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Emma Colven



Southeast Asia Working Paper Series

Paper no.2

May 2022



SOUTHEAST ASIA
Research at LSE ■

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Published by

Saw Swee Hock Southeast Asia Centre
London School of Economics and Political Science
Houghton Street
London
WC2A 2AE
seac.admin@lse.ac.uk
www.lse.ac.uk/seac

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Private Developers and Splintered Ecological Security in North Jakarta

Emma Colven

International and Area Studies

University of Oklahoma

729 Elm Ave, Norman OK 73019

E-mail: emmacolven@ou.edu

Abstract

Jakarta, Indonesia, has gained much attention in recent years owing to its vulnerability to tidal flooding, its fragmented water supply, and unsustainable practices of groundwater extraction. In this paper, I ask: *how does Jakarta's water crisis shape the feasibility, profitability, success, or failure of property development? How does the real estate industry understand, and respond to this crisis?* To answer these questions, I draw on in-depth interviews with consultants and bureaucrats, as well as an analysis of secondary sources relating to water and property to present two preliminary findings from research conducted thus far. First, property buyers (investors and end users) and private developers appear to understand and evaluate environmental and financial risk very differently. Second, while state efforts to secure water supply and flood protection for the urban majority have been hampered for various political, economic, and financial reasons, private developers have the capacity to insulate their developments from environmental (and therefore financial) risk and promise ecological security to property buyers. In examining developers' responses to the water crisis, this paper provides insights into "splintering ecological security", which is actively created in tandem with acts of financial and environmental speculation, with implications for residents well beyond the walls of these bounded enclaves.

Key Words: Speculative urbanism; real-estate; water crises

Acknowledgements: This research was supported by an Early Career Award from the Regional Studies Association. A Visiting Fellowship with the Saw Swee Hock Southeast Asia Centre provided the support and space to develop the ideas presented here. I thank Wahyu Astuti for her research assistance. This paper could not be written without her.

Introduction

Despite the risks of encroaching seas and intensifying weather-events, waterfront property and land in coastal cities have retained their value. Illustrating this trend, Indonesia's capital city of Jakarta has become a poster child for climate risk as one of the world's "fastest sinking cities" (Mei Lin and Hiyadat, 2018) at the same time as the coastal region of North Jakarta continues to undergo intense speculative development (Colven, under review). This is particularly striking given researcher Henri Andreas' now widely circulated and cited prediction that as much as 95% of North Jakarta could be submerged by 2050, if land subsidence continues at the current pace (Mei Lin and Hiyadat, 2018). Jakarta experienced major flood events in 2002, 2007, 2013 and 2020. Beyond the risk of tidal flooding worsened by high rates of land subsidence (Abidin et al., 2011) and rising seas, flooding is also caused by heavy rains during the monsoon season, as the city's stormwater drains, canals, and rivers are overwhelmed. Additionally, access to clean, affordable water across Jakarta is highly uneven and the city faces the prospect of future water shortages.

While the impacts of these interconnected water crises on Jakarta's residents and the community strategies they mobilise in response have been well documented (Betteridge and Webber, 2019; Irawaty, 2018; Padawangi and Douglass, 2015; Rahmayati, Parnell, and Himmayani, 2017; van Voorst, 2016a, 2016b), we have comparatively little knowledge of how the real estate industry is affected by and responding to these environmental risks. This paper therefore examines how Jakarta's water crisis impacts the actual existing practices of the real estate sector. I ask: *How does Jakarta's water crisis shape the feasibility, profitability, success, or failure of property development? How does the real estate industry understand, and respond to this crisis?* Based on an analysis of fifteen semi-structured interviews with property consultants, bureaucrats, and other stakeholders conducted between 2019 in Jakarta and 2021 via Zoom, and a content analysis of relevant planning documents, real estate reports produced by consultancy firms, and media articles, I document the strategies used by private developers to mitigate against the impacts of flooding and threat of water shortages on their developments.

I situate this paper within a broader literature emerging in critical urban studies on the intersections of climate change and real-estate development that examines the relationship and contradictions between environmental and financial risk, devaluation, and profit. My findings indicate that private developers are investing in privatised water infrastructure and technologies to insulate their developments from the impacts of Jakarta’s water crisis, providing a private solution for property owners while outstripping the capacity of state agencies to provide such resources to the city at large. To theorise the impacts of this process, I draw on scholarship from critical infrastructure studies concerning “splintering/splintered urbanism” (Kooy and Bakker, 2008; Marvin and Graham, 2001) to argue that developers are contributing to the generation of *splintered ecological security* wherein some residents are largely insulated from the city’s water crisis, while those outside receive little protection or experience greater risk as a result of the securitisation of others. By bringing together scholarship on urban climate risk and real estate development, and critical infrastructure studies, this paper contributes to furthering our understanding of the contemporary dynamics of urban adaptation in a broader context of speculative urbanism. While most accounts engaging with splintering urbanism employ a historical approach to identify the origins of contemporary landscapes, I turn here to examine how splintered ecological security is actively created in tandem with acts of financial and environmental speculation.

