



Spatial Structure and Tourism Zoning for Cultural Landscape Conservation in Meat Village, Toba Regency, Lake Toba, Indonesia

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Authors' contributions

The sole author designed the study, compiled and interpreted the data, prepared the maps, and wrote and approved the final manuscript.

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ABSTRACT

This study analyzes the spatial structure and spatial pattern of Meat Village, Tampahan District, Toba Regency, and formulates a tourism-zoning direction that protects its cultural, agricultural, and lakefront landscape. A qualitative spatial-planning approach was applied, combining official statistics, district planning documents, government tourism reports, previous studies of settlement morphology and open space, and schematic mapping based on the national base map and satellite-imagery interpretation, organized in four analytical stages. The village exhibits a corridor-cluster structure in which a main access corridor links *huta*-based settlement clusters, service nodes, rice-field landscapes, vegetated slopes, and the Lake Toba waterfront. Tourism growth—signaled by the 2025 groundbreaking of a ten-villa ecolodge and the 2026 opening of a two-kilometer lakefront corridor—creates income opportunities but also raises risks of rice-field conversion, ribbon development, loss of view corridors, shoreline privatization, and sanitation pressure. A seven-zone framework is proposed, ranging from a cultural heritage core to a gateway tourism-service zone, with explicit delineation criteria for each zone. Resident-based homestays integrated with existing settlements are spatially more compatible than dispersed resort-style development. The study concludes that tourism in Meat Village should be governed as a cultural-agricultural-lakefront landscape in which new construction remains subordinate to landscape continuity, public lake access, ecological sensitivity, and village morphology. The zones are conceptual and require verification with official geospatial data and statutory planning instruments.

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1. Introduction

Rural tourism in Indonesia increasingly depends on landscapes rather than on single attractions. Visitors are drawn not only to a monument or a viewpoint but to the combined experience of settlements, farmland, water, topography, and everyday cultural practice. Landscape scholarship describes such places as cultural landscapes: territories whose character results from the long-term interaction between people and their environment, and whose value lies in the continuity of that interaction rather than in isolated objects (Antrop, 2005; Taylor & Lennon, 2011). Protecting a cultural landscape therefore requires attention to spatial relationships—between houses and yards, fields and roads, slopes and shorelines—that are easily disrupted when tourism introduces new land uses.

Meat Village, located on a bay of Lake Toba in Tampahan District, Toba Regency, North Sumatra, exemplifies this challenge. Its spatial identity is produced by the simultaneous presence of rice fields, hilly terrain, traditional Batak Toba settlements (*huta*, clustered rows of houses facing a shared yard), *ulos* weaving, and lake-based recreation. The Ministry of Tourism lists Meat as a tourism village in the initiating (*rintisan*) category, with attractions that include *martonun* (weaving) education, the Ragi Hotang traditional settlement—a cluster of traditional Batak Toba houses that forms the cultural core of the village—, rice-harvest agrotourism, natural scenery, and five locally operated homestays; the village was also ranked among the national top 100 tourism villages in 2021 (Ministry of Tourism of the Republic of Indonesia, n.d.-a, n.d.-b). The principal asset of the destination is thus not a discrete site but the visual and functional relationship among *huta*, agricultural land, roads, slopes, and the lakefront.

The qualities that create tourism value also generate spatial vulnerability. Accommodation, parking, sanitation, access roads, and visitor services all require land, and they tend to gravitate toward the most accessible parcels and the best lake views. Butler's (1980) tourism area life cycle anticipates that, as destinations move from exploration toward development, external investment and facility growth can outpace the capacity of local environments and institutions. In the wider Lake Toba region, designated a Super Priority Tourism Destination and anchored by the Toba Caldera UNESCO Global Geopark, tourism development has been driven primarily by attractions, amenities, and ancillary services (Mulyadi et al., 2024). At the same time, studies of the lake's water quality indicate that nutrient loads from hotels and restaurants are a significant contributor to the lake's trophic decline, alongside cage aquaculture (Hutagaol et al., 2024). Village-scale growth in accommodation is therefore not merely a local design issue but part of a regional environmental question.

In Meat Village, this pressure is no longer hypothetical. The Toba Regency Culture and Tourism Office reported the groundbreaking of Meat Lakefront Ecolodges on 1 May 2025, with a plan for ten villa units, and in March 2026 it launched a new lakefront tourism area extending approximately two kilometers along the *Dusun* III (Hamlet III) shoreline after community members opened access through collective work (*gotong royong*) (Toba Regency Culture and Tourism Office, 2025, 2026). These events mark a transition from tourism potential to active land-use change, making spatial control an immediate planning concern.

Previous studies provide important fragments of the spatial context. Octarino (2019) identified the persistence of traditional *huta* clustering together with a tendency for newer settlement to extend linearly along circulation routes. Manurung (2019) described differences among the village hamlets and emphasized the large share of agricultural land outside the settlement areas. Tampubolon (2024) traced the historical transition of Meat from an agrarian village toward a tourism village, while Febrina Putri S. (2020) examined amenity and homestay development. Beyond Meat, research on Batak Toba settlements shows that the *huta* is organized around rows of houses facing a shared open yard (*alaman*), a configuration that binds kinship and ritual life to spatial form (Tobing &

Hutabarat, 2019; Waterson, 1990). However, these studies do not provide an integrated framework linking settlement morphology, agricultural landscape, lakefront access, accommodation, and ecological protection within a single zoning logic.

This study addresses that gap by interpreting Meat Village as a cultural–agricultural–lakefront tourism landscape. Its objectives are (1) to identify the village’s conceptual spatial structure and spatial pattern, (2) to diagnose the principal tourism-related spatial pressures, and (3) to formulate a zoning direction that prioritizes landscape continuity and community-based tourism. The resulting maps are analytical and conceptual rather than cadastral or statutory products; they are intended to support academic spatial-planning analysis and to identify priorities for detailed GIS and regulatory verification under Indonesia’s spatial-planning system (Republic of Indonesia, 2007, 2021).

