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DISCUSSION DOCUMENT

Adaptation to Climate Change
Decision Making and Opportunities for Transformation in Jakarta, Indonesia

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Transformative Adaptation to Climate Change in Coastal Cities

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This is a Discussion Document

Summary

This case study is part of the UNRISD project "Transformative Adaptation to Climate Change in Coastal Cities" which explores adaptation decision-making processes and barriers to transformative solutions in order to inform more progressive policy making in the context of Southeast Asian coastal cities.

This paper investigates the framing of adaptation across different decision-making levels, the decision to relocate as part of adaptation, and adaptation planning processes. It also considers the role of planners and the participation of densely populated informal settlements, known as *kampung*, in such processes. Through this analysis, the authors hope to identify how Jakarta can adopt transformative adaptation and achieve social justice as it adapts to climate change.

Contents

List of tables and figures

1. Introduction

1.1. Urbanization and flooding

The capital city of Indonesia, officially the Special Capital Region of Jakarta (DKI Jakarta), is situated in a rapidly growing metropolitan area, also known as Jabodetabekpunjur (Greater Jakarta). It consists of nine districts and cities in three provinces, with a total population of 29.74 million people and an area of 6,615.13 square kilometres. The latest data put population density at about 4,496 people per square kilometre (BPS Provinsi DKI Jakarta 2016). Compared with the 2010 density of 4,225 people per square kilometre (JICA 2012), population density has increased by about one percent every year in this metropolitan region. Jakarta makes a huge contribution to the national economy, approximating 3,440 trillion Indonesian Rupiah (IDR)[1], making Greater Jakarta the primary city of Indonesia.

Due to its geographic and climate conditions, Jakarta is highly sensitive to floods. It is located in a coastal and deltaic area shaped by 13 main rivers and two canals. As a delta, Jakarta, and particularly North Jakarta, has young soil and consequently experiences a high risk of land subsidence. Between 1982 and 2014, the rate of land subsidence in North Jakarta increased from 15 to 25 centimetres per year (Abidin et al. 2015). This worsens the impacts of sea level rise and increases tidal floods. The city has also been experiencing both higher rainfall and increasingly uncertain rainfall patterns during the rainy season. These low-lying coastal city thus has been increasingly exposed to flooding.

Patterns of development in Jakarta compound its flooding problems. The lack of green open space lowers the capacity of Jakarta to absorb rainwater. The Indonesian Law of Spatial Planning requires 30 percent of urban areas to be green open space (Werner 2014). However, in practice only 9.98 percent of the total Jakarta area remain green open space (Dinas Kehutanan Provinsi DKI Jakarta2018), while the proportion of blue open space, including lakes, ponds, rivers and drainage channels, is three percent (BPS Provinsi DKI Jakarta 2014). The small proportion of both types of space is one of the factors making Jakarta sensitive to water problems.

As a rapidly growing city, Jakarta embodies the dualism of urban formality and informality (Jieming and Simarmata 2015). Jakarta is a megacity where high-rise towers stand side-by-side with densely populated informal settlements, known as *kampung*[2]. The location of *kampungs*, especially those on river banks, lakeside and low-lying coastal areas, also has serious implications for the city's exposure to floods.

Adaptation measures also mirror this dualism. The government of DKI Jakarta province has taken numerous measures to adapt to and manage flood risks while leaving no one behind. These measures range from building a sea wall on the shoreline, to dredging rivers and lakes, to providing reforestation support to neighbouring cities upstream. At the community level, via modest actions, the urban poor also implement individual adaptation and flood protection strategies.

Few studies on adaptation to potential environmental changes at the city level have discussed urban planning and its effectiveness in reducing future risks (Olazabal 2019). The integrated nature of sustainable development necessitates managing urban growth while simultaneously responding to environmental risks, including climate change impacts and this makes an inquiry into the current urban system of Jakarta necessary. Is the current system enough to address future risks? How should Jakarta adapt to climate change in the light of its fast pace of growth and urbanization?

[1] USD1 = IDR 14,134 (Oct. 2019)
[2] *Kampung* is a product of urban informality often associated with urban poverty. It is a dense, irregular settlement on a neighbourhood unit scale.

