructive fishing gear, such as fish bombs or poison, reflects the community's concern for the ecological future and future generations. This concern aligns with the concept of 'marine citizenship,' which emphasises that human actions today will determine the sustainability of marine ecosystems in the future (McKinley & Fletcher, 2012). Tiaytiki is not merely a ritual, but an instrument of civic virtue that maintains ecological balance.

The value of responsibility is evident in Tiaytiki practices. Every individual and indigenous group has an obligation to preserve the marine and terrestrial environment in accordance with agreed-upon rules. The principle of 'rights are always balanced with obligations' that applies in Yapase demonstrates an ecological ethic based on collective responsibility. The theory of maritime citizenship reinforces this: true citizens not only demand their rights to utilise resources but also bear the responsibility to care for them (Garcia-Vazquez et al., 2022). This mutual awareness strengthens the community ethos in facing the threat of excessive exploitation.

Solidarity is also a key value that binds the Yapase community through Tiaytiki. The ban on fishing in certain zones during sacred periods is observed not only by residents but also by visitors. This collective solidarity demonstrates a moral consensus to protect the sea for the common good. According to Buchan et al. (2023) solidarity in marine citizenship requires collective action, whether through campaigns, education, or participation in policymaking. In other words, Tiaytiki teaches ecological solidarity that transcends personal interests in favour of collective well-being.

Harmony with nature is also evident in the Yapase community's treatment of the marine ecosystem. The use of traditional fishing gear, such as rowing boats, hooks, and small nets, reflects a balanced relationship between humans and nature: taking only what is needed, not too much. This harmony is reminiscent of the concept of '*thalassophilia*' or emotional attachment to the sea, which encourages residents to preserve the ecosystem as part of their identity (Buchan et al., 2023). In other words, the sea is not merely an economic resource, but also part of the spiritual and cultural existence of the community.

Community involvement in complying with ecological prohibitions demonstrates active participation in the management of shared resources. For example, when Tiaytiki is enforced, the entire community works together to monitor the marine area to ensure that the ban is not violated. This confirms the view of Reysen and Katzarska-Miller (2013) that social participation and community education can strengthen residents' ecological identity. Thus, Tiaytiki becomes an arena for learning ecological citizenship, shaping collective habitus.

In addition to being an ecological practice, Tiaytiki also serves as ecological moral education. Children and young people learn from their parents about which fishing gear may and may not be used, as well as the ethical reasons behind this. This knowledge is not transmitted through formal classes, but rather through traditional rituals and daily practices. This aligns with the concept of civic ecology education, which emphasises the importance of community-based learning and the environment as a space for developing ecological awareness (Krasny et al., 2014).

The findings also show how customary institutions, through the authority of the *Ondoafi*, play a central role in enforcing Tiaytiki rules. This authority not only regulates relations between citizens but also ensures the continuity of human relations with ancestral spirits and nature. This customary power reinforces collective compliance, as customary norms are considered more binding than formal regulations. Within the framework of maritime citizenship theory, customary authority can be

understood as a form of community governance that effectively fosters citizens' ecological awareness (Buchan et al., 2024).

The values of virtue—caring, responsibility, solidarity, and harmony with nature—make Tiaytiki a meaningful practice of civic ecology. It not only preserves ecological resources but also shapes citizens who are ecologically minded, critical, and sustainability-oriented. The theory of marine citizenship supports this finding by emphasising that true citizenship does not stop at formal legal compliance but is manifested in moral commitment and collective action to protect the sea. Tiaytiki should be understood as local wisdom that brings the virtues of ecological citizenship to life in Papua.

Tiaytiki Contribution to Ecology

The practice of Tiaytiki in Yapase serves as a social control mechanism that regulates the behaviour of coastal communities in managing the sea. The local expression '*Simisyanupuku nesate ke mekeye...*' emphasises the strict prohibition of destructive fishing gear, as its impact is not only on ecosystem damage but also on the suffering of future generations. This rule is not merely a technical prohibition, but a moral norm that binds all citizens to refrain from greedy exploitation. Tiaytiki acts as a cultural barrier that prevents ecological damage while instilling a sense of intergenerational responsibility.