These findings have implications for cities across Asia where a “real estate turn” (Shatkin 2017) has converged with transnational circuits of expertise promoting private sector involvement and capital in adaptation planning to produce a property-led adaptation regime, wherein property development and private property developers play a central role in delivering adaptation and ecological security. As I will argue, the privileging of private property development and rights is particularly consequential for communities without formalised property and land rights. Using private property to deliver adaptation normalises private property while extending ecological security from water crises (and climate risks more broadly) only to those who can afford formal ownership. This prospect is particularly problematic in cities like Jakarta, where semi-informal settlements provide a crucial source of affordable housing for the majority of residents but have been made vulnerable to evictions as states have framed these communities as “slums” (Irawaty, 2018).

This paper proceeds as follows. First, I critically evaluate the broader literature that informs my conceptual framework: scholarship on urban climate risk and the real estate industry, and critical infrastructure studies that interrogates the co-constitution of uneven access to infrastructure and highly fragmented urban landscapes. I then provide a brief description of Jakarta's hydroscape and contextualise the emergence of splintered ecological security. The main empirical section of this paper is organized around two parts. First, I examine how different actors - developers, consultants, and property buyers - 'know' and perceive environmental risk in Jakarta, which provides important insights into how intense urban development and investment continues in the especially precarious and risky coastal area of North Jakarta. Second, I examine the strategies that developers are using to protect their investments from the city's wider water crisis (which produce a splintered form of ecological security). These contrast to the extensive yet incomplete state efforts to realise flood mitigation infrastructure and provide residents with water supply. I conclude the paper by reflecting on the implications of splintered ecological security for coastal cities and their residents, and what the case of Jakarta tells us more broadly about the impact of a property-led adaptation regime on urban political ecologies.

Urban Climate Risk, Property and Profit

Urban Resilience and Private Property-Led Adaptation Regimes

Coastal cities are now widely recognised as vulnerable to climate change. In response, a smorgasbord of institutions and networks - a "global urban resilience complex" (Leitner et al., 2018) - has emerged to promote urban resilience via transnational circuits of expertise and practice. Encouraged by institutions like the Rockefeller Foundation and World Bank and dovetailing with the new era of "green structural adjustment" (Webber and Bigger, 2021), cities around the world are trying to mobilise private capital and private sector involvement in order to deliver climate adaptation and urban resilience.

An extensive literature on urban resilience orientated towards practice suggests that urban development and sustainability can be reconciled via "good planning" (see Weinstein et al., 2019). However, critical urban scholars have critiqued this scholarship for failing to interrogate (and therefore normalising) the unequal relations of power that shape how resilience is enacted and

takes form (Alvarez and Cardenas, 2019). These scholars argue that market-centred urban development is fundamentally antithetical to the stated goal of urban resilience (Weinstein et al., 2019; see also Koh et al., 2021). For example, Meerow (2017) observes how the privatisation of urban development in Manila has converged with ineffective urban planning that limits “government’s ability to plan climate-resilient infrastructure systems” (2666) in ways that undermine citywide climate resilience.

Urban resilience has presented opportunities to generate profit. Emerging scholarship on urban climate finance makes clear the potential for investors to profit from climate risk by generating and capturing “risk rent” (Taylor and Aalbers, 2021: 4), “new increments of economic value in relation to climate risk”, echoing the logics of disaster capitalism (Klein, 2007; see also Octavianti and Charles, 2018). For example, it has become a common strategy for private developers to capitalise on a “resilience dividend” by employing anticipatory climate risk management strategies (Taylor and Aalbers, 2021). Further, critical urban scholarship elucidates how the resilience agenda has been “used and abused” (Alvarez and Cardenas, 2019: 227) to serve other politico-economic agendas. In Manila and Jakarta, for instance, the state has pursued large-scale evictions under the guise of resilience while turning a blind eye - or in fact facilitating - real estate development in equally precarious areas, which in turn undermines resilience (Leitner et al., 2017; Alvarez and Cardenas, 2019).

It is within this context that scholars have observed the emergence of a *private property-led adaptation regime*, as city governments have come to view private property development as the preferable vehicle for delivering adaptation. In other words, city governments are using climate risk as a trojan horse to realise more real estate development. Across Southeast Asia, the emergence of a private property-led adaptation regime dovetails with a broader “real estate turn” across the region in recent years (Shatkin, 2017), which describes the “trend towards land monetization, and the increasingly acquisitive and speculative eye with which states [across Asia] have viewed land markets” (14). In Jakarta, for example, plans for a coastal defense project quickly morphed into a master plan with extensive land reclamation, construction of a new central business district, and high-end property development (Colven, 2017).

