Settlement Patterns and Cultural Landscapes of Riverfront Communities in Si Phan Don, Southern Laos

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Abstract

This study examines the settlement patterns of riverfront communities in the Si Phan Don region of southern Laos, located along the Mekong River. The research explores the complex interplay between geomorphological characteristics, socio-economic dynamics, and cultural practices that have shaped the development of these communities over time. Utilizing a combination of detailed and rapid survey methods integrated with geographic information systems (GIS), the study provides a comprehensive analysis of the physical and cultural landscapes of the region. Findings highlight the adaptive strategies employed by the local population in response to seasonal fluctuations in the Mekong's flow regime, which profoundly impact agriculture, fishery, and settlement structures. The study also delves into the implications of modern infrastructure development on traditional settlement patterns, revealing a shift from river-based to road-based transportation, with significant effects on community organization and environmental sustainability. By examining these factors, this research contributes valuable insights into the sustainable management of the region's natural resources and the preservation of the region's cultural heritage.

Keywords: riverine settlements, Si Phan Don, Southern Laos, Mekong River, settlement pattern

Introduction

The Si Phan Don region, known in English as the "Four Thousand Islands," is situated in southern Laos along the Mekong River and presents a unique landscape with a rich history of human settlement. This study aims to examine the settlement patterns of the riverfront communities in this area, providing insights into the factors that have shaped their development over time. The Mekong River is a crucial waterway in the region, sustaining the lives and livelihoods of the local population. The floodplains along the river display distinct geomorphological characteristics, influenced by factors such as river gradient and seasonally reversed flows. Settlements in this area have historically been situated in close proximity to the river, taking advantage of the resources and transportation it provides (Souter et al., 2020). In the lower Mekong basin, the majority of residents rely on a combination of agriculture, fishery, livestock, and forestry for

their income (Hanh et al., 2010). Seasonal variations in climate, hydrology, and water quality profoundly impact the lives and activities of these riverfront communities.

The analysis of settlements in Si Phan Don is informed by cultural landscape theory, which emphasizes the interconnections between people, place, and environment. Taylor (2009) and Taylor (2023) highlight how cultural landscapes in the Asia-Pacific region are shaped not only by natural conditions but also by community values, rituals, and socio-spatial practices. Plieninger et al. (2014) and Schaich et al. (2010) further demonstrate the importance of linking cultural landscape studies with ecosystem services, particularly in contexts where cultural identity and environmental resources are deeply intertwined. Similarly, sustainable water resource management is the ability of communities to sustain river-based livelihoods while adapting to ecological change (Loucks, 2000), framing Si Phan Don settlements as both cultural landscapes and adaptive strategies. By situating riverfront settlements within this framework, the study underscores how geomorphological settings, socio-cultural institutions, and vernacular housing patterns in Si Phan Don contribute to a distinctive cultural landscape that cannot be fully understood through physical analysis alone.

The diverse floodplain characteristics of Si Phan Don, ranging from the cut-off point bar patterns in the upper part to the linear floodplains with back marshes in the lower part, along with the unique geomorphology caused by seasonally reversed river flows in the Si Phan Don area, highlight the complex and dynamic nature of the riverine environment. The Mekong River and its tributaries are essential resources for the people living along its banks, providing not only sustenance but also a means of transportation and communication.

This study explores the settlement patterns of the riverfront communities in Si Phan Don within the context of the environmental, social, and political factors that shape their development. By examining these factors, this study aims to gain a comprehensive view of how these communities have adapted to their environment and how their unique architectural and cultural practices have evolved over time. The objectives of this study are twofold. First, it seeks to examine the physical transformations of riverfront settlements in Si Phan Don and identify the underlying geomorphological, socio-cultural, and architectural factors that shape these changes. Second, it aims to propose recommendations for sustainable settlement management that are grounded in the area's distinctive cultural landscape and riverine environment.

Research Methodology

This study examines the complex interaction between natural and human systems, which represent the tangible manifestations of the relationship between people and their environment, reflecting the diverse cultural identities and values of different communities over time (Plieninger et al., 2014). Conducting a comprehensive survey is critical for understanding the unique characteristics, dynamics, and significance of these landscapes, which are often under threat from various socioeconomic and environmental pressures (Shang, 2018; Wu, 2010; Zhang et al., 2020). The article presents a methodological approach for conducting a cultural landscape survey, drawing insights from the existing literature on cultural landscape research and ecosystem service assessment.

This study was determined by three main factors: (1) the geomorphological setting of Si Phan Don as a dynamic riverine environment, (2) the socio-cultural characteristics of riverfront communities, and

(3) the architectural patterns of vernacular dwellings shaped by seasonal water fluctuations. To address these factors, two complementary survey methods were employed. A detailed survey provided in-depth information on specific houses, while a rapid survey offered a broader perspective on the architectural landscape. The rapid survey approach served as an observational methodology to document the general characteristics, architectural styles, and physical condition of houses in the Si Phan Don area.

Integrating the data from this rapid survey with the more detailed information gathered through complementary survey methods enabled a more comprehensive understanding of the physical transformations occurring in the region (Kiatthanawat et al., 2024; Wattanamano et al., 2024). To substantiate these transformations, comparative visual materials, such as historical and recent maps, traditional and modern house plans, and spatial layout sketches were incorporated into the analysis. This combined dataset was then incorporated into a geographic information system to conduct a spatial analysis of Si Phan Don riverfront communities. Rapid architectural surveys offer a dynamic and efficient means of data collection, moving beyond basic inventories to provide a more nuanced comprehension of the built environment. By observing and documenting architectural styles, spatial configurations, and the relationship of design elements, these rapid survey techniques contribute to a richer understanding of the studied built landscape (Roth, 2006).

The assessment of cultural ecosystem services, such as aesthetic, recreational, and cultural heritage values, has become an important aspect of landscape research and management. However, the linkages between ecosystem service research and cultural landscape studies have not been fully explored (Schaich et al., 2010). Cultural landscape research approaches have proven valuable in the assessment of different nonmaterial landscape values and cultural services. Although secondary sources provide important background information, the field survey data in this study contribute specific observations that are not available in existing literature. These include the orientation and spatial configuration of houses, pathways linking settlements to riverbanks, and documentation of household gardens and communal spaces. By combining such empirical evidence with secondary studies, the analysis captures both the physical transformations of the settlements and their cultural significance. In this way, the integration of cultural ecosystem service assessment directly supports the study's objectives by linking settlement patterns to both tangible and intangible dimensions of community adaptation in Si Phan Don.

