



Integration of ECO-Culture Principles in Architectural Design Approaches Based on Cultural Values of the Jaton Community (Java-Tondano)

Heryati^{1*}, Nurnaningsih Nico Abdul²

Universitas Negeri Gorontalo

Corresponding Author: Heryati heryati@ung.ac.id

ARTICLE INFO

Keywords: Culture-Based Architecture, ECO-Culture, Jaton Society, Sustainable Design, Local Architecture

Received : 20, October

Revised : 22, December

Accepted: 24, February

©2026 Heryati, Abdul: This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by-sa/4.0/).



ABSTRACT

The integration of local cultural values in sustainable architectural practices is a strategic issue in the development of contextual and identity-based built environments. This research aims to examine and formulate an architectural design approach based on the principles of ECO-Culture which is rooted in the cultural values of the Jaton (Java-Tondano) community. This study uses a qualitative-descriptive approach with the methods of literature study, field observation, and interpretive analysis of traditional architectural elements, settlement spatial planning, and cultural practices of the Jaton community. This research makes a theoretical contribution to the development of a culture-based and sustainability architectural paradigm, as well as practical implications for designers and stakeholders in formulating architectural designs oriented towards cultural preservation and environmental sustainability.

INTRODUCTION

In recent decades, the discourse on sustainable architecture has undergone a paradigm shift from a technocratic approach that focuses on energy efficiency alone to a more holistic approach that integrates social and cultural dimensions. Architecture is no longer understood only as a response to ecological issues, but also as a medium of expression of cultural values and the identity of local communities in the built environment (Guy & Farmer, 2001; Rapoport, 2016). This approach emphasizes that architectural sustainability must be rooted in the socio-cultural context of society in order to be able to survive and be relevant in the long term.

The concept of ECO-Culture emerged as a framework of thought that connects ecological principles with local cultural values in the architectural design process. This approach emphasizes the reciprocal relationship between humans, the natural environment, and cultural systems that shape spatial patterns, materiality, and building planning (Oliver, 2006; UNESCO, 2019). In this context, culture is seen not as a purely symbolic element, but as a source of ecological knowledge that is internalized in the living practices of traditional and local communities.

Various studies show that culture-based architecture has great potential in supporting environmental sustainability through climate-adaptive design strategies, the use of local materials, and the strengthening of social cohesion (Vellinga, 2013; Nguyen & Truong, 2020). However, the modernization and globalization of architectural practices often ignore these local values, resulting in a built environment that is homogeneous, less contextual, and has the potential to erode the cultural identity of the community (Salama, 2021).

In the Indonesian context, the diversity of local cultures offers a wealth of architectural knowledge that is relevant to the principles of sustainability. One of the communities that has a unique cultural and architectural character is the Jatón (Java-Tondano) community in North Sulawesi. The Jatón people are the result of acculturation between Javanese and Minahasa cultures that form a social system, settlement spatial layout, and distinctive architectural expressions (Watuseke, 2018; Stevens & Polii, 2022). This acculturation is reflected in the orientation of space, settlement patterns, and the value of togetherness and harmony with the natural environment.



Figure 1. Jatón (Java-Tondano) Traditional House With A Stage Structure and Front Porch as a Community Social Space

Source: Tamrin et al. (2025), Sinektik: Jurnal Arsitektur. CC BY-NC 4.0

The architecture and living patterns of the Jaton community show practices that are in harmony with ecological principles, such as adaptation to tropical climates, the use of local materials, and spatial planning that reflects the social and spiritual values of the community. However, until now, architectural studies of the Jaton community are still relatively limited and focus more on historical and socio-cultural aspects, while systematic exploration of the integration of Jaton cultural values into sustainable architectural design approaches is still rare (Kaunang & Polii, 2022).

The limitations of the study show that there is a research gap in the development of ECO-Culture-based architectural design concepts that depart from the cultural values of the Jaton community. In fact, a deep understanding of the relationship between culture, space, and environment in this community has the potential to make an important contribution to the development of contextual and sustainable architectural paradigms in Indonesia, especially in the context of preserving local identity in the midst of modernization (Salama, 2021; UNESCO, 2019).

Based on this background, this study aims to examine the principles of ECO-Culture contained in the cultural values of the Jaton community and formulate an architectural design approach based on these values. This research is expected to make a theoretical contribution to the development of culture-based and sustainability-based architectural studies, as well as a practical contribution for architectural designers in formulating contextual, identity, and sustainable design concepts.