Research suggests that a property-led adaptation regime has the potential to deepen existing inequalities. Johnson (2015) demonstrates how insurance will insulate some properties and populations from climate risk while remaining out of reach for others, a process she calls “splintering protectionism”: a “patchwork of high risk, high reward areas where insurance is available only to those with the ability to pay rising premiums” (2503). Other concerns include the undemocratic nature of private-sector adaptation, which runs counter to the broad consensus among researchers that equity and justice need to be integrated in adaptation planning, and the potential vulnerability of property-led adaptation projects to the whims of investors and market fluctuations (Colven, 2020a). Further, this regime normalises private property rights, marginalising those who do not possess such rights. The enduring prevalence of informality - and in particular, informal settlements - in cities across Southeast Asia raises questions about the ability of this regime to meet the adaptation needs of the urban majority.

The emergence of a property-led adaptation regime helps to explain how and why cities around the world are seeing continued investment and real estate development in areas of high risk (and high return), namely along their coasts and waterfronts. Studies in urban geography and social studies of finance elucidate how insurance renders urban development in environmentally risky areas not only possible, but profitable. Johnson (2015), for instance, illustrates how the insurance industry relies on catastrophic events in order to maintain its profitability. Taylor (2020) meanwhile shows how insurance-linked securities enable the circumvention of environmental barriers to capital accumulation by providing a “fix” that protects valuable real estate from devaluation due to climate risk. In addition to concerns that insurance fosters irresponsible development that undermines climate resilience, scholars have problematised the tendency for neoliberalising states to treat insurance as a tool to facilitate the rollback of state support while “individualizing” responsibility for risk (Boothe, 2018).

By contrast, insurance has little, if any, explanatory power in Jakarta. Indonesia’s insurance industry is comparatively undeveloped with only 500 or so actuaries nationally in 2020 (UPH, 2020), in a country of more than 250 million people. Insurance is not widely held; very few households in Jakarta have insurance, and DKI Jakarta only recently began insuring its public buildings. Only 8.8% of the USD900 million in economic losses caused by the New Year’s Day

floods of 2020 were insured (Swiss Re, 2021). This paper thus contributes to broadening our understanding of the mechanisms used to protect property from devaluation due to climate risk by examining the socio-material practices of the real estate industry.

I examine the various strategies that private developers deploy in order to protect their “rent at risk”: the “existing or anticipated increments of rent that might be lost due to climate risks or their management” (Taylor and Aalbers, 2021: 5). Reflecting an awareness that climate change poses a threat not only to cities as places of habitation, but also as sites of fixed capital, rent at risk corresponds to “industry concerns about the prospects of higher costs of capital and operating expenditures, direct losses incurred by property damages, and declining future markets for assets in risk” (ibid. 5). As I detail in the following section, to theorise these practices and their impacts, I draw inspiration from Johnson’s theorisation of insurance as offering “splintering protectionism”, while also incorporating critiques of splintering urbanism made by scholars of critical infrastructure studies working in the context of Southern cities.

Splintered Cities: Landscapes of Unequal Protection

Widespread reports that infrastructure was *splintering* across the global North proliferated during the 1990s and 2000s (Marvin and Graham, 2001) as scholars observed infrastructure breakdown and decline paired with privatisation and state disinvestment from urban environments. Owing to extensive studies largely drawn from cities in the global South, it is by now well established that the modern infrastructural ideal has remained just that: an unrealised ideal, or simulacra. In practice, the everyday infrastructures and networks that structure urban life have in fact been deeply splintered from their very inception, connecting some people and places better than others, while others not at all, owing to their roots in colonial or imperial modes of governance (Kooy and Bakker, 2008; Pilo, 2019; Schwenkel, 2015; Silver, 2015).

An early notable contribution to this scholarship that inspires this paper is Kooy and Bakker’s (2008) categorisation of Jakarta’s piped water network as “splintered”, and therefore distinguished from the decaying and *splintering* infrastructures that Marvin and Graham (2001) first described. They trace the origins of the network (which connected a little more than 60% of the city at the time of their study) to the period of Dutch colonial rule when it was built exclusively

for European settlers and used to enact socio-spatial segregation; through the post-Independence era, in which time the governor prioritised building infrastructures that signalled modernity rather than providing everyday services, and finally the most recent phase of the network's history, when the World Bank touted privatisation as the most effective means to extend network coverage even as private companies driven by profits are logically uninterested in extending connections to those they consider "unwilling" to pay. Rather than interpreting Jakarta's unequal piped water coverage as a failure to realise the (assumed) goal of universal connection, Kooy and Bakker show that delivering unequal connections was always the goal. To describe such infrastructure as incomplete would therefore be to overlook the logics that propelled its development. Kooy and Bakker (2008) therefore re-conceptualise Jakarta's network as intrinsically splintered.

