Application of Ecological Architecture at the "Kampung Kecil" Restaurant in Medan City

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Abstract

The rapid growth of the culinary industry in Medan has shifted the role of restaurants from merely food-serving facilities into multifunctional social spaces offering spatial experience, visual identity, and comfort for visitors. This trend encourages the need for architectural approaches that are not only aesthetic but also environmentally responsible. This study examines the application of ecological architecture principles in the Kampung Kecil restaurant, which incorporates bamboo as the primary building material and adopts a natural, open-space concept. The research methodology integrates primary data obtained through onsite observation and secondary data sourced from literature reviews. The analysis refers to four key ecological architecture criteria: building morphology, energy efficiency, ecological building materials, and indoor environmental conditioning. The findings reveal that the elongated building form successfully responds to the site's geometry and solar orientation, enabling optimal natural ventilation and daylighting. The use of bamboo as a regenerative material supports environmental sustainability while reducing carbon footprint. Furthermore, the semi-open spatial configuration allows passive cooling and lighting strategies, contributing to reduced energy consumption. In conclusion, the Kampung Kecil restaurant demonstrates an effective implementation of ecological design principles, resulting in an energy-efficient, comfortable, and environmentally integrated built environment.

Keywords: Ecological Architecture, Bamboo, Restaurant Design, Sustainabilit

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Introduction

Medan is one of Indonesia's major cities that has shown rapid development in the commercial, recreational and culinary sectors. This development not only reflects the increasing demand for entertainment facilities, but also lifestyle changes that have turned restaurants into social spaces for gathering, relaxing and enjoying food. In recent years, Medan has become known as a centre for culinary growth. Many restaurants have sprung up with attractive concepts and facilities, such as thematic interior designs, children's play areas, artificial ponds or lakes, and photo areas that attract visitors. This phenomenon is in line with the findings [1], which state that room design and visual experience are important factors in consumers' decisions when choosing a restaurant.

In addition to their function as places to eat, restaurants are now also venues for various activities such as birthday celebrations, reunions, family dinners, and formal gatherings. This has led to increased competition among restaurants, requiring business owners to adjust their strategies not only in terms of the menu, but also the atmosphere, spatial aesthetics, and visual identity Kotler & Keller in [1].

In the context of restaurant architectural design, the use of materials is one of the important aspects that support the spatial concept. One of the growing trends is the use of bamboo as the main material because it is considered environmentally friendly, aesthetically pleasing, and easily renewable. According to [2], bamboo is a material with a fast growth cycle, is lightweight yet strong, and has the potential to be a sustainable construction material of the future. Bamboo has good mechanical strength, a low carbon footprint, and is suitable for use as a sustainable building material.

One restaurant that applies this principle is Kampung Kecil in Medan. This restaurant uses bamboo as the dominant element in the structure and interior of the building, creating a natural, rural atmosphere. This approach is in line with the concept of ecological architecture, which is architecture that pays attention to the harmony between buildings, the environment, and humans [1]. Thus, the application of design concepts such as those in the Kampung Kecil restaurant is not only an aesthetic strategy but also a response to green architecture trends and consumer demand for pleasant, natural, and sustainable spaces.

Literature Review

The term ecology comes from Greek, namely oikos, which means home or living environment, and logos, which means science. Terminologically, ecology can be understood as a branch of science that studies organisms in relation to the environment in which they live, including the reciprocal relationship between living things and their environment. The ecological approach is descriptive and exploratory because it focuses on observing natural phenomena without manipulative experiments.

Ecological studies cannot be separated from the concept of ecosystems, which encompass various components that make up the environment. These components consist of abiotic factors such as temperature, light, water, humidity, and topographical conditions, as well as biotic factors that include living organisms such as humans, animals, plants, and microorganisms. In this context, ecology is also closely related to the hierarchy of life organisation, from populations and communities to ecosystems as a whole. Each level interacts with one another and forms a complete and mutually influential system. In summary, ecology can be described as the science that studies ecosystems. However, in more depth, ecology is the study of the reciprocal relationships between organisms and their connection to the non-living components of their environment.

Ecological design is a design approach that places humans, the environment, and culture in an integrated relationship. This principle aims to create a built environment that not only fulfils architectural functions but also maintains the sustainability of the ecosystem and the local values inherent to a place. Cowan and Ryn in [3] reveal five principles of ecological design, namely: Solution Grows from Place, Design with Nature, minimising the use of energy and materials, harmonising culture and nature, and protecting physical environmental elements.

One important principle in ecological design is Solution Grows from Place, which is the idea that design solutions must be rooted in the local context. This approach emphasises a deep understanding of the character of the community, culture, climate, and history of the place. By understanding local socio-cultural aspects, building design can reflect the identity of the community while supporting the preservation of existing values. This principle ensures that design is not merely a physical object, but part of the social structure and spatial experience of the community.