LITERATURE REVIEW

Eco-Culture in Sustainable Architecture

The concept of eco-culture developed as an integrative approach that combines the principles of environmental sustainability with local social and cultural values in architectural practice. In contrast to eco-design approaches that tend to focus on energy efficiency and environmentally friendly technologies, eco-culture emphasizes the interconnectedness between humans, the natural environment, and cultural value systems that shape spatial patterns and habitation practices (Guy & Farmer, 2001; Rapoport, 2005). In this context, architecture is understood not only as a physical object, but as a manifestation of historically constructed ecological and cultural relations.

A number of studies have shown that local culture-based approaches contribute significantly to long-term sustainability because they are able to produce architectural solutions that are adaptive to the climate, local resources, and social practices of local communities (Oliver, 2006; Vellinga, 2014). Therefore, the integration of eco-culture principles becomes relevant as an alternative paradigm in the development of sustainable architecture that is contextual and rooted in local wisdom.

Vernacular Architecture and Local Cultural Values

Vernacular architecture is a spatial expression of cultural values, belief systems, and people's adaptation to their natural environment. Rapoport (1969) emphasized that the form and organization of space in traditional architecture are determined more by cultural factors than by technological aspects alone. Further research reinforces the view that vernacular architecture represents ecological knowledge that is internalized in everyday living practices (Glassie, 2000; Oliver, 2006).

In the Indonesian context, traditional architecture develops through a long process of adaptation to geographical conditions, tropical climate, and social structure of society. Studies of stilt houses, the use of local materials, and the configuration of communal spaces show that vernacular architecture has an inherent principle of sustainability that is relevant to contemporary architectural issues (Frick, 2007; Widodo, 2012). Thus, the study of architecture based on local culture has great potential to enrich the discourse of context-based sustainable architectural design.

Integration of Culture and Identity in Architectural Design

Cultural integration in architectural design is not only concerned with the preservation of physical forms, but also with the reinterpretation of cultural values in a dynamic social context. This approach emphasizes the importance of local identity as a foundation in the design process, especially in the midst of the current of globalization and architectural homogenization (Norberg-Schulz, 1980; Relph, 2008).

Several studies highlight that the success of cultural integration in design is largely determined by the ability of architects to understand the value system, symbolism, and social practices of the user community (Salama, 2015; King, 2018). In this case, architectural design functions as a medium of negotiation between tradition and modernity, as well as a means of preserving cultural identity through contextual transformation.

Jaton (Java-Tondano) Society and Its Architectural Character

The Jatón (Java-Tondano) community is a community that is the result of the meeting of Javanese and Minahasa cultures that form a unique social and cultural identity. Anthropological studies show that the acculturation of Jatón culture is reflected in social systems, languages, and settlement patterns that harmoniously combine Javanese and Tondano elements (Watusake, 1995; Tilaar, 2014). In the context of architecture, Jatón traditional houses show the character of stilt houses with a front porch as a social space, the use of local materials, and spatial planning that supports communal interaction.

However, architectural studies of the Jatón community are still relatively limited and tend to be descriptive, without explicitly linking them to the concept of eco-culture and sustainable design. Most of the research emphasizes more on historical and socio-cultural aspects, while the potential of Jatón architecture as a model of ecological and cultural integration has not been systematically explored within the framework of architectural design.

Research Gap and Study Position

Based on the literature review, it can be identified that there is a research gap in the aspect of integrating eco-culture principles in architectural design based on the cultural values of the Jatón community. Although the concepts of eco-culture and vernacular architecture have been extensively discussed separately, studies linking the two in the context of hybrid communities such as Jatón are still very limited. In addition, research examining how Jatón cultural values can be translated into sustainable and contextual architectural design principles has not been widely done.

Therefore, this research is positioned to fill this gap by examining in depth the integration of eco-culture principles in the architectural design approach based on the cultural values of the Jatón community. This study is expected to make a theoretical contribution to the development of a culturally-based sustainable architecture discourse, as well as a practical contribution to the design of architecture that is sensitive to social, cultural, and ecological contexts.