In addressing both questions, the dual nature of urbanization in Jakarta presents an additional challenge. There are more than 600 *kampungs* in Jakarta, so the city's urban planning and adaptation strategies cannot ignore the informal forms of settlement inhabited mostly by the urban poor. In the last 10 years (2009-2018) floods caused 76 fatalities and 241 injuries, and displaced 813,678 people living in Jakarta's *kampungs* (BNPB DIBI 2019). Despite having the highest number of victims compared to other types of disasters, however, *kampungs* have also survived floods for decades, demonstrating a capacity for adaptation, albeit at the lowest level. The government of DKI Jakarta should thus not ignore or underestimate the adaptation strategies of these *kampungs*.

Table 1. Impact of floods in Jakarta (2009-2018)

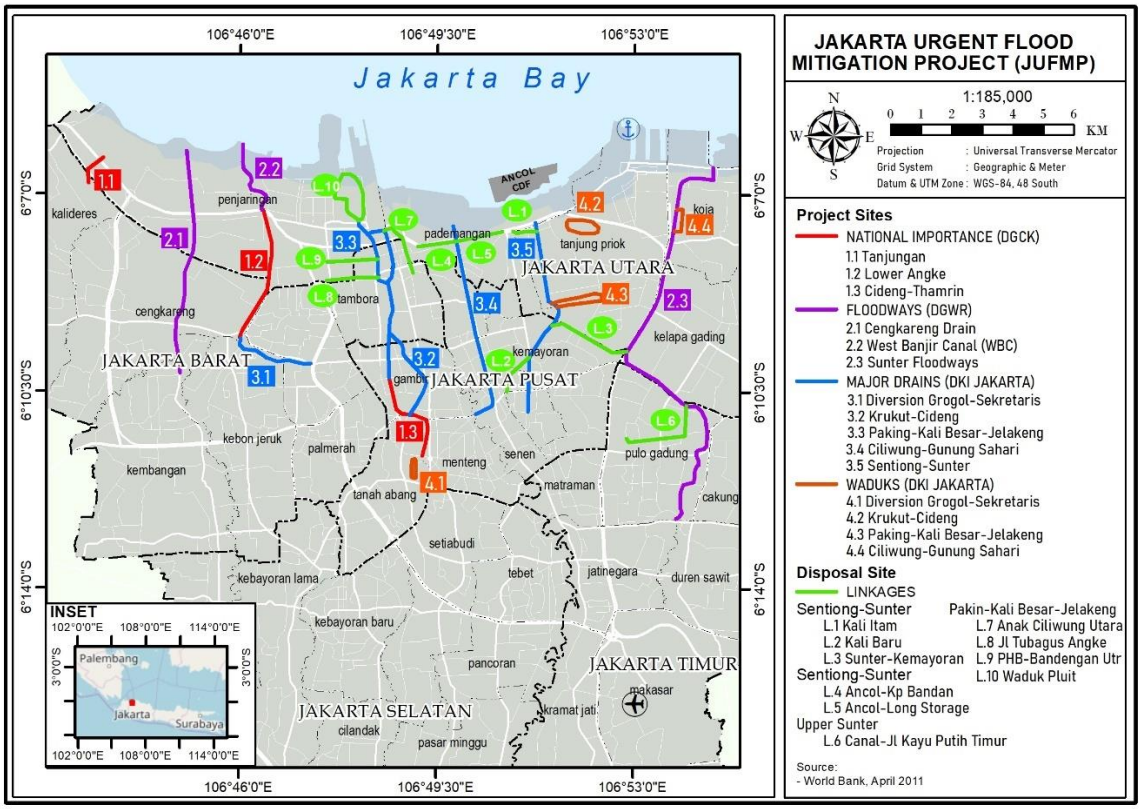
Year	Died	Injured	Evacuated
2018	0	1	10,246
2017	6	0	20,124
2016	3	0	17,686
2015	0	0	91,805
2014	25	0	395,328
2013	38	0	193,278
2012	1	0	33,398
2011	0	0	1,398
2010	3	238	24,851
2009	0	2	25,565
Total	**76**	**241**	**813,679**

Source: BNPB DIBI 2019

1.2. Adaptation

The city has adopted several water engineering measures to improve the urban hydrological system. They include constructing a sea wall along the shoreline to protect the mainland from tidal flood; dredging and "normalizing" (that is, widening and embanking) 13 rivers to increase their capacity during peak rainfall; revitalizing lakes and creating retention ponds in the coastal area; and greening abandoned land to increase water absorption. Most of these efforts focus on flood-control infrastructural projects.

