

LOST WATERWAYS, SHIFTING IDENTITIES: ROAD INFRASTRUCTURE AND THE MORPHOLOGY OF COASTAL VILLAGE SETTLEMENTS IN KUCHING

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ABSTRACT

This paper focuses on how infrastructural planning and urban expansion of Kuching has impacted the growth, social fabric, and cultural identity of the riverine coastal villages in its vicinity. The villages we studied are Sejingkat, Buntal, Bako, and Muara Tebas. Each village's development was shaped by surrounding land-use activities, like factories, ports, educational institutions, or rainforest tourism. Through historical analysis, spatial mapping, and in-depth interviews with village chiefs, we explore the significance of waterways and embedded road networks in shaping the settlement patterns, and their subsequent growth trajectories. The results of our analysis highlight the intricate relationship between ongoing planning policies, socio-economic activities, infrastructure, and cultural identity in these coastal communities. We propose strategies for integrating local participation, existing cultural landscapes and values into future planning efforts, with the aim of preserving the identity of coastal village settlements while ensuring their sustainable development in Kuching. Ultimately, we call for a more holistic approach to road infrastructure development and sectoral planning, to minimize negative impacts for the local communities.

Keywords: Coastal Village Settlements, Infrastructure, Settlement Morphology, Sustainable Development

1. INTRODUCTION

Critical discourse on road infrastructures as means of bridging inequality and markers of modernity in transforming settlements in the Global South has sparked a litany of scholarship in the past five years (Schindler & Kanai, 2019; Akhter et al, 2022; Silver, 2023; Iossifova et al, 2022). Large infrastructural projects such as China's Belt and Road Initiative and Trans-African Highway Network have received more attention, considering their scale and environmental impact.

Road and highway infrastructures represent more than physical connectivity and accessibility. They embody the integration of united territories under a national agenda and bridge the 'geographical and social gap between a centralised power-elite and an ethnically and racially defined regional periphery' (Harvey & Knox, 2012). Indeed, states and governments in the countries of the Global South seemed to take on this dominant narrative of the networked city model as a parameter of urban modernity (Silver, 2023).

Roads act as bridges between different areas, fueling their continued development. Especially in rural regions, well-maintained road networks are crucial. They connect people to essential services, education, and jobs. Scholars categorize these benefits as economic, social, and socio-economic (Surchev, 2009). Existing research shows that most rural populations lack access to paved roads, hindering economic growth (Chen et al, 2021). But good connections go beyond facilitating access. They also ensure the flow of people and goods out of an area, fostering wider connections (Sieber, 1997). Indeed, studies conducted in Africa and South Asia have shown that connecting rural areas have a significant impact on the reduction of poverty and an increase in income levels (Khandker, 2009; Kodongo and Ojah 2016; Asher & Novosad, 2020). Based on a study done in Vietnam, Nguyen et al. (2017) suggest that people in villages with new roads are more likely to look for jobs in factories than service industries. This aligns with research by Mohapatra et al. (2007) which found that improved rural access in India creates more jobs overall, along with opportunities for self-employment and increased economic activity.

While the aforementioned existing research on road construction in various countries has documented positive socio-economic impacts, a crucial gap exists. In certain fields such as planning history, these studies often overlook the traditional mobility patterns and rich indigenous vernacular knowledge embedded in the lives of these rural communities. Furthermore, they fail to delve deeply into the impact of these infrastructure projects on cultural identity, neglecting how changing jobs and lifestyles disrupt traditional practices and the very essence of who these people are.

In promoting a vision of global connectivity, state-regulated networked mobility does not homogenize the world (Sinha, 2012). Each country in the Global South, with its peripheral settlements shaped by postcolonial development and unique characteristics, experiences this transformation differently. Based on these idiosyncrasies, these settlements do not undergo a uniform change. From nation to nation, and even within the same city, variations emerge based on geographical location relative to the urban centre.

The arrival of road infrastructures connecting Kuching to the coastal riverine villages embodies the narrative of modernity prescribed by Silver (2023). Rather than focusing on the materialist aspects of how settlements change physically over time, we also explore the social and economic effects. The impact of road infrastructure on Kuching's fishing villages serves as a microcosm of this phenomenon, demanding a nuanced understanding that goes beyond simplistic narratives of modernization.

The history of early settlements and the origins of cities in Borneo is deeply intertwined with their rivers. Long before Kuching became the official port city during the Brooke administration, Santubong was the official trading post since the 10th century, and for circa 600 years attracted traders from all over Austronesia as well as Arab and Chinese traders, who settled there during the monsoon season (McLaughlin & Sahari, 2019; Mills, 1974; Christie, 1985). Santubong was referred to as Po'Ni according to ancient Chinese records and in its heyday, was supposedly a town consisting of 10,000 inhabitants with houses made from wood and dried leaves (Ongkili, 1973). Rice and jungle produce such as bird's nests were acquired by the indigenous people and the rivers were used to transport these goods to trade with the Chinese and Arabs during the high tide (Ho, 2004). Coastal fishing villages thrived along these waterways, consisting of mostly Malay inhabitants, utilizing boats as their primary mode of transportation for centuries, as documented in historical records. Some of these Malay coastal villages discussed in this paper have been in existence since the reign of Indra Sarik (1053-1096) and Indra Rangka (1096-1131), which are Sungey Bakok (Bako), Sungey Buntak (Buntal) and Muara Tebas. In fact, these kampungs played a pivotal role in the prosperity of Santubong. For instance, Kampung Sungey Buntak (Buntal) emerged as a port

specializing in ship repair for Santubong (McLaughlin & Sahari, 2019). For a long time, the identity of the Malays in Sarawak was intrinsically linked to this "boat culture," evident in bustling marketplaces like Kuching's Ceko Market, historically linked to the river port at Lorna Doone Wharf.