In daily practice, the Yapase community prefers environmentally friendly fishing equipment such as rowing boats, small motorboats (Jhonzon), hooks, spears, small nets, and traditional fish traps. This equipment is not merely a technical choice, but a manifestation of compliance with the decisions of traditional institutions, which are reinforced through the Tiaytiki ritual (Yarisetou, 2009). Every prohibition and recommendation becomes effective when framed within customary symbolism that provides spiritual legitimacy. This shows that customary rules are not outdated norms but ecological instruments that remain relevant amid modernisation.

The enforcement of no-take zones in the *Nau Koti*, *Akadame*, and *Kia-Kia* areas demonstrates the Yapase community's seriousness in protecting the marine ecosystem. During the closure period, neither local nor visiting fishermen are permitted to harvest marine resources. This rotational system allows the ecosystem to recover, ensuring that fish populations and other marine life remain sustainable. This mechanism is similar to the *sasi* system in Raja Ampat, which restricts access to resources to maintain sustainability (Lionata et al., 2025; Mentansan et al., 2023; Prasetyo et al., 2020; Touwe, 2020). *Tiaytiki* can be seen as a local form of marine ethnoconservation in Papua.

Another aspect that reinforces Tiaytiki's role is the principle of balancing rights and obligations within the community. Residents have the right to manage and utilise marine resources, but the obligation to protect the reef, respect customary boundaries, and maintain relationships with ancestors is a key prerequisite. Even an Ondoafi, the highest customary leader, has an obligation to protect the community's resources and welfare in addition to his right to impose sanctions. This relationship between rights and obligations ensures that marine management is grounded not only in economics but also in ethics and ecological spirituality.

Field findings show that Yapase fishermen catch fish selectively and proportionally. Small fish such as *kombong* and *paneombang* are preserved because they serve as bait, attracting large predators. By taking only what they need, the community maintains the balance of the marine food chain. Observations of the reef reveal the beauty of healthy coral reefs, inhabited by diverse biota, which serve as an indicator of the success of traditional practices in preserving the ecology. This awareness aligns with community ecology theory, which emphasises the importance of local-based regulation in preventing overfishing.

The ecological knowledge of the Yapase community is also evident in their understanding of the west wind season (*yaru ya*) and the east wind season (*yamka ya*). When the sea is rough, fishermen choose to repair their equipment and allow the sea to rest, giving fish and other marine life a chance to regenerate. This pattern aligns with the traditional ecological view that nature has a rhythm to be respected. This practice is like the *Abanfan matilon* tradition in Liki, Sarmi, which regulates sea harvesting through a customary cycle (Keiluhu et al., 2023). Thus, Tiaytiki has become an ecological educational tool passed down from generation to generation. Yapase indigenous people have always kept the core moral teachings on ecology in Tiaytiki to avoid being affected by the pressures of modernisation. They demonstrated civic virtue by exercising Tiaytiki's dual functions as an ecological defence and a moral negotiation tool against modernising influences. When more modern fishing

technologies emerged, the community continued to apply the principle of “rights balanced with obligations” and rejected destructive modern fishing gear.

The joint rejection of environmentally unfriendly fishing gear shows that modernisation does not necessarily eliminate customary rules, but rather challenges them to renew themselves. By strengthening customary institutions and formal legal mechanisms in synergy, Tiaytiki can transform into an ecological management system that combines local knowledge with modern government regulations. At this point, Tiaytiki demonstrates cultural resilience by not opposing change but rather directing it toward maintaining harmony and balance in nature and social morality.

Theoretically, Tiaytiki's contribution to marine ecology can be understood within the framework of civic ecology practices (Krasny et al., 2014). The direct participation of residents in protecting no-take zones, complying with customary rules, and participating in traditional ceremonies demonstrates tangible citizen-based ecological engagement. Virtues such as care, responsibility, and humility towards the sea are reflected in these practices (Beau, 2023; Delorme et al., 2024; Hannis, 2015). Tiaytiki is not only a cultural tradition but also an ecological civic virtue relevant to environmental education and sustainable development in Papua.