Figure 1. Map of Jakarta Urgent Flood Mitigation Project



Source: Own draft based on World Bank 2011

The development of flood-control infrastructure is no small undertaking. Such projects often involve the relocation of settlements away from flood-prone areas—often informal settlements inhabited by poor people. The objective of relocation is often twofold: (1) to increase water absorption, clearing the way for flood protection and a more healthy environment; and (ii) to reduce slum areas and alleviate poverty, improving well-being and living conditions.

Examples of population relocation go back to the period of Dutch colonialization. In the 1930s and 1950s, the development of Hotel Indonesia and other landmarks resulted in the relocation of the Menteng area, for example. In the 1970s, under governor Ali Sadikin, a *kampung* improvement programme resulted in the relocation of numerous households. Over the last five years, relocation has become a major issue. In 2015, more than 30 communities across Jakarta were relocated (LBH Jakarta 2015). Reasons for relocation included river normalization (12 locations), retention pond development (1 location), city park development (1 location), and others (for example land dispute or building permit violation) (16 locations). Relocations are increasing in number as Jakarta seeks to improve the drainage capacity of the city's water bodies and reduce hydrometeorological disasters.

Recently, land subsidence has become another factor triggering resettlement. Pictures and videos of cracking and subsided buildings and roads appear frequently on mass media. For example, in the North Jakarta *kampung* of Muara Baru a building is no longer in use because the ground floor is permanently submerged under seawater, and according to a news article, the government has begun to enforce the inspection of illegal groundwater extractions that trigger land subsidence (Komara 2018). While there is no direct evidence that people have been forced to move due to land subsidence, the rate of subsidence is very alarming. With 40 percent of the city already below sea level and coastal areas sinking fast,

relocation is to some extent becoming a rational decision for Jakarta in building its flood resilience (Kimmelman 2017).

But must adaptation to the impacts of climate change in Jakarta—flooding, first and foremost—necessarily involve the relocation of large numbers of people? Or is it possible to envision more transformative strategies to deal with the changing environment, strategies that would be less uprooting and disruptive to the lives and livelihoods of the city's most vulnerable populations? It is well acknowledged that different actors at various levels have adopted a range of adaptation measures. While official adaptation measures are taken at the national and sub-national levels, most affected communities directly adapt to changes based on their own practical knowledge. Research on adaptation in Jakarta shows that the urban poor often develop their own adaptation plans, with more tacit and short-term strategies (Simarmata 2018). On the other hand, at the city level, the government of DKI Jakarta has also prepared an urban adaptation plan. Adaptation measures at the city scale sometimes result in spatial changes at community level. The sea dyke that protects the city from rising sea levels has changed the living conditions of coastal communities. The revitalization of a reservoir has taken up space where informal communities have lived for decades. Therefore, adaptation measures at the city level can have unintended consequences and justice implications at the community level.

Given the complexity of climate change adaptation, this paper aims to investigate the framing of adaptation across levels, the decision to relocate as part of adaptation, and adaptation planning processes. Furthermore, this study also discloses the role of planners and the participation of *kampung* in such processes. Through this analysis, the authors hope to identify how Jakarta can adopt transformative adaptation and achieve social justice in adapting to climate change.

2. Social justice in transformative adaptation

As scholars and practitioners realize that incremental adaptation will not be enough to face the increasing uncertainty of climate change (Wise et al. 2014; Pelling et al. 2015), the idea of transformative adaptation (understood as change that can overcome inequalities and root causes of vulnerability) is gaining prominence. Several studies find that adaptation to reduce vulnerability and manage risks can have unintended consequences (Barnett and O'Neill 2010; Paavola and Adger 2013). Moreover, adaptation to current climate change impacts can result in maladaptation in the future by increasing susceptibility to shocks or reducing adaptive capacity (Magnan et al. 2016). Adaptation is diverse across scales and levels; adaptation at one level can impact that at another level (Snorek et al. 2014). Adaptation at the city level may create risks among local communities if it leaves the most vulnerable groups behind by changing their livelihoods and social assets (Garschagen et al. 2018). Unintended consequences of adaptation can increase long-term vulnerability. For instance, relocation to reduce exposure to flooding may increase susceptibility to hazards and shocks and decrease adaptive capacity as it disrupts social cohesion and reduces local resilience (Garschagen et al. 2018).

