

The urban political ecology of worsening flooding in Phnom Penh, Cambodia: Neopatrimonialism, displacement, and uneven harm

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ABSTRACT

This paper investigates worsening flooding damage recently experienced in Phnom Penh, Cambodia. Contrary to Cambodia government leadership assertions that these floods have been caused by climate change, the study adopts an urban political ecology framework to uncover their actual underlying causes, which are rooted in political decisions, economic interests, and prevailing power dynamics. We argue that three processes have significantly contributed to the adverse flooding outcomes. First, rapid and uncoordinated urban land transformations have exacerbated flooding, disproportionately benefiting the economic elites. Second, inadequate governance of waste management systems and flood protection infrastructure has further compounded flooding. Last, state-sanctioned land reclamation projects of lakes and wetlands, which favor business and political elites, have displaced the urban poor and rendered the city, but particularly this group, more susceptible to flooding risks. All these processes are linked to Cambodia's neopatrimonial political economic system, and are sustained by informal practices, coercion, and financial profits for elites. The urban poor tend to suffer the most, facing displacement risks and worsening vulnerability to floods. Our research transcends the rural-urban dichotomy, revealing the interconnectedness of this system across different contexts, including the influence of illicit gains from land enclosures on development. It also aims to contribute to international debates by highlighting that flood damage and losses are not solely caused by climate change but are also shaped by political-economic factors specific to each location.

1. Introduction

In the past few years (2020–2024), Cambodia has experienced heavy flood damage. For example, in 2020, floods killed at least 43, affected more than 800,000 people, and damaged more than 160,000 houses. The following year floods adversely affected more than 45,000 households, killing 11, and forcing almost 3000 families to evacuate, including over 1000 in Phnom Penh, the nation's capital. In 2022, over 85,000 households were impacted by floods, with 15 deaths occurring. While flooding affects various parts of the country, Phnom Penh, home to 2.3 million, has been arguably affected the most, and is thus the focus of this article. According to recent Global Surface Water data, floods in Phnom Penh grew in both spatial extent and frequency from 1985 to 2021 [1].

The city's recent flooding is not surprising, given the country's long history of seasonal flooding due to its monsoon climate and low-lying position in the Mekong River Basin. However, damage from flooding has increased beyond historical norms. In March 2023, Cambodia's Prime Minister Hun Sen attributed the unprecedented recent flooding to climate change [2]. Similarly, in October 2020, he described the heavy flooding that year as a "natural disaster," caused by "too much extra water," labeling it "a natural disaster" (quoted in Ref. [3]). While the UNDP (2020) has acknowledged Cambodia's vulnerability to climate change, government leaders in Cambodia have deflected responsibility for policies and practices that increased flood damage by blaming climate change and natural factors [4,5].

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In this article, we address these issues using an urban political ecology framework. We argue that recent flooding in Phnom Penh is primarily a result of specific types of urban development driven by political decisions, economic interests, and unequal power relations, rather than solely climate change. Moreover, we contend that vulnerability to floods is unequally distributed across the city's geographic and social landscape, with residents of informal settlements being particularly vulnerable. Further, these conditions are largely attributable to the country's neopatrimonial political economic system, which combines an outwardly rational legal structure with networked personal patronage connections that often, in practice, override the legal structure.

To make this argument, we focus on three processes that have contributed to these outcomes. First, rapid and uncoordinated land use changes have exacerbated flooding, disproportionately benefiting the country's tycoons (*okhna*) at the expense of others. Second, weak governance of waste management and flood-protection infrastructure has further intensified flooding. Lastly, in exchange for loyalty and material benefits, the state has enabled the filling of the city's lakes and wetlands, allocating these prime pieces of land to business and political elites. This in-filling has displaced and hurt the livelihoods of many urban poor communities and heightened their flood vulnerability. We contend that the unequal and worsening flooding damage is largely a consequence of Cambodia's neopatrimonial regime, which operates within the formal structures of the state while simultaneously fostering informal patronage-based alliances and resource flows ([6], p. 34).

This article makes a novel contribution as the first to examine the political ecology of flooding in Phnom Penh, and to engage with how climate change is sometimes used, particularly in poorer countries that are not major emitters of greenhouse gases, by powerful politicians to deflect criticism of their own decision-making processes concerning environmental governance. Previous studies have explored how land use changes and hydrological factors contribute to flooding in Phnom Penh [1,7], while others have discussed the disproportionate impact of floods on the urban poor (e.g., [8]). However, to our knowledge, no studies have investigated how Cambodia's neopatrimonial system has created uneven flood risk in its capital and largest city.

We aim to address this gap by building upon previous literature on Cambodia's political ecology [9,10]. Additionally, we extend the work of Thuon [11] on Cambodia's urbanisation by engaging with theories of the state while contributing to the broader literature on urban political ecology of flooding in the global South [4,12,13]. In Southeast Asia, scholars have similarly examined the relationship between urban land grabbing and reclamation projects and capitalist transformations in cities such as Vientiane (Chen and Kenney-Lazar 2024) and Hanoi [14]. We further seek to link the emerging literature regarding patrimonialism and clientelism in increasingly authoritarian Southeast Asia to urban flood vulnerability in Phnom Penh (e.g., [15]; [16]).

2. Literature review

2.1. Urban political ecology of flooding

Urban political ecologists argue that disasters are not simply outcomes of biophysical processes but also political decisions, economic interests, and power relations. Building on David Harvey's (1973) notion of cities as constantly evolving landscapes of inequality, urban political ecology (UPE) sees cities as historical hybrids shaped by co-evolving biophysical and socio-political processes laden by uneven power relations. The political economy of urban space production determines who can access and mobilise scarce resources, such as flood-protection infrastructure, or access to higher land, while marginalising others to spaces with high exposure [17]. UPE theorists contend that exposure to the risk to hazards, including floods, is spread unevenly across city topographies, and is heavily influenced by power relations ([18]; [19]). They also reject the separation of urban areas from nature, asserting that urbanisation fundamentally transforms natural environments, and that the two are crucially intertwined.

Thus, floods do not simply occur because of one-time 'external' incidents, such as heavy rainfall, but also arise from the interactions with socio-environmental processes, some of which emerged long before the event, such as those that affect land use change [20]. Therefore, analyses of floods needs to consider how these processes affect floods and whether they compounded vulnerability [21]. Moreover, vulnerability to floods is not only determined by exposure but also coping capacity. Coping capacity shifts over time and is shaped by "the broader structural political economy that stratifies society, enabling some while disabling others, providing for some while excluding others" ([22], p. 679).