Studies conducted on the Malay coastal villages in the 1950s by Abidin et al (2002) on the north bank of the Sarawak River in the center of Kuching further reinforce this connection, highlighting how these communities revolved around their riverine livelihoods. Research findings show a co-dependency between kampungs within the river networks, as villagers in Kuching would paddle their boats to the nipah-rich areas in Pending or the vast mangrove swamps in Rambungan to procure resources for housebuilding (ibid).

Comparatively, existing studies on Malaysian coastal villages often overlook the interplay between infrastructure networks, urbanization, and the villages themselves. While some, like Zainudin et al. (2019) and Zain et al. (2018), analyze social processes and economic activities in Terengganu fishing villages, they do not delve into the impact of infrastructure. There is also existing research on socio-economic impacts of agro-tourism activities in coastal villages, however they do not contextualize them within the larger spatial organization and relationship to surrounding areas (Fahmi et al, 2013). Ahmad et al. (2012)'s article examines the morphology and spatial transformation of coastal fishing villages in Kuala Kedah, highlighting patterns such as development along riverbanks and estuaries. Initially concentrated near water, settlements expand inland as land becomes scarce, leading to layered structures. The Fishermen Relocation Program has altered social dynamics, reducing community cohesion as families disperse. They found that challenges like poor transportation hinder fish distribution, while the evolving landscape raises concerns about maintaining traditional practices. In addition, within Sarawak, research on coastal villages like Sebuyau and Buntal focuses primarily on their economic potential for ecotourism, rather than from an urbanization standpoint (Kichin et al., 2021; Ahmad et al., 2014). In these articles, the authors rarely connect their formation to the broader processes of modernization and urbanization, nor do they examine them from a territorial perspective. Critically, these studies predominantly frame infrastructure's impact through an economic lens, neglecting the profound socio-cultural transformations it instigates. They fail to adequately consider how new roads, or bridges reshape community dynamics, alter traditional knowledge transmission, or impact cultural landscapes. The emphasis on economic outputs, such as tourism revenue or improved market access, overshadows the nuanced ways infrastructure reconfigures social networks, power structures, and the very fabric of village life.

On the other hand, existing urban studies in Borneo underestimate the crucial impact of infrastructure networks on these very riverine villages, despite being briefly mentioned (Kozłowski et al., 2021). This research aims to rectify this gap by examining the role these kampungs play within the city's larger metabolism, contributing significantly to food production and the circulation of labor. We also examine how infrastructure development and urbanization reshape the lives, identities, and spatial organization of Kuching's fishing villages.

Therefore, this paper delves into the impact of road networks on four riverine coastal villages in Kuching. It examines how their embeddedness in these networks has shaped their settlement morphology and growth trajectory. The kampungs that we have chosen as case studies here are Sejingkat, Buntal, Bako, and Muara Tebas. The research explores the socio-economic changes experienced by these kampungs, including their evolving cultural identity over the last 60 years, since the formation of Malaysia in 1963 until 2023. Three key research questions guide the analysis:

1. To what extent have nearby places of interest and road infrastructural projects influenced the physical expansion patterns of the studied villages?
2. In what ways have changes in infrastructural development and economic activities influenced the cultural identity of the villagers?
3. How can we propose strategies for integrating local participation, existing cultural landscapes, and values into future planning efforts?

Following the introduction, the paper is structured into six sections. The methodology and theoretical framework sections will discuss the theories underpinning the research. We then discuss the key features of the case studies, compare their trajectories in the discussion section, contextualizing them based on Lefebvre's State Mode of Production (1978) theory, finishing off with our proposed Magnaghi-inspired strategies in our concluding remarks.

2. LITERATURE REVIEW

2.1 Theoretical Framework

Henri Lefebvre's concept of the State Mode of Production (SMP) (Lefebvre, 2009 (1978)) offers valuable lens through which to examine the impact of infrastructure development on Kuching's fishing villages. The theory of SMP argues that the state plays a crucial role in shaping space to support capitalist expansion. The shape of territories is defined by the calibration of national and state planning policies, which in turn affects the settlements within those territories. In relation to our case studies, we refer to three core observations, which are:

- a. State as spatial producer: Lefebvre emphasizes the state's ability to manage space "on a grand scale" through infrastructure projects like highways. The introduction of roads in Kuching's fishing villages exemplifies this. Traditionally, waterways served as the primary mode of transportation. However, state-led road construction fundamentally reconfigured the spatial organization of these villages. This shift has transformed their relationship with the surrounding environment and resources.
- b. Infrastructure as support for capital circulation: The SMP highlights how state-produced infrastructure acts as a "fixed support" for the movement of capital. Roads in fishing villages might facilitate the transportation of fish catches to larger markets, integrating them into wider capitalist networks. However, this has also disrupted traditional distribution channels and benefited larger corporations over local fishermen.
- c. Intermeshing of state space and urban fabric: Lefebvre argues that state space and urban fabric are increasingly intertwined. In Kuching's case, the introduction of roads creates a physical connection between the villages and the broader urban landscape. This led to new economic opportunities but also disrupted the villages' social fabric and cultural identity. The traditional way of life centered around waterways gave way to increased interaction with urban centers, leading to a homogenization of cultural practices.