2. Method

2.1 Study Area and Research Design

The unit of analysis is Meat Village, administratively part of Tampahan District (*Kecamatan* Tampahan), Toba Regency, North Sumatra. The village borders Lake Toba to the north and is connected by a main road toward Balige. The study applies a qualitative spatial-planning approach supported by schematic mapping. This design was chosen because the available evidence supports the identification of broad spatial relationships and planning pressures, but it does not include a verified legal village polygon, a parcel ownership database, or a complete geotechnical dataset. The region concept was used as an organizing device, following the planning distinction among homogeneous, nodal, administrative, and planning regions (Glasson & Marshall, 2007).

2.2 Data Sources

The evidence base combined official statistics, local planning documents, government tourism information, previous academic studies, and national spatial-planning regulations (Table 1). Statistical values were interpreted according to their stated reference years so that historical and current figures were not combined as though they described a single point in time.

Table 1. Data sources and their use in the analysis

Source	Reference year	Use in the analysis
Tampahan District in Figures (Central Bureau of Statistics of Toba Regency, 2024, 2025)	2024–2025	Village area, population, hamlets, land-use context
District Strategic Plan (Tampahan District, 2021)	2021–2026	District planning priorities and service context
ProKlim socialization report (Tampahan District, 2023)	2023	Waste generation and disposal practices
Jadesta tourism-village profile (Ministry of Tourism of the Republic of Indonesia, n.d.-a)	n.d.	Attractions, homestays, village classification
Toba Regency Culture and Tourism Office (2025, 2026)	2025–2026	Ecolodge groundbreaking; Dusun III lakefront corridor
Previous studies of Meat Village (Otarino, 2019; Manurung, 2019; Febrina Putri S., 2020; Tampubolon, 2024)	2019–2024	Settlement morphology, open space, amenities, history
National regulations (Republic of Indonesia, 2007, 2014, 2021; Ministry of Public Works and Public Housing, 2015)	2007–2021	Spatial-planning hierarchy, lake setback, Lake Toba regional plan

Source: Compiled by the author.

The three schematic maps (Figures 2–4) were drawn by the author at village scale. The Toba Regency administrative map (Central Bureau of Statistics of Toba Regency, 2024) and the national base map and national digital elevation model published by the Geospatial Information Agency (BIG) were used for orientation, and publicly available high-resolution satellite imagery (2024) was interpreted visually to delineate settlement clusters, rice fields, vegetated slopes, and the shoreline. No parcel-level survey, GPS ground-truthing, or interviews were undertaken. Population data are taken from the official BPS statistics; other figures are used as reported by their sources.

2.3 Analytical Procedure

The analysis proceeded in four stages (Figure 1). In the first stage, the village was interpreted from homogeneous, nodal, administrative, and planning-region perspectives. In the second stage, its spatial structure was reconstructed from access corridors, settlement clusters, service nodes, productive open space, the lakefront, and surrounding slopes. In the third stage, the spatial pattern was classified into six components—settlement and *huta*, agricultural landscape, cultural core, lakefront, vegetated slope and ecological area, and tourism services—with attention to the interfaces between them. In the fourth stage, documented development pressures were translated into a conceptual zoning framework distinguishing areas for conservation, community-based accommodation, controlled tourism development, ecological protection, and concentrated visitor services. Zoning criteria drew on the concepts of visual landscape character (Tveit et al., 2006) and tourism carrying capacity (Saveriades, 2000), the latter treated as a parameter to be quantified in subsequent studies, and on national rules governing lake setbacks and the Lake Toba regional spatial plan (Ministry of Public Works and Public Housing, 2015; Republic of Indonesia, 2014). The delineation criteria for each zone are reported in Section 3.1.5.

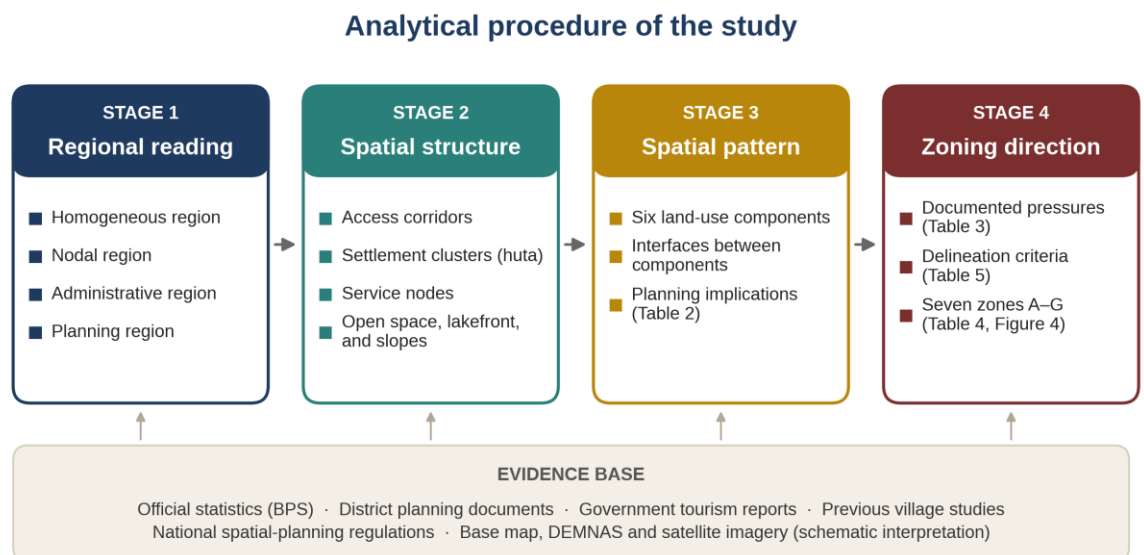


Figure 1. Analytical procedure of the study
Source: Prepared by the author.