Results and the Discussion

The settlement pattern of vernacular dwellings in Laos is closely aligned with their geographical contexts. Upland and highland residences exhibit analogous physical characteristics, such as high-pitched roofs that are well-suited to local environmental conditions and building materials. In contrast, lowland Lao dwellings are constructed on stilts to mitigate the risk of flooding from surrounding rice paddies, reflecting the influence of the region's agricultural practices (Anolac, 2013). Diverse socio-cultural factors have shaped the distinct physical forms and spatial arrangements of traditional housing across Laos.

The Si Phan Don region is a captivating area characterized by its unique geographical features and the intricate connection between land and water. This area is situated along the Mekong River, which serves as a vital waterway and source of livelihood for the local population. The Mekong River in Si Phan Don broadens to 14 km in the wet season (Kiernan, 2009). The geography of Si Phan Don is shaped by the river and its numerous tributaries, creating a complex network of islands, channels, and backwaters.

The region is influenced by the seasonal fluctuations of the Mekong, with the river's discharge and sediment load varying throughout the year. The topographical diversity of Si Phan Don, with its mix of linear floodplains, cut-off point bar patterns, and unevenly distributed artificial calmatives, reflects the dynamic interaction between the river and the surrounding landscape (Esri and Impact Observatory, 2021; Karra et al., 2021; Figure 1).

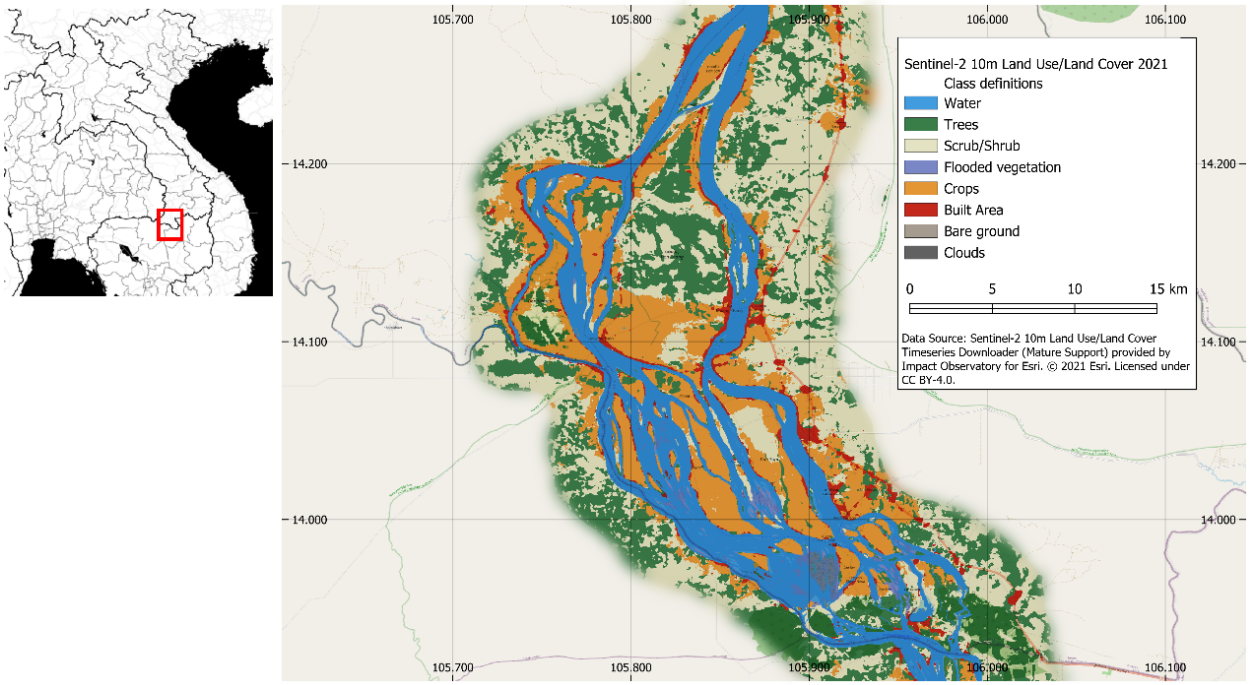

Figure 1 This map illustrates the land use and land cover of the Si Phan Don region based on Sentinel-2 imagery from 2021. The legend classifies the area into water, trees, scrub/shrubs, flooded vegetation, crops, built areas, bare ground, and clouds. Map based on Sentinel-2 10m Land Use/Land Cover –Esri and Impact Observatory (2021) and Karra et al. (2021), used under CC BY 4.0. Basemap © Stadia Maps, © OpenMapTiles, © OpenStreetMap contributors

Si Phan Don is characterized by non-alluvial, multichannel systems (Latrubesse and Stevaux, 2015) that create a dynamic environment where the availability of arable land and water resources fluctuates seasonally. This region encompasses a complex of islands along approximately 10 kilometers of the Mekong River. The river has subsequently eroded this surface to form 17 channels in the Si Phan Don area (National Consulting Company, 2013). Additionally, there are numerous smaller channels and cascades, most of which flow only during the wet season when the river level is high. During the high flow season, other branches, particularly those closer to the right bank of the Mekong, carry higher flows.

Figure 2 illustrates the relationship between the island area and the built area across the 25 largest islands in Si Phan Don, derived from building footprint data (Sirko et al., 2021). Larger islands such as Don Khong and Don Som contain higher concentrations of buildings but still maintain relatively low coverage ratios. This pattern suggests that settlement density remains modest even on the largest islands, reflecting an adaptation to the geomorphological constraints of the riverine environment. Table 1 provides further details by summarizing land use and building distribution based on footprint data (Sirko et al.,

2021), highlighting how settlements are distributed unevenly across islands. For instance, Don Khong, the largest island, contains more than 8,000 buildings, whereas smaller islands such as Don Salat or Don Phapeng comprise only a handful of structures. Together, these visualizations reinforce the conclusion that settlement patterns in Si Phan Don are shaped not only by island size but also by cultural and environmental considerations, such as access to agricultural land, sacred sites, and water routes. Integrating these insights clarifies how physical geography and socio-cultural elements combine to influence community organization.

