Nakhara: Journal of Environmental Design and Planning (2025)
Volume 24(2), Article 511
DOI: https://doi.org/10.54028/NJ202524511
Article Type: Research Article

Dynamics of Landscape Transformation and Governance of Bangkok's Urban Waterways

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Received 2025-03-04; Revised 2025-05-09; Accepted 2025-05-12

ABSTRACT

This paper critically examines the shortcomings of traditional Thai institutions in urban governance focusing on Bangkok Urban Waterways (BUW) conceptualised as dynamic and essential landscape elements. Framing BUW through the lens of 'landscape governance', the paper explores how institutional practices and management actions have led to erosion of cultural heritage, ineffective flood control, and the marginalisation of local communities. The research asks: To what extent does the governance of BUW contribute to these changing landscapes? To do this, the paper draws on extensive qualitative fieldwork, including interviews with government agencies, experts, practitioners, NGOs, and in-depth fieldwork with residents. The findings reveal that the governance structures surrounding BUW have largely generated unintended consequences rather than achieving their intended goals. The paper examines governance failure and identifies significant obstacles to effective management, highlighting the futility of enforcing rigid boundaries between land and waterways in this complex urban landscape. The discussion advocates for a collaborative approach to urban landscape management by proposing it as a means to transcend the limitations of conservative institutions and addressing the challenges facing coastal cities in Southeast Asia.

Keywords: landscape change, environmental management, landscape governance, institutions, Bangkok waterways

INTRODUCTION

Change and Complexity in Water-Related Urban Landscape

The causes of change in urban areas are difficult to identify precisely because interventions often have ripple effects that are only partially observable (Martine, 2011). A clear example is the effect of urbanisation on waterways. Urban development disrupts natural hydrology by increasing impervious surfaces and implementing engineered drainage systems, which leads to altered stream flows. This urban sprawl has also resulted in insufficient natural resources, such as declining water quality, posing risks to public health and the environment, particularly in impoverished areas. Urban expansion in Global South cities (2000–2030) has been largely driven by low-income migrants seeking employment, many of whom settle in ecologically fragile areas, including zones adjacent to waterways (Laquian, 2011). This trend has contributed to shifts in social structures and processes of gentrification (Taylor, 2018). Meanwhile, industrial, commercial, and modern residential developments often neglect their relationship with the surrounding physical landscape (Divay & Wolfe, 2002). These patterns have heightened vulnerability to disasters such as flooding (Innes & Booher, 1999), exacerbated by infrastructure limitations, rapid population growth, land subsidence, and ongoing urban expansion (Chan et al., 2015). This complex phenomenon can be attributed to inadequate government responses, such as failing to address demands for land and housing or adhering to established land-use plans. These issues are often linked to poor administrative practices and fragmented governance (Laquian, 2011; Martine, 2011). Examples of such cities include Greater Jakarta (Colven, 2023), Ho Chi Minh City (Lempert et al., 2013), and Bangkok (Thanapet & Kung, 2015).

Bangkok Urban Waterways (BUW) have undergone significant transformation, evolving from vernacular settlement and multifunctional infrastructure —used for defence, trade, irrigation, and transport—to neglected urban remnants. Initially shaped by land reclamation and agricultural practices (1470–1860s), the shift toward a road-based city (1860s–1940s) and modern irrigation projects led to reduced navigability, halted excavation, and increasing urban encroachment. The economic booms (1980s), tourism-driven development (1990s), and the city's expansion (1960s–2020s) exacerbated the marginalisation of the BUW, leading to the degradation of cultural heritage and the abandonment of waterways (Casper, 2015).

Scholars in Thailand have illustrated the transformation of BUW. Tohiguchi et al. (2002) focused on the settlement patterns in four Bangkok canal-side areas between 1952 and 1998. A shift from traditional to modern building styles and materials connected to changes in settlement structures varied in duration, taking over forty years in urban fringe areas like Sai Gong Din in Eastern Bangkok, and a considerably shorter twenty years in the central business districts like Mahasawat in Western Bangkok (Tohiguchi et al., 2002). Davivongs highlighted Bangkok's western canal deterioration by investigating the indigenous waterway irrigation system of 1959. Their study indicates that landownership plays a considerable role in the waterways' change, which has been linked to private ownership and sparked conflict between local farmers and real estate developers, ultimately transforming urban areas (Davivongs & Arifwidodo, 2020; Davivongs et al., 2012). Unakul delved into historical aspects of BUW and highlighted the changing patterns, including issues like inaccessibility to canal side areas. She pointed out that urbanisation had led to the underutilisation and fragmentation of canals (Unakul, 2012). The extent to which Bangkok's governance contributes to these changes of BUW will be explored in this paper.

Institutions Involved in Bangkok's Waterways Management

Figure 1 illustrates the government agencies involved in BUW management, both in water body management and the area adjacent to BUW. Central administration tasked with BUW waterbody management includes the Royal Irrigation Department (RID) overseeing irrigation waterways, Agricultural Extension Department (AED) managing agricultural production relating to irrigation channels in Bangkok's outskirts, the Marine Department (MAD) handling water transportation, and the Meteorological Department (MED) and Hydrographical Royal Thai Navy (RTN) measuring rainfall and water levels in the river. The Disaster Prevention Department (DPD) addresses flooding incidents, and the Metropolitan Waterworks Department (MWD) oversees the Khlong Phrapa waterway supplying water for use in Bangkok, while the Office of National Water Resource (ONWR) is a special national government agency which coordinates water agencies across different ministries (Office of the National Water Resources [ONWR], 2021).

Concerning area management along BUW, the Public Work Town and Planning Department (PWTPD) monitors Bangkok's town plan. The Community Organisation Development Institute (CODI) and the National Housing Authority (NHA) enhance existing legal residential zones, including along the BUW. The Royal Treasure Department (RTD) and the National Office of Buddhism (NOB) own many areas along BUW. The Land Department (LAD) manages and justifies leases including those along BUW. The Fine Art Department (FAD) is responsible for protecting or conserving monuments including those in BUW in the conservation zone. At the same time, the Tourist Authority of Thailand (TAT) enhances the development of historical waterways to support tourist attractions.