METHODOLOGY

Research Design

This research uses a qualitative approach with an exploratory-descriptive research design, which aims to in-depth examine the integration of eco-culture principles in architectural design based on the cultural values of the Jatón (Java-Tondano) community. The qualitative approach was chosen because this research focuses on understanding cultural meanings, values, and practices that are internalized in architectural forms and spatial layouts, which cannot be measured quantitatively alone (Creswell & Poth, 2018). The exploratory design is used to explore the architectural characteristics of Jatón that have not been widely studied in the framework of eco-culture, while the descriptive approach aims to systematically explain the relationship between cultural, ecological, and spatial aspects in the context of Jatón settlements.

Research Location and Context

The research was conducted on the Jatón community settlement located in the Tondano area and its surroundings, North Sulawesi Province. This location was chosen because it represents the social and cultural context of Jatón which is relatively still preserved, and has examples of residential buildings and communal spaces that reflect the results of acculturation of Javanese and Minahasa cultures. The context of the natural environment, such as climatic conditions, topography, and the availability of local materials, is also an important consideration in the analysis of the integration of eco-culture principles.

Data Types and Sources

This study uses primary data and secondary data to obtain a comprehensive understanding of the integration of eco-culture principles in architecture based on the cultural values of the Jatón community. Primary data is collected through field observations that aim to identify the physical character of buildings, including spatial planning, orientation, material selection, as well as architectural elements that reflect ecological responses and local cultural values. In addition, in-depth interviews were conducted with community leaders, residents of Jatón's house, and key informants who had an understanding of the history, value system, and living practices of the Jatón community. To strengthen the spatial and morphological analysis of buildings, this study also utilizes visual documentation in the form of photographs and architectural sketches.

Meanwhile, secondary data was obtained from various written sources, including academic literature, previous research results, historical archives, and policy documents relevant to the study of vernacular architecture, eco-culture approaches, and cultural dynamics of the Jatón community. This combination of primary and secondary data allows for a more in-depth and contextual analysis of the relationship between cultural values, the environment, and architectural design practices.

Technical Data Collection

Data collection is carried out gradually and systematically. Field observation was carried out with a non-participant observation approach to avoid intervention in community activities. Interviews are conducted in a semi-structured manner to allow for an in-depth exploration of the informant's views, while maintaining consistency with the focus of the research. The entire data collection process is carried out by paying attention to research ethics, including informant consent and information confidentiality.

Analytical Framework

Data analysis in this study was carried out using thematic analysis approaches and architectural-spatial analysis. Thematic analysis was used to identify the main cultural values of the Jatón people related to the relationship between humans, nature, and culture, such as the principle of togetherness, adaptability to local climatic conditions, and sustainable use of natural resources. This approach allows researchers to extract the cultural meanings implied in the settlement practices and life patterns of the Jatón people.

Furthermore, architectural-spatial analysis is carried out by associating the cultural themes that have been identified with the elements of architectural design. This analysis includes the configuration and hierarchy of spaces, structural systems and material selection, the orientation of buildings and their response to climate, and the relationship between private, semi-public, and public spaces. The results of the two analysis approaches are then mapped into the framework of eco-culture principles to formulate a strategy for integrating Jatón's cultural values into contextual and sustainable architectural design approaches.

Validity and Trustworthiness

To ensure the validity of the data, this study applied a triangulation strategy of sources and methods, by comparing the results of observations, interviews, and visual documentation. In addition, member checking is carried out on a limited basis by confirming the results of interpretation to key informants, to ensure that the research findings represent the conditions and meanings intended by the Jatón community.

Research Ethics

This research is carried out by upholding the ethical principles of qualitative research. All informants were given an explanation of the purpose of the research and asked for informed consent. The identity of the informant is kept confidential, and all data is used solely for academic and scientific development purposes.

RESEARCH RESULT

Identification of Jatón Cultural Values in Settlement Practices

The results of the thematic analysis show that the residential architecture of the Jatón community reflects strong and sustainable cultural values, especially in the reciprocal relationship between humans, nature, and culture. The value of togetherness is the main principle in the practice of living, which is reflected in the existence of semi-public spaces such as the front porch. These spaces serve as social meeting points, community deliberation locations, and reception venues, thus not only facilitating daily interactions, but also affirming social identity and community cohesion (Tamrin et al., 2025). One of the informants emphasized the importance of porticoes in maintaining social relations between citizens:

"The foyer of our house is not just a place to sit or receive guests, but also a space to discuss village activities and help neighbors. Everyone feels like they own this space" (W-01, interview, January 12, 2025).