In the case of urban flood adaptation, the focus on providing more space for water to reduce flood impacts leads to space contestation. In many developing countries with unplanned urbanization, urban poor people settle along riverbanks, near reservoirs, and in protected areas and conservation reserves. Target areas for flood protection measures are often also home to some of the most vulnerable groups in the city, including slum dwellers. They are subject to relocation because their settlements are flood-prone and hinder the installation of protective infrastructure and they often lack land tenure (Padawangi 2012). Eviction is also used to make space for the development of mega-projects, the regulation of public spaces, and also urban planning (Sugranyes and Mathivet 2010). Ensuring the right to the city among the urban poor is obviously a challenge in urban flood protection programmes.

Social justice is central to assessing transformative adaptation (Tschakert et al. 2013). Transformative adaptation considers long-term vulnerability and risks as a product of current adaptation, which mainly emerge due to unequal power relationships among actors (Schulz and Siriwardane 2015; Pelling 2011). Achieving local engagement in adaptation planning by including local people in deliberations is characteristic of transformative adaptation (Schlosberg et al. 2017). Moreover, ensuring social justice also requires fair distribution of information and consequences (Thaler et al. 2014).

Addressing social justice in adaptation often requires stakeholder mapping in order to understand the varying, and at times conflicting, needs of different interest groups (Brisley et al. 2012). Social issues in adaptation are rooted in the causes of vulnerability such as inequality, marginalization, inequity and poverty that affect some social groups disproportionately (Singh et al. 2014). Adaptation decision making is embedded in technocratic and political debates, thus the institutionalization of adaptation makes it difficult to address root causes of vulnerability (Schulz and Siriwardane 2015). Practically, adaptation on any level or scale will only focus on its local context. Yet, the diversity of actors at each level implies that adaptation covers a wide spectrum (Grüneis et al. 2016). The spectrum ranges from local to global and from individual to collective actions (Grüneis et al. 2016). Stakeholder mapping helps minimize unintended consequences, preventing adaptation at the region or city level from having negative impacts at the local or community level. Our analysis in this paper therefore focuses on the link between adaptation and vulnerability at different levels and scales of governance.

Furthermore, adaptation needs to take into account practical knowledge generated from triple-loop learning of local people experiencing floods (Simarmata 2018), meaning that people react, reframe, and transform their adaptation actions based on previous experiences. Simarmata defines the individuals who fail, or those facing continuous flood impacts , as the vulnerable. They experience floods over time without being able to reduce losses or damage. At the opposite end of the spectrum are the adapters, who succeed in reducing losses or suffer no damage. At the individual level, people transform from being vulnerable to being an adapter when they learn from frequent experience and have access to local networks. They can even become informal adaptation planners in their community if they can organize survival strategies and even benefit from flooding events, for example by identifying additional sources of income. The replication of this type of transformation by other *kampung* residents ultimately makes the *kampung* more resilient to floods.

Such localized adaptation knowledge derived from *kampung* practices is rarely transmitted to and taken up by official planners at the city level, however, and any response is in any case limited by the difficulty of anticipating flood magnitudes. In transformative adaptation, the question of who transforms and whose needs are served by transformation is crucial (see O'Brien 2012). This paper will discuss on-going adaptation at city and community levels in Jakarta.