Thus, infrastructure development in Kuching's fishing villages is not simply a neutral process of modernization. It reflects the state's role in shaping space to facilitate capitalist expansion, impacting the people's livelihoods, cultural identity, and relationship with their environment (Brenner, 2019).

For our proposed strategies aimed at integrating local participation and cultural values into future planning endeavors, we draw inspiration from the theory of "local self-sustainable development" advocated by the Italian Territorialist School, particularly from Alberto Magnaghi's seminal work "The Urban Village" (Magnaghi, 2005), the English version of *Il Progetto Locale* (Magnaghi, 2000). The Territorialist School, constituted of (mostly) Italian geographers, economists, sociologists, and urban planners, offers alternative perspectives on heritage, local participation and spatial planning (Berzi, 2017). While Magnaghi's ideas and those of the Territorialist School are primarily rooted in Italian society and subject to criticism, their concepts regarding local self-sustainable development and dynamic interpretations of heritage and identity have garnered praise from scholars. Particularly among those aiming to challenge prevailing approaches to heritage while respecting local contexts (Colavitti et al, 2018).

Magnaghi's approach to "local self-sustainable development" diverges from mainstream sustainable development paradigms, which emphasize the preservation of natural and cultural resources to such an extent that it borders on fossilization, all the while maintaining the unquestioned dominance of economic productivity (Marzocca, 2023). He also critiques the 'technocratic and technical definitions of sustainability' (Magnaghi, 2005: 44), which excessively rely on external, top-down controls, prohibitions, regulations, and infrastructures. Instead, he advocates for an interdisciplinary approach emphasizing community autonomy and environmental stewardship. Key tenets of Magnaghi's framework include (Magnaghi, 2005: 66–70):

- a. Shifting 'from participation to the social production of the territory'. In the traditional modes of participation, residents lacked agency in development projects, which were primarily driven by technicians and predetermined agendas. Magnaghi emphasizes the need for local residents to reclaim their decision-making autonomy over their territory, which has been undermined by globalization.
- b. Transitioning from waged labour to self-employment, from wage-based employment to fostering self-employment opportunities. Although we are cautious about Magnaghi's optimism regarding the potential benefits of self-employment, micro-firms, and personal entrepreneurship, we agree with his critique of the prevailing liberal and neo-liberal capitalist labor relations. We advocate for the diversification of

employment modes to empower citizens and enhance their voice and agency in local development initiatives.

- c. Advancing self-governance. This proposal places a significant demand on local communities and institutions. Firstly, communities must reclaim and apply widespread environmental knowledge and skills. Secondly, municipal and local government institutions need to redefine themselves to directly utilize this knowledge, empowering its development through targeted policies and powers.

Therefore, Magnaghi's vision of "local self-sustainable development" is not a quick fix but a visionary proposal demanding long-term commitment from all stakeholders in a given place. As such, it offers a concrete yet aspirational framework for reshaping local development paradigms (Ganjavie, 2014; Dematteis, 2021).

2.2 National and State Territorial Planning Policies

Historically, north Kuching was dominated by expansive mangrove forest reserve, which served as vital breeding grounds for fish and other marine life, supporting the livelihoods of the coastal riverine fishing communities. The Bako National Park, Santubong National Park, and the Kuching Wetlands National Park, established in 1957, 1998, and 1992 respectively, were designated to conserve these mangrove eco-systems.

The Brooke administration and the British colonial government prioritized construction of roads which connect resource-rich areas with ports or administrative centers, by-passing marginalized existing coastal village settlements, focusing on south Kuching. However, the 20th century witnessed a significant transformation in North Kuching, particularly during the 1980s. The relocation of the port to Pending led to a significant impact on urban growth, causing a shift in economic activities away from the traditional port area. This change prompted a transformation in the urban landscape, with a redirection of focus towards other areas for development. In Petra Jaya, north Kuching, there was notable urban growth characterized by infrastructural improvements, the construction of government buildings, and residential areas. This development marked a shift in the city's center of gravity towards the north, reflecting changing economic and spatial dynamics. The move of the port to Pending area not only influenced urban development in Petra Jaya but also contributed to the broader urban planning strategies and spatial reconfigurations in Kuching (Arzmi & Wahid, 2024).

During the mid-1960s, the Sarawak Development Plan, which was conceived following the state's annexation to Malaysia, included policies on improving and diversifying the agricultural sector, which lead to prioritization of infrastructure projects. This thus translated to a greater focus on road construction, connecting previously isolated areas to industrial centers or ports. After being absorbed into the Malaysian Plans, there was new emphasis on extraction of the state's natural resources, as well as the to ensure economic equity and social integration, through the New Economic Policy (NEP) in the 1970s (Malaysian Information Services, 1983). These new road-building policies facilitate connection to new allocated areas of interest, such as the national parks, while building upon the existing colonial infrastructure.

3. METHODOLOGY

Our research employs a qualitative approach in understanding the impact of infrastructure development on the fishing villages. The research originated from an assignment given to third-year undergraduate architecture course Human Settlements at the Faculty of Built Environment, University Malaysia Sarawak, at the end of 2023, where they explored the morphology of coastal village settlements. We build upon that initial exploration with more an in-depth, rigorous qualitative investigation. The choice of villages for this study was strategic, aiming to capture diverse experiences and perspectives within the context of Kuching's complex urban landscape. They are situated along different waterbodies and near places of interest, representing various stages of development. We also chose to interrogate these villages as they were directly impacted by new roads, provide easy accessibility, present a diversity of livelihoods and experienced different pathways in spatial organization as baseline of comparison.