2.4 Limitations of the Spatial Data

The maps presented in this article are schematic and not to scale; each map carries this statement in place of a numerical scale. They communicate conceptual planning relationships rather than survey-grade positions, and the depicted boundary and place labels should be read as orientation aids. Implementation would require verification against official administrative boundaries, the national base map (*Rupa Bumi Indonesia*, RBI), the national digital elevation model (DEMNAS) or equivalent elevation data, high-resolution

imagery, lake-setback delineation, hazard data, and field-surveyed coordinates for cultural assets, accommodation, infrastructure, and public access points.

3. Results and Discussion

3.1 Results

3.1.1 Village Profile and Planning Context

Official statistics record Meat Village as covering approximately 3.00 km² (about 300 ha), with 811 residents in 2023, comprising 411 males and 400 females, organized in three hamlets (Central Bureau of Statistics of Toba Regency, 2024). A 2023 district report on the climate-village program (*Program Kampung Iklim*, ProKlim) refers to 752 residents (Tampahan District, 2023), a difference that underlines the need to anchor planning figures to a single, clearly dated source. The BPS figure is used in this study because it is the official statistic with a stated reference year. These data are used here to establish the scale and functional character of the village rather than to project population.

Figure 2 situates the village between Lake Toba to the north and forested hills to the south, with the main access corridor running east–west toward Balige (east) and North Tapanuli (*Tapanuli Utara*, abbreviated “Taput” on the maps; west). Settlement clusters are distributed along the corridor and near the shoreline, while rice fields occupy most of the intervening land. From a regional perspective, the village can be read as a relatively homogeneous cultural–agrarian–lake landscape, because its major elements together form a recognizable identity. It also has a nodal structure, in which village services, cultural clusters, and lakefront attractions act as activity nodes connected through the corridor system. Administratively, the village is embedded in district and regency planning systems, whereas as a planning region it is more appropriately treated as a community-based tourism landscape than as a resort enclave.

3.1.2 Conceptual Spatial Structure

The spatial structure of Meat Village is best described as a corridor–cluster system. The main access corridor functions as the movement backbone and branches into smaller roads leading to *huta* and other settlement clusters. Unlike an urban grid, this structure depends on a limited number of connections; indiscriminate road extension could therefore fragment rice fields, alter settlement morphology, and encourage ribbon development. Service functions should accordingly be consolidated around accessible nodes rather than dispersed across agricultural land or the shoreline.

Three elements are central to this structure: the main access corridor and its service points; the cluster system of settlements and culturally significant *huta*; and the productive and natural open-space system consisting of rice fields, traditional yards, shoreline areas, watercourses, and hillsides. The relationship among these elements creates view corridors—uninterrupted visual connections among the road, fields, hills, and Lake Toba—that contribute directly to landscape identity and to the tourism experience. Visual-landscape research identifies such coherence, openness, and historicity as core dimensions of landscape character (Tveit et al., 2006).

3.1.3 Existing Spatial Pattern

Figure 3 shows the existing spatial pattern. Settlement clusters appear as dispersed patches along the corridor and the local road network; agricultural land and rice fields form the dominant matrix; the Ragi Hotang cultural core is located in the north-central part of the village; tourism nodes are concentrated at Simanjuntak Beach and along the lakefront; and vegetated hillsides frame the village on its western, eastern, and southern edges. These components are not separated by hard boundaries. Their interfaces matter because tourism development typically occurs precisely where accessibility, scenic value, and available land overlap.

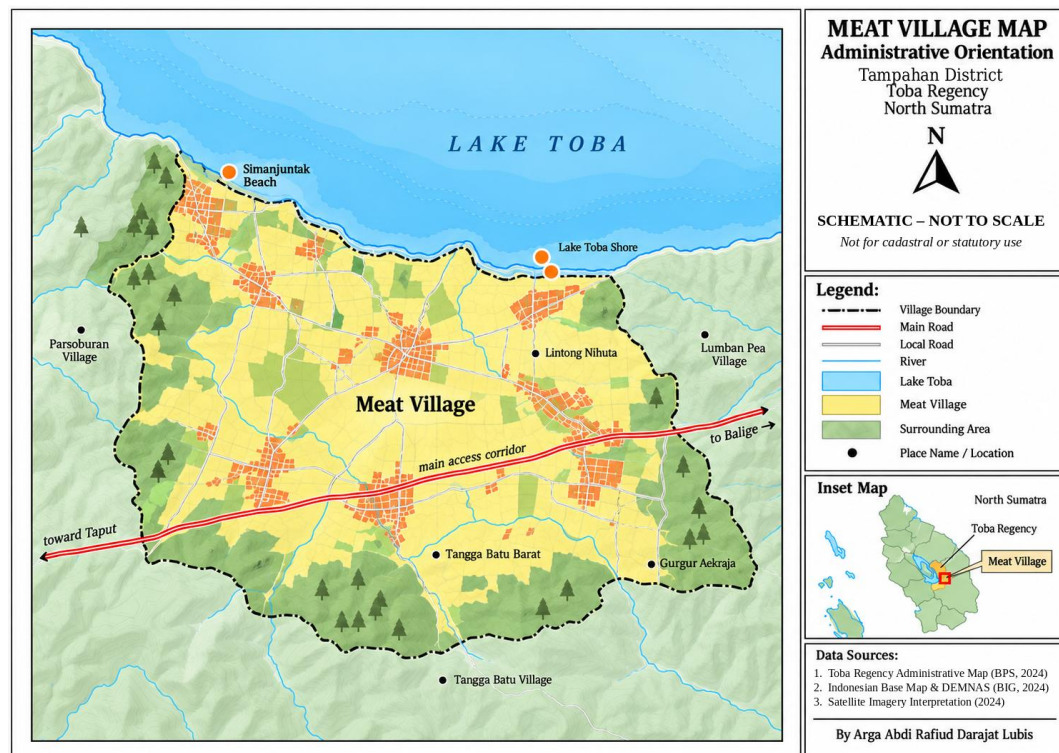


Figure 2. Administrative orientation of Meat Village (schematic). Orange patches denote settlement clusters and tree symbols denote vegetated hillsides.

