

Analysis of the Transformation of Social Relations and Living Spaces of Communities Along the Deli River in Medan

Henry Paulus Lumbangaol, Cut Nuraini

Abstract

Changes in spatial structure along the Deli River in Medan City have led to significant transformations in social relations and the living environment of local communities. This study aims to analyze the forms of social relational changes, living space conditions, and to formulate community-strengthening strategies based on a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. The research methods included field observation, interviews, and visual documentation in three urban villages along the downstream corridor of the Deli River: Kesawan, Aur, and Hamdan. The findings indicate that social relations among residents are still maintained through mutual cooperation and daily interactions, although their intensity has decreased due to limited public spaces and deteriorating environmental conditions. Regarding living space, high residential density, inadequate sanitation, and limited access to clean water are the main challenges. The SWOT analysis reveals that the primary strengths lie in social cohesion and local wisdom, while weaknesses include limited infrastructure and environmental degradation. Opportunities arise from river-based economic potential, whereas the main threats come from urbanization pressure and spatial planning uncertainty. This study emphasizes the need for a community-based sustainable development approach that balances social, economic, and ecological aspects to ensure the sustainability of life along the Deli River.

Keywords: Social Transformation, Living Space, SWOT, Riverbank Community, Deli River, Medan

Henry Paulus Lumbangaol¹

¹Master of Regional and Urban Planning, Universitas Pembangunan Panca Budi, Indonesia

e-mail: henrypaulus@gmail.com¹

Cut Nuraini²

²Master of Regional and Urban Planning, Universitas Pembangunan Panca Budi, Indonesia

e-mail: cutnuraini@dosen.pancabudi.ac.id²

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Introduction

The development of Medan as one of Indonesia's metropolitan cities has demonstrated increasingly complex social and spatial dynamics over the past decade. With a population reaching approximately 2.49 million in 2024, pressures on living spaces have intensified, particularly along riverbanks that serve as centers of social and economic activity [1]. Historically, the Deli River has functioned as the city's lifeline, but it now faces serious challenges, including pollution, narrowing of the riverbank, and environmental degradation due to high-density settlements along its course. Data indicate that around 70% of solid and liquid domestic waste in Medan originates from areas adjacent to the Deli River, significantly impacting local ecosystems and residents' quality of life [2].

From a social perspective, communities along the Deli River have experienced significant changes in social relations and living space structure. Interactions among residents, which were previously strong, have begun to decline due to shrinking public spaces and pressures from informal economic activities. Nasution [3] highlights a mismatch between actual land use and the Medan City Spatial Plan (RTRW), particularly along the 23.79-hectare Deli River corridor. This discrepancy not only affects ecological aspects but also contributes to the degradation of social networks and the sustainability of riverbank communities' economies.

Previous studies have largely focused on the physical and environmental aspects of river management, while the social and economic dimensions of riverbank communities remain underexplored. Research on community engagement in urban river improvement in Yogyakarta [4] emphasizes the importance of public participation in river restoration to ensure that rehabilitation programs enhance social welfare alongside physical improvements. Similarly, studies in the Cisadane Riverside, Tangerang, indicate that sustainable riverbank management must balance social, economic, and environmental dimensions as an integrated urban system [5]. Approaches used in research on urban well-being and community development also demonstrate that the interplay between the built environment, social networks, and quality of life is crucial for community sustainability in urban contexts [6].

In the context of the Deli River, the shift from river-based activities to built-up spaces has accelerated social and economic transformation. Activities previously dependent on the river—such as small-scale trade, water transportation, and local cultural practices—have gradually been displaced by modern urban economic interests. This transition has reduced daily interactions among residents and weakened communal spatial identity [7]. Therefore, a strategic analysis based on SWOT (Strengths, Weaknesses, Opportunities, Threats) is necessary to identify internal strengths, such as social solidarity and community attachment, as well as weaknesses, including limited public spaces and environmental degradation threats [8].

Thus, this study holds both academic and practical relevance in formulating strategies for a more adaptive and sustainable development of communities along the Deli River. The SWOT approach allows for a comprehensive analysis of social relations, living spaces, and economic dynamics of riverbank communities, with expected contributions to strengthening social capacity and guiding sustainable spatial planning along the riverbanks.