In a similar spirit, by using '*splintered*' to describe the privatised and elite form of ecological security that private developers are providing to property buyers, my intention is not to suggest that infrastructural development in Jakarta is somehow lacking or incomplete. As Guma (2020) importantly reminds us, to treat infrastructural "incompleteness" as inadequacy is to view contemporary urbanisation through the lens of outdated northern ideals of what a networked city is or how ought to function. Instead, I take the lead from scholars who have reimagined infrastructure in light of Southern experiences (Lawhon et al., 2018) to conceptualise splintered ecological security not as a marker of the absence of "development", but as a key characteristic of the property-led adaptation regime.

By examining how the material infrastructures of flood control and water provision in Jakarta are splintered, I extend engagements with splintering/ed urbanism into the realm of adaptation planning. Additionally, while much of the work drawn from cities across the global South is historically oriented, tracing the splintered nature of contemporary infrastructural networks back to legacies of colonialism, this paper contributes to broadening critical engagements with infrastructure by examining the ongoing generation of "splintered ecological security". I use this term to capture how developer practices create what Hodson and Marvin (2009) describe as "'bounded' security in new ecological enclaves for premium users that ignore wider distributional questions about uneven access to resource politics" (311), thus contributing to the construction of uneven landscape of flood mitigation and water provision infrastructure in anticipation of changing

conditions. My research finds that property developers in Jakarta actively try to offset environmental and financial risks via investments in privatised, physical infrastructure. In the following section, I describe my methodology and the data that underpins my analysis of Jakarta before turning to briefly contextualise Jakarta's splintered ecological security, identifying several key processes that have facilitated its emergence.

Methodology

This paper draws on an analysis of relevant documents including real estate reports, internal government presentations, and news articles relating: to trends in urban development and investment in Jakarta's built environment; state flood mitigation, water supply, and water management plans; groundwater regulations, AMDAL, permitting processes, and the origins and impacts of Jakarta's water crisis. To date, we have conducted a total of 13 in-depth, semi-structured interviews with: (1) experts and stakeholders in the real estate industry, including consultants from the Jakarta offices of global firms such as Cushman and Wakefield, Knight Frank, and Colliers International, and local consultants who perform environmental evaluations; (2) experts from the water sector representing both private companies and state-owned enterprises (SOEs); and (3) bureaucrats and ministers from the provincial government of DKI Jakarta and the national government of Indonesia whose work relates to spatial planning, environmental governance, and issuing permits and construction and groundwater extraction.¹ A first round of interviews were conducted in Jakarta in 2019, and a second round of interviews conducted via Zoom is ongoing.

Interview questions were designed to solicit thick descriptive narratives that drew on the participants' specific area of expertise (typically property development and the real estate sector, or water management). In order to enable comparison across interview data, we also included a more general set of standardised questions regarding the interviewee's perceptions of real estate development, Jakarta's water crisis, and the relationship between these (for example, what interviewees considered to be the leading causes of Jakarta's water crisis). Interviews were conducted in English or Bahasa depending on the interviewee's preference. We recorded the

¹ Thus far, we have been unable to conduct interviews with representatives from real estate developers which constitutes a major gap in this research.

interviews either as audio files or videos when permission was given and took notes throughout the interview to record any new questions, themes, or topics to pursue. Interviews conducted in English were then transcribed verbatim with the assistance of otter.ai. software. Interviews conducted in Bahasa were transcribed verbatim and translated into English by Wahyu Astuti. Interview transcripts were read and coded reiteratively using a coding book that was developed at the start of the coding process and refined throughout several phases of coding.

Contextualising Jakarta's Splintering Urbanism

This section of the paper contextualises splintered ecological security, situating its emergence within the broader environmental history of Jakarta. I trace the emergence of splintered security in Jakarta to three interconnected socio-material processes: the institutional privileging of hard engineering approaches to water management; the historical use of water infrastructure and urban development as tools to facilitate segregation; and finally, the oligarchic structures characteristic of Indonesia's "hybrid neoliberalism" (Herlambang et al., 2019).