Source: Prepared by the author.

Table 2. Spatial-pattern interpretation and planning implications

Spatial component	Primary function	Planning implication
Settlement / <i>huta</i>	Housing, social interaction, resident-based homestays	Maintain village-scale building mass and clustered morphology; prioritize adaptive reuse.
Agricultural landscape	Food production, open space, tourism scenery	Limit fragmentation and conversion; support agrotourism and interpretation routes.
Lake waterfront	Toba Public natural space, recreation, fisheries, views	Maintain public access and water quality; avoid dominant permanent buildings.
Cultural core	Traditional houses, Ragi Hotang setting, cultural activity	Conserve spatial orientation, scale, yards, and landscape setting.
Slopes / ecological areas	Vegetation, infiltration, landscape framing	Restrict intensive construction; verify slope and ground-movement risk.
Tourism services	Parking, information, micro, small, and medium enterprises (MSMEs), sanitation, food services	Concentrate at access and service nodes rather than dispersing throughout the village.

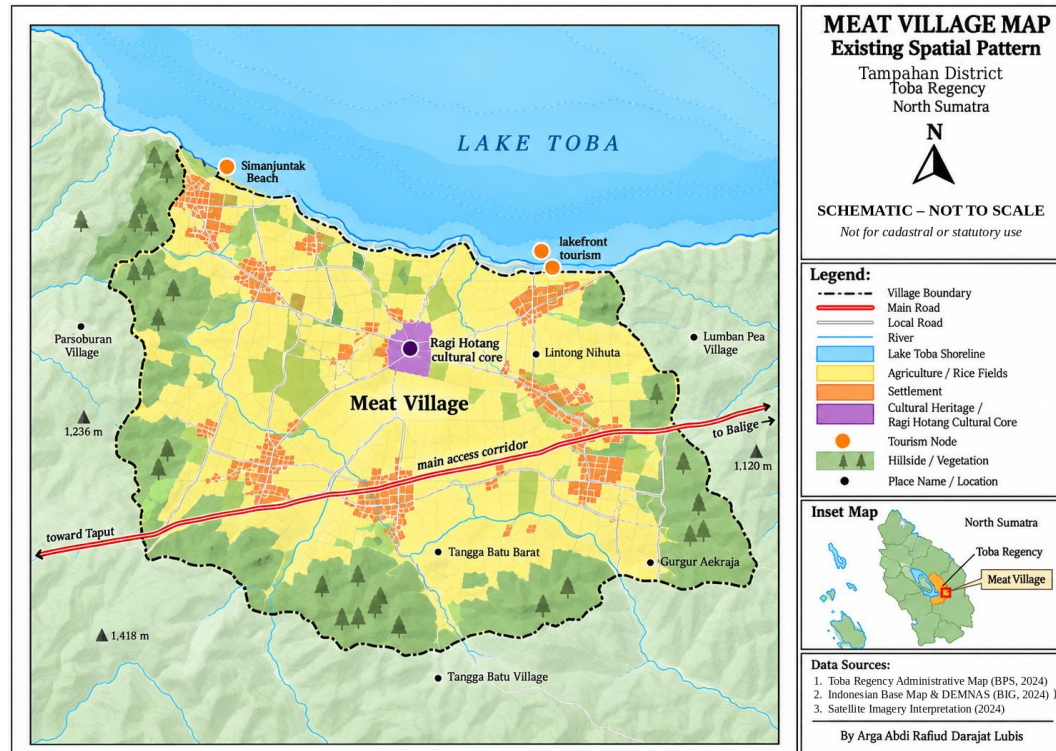


Figure 3. Existing spatial pattern of Meat Village (schematic)

Source: Prepared by the author.

Agricultural land performs more than a production function. The rice-field landscape is part of the village image and supports harvest-based agrotourism; its conversion would remove both productive capacity and scenic capital. Similarly, the cultural core should be understood as a setting rather than as a set of individual buildings: the relationship among houses, *alaman*, circulation, fields, and views constitutes the heritage value (Tobing & Hutabarat, 2019). This reinforces the need to regulate building mass, orientation, setbacks, and the continuity of open space around culturally significant areas. Table 2 summarizes the function and planning implication of each component.

3.1.4 Strategic Spatial Pressures

Five pressures were identified (Table 3). The most immediate is accommodation growth. Resident-based homestays that use or adapt existing houses distribute tourism income while minimizing new land conversion. New villas and ecolodges, by contrast, generally require additional land, road access, parking, water supply, wastewater treatment, and solid-waste systems. They carry higher spatial risk and should not be governed by the same locational logic as homestays—a distinction that became operational with the 2025 ecolodge groundbreaking.

The opening of the *Dusun* III lakefront corridor increases public accessibility and economic opportunity, but it may also trigger kiosks, parking areas, accommodation, and permanent structures along the shoreline. Without spatial control, incremental development can reduce public access and degrade water quality. Public lake access, sanitation, and the visual openness of the shoreline should therefore be treated as preconditions for development rather than as post-development mitigation, consistent with national lake-setback rules, which set the lake border line at a minimum of 50 m from the highest recorded water level (Ministry of Public Works and Public Housing, 2015, Art. 11(1)).