With the assistance of enumerators who are well-versed in the local dialect, we visited the four villages individually and conducted systematic observations, semi-structured interviews between October 2023 and February 2024. In total, we conducted eight interviews, four of which were with the Ketua Kampung (village headmen) and three were chance encounters with the locals. While we acknowledge that they are considerably a small sample size, we focused on obtaining information through more knowledgeable, reliable sources such as the

Ketua Kampung rather than a large collection of individual perceptions. The Ketua Kampung, as symbolic heads of the community, were key informants, providing valuable insights and access to exclusive documents, such as the demographics and current employment statistics. Among the locals we talked to was a Malay family from Muara Tebas, an elderly fisherman from Buntal and a kindergarten teacher at Sejingkat. The interviews were recorded face-to-face, transcribed, and analysed, each ranging from 30 minutes to an hour. The data was examined using a thematic analysis approach, and tabulated as means of comparison. In addition, we were able to determine how places of interest within their villages or in the vicinity became an impetus for facilitating economic and business growth, thus leading to new forms of symbolic economic identity, which no longer relied on subsistence primary sector.

To strengthen the validity and reliability of our research, we cross-referenced the interview data by studying early state policy reports, land survey maps, satellite imagery, archival photographs, and official news media. Despite the limitations in obtaining historic satellite photos and land survey maps in Kuching dating back to the 1980s, we were able to obtain aerial photos from the 1950s-60s, which contributed to the morphological analysis. Despite our efforts, we were limited to illustrating Sejingkat's morphological changes driven by road development. Conflicting narratives from Bako, Muara Tebas, and Buntal villagers regarding pre-road settlement locations, combined with inadequate satellite imagery and a lack of historical maps, prevented us from drawing definitive conclusions.

By triangulating and comparing the narratives provided by our interviewees, we were able to identify broader trends and underlying processes on the relations between the settlement morphology and formation of road networks.

4. DESCRIPTION OF THE COASTAL VILLAGES

4.1 Muara Tebas

Muara Tebas is popular with Chinese visitors for its Ching San Yen temple on the hill overlooking the mouth of the Sarawak River (Figure 1). It is strategically located along the Sarawak River, as it is the first village passed by cargo and freight ships on their way to the Pending Port in Kuching.

The temple is the largest Buddhist temple in North Kuching and attracts many devotees during the Chinese New Year festivals. Despite the predominance of Malay households, totaling 1912 residents, the village's economy is tied with Chinese religious tourism, as they earn a considerable income from the tourists who come to worship at the temple. Since 1918, the Chinese community's belief in "Fung Shui" led them to settle by the seashore, influencing the village's early living patterns. As the Chinese community grew, the Malays sold their lands to them and began to build their own cemetery. Today the few remaining Chinese households, who have settled along the seashore, own the seafood restaurants and a seafood factory located on the coast.



Figure 1: View of Muara Tebas with the Ching San Yen temple on the hill. A seafood factory and seafood restaurants owned by the Chinese line the coast of the Sarawak River.

In the 1980s, when the roads to Kuching were built, houses were clustered around the jetty, facing the water. After the roads were built, in the 1990s, the houses grew, flanking the main road and expanding westwards. Over time, the layout of the village includes communal spaces such as markets, health clinics, mosque, and educational institutions that cater to the residents' daily needs (Figure 2). These community facilities serve as hubs for social interactions, healthcare services, and educational opportunities, enhancing the quality of life in Muara Tebas.

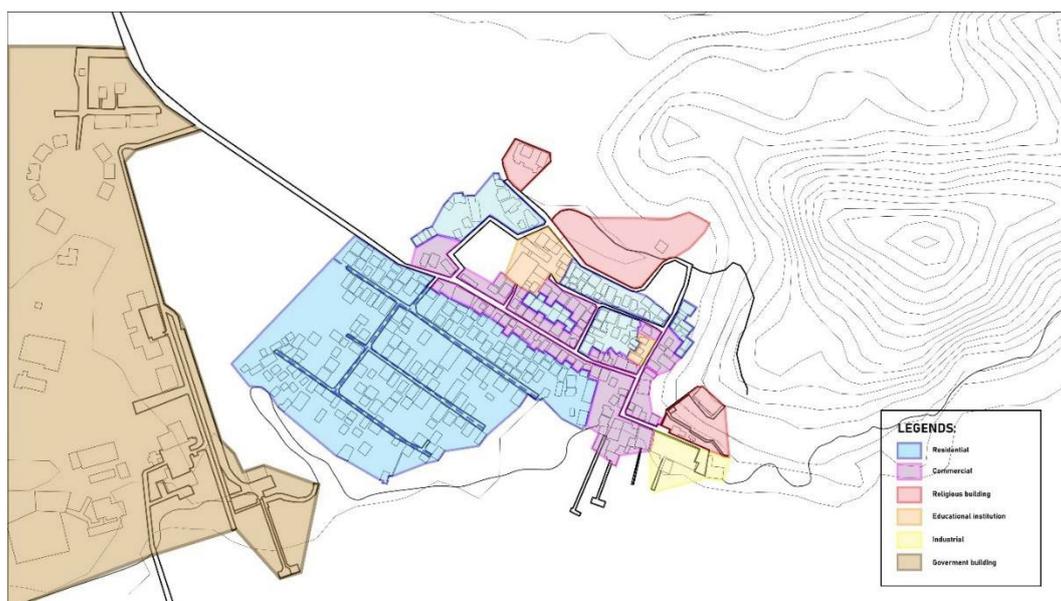


Figure 2: Map of current land uses around Muara Tebas, showing the Maritime Complex and Marine Department beside the village.