The Formation of Ecological Civic Virtue

The formation of ecological civic virtue in the Yapase community shows how Tiaytiki traditional values serve as the foundation for environmental sustainability-oriented civic ethics. Environmental virtue ethics theory emphasises the importance of habits of care, responsibility, and harmony with nature as the basis for the formation of citizens' ecological character (Beau, 2023; Jordan & Kristjánsson, 2017). This aligns with Tiaytiki practices that regulate the sacred use of natural resources, thereby forming a collective discipline to live in harmony with the ecosystem.

Field findings show that Tiaytiki is understood as both an expression of faith in God and an ecological protection mechanism. Customary prohibitions, such as not taking marine life before a specified time, serve as instruments of social control that ensure the sustainability of resources. Within the framework of civic ecology, this practice is not merely a traditional rule, but a form of active citizen participation in caring for the shared ecology (Bartkieni  et al., 2018; Hess, 2024)

The relationship between environmental virtue ethics and ecological civic virtue is evident in the Yapase community's awareness of nature as a moral subject rather than merely an object of exploitation. The non-anthropocentric perspective in environmental virtue theory emphasises that other living beings and ecosystems also deserve protection (Delorme et al., 2024; Di Paola, 2024). In the context of Tiaytiki, this is realised through customary prohibitions that guarantee the regeneration of marine life and the preservation of forests as a legacy for future generations.

The spiritual values in Tiaytiki expand the dimension of civic virtue by making care for nature an expression of faith and worship. Informants emphasised that damaging nature is considered a *sin*, while protecting it is a form of gratitude and obedience to God. Ecotheology supports this view by placing humans in the role of responsible stewards of creation (Latta, 2007; Misra, 2023). Ecological civic virtue in Yapase is not only rational but also religious. The social solidarity that arises from Tiaytiki practices shows that ecological virtue is not only about protecting nature but also about nurturing social bonds. Customary prohibitions strengthen a sense of togetherness, mutual care, and build collective loyalty to customary spatial arrangements. This aligns with civic virtue theory, which emphasises the importance of citizen participation in maintaining the common good through concrete actions in the socio-ecological sphere (Bartkieni  et al., 2018; Beau, 2023).

The younger generation in Yapase learns ecological civic virtue through the Tiaytiki tradition, both through sacred symbols such as sago palm leaves (*finday*) and ancestral stories. The values of discipline, solidarity and ecological awareness are instilled from an early age, forming a strong ecological habitus. Theoretically, this shows how environmental ethics can be internalised through non-formal education based on local traditions (Foley-Keene, 2025). Thus, ecological civic virtue has intergenerational continuity.

This study proves that Tiaytiki is a tangible manifestation of environmental virtue ethics that gives rise to ecological civic virtue in Yapase. This practice successfully balances spiritual, social, and ecological interests while demonstrating that citizenship can be interpreted contextually and ecologically. The theory of ecological civic virtue is empirically validated by the Tiaytiki customary

practice, which not only preserves nature but also strengthens citizens' morality in an era of global environmental crisis.

Conclusion

Tiaytiki has been practised as a local customary rule rich in civic virtues that promote sustainable ecological management within the Yapase indigenous community, functioning as a spiritual, social, educational, marine-ecological, and institutional model of environmental stewardship. It also represents a moral framework emphasising collective responsibility, social solidarity, and spiritual awareness, thereby fostering harmony between humans and nature. This practice plays a significant role in managing natural resources sustainably, as reflected in the prohibition of destructive fishing gear, the establishment of no-take zones, and the principle of balancing rights and obligations, all of which serve as effective social control mechanisms to prevent overexploitation. At the same time, Tiaytiki encourages active community participation in preserving marine ecosystems while strengthening social cohesion. However, this research has several limitations that should be considered. Its focus on the Yapase indigenous community in Jayapura Regency, Papua, limits the contextual relevance and generalisability of the findings to other indigenous communities in Papua and Indonesia. Tiaytiki possesses unique local characteristics across spiritual, social, educational, marine-ecological, and institutional dimensions, which may require different interpretations in other cultural contexts. Additionally, the qualitative single case study approach provides in-depth insights. Still, it lacks cross-case comparisons, limiting the ability to explain variations in ecological civic virtue practices across different coastal communities. Therefore, future research should adopt comparative approaches involving other indigenous communities and integrate transdisciplinary perspectives to strengthen empirical evidence on ecological impacts.

