

SEEDS OF INTERACTION: DESIGNING A MULTI-PURPOSE FARMING CENTER AS A COMMUNITY GATHERING AND TOURIST DESTINATION IN SERDANG BEDAGAI**Yulia Suci Utami¹, Wahyuni Zahrah²**Department of Architecture, Faculty of Engineering, Universitas Sumatera Utara, medan,
20155, Indonesiayuliasuciutamii@gmail.com**Abstract (English)**

Serdang Bedagai, North Sumatra, is characterized by fertile rice fields and coastal scenery, offering a unique potential for sustainable tourism development. This research aims to design a multi-functional farming center that integrates agricultural education, community interaction, and tourism. Located in Lubuk Bayas, the site combines traditional farming values with sustainable architectural strategies to create a space that benefits both local residents and visitors. The center is envisioned as a knowledge-sharing platform for farmers, an eco-tourism destination, and a cultural showcase. Using a site-responsive design approach, the building adopts a stilt-house typology adapted for tropical climates, with passive design strategies such as natural ventilation, light optimization, and material sustainability. The architectural massing supports social integration, while the spatial planning emphasizes harmony between built forms and productive land. This project promotes sustainable agriculture, local empowerment, and educational tourism, supporting economic growth while preserving the natural and cultural landscape of Serdang Bedagai.

Abstrak (Indonesia)

Kabupaten Serdang Bedagai di Sumatera Utara memiliki potensi besar dalam pengembangan wisata berkelanjutan dengan lanskap sawah yang luas dan kawasan pesisir yang khas. Penelitian ini bertujuan merancang sebuah pusat pertanian multifungsi yang menggabungkan edukasi pertanian, interaksi komunitas, dan daya tarik wisata. Terletak di Lubuk Bayas, desain pusat ini mengadopsi pendekatan arsitektur responsif-lokasi, menggunakan prinsip rumah panggung tropis yang dimodifikasi dengan strategi desain pasif seperti ventilasi alami, pencahayaan alami, dan pemilihan material lokal. Bangunan dibagi menjadi beberapa zona fungsional yang mendukung interaksi sosial, sekaligus mempertahankan integrasi harmonis dengan lahan pertanian produktif di sekitarnya. Pusat ini diharapkan menjadi tempat pertukaran pengetahuan, destinasi wisata edukatif, dan wadah penguatan budaya lokal, yang secara bersamaan mendorong pertumbuhan ekonomi serta pelestarian alam di wilayah Serdang Bedagai.

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Serdang Bedagai**Sejarah Artikel***Submitted: 17 Juli 2025**Accepted: 20 Juli 2025**Published: 21 Juli 2025***Kata Kunci**pertanian berkelanjutan,
arsitektur multifungsi,
wisata, komunitas tani,
Serdang Bedagai**Introduction**

Serdang Bedagai, as an agrarian region in North Sumatra, holds significant potential for development into an educational tourism destination based on agriculture. Nevertheless, there remains a notable limitation in the availability of facilities that architecturally integrate educational, social, and tourism functions within a single, cohesive area. Based on literature reviews and case studies, the holistic implementation of a multifunctional agricultural center concept is still relatively uncommon in the coastal regions of Sumatra. Therefore, the problem arises of how to design a multifunctional agricultural center that can overcome these limitations and optimize Serdang Bedagai's potential as an integrated agrotourism destination.

This article proposes a solution through a design approach that emphasizes sustainability principles and the optimization of social interaction. The novelty of this research lies in the spatial integration between agricultural activities and tourism, as well as the development of tropical design strategies responsive to the local context.

The primary objective of this study is to design a multifunctional agricultural center that serves as a community interaction space and an educational tourism destination, harmoniously integrated with the natural landscape of Serdang Bedagai.

Research Methods

This study adopted a comprehensive architectural design approach. The research was conducted in Lubuk Bayas Village, Perbaungan District, Serdang Bedagai Regency, North Sumatra, Indonesia, an agrarian location with significant potential for agrotourism development. The study focused on designing a multifunctional agricultural center that integrates social, educational, and tourism aspects.