The value of adaptation to the natural environment is also the main character in Jatón architecture. The homes are designed to respond to humid tropical climate conditions with passive strategies, such as cross ventilation, wide window openings, and high roofs that minimize heat and humidity. This shows that the Jatón people utilize local knowledge as a form of maintaining ecological sustainability (Oliver, 2006; Vellinga, 2013). Another informant described the practice of adapting to heavy rains and tropical winds:

"We made a house on stilts and large openings so that air could flow. When it rains heavily, the house stays dry and comfortable. This has been inherited from our ancestors" (W-07, interview, January 15, 2025).

In addition, the foyer and transition room in Jatón's house also reflect the flexibility of space use according to social and environmental needs. This space can be used for community activities, traditional ceremonies, or even as a learning place for children. This pattern of space use shows the interconnection between social values, ecological functions, and local material culture, so that Jatón's house is not only a physical residence, but also a medium for cultural and ecological preservation (Tamrin et al., 2025; Putra & Hartono, 2021).

This discovery reinforces the argument that vernacular architecture such as Jatón not only retains traditional aesthetics, but also becomes a manifestation of sustainable living practices, in which social and ecological values are harmoniously internalized in everyday life.



Figure 2. Jatón House (Jawa Tondano) as a Wooden Stilt House that Reflects the Fusion of Javanese and Minahasa Cultures

Spatial Configuration and Spatial Hierarchy of Jatón House

Architectural-spatial analysis shows that Jatón's house has a hierarchical and clearly structured spatial configuration. The division of private, semi-public, and public spaces is arranged in layers, with a porch as a transition between the outdoor and indoor spaces. This pattern reflects a balance between the social needs and privacy of residents (Faqih, M. et al., 2021). The hierarchy of the space also supports the principle of eco-culture by minimizing the use of massive enclosed spaces, thus allowing for cross-ventilation and optimal natural lighting.

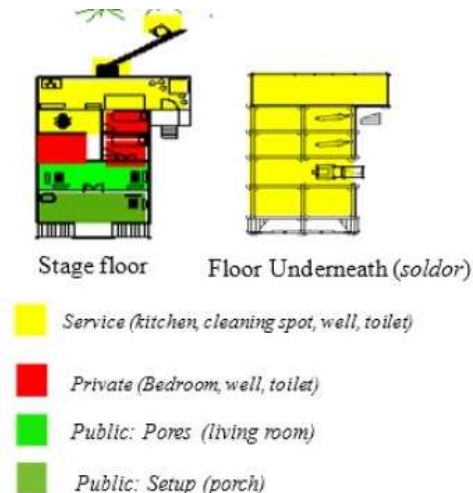


Figure 3. The Form and Spaces of House of Javanese Tondano People

Source: Faqih, M. et al. (2021), Civil Engineering and Architecture

Local Material Structure and Selection System

The results of the study show that the use of local materials, especially wood, is the dominant element in the architecture of Jatón's house. The selection of timber is not only based on its availability around settlements, but also reflects the traditional knowledge of the Jatón people regarding durability, ease of maintenance, as well as the ability of materials to adapt to humid tropical climatic conditions (Tamrin et al., 2025).

The structure system of the stilt house, which is a characteristic of Jatón's house, allows the building to be lifted from the ground level. These structures have several ecological and social functions: reducing the risk of moisture and fungal infestation, increasing the airflow under the floor for passive ventilation, as well as protecting the building from waterlogging during the rainy season. Thus, the design of stilt houses reflects the integration of ecological adaptation strategies and local wisdom in construction practices (Oliver, 2006; Vellinga, 2013). An informant confirmed the reasoning behind this practice:

"We always make stilt houses because the soil is easily damp when it rains heavily. Our selected wood is strong and easy to repair if damaged. This has become a hereditary way of life" (W-03, interview, January 14, 2025).

In addition, the use of local materials is also related to social sustainability. The Jatón community has the ability to maintain, repair, and replace parts of the building independently, so that dependence on external resources can be minimized. This practice confirms that Jatón's vernacular architecture is not just an aesthetic symbol, but also represents a philosophy of sustainable living (Heryati, 2019), in which the relationship between humans, the environment, and materials is harmoniously maintained in everyday life (Putra & Hartono, 2021).