A further pressure is the gradual replacement of clustered settlement morphology by linear construction along roads, a tendency already observed by Octarino (2019). Tourism can accelerate such ribbon development because roadside parcels are comparatively

accessible; continuous building fronts along the corridor or the shoreline would block views and weaken the relationship between settlements and farmland. Waste management is equally critical. A 2023 district report estimated that the village generates about 300 kg of waste per day, with no organized collection system and with residents burning, burying, or discarding waste into watercourses (Tampahan District, 2023); for a population of 752–811 residents, this corresponds to roughly 0.4 kg per person per day, before any visitor load is added. Evidence from island destinations shows that municipal waste rises measurably with visitor numbers (Mateu-Sbert et al., 2013), so accommodation approval in Meat Village should be conditional on demonstrated sanitation, solid-waste, and water-management capacity. Finally, the topographic setting requires attention to slope stability and emergency access: sensitive slopes are better retained for vegetation, infiltration, and low-intensity recreation, and parking should be placed at gateways so that large vehicles do not enter narrow settlement and lakefront areas.

Table 3. Strategic spatial pressures and required controls

Pressure	Evidence	Spatial risk	Required control
Accommodation growth	Ten-villa ecolodge groundbreaking, May 2025	Land conversion; new roads and utilities	Homestay-first policy; suitability checks for villas (Zone E)
Lakefront opening	About 2 km Dusun III corridor launched, March 2026	Shoreline privatization; water pollution; loss of openness	Public access and lake setback as preconditions (Zone D)
Ribbon development	Linear growth along roads (Otarino, 2019)	Blocked views; fragmented farmland	Cluster-based infill; roadside frontage limits
Waste and sanitation	About 300 kg/day; no organized collection (2023)	Water and soil contamination	Permits linked to wastewater and solid-waste capacity
Slope sensitivity	Hilly terrain framing the village	Erosion, ground movement, access failure	Hazard verification; restrict permanent buildings (Zone F)

Source: Author's analysis based on the cited sources.

3.1.5 Conceptual Tourism Zoning Direction

The proposed planning concept treats cultural heritage, agricultural production, and the lake ecosystem as the primary spatial structure to which tourism functions must adapt, rather than allocating tourism as a dominant land-use layer. Seven zones are proposed (Figure 4; Table 4), and the variables used to delineate them are summarized in Table 5. Zone A, the cultural heritage core, is centered on Ragi Hotang in the north-central part of the village and prioritizes conservation of *huta* morphology, house settings, yards, and orientation. Zone B, the settlement and homestay area, comprises the existing residential clusters in the north-western and central-eastern parts of the village, including frontage along the corridor. It supports accommodation, culinary activity, and small enterprises within the existing fabric. Zone C, the agricultural landscape, retains the rice-field matrix as productive land while permitting low-impact agrotourism and interpretation. Zone D, lakefront tourism, occupies the shoreline strips and prioritizes public access, light facilities, viewpoints, and water-quality protection; it is drawn to include the water's edge, which is why it extends slightly beyond the schematic land boundary of the village. Zone E, controlled accommodation, is located along the eastern part of the corridor, where access is available outside the most sensitive areas. Development there is subject to suitability checks for slope, sanitation, views, carrying capacity, and regulation. Zone F, slope and ecological protection, covers the vegetated hillsides on the western, eastern, and southern margins and restricts permanent construction. Zone G, tourism services, is concentrated at the western gateway on the main corridor, where parking, information, toilets, and transfer points can intercept vehicles before they reach the settlement and shoreline.

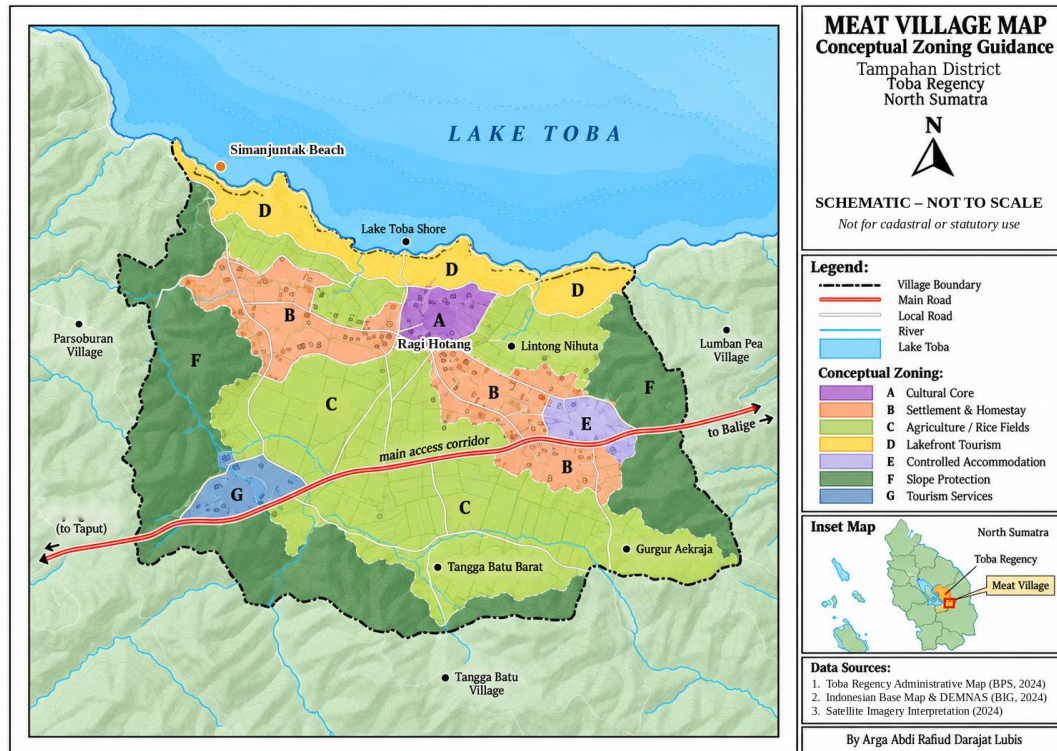


Figure 4. Conceptual zoning direction for Meat Village (zones A–G)

Source: Prepared by the author.