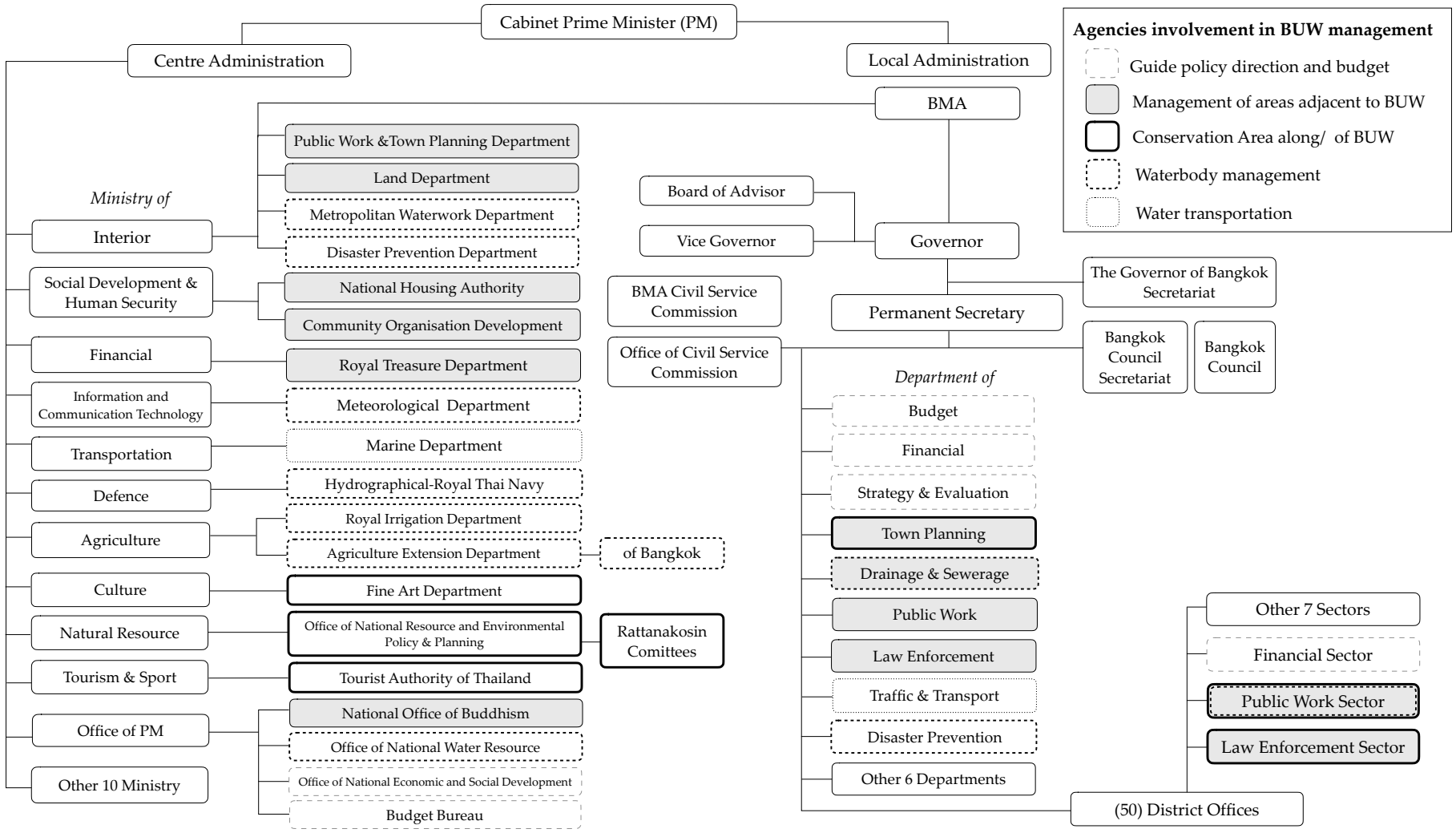
The Rattanakosin Committee (RC) under the Office of National Policy and Planning (ONEP) creates policy in the conservation zone. The ONEP monitors the Environmental Impact Assessment (EIA), while the RC-ONEP is responsible for the conservation area, establishing guidelines for infrastructure and services and overseeing projects occurring in Bangkok's ancient town (Office of the National Water Resources [ONEP], 1994, 2017).

For local administration, the Bangkok Metropolitan Administration (BMA) adheres to the BMA Act of 1985, which designates BMA as the governing body directed by the Ministry of Interior (MOI), and the Governor is an elected official. Six out of fifteen departments are involved in BUW management. The Town Planning Department (TPD) oversees the city's development by creating comprehensive plans, including developing areas along BUW, while the Public Works Department (PWD) implements these plans on-site. The Law Enforcement Department (LED) maintains order addressing (e.g.) illegal street vendor occupation along BUW. The Drainage and Sewage Department (DSD) ensures water quality, solid refuse collection, and flood protection (Drainage and Sewerage Department [DSD], 2017). Flood incidents are managed by the Disaster Prevention Department (DPD). Transportation, including waterway routes, falls under the jurisdiction of the Traffic and Transport Department (TTD). The Strategic and Evaluation Department (SED), Budget Department (BUD), and Financial Department (FID) handle policy guidelines, budget decisions, and financial control, respectively. Each of the 50 districts in Bangkok is overseen through District Offices (DIO), each comprising small sectors. Three of these are involved in BUW management. The resources and staff of its 50 districts have been agreed to be ordered by the Governor (Sevilla, 2012).