Disclosure Statement

The author does not have any potential conflict of interest to disclose.

Funding Statement

This work did not receive any specific funding.

Ethics Approval

Ethics approval was not required because this study did not involve human participants.

References

- Abood, S. A., Lee, J. S. H., Burivalova, Z., Garcia-Ulloa, J., & Koh, L. P. (2015). Relative contributions of the logging, fiber, oil palm, and mining industries to forest loss in Indonesia. *Conservation Letters*, 8(1), 58–67. <https://doi.org/10.1111/conl.12103>
- Austin, K. G., Schwantes, A., Gu, Y., & Kasibhatla, P. S. (2019). What causes deforestation in Indonesia? *Environmental Research Letters*, 14(2), 024007. <https://doi.org/10.1088/1748-9326/aaf6db>
- Bartkienė, A., Bikauskaitė, R., & Šaulauskas, M. P. (2018). Ecological citizenship: Habitus of care in the public sphere. *Problemos*, 93, 129–141. <https://doi.org/10.15388/Problemos.2018.93.11757>
- Beau, R. (2023). The ecological community: The blind spot of environmental virtue ethics. *Philosophies*, 8(6), 112. <https://doi.org/10.3390/philosophies8060112>
- Boikh, L. I., Dewi, I. A. L., Bessie, D. M., & Djonu, A. (2021). Persepsi masyarakat terhadap potensi sumberdaya pesisir di daerah Lilifuk Desa Bolok. *Jurnal Bahari Papadak*, 2(2).
- Buchan, P. M., Evans, L. S., Barr, S., & Pieraccini, M. (2024). Thalassophilia and marine identity: Drivers of 'thick' marine citizenship. *Journal of Environmental Management*, 352, 120111. <https://doi.org/10.1016/j.jenvman.2024.120111>
- Buchan, P. M., Evans, L. S., Pieraccini, M., & Barr, S. (2023). Marine citizenship: The right to participate in the transformation of the human-ocean relationship for sustainability. *PLOS ONE*, 18(3), e0280518. <https://doi.org/10.1371/journal.pone.0280518>
- Creswell, J. W. (2015). *Penelitian kualitatif dan desain riset*. Pustaka Pelajar.
- Delorme, D., Calidori, N., & Frigo, G. (2024). Ecological virtuous selves: Towards a non-anthropocentric environmental virtue ethic? *Philosophies*, 9(1), 11. <https://doi.org/10.3390/philosophies9010011>
- Di Paola, M. (2024). Virtue, environmental ethics, nonhuman values, and anthropocentrism. *Philosophies*, 9(1), 15. <https://doi.org/10.3390/philosophies9010015>