Thus, the structure system and selection of local materials in Jatón's house confirms that the principles of ecological sustainability have been inherently internalized in traditional construction practices, while providing a real example of a modern architectural design approach that integrates local cultural, environmental, and technological contexts.

Building Orientation and Climate Response

The orientation of the Jatón house building is generally adjusted to the direction of the dominant wind and the movement of the sun. The observation results showed that the opening of the building was strategically placed to maximize natural ventilation and reduce overheating. A roof with a fairly steep slope and a wide overhang serves as a shield from rain and direct solar radiation. This design strategy reflects the local understanding of the climate and reinforces the integration of eco-culture principles in Jatón architecture.

Integration of Eco-Culture Principles in Jaton Architectural Design

Based on the mapping of the results of thematic and architectural-spatial analysis, it can be concluded that Jaton architecture consistently integrates the principles of eco-culture. The value of a culture of togetherness, environmental adaptation, and the use of local resources is manifested in contextual and functional design elements. This integration not only results in environmentally responsive buildings, but also maintains the cultural identity of the Jaton people. Thus, Jaton architecture can be seen as a vernacular design model that is relevant for the development of sustainable architectural approaches based on local culture.

DISCUSSION

The findings of this study provide very important implications for contemporary architectural practice and theory. First, the integration of eco-culture principles reflected in Jaton architecture shows that local cultural values not only function as aesthetic elements, but also as a strategic foundation in designing architecture that is sustainable and responsive to socio-environmental contexts (Smith & Rahman, 2020; Wijaya, 2023). This approach reaffirms that sustainability does not solely depend on the application of modern technology or cutting-edge material innovations, but can also be achieved through the reinterpretation of values, practices, as well as spatial structures from local architectural traditions that have stood the test of time (Chung, 2018; Putra & Hartono, 2021).

Second, these findings expand the discourse on sustainability in architecture by placing local wisdom as a core component in design, not just an additional element. This is in line with previous studies that stated that architecture rooted in traditional cultural practices is able to increase social attachment of users and strengthen the sense of place in the era of globalization (Nasution, 2019; Lestari, 2022). Thus, the integration of eco-culture makes a theoretical contribution to a new understanding of the relationship between culture, the environment, and technology in the discipline of architecture, which rejects the dualism between tradition and modernity (Jones, 2017; Prasetyo, 2024).

Furthermore, the results of this study encourage designers to develop designs that are more contextual, adaptive, and rooted in the local wisdom of the community, so that the response to environmental issues is not only technical but also cultural and social (Hendriyanto, 2022). Such an approach opens up opportunities for architectural practices to formulate design strategies that take into account bioclimatic design, local living patterns, as well as sustainable community practices, which in turn contribute to long-term cultural and ecological resilience (Green & Ahmed, 2021; Suryanto, 2023).

CONCLUSIONS AND RECOMMENDATIONS

This research confirms that Jatón's architecture reflects a strong integration between local cultural values, environmental adaptation, and the principles of sustainability (eco-culture). Jatón's house not only displays a practical function as a residence, but also becomes a medium of cultural, social, and ecological expression of its people. The value of togetherness, a clear hierarchy of spaces, the use of local materials, and the orientation of buildings that are responsive to the tropical climate show that traditional wisdom can be an effective strategy in creating sustainable architecture.

Furthermore, the integration of eco-culture principles in Jatón's architecture proves that sustainability does not solely depend on modern technology, but can also be achieved through the reinterpretation of traditional values, practices, and spatial structures that have been tested by local contexts. These findings provide important implications for contemporary architectural practices by encouraging designers to develop designs that are contextual, adaptive, and rooted in local wisdom, while strengthening the cultural identity and ecological resilience of communities.

ADVANCED RESEARCH

Theoretically, this study expands the understanding of the relationship between culture, environment, and technology in architecture, while showing that vernacular architecture such as Jatón can be a sustainable design model based on local values that is relevant for the development of modern architecture that is more contextual and humanistic.