This institutional scale plays a vital role in shaping landscape change, as it determines who holds influence, from everyday users to key decision-makers (Bürgi et al., 2004). Meanwhile, Thailand's rigid institutional structure, along with its responsibilities and mandates, is widely regarded as fragmented. Punyaratabandhu critiqued the inflexibility of Thailand's institutions due to centralised decision-making and limited grassroots

Figure 1

The Structural Government Agencies Involved in BUW Management (Created by the Author)



participation. The study revealed BMA's insufficient capacity to address environmental crises, exemplified by the 1980 flooding incident, which the Prime Minister assumed control, sidelining the BMA. The study noted the lack of a single agency overseeing policy in Bangkok, with state enterprises operating independently. For instance, the NHA exclusively operated within Bangkok but was not in any way subject to the BMA's jurisdiction (Punyaratabandhu, 1985). Sevilla (2012) further highlighted the Decentralisation Act, enacted in 2000, which created urban units with limited powers. The distribution of staff across the 50 districts in BMA, including operational responsibilities, procedures, staff policies, and resource allocation, remains strongly centralised. The limited powers of the BMA remain, and it can only manage a fraction of the required refuse collection, parks, and recreation. Other public facilities and infrastructure investments are all handled by state enterprises. The land use plans in Bangkok are not well coordinated, often not aligning with provincial borders, and the BMA has limited influence in shaping the urban pattern because the challenges inherent to enforcing private land ownership remain (Sevilla, 2012). Webster and Manepong (2009) addressed the opposition of political favouritism between Bangkok and other provinces. Following the enactment of the Decentralisation Act in 2000, budget allocations were prioritised for all local authorities over the BMA, on the grounds that the BMA already possessed more extensive powers than other local governments (Webster & Maneepong, 2009). This paper will further explore the institution's performance in relation to BUW management, including its implementation in real-world practice.

Governance Influences (Un) Intended Change in Landscapes

Landscapes are not static (Stenseke et al., 2012) and cannot be easily managed by a single entity with distinct roles and responsibilities (Reed, 2008) in traditional government structures (Divay & Wolfe, 2002). In order to manage a complex landscape like urban waterways, it is important to understand the term 'landscape governance'. The 'governance' itself encompasses the interactions between government, local authorities, and various actors in civil society, including the private sector, community, and non-governmental sectors (Smith et al., 2014). The role of leaders is described here as an essential factor supporting effective governance (John & Cole, 1999), tackling complex problems (Sweeting, 2002) and fostering partnerships (Slater et al., 2007). Landscape governance refers to the decision-making processes and the associated frameworks, policies, and mechanisms used to manage complex landscapes (Görg, 2007; Jansson et al., 2019).

The governance of urban waterways extends beyond water management to include the surrounding landscape, emphasizing place-based considerations. It also plays a crucial role in shaping the living conditions of water-adjacent communities, particularly in areas marked by poverty and inadequate public services, as evidenced by the vulnerability of such regions (Innes & Booher, 1999). Governments often contribute to this situation by neglecting to deliver services in areas where land rights are unclear (Martine, 2011). A complex interplay between the need to conserve heritage sites and meeting the demands of growing tourism has occurred in many antique water cities worldwide (Harrison, 2013; Porfyriou, 2019), for instance, the ancient water towns in China named Tongli, Zhouzhuang, and Wuzhen (Porfyriou, 2019), or the water village named Kampong Ayer in Brunei (Azman et al., 2021).

Numerous studies in Thailand highlight the challenges in managing the urban landscape. Heritage management, for instance, has been studied for its lack of effective implementation in policy planning (Peerapun et al., 2020). Although the RC-ONEP's projects were approved in 1994, a number of residential areas were to be demolished, influencing social controversy. Less than 40% of the projects were implemented (Issarathumnoon, 2020). Clashes between the government and communities occurred despite the revised version of the Decentralisation Act in 1997, with local exclusion persisting, such as in the relocation of a traditional community along a historical waterway (Sirisrisak & Akagawa, 2012). Implementation efforts involved reordering areas—including those near historical

waterways—through the construction of walkways, dams, roads, and embankments (ONEP, 1994). These areas were transformed by government projects to serve tourists and urban populations, yet the developments overlooked the importance of local livelihoods and the everyday cultural significance of the waterways (Numsuk & Dempsey, 2024).

In the Thai context, long-standing class divisions have contributed to political and social inequalities deeply embedded in governance structures. This hierarchical dynamic became particularly visible not only in relocation projects within conservation zones, as previously discussed, but also in the flood management strategies. During the 2011 flood, the government prioritised protecting economically valuable and middle-to-upper-class areas, particularly in inner Bangkok, while rural and low-income communities bore the brunt of redirected floodwaters (Jular, 2017). When dykes failed, government responses, including the use of sandbags and temporary barriers, faced strong resistance from affected communities. In some cases, low-income residents protested by dismantling flood walls erected by authorities. These events exposed the severe social inequities and the fragility of democratic engagement in Thailand's governance (Marks et al., 2020).

Studies on flood management in Thailand have further highlighted widespread mismanagement, particularly due to poor decentralisation efforts, leading to unregulated land use and a lack of coordination between upstream and downstream authorities (Jular, 2017; Marks & Lebel, 2016). Key issues include the absence of accountability during critical decisions, such as the failure of river basin committees established in 2002 to integrate land use and water management effectively (Ratanawaraha, 2016). Misguided structural developments along the Chao Phraya River have worsened flood events (Aruninta et al., 2020), while reliance on rigid measures like floodwalls and sandbags has disproportionately harmed vulnerable communities (Marks et al., 2020). Additionally, the embankments built along the BUW by DSD have compromised their natural ability to serve as detention areas for excess water (Numsuk & Dempsey, 2024). This paper will further explore the process of landscape change through the BUW, underpinned by the research question: "How does institutional performance shape landscape transformation in Bangkok Urban Waterways?"

RESEARCH METHOD

The study examined the institution's sphere of management involving BUW, adopting a qualitative approach (Ritchie et al., 2013) to explore landscape governance (Görg, 2007; Jansson et al., 2019), which encompasses the intricate relationship between the BUW landscape, stakeholders, and management action (Oosten et al., 2018).

Semi-Structured Interviews

The data were collected from relevant stakeholders on an institutional scale (Bürgi et al., 2004) with semi-structured interviews (S3) (Adams, 2010; Rabionet, 2011) conducted with 29 participants (S1) between November 2021 and July 2022. Ethical approval was obtained prior to conducting the fieldwork. All individuals were chosen because their positions have (been) affected by, or caused, the BUW area, which included institutions to gain insight into their organisation's role in positions of power, their performance practices, and organisational routines (Merkus et al., 2019).