- Dodlek, I. (2022). Ecological spirituality. *Bogoslovska Smotra*, 91(5), 1005–1036. <https://doi.org/10.53745/bs.91.5.7>
- Foley-Keene, M. (2025). A green Rosa: Toward a Luxemburgian environmental ethic. *Philosophy & Social Criticism*. <https://doi.org/10.1177/01914537251334842>
- Garcia-Vazquez, E., Garcia-Ael, C., Mesa, M. L. C., Dopico, E., & Rodriguez, N. (2022). Enhancing marine citizenship as a strategy to promote the reduction of single-use plastics consumption in different cultures. *Frontiers in Marine Science*, 9. <https://doi.org/10.3389/fmars.2022.941694>
- Garcia-Vazquez, E., Garcia-Ael, C., Mesa, M. L. C., Rodriguez, N., & Dopico, E. (2023). Greater willingness to reduce microplastics consumption in Mexico than in Spain supports the importance of legislation on the use of plastics. *Frontiers in Psychology*, 13, 1027336. <https://doi.org/10.3389/FPSYG.2022.1027336>
- Gaspersz, E. J., & Saiya, H. G. (2019). Pemetaan kearifan lokal budaya Sasi di Negeri Haruku dan Negeri Kailolo, Pulau Haruku, Kabupaten Maluku Tengah. *Seminar Nasional Geomatika*, 3. <https://doi.org/10.24895/sng.2018.3-0.933>
- Hannis, M. (2015). The virtues of acknowledged ecological dependence: Sustainability, autonomy and human flourishing. *Environmental Values*, 24(2), 145–164. <https://doi.org/10.3197/096327114X13947900181437>
- Hasriyanti, Saputro, A., & Isromi, A. (2021). Kearifan lokal Lilifuk di Nusa Tenggara Timur dalam. *Jurnal Environmental Science*, 4(1).
- Hess, G. (2024). Virtue ethics and the ecological self: From environmental to ecological virtues. *Philosophies*, 9(1), 23. <https://doi.org/10.3390/philosophies9010023>
- Indriana, H., Fatchiya, A., Hafinuddin, H., & Akbar, H. (2023). Kondisi kearifan lokal pengelolaan sumberdaya perikanan di Indonesia: Sebuah tinjauan. *Jurnal Perikanan Tropis*, 10(1), 43–68.
- Jordan, K., & Kristjánsson, K. (2017). Sustainability, virtue ethics, and the virtue of harmony with nature. *Environmental Education Research*, 23(9), 1205–1229. <https://doi.org/10.1080/13504622.2016.1157681>
- Juliana, I., Safitri, N. L., & Fadillah, W. (2023). Pemaknaan tradisi Petik Laut bagi masyarakat pesisir. *TUTURAN: Jurnal Ilmu Komunikasi, Sosial dan Humaniora*, 1(2), 218–232.
- Karepesina, S. S., Susilo, E., & Indrayani, E. (2013). Eksistensi hukum adat dalam melindungi pelestarian Sasi ikan lompaa di Desa Haruku Kabupaten Maluku Tengah. *ECISOFiM (Economic and Social of Fisheries and Marine Journal)*, 1(1).
- Kartikasari, S. N., Marshall, A. J., & Beehler, B. (2012). *Ekologi Papua* (No. 6). Yayasan Pustaka Obor Indonesia.
- Keiluhu, H. J., Sujarta, P., Suharno, S., Mailissa, M. G., Hadisusanto, S., Yuliana, S., & Setyawan, A. D. (2023). Abanfan matilon, a local wisdom in marine ethnoconservation system on the coast of Liki Island, Sarmi District, Papua, Indonesia. *Biodiversitas Journal of Biological Diversity*, 24(9). <https://doi.org/10.13057/biodiv/d240909>
- Krasny, M. E., Russ, A., Tidball, K. G., & Elmqvist, T. (2014). Civic ecology practices: Participatory approaches to generating and measuring ecosystem services in cities. *Ecosystem Services*, 7. <https://doi.org/10.1016/j.ecoser.2013.11.002>
- Krei, A. (2024). Youtefa Bay: Dealing with pollution threats and ecosystem conservation. *Formosa Journal of Social Sciences (FJSS)*, 3(3), 833–850. <https://doi.org/10.55927/fjss.v3i3.11574>
- Lane, D. (2023). *Nature praising God*. Liturgical Press.
- Latta, P. A. (2007). Locating democratic politics in ecological citizenship. *Environmental Politics*, 16(3), 377–393. <https://doi.org/10.1080/09644010701251631>
- Lionata, H., Soemodinoto, A., Awaludinnoer, Tjoe, S., Rumetna, L., & Butt, N. (2025). Women managers, local wisdom, and customary practice in marine conservation, Raja Ampat, Papua. *Bulletin of Marine Science*, 101(1), 379–390. <https://doi.org/10.5343/bms.2023.0115>
- Margono, B. A., Potapov, P. V., Turubanova, S., Stolle, F., & Hansen, M. C. (2014). Primary forest cover loss in Indonesia over 2000–2012. *Nature Climate Change*, 4(8), 730–735. <https://doi.org/10.1038/nclimate2277>
- McKinley, E., & Fletcher, S. (2012). Improving marine environmental health through marine citizenship: A call for debate. *Marine Policy*, 36(3), 839–843. <https://doi.org/10.1016/j.marpol.2011.11.001>