This approach highlights how unequal economic and political power shapes flood vulnerability. In many cities, state and market institutions have protected the lives and the interests of the elite while neglecting or worsening the risk for the marginalised [23]. Since the state normally undertakes measures to reduce its citizens' vulnerability to floods, such as by erecting flood-control infrastructure and creating land use plans, the state potentially plays a key role in determining the vulnerability of marginalised groups due to floods. However, the state is neither an impartial actor nor monolithic but is comprised of many actors with differing interests. In numerous countries, elites have leveraged state resources to reduce their vulnerability while, in some cases, increasing that of others [24]. For example, in Calcutta, flooding impacts worsened when private developers, abetted by the state's neoliberalisation, commodified at-risk land [25]. UPE thus seeks to uncover the complex socio-environmental factors that produce unequal urban vulnerability to floods.

2.2. Clientelism, patrimonialism and urban floods

In the 1970s, political scientists introduced the concept of clientelism to explain the distribution of resources within some societies. Clientelism describes a mutually beneficial exchange, where a higher-status patron provides protection or benefits in return for the lower-status client's support and services [26]. Scott [26] argued that clientelism has been prevalent in Southeast Asia, including in Cambodia's traditional and contemporary political systems. Initially applied to local and urban politics, the concept was later used to

depict less-developed countries as patron-client pyramids, with the national leader at the top [27,28].

Patrimonialism, as defined by Weber [29], is a governance system where a state's leader holds authority to appoint and control the administrative and military apparatus. This system closely aligns with clientelism, as administrative positions become a valuable reward that patrons can distribute to their clients [27]. Neopatrimonialism is thus a mixed system of rule which has a "rational-legal veneer overlaying a web of personalistic ties characteristic of patrimonial rule" ([27], 40). Scholars have noted neopatrimonial systems in Cambodia (So and Un 2011) and countries such as Bangladesh and various African nations [30,31].

Recently, scholars have examined how clientelism and neopatrimonialism affect urban floods. Coates and Nygren [15], through case studies of Brazil and Mexico, argue that clientelism perpetuates unequal exchanges of favours as the basis of state power, leading to repeated cycles of environmental degradation and worsening flood risks. Scholars have also suggested that large-scale land acquisitions, facilitated through clientelist connections and often in violation of land use plans, exacerbate flooding [32,16]. This form of urbanisation benefits well-connected developers while increasing flood vulnerability for at-risk groups [33]. In cities such as Manila, Jakarta, and Bangkok, unregistered communities near water bodies have frequently been evicted, with the justification that their settlements worsen flooding by encroaching upon waterways [34–36]. However, shopping malls and high-end real estate developments encroaching upon waterways have rarely been blamed or evicted by the state [37].

Roy [38] argues that urban governance in many cities, including Phnom Penh, is shaped not by formal planning but by informal, deregulated processes of resource management, particularly regarding land. This means land use, ownership, and its purpose are often not bound by formal regulations but are uncoordinated and exist in a state of deregulation. For example, Cambodian elites have played crucial roles in facilitating major urban developments that benefit foreign investors and their associated elites, thereby subverting normative land-use planning processes [39]. Similarly, in Brazilian cities this informality has led to what Holston (1991) calls "the misrule of law" or an "unstable relationship between the legal and illegal". Consequently, in such cities, the absence of enforced plans and regulations creates conditions where neopatrimonial regimes can flourish.

2.3. Cambodia's neopatrimonial political ecology

Cambodia offers an illuminating case study for examining the effects of neopatrimonialism on urban floods due to its elite-dominated political economy. This system centres on patronage networks where elites and tycoons, with state backing, exert control over the economy through crony business deals. Former Prime Minister Hun Sen, who was in office for over three decades, and his son Hun Manet, who succeeded him in August 2023, lie at the core of these networks, which the father has carefully cultivated [40,41]. In exchange for loyalty to the ruling Cambodia People's Party (CPP), which is headed by Hun Sen's family, and associated material benefits, political, military, and business elites receive exclusive access to valuable resources—forests, minerals, land, and sand—along with government positions and lucrative licenses [42]. Thus, access to the state becomes the main avenue for this ruling class to accumulate wealth [43]. This neopatrimonial system relies on informality and secrecy, with resources distributed through informal and covert patronage networks. Overlapping laws and blurred lines between legal and illegal practices, as well as state and private interests, further enable this pervasive informality [44].

Besides Hun Sen's family, another significant group of key actors in Cambodia's political landscape are the *okhna*, roughly translated as tycoons. These business elites have made large donations (easily exceeding \$US100,000) to the government, serving as a political dowry that signals their commitment to the CPP. In return for obtaining *okhna* titles, they receive exclusive although often informal state privileges and favours, including impunity, monopolies, land concessions, and, in some cases, appointments as Senators and government advisors. Even after their initial donation, they are expected to contribute to the CPP's electoral funds [10,45]. Hun Sen's family, in turn, continually negotiates with the *okhna* and military elites to maintain its position [44].

CPP patronage networks permeate Cambodia's bureaucracy, giving the party dominance over national and local government agencies [42]. This control has led to the politicised bureaucracy, characterized by low levels of transparency, excessive top-down leadership (e.g., 11 Deputy Prime Ministers and 1422 secretaries or undersecretaries of state [46]), underfunding, staffing shortages, poor interagency coordination [47], and widespread corruption—all of which impede policy development and effective governance [48], including in the water sector [49]. Patronage dominance also limits leader accountability to the public and civil society. Instead, accountability primarily exists between patrons and clients [42]. In Phnom Penh, these political-economic factors—including informality, patronage, the interests of the *okhna* and political elite, and limited accountability—have worsened flooding, disproportionately affecting the urban poor while benefiting the elite.

3. Methods

This research draws upon a combination of documentary content analysis and qualitative interviews. The first author conducted 25 semi-structured interviews between December 2021 and May 2024 (see Appendix A). He used a combination of key information interviews and snowball sampling (interviewing people recommended by previous interviewees) to conduct 18 with respondents from four sectors: private sector, government, international donors, and civil society. He also conducted interviews with seven community leaders of informal settlements who have recently experienced significant flood damage. Most interviews were conducted in person but a few were conducted online. A limitation is that government officials, at both the national and municipal level, refused multiple requests. Overall, we found that 25 interviews were sufficient to obtain meaningful results. Research indicates that data saturation often occurs within the first 12 interviews [50], as was the case in our study. Mason [51] asserted that sample sizes of 20–30 interviews are typically adequate for thematic analysis. In addition, the article benefits from the second author's extensive experience of over three decades conducting research in Cambodia, which helped contextualise the interview and documentary information collected

during the study.