The institutionalisation of a hard engineering approach to water management can be traced back to the Dutch colonial era (Padawangi and Douglass, 2015; Colven, 2020b). As argued by Octavianti and Charles (2018), Jakarta's contemporary hydroscape is the product of some four centuries of hard-engineering interventions which, despite both evidence of the limitations of such approaches and the persistence of flood events, remain the dominant mode of flood management in Jakarta. The institutionalisation of hard infrastructural approaches in Jakarta also converges with circuits of knowledge, expertise, and finance, including Indonesia-Netherlands training networks, and efforts by the Government of the Netherlands to export Dutch water expertise worldwide (Colven 2017; see also Colven, 2020a). Further, the World Bank is actively socially constructing the notion of "infrastructural financial gap" (Webber and Bigger, 2020) that they claim can be addressed with private finance, adding impetus and legitimacy to infrastructural approaches to water management.

The institutionalisation of hard engineering sets the stage for splintered ecological security in a couple of ways. First, it has established a project-based mentality to flood mitigation and water management in Jakarta that contributes to a fragmented and piecemeal, rather than integrated

approach. For example, when I accompanied several consultants during a field visit in 2015, we stopped at Jembatan Merah watergate roughly six kilometres from the coast so the lead consultant could inspect a canal that had recently been dredged and reinforced with concrete walls to alleviate flooding due to monsoon rains. The consultant observed that the bridge over the canal (upon which we stood) had not been accounted for in the dredging plans. In the event of a flood, therefore, floodwaters would therefore breach the bridge, rendering the newly heightened walls redundant. I use this example to illustrate how the city has pursued numerous efforts to address flood mitigation and water infrastructure, but a general lack of comprehensive and integrated planning has nonetheless contributed to a fragmented landscape. Second, the use of hard infrastructure, particularly in flood mitigation, reflects a deep cultural investment in Indonesia in engineering and its ability to control water. This attitude is also shared by developers, as I will illustrate later. The faith in hard infrastructure and its ability to deliver protection from flooding helps to explain how urban development in North Jakarta continues, while simultaneously closing down any opportunities to reflect on the sustainability of such an approach.

The emergence of splintered ecological security has also been facilitated by the enduring legacies of colonial authorities using water infrastructure and urban planning practices to facilitate socio-spatial segregation. During the colonial period, the Dutch authorities used several strategies to socially and spatially differentiate European settlers from Indonesia and Chinese residents. As discussed previously, piped water infrastructure was extended only to European settlers, while Indigenous Betawi residents, colonial authorities reasoned, would be content to use river water (Kooy and Bakker, 2008). Glodok, a North Jakarta neighbourhood home to a predominantly Chinese population today, was walled off and designated a Chinese settlement. The historically fragmented nature of Jakarta's urban landscape manifests today as a landscape divided between kampungs and gated communities. As Putri (2019) argues, colonial imaginaries of the kampung as unsanitary and undisciplined places continue to inform urban planning in Jakarta today, "resulting in a persistent failure to improve the environmental health of kampungs and the city as a whole" (805). As this paper will show, this fragmentation has also set the scene for highly uneven adaptation practices.

Finally, the activities of private developers and their ability to fundamentally shape Jakarta's urban development has also contributed to the city's fragmented landscape. As detailed by Herlambang et al. (2018) and discussed elsewhere (Savirani, 2017; Colven, under review), enduring oligarchic structures dating to the Suharto era (1967 - 1998) continue to empower developers with connections to the Suharto family. These structures, combined with decentralisation in the 2000s that transferred responsibility for spatial planning to local authorities who initially lacked capacity, have empowered private developers to play a major role in shaping urban development in Jakarta.

Much in the same way that private developers took advantage of weak institutional capacity in planning and influenced the direction of Jakarta's development to their advantage (Herlambang et al., 2018), I argue that the private sector is once again stepping into the realm of public governance by providing water and flood-defense infrastructure where the state generally cannot, but only for those who can afford it. For example, while both the provincial government of DKI Jakarta and the Indonesian government have pursued numerous projects to improve water infrastructure and quality, reduce flood risk, and increase water supply, many of these remain unrealised, usually due to political and economic factors such as bureaucracy and funding (Colven, 2020). An obvious example is the Banjir Kanal Timur (East Flood Canal), which was designed by Dutch engineers in the 1970s but is still not complete. Water privatisation has failed spectacularly to deliver on the promise of extending the city's colonial piped network, at great cost to the Indonesian state. Poor households who lack access to piped water and must buy refill or bottled water for consumption pay proportionally higher rates per unit consumed than their wealthier counterparts (Walter et al., 2017). In contrast to the state, private developers are able to mobilise the capital and resources to provide such infrastructure to private residents, contributing to reinscribing and further entrenching Jakarta's splintered infrastructural landscape, as I explore in the following section. In sum, the fragmentation of flood protection and water infrastructure today emerges from and continues to mirror the historical production of Jakarta's fragmented urban landscape.