Due to the location of Muara Tebas, the Maritime Complex and the Marine Department are located next to the village, on the other side of the highway that connects the village. Since the 1960s, the Navigation Ordinance and Harbour Ordinance have led to increased regulation of the Sarawak River, limiting the areas where fishermen could freely navigate. Before 2000, 70% of the population worked as independent fishermen, while the rest worked as farmers. Out of a working population of 1400, there are still more than 200 registered fishermen under the Demak Laut Fishermen Association. Thanks also to better education and opportunities provided by the state, most are employed in the civil sector in the city, in private companies or are self-employed. Improved accessibility has enabled residents to engage in commercial activities beyond the village boundaries, expanding their market reach and potential for trade. The connectivity provided by the roads has facilitated the transportation of goods, including seafood products, to markets in the center of Kuching and other areas, boosting the village's economic prospects. Despite these advances, questions remain about how these institutions and the establishment of port infrastructures and industries along the riverbanks have influenced resource management and coastal conservation, both of which affect the livelihoods of fishermen. Further research is required to investigate these issues.

4.2 Bako



Figure 3: View of Bako from the Bako National Park jetty, on the Tabo River. Some of the villagers earn income from visitors heading for the Bako National Park via boat.

Not far from Muara Tebas is Kampung Bako, at the mouth of the Tabo River, an area known for its abundance of mangrove trees. Bako is the Sarawakian Malay term for mangrove tree. The original village is nestled between two hills overlooking the river on the north side of the bank. Unlike Muara Tebas, Bako faces fewer restrictions from the Sarawak River Board because the Tabo River is not the main passageway for large vessels. Although the villagers are still able to fish, Penghulu Hajah Janivah of Bako revealed that most young people have moved to the planned, top-down Mesra Rakyat settlement due to demographic changes in Kampung Bako, which has an aging population. Currently, only 13.6% of the 1800 villagers work in the primary sector as fishermen or farmers. 15% work in nearby factories in the nearby Sejingkat or Demak Laut Industrial Estate, while almost a third of the villagers are employed in the service sector, such as tourist guides, clerks, entrepreneurs or marine officers. Its proximity to the Bako National Park Reserve has boosted tourism, with villagers working as boatmen to ferry tourists and nature lovers from the village jetty to the national park headquarters, 20 minutes away by boat on an inlet facing the sea (Figure 3).

The land surrounding the village has been reserved for agriculture and aquaculture, with small family orchards, shrimp farms and large plantations. The ecotourism sector, the nearby agricultural lands and the links to the industrial estates have led to the expansion of Kampung Bako and new facilities such as the jetty terminal, bus services, mosque, clinic, schools, and community hall (Figure 4). The new Kampung Bako to the south-east has been formally planned and served by Kampung Bako Road, which connects both the new and the original village to the Bako causeway, which then leads to the city. It is also known for its wet market and is popular with visitors looking to buy fish and seafood.



Figure 4: Map of Current Land Uses Around Bako.

4.3 Buntal

Located near Santubong, where the old port used to be, Kampung Buntal faces the sea at the mouth of the Buntal River and sits on a coastal plain. The village was originally built along the coastline. However, natural erosion forced the villagers to move their houses from the coast to a more inland location, based on land plots provided by the government. These plots are organised along the Kampung Buntal road. Considering the distance between Buntal and the centre of Kuching, this was a very distant link until the road to Kuching via the Santubong Bridge was completed in 1986. The Sarawak Cultural Village is located in Santubong and is one of the attractions near Buntal. As with Bako, the villagers are not restricted by regulations and are allowed to fish in the river and open sea. This is in contrast with Sejingkat and Muara Tebas, who are bound to the Marine Ordinance and face the obstacles of other shipping vessels navigating the Sarawak River.

Buntal happens to be one of the most populated villages in North Kuching numbering around 3799. There are a few Chinese residents among the mostly Malay population, and they own seafood restaurants and convenience stores along the coast. In a recent interview with the Ketua Kampung, Sarbini Oden, in late 2024, he said that an estimated 50% of the villagers still work as fishermen. He admitted: “Most of the younger generation now work in the city in jobs such as hotels and the private sector. Not many young people are interested or willing to continue the fishing tradition in this village.” As part of the Damai-Santubong-Buntal-Pasir Pandak (DSBP) tourism corridor, tourism is also growing in popularity, with the Buntal esplanade being well known to birdwatchers, and boat tours available from Buntal Bay. Buntal Bay, with its wet market and seafood restaurants, has attracted many visitors from Kuching since the 1980s and has seen its population grow. The village now consists of mosques, clinics, community halls, schools, and a Chinese temple (Figure 5 & 6).