- Mentansan, G., Nauw, M., Awom, R., Ayorbaba, M., Lumi, J., & Reeve, D. (2023). Sasi local wisdom as a cultural capital for sustainable tourism development in Raja Ampat Regency, West Papua. *International Journal of Green Tourism Research and Applications*, 5(1), 52–59. <https://doi.org/10.31940/ijogtra.v5i1.52-59>
- Misra, M. (2023). Practicing ecological citizenship through community supported agriculture: Opportunities, challenges, and social justice concerns. *Culture, Agriculture, Food and Environment*, 45(1), 21–33. <https://doi.org/10.1111/cuag.12306>
- Murdjoko, A., Brearley, F. Q., Ungirwalu, A., Djitmau, D. A., & Benu, N. M. H. (2022). Secondary succession after slash-and-burn cultivation in Papuan lowland forest, Indonesia. *Forests*, 13(3), 434. <https://doi.org/10.3390/f13030434>
- Muslihin, M., Wahyudi, W., Rahman, A. A., & Zahara, A. (2022). Kearifan lokal Panglima Laot dalam pengelolaan pesisir di Kabupaten Bireuen sebagai bahan kajian matakuliah oceanografi. *Jurnal Pendidikan Geosfer*, 7(2). <https://doi.org/10.24815/jpg.v7i2.29819>
- Omoyajowo, K., Danjin, M., Omoyajowo, K., Odipe, O., Mwadi, B., May, A., Ogonyebi, A., & Rabie, M. (2023). Exploring the interplay of environmental conservation within spirituality and multicultural perspective: Insights from a cross-sectional study. *Environment, Development and Sustainability*, 26(7), 16957–16985. <https://doi.org/10.1007/s10668-023-03319-5>
- Paulangan, Y. P., Sutrisno, D., Bengen, D. G., Fahrudin, A., Subarno, T., & Affandi, Z. (2021). Conservation zonation design of coral reef areas in Depapre Bay, Papua Province, Indonesia. *International Journal of Conservation Science*, 12(3).
- Pickering, J. (2019). Ecological reflexivity: Characterising an elusive virtue for governance in the Anthropocene. *Environmental Politics*, 28(7), 1145–1166. <https://doi.org/10.1080/09644016.2018.1487148>
- Pramudya, F. S., Bong, L., Rolling, E., Awirya, A. A., & Gunawan, A. A. S. (2023). Forest loss analysis and calculation with geospatial artificial intelligence: A case study of Papua Province. *Procedia Computer Science*, 216, 346–355. <https://doi.org/10.1016/j.procs.2022.12.145>
- Prasetyo, N., Carr, A., & Filep, S. (2020). Indigenous knowledge in marine ecotourism development: The case of Sasi Laut, Misool, Indonesia. *Tourism Planning & Development*, 17(1), 46–61. <https://doi.org/10.1080/21568316.2019.1604424>
- Puspita, M. (2017). Kearifan lokal dalam pengelolaan sumber daya pesisir dan laut hukum adat Laot dan lembaga Panglima Laot di Nanggroe Aceh Darussalam. *Sabda: Jurnal Kajian Kebudayaan*, 3(2). <https://doi.org/10.14710/sabda.v3i2.13253>
- Qomariyah, R. S., Firdausy, A. N., Kurniawati, A., Puspita, D., & Zamili, F. (2024). Tradisi Petik Laut sebagai pelestarian kearifan lokal di pesisir Mayangan Probolinggo. *Jurnal Pendidikan Sosial dan Konseling*, 1(4), 1141–1143.
- Rahman, B. A. W., Karjaya, L. P., Dewanto, P. A., & Estriani, H. N. (2023). Peran Greenpeace Indonesia dalam melindungi Lembah Grime Nawa dari deforestasi di Papua. *Indonesian Journal of Peace and Security Studies (IJPSS)*, 5(2), 91–114.
- Ranja, A., Juhani, S., & Sudhiarsa, R. (2023). Pastoral experience as a driver of encounter with God. *Mysterium Fidei: Journal of Asian Empirical Theology*, 1(2), 102–115.
- Reppie, E. (2015). Local wisdom Mane'e and its impact on fish resources and environment in Nanusa Islands, North Sulawesi, Indonesia. *J. Bio. & Env. Sci*, 2015(6).
- Reysen, S., & Katzarska-Miller, I. (2013). A model of global citizenship: Antecedents and outcomes. *International Journal of Psychology*, 48(5), 858–870. <https://doi.org/10.1080/00207594.2012.701749>
- Rizqi, R., Simbolon, D., & Mustaruddin, M. (2018). Interaksi kebijakan perikanan tangkap dan kearifan lokal di perairan utara Aceh. *ALBACORE Jurnal Penelitian Perikanan Laut*, 1(3). <https://doi.org/10.29244/core.1.3.257-264>
- Sairiltiata, S. (2023). Eksistensi Sasi perempuan sebagai kearifan lokal adat dan budaya di Desa Moning Pulau Wetar Kecamatan Wetar Timur Kabupaten Maluku Barat Daya. *Indonesia Journal of Business Law*, 2(2). <https://doi.org/10.47709/ijbl.v2i2.2317>
- Saiya, H. G., Heij, C. J., Cahyono, T. D., Amarlita, D. M., Ralahallo, F. N., & Persulesy, G. (2017). Kearifan lokal masyarakat adat di Maluku untuk konservasi burung gosong Maluku (*Eulipoa wallacei*). *Prosiding Seminar Nasional & CFP I IDRI*.