Qualitative methods are suited for evaluating different perceptions of the causes and consequences of Phnom Penh's floods in an urban context, which often ignores inequalities in official narratives. The first author asked interview questions underpinned by two unifying themes: (1) perceptions of the underlying causalities and consequences of flooding in Phnom Penh; and (2) the effects of domestic politics on flooding. We triangulated our interview findings where possible through qualitative documentary analysis (journal articles, books, and media content). This documentary content analysis was conducive to comparing perceptions of flooding, its effects, and its socio-political causes that do not lend toward statistical analysis [52]. Interviews were conducted in English or were translated from Khmer into English.

4. The drivers of the City's worsening flooding

Due to its location on an alluvial plain that sits at the confluence of the Mekong, Tonle Sap, and Basaac Rivers, Phnom Penh has long experienced seasonal floods. However, flooding in the past was a critical source of wealth in the form of aquatic resources, which greatly benefit from flooding each year. Floods can originate from heavy monsoon rains, recurring storms, or high-season water overflowing from the Tonle Sap and Mekong rivers, or a confluence of these sources. However, historically, flooding was mediated by the city's numerous naturally-formed lakes, wetlands, and surrounding rice fields [53], which also benefit aquatic resources important to the livelihoods of people.

Recently, vulnerability to flooding has been heightened by uncurbed land use change, insufficient drainage and wastewater infrastructure, and the in-filling of water bodies, largely due to a dramatic increase in land values in Phnom Penh over the last few decades [39]. As a result, the risk to pluvial flooding has increased in recent years [1].

4.1. Unrestrained urbanisation

The first major cause of increasingly damaging flooding in the city is rapid land use change. Between 1973 and 2015, the total urban area of Phnom Penh expanded eightfold, increasing from approximately 3100 ha to 25,400 ha. The pace of urbanization has intensified, with an average annual addition of 1000 ha of built-up area between 2000 and 2015 [7].

During the early 2000s, Cambodia experienced economic stability, triggering a real estate boom in Phnom Penh that continues to this day, although prices dipped for a period in the late 2000s [39] and again during the COVID-19 pandemic. Overall, however, the city has witnessed the fastest-growing land prices in Southeast Asia since 2000 [54]. Beginning that year, there was a rapid expansion of local residential projects, with these developments targeting the middle to upper classes. Local developers, who have become more professionalised, spearheaded these projects, often funded by the economic elite who sought to profit from the booming real estate sector [55]. The investments made by the elite were often derived from various activities, including agribusiness, logging, land speculation inside and outside of Phnom Penh, import-export ventures, and sometimes from illicit activities facilitated by state officials [56]. Consequently, some of these real estate projects have served as vehicles for money laundering [39]. As a local non-government organisation (NGO) representative asserted: "They [the elite] don't need these [real estate] projects to be successful; they just need their money to be laundered" (3).

In the second half of the 2000s, Phnom Penh experienced a second real estate boom. The value of new projects skyrocketed US\$500 million in 2003 to US\$3.2 billion in 2007 [57]. Similar to many other cities in Asia [58], the government's deregulation and privatization of urban governance created favourable conditions for both foreign and domestic developers to undertake large-scale real

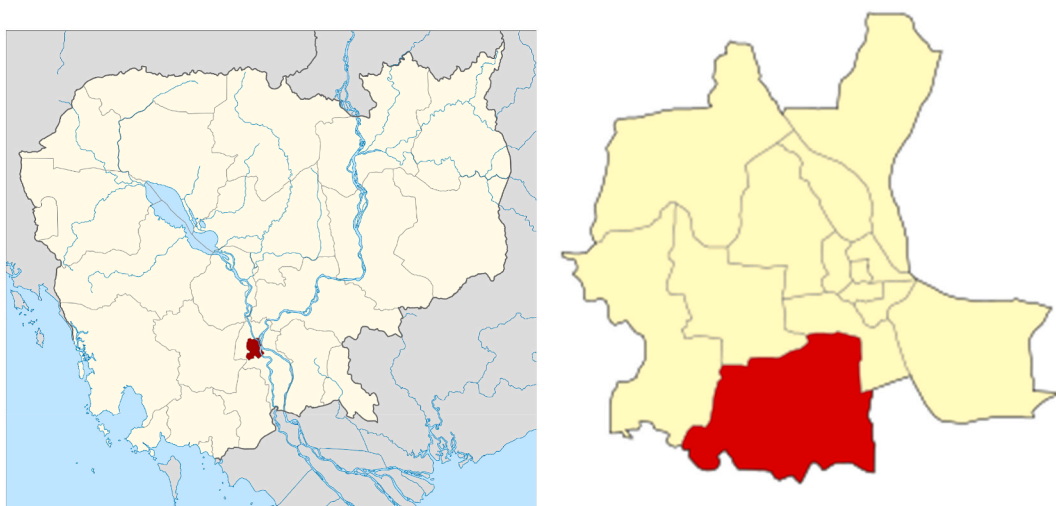


Fig. 1. Map of A) Phnom Penh within Cambodia and B) Dangkao district within Phnom Penh.

estate projects, including gated housing estates known as *borei*. Similar to the first wave, corporate actors, including the *okhna*, played a central role in financing and constructing these projects [39,59]. These megaprojects accounted for almost 7 % of the city's total area [55].

In the 2010s, a sub-decree allowed foreigners to own up to 70 % of private units in co-owned buildings, spurring developers to focus on high-rise condominiums in Phnom Penh's central and peri-urban districts. From 2010 to 2017, about 53 % of building permits were for new condominium projects [55]. Demand largely came from foreign investors—mainly Chinese, but also Taiwanese and Koreans—seeking investment opportunities or a means to transfer funds out of their home countries, with some involvement in money laundering [39]. As an international NGO head explained, “Some of the Chinese don't even come—they just buy the condos from China” (17). These properties were often unaffordable for most locals, targeting the Chinese market specifically (17; [60]). Many construction sites also facilitated international money laundering. Chinese investors “are going halves with Cambodian.” For example, “if it's a \$10 million project to fund a construction site on paper but in reality, it's \$2 million in costs and this leaves \$8 million in free money.” He added that “many of these sites are half-finished and always ‘under development’” (7; see, also, [39]).

The real estate boom has driven significant land use changes, especially in Phnom Penh's peri-urban areas. From 1998 to 2008, the peri-urban population grew by 300,000, while the central areas saw a modest increase of just 1000 people [8]. This spatial expansion was partly fueled by households relocating to suburban *borei* developments. Many residents sold their central city properties, benefiting from rising prices, and moved to more affordable peri-urban areas. Lower land prices in these zones also attracted developers to build large-scale residential and commercial projects [60].