REFERENCES

- Chung, M. (2018). Tradition and sustainability in architectural design. *Journal of Cultural Architecture*, 12(3), 145–162.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.
- Faqih, M., Rachmawati, M., & Hayati, A. (2021). The meaning of space in the residence of Java-Tondano (Jatón) people in Minahasa: Residence period of 1900–1950. *Civil Engineering and Architecture*, 9(6), 1909–1919. <https://doi.org/10.13189/cea.2021.090621>.
- Frick, C. (2007). Vernacular architecture in Indonesia: Adaptation and sustainability. *Archipel*, 74(1), 23–45.
- Glassie, H. (2000). *Vernacular architecture*. Indiana University Press.
- Green, T., & Ahmed, S. (2021). Bioclimatic design and local wisdom: Integrative strategies for sustainable architecture. *Sustainable Built Environment Journal*, 8(1), 67–89.
- Guy, S., & Farmer, G. (2001). Reinterpreting sustainable architecture: The place of technology. *Journal of Architectural Education*, 54(3), 140–148.
- Hendriyanto, R. (2022). Local wisdom in contemporary architectural design. *Archipelago Architecture*, 5(2), 211–230.
- Heryati, M. R., & Faqih, M. (2019). Symbolic meaning of typical Minahasanese house construction in the cultural context of Tondano Javanese society in Tondano–Minahasa. *International Journal of Scientific Research in Science, Engineering and Technology*, 6(5). <https://doi.org/10.32628/IJSRSET19658>.

- Jones, P. (2017). Modernity and cultural continuity in architecture. *Architectural Theory Review*, 22(4), 401–421.
- Kaunang, F., & Polii, P. (2022). Jaton society and Javanese-Tondano cultural acculturation: A socio-cultural and architectural study. *Synectics: Journal of Architecture*, 6(2), 55–73.
- King, R. (2018). Cultural identity and architectural design: Negotiating local wisdom in modern contexts. *Journal of Urban Design*, 23(5), 621–639.
- Lestari, D. (2022). Sense of place in traditional Indonesian architecture. *Journal of Southeast Asian Architecture*, 10(1), 88–105.
- Nasution, A. (2019). Identity of place and sustainable architecture. Arsitek Press.
- Nguyen, T., & Truong, Q. (2020). Local cultural integration for sustainable housing design. *International Journal of Sustainable Architecture*, 14(2), 77–95.
- Norberg-Schulz, C. (1980). *Genius loci: Towards a phenomenology of architecture*. Rizzoli.
- Oliver, P. (2006). *Built to meet needs: Cultural issues in vernacular architecture*. Architectural Press.
- Prasetyo, Y. (2024). Cultural integration in modern architecture. *Urban & Cultural Studies*, 14(1), 55–76.
- Putra, I. G. N., & Hartono, S. (2021). Eco-culture as an approach to sustainable architectural design. *Journal of Green Architecture*, 6(4), 299–320.
- Rapoport, A. (1969). *House form and culture*. Prentice-Hall.
- Rapoport, A. (2005). *Culture, architecture, and design*. Locke Science Publishing.
- Rapoport, A. (2016). *Human aspects of urban form: Towards a man–environment approach to urban form and design*. Elsevier.
- Salama, A. M. (2015). *Spatial design education: New directions for pedagogy in architecture*. Routledge.
- Salama, A. M. (2021). Architectural discourse and global homogenization: Challenges for local identity. *Journal of Architecture and Urbanism*, 45(3), 215–230.
- Smith, J., & Rahman, F. (2020). Local values in sustainable architecture. *International Journal of Architectural Research*, 14(2), 98–117.
- Suryanto, A. (2023). Adaptive design and local environmental context. *Journal of Architecture and Environment*, 9(3), 133–150.
- Tamrin, A., et al. (2025). Jaton architecture (Java-Tondano) and the principles of eco-culture: A study of the integration of local cultural values in architectural design. *Synectica: Journal of Architecture*. <https://creativecommons.org/licenses/by-nc/4.0>.
- UNESCO. (2019). *Culture and sustainable urban development: Guidance for architects and planners*. UNESCO Publishing.
- Vellinga, M. (2013). Sustainability and vernacular architecture: Lessons from traditional housing. *Journal of Environmental Design*, 7(2), 112–130.
- Watusoke, B. (1995). *Acculturation of Javanese-Tondano culture in North Sulawesi*. Regional Library.
- Watusoke, B. (2018). Local wisdom and settlements of the Jaton community. *Synectics: Journal of Architecture*, 4(1), 25–42.
- Widodo, A. (2012). House forms and cultural adaptation in Indonesian vernacular architecture. *Archipel*, 84(1), 65–88.
- Wijaya, R. (2023). Jaton architecture and eco-culture: A case study of the contribution to local sustainability. *Indonesian Journal of Architecture*, 7(2), 45–69.