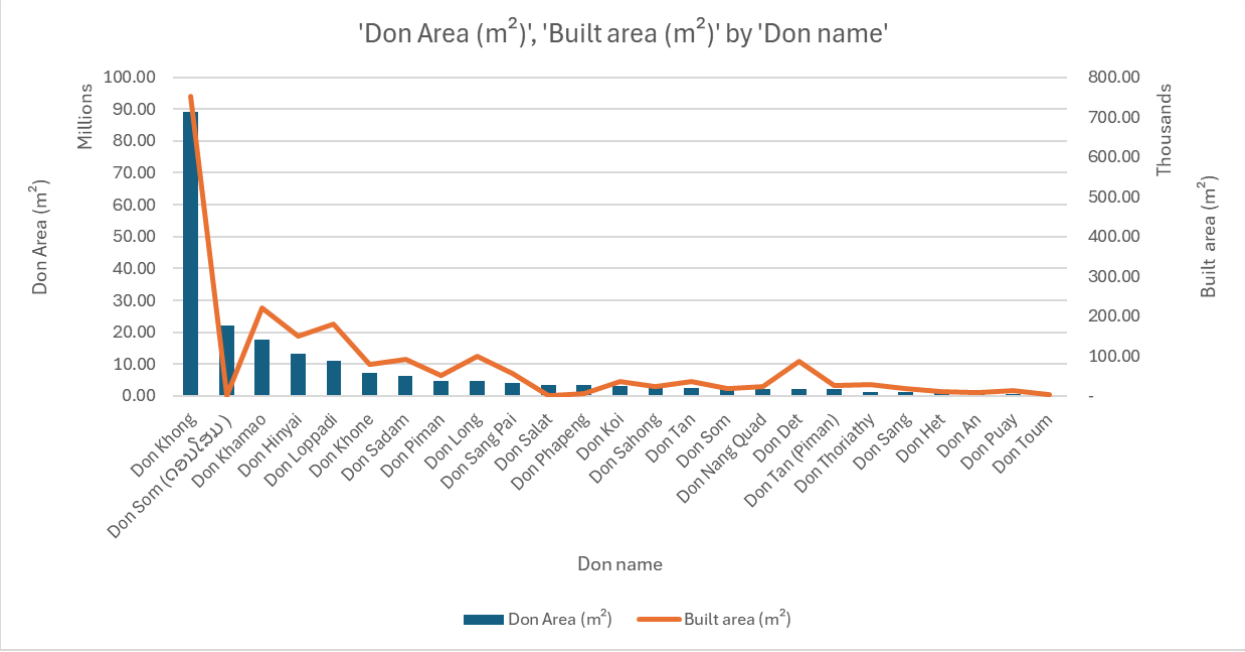

Figure 2 Relationship between the total area and the built area on the 25 largest Don islands, based on building footprint data (Sirko et al., 2021)

The socio-economic dynamics of the riverfront communities in Si Phan Don are closely linked to the region's natural environment. Hortle (2009) discusses how the majority of the population relies on a combination of agriculture, fishery, livestock, and forestry for their livelihoods. Seasonal variations in the Mekong's flow regime profoundly impact these activities, influencing settlement patterns and community structures. Studies by Jensen (2017) highlight the adaptive strategies employed by these communities to cope with environmental variability, including the construction of elevated homes and the development of diverse agricultural practices. Adaptive strategies in Si Phan Don are evident in both housing and livelihood practices. Elevated stilt houses mitigate seasonal floods while also creating shaded spaces for storage and livestock. At the community scale, flexible cropping systems, the maintenance of kitchen gardens on river margins, and reliance on multiple livelihood sources such as fishing, farming, and forestry help households absorb seasonal uncertainty. These strategies illustrate how settlement patterns are not static forms but dynamic responses to environmental variability.

Table 1 Summary of land use and building distribution across Don islands, derived from footprint data (Sirko et al., 2021)

Don name	Don area (m²)	Total built area (m²)	Covered area ratio	Average built area (m²)	Number of buildings	Confidence level
Don Khong	89,049,118.21	752,581.34	0.01	93.33	8,063.00	0.79
Don Som	21,934,156.14	305,481.30	0.01	79.49	3,843.00	0.79
Don Khamao	17,810,931.89	221,344.21	0.01	76.70	2,886.00	0.79
Don Hinyai	13,126,329.22	149,057.04	0.01	81.63	1,826.00	0.78
Don Loppadi	11,126,355.99	181,129.45	0.02	79.44	2,280.00	0.78
Don Khone	7,308,265.67	80,195.33	0.01	83.45	961.00	0.80
Don Sadam	6,268,435.65	92,964.38	0.01	94.96	979.00	0.81
Don Piman	4,702,265.08	51,362.16	0.01	78.66	653.00	0.78
Don Long	4,684,384.34	98,511.17	0.02	81.96	1,202.00	0.79
Don Sang Pai	4,066,477.41	55,670.93	0.01	76.05	732.00	0.78
Don Salat	3,486,805.93	336.38	0.00	42.05	8.00	0.73
Don Phapeng	3,343,582.77	6,688.47	0.00	73.50	91.00	0.82
Don Koi	3,053,812.74	36,034.26	0.01	73.69	489.00	0.79
Don Sahong	2,987,443.43	23,481.28	0.01	80.42	292.00	0.80
Don Tan	2,549,128.55	35,063.89	0.01	74.92	468.00	0.79
Don Som	2,423,070.87	19,018.66	0.01	70.18	271.00	0.80
Don Nang Quad	2,231,716.43	23,824.40	0.01	72.41	329.00	0.78
Don Det	2,229,208.74	85,804.69	0.04	85.29	1,006.00	0.79
Don Tan	2,004,966.74	26,324.50	0.01	81.50	323.00	0.78
Don Thoriathy	1,221,865.25	28,244.11	0.02	95.42	296.00	0.79
Don Sang	1,192,728.03	18,950.33	0.02	83.85	226.00	0.78
Don Het	967,626.08	11,566.63	0.01	70.96	163.00	0.80
Don An	595,964.45	7,978.67	0.01	65.94	121.00	0.78
Don Puay	471,689.33	13,903.06	0.03	84.26	165.00	0.79
Don Toum	351,205.09	4,467.66	0.01	68.73	65.00	0.77
Other Don islands	6,221,847.81	98,841.17	0.02	78.38	1,261.00	0.77
Total	**215,409,381.84**	**2,428,825.48**	**0.01**	**77.97**	**28,999.00**	**0.79**

The management of water resources in the Mekong basin has significant implications for the settlement patterns in Si Phan Don. Uneven economic and social development, coupled with inadequate regional cooperation, has led to challenges in sustainable water resource management. Hensengerth (2024) emphasizes the need for equitable water governance to ensure the sustainable development of the Mekong's riparian communities. The impacts of hydropower development, as discussed by Carew-Reid (2016), further complicate the management of water resources, affecting the livelihoods and settlement patterns of riverfront communities.