Previous research on the Deli River has generally emphasized spatial planning and environmental conditions [3], [9], but few studies have integrated a strategic approach to understand social and living space transformations simultaneously. Studies in other river contexts, such as the Musi River [10], have examined community adaptation to environmental risks but have not linked social and economic aspects with comprehensive community management strategies. Moreover, empirical indicators such as the frequency of resident interactions, community participation, and perceptions of the river environment have rarely been treated as primary variables for understanding socio-economic structural changes.

This study seeks to address these gaps through a SWOT-based analysis that integrates social, economic, and spatial variables. Consequently, the findings are expected to enrich the

literature on sustainable riverbank community development strategies in Indonesia, particularly in urban contexts like Medan.

The study aims to analyze the transformation of social relations and community living spaces along the Deli River using a SWOT approach, identify the impact of spatial function changes on social and economic interactions, and formulate strategic recommendations to strengthen social connectivity and ensure the sustainability of living spaces along the riverbank.

Literature Review

The transformation of social relations and living spaces along riverbanks is a complex and multidimensional phenomenon, encompassing interrelated social, economic, cultural, and ecological aspects. In urban contexts such as Medan, changes in land use along the Deli River have direct implications for the patterns of social interaction among local communities. As Lefebvre explains, space is not merely a physical entity but also a social product shaped through interactions and power relations among actors [11]. Therefore, analyzing changes in space cannot be separated from the social dynamics occurring within it.

Historically, riverbanks have served as social spaces with symbolic and functional significance for communities. The Deli River, for instance, has functioned since the colonial period as a space for economic activity, transportation, and as part of the social identity of Medan residents [12]. However, in the past two decades, rapid urbanization has led to the degradation of both ecological and social functions of this area. Limited urban land has encouraged the growth of informal settlements along the riverbanks, resulting in declining environmental quality and increased social vulnerability [13].

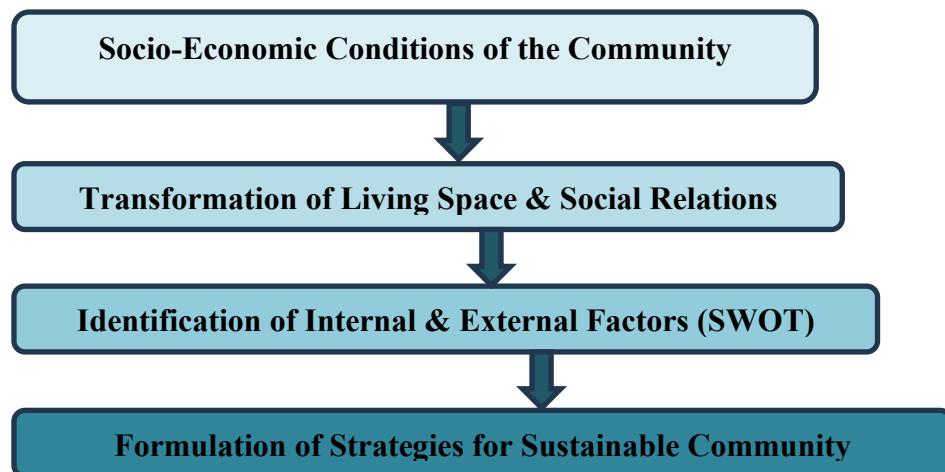
A study by Rahmawati [14] shows that social transformations along riverbanks are often marked by weakening community solidarity due to land-use changes and economic pressures. Communities that previously maintained social networks based on spatial proximity and shared activities now face social segregation due to restricted public space. This reflects a shift from traditional social relations toward more individualistic patterns, where economic orientation becomes a dominant factor in shaping new social structures [15]. The concept of living space (*lebensraum*), developed by Haeckel and later refined by Habermas, emphasizes that space is the result of a social construction that continuously evolves according to societal dynamics [16]. In the context of the Deli River, the living space of riverbank communities emerges from adaptation to limited environmental conditions, giving rise to community-based survival strategies. Research by Setiawan and Dewi [17] highlights that a community's ability to maintain a balance between social and environmental functions is a key indicator for sustaining riverbank areas.

The SWOT (Strengths, Weaknesses, Opportunities, Threats) approach is considered relevant for analyzing social and living space transformations in this context because it provides a comprehensive depiction of both internal and external community conditions [18]. Regarding strengths, the Deli Riverbank communities still exhibit strong social solidarity and a well-established local identity. In terms of weaknesses, limited public spaces, inadequate access to basic infrastructure, and low participation in planning processes are major obstacles to empowerment. Opportunities arise from increasing government attention to river revitalization and programs supporting local economic development, while threats include risks of relocation, economic inequality, and ongoing ecological degradation [19].