Case Study Approach

Communities along the BUW—namely the Sanseab Canal and Banglampoo Canal in eastern Bangkok—were chosen to study to gain insights into real-world practices and experiences related to the landscape. The communities included Banpantom, Minburi Upatum, and Talad Nongchok. Three BUW communities served as the case studies for this research (Yin, 2003). The location selection was made (Figure 2) according to the variation of landscape characters and the project implementation phase (S2).

1. Banpantom, originally an artisan settlement (1884) located near the Banglampoo Canal, was historically surrounded by waterways,

orchards, and marketplaces, inhabited by palace-affiliated craftsmen and officials (Shuchaiya, 2005). The waterway transformation began with road construction in 1939 and intensified after the decline of water-based craft activities in the 1960s. The community became part of a conservation zone and a tourism destination by the 1990s (ONEP, 1994).

2. Minburi Upatum illustrates the transformation from a prominent trade center along the Sanseab Canal (1911–1987) into a high-density residential district shaped by flood control infrastructure and the Transit-Oriented Development (TOD) Project (Town Planning Department [TPD], 2014). Historically characterised by agricultural settlements and rice mills, the area began to shift in function with the decline of water-based transportation (1915–1950s) (Town Planning Department [TPD], 1997).

3. Talad Nongchok, a market village located at a strategic waterway junction that included the Sansaeb Canal (1917), experienced a decline in commercial vitality as irrigation infrastructure developed (1904-1910) began to impede water-based transportation. Despite being zoned as agricultural land, the area has progressively evolved into suburban housing due to the ongoing pressures of metropolitan expansion (Suksawang, 2012).

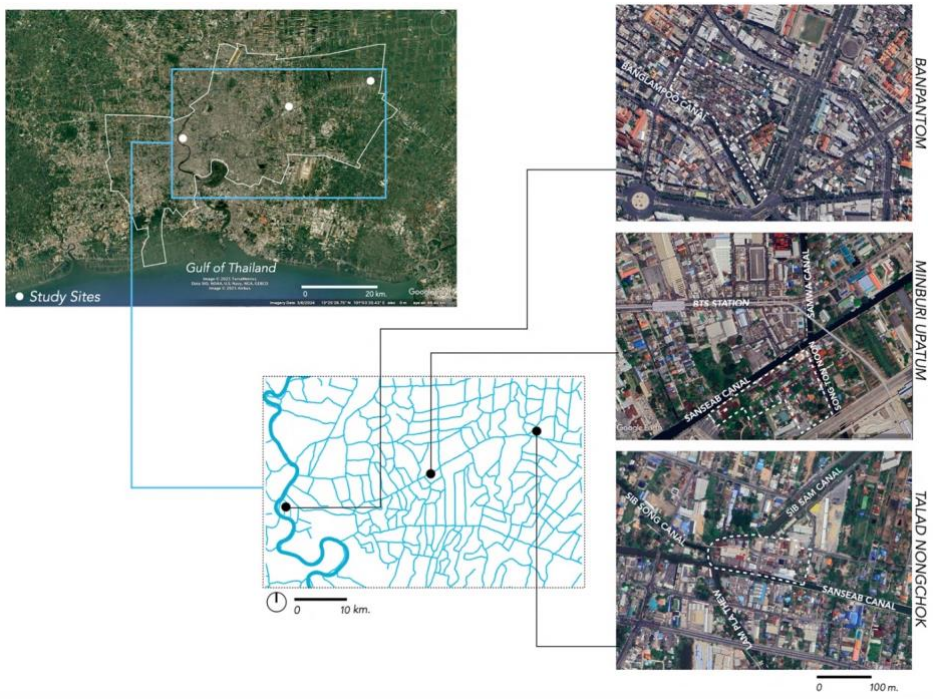
Walking Observations and Photographs Taken

The go-along interviews were used with residents, where the researcher and participants walked through the landscape while having interviews in the community spaces (Rishbeth, 2020). This outdoor-based, on-site method helped develop a rapport between residents and the researcher through places (Carpiano, 2009), i.e. BUW, encouraging a sense of connection with the study area (Stiegler, 2021). The fieldwork used photographs to document the physical and spatial patterns of landscape change in each community.

All interviewees, including semi-structured and go-along interviews, included government agencies (GA, n=7), experts and practitioners (EP, n=10), international agencies or NGOs (IA, n=2), and residents in three communities (RE, n=10). Interviews were recorded and transcribed before being analysed using thematic analysis (Braun & Clarke, 2020) through the abductive approach (Thompson, 2022).

Figure 2

The Study Site's Location (Created by the author)



Note. Adapted from *The Study Site's Location,* by Google Maps, 2023. Copyright 2025 by Google LLC.

RESULT AND DISCUSSION

Revealing the Unintended Change of BUW from Decision-Making

There has been an unintended transformation of BUW, resulting directly from management decisions that have controlled or, at times, eliminated BUW. Table 1 illustrates how the change of BUW has intertwined with the performance of Bangkok's governance.

BUW's environmental impact and flooding

The findings show that BUWs are controlled and disappear (d) and lack biodiversity (e), as demonstrated in Minburi Upatum. The flow of a remaining minor waterway in the community has been obstructed by the constructed embankment (Figure 3-b), accelerating poor water quality (e) and resulting in the absence of surviving organisms.

> *"…when the natural soil bank disappeared, the small fish could not survive [and] there are now only the non-native animals such as the Sucker Fish which survives in the low water quality."*
>
> (EP-06, personal communication, May 05, 2022).

Insufficient regulations (J) regarding wastewater management also exacerbate the decline in water quality.

> *"Most buildings around here [Minburi District] do not treat their wastewater before discharging it into the canal, and no agency regularly enforces strict regulations."*
>
> (RE-05 personal communication, January 13, 2022).

The fragmented management (A) of water flow during watergate operations in the Sanseab Canal degrades water quality, as closed gates restrict ventilation.

> "*In Nongchok, RID manages around 40 waterways, while BMA oversees three. Only RID can issue orders for RID-managed waterways; local DIO, DSD leaders, or the Bangkok Governor cannot act independently. This is why the watergate here rarely opens."*
>
> (RE-07, personal communication, February 28, 2022)

Most minor waterways have been covered (a, d) to make space for development or improve accessibility, as seen in Banpantom Community (Figure 3-c).