Comparative studies of settlement patterns in similar riverine environments provide valuable insights into the factors influencing community development in Si Phan Don. Research on the Mekong Delta in Cambodia, for example, reveals parallels in the geomorphological and socio-economic dynamics that shape settlement patterns. Oketani et al. (2007) compare the floodplain characteristics and settlement structures in the upper and lower Mekong regions, highlighting the similarities and differences that arise from local environmental conditions and historical contexts.

The settlement patterns of riverfront communities in Si Phan Don are the result of a complex connection of historical, geomorphological, and socio-economic factors. The Mekong River's dynamic environment has shaped these communities' development, influencing their livelihoods and settlement structures. Understanding the historical context, environmental challenges, and socio-economic dynamics is crucial for developing sustainable strategies for managing the region's natural resources and supporting its communities.

The settlements play a crucial role in responding to the cultural landscape formation (Yodsurang et al., 2015). These settlements are typically located along water bodies, particularly riverbanks, to ensure easy access to water resources. In the past, people were more reliant on the river as the main transportation route. This strategic placement not only ensured the availability of water for daily sustenance but also leveraged rivers as primary transportation routes, reflecting a deep reliance on these water bodies for mobility, trade, and communication. The study highlights how such settlement patterns have significantly influenced the development and character of cultural landscapes, shaping human interactions with the natural environment over time.

Figure 3 presents a historical map of the Mekong River, created between 1893 and 1896 by Simon et al. (1898). This map offers a fascinating glimpse into the settlements and administrative divisions along the Mekong River during the late 19th century. This period was marked by significant colonial activity, particularly by the French, who were expanding their influence in Southeast Asia. The map is a testament to the intricate integration between geography, colonial administration, and local settlements that characterized the region at the time. The map centers on the Mekong River, a major waterway that has historically been vital for the regions it traverses. A notable focus is the area labeled "MUONG KONG," and the "Ile de Kong" (Kong Island), which is the most prominent and largest island in the Si Phan Don area. "Muong Kong" appears to be a central settlement or administrative hub. The presence of additional labels, such as "Résidence" and "Postes," in "Don Khone" indicates that this area housed colonial administrative offices and postal services, underscoring its importance in the colonial infrastructure.

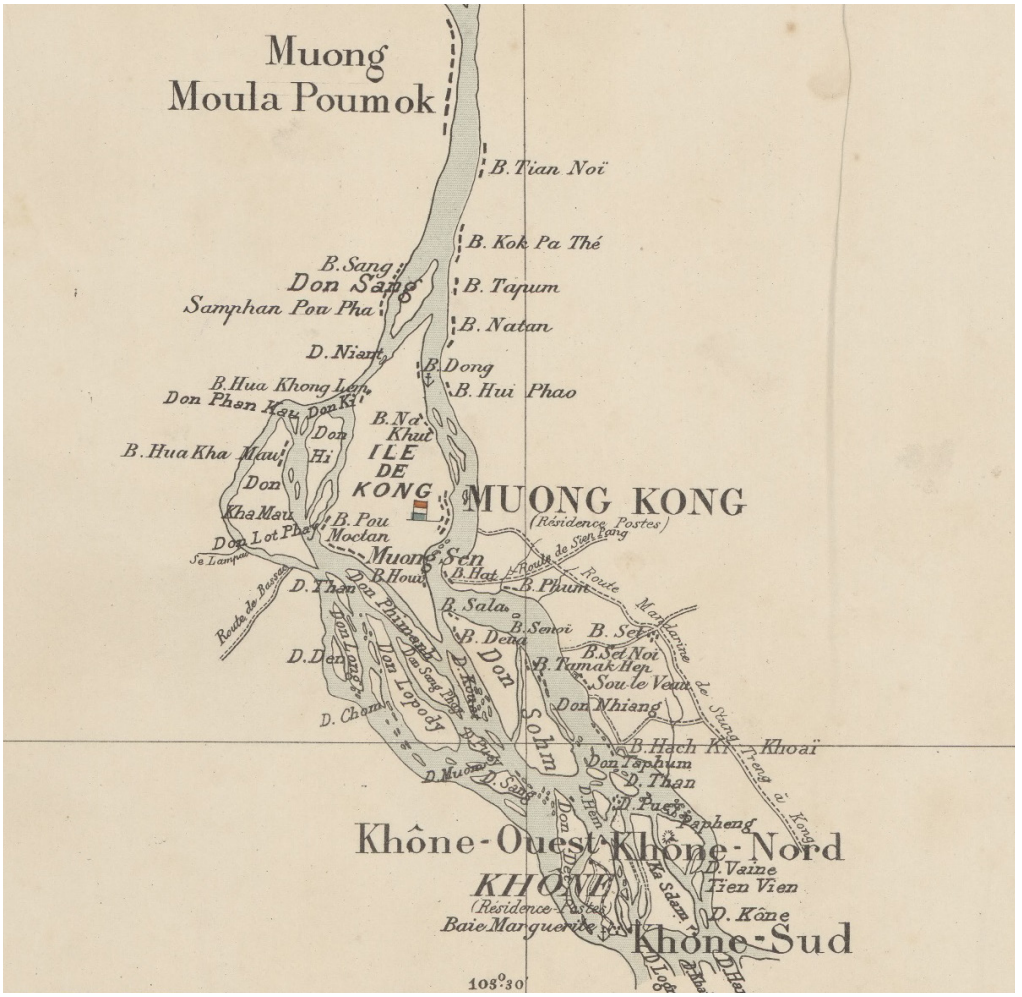

Figure 3 Map of Si Phan Don settlement in the 1890s from Muong Moula Pooumok to Don Sadam (Simon et al., 1898)

The detailed depiction of regions like Muong Kong, Khône, and the various "Don" islands illustrates the intricate relationship between geography and human settlement. The map features numerous settlements, many of which are prefixed with "Don" and "B." The prefix "Don" is commonly used to denote islands or specific settlements within the river, such as Don Sahong and Don Phan. These islands were likely significant not only for their geographical prominence but also for their strategic and economic roles. The prefix "B." stands for "Ban," which means village in Lao, indicating smaller villages or hamlets scattered throughout the region. These smaller settlements provide a detailed view of the local habitation patterns and community structures. The Dons and falls were, and remain, a critical natural barrier and landmark, influencing settlement patterns and transportation routes.