Over the past half-century, Phnom Penh expanded haphazardly with minimal land use planning (19). Although the government introduced the ‘2035 Phnom Penh Master Plan’ in 2015, it lacked specifics on spatial growth and land use, such as district-level land use types. The city also has a limited regulatory framework to manage growth effectively. Legal loopholes and political cronyism have further enabled development projects [7]. Large contracts have often been awarded directly to companies owned by government members, bypassing the tender process, as in the Boeung Kak development case (discussed below). These practices highlight the close ties between the CPP, the state, and business elites, which play a key role in the city's urban expansion [61]. As such, this sector exemplifies the dynamics of the country's neopatrimonial system.

This pattern of unregulated urban sprawl has heightened the city's vulnerability to flooding. The extensive paving of previously agricultural land and wetlands for roads, residential, commercial, and industrial buildings has disrupted natural flood retention processes, reducing water infiltration, increasing runoff, and accelerating water flow into drainage channels [8]. On land with natural ground cover, about 50 % of precipitation infiltrates the soil, whereas in fully paved areas, only 15 % does [62]. Moreover, private-sector-led urban expansion has neglected essential urban components that provide public goods, such as green spaces, which may not yield immediate profits [63].

A notable illustration of the impact of land use change on worsening flooding can be seen in Dangkao District, situated on the southern outskirts of the city (Fig. 1). In 2021, in this area severe flooding affected approximately 3200 families across 10 communes (sub-districts). Hundreds of households had to evacuate, and around 1000 families built temporary shelters [64]. One elderly evacuee declared: “My children could not go to work. They all stayed home. We don't have boats for crossing” (quoted in [65]). Two leaders of



Fig. 2. Trash in a canal in Russei Keo district (a northern district), Phnom Penh in March 2022 (source: [71]).

informal communities in Khvet and Baku villages described the floods as they worst they had ever witnessed. Residents faced property damage, challenges in accessing drinking water, and losses of personal belongings (12, 13).

Before Cambodia's real estate boom in the early 2000s, residents of Dangkao had always experienced seasonal flooding, but rarely heavy flood damage. An INGO head who lives in Dangkao explained: "Dangkao used to be a rice field. Now the land has been filled in to be a residential area. We can clearly see where the water goes" (2). The rapid population growth and land use change in Dangkao and other peripheral areas has outpaced the development of flood infrastructure. Flood control and drainage projects, primarily supported by the Japanese International Cooperation Agency (JICA), are mostly concentrated in the inner district, leaving, peri-urban areas without adequate floodwalls and drainage systems [8]. Moreover, exposure is uneven in these areas because *borei* developers have elevated them with sand and clay, causing floodwater to flow to lower areas, including informal communities (*ibid.*). The city's unregulated real estate boom, particularly in peri-urban areas, has not only intensified the city's overall disaster risk but also made it more unequal. The state plays a crucial role as a mediator, influencing both land use and the distribution of risk [66].

4.2. Drainage-blocking waste and limited flood-protection infrastructure

Another significant contributor to the worsening floods is the city's inadequate drainage system, which stems from inadequate waste collection and underinvestment in drainage infrastructure. The head of a local NGO working on water management stated: "[T]he waste is not managed well and goes into the sewage and blocks the drainage" [of stormwater] (1). Another head of a local NGO concurred: "You can see a lot of trash blocking the sewage system" (2). A former JICA official who worked on flood management added that for "the construction of buildings, they [construction companies] mix concrete and dump it into the drainage system" (10). The dumping of concrete slurry in the city's drains blocks stormwater because the city's sewage system is a combined system which not only transports liquid waste but also drains excess stormwater. Specifically, the city's rising unmanaged waste has resulted in many drainage pipes becoming clogged [67].

The city's canals, like its pipes, have also become clogged with trash (Fig. 2). Although the municipal government claims to collect 10,000 tons of waste from the canals each year, it admits that this is only a fraction of the total waste polluting these waterways [68]. In March 2022, a spokesman for Phnom Penh City Hall acknowledged that floodwater drainage was slower due to garbage clogging the sewers and canals, but he shifted the blame onto residents who dump their trash into these waterways [69]. Similarly, in May 2022, the commune chief of Phsar Depou Muoy in Tuol Kork District, attributed the exacerbation of flooding in his commune to garbage [70]. A local journalist who has investigated this issue explained: "When there's heavy rain, it's bad – the trash makes the canal stuck" (22). He added that the government wants to remain popular so "it doesn't fine those who throws their trash into the canals. Further, although the municipal "government has enough money ... it doesn't devote funding to clearing trash from the canals" (22).

Both the interviewees and our document analysis have attributed the city's mismanaged waste to the government. An NGO worker proclaimed: "The government hasn't done anything about for a long time" (1). Since 2002, with a hiatus from 2019 to 2021, CINTRI, a private firm known for its poor performance, has managed the city's waste, but 36 % of the city's low-income communities reportedly lack waste collection services [72]. Many outer districts have also been underserved since 2013 when the city expanded to include three new districts, leading to sporadic service for some communities. Consequently, many residents resort to burning waste or disposing of it in public areas or waterways, which blocks drains and exacerbates flooding [73]. A local journalist who has reported on this issue concurred: "In the outskirts of the city, you see more trash than in the inner city" (22). Additionally, pervasive water hyacinths in lakes surrounding the city often choke these bodies of water, further increasing flooding [74].

The underlying cause of the city's poor management system is once again its neopatrimonial system. According to an Asia Foundation report, CINTRI is reportedly "politically protected," having "control of guaranteed revenues irrespective of performance" ([73], 24). The company receives a fee derived from peoples' electricity bills, regardless of the service provided. Further, its contract with the government is confidential, making it difficult for third parties to monitor [73]. After receiving numerous complaints, the city government suspended their contract in 2019 but two years later renewed it and gave contracts to two other companies (Mizuda Sanitation Cambodia and 800 Super-GAEA) to manage the city's waste. The three companies, therefore, currently manage the city's waste jointly [75].

Further exacerbating the city's limited drainage capacity, the government has failed to upgrade the drainage system. An NGO leader stated: "Many sewage drains are old and small," having been constructed based on the city's previous master plan when the population was smaller and fewer people lived in flood-prone areas (2). Instead of improving drainage, the government has prioritized road infrastructure, due to increasing traffic congestion, which often obstructs natural water flow and prolongs flooding. Only four central districts have sufficient drainage systems, supported by the JICA, which has focused on building drainage channels, sluiceways, and pumping stations [68]. In contrast, peri-urban areas have developed without adequate flood-protection infrastructure, such as dykes and drainage systems [76]. In their absence, developers have elevated the land of *borei* in these areas, leading to increased flooding in low-income communities situated on lower-lying land, where residents often cannot afford to raise their land (9, [8]).