> *"…the government cannot interfere with the land belonged to the residents. So, they [GA] constructed the structure inside the canal instead."*
>
> (EP-09, personal communication, January 21, 2022)

Ironically, these minor waterways used to be the main means of access in the past.

The frequent occurrence of urban floods in Bangkok is unsurprising when water cannot flow through areas where the BUW network no longer exists, unlike the natural floods of the past**.**

> *"Historical flood events [in Talad Nongchok] involve a rise in water levels, surpassing the norm and reaching terrace levels, but receding quickly within a short span. The area where we reside has never encountered flooding impacts."*
>
> (RE-06, personal communication, May 22, 2022).

Due to time and fiscal limitations (I) in supporting the design capacity of structural measures, which are the only approach applied in flood protection, flood events continue to occur annually in Bangkok.

Figure 3

The Obstructed Visibility Flood Dike in Sanseab canal at Talad Nongchok

(a) (b) (c)

Note. (a), a minor waterway in Minburi Upatum used to connect to Sanseab Canal (b), a minor waterway used to run around Parinayok Temple through Banblampoo Canal (c).

Table 1

The Relationship of References From Interviewees Describing Performance in Bangkok Urban Waterways (BUW) Governance and BUW Transformation.

Performance of BUW Governance		**Landscape change of BUW**	(a) Structural encroachment	(b) Building re-orientation	(c) Owners and boundary change	(d) Waterways are controlled and disappear	(e) Poor water quality and absent biodiversity	(f) Diminished accessibility and visibility	(g) Change in impacts of inundation
(A)	Fragmentation management		/			/	/	/	/
(B)	Informative communication					/	/	/	/
(C)	Centralised power		/		/	/		/	/
(D)	Lack of autonomy				/				/
(E)	Absent in resident engagement		/		/	/		/	
(F)	Lack research implementation		/	/	/	/	/	/	/
(G)	Data limitation in decision-making		/			/	/	/	/
(H)	Different interest and limited knowledge		/			/	/	/	/
(I)	Time and fiscal limitation		/					/	/
(J)	Insufficient regulation and enforcement				/	/	/	/	/

The centralised strategy (C) to safeguard conservation and commercial districts from flooding has resulted in the redirection of water to other places, illustrated in Minburi Upatum. The flood event (g) in this community was caused by the decision to close certain watergates without any acknowledgement from the locals (Table 1). The 2011 prolonged community flooding, persisting for two months, further illustrates the DIO's lack of autonomy (D). Despite persistent communications from locals to the DIO, no remedial actions had been taken. This aligns with studies on inequality in Thailand and highlights how government decisions alter the natural landscape by ignoring the fundamental issue of flooding (Marks, 2020; Marks et al., 2020).

Land Ownership and Boundary Complexities in BUW

The land ownership and boundary changes (c) are evident in Talad Nongchok, where houses are settled along the edge of the Sanseab Canal. The ambiguity surrounding land ownership has contributed to the lack of government support for essential infrastructure, reflecting Talad Nongchok's characteristics as an improvised community, echoed in the literature (Martine, 2011). The complicated matter occurs when the DSD's efforts to define water bodies and land through embankments. This highlights the limited agency's knowledge and interest (H), as the standardised rule for enabling the drainage function of BUW is applied, oversimplifying the complex dynamics of the landscape (Numsuk & Dempsey, 2024). While the GA recognised an illegal encroachment and proposed a relocation effort to foster the embankment construction, the locals insisted on their legal rights.

> *"We used to rent, then bought the whole market [Talad Nongchok], including the [Sanseab] canal bank. But even though we own it, the properties along the canal still don't have deeds"*
>
> (RE-09, personal communication, July 12, 2022).

The BUWs are classified as public property, despite intersecting with privately owned land along the waterways, reflecting a common issue in urban areas (Laquian, 2011; Martine, 2011).

This complex situation in landownership unfolded in Minburi Upatum, where the community has always been excluded from TPD's policies (1997, 2014, 2020) and remains lacking in research implementation (F).

> *" Minburi Upatum was originally part of the governmental research (TPD, 2020) but got left out of the plan later, including the wastewater management project [Figure 4-a], because of unclear land ownership and slow communication with NOB [the deed's owner]."*
>
> (EP-01 personal communication, December 05, 2021).

This echoes the literature on challenges in plan implementation when various stakeholders are involved (Phi et al., 2015; Talen, 1996). The findings further illustrate boundary changes in Minburi Upatum, shifting from private to public access via the embankment walkways along the Sanseab Canal. Unfortunately, locals noted that the routes were inefficient, as they never connected seamlessly.

Inaccessibility and Disruption of BUW Utilisation

The findings indicate an absence of accessibility (f) with no means in BUW utilisation through the implemented embankment or roadway (a), evidenced across three BUW communities. The embankment hindered water flow in the Sanseab Canal through irrigation channels of farmlands in the Nongchok Area and hindered the local boat utilisation.

> *"Because we still used boats to transport, we invented the structure [Figure 4-b] to overcome the high embankment that prevented us from using the canal."*
>
> (RE-09, personal communication, July 12, 2022).

This indicates the lack of acknowledgment of locals' water utilisation in project implementation (Numsuk & Dempsey, 2024) and limited local knowledge in decision-making (Raymond et al., 2010).

The findings further reveal the data limitation in decision-making (G) when the construction company implies the typical dimension only from the documents without fieldwork observation in the Talad Nongchok, including no evidence of residents' engagement (E). This resulted in the extensive embankment height of the Sanseab Canal (Figure 3-a), overlooking the reliance on daily water needs. The resulting structures also reveal shortcomings in capacity and effectiveness, highlighted by the breakdown of the flood dike in 2019. While the GA attributes this damage to drought, residents argue it stems from the substandard structure and their exclusion from decision-making (E).

> *"We believe the structures were not the same as elsewhere, like in the [Sanseab Canal's embankment in the] inner city, because of the bribery. […] No compensation was provided to us despite our negative impac."*
>
> (RE-08, personal communication, December 08, 2021).