Suharto [20] emphasizes in his study on participatory approaches to social development that community capacity cannot be strengthened through top-down measures alone. In the Deli River context, the success of revitalization efforts heavily depends on the active involvement of local communities in planning and implementing programs. Therefore, strategies to strengthen social relations should focus on enhancing the role of residents in environmental management and community-based economic activities.

The SWOT analysis in this study will focus on four key elements: (1) social strengths of the community, such as mutual cooperation and solidarity; (2) structural weaknesses, including limited public facilities and non-inclusive spatial planning; (3) opportunities arising from government programs and academic support for sustainable river management; and (4) external threats, including rapid urbanization and climate change [21]. By understanding the interactions among these elements, the study aims to formulate realistic adaptive strategies to strengthen the social and environmental sustainability of the area.

The conceptual framework of this study is designed to illustrate the relationship between social relations, living spaces, and SWOT analysis within the context of the Deli Riverbank communities. This conceptual relationship can be described as follows:



Source: Author, 2025

Figure 1. Research Conceptual Framework

The diagram above illustrates that changes in social relations and living spaces serve as the starting point for understanding community dynamics, which are then analyzed using the SWOT approach to formulate sustainable community development strategies. This approach emphasizes not only physical aspects but also the social, cultural, and economic values that form the foundational strengths of riverbank communities. Consequently, this conceptual framework provides a comprehensive basis for analyzing efforts to strengthen social and environmental sustainability along the Deli River in Medan.

Research Methodology

This study employs a descriptive-qualitative approach combined with a SWOT analysis framework to identify and understand the dynamics of social relations and living space transformations in the communities along the Deli River. This approach was chosen because it effectively integrates social, economic, and spatial dimensions that interact within the context of urban environmental changes [3], [6], [10]. The qualitative method allows the researcher to capture social phenomena in depth through interpretation of the meanings, perceptions, and experiences of the community in responding to changes in their living environment [5], [8], [13].

The research focuses on the downstream areas of the Deli River, encompassing the Kesawan, Aur, and Hamdan urban villages in Medan Maimun District. These areas were selected due to their complex social and spatial characteristics, and because they represent the real pressures of urbanization and shifts in land use along the Deli River [2], [7], [11]. Additionally, these locations illustrate the close interconnection between informal economic

activities, social relations, and environmental conditions that continuously transform due to urban growth.

Data were collected through field observation, in-depth interviews with community leaders, and documentation of physical conditions and socio-economic activities of residents. Primary data were obtained through direct interaction with riverbank communities to understand adaptation patterns and social strategies that emerge as a result of changes in living spaces [4], [9], [14]. Secondary data were collected from scholarly literature, regional regulations, and spatial data relevant to the management of riverbank areas [1], [12], [18].

SWOT analysis was applied to examine four key aspects: strengths, weaknesses, opportunities, and threats affecting the sustainability of the Deli River communities [15], [19]. The analysis involved identifying internal and external factors based on observation and interview results, which were then organized into a SWOT matrix to determine the community's strategic position. The findings were subsequently interpreted to formulate strategies for strengthening social cohesion and sustainable land use [16], [17], [20].

The analysis was conducted systematically through data reduction, data display, and drawing conclusions, as outlined by Miles and Huberman in their qualitative analysis framework [21]. All data were presented narratively with validity ensured through triangulation of sources and methods. This approach ensures that the findings and strategies reflect the actual conditions of the communities and are grounded in empirical evidence to support social and environmental sustainability along the Deli River.

The research flow can be summarized as follows: it begins with the identification of social and spatial changes in riverbank areas, followed by the collection of primary and secondary data, SWOT analysis to map internal and external community conditions, and ultimately the formulation of strategies for social empowerment and sustainable land use. This methodological approach is expected to provide a comprehensive understanding of how communities along the Deli River adapt to transformations in their living environment and to identify the most relevant strategies for maintaining social and ecological sustainability in the area.