3. Transformative adaptation in Jakarta

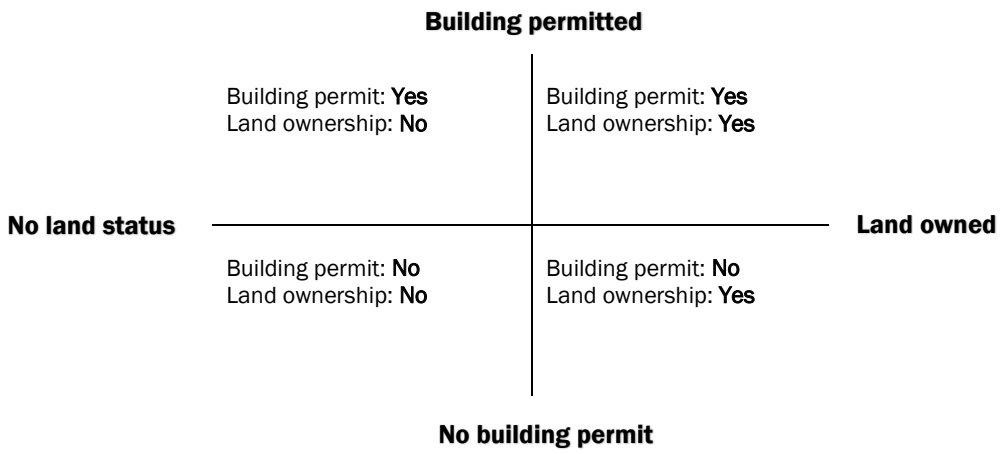
3.1. Increased flooding and vulnerability of the urban poor

In Jakarta, flooding was a regular occurrence a century ago, but over the last two decades it has been increasing in both intensity and frequency. Extreme flooding happens when a tidal flood occurs at the same time as heavy rainfall in the city of Jakarta and upstream areas. The 2007 and 2013 floods caused by a combination of tidal and urban flooding were an example, devastating more than 60 percent of Jakarta. Today, in 2019, Jakarta still experiences floods due to heavy rainfall; in North Jakarta, tidal flooding occurs more frequently with longer inundation durations. Moreover, research finds that North Jakarta has sunk 2.5 meters in just 10 years, and parts of Jakarta will continue to sink by as much as 25 millimeters a year (Lin and Hidayat 2018), further increasing the risk of flooding.

Kampung dwellers are the most vulnerable community. Previous events have shown that the urban poor suffer disproportionately from floods because their settlements are located in flood-prone areas. These areas experience a flood every three to five years, making them frequently-flooded settlements. The urban poor, generally working in the informal sector, are unable to afford homes in a flood-free area. As a result, they also stay in shelter camps for the longest duration, which can be over 14 days, following a flood. Data from the National Statistical Bureau show that North Jakarta has the highest number of informal settlements with low-income populations, making it a highly vulnerable region (BPS DKI Jakarta 2014). Given that current flood impacts are already significant and in the future they will only get higher, Jakarta should not count on a business-as-usual approach. Infrastructural solutions will not be enough without improving the adaptive capacity of local people, especially the poor who lack access to resources.

According to agrarian and spatial planning laws, there are four types of urban *kampung* residents: (i) those that have clear legal status for both land and building; (ii) those that have a legal building permit, but not legal land status; (iii) those that have legal land status, but no building permit; and (iv) those that have neither legal land status nor a building permit.

Figure 2. Four types of urban *kampung* residents



Source: Own draft

The typology above implies that different interventions are needed for each category of *kampung* dweller. For type (i) residents, the provision of additional infrastructure can reduce flood impacts. For type (ii), an administrative investigation is necessary to examine the issuance of building permits despite unclear land ownership. For type (iii), zoning regulations should outline development preconditions in flood plain areas zoned for development. For type (iv) residents, relocation is usually the only solution due to their lack of legal status. Future scenarios of flood impacts need to be estimated for all 4 categories in any case.

3.2. Jakarta vision and transformative adaptation

The Mid-term Development Plan of DKI Jakarta (2017-2022) outlines the vision for Jakarta as a progressive, sustainable and cultural city, whose citizens are involved in promoting civilization, justice and welfare for all. This vision emphasizes a people-based approach to development. The fourth mission in the plan aims to balance the environmental carrying capacity and the social support system. The government intends to protect the environment while respecting existing social conditions. This marks a shift in the government's vision, as the previous regime focused solely on environmental preservation while perceiving Jakarta citizens as the recipients of policies and programmes rather than co-creators.