Figure 4

The Construction for Wastewater Management in Minburi Area

(a) (b) (c)

Note. (a), The stairs created by locals in Nongchok Neighbourhood for local boat usage (b), The inaccessibility to Banglampoo Canal in Banpantom (c).

A parallel of an absence BUW accessibility (f) unfolded in Banpantom and Minburi Upatum. Despite GA claims of repurposing, i.e., improving the area for public service, the structures along BUW impede permanent accessibility to the waterways. Instances echo in the Sabarmati Riverfront in India (Dempsey et al., 2017). Disagreements can arise when residents are not informed about upcoming projects. This lack of awareness often stems from agencies constructing structures within their own jurisdiction without adequately involving the local community. As a result, conflicts arise over ownership and the use of shared resources (Martine, 2011).

Barriers to BUW governance

Informational silos

Issues around different interests in decision-making (H) from distinct agencies persist in BUW management processes. Consider a scenario where a flooding issue arises in the Old Town Area, and the DSD is tasked with addressing it, while the FAD and RC-ONEP oversee this conservation area. Even though these government agencies have projects to improve the situation – one focused on drainage enhancement and the other on area preservation – the projects will proceed independently.

> *"We [FAD] received the project details from DSD. […] The embankment height was already decided. […] We received predetermined solutions. Our [GA] working process is shaped by the fact that we finalise all decisions within our agencies. We request budgets based on the explicit framework with our department names only*
>
> (GA-07, personal communication, February 28, 2022)*."*

These findings highlight one-way communication, where each agency has a different perspective on BUW and aims to achieve separate objectives, viewing BUW as a set of fixed problems, a common obstacle in environmental management (Collins & Ison, 2009).

This organisational decision-making reflects that informative communication (B) between agencies occurred only after their separate objectives were firmly established. This rigid, one-way communication was evident in Minburi Upatum. While TPD led the redevelopment project (TPD, 2020), various agencies participated through a consultant company, primarily to relay information.

> "*We [the consultant company] were the sole conduit for passing information to other GA. [...] I had to communicate with NOB, which took a very long time. […] We also contacted DSD because the project involved the Sanseab Canal—but only to relay data. TPD typically advised us on whom to contact rather than actively participating in discussions."*
>
> (EP-03, personal communication, January 07, 2022).

This highlights the inherent rigidity within the organisational structure, identified as a major logic of inaction (Dobson & Dempsey, 2021) – here, in managing BUW effectively.

Institutional Overlap in Sectoral Management

The fragmentation management (A) is evident through multiple agencies' involvement in managing BUW in the conservation zone, i.e., Rattanakosin. The Banglampoo Area, for instance, includes the FAD, RC-ONEP, DSD, and TPD. A different combination of agencies is involved for transportation-related matters: RID, DSD, and MAD. This wide institutional participation in Bangkok's heritage preservation (Prakitnonthakan, 2012; Tantinipankul, 2012) can create challenges in effectively managing the conservation area (Phi et al., 2015; Talen, 1996). This challenge is also reflected in Venice and its lagoons (Munaretto et al., 2012). The findings show that the drainage capacity improvement project in Rattanakosin, initiated by the DSD, encountered challenges in terms of waiting time and communication with FAD and RC-ONEP regarding the proposal to renovate the piping diameter. Eventually, DSD explored alternative solutions of such as raising flood dykes and installing additional pumps to enhance drainage capacity. *"We [DSD] couldn't waste time or budget digging in the dirt or waiting on archaeology like FAD suggested, so we focused on easier fixes like raising the dikes* (GA-04, personal communication, February 08, 2022)*."* This echoes the sectoral management or traditional government structures (Reed, 2008) (Figure 5-Left).

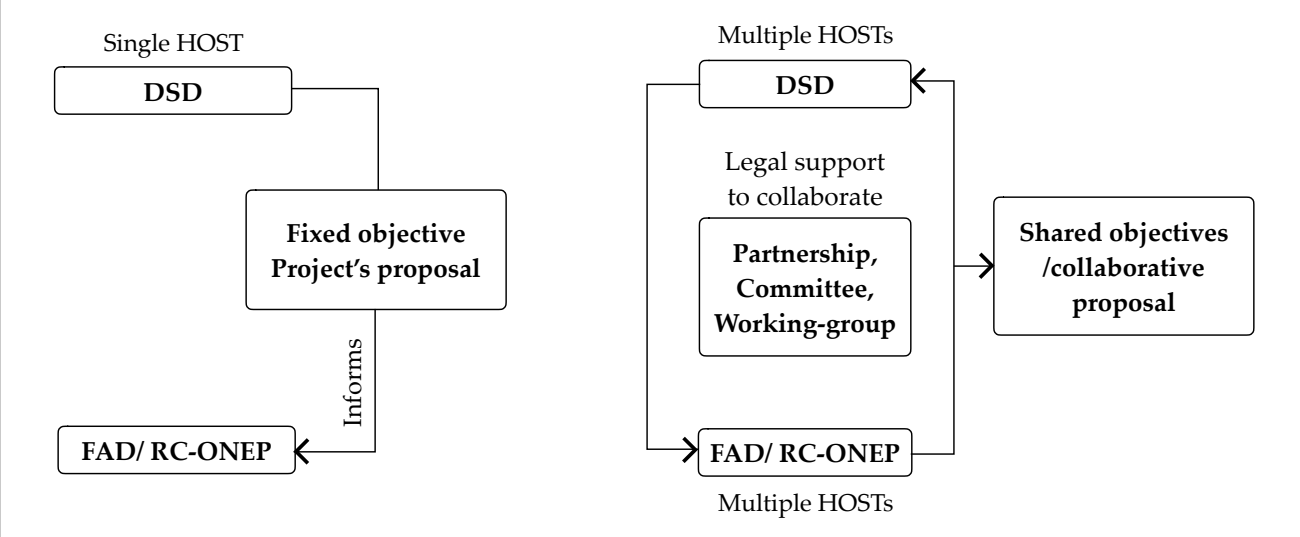
Governmental BUW management involves various agencies; however, plan implementation ultimately relies on the DSD as the primary agency for taking action, often defaulting to conventional actions, e.g., drainage channels. This reflects the limited knowledge in decision-making (H). The findings indicate that overlapping responsibilities within traditional government structures (Reed, 2008) hinder the effective management (Sevilla, 2012) of BUW. These findings highlight the need to reassess regulations, particularly the concept of a 'host' agency, which traditionally allows only one agency to take on this role. Figure 5 (Right) suggests an opportunity to enhance knowledge sharing, especially in understanding landscape elements of waterways, rather than focusing solely on drainage capacity.