Table 4. Conceptual zoning direction for Meat Village

Zone	Main function	Planning direction
A. Cultural heritage core	<i>Huta</i> , traditional houses, Ragi Hotang, cultural space	Conserve building pattern, yards, orientation, and cultural use; prioritize adaptive reuse for homestays.
B. Settlement and homestay	Existing settlement and local corridors	Support homestays, culinary activities, and MSMEs while maintaining village morphology.
C. Agricultural landscape	Rice fields and productive land	Retain as productive landscape; permit agrotourism and interpretation; limit large-scale conversion.
D. Lakefront tourism	Public waterfront and water recreation	Maintain public access, light facilities, sanitation, and viewpoints; avoid shoreline privatization.
E. Controlled accommodation	Potential villa or ecolodge sites outside sensitive areas	Permit only after suitability checks for access, slope, sanitation, views, carrying capacity, and regulation.
F. Slope and ecological protection	Vegetated slopes and sensitive areas	Restrict permanent buildings; prioritize revegetation and low-intensity recreation.
G. Tourism services	Parking, information, sanitation, local business services	Concentrate at the gateway node to reduce vehicle pressure on <i>huta</i> and the lakefront.

Source: Author's analysis.

Table 5. Delineation criteria for the conceptual zones

Zone	Determining variables	Conceptual or regulatory reference
A. Cultural heritage core	Location of Ragi Hotang and traditional huta; integrity of house rows, yards (alaman), and orientation	Tobing & Hutabarat (2019); UNESCO (2011)
B. Settlement and homestay	Existing residential clusters and their immediate frontage; local road access; village-scale building mass	Octarino (2019); Okazaki (2008)
C. Agricultural landscape	Rice-field and productive land cover; continuity of the open-field matrix and view corridors	Tveit et al. (2006); Manurung (2019)
D. Lakefront tourism	Shoreline strip within the lake border line (minimum 50 m from the highest recorded water level); public access points	Ministry of Public Works and Public Housing (2015, Art. 11(1)); Republic of Indonesia (2014)
E. Controlled accommodation	Road access outside Zones A, C, D, and F; gentle terrain; wastewater, solid-waste, and water-supply capacity	Saveriades (2000); Mateu-Sbert et al. (2013)
F. Slope and ecological protection	Vegetated hillsides and steeper terrain framing the village; infiltration and erosion sensitivity	Republic of Indonesia (2014, 2021)
G. Tourism services	Gateway position on the main corridor; distance from huta and the shoreline; space for parking and transfer	Glasson & Marshall (2007)

Note. Slope classes and exact distances are to be determined with DEMNAS and field-surveyed data; the table lists the variables used for conceptual delineation.

Carrying capacity is treated here as a parameter to be determined rather than as a computed threshold. Suitable indicators for subsequent monitoring include the number of homestay rooms per hamlet, overnight visitors per day relative to wastewater and solid-waste capacity, and parking spaces relative to vehicle arrivals at the gateway (Saveriades, 2000).

3.2 Discussion

3.2.1 Key Findings

Three principal findings emerge. First, the value of Meat Village lies in the continuity of its corridor–cluster structure—the linked system of *huta*, rice fields, slopes, and shoreline—rather than in any single tourism parcel. Second, the pressures now emerging are spatially selective: accommodation, kiosks, and parking gravitate toward the lakefront and the corridor, which are also the most visually and ecologically sensitive parts of the village. Third, resident-based homestays are structurally more compatible with the village than dispersed villa or resort development, because they reuse the existing settlement fabric and require little additional land or infrastructure.

3.2.2 Comparison with Previous Studies

The findings extend earlier village-level work. Octarino's (2019) observation of linear settlement growth is reinterpreted here as a tourism-sensitive risk of ribbon development, while Manurung's (2019) emphasis on extensive agricultural land is translated into a protected agricultural-landscape zone. Tampubolon's (2024) historical account of the shift from an agrarian to a tourism village is consistent with a transition from the involvement stage toward the development stage in Butler's (1980) life-cycle model. Three indicators support this reading: the village is classified as an initiating tourism village with five locally operated homestays, it was ranked among the national top 100 tourism villages in 2021, and external investment entered with the 2025 ecolodge groundbreaking (Ministry of Tourism of the Republic of Indonesia, n.d.-a; Toba Regency Culture and Tourism Office, 2025). This suggests that spatial controls should be introduced before accommodation growth becomes self-reinforcing.

The results also align with international evidence on rural and community-based tourism. Okazaki (2008) argues that community-based tourism depends on participation, redistribution of benefits, and the protection of shared resources; Kontogeorgopoulos et al. (2014) show that such initiatives succeed where local leadership and external support are combined; and Gao and Wu (2017) demonstrate that traditional villages can be revitalized through tourism when community cooperatives, rather than external developers, control the pace and form of change. The homestay-first principle proposed here applies these insights spatially. At the regional scale, the zoning of lakefront and accommodation areas responds to evidence that tourism facilities contribute significantly to nutrient loading in Lake Toba (Hutagaol et al., 2024) and to the importance of amenities in the region's development pathway (Mulyadi et al., 2024).

3.2.3 Implications and Applications

The framework has phased implementation implications. In the very short term, official village boundaries and base GIS layers should be verified, followed by an inventory of *huta*, rice fields, tourism buildings, public lake access, sanitation infrastructure, and existing accommodation. In the short term, a village design guideline should be prepared, parking and visitor services consolidated at the gateway node, and a quality-improvement program for resident-based homestays implemented; new buildings along the corridor and shoreline should be screened against landscape, access, sanitation, and cultural-setting criteria. In the medium term, pedestrian and interpretation routes can connect cultural, agricultural, and lakefront assets without extensive new roads, while agrotourism and ulos-based enterprises increase the economic value of retaining the landscape. Annual monitoring of new buildings, rice-field conversion, shoreline change, and accommodation density would provide an evidence base for adjusting controls.