Risk and Security in Jakarta

Before examining the strategies that private developers use to provide ecological security to buyers, I first examine and compare how property developers, consultants, and buyers perceive, evaluate and ‘know’ financial and environmental risks. Understanding how different actors understand and know environmental risk provides important insights into how urban development continues in precarious areas in North Jakarta, therefore driving splintered ecological security. As I discuss below, these actors do not always equate environmental risk with financial risk, which further helps to explain why speculative investment continues in areas highly vulnerable to sea level rise and tidal flooding, and whose future is uncertain.

‘Knowing’ environmental and financial risk

Interviews conducted indicate that awareness of Jakarta’s water crises and risk perception varies substantially across different groups. During interviews with consultants and an analysis of media articles, I found no suggestion that property buyers (both end-users and investors) are concerned about Jakarta’s water crisis in ways that have impacted buying or investment practices. In fact, during interviews, real estate consultants lamented what they perceived as general lack of awareness among buyers of land subsidence and flood risk. As a consultant from Knight Frank expressed:

...people, investors, home buyers are very ignorant about this serious topic. And this is very, very unfortunate (...) I don't think a lot of investors or consultants are putting [flooding and sinking] as one of their key, key negative sort of erm, factors. You know, when they look into projects. So either is it because it's too long shot for them, right? You build, you sell, after 2-3 years, you wash your hands of it. (...) And leave the home buyer, the poor home buyer dangling with a place that is flooded, that is sinking (...) that is something that maybe we need to pay more attention to. (May 28, 2019).

Repeatedly, interviewees offered cultural explanations for the continued desirability of property in North Jakarta in spite of the riskiness of this area. Chinese and Indo-Chinese residents, several interviewees explained, are willing to live with flood risk because of their preference to be

in the North Jakarta area due to the *feng shui* of the location, as well as its image as a high-income, desirable area:

The Chinese love to live up north. So, they would move up north because that's where the community is.... Apparently, that's the best area on feng shui. That's where all the best Chinese food you can find. So, even with the news of land subsidence, even with the news of reclamation... people still want to move, their reason being because they have faith in that area.

While consumer preferences cannot be entirely discounted, this explanation is a partial one that ignores the structuring conditions that make property available in these areas in the first place, and how developers are taking advantage of consumer preferences. This is important because it suggests that, without regulation that actually prevents development, development will still continue in areas of high subsidence. As one real estate expert expressed: “The demand is still there, if you build in [North Jakarta]...people will buy.”

Another important consideration in understanding the continued investment in North Jakarta is the limited understanding of land subsidence, a major driver of worsening flooding. While low-income residents across the city are intimately and experientially knowledgeable about groundwater, public understandings of land subsidence and its relationship to groundwater is generally very limited, as one real estate expert expressed:

Land subsidence and even climate change is an elitist issue, it is only discussed between people who understand it. I think the government must have campaigned about climate change, but that issue is discussed only within the academia or professionals. The developers do not really attend to that issue.

Similarly, the Head of Groundwater Inventory and Conservation Subdivision in the Ministry of Energy and Mineral Resources suggested there is a low understanding of Jakarta’s groundwater problem, including within the real estate sector (interview, 27 August 2021). Despite extensive studies by researchers at ITB Bandung (including a well cited and landmark study by Abidin et al. (2011)), international media coverage, and Dutch-led campaigns to raise awareness,

much of the research on land subsidence sits behind paywalls in academic journals and is published in English. Land subsidence has also become a contested issue within the Indonesian scientific community, with some scientists downplaying the role of deep groundwater extraction associated with urban development in generating land subsidence. Additionally, the material qualities of groundwater - an invisible and fugitive resource hidden from view under the earth's surface - makes it difficult to visualise and easy to ignore (Colven, 2020b).

In the absence of comprehensive public data on the real estate market, property consultants in Jakarta play a crucial role as knowledge brokers to investors. Yet, property consultants are (understandably) not knowledgeable about environmental risk, and the expertise they provide and tools they develop to evaluate land and real estate do not incorporate environmental risk. For example, in order to track land prices for commercial and residential land across Asia, Knight Frank Research has developed the Prime Development Land Index (hereafter, PDL Index). Knight Frank derive land values using a repeat residual valuation methodology, which “essentially looks at what a reasonable developer would be expected to pay for development land, given the gross development value of the potential scheme, costs (construction, professional, contingencies, and financial), required profit, acquisition costs and relevant taxes”. Knight Frank published the first report to present the findings of this index in 2014. The report singles out Indonesia’s performance as particularly noteworthy, observing “prime land prices in Jakarta have seen triple digit increases”. Indices and measures such as the PDL Index provide investors with enumerated and abstracted data intended to guide investment decisions.