Results

The research was conducted in the downstream areas of the Deli River, encompassing the urban villages of Kesawan, Aur, and Hamdan in Medan Maimun District. Geographically, this area is characterized by high residential density and intense informal economic activities, particularly along the riverbanks. The local population is predominantly lower- to middle-income, with primary occupations in the service sector, small-scale trade, and household-based enterprises.

Field observations indicate that the physical conditions of the riverbank settlements are generally dense and poorly organized. Some houses are built directly on the riverbank, with portions of structures even extending over the water. Natural drainage systems do not function optimally due to the accumulation of waste and sediment along the river edges. This highlights the spatial limitations that compel residents to utilize every available inch of land for housing and economic activities.

4.1 Physical Conditions and Community Living Space

Visually, the study area exhibits a very dense spatial pattern. Access routes to the riverbank in several locations consist only of narrow alleys approximately 1–1.5 meters wide. The roads are predominantly paved or covered with rough concrete, some of which are damaged, indicating limited basic infrastructure. Community activity appears dynamic, particularly during the day, with residents engaging in economic activities such as selling food, beverages, and daily necessities along the roadside.

Along the river, ecological conditions present significant challenges. Wild vegetation grows unchecked, while piles of household waste are visible at several points along the banks. The murky color of the river water indicates organic pollution from domestic activities. However, despite these conditions, the community's living space remains active: children play by the riverbank, residents interact on house terraces, and small social activities continue in the narrow alleys. This phenomenon shows that even with limited physical public space, social space remains vibrant through daily interactions based on physical and emotional proximity.

4.2 Community Social and Economic Activities

Social activities among residents along the Deli River have distinctive characteristics. Relationships between neighbors remain relatively strong, marked by habits such as greeting one another, participating in communal clean-up activities, and sharing information about community events. However, the frequency of social interaction has begun to decline compared to a decade ago, as economic pressures increase and public space for communal activities decreases.

The local economy is dominated by informal trade, including small eateries, beverage vendors, small workshops, and transportation services. These small shops and stalls play an important role in local economic circulation. At the same time, these activities strengthen the social function of the area as an informal meeting space, a place for exchanging stories, and maintaining connections among residents.

4.3 SWOT Analysis of the Deli Riverbank Community

A SWOT analysis is used to identify the internal and external conditions of the community that influence the social and living space transformation in the study area.

Table 1. Analisis SWOT Komunitas Tepian Sungai Deli

Aspect	Aspect
Strengths	<ol style="list-style-type: none"> 1. Strong social solidarity within the community. 2. Presence of informal networks among residents in economic activities. 3. Historical and cultural attachment to the river area. 4. High community adaptability to environmental conditions.
Weaknesses	<ol style="list-style-type: none"> 1. Limited public spaces for social activities. 2. Inadequate residential infrastructure, vulnerable to flooding. 3. Economic dependence on the informal sector without institutional support. 4. Low awareness of environmental management.
Opportunities	<ol style="list-style-type: none"> 1. Potential for river-based tourism and local MSME development. 2. Government support for riverbank revitalization programs. 3. Potential collaboration with universities and social organizations for community empowerment.
Threats	<ol style="list-style-type: none"> 1. Increasing environmental degradation. 2. Risk of relocation due to area planning programs. 3. Social inequality and land conflicts along the riverbanks. 4. Declining water quality and public health.

Source: SWOT analysis by the author, 2025

The SWOT analysis table above shows that the community's social strength serves as the main asset in maintaining community sustainability. Strong solidarity and social bonds can serve as a foundation for participatory empowerment programs. However, structural

weaknesses such as limited public spaces and inadequate infrastructure need to be addressed urgently through collaborative approaches involving the government, the community, and academia. Riverfront revitalization opportunities should not only focus on physical improvements but also on strengthening the community's social and economic dimensions. This way, the transformation of social relations and living spaces in riverbank communities can progress toward more adaptive, productive, and sustainable conditions.

The transformation of social relations and living spaces in communities along the Deli River demonstrates a complex dynamic between physical environmental changes and evolving patterns of social interaction. Based on field observations in Kesawan, Aur, and Hamdan sub-districts, it is evident that communities are experiencing shifts in the ways they interact, use space, and adapt to increasing environmental pressures.

Physical changes in the area, such as the reduction of open spaces and increased settlement density, have altered the nature of relationships among residents. Initially, social relations were characterized by emotional closeness, collective activities, and river-based interactions. However, these ties have gradually weakened as residents' activities have become more individually economic and focused on work mobility outside the neighborhood. This condition reinforces previous research findings that urban spatial transformation in waterfront areas tends to shift social solidarity toward more pragmatic, economically driven relationships [22].