Neglected Community Voices

The findings reveal a strained relationship between agencies and residents during the participation process**.** On the one hand, policy documents and rhetorical statements from government agencies portray resident engagement as adequate.

Figure 5

The Existing Communication Process (left) and Potential Collaboration Emerging From the Findings (Right)



> *"RobKrung Canal, for example, is under the Governor's policy. The project would have never occurred if the residents weren't complaining in that area […] All projects under scrutiny must undergo a participation process at least once."*
>
> (GA-06, personal communication, May 22, 2022).

However, the empirical evidence highlights persistent limitations, demonstrating that resident engagement remains ineffective (E). This can be explained by Arnstein's ladder of participation (Arnstein, 1969). The "informing rungs" or one-way information is evident in Minburi Upatum, where locals were notified about the construction of treatment piping at Sansaeb Canal, despite the project excluding local properties. In Banpantom, residents were instructed to remove their carts and commercial activities from the roadway along the Banglampoo Canal to facilitate tourist attractions as outlined in preservation plans. As noted in the literature, such heritage preservation efforts in Bangkok often neglect local livelihoods (Jhearmaneechotechai, 2022). Although framed as development, these projects have disrupted local access to economic opportunities, a pattern also observed in Brunei (Ahmad, 2013).

The findings show that only community leaders across three communities are included in project consultation without any matters, reflecting how residents have limited influence on decision-making, i.e., the placation rung (Arnstein, 1969).

> *"They [GA] did talk to our leader to inform the project to construct this structure [of treatment piping in Sanseab Canal] despite it did not connect to our wastewater piping in the [Minburi Upatum] community."*
>
> (RE-07, personal communication, February 28, 2022).

The findings further indicated that agencies frequently perceive residents as potential obstacles to project implementation and tend to exclude them from decision-making processes, reflecting the barrier of extensive and lengthy negotiation (Sevilla, 2012).

In Talad Nongchok, locals had no clue about what DSD was proposed for flood structure measures in their community area.

> *"They [GA] never consider our viewpoints. They [GA] rely on the input of only a select few when making important decisions. […] Our community's longstanding presence and information spanning centuries were completely overlooked."*
>
> (RE-09, personal communication, July 12, 2022).

The findings further indicate the deficiency in local autonomy (D). While residents complained to the DIO about the excessive height of the embankment and appealed when it broke down, the GA persists in maintaining construction to "protect Bangkok as a whole". The DIO's lack of response is attributed to the project being commissioned by the BMA, presumably as part of the national flood management strategy, further reflecting the centralised decision-making (C). This absence of local involvement is extensively echoed in the literature on Thailand's flood management (Julár, 2017; Marks & Lebel, 2016).

The Need to Reform BUW Management

The findings underscore that BUW—understood as dynamic landscape elements—are not meaningfully acknowledged in practice, as seen across the implementation of governmental projects in three communities. The DSD primarily focuses on drainage capacity without directly engaging with waterways as landscape systems. In Talad Nongchok, which RID is involved, canals are primarily regarded as irrigation channels rather than integral landscape elements. Similarly, FAD and RC-ONEP treat historical waterways as static heritage objects rather than adopting a holistic landscape perspective. Although the Banglampoo Canal is adorned with heritage features through conservation efforts and serves as a tourist attraction, the embedded waterways, integral to natural systems and community relationships, are largely overlooked. Despite distinctive characteristics of three study sites, the findings reveal that the DSD consistently applies conventional drainage knowledge across all waterway interventions.

Figure 6

The Current Working Structure of the Government Agencies Relating BUW

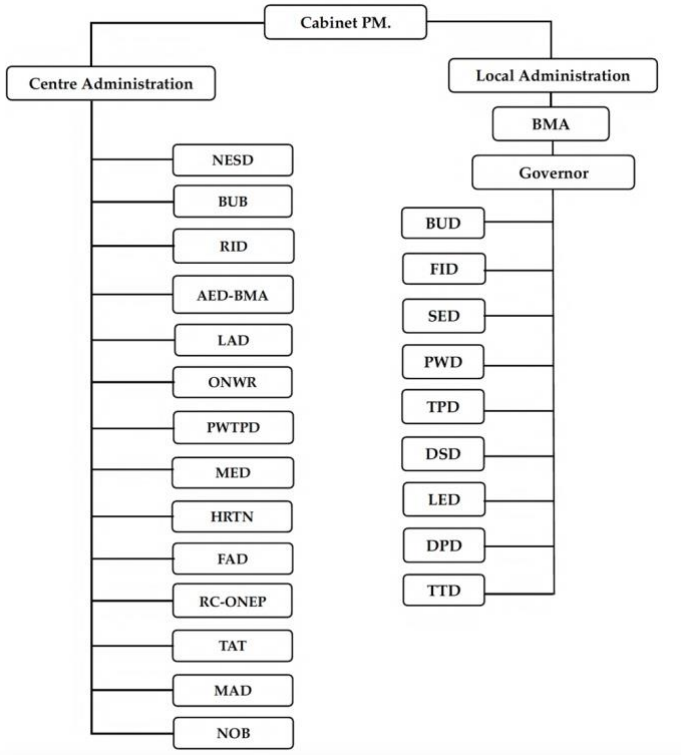
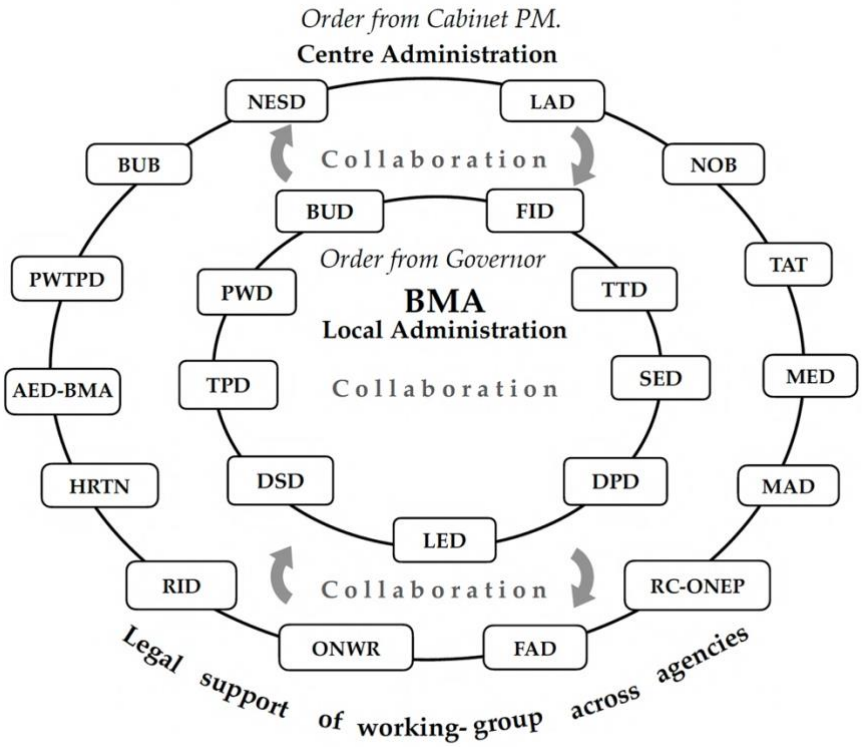