As Tania Li (2014) observes, indices and measures such as the PDL Index help to assemble land as a resource available for global investment, therefore shaping speculative urban development in Jakarta, and elsewhere. Designed and deployed by global consultancy firms, these “inscription devices” shape what knowledge is available and thus perceived as useful and relevant. The PDL Index is intended to be used alongside in-depth research studies of potential investment sites and is necessarily limited in scope. It is perhaps not surprising, then, that the index does not include environmental risk in its calculations. Nonetheless, these omissions stand in contrast to growing efforts in the insurance industry to incorporate climate risk (Pollack, 2021). The lack of engagement with environmental risk is also troubling as cities across Asia face increasingly severe

water shortages and flood events and given the role of speculative urban development in generating increased environmental risks (Colven, forthcoming; Weinstein et al., 2019.)

Nonetheless, it appears that buyer behaviour has not been notably affected by growing flood risk. Likewise, I could find no evidence that business-as-usual in Jakarta's real estate industry has been disrupted by the water crisis. As one environmental consultant described:

...if you ask me whether this water crisis gives ramification to real estate developer, whether AMDAL [the environmental permitting process] has been difficult and real estate development stop – no. They still develop.

Despite the contributions of the real estate industry to Jakarta's water crisis, industry actors in the sector do not see this as their concern or responsibility. Developers, as a consultant explained in an interview, are only concerned with “*things that can be financially calculated*”. Echoing this sentiment, when asked whether the real estate industry is engaged with the city's water crisis, a real estate consultant responded:

We are [a] money-making machine. As long as the investor [is] coming in and as long as we see an opportunity to make money, we'll do it. That's not our job, to warn the government “hey this is happening” (...) We're real estate consultants. We do what's above the ground. What's under the ground, it's going to be up to the environmental consultant.

Similarly, when asked whether their consultancy firm advises clients on the risks posed by flooding, another real estate consultant responded:

Consultant: “(...) depending on what role you're playing, as property agent you say just go ahead. You know. Buyers beware [laughs] sort of attitude. As a well-known consultant to make that statement publicly, I think, sometimes can be quite challenging.”

“Because it undermines the viability, profitability?”

Consultant: “Correct. And a thousand developer running after you! [laughs]”

However, findings from this research suggest that, in contrast to buyers and investors, private developers are acting on their knowledge of land subsidence, flood risk, and potential water shortages than property buyers and investors. As the Head of Research and Consultancy at Savills Indonesia recalled:

I think [the developers] consider a flooded area as a critical issue. We had the experience when advis[ing] a client, and finally they decided to cancel [the] project because of the flooding problem. (June 11, 2019)

For now, however, awareness amongst property developers of Jakarta’s growing water crisis has not changed their practices and nothing in my findings thus far suggests that developers are thinking beyond the usual (short) time horizons of property development and sales. This is because developers are able to pursue their own private, technical solutions to these problems, as I explore in the next section.

Splintered ecological security

In this section, I turn to examine how private developers seek private technical and infrastructural solutions to Jakarta’s water crisis, contributing to the emergence of splintered ecological security. During interviews, consultants repeatedly brushed aside the question of whether the water crisis hinders the activities of developers, claiming that developers are not concerned about the impacts of Jakarta’s water crisis on their activities because they can find private solutions to the impacts of Jakarta’s water crisis:

I mean, the developer itself is really taking care of the issue [of flooding and land subsidence].

The [piped water] supply is not enough, then they buy water. If that’s not enough, they can recycle water (...) “[real estate developers] actually realized that Jakarta is already in a crisis. But there are still other water sources, right? (...)

Strategies used by developers include providing their developments with private water treatment and desalination plants, investing in reverse osmosis infrastructure and gray water recycling, and constructing polders, a Dutch designed system to provide flood protection. For example, in 2019 when visiting the showroom for a new development called Pantai Indah Kapuk (PIK) 2² by Agung Sedaya Group in North Jakarta, I observed a series of marketing panels that address flood risk. Alongside photos of Jakarta's historic flood events as well as photos of more recent ones likely recognisable to prospective buyers, the panels assure potential buyers that PIK 2 will be protected from the flood risk that plagues the city via a Dutch-approved polder system. Developers also protect their developments from flood risk by raising their land plots, enabling construction on elevated ground, designed to facilitate surface run off during high precipitation events, thus reducing flood risk. Together, these strategies provide ecological security for an elite community while making it possible for development to continue.

The state, meanwhile, cannot provide such infrastructure for the city:

...large property developers are ahead of us [the city government] ... Some of them have already the tools for water reuse which is proven to be more efficient for them. (...) Even to anticipate climate change, they change the concept to green building to increase the efficiency of water and electricity use. (...) They can afford to buy technology and some of them also realise the importance of green building. So, for large developers, I think it's [the water crisis] not a problem.