The city's mismanaged waste and inadequate drainage infrastructure is clearly contributing to uneven vulnerability to flooding, with low-income communities being the most affected, as they tend to live in the lowest lying and most vulnerable areas. They also typically do not have the capital to buy fill to raise up their own areas. Additionally, due to their location in lower-lying areas, stormwater tends to flow towards these spaces. During floods, the water not only consists of rainwater but also contains human waste overflowing from the city's pipes [67], posing significant health risks to residents [8]. This subsection clearly illustrates how the combination of the country's neopatrimonial system and weak state capacity increases the city's flood risk, emphasising the importance of local development decisions in determining outcomes, over broader global factors such as human-induced climate change.

4.3. Filling in of lakes and wetlands

A third and likely the largest driver of Phnom Penh's recent flooding is the filling in of the city's lakes and wetlands. One study found that from 1990 to 2015, 6000 ha of lakes and wetlands were reclaimed for urban land use and that by 2015 this was reportedly the largest source of land reclamation (such as compared to agriculture) [71]. As of 2024, 16 lakes had been completely filled, 10 partially filled, and no lakes remained untouched [77]. For instance, Boeung Kak, a 133-ha lake located in the inner city, was completely filled in 2008. Another study revealed that from 2018 to 2023, including during the COVID-19 pandemic, developers accelerated the filling in of two major lakes, Boeung Tompun and Boeung Tamouk, at an increased rate. The latter experienced particularly rapid infilling during this period, with an annual loss of nine per cent [78].

Most lakes and wetlands have been filled in order to construct high-end condominiums, shopping malls, and other commercial developments [79]. This in-filling has worsened flooding because these lakes previously played the important function of absorbing excess fluvial and pluvial floodwater. Many interviewees concurred on this. For example, a former international NGO official stated: "Before we had many lakes that could save Phnom Penh from flooding. Now we don't have them" (8). Exacerbating the reduced drainage capacity from the infilling is that the city has limited public parks and other green spaces, particularly in its inner districts [80].

Under Cambodia's 2001 Land Law, public lands such as lakes can be leased through concessions. It is considered to be state-public land [81]. In 2006, the government issued Royal Decree No. 339 to facilitate land reclamation. This decree allowed the government to classify state property as both state-public and state-private, enabling the leasing of state-private land to private interests [82]. According to the decree, for state-public land to become state-private land, it must no longer serve the public interest and must have lost its value in providing public services [83]. Thus, according to a Ministry of Environment official, the government has "followed the legal procedures step by step" from making the lakes "state-public to state-private." (23; [84]). However, according to numerous interviewees, the legality of these procedures is questionable, since, for example, "a lot of people depend on Boeung Tamouk's fisheries and growing morning glory there" (8). However, the state has been able to proceed with these actions due to a compliant judiciary that has consistently favoured the ruling party [45].

Through this procedure, those at the top of the state have allocated valuable urban land to the elite, often through 99-year leases [63]. A Ministry of Environment official explained: "Powerful people are able to do this [acquire land underneath the lakes] – those who have connections. It's not possible for a normal person to do this ... [these people] are running in a circle." This form of neopatrimonialism appeals to the political elite because, as an NGO official aiding the urban poor explained, this land is "easy and cheap real estate. The government also doesn't want to evict people [on a mass scale]." Filling the lakes with sand is also inexpensive (4), although sand mining to acquire this sand is having its own negative impacts in the ecology of the Mekong River [85]. In any case, the same official emphasised that due to a "link between investors and politics," these land reclamation projects are unlikely to "go bankrupt" (23). Patronage extends to selecting companies responsible for sand filling projects, with those like Global Green Energy, linked to *okhna* Try Pheap, and Hero King, owned by the wife of *okhna* Ly Yong Phat, actively involved in these ventures [79]. Both are notorious cronies of the CPP, involved in logging, sand mining and large-scale land grabbing [86,87].

Boeung Kak Lake was one of the first major lakes to be filled, with Shukaku Inc., owned by influential CPP senator Lao Meng Khin, awarded a 99-year lease for US\$79 million. This led to the eviction of over 4000 low-income families living along the lake [88]. A *Mongabay* investigation found that Boeung Tampung and Cheoung Ek wetlands, originally covering 1500 ha, have significantly shrunk (Fig. 4), leaving only 156 ha as legally state-public land, with the rest allocated to developers [79]. Senator Ing Bun Hoaw has benefited greatly, as his Ing City development acquired over 2500 ha, much of which was previously part of the lake and wetlands. Hun Sen's family also profited through their joint ownership of a luxury condo company that obtained land within the lake area. Additionally, the Japanese company AEON, which has built its third shopping centre within Ing City, is collaborating with Ing Bun Hoaw. By 2022, most of the approximately 1000 households around the lake had either relocated or been evicted [79]. AEON has distanced itself from these evictions, claiming it is simply constructing a mall on land already leased under the Ing City project (4).

The size of Boeung Tamouk, located in the northern part of the city, was originally over 3200 ha (Fig. 5). However, 2152 ha, or about two-thirds of the lake, were opaquely reclassified into 'state private land' private and subsequently sold or gifted to state institutions or private individuals without any public consultation [89]. The Cambodian elite set to benefit from land ownership in this increasingly attractive real estate area includes several prominent individuals. *Okhna* Kim Heang has received 30 ha, while CPP senator Kok An, known for his involvement in tobacco trading, has been granted 155 ha. A business associate of the prime minister's daughter received 67 ha. High-ranking military and police chiefs are also among the beneficiaries, along with Chea Sophamaden, the daughter of the Minister of Land Management. Additionally, as reported by the local media outlet VOD, Choeung Sopheap, the wife of Lao Meng Khin, and pop star Preap Sovath have been allocated land [79,90,91]. In contrast, over 225 families living near the lakeside, who depend on fishing and aquaculture, are at risk of eviction due to ongoing land reclamation [79].

Like the other two drivers, this form of water grabbing [92] created clear winners—those who have acquired the high-value land beneath the lakes. While lakeside communities, primarily poor residents, gained easier access to urban amenities, their livelihoods have suffered as they previously depended on the lakes for fishing and growing morning glory. The reduction of wetlands and lakes in the city has adversely affected residents by worsening flooding in areas that otherwise would not have been less impacted. It has disproportionately affected the poor living in low-lying, vulnerable areas, therefore highlighting how disaster risk creation—shaped by power imbalances through urban transformations—is both uneven and unequal [20]. Here we can see how the neopatrimonial system is leading to unevenness with regards to who is the most impacted and who is benefiting from the decisions being made. The next section provides a detailed exploration of how these drivers have intensified flooding for vulnerable, low-income communities.