The next principle is Design with Nature, which emphasises that design must be in harmony with existing ecological systems. Buildings and open spaces are designed with consideration for existing ecosystems so as not to disrupt the flow of energy, water, vegetation, or the habitats of other organisms. Thus, design not only minimises ecological impact but also strengthens environmental sustainability through the integration of man-made structures and natural dynamics.

Furthermore, ecological design also emphasises the importance of minimising energy and material use. This can be achieved through the selection of local materials, the use of renewable energy, energy-efficient technologies, and the optimisation of natural lighting and ventilation. This approach not only reduces the ecological footprint of buildings but also extends their life cycle through structural and operational efficiency.

Another inseparable principle is the harmonisation between culture and nature, namely the awareness that design must consider local cultural values and the relationship between humans and their environment. Built spaces need to be able to support the lifestyles of local communities without severing their connection with the natural environment.

Finally, ecological design also emphasises the importance of protecting physical environmental elements, such as soil, water, vegetation, and biodiversity. By maintaining environmental quality and avoiding habitat destruction, ecosystem sustainability can be maintained in the long term.

By applying these principles, ecological design not only produces technically functional buildings but also creates responsive, characterful, and sustainable built environments.

Research Methodology

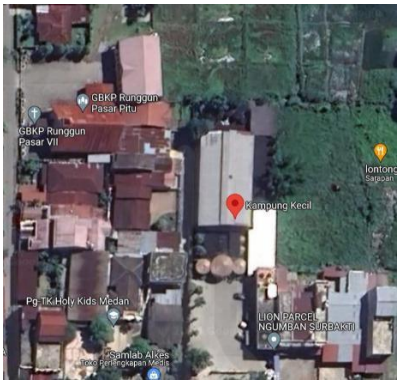
Data collection in this study was conducted through two main approaches: primary data and secondary data. Primary data was obtained through direct observation at the study site as part of the qualitative method. Field surveys were conducted to identify existing site conditions, environmental characteristics, and physical elements relevant to the application of the concept of Ecological Architecture. This information was used to ensure that the resulting design was appropriate to the spatial and ecological context in the field. Secondary data was collected through literature studies covering scientific journals, academic articles, reliable online publications, government policy documents, and case studies relevant to the object and theme of the research. This data was used to strengthen the theoretical basis, develop analysis indicators, and compare the suitability of the application of the concept of Ecological Architecture to the object of study.

Results

This study focuses on the application of ecological architecture principles to the Kampung Kecil family restaurant building located on Jalan Ngumban Surbakti, Sempakata, Medan Selayang District, Medan City. To facilitate analysis, the discussion of the application of ecological architecture to buildings is limited to several assessment criteria, one of which is the morphological aspect of the building's form.

A. Morphology Aspect

Building morphology relates to the ability of a building's form to adapt and harmonize with its surrounding environment, thereby enabling integration between the building and its site context. In this case, the shape of the Kampung Kecil building is designed to be elongated with a main orientation facing south. The choice of orientation and shape is influenced by the physical conditions of the land, which tends to be elongated and narrow, so that the design follows the characteristics of the site to achieve space efficiency and suitability for the environment.



source: google maps

Figure 1. Kampung Kecil Restaurant Site Location

By adjusting the shape of the site, the available land can be used to its full potential. In addition, the elongated orientation of the building is a design response to wind flow and sun movement, so that it can be used as a source of natural ventilation and lighting.

Morphologically, the elongated shape of the building follows the contours and dimensions of the land, demonstrating the application of the principle of solution grows from place [3]. The open orientation of the building allows visual integration with the surrounding environment while supporting natural circulation

B. Energy Efficiency Aspects

In terms of energy efficiency, the use of wide glass openings, cross ventilation, and natural lighting significantly reduces the energy requirements for air conditioning and artificial lighting. This approach is consistent with the concept of design with nature, which emphasizes the integration of passive energy in buildings [2].



Figure 2. Natural light openings in the room

C. Building Materials

Building materials are the main components that make up the structure and physical elements of architecture. In the context of ecological architecture, the selection of materials is an important aspect because it is related to sustainability, ecological footprint, and its impact on the environment.

Heinz Frick in [4] categorizes ecological materials based on their level of environmental friendliness, ranging from the most sustainable to those with the potential for negative impacts. These categories include regenerative materials, reusable materials, recycled materials, natural materials that undergo only simple transformation processes, and composite materials. In the Kampung Kecil restaurant case study, the application of ecological materials can be seen in the use of bamboo as the main material. Bamboo falls into the category of regenerative materials because it can be quickly renewed, has a short growth cycle, and can be cultivated sustainably. In addition, the use of bamboo also supports the principle of low-emission construction because its production and processing do not require high energy compared to industrial materials such as concrete or steel. Bamboo is one of the construction materials with great potential to support environmentally friendly designs in tropical architecture [2].