The Mekong's complex network of islands and waterways is meticulously detailed, reflecting the river's significance as a transportation and communication route. Settlements are typically clustered along the river's banks, taking advantage of the easy access to water resources. This pattern aligns with the observation that in the past, people relied more heavily on rivers as the primary means of transportation. The Mekong River and its surrounding floodplains have played a crucial role in shaping the cultural landscape of the region (Figure 4).

Figure 4 (left) Fishing activities in the Mekong River (at the Hua Don of the Don Khong) often involve mutual cooperation and traditional methods. The river's diverse ecosystem supports a wide variety of fish species, making it an important area for both subsistence and commercial fishing; (right) a riverside settlement in Si Phan Don. The houses, including a prominent stilt house, are built close to the riverbank. The presence of lush vegetation and coconut trees highlights the tropical environment. The settlement's proximity to the river underscores the importance of the Mekong for transportation, sustenance, and daily life in this region.

The Si Phan Don fisheries are typically located in the zone of the flat water between the islets, particularly on a rainy day in the main river channel and the nearby flooded forests along the riverbanks (Figure 5). While the Mekong River ecosystem boasts a wide range of fish species, habitats, fishing gear, and techniques, recent times have seen a noticeable decline in the variety of fishing gear used according to Sverdrup-Jensen (2002). Primarily, only mhong, hook (bet), line, and bait methods are being observed. It appears that changes in water levels have made fish traps a rare sight. Around 201 fish species have been identified in the area, highlighting the region's remarkable biodiversity. In southern Lao PDR, wild capture fisheries comprise around 20 percent of gross income, with more than 80 percent of households participating (Baran and Ratner, 2007), underscoring the vital role these fisheries play in supporting local livelihoods and the economy.

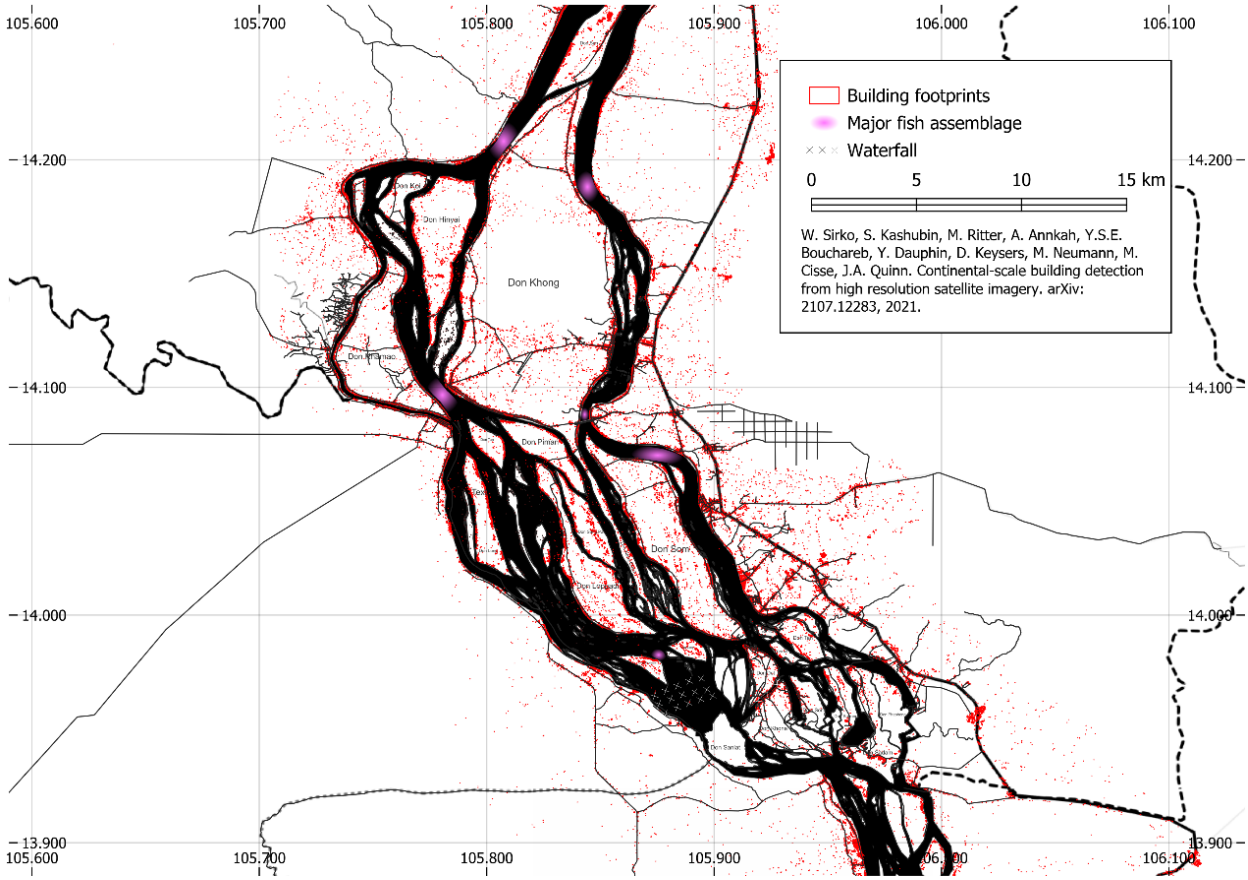

Figure 5 Map of remaining settlement and fish sanctuary, based on building footprint data from Sirko et al. (2021) processed by the authors. Basemap © Stadia Maps, © OpenMapTiles, © OpenStreetMap contributors

Typical traditional villages scattered throughout the *Cam Kong* (riverfront) often emphasize their harmonious relationship with the surrounding natural environment (Figure 6). The *Cam Kong* area also served as a resilient front yard where households would plant vegetables during specific seasons. These practices reflect the deep connection between the villagers and their environment, with the river playing a central role in sustaining both their daily needs and agricultural activities. The villages are typically characterized by wooden stilt houses facing the river, where the waterway serves as a vital source of livelihood and transportation. The rear side of these settlements often consists of lush, dense forests and expansive rice fields that sustain the community's agricultural practices. The forest was reserved as a dwelling place for ancestral spirits. This area typically includes a small shrine, which is constructed to house these spirits. The location chosen for spirit dwelling must be on high ground, such as a hill or mound, that is not prone to flooding. The area is characterized by a dense, shady forest teeming with wildlife, which contributes to an eerie and sacred atmosphere. The sounds of animals and the rustling of trees and vines further enhance the mystical ambiance of the area.