With regard to flood mitigation, the government promotes an integrated approach to water resource management. It identifies the following causes of increased flood risk: the low elevated area of Jakarta crossed by 13 rivers; a high proportion of developed land that reduces the absorption capacity; and limited space for additional flood control infrastructure due to expansive individual land ownership. To mitigate floods, the government will deploy both soft and hard infrastructure measures, including strengthening water institutions and human capital, and organizing systems of ground water, waste water, rain water and clean water. Other mitigation measures include increasing the capacity of rivers, drainage, ponds and lakes; improving water gates, sea-infiltration protection and an early warning system; developing a protective wall at sea and river mouths; and preventing land subsidence through a stricter policy on access to groundwater. These are examples of the government's attempts to link flood mitigation with water resources to have an effective development process.

Compared to the previous five-year programme, there are several different approaches to managing urban floods in Jakarta:

Table 2. Flood management in Jakarta before and after 2017

No.	Flood management strategies	Before 2017	After 2017
1	Approach to improving the capacity of rivers	The term used was **normalization**: the construction of embankments or walls along the Kali Ciliwung and other rivers	The term now used is **naturalization**: efforts to reduce the flow of water from upstream to downstream by developing a number of infiltration wells and greening flood-plain zones
2	Response to settlements affected by flooding	Relocation, followed by building *rumah susun* or cheap apartments for relocated flood-affected residents	Land consolidation, keeping residents in flood-affected areas but with major improvements, involving local residents in preparing a local Community Action Plan
3	Flood emergency response	Using water pumps (especially in flood gates) to pump water out and distribute it to the canals, reducing water inundation	Using vertical drainage, putting water into the soil through infiltration wells
		Creating a rainbow team: The blue team deals with inundation; the orange team deals with cleanliness, including clogged drains; and the green team focuses on gardening (greening) the city.	The rainbow team still exists, but participation of local community is encouraged to handle local inundation.

Source: Own draft

The current administration promotes an inclusive Jakarta; it gives people equal access to the development agenda. According to our interview with a member of the Jakarta Advisory Team, the governor seeks to make Jakarta more humanistic through various activities, such as promoting social interaction in public spaces and public transportation; improving *kampungs'* environment via the Community Action Plan; and providing more cultural spaces (interview, August 2019).

The *kampung* residents we interviewed confirmed the changes above. A resident in Kamal Muara, Mr. A., told us his perception regarding the new leadership after 2017. He acknowledged better communication between the government and local residents during the coastal revitalization of a fish market. He was more informed about the programme components, from road construction to drinking water facility development. Mr. A said:

> *"...kalau sekarang mah program yang Pak Anies mau kerjakan di wilayah sini, didiskusikan dulu dengan warga, saya beberapa kali diundang ke kantor walikota.*"

> "…nowadays, the (government) programme… in this area, is discussed with the residents. I was invited several times to the Mayor's Office."

Public participation has increased not only at the planning stage but also in the monitoring of adaptation measures. Residents of *kampung* Muara Baru shared a similarly positive experience when reporting a problem with the sea wall construction in their neighbourhood. They also acknowledged the existence of a proper communication channel with the government offices. When we visited the *kampung* in June 2018, we saw a little crack from which water was dripping through the sea wall (Figure 3). According to our interviews, Muara Baru residents had already reported the crack to the neighbourhood leaders, who coordinated with the *kelurahan* office.[3] However, responses from the technical department to address the crack were still slow.

Both the vision for Jakarta as detailed in its Mid-term Development Plan and the anecdotes shared by local residents suggest that Jakarta is promoting public participation and social justice. The new leadership aims to develop a co-creative space for the people to identify key issues in their interests. This is in line with the concept of transformative adaptation discussed in Section 2. Current leaders show concern about spatial justice. *Kampung* residents now have their own plan, the Community Action Plan, and they are the ones to implement it. Through this mechanism, the government hears the voices of the most vulnerable groups. Therefore, at the planning level, there is potential for transformative adaptation.

3.3. The uncertainty of adaptation measures

In recent decades, there have been at least three planning concepts for Jakarta Bay, an area heavily exposed to land subsidence and rising sea levels. The changing planning concepts for Jakarta Bay create a lot of uncertainty for the future of urban *kampungs*, even though all three concepts recognize the presence of the *kampungs*.