Nevertheless, some community members continue to preserve social values rooted in local culture. Activities such as communal clean-ups, religious gatherings, and the use of riverbank spaces for social purposes still occur, albeit less frequently. This phenomenon aligns with Cut Nuraini's findings [23], which highlight that communities with strong social bonds are more capable of maintaining the social functions of space amidst urban change. Meanwhile, Feby Milanie [24] found that the availability of public spaces and communal interaction pathways plays a crucial role in sustaining social relationships in densely populated neighborhoods.

From the perspective of living space transformation, communities along the Deli River show gradual adaptation to changing physical and social conditions. Many houses have been modified to accommodate small-scale economic activities, such as food stalls, workshops, or laundry services. These adaptations reflect the flexibility of urban communities in utilizing limited space as new economic resources. Abdi Sugiarto's research [25] also indicates that physical adaptations of buildings in dense urban areas reflect survival strategies among lower-middle-income urban residents.

However, not all transformations occur in a balanced manner. Some findings indicate social fragmentation due to shrinking communal spaces and increasing private economic activities. This situation corresponds with Abdiyanto's study [26], which found that when communal spaces diminish, social networks among residents tend to weaken, leading to reduced social cohesion and increased individualism in urban neighborhoods.

Based on the SWOT analysis, the community's main strengths along the Deli River lie in their social solidarity and enduring cultural values, while their weaknesses are limited space and a lack of public infrastructure support. Opportunities arise from the potential for river-based economic revitalization through tourism and local MSMEs, while the main threats include environmental pollution and uncontrolled urban development pressures. These findings are consistent with national research emphasizing the importance of community-based strategies for maintaining the social and ecological sustainability of river areas [27].

Meanwhile, some studies present contrasting results. International studies [28] reveal that in several major cities, waterfront modernization has actually enhanced social connectivity through innovative public space design. However, this context differs from that of the Deli River, where community participation remains low and government involvement is not yet optimal. Additionally, other research [29] suggests that urbanization can foster new forms of

social integration based on the creative economy, but this has not yet materialized in Medan due to a lack of local policy support and social infrastructure.

Therefore, the transformation occurring along the Deli River is paradoxical: on one hand, there are efforts to adapt through socio-economic strategies, but on the other hand, vulnerabilities are emerging due to spatial limitations and weakening social relations. This discussion reinforces the notion that strategies for strengthening riverbank communities cannot be separated from a living-space-based approach and social connectivity that are integrated with sustainable development policies.

Conclusion

The transformation of social relations and living spaces in communities along the Deli River demonstrates that physical changes in the area—particularly due to development pressures and declining environmental quality—directly influence patterns of social interaction. The reduction of public spaces and increasing residential density have decreased the intensity of neighborly interactions, which previously occurred naturally through river-based activities. Nevertheless, values of solidarity and mutual cooperation have not entirely disappeared, as community members continue to maintain some forms of collective activities and socio-economic adaptation by utilizing their homes for micro-enterprises. This indicates the community's resilience in facing spatial change pressures.

Based on the SWOT analysis, the community's main strengths lie in social cohesion and enduring local cultural values, while the primary weaknesses are the limited open spaces and inadequate public infrastructure. Opportunities for development arise from river-based economic potentials, such as tourism, culinary activities, and small-scale trade, whereas the most significant threats include pollution, policy uncertainty, and uncontrolled urbanization pressures. Therefore, community-strengthening strategies in this area should focus on participatory management of living spaces, enhancing socio-economic capacities through environmentally friendly productive activities, and fostering synergy among government, academia, and local residents in designing sustainable river revitalization programs.

In the context of increasingly dense urban development in Medan, efforts to balance social and ecological sustainability have become an urgent need. Strengthening the identity of the Deli River waterfront as a shared public space can be achieved through area planning that preserves social, cultural, and local economic elements. Local government is expected to implement policies that support riverbank communities by facilitating public interaction spaces, improving sanitation and basic infrastructure, and redesigning the area with a socio-spatial approach sensitive to community conditions. With these measures, the Deli River can be restored not only as an ecological element of the city but also as a socially empowered, adaptive, and sustainable living space for the communities that have long resided along its banks.

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