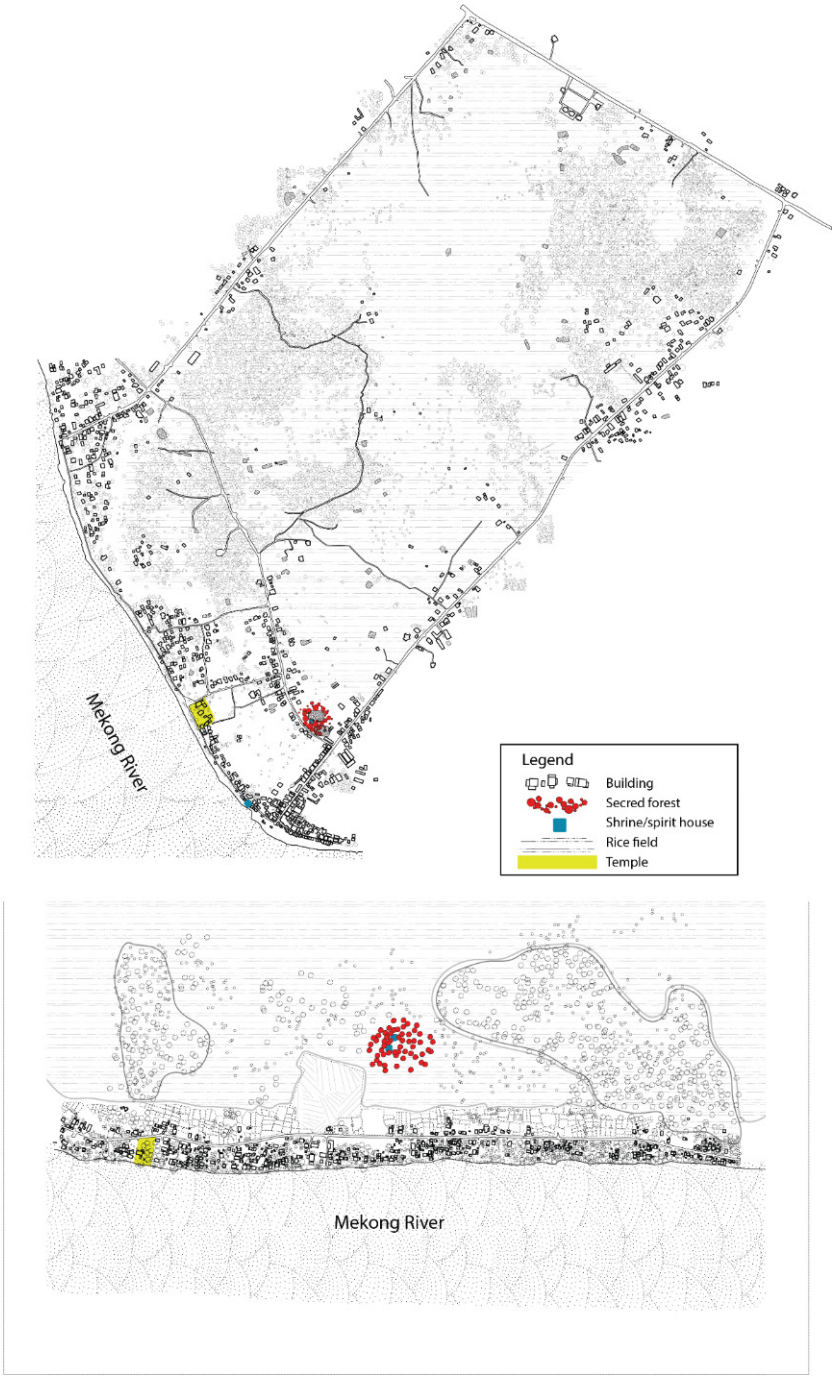

Figure 6 Village planning in common. Stilt houses and their front yards scattered along the Mekong River, with lush forests and rice fields stretching behind inland

Houses were traditionally constructed on stilts, an architectural style that protected them from flooding and provided additional living space underneath. While the newly constructed houses feature different design patterns from the original plans, the layout for space utilization remains similar to the traditional house designs (Fongkhamdeng and Wongphyat, 2021). There were also small pathways along the riverbanks, dividing the residential areas from the waterfront. The pathway itself was unpaved and primarily used by residents for traveling within the village (Figure 7). Houses were oriented parallel to the river, with the front facing the river and the back turned toward the inland rice field. Figure 8 illustrates

a typical house planning layout, showing the arrangement of indoor and outdoor spaces. The plan highlights how the central living area connects to semi-open verandas, storage spaces, and kitchen zones, while the frontage toward the river often includes docking areas for boats. Behind the house, vegetable plots and access to rice fields reflect the integration of domestic life with both riverine and agricultural environments.