The approach does not substitute for statutory instruments such as the regency spatial plan (*Rencana Tata Ruang Wilayah*, RTRW), detailed spatial plan (*Rencana Detail Tata Ruang*, RDTR), spatial-use suitability approval (*Kesesuaian Kegiatan Pemanfaatan Ruang*, KKPR), or lake-setback requirements (Republic of Indonesia, 2007, 2014, 2021; Ministry of Public Works and Public Housing, 2015). Its contribution is to identify the spatial relationships that should be protected when those instruments are applied at village scale, in line with the landscape-based approach advocated for historic settlements (UNESCO, 2011). In particular, it shifts the planning question from how to maximize accommodation capacity toward how to maintain the landscape system that makes tourism economically and culturally viable. The same logic may be transferable to other lakeside Batak Toba villages facing similar accommodation and shoreline pressures, although this requires comparative testing.

4. Conclusion

Meat Village has a distinctive corridor-cluster spatial structure that links traditional settlement clusters, agricultural land, Lake Toba, hillsides, and service nodes. Its value lies in the continuity among these elements rather than in isolated tourism parcels. Recent accommodation and lakefront development indicates growing pressure on land use,

particularly along the shoreline and the main corridor. Resident-based homestays integrated with existing settlements are more compatible with this structure than dispersed villa or resort development, and new villas or ecolodges should be permitted only after suitability checks for access, slope, sanitation, carrying capacity, landscape views, and applicable regulation. The proposed seven-zone framework provides a conceptual basis for balancing cultural conservation, agriculture, ecological protection, tourism services, and controlled accommodation. Its central principle is that tourism should follow and strengthen the cultural–agricultural–lakefront structure of Meat Village rather than replace it. The zones remain conceptual and should be verified with official geospatial data before they are incorporated into statutory instruments. Because the views of residents and customary leaders were not collected, the framework should also be validated through participatory mapping.

Recommendations

Four recommendations follow:

- (1) The Toba Regency government should verify the village boundary and prepare base GIS layers so that the conceptual zones can be delineated and integrated into the RDTR and KKPR process.
- (2) A village design guideline should regulate building height, mass, orientation, and setbacks in Zones A, B, and D, and should protect key view corridors toward the lake.
- (3) Accommodation permits in Zone E should be conditional on demonstrated wastewater, solid-waste, and water-supply capacity, and the village should establish an organized waste-collection system before tourism volumes increase further.
- (4) Future research should test the framework with field-surveyed data, slope and hazard analysis, visitor-count monitoring, and participatory mapping with residents and customary leaders (Chambers, 2006); culturally significant sites should be mapped only with the consent of customary leaders.

5. References

- Antrop, M. (2005). Why landscapes of the past are important for the future. *Landscape and Urban Planning*, 70(1–2), 21–34. <https://doi.org/10.1016/j.landurbplan.2003.10.002>
- Butler, R. W. (1980). The concept of a tourist area cycle of evolution: Implications for management of resources. *Canadian Geographer*, 24(1), 5–12. <https://doi.org/10.1111/j.1541-0064.1980.tb00970.x>
- Central Bureau of Statistics of Toba Regency. (2024). *Tampahan District in figures 2024*. BPS Kabupaten Toba. <https://tobakab.bps.go.id/en/publication/2024/09/26/09e34daf058dc5834e02ae1e/kecamatan-tampahan-dalam-angka-2024.html>
- Central Bureau of Statistics of Toba Regency. (2025). *Tampahan District in figures 2025*. BPS Kabupaten Toba. <https://tobakab.bps.go.id/id/publication/2025/09/26/61634f3920b4df13167749ef/tampahan-district-in-figures-2025.html>
- Chambers, R. (2006). Participatory mapping and geographic information systems: Whose map? Who is empowered and who disempowered? Who gains and who loses? *The Electronic Journal of Information Systems in Developing Countries*, 25(2), 1–11. <https://doi.org/10.1002/j.1681-4835.2006.tb00163.x>
- Febrina Putri S. (2020). *Pengembangan amenities di Desa Wisata Meat, Kecamatan Tampahan, Kabupaten Toba Samosir* [Amenity development in Meat Tourism Village, Tampahan District, Toba Samosir Regency] [Undergraduate thesis, Universitas Gadjah Mada]. Repositori UGM. <https://etd.repository.ugm.ac.id/penelitian/detail/188722>