Thus, the privatisation of water infrastructure enables property buyers to enjoy clean water and security from flood risk, while the risks remain the same for the rest of Jakarta.

However, these infrastructures cannot guarantee ecological security into the future. By offering privatised solutions linked to property ownership, financial and environmental risks are individualised and redistributed to property owners. Additionally, rather than cutting into profit margins, developers will most likely raise property prices to incorporate the cost of water

² PIK 2 follows Pantai Indah Kapuk, which was developed in the 1990s, and was later blamed for the flooding of Soekarno-Hatta international airport.

infrastructure, particularly costly technologies like water desalination plants. Notably, promotional materials at the PIK2 marketing gallery explain to readers that areas that do not experience floods have more expensive – “fantastical” – property prices (PIK 2 marketing gallery, field notes June 2019). This will contribute to rising property prices and greater inequality in the distribution and experience of risk. This is concerning given Jakarta’s affordable housing crisis; prospective first-time buyers are struggling to get onto the ladder, the middle-class are already increasingly being squeezed, and kampung residents are under tremendous pressure to sell their land to developers.

Beyond the residents benefiting from splintered ecological security, low-income kampung communities adjacent to these private ecological enclaves find themselves at greater risk. The use of elevated platforms physically displaces surface water runoff onto these neighborhoods, heightening flood risk and exacerbating flood impacts. As the Head of Urban Planning Evaluation in the Department of Human Settlements, Spatial Planning and Land Affairs of DKI recalled in an interview:

People demonstrated because their kampung was flooded after AEON Mall was developed. After our office investigated it, the developer has not developed a water retention area as promised in their masterplan.

This underscores the fundamentally relational nature of ecological security, and reminds us that communities, however socially or spatially segregated, are nonetheless directly implicated in one another’s futures. As Laura Pulido (2000) writes, “It is impossible to privilege one group without disadvantaging another” (16).

Conclusion

This paper helps to illuminate how real estate development can continue to flourish in Jakarta’s remarkably risky coastal area. By offering privatized forms of security and insulation from the city’s broader water crisis, private developers assure buyers that their investments are safe. Developers have the capital to obtain knowledge and data about flood risk that is not publicly available, to provide private infrastructure, and to secure alternative sources of water supply for their developments. Private developers are therefore responding to environmental risks in ways

that continue to make urban development possible even in North Jakarta, the most precarious area of the city in arguably one of the riskiest cities in the world.

The splintered form of ecological security observable in Jakarta has implications for places and communities well beyond the walls of bounded enclaves. At best, splintered ecological security stands to reproduce social inequalities and, at worst, to deepen them. As another example of the supremacy of real estate (Taylor, n.d.) and private property within adaptation planning, splintered ecological security in Jakarta constitutes a form of privatised risk management that is extended only to those who own private property - in a city where the urban majority do not own a formal freehold property title. Tying adaptation to private property normalizes and entrenches liberal western notions of private property, while implying that ecological security is only for the property-owning class. The pursuit of a property-led adaptation regime therefore ignores the complicated question of what happens to those without formalised property rights or tenure when the seawalls are topped, and taps run dry.

While seemingly disconnected from the rest of the city, the securitisation of developments like PIK has relational effects as they displace flood and financial³ risk to kampungs and residents outside their walls. Therefore, while recent research underscores the importance of integrating equity and justice into climate adaptation planning to avoid maladaptation - unintended, undesirable outcomes, such as new risks and increased vulnerability to climate change (Magnan et al. 2016) - a property-led adaptation regime threatens to undermine these principles.

Beyond the social justice implications, we ought to question the durability of forms of security premised on fortification, technological innovation, and hard infrastructural design. As sea levels rise, some argue that it is no longer a question of whether people will be displaced by climate change, but when (Siders et al., 2019). This challenge is of a truly global scale: recent research using new elevation data finds that prior studies vastly underestimated vulnerability to sea level rise and coastal flooding: 1 billion people reside less than 10 meters below current high tide levels; by 2100, more than 630 million people will occupy land that will experience an annual

³ Financial risk is not only the remit of private developers but of everyday residents whose material assets - not to livelihoods, health, and lives - are placed at heightened risk.

flood event (Kulp and Strauss, 2019). Though cities have historically fortified themselves against sea level rise using walls, embankments, and other coastal defenses, climate scientists warn that we may soon reach the economic limits of hard infrastructural approaches (Oppenheimer et al., 2019). These defenses do not offer unlimited protection, and even the splintered form of ecological security developers are selling will reach its limits. Climate change demands new ways of thinking about urban habitation, and it seems unlikely that this can be supported via a property-led adaptation regime.

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