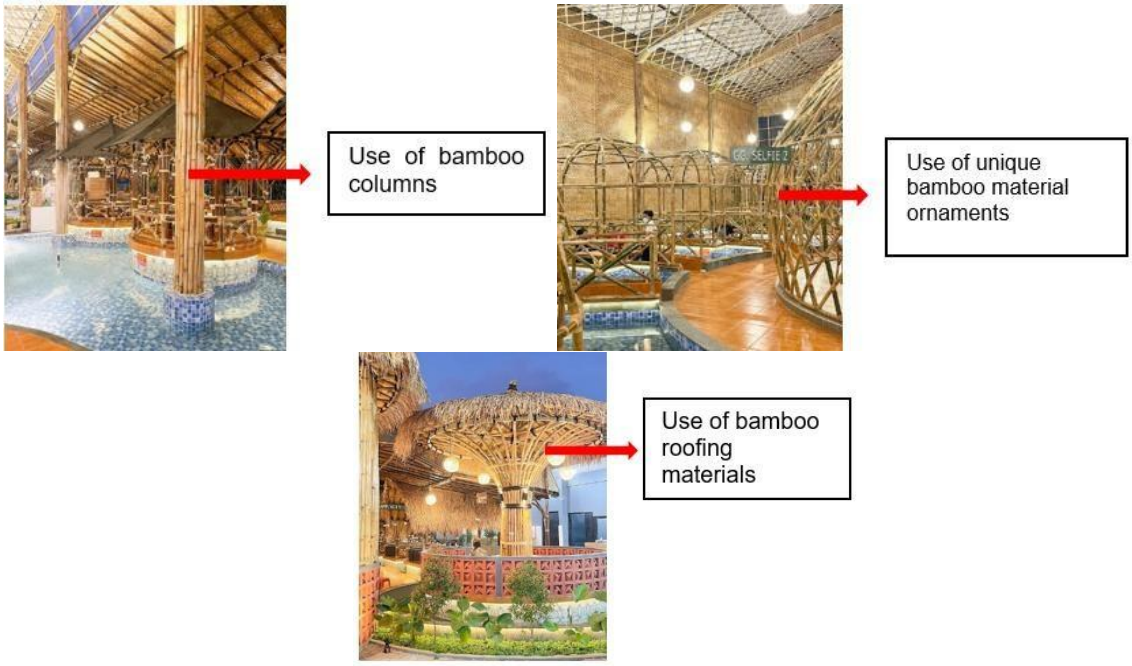


Figure 3. The use of bamboo materials in buildings

D. Room conditioning in buildings

Room conditioning is an effort made in design to create comfort in a room. Therefore, room conditioning with natural lighting and ventilation is necessary. The following are examples of space conditioning applied to a small village restaurant building:

1. Natural lighting, the use of natural light is a passive energy saving measure. Natural light comes from sunlight entering the room through openings in the walls. The openings in the walls of the building are glass windows installed in rooms that require a lot of natural lighting.



Figure 4. Natural lighting in buildings

2. Natural ventilation. The use of natural ventilation is very important in buildings that apply ecological architecture concepts because it can reduce electricity consumption.



Therefore, small village restaurants apply semi-open building designs and utilize water features indoors to make the rooms feel cool.

Figure 5. Natural ventilation in buildings

Conclusion

Based on the results of research on the Kampung Kecil restaurant building, it was found that several aspects of the design have applied the principles of ecological architecture. There are four main criteria that serve as evaluation parameters, namely the morphology of the building, energy efficiency, use of materials, and space conditioning. The application of these four aspects shows that the building is able to accommodate the needs of users while supporting energy-efficient and environmentally-friendly design practices.

The use of ecological materials in most elements of the building contributes to reducing environmental impact and supporting sustainability. In addition, space management through the optimization of natural lighting makes the interior of the building feel more comfortable without relying excessively on electrical energy. Thus, the design strategy applied not only creates an optimal room atmosphere but also increases overall energy efficiency.

References

[1] J. Santoso and S. E. Indrawan, "Pendekatan arsitektur bambu yang ramah lingkungan untuk pengurangan jejak karbon di Bali," *J. Arsit. Pendapa Online*, vol. 8, no. 1, pp. 11–17, 2025.

[2] B. K. Kurniawan, N. Shahman, A. Purnomo, and M. Ezran, "Bamboo Material for Sustainable Development: A Systematic Review," *E3S Web Conf.*, vol. 444, 2023, doi: 10.1051/e3sconf/202344401011.

[3] A. L. Kristiana Bebhe, Richardus Daton, Reginaldo Christophori Lake, "Jurnal Arsitektur KOMPOSISI, Volume 12, Nomor 3, April 2019," *J. Arsit. KOMPOSISI*, vol. 12, no. April, 2019.

[4] P. F. Azzahra, M. Andria, and M. Suastika, "Penerapan Arsitektur Ekologis Pada Bangunan Pengembangan Aquapark Tlatar Di Boyolali," *Senthong*, vol. 2, no. 1, pp. 1–10, 2019, [Online]. Available: https://jurnal.ft.uns.ac.id/index.php/senthong/article/view/793