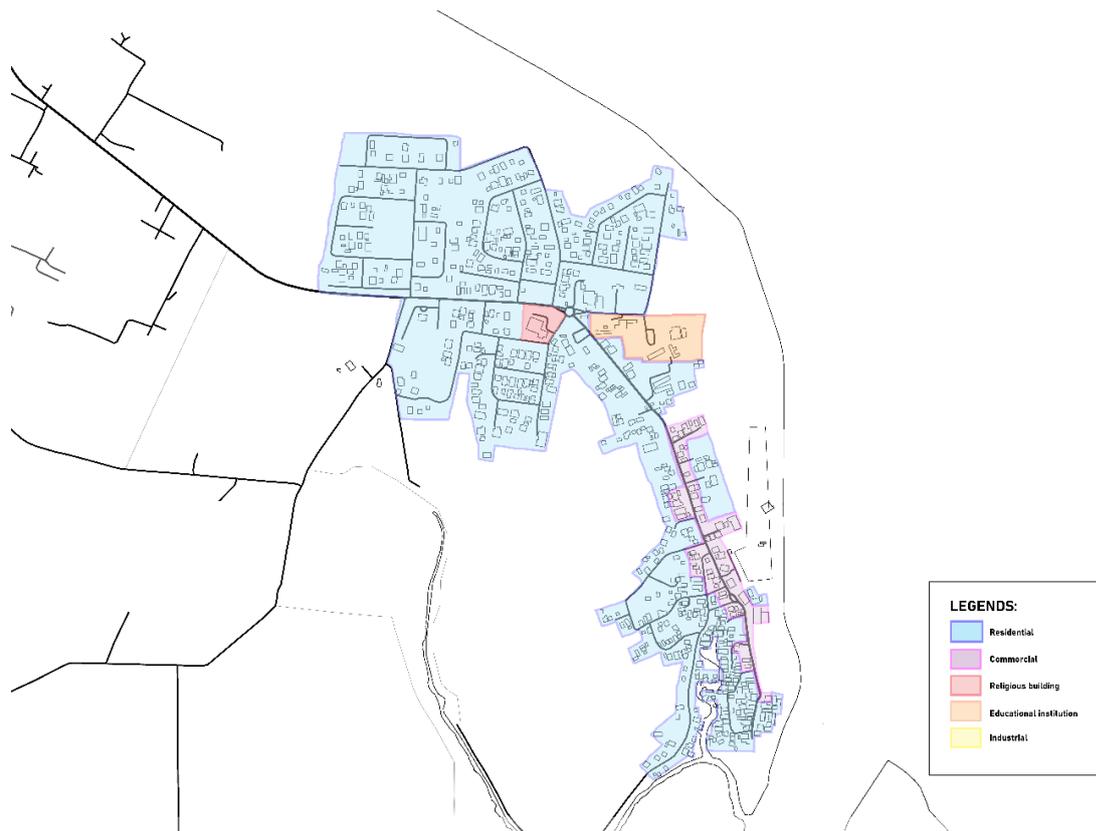


Figure 5: Map of Current Land Uses Around Buntal.



Figure 6: Wet Market in Buntal.

4.4 Sejingkat



Figure 7: The morphological changes, showing the expansion of the Demak Laut Industrial Estate and the road networks connecting with Kampung Sejingkat which is situated beneath a hill on the banks of the Sarawak River.

Sejingkat sits on the edge of a steep hill next to the Brooke Dockyard Engineering Works on the banks of the Sarawak River. Only two decades ago, the village expanded westwards in a linear settlement pattern when the road from the village to the Bako Causeway was built. Challenges arose from the lack of housing on the steep terrain, with most of the land already occupied. The village itself is in a precarious position, not only because of its environmental vulnerability to flooding and landslides, but also because of the stakeholders in the surrounding lands. The Ministry of International Trade & Industry, Industrial Terminal and Entrepreneur Development Sarawak, the Public Works Department, the River Board and the private companies that own shops, factories and warehouses in the area all have interests in the land (Figure 7). The 1993 River Ordinance has affected the villagers as they cannot fish openly as they used to. The area next to the village is restricted because the Demak Industrial Estate is building another terminal there for large container ships. Its presence may affect the quality of life and ecological balance along the riverbank.

Since the 1990s, villagers have begun to work in nearby factories, as entrepreneurs or in the service industry, as fishing and other related primary activities no longer provide a viable income. Fishing has become a hobby rather than means of subsistence. As the village is in a precarious position, there is talk of relocating to a more stable area. The state is building a housing estate to accommodate them. The villagers no longer define themselves as a fishing village and some of them have access to better social mobility.



Figure 8: Houses of Sejingkat village facing the Sarawak River.

5. RESULTS AND DISCUSSION

By comparing the case studies above, five observations can be made to showcase the diverse ways infrastructure and nearby points of interest reshape the physical landscape of fishing villages. The first observation is that villages like Bako, Buntal and Sejingkat exhibit linear expansion patterns. New houses built from the 1980s onwards tend to follow the roads leading into the villages, suggesting infrastructure played a significant role in guiding physical growth. The second is the prevalence of a top-down, planned development. Bako and Buntal present a case of planned expansion with the creation of new villages and connecting roads. This signifies a state government intervention influencing settlement patterns. Thirdly, the pattern displays a shift from river-facing to road-facing. In the case of Muara Tebas, while most villagers still own boats, the new generation builds houses on available land plots served by roads provided by the Land Survey Department, indicating a potential decline in dependence on waterways for daily life. As for Buntal, there was a dire need for relocation due to natural erosion and to take advantage of the built infrastructure. Natural erosion forced relocation inwards, with the Land Survey Department allotting new plots. Additionally, the presence of roads have attracted new residents, further influencing the village's physical form. Lastly, in the case of Sejingkat, its settlement patterns are also affected by scarce land availability and the prospect of future relocation. However, its linear development along the road towards the coast suggests infrastructure influenced its growth pattern. Notably, the village faces future relocation to a nearby housing estate, highlighting the ongoing interplay between infrastructure projects and spatial transformations. Thus, from the observations through our comparisons of all five villages, we can deduce that while traditional riverine connections remain in some villages, the arrival of roads and planned development projects appear to be driving a shift towards land-based expansion.