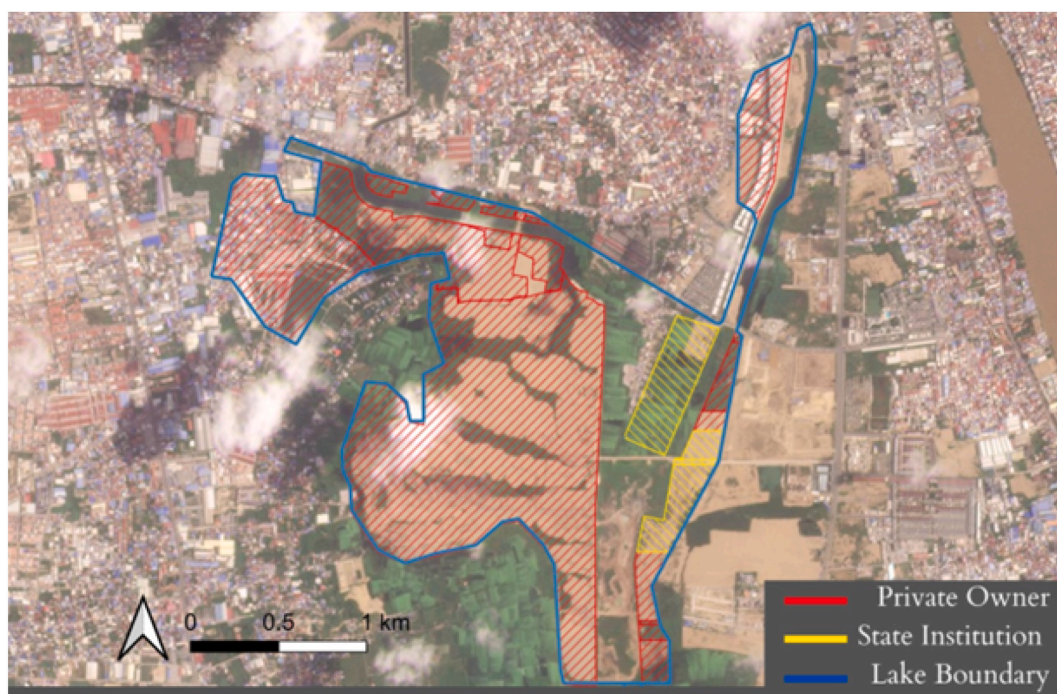


Fig. 4. Ownership and filled in areas of Boeung Tompoun, a lake in the centre of the city (source: [79]). The red area shows how much of the lake has been given away to private owner.

5. Worsening flooding inflicted upon the urban poor

While middle-class and upper-class *borei* residents were also affected by flooding in 2020 and 2022, they were generally better equipped to cope with losses due to their greater assets, and also to their greater access to government support. But also, as a long-time NGO official with expertise of Cambodian development issues asserted, “flooding is generally less” in these areas because “rich people live on high land and poor people live on low land.” Although the city is mostly flat, *borei* developments are typically situated on higher land, as developers often raise them using clay or sand to fill the foundations of townhouses and condominiums. Consequently, “mostly the poor are more affected than the rich by floods.” While they are “aware that they are the most vulnerable,” they “don’t have power to do anything about it” (3).

Interviews with community leaders in informal settlements support this argument. For example, the Preah Takong 3 community, located alongside the former Boeung Tompoun Lake, has experienced persistent flooding during the wet season. Residents have lived there since 2000 without land titles, working in factories or construction and earning \$100–200 per month. The construction of a *borei* owned by a member of the ruling family has worsened flooding in the area. As one leader explained, “When they [the developers] put down big construction blocks for the condominium, it destroyed our drainage system,” and the elevated land means “water cannot flow.” Previously, “there was no flooding,” but now it can rise “up to 1.5 m” or “at neck-level.” The developer pressured residents to sell their land, but they refused because, as the leader stated, “I cannot afford a new house with that price” (9). The community’s flooding issues are further compounded by the municipal government’s failure to collect garbage, leading residents to dispose of waste outside, which raises floodwater levels and pollutes the water. The adverse effects of flooding include children being unable to attend school, loss of work due to caregiving, and damage to belongings like motorcycles, pillows, and furniture.

Another informal community, Preay Takhom 1, was formerly located along Boeung Tompoun but is now situated next to sandy land that had yet to be filled as of December 2021. Floodwater in their community has become “dirtier” because the lake, which previously absorbed and cleansed wastewater, is no longer there. This has led to sewage mixing with floodwater, causing some residents to experience “itchy skin” and illness. Additionally, community members have lost income and had to change jobs, transitioning from vegetable growing and fishing to roles as waste collectors, construction workers, and factory employees. Some former fishers and vegetable growers have also left the community due to a lack of livelihood opportunities (17).

Two informal communities in Chbar Ampov District, which straddles the Mekong and Bassac Rivers, have also been severely affected by flooding. Considered rural a decade ago, this area has rapidly transformed into one of the city’s fastest-growing regions [93]. A leader from the Chamreab Community near Chbar Ampov Pagoda asserted that new buildings have blocked floodwater from flowing back to the river. The water has become “stuck” due to developers filling land by the river, whereas previously, floodwater would flow “through the gates back into the river.” At least 20 households experience flooding annually, leading to health issues like increased rates of influenza and diarrhoea, compounded by unpleasant odors from wastewater discharged by a nearby *borei*. Despite discussions with authorities, the leader stated that “nothing changes” because officials “receive money from the *borei* owners” (16). In