- Gao, J., & Wu, B. (2017). Revitalizing traditional villages through rural tourism: A case study of Yuanjia Village, Shaanxi Province, China. *Tourism Management*, 63, 223–233. <https://doi.org/10.1016/j.tourman.2017.04.003>
- Glasson, J., & Marshall, T. (2007). *Regional planning*. Routledge. <https://doi.org/10.4324/9780203938935>
- Hutagaol, M. P., Tanjung, D., Nirmala, K., Hastuti, Y. P., & Wulandari, Y. P. (2024). Assessing the impacts of fish in-cage farming and tourism on Lake Toba's water quality. *International Journal of Sustainable Development and Planning*, 19(4), 1299–1306. <https://doi.org/10.18280/ijstdp.190408>
- Kontogeorgopoulos, N., Churyen, A., & Duangsaeng, V. (2014). Success factors in community-based tourism in Thailand: The role of luck, external support, and local leadership. *Tourism Planning & Development*, 11(1), 106–124. <https://doi.org/10.1080/21568316.2013.852991>
- Manurung, P. (2019). Ruang bermain anak di Desa Meat, Kabupaten Toba Samosir [Children's play space in Meat Village, Toba Samosir Regency]. *TALENTA Conference Series: Energy & Engineering*, 2(1). <https://doi.org/10.32734/ee.v2i1.400>
- Mateu-Sbert, J., Ricci-Cabello, I., Villalonga-Olives, E., & Cabeza-Irigoyen, E. (2013). The impact of tourism on municipal solid waste generation: The case of Menorca Island (Spain). *Waste Management*, 33(12), 2589–2593. <https://doi.org/10.1016/j.wasman.2013.08.007>
- Ministry of Public Works and Public Housing. (2015). *Regulation of the Minister of Public Works and Public Housing No. 28/PRT/M/2015 on the determination of river and lake border lines*. Kementerian PUPR. <https://peraturan.bpk.go.id/Home/Details/159992/permen-pupr-no-28prtm2015-tahun-2015>
- Ministry of Tourism of the Republic of Indonesia. (n.d.-a). *Desa Wisata Meat* [Meat Tourism Village]. Jejaring Desa Wisata (Jadesta). Retrieved September 27, 2026, from <https://jadesta.kemenpar.go.id/desa/meat>
- Ministry of Tourism of the Republic of Indonesia. (n.d.-b). *Edukasi martonun – Desa Wisata Meat* [Martonun (weaving) education – Meat Tourism Village]. Jejaring Desa Wisata (Jadesta). Retrieved September 27, 2026, from <https://jadesta.kemenpar.go.id/atraksi/31926>
- Mulyadi, B., Sirojuzilam, S., Lubis, S., & Purwoko, A. (2024). The role of caldera geopark in tourism development of Lake Toba super priority destinations, Indonesia. *GeoJournal of Tourism and Geosites*, 55(3), 1426–1437. <https://doi.org/10.30892/gtg.55342-1314>
- Octarino, C. N. (2019). Identifikasi pola permukiman tradisional Desa Meat, Toba Samosir [Identification of the traditional settlement pattern of Meat Village, Toba Samosir]. *Prosiding Seminar Nasional Desain dan Arsitektur (SENADA)*, 2.
- Okazaki, E. (2008). A community-based tourism model: Its conception and use. *Journal of Sustainable Tourism*, 16(5), 511–529. <https://doi.org/10.1080/09669580802159594>
- Republic of Indonesia. (2007). *Law No. 26 of 2007 on spatial planning*. State Gazette of the Republic of Indonesia. <https://peraturan.bpk.go.id/Details/39908/uu-no-26-tahun-2007>
- Republic of Indonesia. (2014). *Presidential Regulation No. 81 of 2014 on the spatial plan of the Lake Toba area and its surroundings*. <https://peraturan.bpk.go.id/Details/41575/perpres-no-81-tahun-2014>
- Republic of Indonesia. (2021). *Government Regulation No. 21 of 2021 on the implementation of spatial planning*. State Gazette of the Republic of Indonesia. <https://peraturan.bpk.go.id/Details/161851/pp-no-21-tahun-2021>

- Saveriades, A. (2000). Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the Republic of Cyprus. *Tourism Management*, 21(2), 147–156. [https://doi.org/10.1016/S0261-5177\(99\)00044-8](https://doi.org/10.1016/S0261-5177(99)00044-8)
- Tampahan District. (2021). *Rencana strategis perangkat daerah Kecamatan Tampahan Kabupaten Toba tahun 2021–2026* [Strategic plan of the Tampahan District office, Toba Regency, 2021–2026]. Pemerintah Kabupaten Toba.
- Tampahan District. (2023, June 5). *Sosialisasi Program Kampung Iklim (ProKlim) Desa Meat* [Socialization of the Climate Village Program (ProKlim) in Meat Village]. Pemerintah Kecamatan Tampahan. <https://kectampahan.tobakab.go.id/2023/06/05/sosialisasi-program-kampung-iklim-proklm/>
- Tampubolon, S. N. (2024). *Dari desa agraris menuju desa wisata: Sejarah Desa Meat Kecamatan Tampahan, Toba, Sumatera Utara* [From agrarian village to tourism village: A history of Meat Village, Tampahan District, Toba, North Sumatra] [Undergraduate thesis, Universitas Negeri Medan]. Repositori UNIMED. <https://digilib.unimed.ac.id/id/eprint/61689/>
- Taylor, K., & Lennon, J. (2011). Cultural landscapes: A bridge between culture and nature? *International Journal of Heritage Studies*, 17(6), 537–554. <https://doi.org/10.1080/13527258.2011.618246>
- Toba Regency Culture and Tourism Office. (2025, May 1). *Pembangunan Meat Lakefront Ecolodges dimulai, dorong pengembangan pariwisata berbasis alam dan budaya* [Construction of Meat Lakefront Ecolodges begins, promoting nature- and culture-based tourism development]. <https://wisata.tobakab.go.id/2025/05/01/pembangunan-meat-lakefront-ecolodges-dimulai-dorong-pengembangan-pariwisata-berbasis-alam-dan-budaya/>
- Toba Regency Culture and Tourism Office. (2026, March 16). *Launching kawasan wisata Pantai Dusun III Desa Meat: Semangat gotong royong menuju penguatan ekonomi masyarakat* [Launch of the Dusun III Beach tourism area in Meat Village: The spirit of mutual cooperation toward strengthening the community economy]. <https://wisata.tobakab.go.id/2026/03/16/launching-kawasan-wisata-pantai-dusun-iii-desa-meat-semangat-gotong-royong-menuju-penguatan-ekonomi-masyarakat/>
- Tobing, R. R., & Hutabarat, G. M. (2019). The traditional settlement architecture of the Bataknese Toba tribe and clan kinship in the village of Hutaginjang, North Sumatra, Indonesia. *ISVS e-journal*, 6(2), 12–21. https://www.isvshome.com/pdf/ISVS_6-2/ISVS-ej-6.2.2-Rumaiti-Final-Published.pdf
- Tveit, M., Ode, Å., & Fry, G. (2006). Key concepts in a framework for analysing visual landscape character. *Landscape Research*, 31(3), 229–255. <https://doi.org/10.1080/01426390600783269>
- UNESCO. (2011). *Recommendation on the historic urban landscape*. UNESCO. <https://www.unesco.org/en/legal-affairs/recommendation-historic-urban-landscape-including-glossary-definitions>
- Waterson, R. (1990). *The living house: An anthropology of architecture in South-East Asia*. Oxford University Press.