In terms of how infrastructure and economic activities influence their evolving cultural identity, there are contrasting scenarios as the villages adapt differently. While some villages adapt and integrate tourism, others grapple with the decline of traditional fishing practices and a shift towards service or industrial jobs.

As for Bako, the Bako National Park jetty has brought a surge of visitors. While the village retains its core identity as a fishing community, with traditional fishing practices still observed, some villagers now work in tourism and service sectors. This exposure to outsiders presents both opportunities and challenges for cultural preservation.

Meanwhile, Buntal's culinary scene, with its seafood market and Chinese-owned restaurants, thrives due to its location near tourist attractions like the Sarawak Cultural Village, hiking trails and hotels. While many villagers remain fishermen, the younger generation pursues education and diverse job opportunities. Even though they do not rely solely on boats for transportation, yet their identity as a fishing village persists. However, with increasing city connections and ongoing coastal erosion, Buntal faces an uncertain future.

As for Muara Tebas, this village attracts crowds due to its temple and riverside location. Chinese-owned seafood restaurants flourish, and car-ownership has become more common. The village's transformation into a popular destination with car-oriented infrastructure and a thriving restaurant scene reflects the state's influence on economic activities. However, this shift marginalizes fishing, a core aspect of the villagers' identity. While some still use boats to travel as far as Santubong, traditional fishing practices are becoming less frequent. Younger generations, faced with a transformed economic landscape, opt for secondary sector jobs prefer to venture into modern agriculture, unlike their forefathers. This highlights the tension between economic development, driven by state interventions, and the preservation of cultural practices.

Sejingkat presents a more concerning picture. Infrastructure development in nearby industrial areas impacted their traditional fishing activities. The younger generation now works in factories, leading to a demographic shift with a younger population residing upstream (Hulu) and the older generation downstream (Hilir). Sejingkat faces the threat of landslides and flooding, posing a precarious future for its cultural identity and way of life. Interestingly, among the younger generation we interviewed, they no longer viewed Sejingkat as a fishing village, but rather as another coastal village by the Sarawak River.

Additionally, these villages, historically built on Native Customary Lands, have witnessed a demographic shift, in part thanks to the diverse economy generated through infrastructural networks. Traditionally Malay, some residents have sold parcels of their land, particularly in coastal areas, to Chinese settlers. This has led to a growing Chinese presence, with businesses and even homes established along the waterfronts. This transformation raises questions about the potential impact on the traditional fishing livelihoods that relied heavily on these very

coastlines.

Relating back through the lens of Henri Lefebvre's State Mode of Production (SMP) (1978), we can gain a deeper understanding of how state intervention, via infrastructure projects and economic policies, shapes the lives of these communities. Lefebvre argues that the state plays a crucial role in shaping space to facilitate capitalist expansion. The construction of roads in these villages exemplifies this. Traditionally, waterways served as the primary mode of transportation. However, state-led road construction fundamentally reconfigured the spatial organization of these villages. This shift potentially transformed their relationship with the surrounding environment and resources. As Bako and Sejingkat demonstrate, villages expanded linearly following newly built roads, highlighting the state's role in guiding spatial development. Furthermore, the SMP emphasizes the state's production of a coherent, coordinated urban fabric to support the capitalist metabolism. In the case of Buntal, its location near tourist attractions like the Sarawak Cultural Village benefits from state-directed infrastructure, potentially integrating the village into a broader tourist circuit. This development, however, tends to prioritize economic gains over traditional livelihoods, as evidenced by the increasing presence of Chinese-owned restaurants catering to tourists.

Considering the need to address decision-making complexities and advance inclusive development in coastal villages, the subsequent discussion presents strategic approaches focused on integrating local participation, curating cultural heritage and social identity, and fostering sustainable development in Kuching. Specifically, we draw on Alberto Magnaghi's Territorialist approach to "local self-sustainable development". As explicated in the Theoretical Framework section, this approach deviates from traditional sustainable development paradigms, government-led participatory models and conventional heritage discourses. This approach is also in line with Lefebvre's critique on the state's role in capitalist expansion, highlighting the importance of empowering local citizens to the end of self-governance and self-sustainability. However, acknowledging the long-term commitment required by Magnaghi's approach and its internal contradictions—such as the tension between his emphasis on 'local identity' and his recognition of evolving place identities—this paper critically adapts, rather than fully endorses, Magnaghi's theoretical framework. In light of the complexities arising from the shifting landscapes and changing identities in the five villages, the following considerations are proposed for the formulation of local self-sustainable development strategies:

First, we need to identify the long-term heritage of the "territory". In Magnaghi's territorialist theory, the term "territorio" (territory) diverges from the English interpretation of 'territory,' which commonly implies boundaries, delineations, and defensive associations (Franklin 2007). Territory, according to Magnaghi, instead of marking boundaries and defense (Ibid), is a product of human interaction and historical evolution, embodying the living heritage of a place (Magnaghi 2005: 1, 61, 62, 91). To identify the long-term territorial heritage of the villages, we must: 1) analyze ongoing processes shaping the territory, including urban development, environmental changes, and socioeconomic factors; 2) recognize the material and cognitive elements foundational for future actions, such as both tangible and intangible cultural heritage; and 3) involve local communities in the identification process. It is crucial to view heritage elements not as static relics but as dynamic processes (Harvey 2001) and social actions actively engaged in by local communities (Byrne 2008; Harrison 2010).