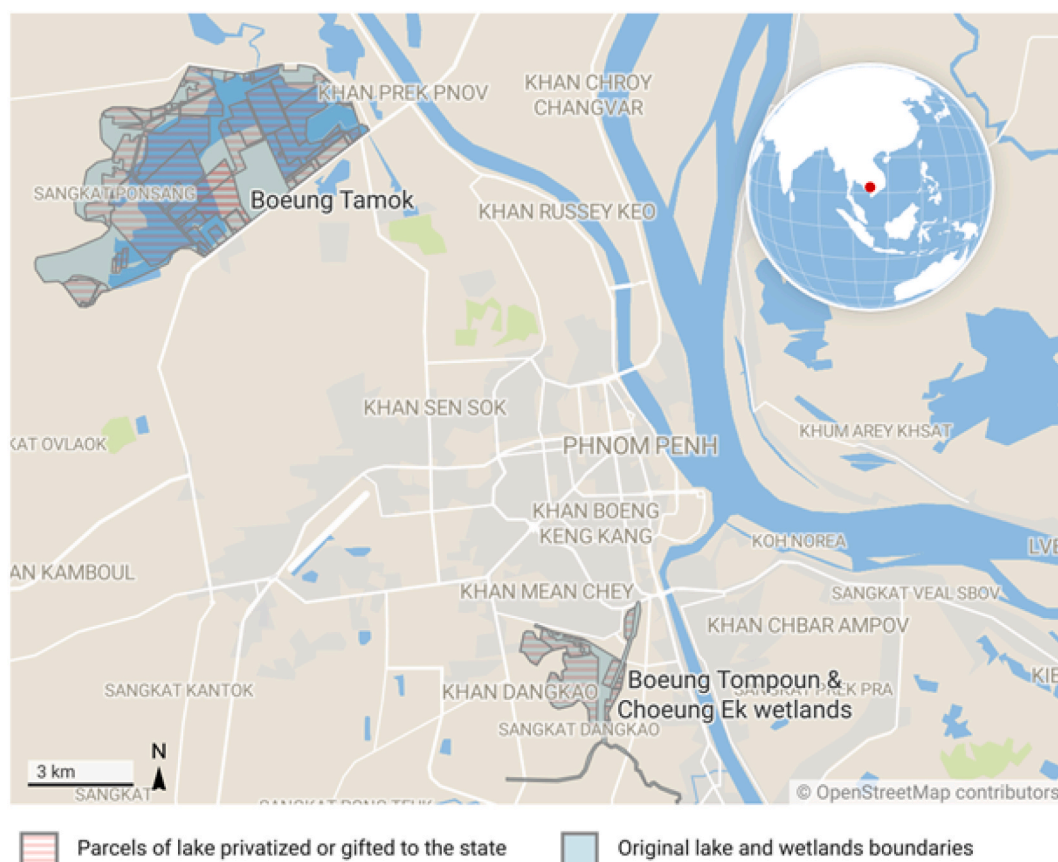


Fig. 5. Map of Boeung Tamouk and Boeung Toupoun which show in red the amount of land privatized (source: [79]).

the nearby Smal San Community, flooding lasts for three months during the rainy season, with residents, including children, suffering from illnesses such as diarrhoea and dengue fever. The community leader explained that the prolonged flooding is due to the land being low and lacking drainage, leaving "water with no place to go. This land is low" (15).

Many communities, particularly those near the lakes, have already experienced displacement. Studies show that only a small fraction have obtained land titles, resulting in ongoing tenure insecurity and enabling evictions [94]. In many instances, these communities have been resettled in outer areas where they face challenges such as limited livelihood opportunities, inadequate housing, and insufficient compensation. These outer areas also offer minimal flood protection, as previously discussed. Alternatively, some displaced individuals have moved into existing informal settlements where they have personal connections, leading to increased overcrowding and additional waste discharge, which further worsens flooding conditions (19).

Consequently, the urban poor have become increasingly vulnerable to floods due to a combination of political-ecological factors, including land use change, land reclamation projects, and development-induced displacement. This section, therefore, demonstrates that their coping capacity is shaped by the broader political economy of the city, which has excluded them from the benefits of urbanisation (cf. [22]). As exemplified by the case of Chamreab Community, the poor have sometimes sought to reduce their vulnerability through advocacy and negotiations but often lack sufficient legal and political power to be able to alter the city's urbanisation and its shifting geography of flood risk.

6. Nature of power shaping flooding outcomes in Phnom Penh

This section explores how the country's power structure has shaped flood governance, enabling the elite to profit from urban changes while causing greater harm¹ to the urban poor. One key underlying factor is the prevalence of informality, legal ambiguity, and obfuscation. The city's master plan is, for example, "very vague" and even the Ministry of Land Management lacks a detailed version (2; [61]). Moreover, the example of the filling in of the city's lakes demonstrates that these acquisitions, like other land deals in the country, are often conducted through "complex arrangements that are legal unclear and rather opaque" ([60], 187). As a former donor representative stated: "There are a lot of overlapping laws and regulations. One ministry says one thing, another ministry says

¹ In the context of this article, "harm" refers to the damage and losses caused by flooding.

another" (10). This legal ambiguity fosters a network of informal relationships and undisclosed land transfers [42], while simultaneously weakening flood governance.

Another key power dynamic worsening flooding is the concentration of power among the elite, both vertically and horizontally. Historically, the Phnom Penh municipal government has been underfunded and lacks significant autonomy [53]. A municipal official noted that "everything is very centralized. The Phnom Penh City Hall is only an implementer; it doesn't have the power to create its own regulations." He further stated that "all decisions, including the filling of lakes, are made at the top level" (20). Sectoral ministries that could mitigate flood risk are similarly weakened, with most power concentrated: "Most of the big decisions are made by one man" (2). This high degree of concentrated power enables not only the "arbitrary nature of sovereign power" ([95], 22) wherein laws are bent to suit the needs of those at the top but also coercion which often operates against the public's interest [41], as evidenced by reshaped geography of the city's flooding. Rather than addressing public grievances, the regime has chosen to suppress them, evidenced by the arrests and threats against activists and community leaders protesting the city's poor wastewater management and lake infill practices [76,96].

This concentrated power can persist as long as the elite remains a cohesive unit and continue to personally benefit from these resource acquisitions. The distribution of land beneath the lakes, the awarding of contracts for new real estate developments, and sand-filling contribute to the preservation of the state's neopatrimonial system. As a local NGO official explained, "Some sons and daughters of ministers are getting the land [underneath the lakes]. Giving them this land is a way of initiating them" (4). Another added, "Politics is connected to building houses; the lakes are also connected to politics. Tycoons [*okhna*] and high-ranking officials make the money" (1). This patronage must be seen in the context of the succession from Hun Sen to Hun Manet, a period considered the weakest point for the Hun family (24). There was also a succession in the tycoon class (*okhna*) and Ministries, with many of their children assuming power. Granting land to the children of these allies was a way for Cambodia's ruling family to maintain patronage ties and reduce the risk of instability.

Another key strategy to depoliticise flooding in Phnom Penh has been to remove the electoral threat to Hun Manet's reign due to the repeated dissolution of opposition parties, the harassment of civil society and community leaders and co-option of opposition leaders, former journalists, and NGO leaders (25, [86]), even as "flooding has now become a political issue" (14). These strategies have allowed the CPP to operate "with complete immunity and a lack of rule of law" (3). Consequently, Cambodia's political elite can continue to shape the city's materiality and flood risk unequally and unfairly ways, enabling them to strengthen their patron-client relations, which are foundational to the neopatrimonial system that is key to preserving the regime's power.