- Samosir, H. (2019). Problematic policy: Environmental impacts of traditional mining in Papua. *Hasanuddin Law Review*, 5(3). <https://doi.org/10.20956/halrev.v3i3.2219>
- Satria, A. (2016). Analysis of institutional and sustainability Eha Laut and Mane'e as community based coastal resource management. *Sodality: Jurnal Sosiologi Pedesaan*.
- Satria, K. A. (2016). Analysis of institutional marine eha and mane'e as community-based (coastal) resources management. *Sustainable Tourism VII*, 1. <https://doi.org/10.2495/st160181>
- Sugiyono. (2014). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*. Alfabeta.
- Sugiyono. (2016). *Metode penelitian pendidikan*. Alfabeta.
- Sujarta, P. (2015). *Sistem konservasi Tiyaitiki dengan pendekatan biologi di perairan Teluk Tanah Merah, Depapre, Jayapura*. Universitas Gadjah Mada.
- Sujarta, P., Renyoet, A., & Dimara, L. (2021). Kajian sistem etno konservasi laut masyarakat pesisir Papua: Sasisen dan Tiyaitiki. *Jurnal Education and Development*, 9(1).
- Surbakti, J. A., & Leonak, S. P. P. (2020). Kajian profil kearifan lokal Lilifuk: Traditional ecological knowledge (TEK) di Desa Kuanheum. *Jurnal Sumberdaya Akuatik Indopasifik*, 4(2). <https://doi.org/10.46252/jsai-fpik-unipa.2020.vol.4.no.2.114>
- Suriyani, M., & Hayati, V. (2023). Revitalisasi hukum adat Laot sebagai kearifan lokal masyarakat nelayan dalam penangkapan ikan di laut Aceh bagian timur. *Jurnal Hukum Samudra Keadilan*, 18(Khusus), 158–171.
- Tijjani, S., Mizuno, K., & Herdiansyah, H. (2021). The loss of ecosystem services in women's forest at Youtefa Bay, Jayapura, Papua, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 940(1), 012061. <https://doi.org/10.1088/1755-1315/940/1/012061>
- Touwe, S. (2020). Local wisdom values of maritime community in preserving marine resources in Indonesia. *Journal of Maritime Studies and National Integration*, 4(2), 84–94. <https://doi.org/10.14710/jmsni.v4i2.4812>
- Unsworth, R. K. F., Ambo-Rappe, R., Jones, B. L., La Nafie, Y. A., Irawan, A., Hernawan, U. E., Moore, A. M., & Cullen-Unsworth, L. C. (2018). Indonesia's globally significant seagrass meadows are under widespread threat. *Science of the Total Environment*, 634, 279–286. <https://doi.org/10.1016/j.scitotenv.2018.03.315>
- Xiuping, H. H. M., Kissya, E., & Yanes. (2010). *Indigenous knowledge and customary law in natural resource management: Experiences in Yunnan, China and Haruku, Indonesia*. Asia Indigenous Peoples Pact (AIPP) Foundation.
- Yarisetou, W. (2009). *Tiaitiki: Konsep dan praktek*. Kerjasama Penerbit Arika dengan Pemerintah Kabupaten Jayapura.