Second, we need to curate the evolving landscape as a living system. Here, we use the term 'curate' instead of "preserve", because our approach, in line with Magnaghi's perspective, seeks to prevent the fossilization of local heritage within the landscape, distinguishing it from traditional sustainable practices. Specifically, we propose to perceive the landscape not solely as a physical entity, but as a tangible expression of territorial identity (Magnaghi 2011; Berzi 2017) and a dynamic system. In line with this understanding, traditional approaches to nature reservoir or heritage parks are inappropriate. Instead, we advocate for a participatory approach that researches the historical context, environmental dynamics, and ongoing human interactions, using this knowledge to curate the evolving identity of the territory.

Third, we need to foster informed self-governance, i.e., encourage communities to take charge of their own governance by providing them with the information and knowledge they need to make informed decisions. Building upon Magnaghi's territorialist approach to community participation, we caution against "tokenistic participation" (Morrison & Dearden 2013) and aim to move beyond the usual divide between top-down and bottom-up approaches (as classified in Rodenberg & Wagenaar 2023). To achieve informed self-governance, we must: 1) re-establish the connection between local communities and their traditional knowledge, practices, and cultural heritage that may have been diminished or forgotten as a result of globalization; 2) empower these communities to reclaim and effectively use their extensive environmental and cultural knowledge and skills; 3) advise that municipal and local governments undergo significant changes to directly integrate this knowledge into

their policies and practices, ensuring its continuous growth and development. Additionally, we must emphasize the dynamic nature of the notion of "community" and caution against perceiving it as a static or monolithic entity. In the same vein as our approach to the shifting identity of a territory, we propose treating the community with a high degree of openness and self-reflexivity. Moreover, it is important to acknowledge that reconnecting local communities with lost knowledge and empowering them to reclaim their broader knowledge is a long-term project. This endeavor requires institutional reform to ensure equal access to cultural resources for all social groups.

While advocating Magnaghi's "local self-sustainable development" approach, we caution against its limitations in the context of Kuching, Sarawak. This approach emphasizes community participation and self-governance, which require a strong civil society and social cohesion. Though Malaysia has an active civil society, scholars highlight key challenges: (1) ethnic segregation within civil society organizations (Giersdorf and Croissant, 2011, p. 12); (2) activism being concentrated among privileged circles, with low rural participation (Giersdorf and Croissant, 2011, p. 12); and (3) heritage activism often being co-opted by the state (Lam-Knott, S., Connolly, C., & Ho, K. C. (2019).

Although Sarawak often celebrates its ethnic harmony, ethnic segregation persists in heritage activism. For example, Friends of Sarawak Museums, a key heritage organization, is largely composed of ethnic Chinese, expats, and some Dayak members, but reportedly no Malays (personal communication). Furthermore, unlike in Italy, where Magnaghi's approach can be supported by citizen participation regulations, Malaysia lacks such policies, and activism faces restrictions (Annuar and Ismail, 2023, p. 271). However, this does not rule out the applicability of Magnaghi's approach in Kuching; on the contrary, applying it while addressing these structural barriers can further develop the theory.

6. CONCLUSION

The introduction of road networks in North Kuching's fishing villages presents a complex story of both progress and potential drawbacks. On the positive side, these roads have opened doors to job opportunities outside of fishing, diversified the local economy, and brought additional facilities and improved accessibility. However, this development has come at a cost. The younger generation shows a diminished interest in traditional fishing, leading to a gradual shift in cultural identity. This change is further amplified by the expansion of the food business, increased links to the city, and the rise of tourism. While all villages but one appear to be adapting and finding ways to sustain themselves, the future of their unique fishing heritage remains uncertain.

This study fills a critical research gap by explicitly examining the socio-cultural impacts of infrastructure development in Malaysian coastal villages, an aspect largely neglected in prior research. Existing studies, while addressing economic activities and spatial transformations, often fail to contextualize these changes within broader urbanization processes and the intricate interplay between infrastructure and local communities. By applying Henri Lefebvre's State Mode of Production theory, this research provides a nuanced understanding of how state-led infrastructure projects shape territories and impact the socio-economic fabric of these villages, going beyond mere economic analyses.

The proposed strategies by Magnaghi aim to empower local communities, reconnect them with lost knowledge, and foster sustainable development practices that honor their unique cultural heritage. While the SMP provides a valuable framework for understanding the state's role in shaping these villages, it is important to acknowledge its limitations. Lefebvre focuses primarily on the state as a monolithic entity driving capitalist expansion.

These findings call for a more holistic approach to infrastructure and sectoral planning in Kuching's periphery. Local participation is crucial to ensure projects meet the needs of the fishing communities while minimizing disruptions to their way of life. Additionally, surveys that capture the full picture of the villagers' lives are essential for informed decision-making. Future research could explore similar case studies in other Southeast Asian cities, particularly focusing on riverine and coastal villages facing similar challenges. This broader perspective can help us understand how these villages, while often categorized as separate entities, are intricately connected to the urban fabric of their respective cities, undergoing a process of extended urbanization.

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