7. Conclusion

An urban political ecology framework challenges the discourses used by Cambodian political leaders who attribute worsening floods solely to climate change, and thus people outside of Cambodia, since Cambodia is not a major emitter of greenhouse gases at a global scale. Our analysis reveals that the increasing vulnerability of Phnom Penh residents to floods, particularly the urban poor, is much less driven by climate change than by various political-economic factors, including changes in the city's built environment. Similar findings have been found in other large Southeast Asian cities [4,16,35,97]. Floods are therefore understood as part of wider processes of uneven urbanization shaped by capitalism [98]. Thus, our analysis contributes to UPE's situated theory on how "urban environments are shaped, politicised, and contested" [99].

Rapid, unregulated land use changes in the city, driven by a real estate boom that primarily benefits the *okhna* and political elite, have diminished drainage capacity, especially in rapidly urbanising outer areas facing increased flooding. This issue is compounded by an inadequate drainage system due to insufficient state investment and the poor performance of a politically-protected waste management company, which has failed to collect waste in many low-income communities, leading to trash accumulation in canals and drainage pipes. Further, the state has enabled the conversion of lakes and wetlands—essential for floodwater storage and wastewater purification—into prime real estate for the elite, a move aimed at securing their loyalty to the Prime Minister. These processes are rooted in Cambodia's neopatrimonial system, maintained through informal practices, obfuscation, coercion, and elite financial gain.

Overall, our analysis makes three significant contributions at the intersection of disaster risk geographies and urban political ecology (UPE). First, we have demonstrated how Cambodia's neopatrimonial system, which has primarily been applied to understand socio-environmental changes in rural contexts [9,100], has also increased vulnerability to urban floods and made it more uneven. However, we have sought to transcend the rural-urban dichotomy by highlighting the interconnectedness of rural and urban and how Cambodia's neopatrimonial system generates uneven vulnerabilities throughout the country [101]. Past rural land acquisitions have been partially fueled by profits from urban land development [39], and the illicit gains of the *okhna* from land enclosures and deforestations in rural areas [102] have partially fueled the city's real estate boom and financed investments in former lake areas. Sand mined from the Mekong River that has been transported and used to fill these lakes, and this sand-mining is negatively impacting the Mekong River [85,103]. Moreover, there is an 'international political ecology' dimension [104] that contributes to the city's evolving 'hazardscape': China's 'authoritarian cooperation' with the Cambodian regime [87] has encouraged and facilitated Chinese real estate speculation in the city, including in areas which were previously lakes and green spaces. Our analysis, therefore, shows how extra-local factors compound disaster risk.

Second, our analysis reveals that while Phnom Penh as a whole faces flood risks, historical flooding was much less damaging, and more recent vulnerability has been distributed unevenly and unequally across the city, and has been produced through Cambodia's neopatrimonial system. The urban poor suffer the most from these processes, as they not only face the risk of displacement [105] but also experience greater exposure to flooding. Our research has revealed that the conversion of lakes and previously empty land into built-up areas has disrupted the natural flow of floodwater in their communities. Further, the lack of proper waste collection worsens

flooding but also makes the floodwater more harmful to these communities. As a result, this group suffers from various impacts, including illnesses, damage of possessions, damage to their homes, and the inability to work. Thus these development projects actively shapes urban precarity in the city—reinforcing power and privilege while undermining the spatial rights of the urban poor [106].

Third, we advocate for a more inclusive and comprehensive approach to flood governance, one that addresses the shortcomings of conventional engineering-focused strategies, and recognises that certain groups have been made more vulnerable than others. The neglect of non-structural measures, such as controlling land use and preserving natural water bodies, has exacerbated flood losses, particularly for certain vulnerable groups. While structural solutions have their place, our article highlights the importance of ecologically-based approaches that embrace living harmoniously with floods. Restoring wetlands, building sustainable urban drainage systems, and allowing rivers more room to spread offer promising alternatives. Political and economic solutions are equally critical. The urban floodplain should be reimagined as a space where all communities can come together and flourish [107]. Policies must reduce the exposure of vulnerable groups, such as by upgrading flood-protection infrastructure in communities, while building their capacity to cope through livelihood support. Participatory policy processes are needed to ensure inclusive decision-making. Finally, recognising the state's limitations, the urban poor should take proactive steps to reduce their vulnerability by organising initiatives like community-based early warning systems, social safety nets, and advocacy for fair relief and recovery support during floods.

Flooding can create opportunities for communities to demand recognition of their land rights and advocate for alternative models of property relations and urban development [108]. Thus, strengthening connections between rural and urban civil society movements could be a promising way forward. Consequently, further research is needed on effective strategies to foster such connections would be valuable and to examine the political ecology of flooding in other Cambodian cities. However, without a fundamental shift in the underlying political-economic dynamics, including recognising and working to reduce the neopatrimonial nature of Cambodia's political system, flooding is likely to persist as a problem in the foreseeable future, regardless of the influences of climate change.

CRediT authorship contribution statement

Danny Marks: Writing – review & editing, Writing – original draft, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Ian G. Baird:** Writing – review & editing, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Interviewee Information

Interview #	Identity	Date(s) interviewed
1	Local NGO senior official #1	Dec 6, 2021
2	Local NGO senior official #2	Dec 8, 2021
3	Local NGO midlevel official	Dec 13, 2021
4	Local NGO midlevel official	Dec 14, 2021
5	Head of social enterprise working on water-related solutions	Dec 14, 2021
6	Senior official of political party	Dec 15, 2021
7	Local journalist #1	Dec 16, 2021 & 22 May 2024
8	Former international NGO senior official	Dec 17, 2021
9	Informal community leader #1	Dec 19, 2021
10	Former international donor agency senior official	Dec 19, 2021
11	International donor agency senior official	Dec 20, 2021
12	Informal community leader #2	Dec 22, 2021
13	Informal community leader #3	Dec 22, 2021
14	Local NGO senior official #3	Dec 23, 2021
15	Informal community leader #4	Dec 26, 2021
16	Informal community leader #5	Dec 27, 2021
17	Informal community leader #6	Dec 27, 2021
18	Informal community leader #7	Dec 28, 2021
19	International NGO senior official #2	Jan 3, 2022
20	Phnom Penh municipal official	Mar 23, 2022
21	Real estate developer senior representative	Jul 8, 2023

(continued on next page)

(continued)

Interview #	Identity	Date(s) interviewed
22	Local journalist #2	Jul 9, 2023
23	Ministry of Environment midlevel official	Jul 14, 2023
24	Cambodia-based think tank official	May 23, 2024
25	International NGO midlevel official	May 23, 2024

Data availability

The data that has been used is confidential.

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