Figure 7

The Potential Collaborating Work, Emerging From the Findings



The fragmented management (A) of BUW highlights the need for improved communication and collaboration (Jular, 2017; Nair et al., 2014; Saito, 2014). This echoes the notion of landscape governance, which reflects the management of a complex landscape (Görg, 2007; Jansson et al., 2019), as exemplified by BUW. The current conventional governance structure (Reed, 2008) (Figure 6) should be reoriented toward a non-boundary, holistic, and collaborative model—a landscape approach (Figure 7) (Stenseke et al., 2012). This shift is crucial for addressing the limited knowledge (H) and data constraints (G) in decision-making, as evidenced by governmental projects that focus exclusively on water bodies with little to no consideration for place-making, and vice versa. Therefore, this necessitates moving beyond the rigid, one-size-fits-all approach of treating every BUW solely as a drainage channel.

The informative communication (B) between (e.g.) FAD and DSD, driven by efforts to improve flood impact in the conservation zone (Figure 5-Left), underscores the need for effective leadership within the BUW management system to foster collaboration (Figure 5-Right). This includes Thailand's Prime Minister, whose significant influence enables key collaborations and the appointment of shared hosts, as well as the Bangkok Governor, who could facilitate seamless communication among BMA departments. The GA could overcome time and fiscal limitations (I) by leveraging the legitimacy of shared objectives through collaboration.

The absence of resident engagement (E) in cases such as Banpantom and Minburi Upatum, where only community leaders participated in public hearings, demonstrates the need for more meaningful engagement, which involves creating opportunities for residents to participate in dialogue and decision-making processes (Arnstein, 1969; Reed et al., 2008; Reed, 2016). Notably, the position of local knowledge could be of interest, ensuring that the needs and perspectives of local communities are properly integrated (Raymond et al., 2010). This can also be strengthened through the accountability of the local agency (D), namely DIO, which maintains the closest connection with local communities. By leveraging this relationship, the DIO can help counteract the effects of centralised decision-making (C) and limited local autonomy, issues that are evident in both the flood impacts experienced in Minburi Upatum and the exclusion of local voices in the flood dyke project in Talad Nongchok.

Although the Minburi Projects (TPD, 2020) aimed to redevelop the Minburi Upatum Community, evidence shows that locals were excluded, highlighting a lack of research implementation (F). The findings reveal that consultant companies were hired only after the project's objectives had been set, making their role ineffective in communicating with locals and ensuring practical effectiveness. This underscores the need for third parties to take a more proactive role in the process. Instead of adhering to traditional procedures, they should facilitate collaboration between private and public stakeholders, forming partnerships (Slater et al., 2007). These third parties can play a pivotal role in empowering local communities (Laquian, 2011) and facilitating the knowledge integration among stakeholders.

CONCLUSION

This research provides empirical evidence that fragmented institutional responsibilities and misaligned infrastructure planning have significantly shaped the negative transformation of BUW, with adverse effects on both ecosystems and local livelihoods. These landscape changes highlight the influence of governance, particularly Thailand's long-standing centralised bureaucratic structure and the proliferation of sectoral agencies. Across all three case studies, the waterways have not been treated or managed as integrated components of the urban landscape.

The study highlights the significance of expressing the interplay between management actions and landscape transformation. Without a comprehensive understanding of how institutions drive landscape change, efforts to prevent or mitigate degradation may remain stagnant. A deeper examination of political and institutional structures that contribute to management inefficiencies is recommended to inform more effective reforms and enhance the long-term sustainability of BUW.

The paper further proposes that collaboration among stakeholders using a landscape approach should be normalised in Thai governance rather than treated as an exception. This is crucial in addressing the complex challenges in Bangkok's contemporary urban environments. The involvement of third-party actors, such as NGOs and academic researchers, emerges as a promising mechanism for fostering cross-agency knowledge integration and advancing holistic governance approaches in the Thai context. Further research is needed to examine their formal roles and institutional legitimacy within existing governance structures.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material; Table S1: List of the interviewees; Table S2: The variation of landscape characters and the project implementation phase for site selection; and Table S3: List of questions for interviews. Further inquiries can be directed to the author.

DISCLOSURES AND ACKNOWLEDGEMENTS

I sincerely thank Dr. Nicola Dempsey from the Landscape Architecture Department at the University of Sheffield for her significant contribution in supervising this research. I also extend my gratitude to all participants, including academics, practitioners, NGO representatives, local residents, and government agency staff involved in waterway management in Bangkok, Thailand, for their valuable contributions during the interviews.

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