The first concept imagines Jakarta Bay as a world-class waterfront city through sea reclamation. It includes the revitalization of urban *kampungs* along the coast, under a programme titled "Rebirth of Jakarta". This concept, however, suffered from the financial crisis in 1998. To date, only three of the 17 reclaimed islands have gone through with construction.

The second concept, launched in 2005, seeks to protect Jakarta with a giant sea wall and undertake integrated development of new land reclaimed from the sea, under the programme called National Capital Integrated Coastal Development (NCICD) in 2005. The NCICD has only completed one out of three phases of sea wall development approved by the government. This concept also involves subsidized *kampung* improvement, but does not include *kampungs* in the new development. The current governor aims to provide public housing and public spaces in the reclaimed area.

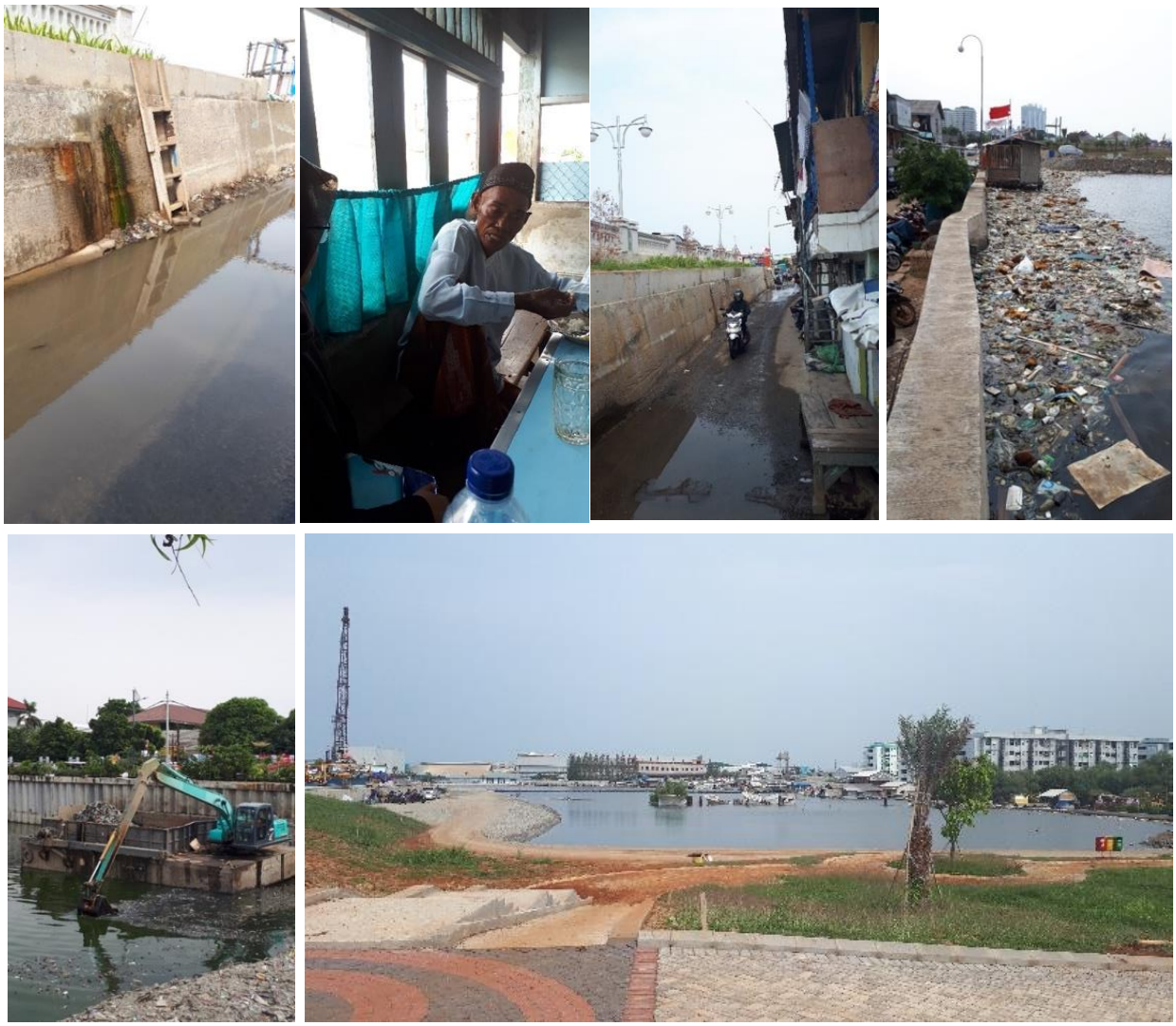
The third planning concept restores Jakarta Bay's ecosystem and develops it as a new freshwater resource for Jakarta, at the same time pursuing other areas of national interest such as desalination. This concept is being studied by the central government, focusing on water issues such as affordable water for the urban poor.