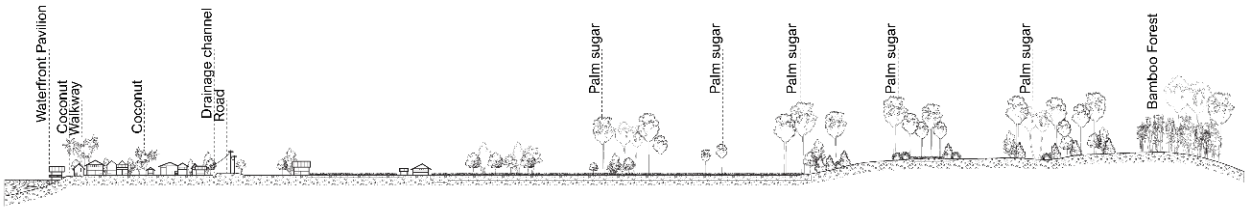

Figure 7 Typical village cross section

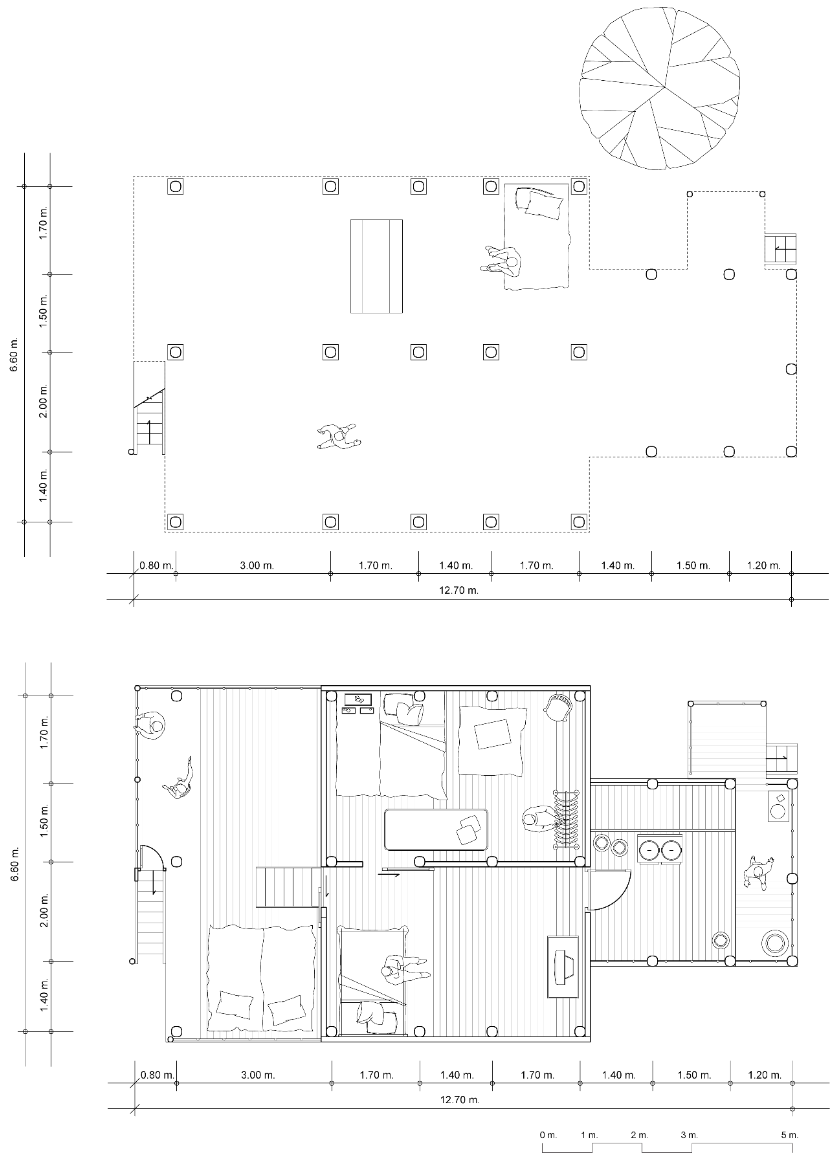

Figure 8 Typical house plan

The connection between housing and the waterfront is reflected in the ongoing housing and landscape elements, such as riverside pavilions, kitchen gardens planted along the riverbanks, and boat docking areas. The river continues to serve as a transportation route to various islands and a fishing ground for the villagers. Traditional boats, including longboats, are used for commuting, trade, and tourism. River transport connects communities, facilitating social and economic interactions while also providing opportunities for cultural exchange (Shimizu et al., 2024). Thus, the village layout, with its proximity to water and natural resources, still reflects the strong harmonious coexistence between the people and their environment.

The relationship between houses and the waterfront is central to the spatial logic of Si Phan Don settlements. Houses are oriented towards the river, with entrances, verandas, and docking areas facing the water, while the backs connect to rice fields and gardens. This dual orientation links domestic life to both aquatic and terrestrial resources. Figures 7–9 illustrate how pathways, pavilions, and gardens reinforce this connection, showing that the river is not only a transportation route but also a space for food production, social gatherings, and ritual practices. Together, these visual and textual accounts clarify how the waterfront shapes both daily routines and community organization.