Data Sources and Data Collection Techniques

Data collection in this research was carried out through several primary techniques:

- **Literature Study:** This serves as the theoretical foundation, involving a review of relevant academic sources, architectural journals, and case studies related to sustainable architecture, community-based design, and agrotourism development. This method provides insight into design principles that promote environmental sustainability, social inclusivity, and cultural integration. In the context of architectural design, the literature study supports the formulation of spatial programs, design strategies, and sustainable practices relevant to the local setting, and enables the identification of key components required to develop a functional and context-sensitive multi-purpose farming center.
- **Comparative Study (Precedents):** This involved analyzing the architectural and functional aspects of existing farming and agrotourism centers. These precedents provided valuable references for spatial design, material use, landscape integration, and user experience, helping to tailor an appropriate architectural response for the local context of Serdang Bedagai.
- **Field Observation:** Observation was conducted at the selected site in Serdang Bedagai to analyze environmental conditions and human activities. This included sun orientation, wind patterns, site accessibility, and local cultural practices. Findings from these observations shaped the site layout, spatial zoning, and environmental response of the proposed design.

Research Procedures

The research procedures followed systematic architectural design stages:

1. **Ideation and Conceptualization:** This stage focused on developing the narrative and functional theme, namely "Seeds of Interaction," which became the primary foundation for the design.
2. **Data Analysis:** This encompassed an analysis of the site, climatic conditions, circulation patterns, potential for social interaction, and typologies of vernacular buildings in the study area. Data from literature, comparative studies, and observations were integrated to gain a comprehensive understanding.
3. **Alternative Evaluation and Design Criteria:** The design evaluation process was based on principles of sustainability, spatial comfort, accessibility, and harmonious integration with the natural environment.
4. **Design Selection:** The final design was chosen based on criteria of circulation efficiency, educational potential, and optimal tourist appeal.

Research Instruments

The instruments used in this research included: academic documents and journals for literature and precedent studies; observation forms/checklists for recording field data related to environmental conditions and activities at the site; visual documentation tools (cameras) for documenting site conditions and study objects; and architectural design software for design development.

Data Analysis Techniques

Data collected from the literature study, comparative study, and field observations were analyzed using a descriptive qualitative approach. This analysis included: content analysis to identify sustainable design and agrotourism principles from the literature; comparative analysis to compare and evaluate best practices from precedent studies; spatial and environmental analysis to understand site characteristics and their implications for design; and design synthesis to integrate analytical findings into the formulation of architectural concepts and strategies.

Results and Discussion

This section presents the research findings in a descriptive manner, followed by in-depth analysis and interpretation. Supporting spatial and visual data are provided through relevant tables and figures. The discussion focuses on connecting the data and analysis with the research objectives, addressing key questions, and linking them to a broader theoretical context.

The research results indicate that the multifunctional agricultural center design encompasses a total area of approximately $\pm 10,000$ m², strategically divided into several main functional zones to accommodate various activities. The spatial arrangement is designed to minimize interference between activities while supporting the efficient flow of both visitors and farmers.

The detailed allocation and program of spaces within each zone are presented in Table 1.

Room Grouping	Total
Reception Area	221,52
Main Area	7150
Farmer Area	540,15
Management Area	109,2
Public Area	2054
Service Area	145,405
Parking Area	2182,5
	12402,775

Table 1. Room Grouping Plan
Personal Source

Furthermore, the design incorporates a comprehensive **zoning analysis** that delineates specific areas based on user groups, their activities, and required space programs, ensuring appropriate access types for each.

The detailed zoning plan, outlining the relationships between user groups, their activities, and associated spaces, is provided in Table 2.

Participant	Activity	Space Program	Access Type
Farmer	Go to the field, plant, and tend to crops	Farming fields, research center	PUBLIC
	Communicate and gather with fellow farmers for sharing	Farmer meeting room, discussion area, farmer community room	
	Join agricultural training and workshops	Workshop room, agricultural classroom, training center	
	Hold special ceremonies or harvest celebrations	Farming field, agricultural hall, harvest exhibition area	
	Watch educational content or agricultural documentaries together	Agricultural hall, multipurpose room, screening area	
Community	Buy and sell agricultural products in the local market	Local market, harvest exhibition area	PUBLIC
	Participate in social and cultural community events	Community room, meeting hall, discussion area	
	Create and sell handicrafts	Creative room, craft area	
	Join art and cultural activities at the community center	Art hall, multipurpose room	
	Participate in economic empowerment and training programs	Training room, skills development area	
	Organize community events and folk parties	Farming field, meeting hall, harvest exhibition area	
Visitors & Tourists	Visit fields and learn about farming from locals	Farming field, agricultural research center	PUBLIC
	Buy farm products and handicrafts	Local market, harvest exhibition area	
	Learn to craft using agricultural	Craft workshop, creativity	