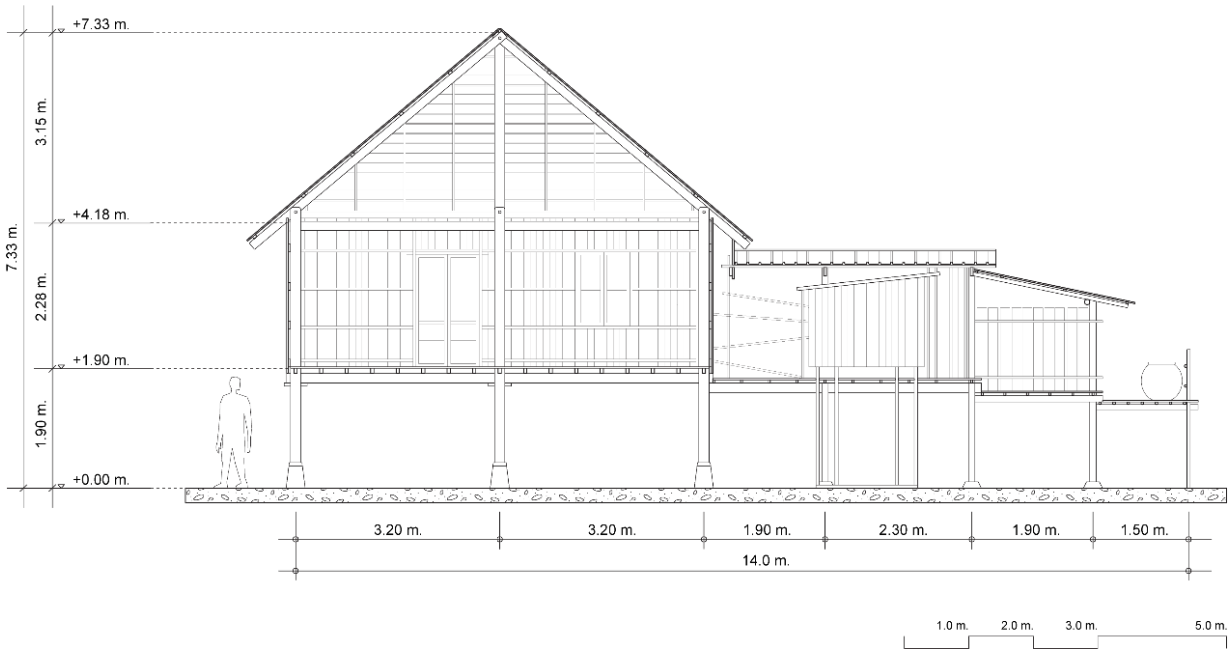

Figure 9 Typical house section

The settlement patterns of Si Phan Don display unique characteristics that set them apart from other riverine communities in the Mekong basin. Unlike other riverine communities here, the settlements of Si Phan Don are shaped by a combination of socio-cultural anchors and distinctive geomorphological conditions. Sacred forests, the sacred village pillar (*sao lak baan*), and Buddhist temples function as focal points of spiritual life while also structuring communal territories. At the same time, the geomorphological setting of multiple islands, cascades, and seasonally shifting river channels dictates where dwellings, agricultural fields, and communal spaces are located. This interplay between cultural elements and dynamic riverine landscapes defines the uniqueness of settlement patterns in Si Phan Don, a dimension often overlooked in generalized studies of Mekong communities (Yodsurang et al., 2025).

However, the modern infrastructure that began in 1975 and increased rapidly in 2005 resulted in a more than three-fold increase in 30 years, including rural areas (Oraboune, 2008). Bridges and concrete roads began to be constructed, transforming the main transportation route from the river to the road. Consequently, this road became the dividing line between the village area and agricultural fields. Although there is only one bridge connecting to the Don Khong area, the impact of new settlements and modernization is clearly evident. The presence of modern infrastructure has also spurred the development of new settlements along these roads, contributing to the expansion of urban areas. This expansion has not only altered the traditional landscape but has also introduced changes in land use, which have disrupted the balance between human activities and the natural environment.

Moreover, the growth of urban areas upstream has generally affected the downstream environment, especially water quality, which is a significant concern for individuals residing in downstream rural communities. Additionally, the deterioration of the river's ecosystem has led to a decrease in fish and edible plants, thereby affecting the food security of the local populace (Thongyou et al., 2014). This clear divide between modern and traditional practices underscores the complex connection between infrastructure development and the preservation of cultural landscapes, highlighting the need for sustainable development approaches that consider the long-term impacts on both the environment and local communities.

Conclusion

The settlement patterns in the Si Phan Don region of southern Laos illustrate the complex relationship between communities and their environment, shaped by both historical context and modern development pressures. This study reveals that the traditional riverine settlements, characterized by stilt houses and proximity to the Mekong River, have been profoundly influenced by the seasonal dynamics of the river, which have dictated agricultural practices, fishing activities, and overall community organization.

However, modern infrastructure development, particularly the shift from river-based to road-based transportation, has significantly altered these traditional settlement patterns, distinguishing them from other Lao settlements where road access evolved gradually. In Si Phan Don, the abrupt transition has created a clear division between riverfront villages and agricultural fields, a pattern not commonly observed elsewhere, making the disconnection between people and the river a distinctive finding of this study. The construction of bridges and roads has not only changed the physical layout of communities but has also disrupted the socio-economic and cultural fabric that has historically centered around the river. This shift aligns with the findings of Oraboune (2008), who noted a rapid increase in infrastructure development in rural Laos from 1975 onwards, resulting in profound changes to local communities. The road infrastructure, which now serves as the main transportation route, has effectively divided villages from their agricultural fields, leading to a disconnection between the people and the river that has long sustained them.

Evidence from Table 1 and Figures 2, 6, and 8 demonstrates how seasonal fluctuations in the Mekong directly shape settlement form and use: stilt houses are elevated to withstand flooding, gardens and fields shift according to water levels, and building density remains low even on large islands to accommodate floodplain variation. These patterns confirm that the seasonal dynamics of the river are not background conditions but active forces that structure livelihoods and community organization in Si Phan Don.

The literature suggests that such transitions can have far-reaching implications. For instance, Plieninger et al. (2014) emphasized the importance of cultural landscapes as manifestations of the relationship between people and their environment, warning that modern development often threatens these landscapes. Similarly, Hensengerth (2024) pointed out the challenges in sustainable water resource management in the Mekong basin, exacerbated by uneven development and inadequate regional cooperation. The disruption of traditional settlement patterns in Si Phan Don due to road development echoes these concerns, as it not only threatens the cultural heritage of the region but also undermines the sustainability of its natural resources.

Moreover, the shift away from river-based livelihoods has had environmental consequences. The decline in traditional fishing practices and the deterioration of the Mekong's ecosystem, as discussed by Baran and Ratner (2007) and Sverdrup-Jensen (2002), have directly impacted food security and the economic stability of the local population. This situation highlights the need for a more integrated approach to regional development, one that considers the environmental, cultural, and socio-economic dimensions in tandem. The findings of this study go beyond describing common settlement phenomena in the Mekong basin by highlighting distinctive features of Si Phan Don. These include the close integration of sacred spaces and riverine settlement into the spatial layout, as well as the influence of geomorphological conditions, such as multiple islands and cascades on community organization (Yodsurang et al., 2025). These elements distinguish Si Phan Don from other riverine settlements and provide the basis for more locally grounded recommendations.

The Si Phan Don region stands at a crossroads, where the pressures of modernization are challenging the resilience of traditional communities. The findings of this study argue for a balanced approach to development that respects and preserves the cultural and environmental heritage of the region. Sustainable strategies in this context should include conserving river-based livelihoods such as fisheries and seasonal agriculture, protecting sacred forests and communal spaces that anchor community identity, and adapting housing and settlement layouts to seasonal flooding. They should also promote balanced infrastructure planning that integrates modern roads without severing the communities' connection to the river. Rooted in a deep understanding of the historical and cultural context, as well as the adaptive strategies that have allowed these communities to thrive in a dynamic riverine environment, such approaches can ensure that development policies integrate traditional practices with modern needs, allowing the communities of Si Phan Don to continue living in harmony with the Mekong River, their source of life and identity.

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