	materials with locals	area, farming field	
	Enjoy and buy local food	Cafeteria, culinary area, farming field	
	Join harvest celebrations or agricultural ceremonies	Farming field, agricultural hall, harvest exhibition area	
	Watch agricultural educational content or documentaries	Agricultural hall, multipurpose room, screening area	
	Rest, gather, and engage in general activities at the community center	Waiting room, gazebo, rest area, cafeteria, toilet	
Management Team	Monitor and manage activities at the community center	Control room, management room	SERVICE
	Coordinate with farmers and community for organizing events	Meeting room, coordination room	PRIVATE
	Conduct regular meetings and evaluations	Meeting room, evaluation room	PRIVATE
	Manage room and facility rentals	Admin office, control room	SERVICE
	Support the development of training and education programs	Development room, training room	PRIVATE
	Prepare financial and administrative reports	Admin office, finance room	PRIVATE
	Receive guests, provide information, and schedule events	Reception, waiting room, lobby	PUBLIC

Table 2. Zoning Analysis
Personal Source

The design adopts light, separated mass forms resembling Deli Malay vernacular stilt houses, connected by semi-open circulation. Building orientation optimizes natural lighting and mitigates western heat. The use of local materials like bamboo and wood reinforces the natural aesthetic. An "arch shape" symbolizes a gateway for interaction and learning, applied to entrances, shading, and educational facades, representing openness.

The visualization of the building mass concept and the implementation of architectural elements can be observed in Figure 1.

Buildings harmoniously integrate with rice fields, preserving productive land. Green open spaces dominate the site. The design prioritizes sustainable rice farming integration with eco-friendly facilities like efficient irrigation and organic fertilizers. Building roofs also serve as solar energy demonstration sites.

The spatial organization and functional relationships based on the zoning analysis are further illustrated in Figure 2.

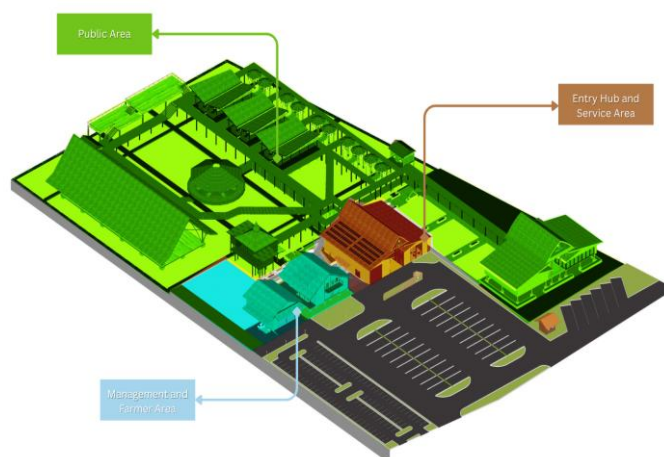


Figure 1. Proposed Zoning Plan of the Multifunctional Agricultural Center



Figure 2. Site Plan of the Multifunctional Agricultural Center

Conclusion

This research successfully developed a design for a multifunctional agricultural center in Serdang Bedagai that effectively integrates social, educational, and tourism aspects with sustainability principles. The proposed design adopts a climate-responsive tropical architectural approach, utilizing local vernacular elements like stilt houses and gable roofs, and incorporating eco-friendly materials. The concept of separated building masses connected by semi-open circulation supports interaction while minimizing interference between functions.

The harmonious integration with the sustainable rice farming landscape, educational facilities, community spaces, and solar energy utilization demonstrates the significant potential of this center as a pioneer in community-based agrotourism in Indonesia. This design not only facilitates agricultural production but also empowers the local community through education and economic opportunities, all while promoting sustainable practices aligned with local environmental conditions.

References

Akmal, I. (2007). *Sustainable Construction, Rumah Ide*. Gramedia Pustaka Utama.

- Chauhan, R. (2014). *Design Implications and Effects of Environmental Stressors in a Healing Space*. School of Architecture and Planning, Bhopal, India.
- MDPI. (n.d.). *Energy-Efficient Building Design for a Tropical Climate: A Field Study on the Caribbean Island Curaçao*.
- Novatr. (2025). *Passive Strategies for Building Design in Tropical Climates*.
- Rethinking The Future. (n.d.). *The Crucial Role of Ventilation in Hot and Humid Climate Design*.
- SciELO. (n.d.). *Building form and energy efficiency in tropical climates: A case study of Penang, Malaysia*.
- Urban Green. (n.d.). *Crossed Ventilation: Your Guide To a Proper Building Design*.