The uncertainty of city-level adaptation results in unexpected responses to the sea wall by local communities. Although there is a small crack in the sea wall, local people do not consider it a hazardous place. They use the sea wall as a foundation for their chicken coops and communal toilets. There is little

[3] *Kelurahan* is the lowest level of government in Indonesia, the equivalent of an administrative village or subdistrict.

effort to keep the environment surrounding the sea wall clean. Many people throw garbage into the sea, which degrades the quality of the green vegetated dyke as conceptualized in the government plan.

Figure 3. Top – The sea wall and inundation due to a small crack.
Bottom – Efforts to clean and beautify the sea wall.



Source: author's own

To improve the coastal ecosystem, the government conducts regular dredging to collect garbage at the bottom of the reservoir. A dredging supervisor reported 20 trucks each day carrying garbage to Bantar Gebang, the final disposal site (interview, August 2019). In addition, the government has also developed a retention pond and a small park for recreational purposes in order to increase the social and economic value of the space.

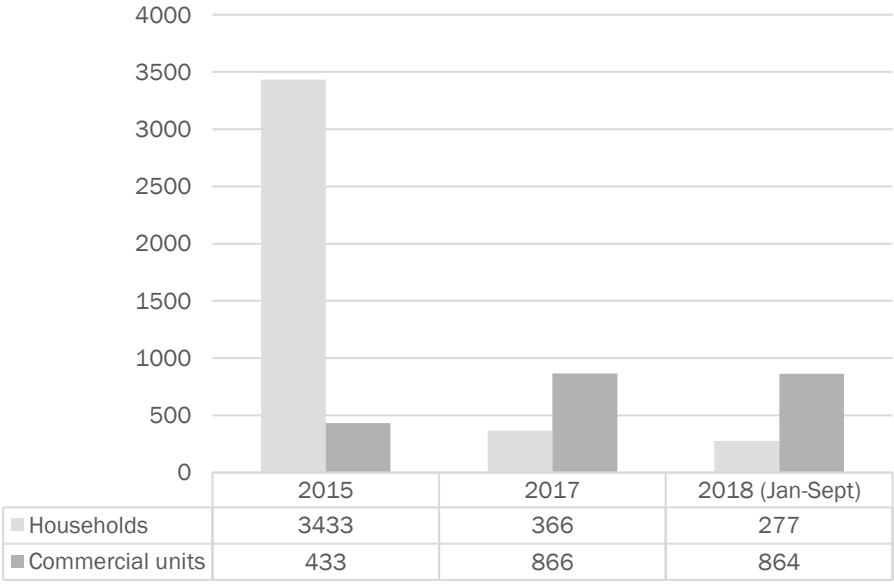
3.4. Relocation in numbers

Even though the government has sought to increase the participation of *kampung* residents in planning and development, relocation remains an issue with serious social justice implications. A report by Jakarta Legal Aid Institute (LBH), a national non-profit organization, compares the locations, purposes and funding of relocation programmes in 2015 and 2018 in Jakarta and presents the following findings (LBH 2018).

Relocation points and affected populations

In 2015, there were at least 30 relocation points (concentrated in North Jakarta and East Jakarta) affecting a total of 3,433 families and 433 business units. In the period from January to September 2018, there were 79 relocation points (concentrated in Central Jakarta and South Jakarta) affecting a total of 277 households and 864 business units. There was an increase in the number of relocation points. While relocation affected more residential areas in 2015, it impacted more commercial areas in both 2017 and 2018 (see Figure 4).

Figure 4. Number of relocated units



Source: own graph based on LBH (2018)

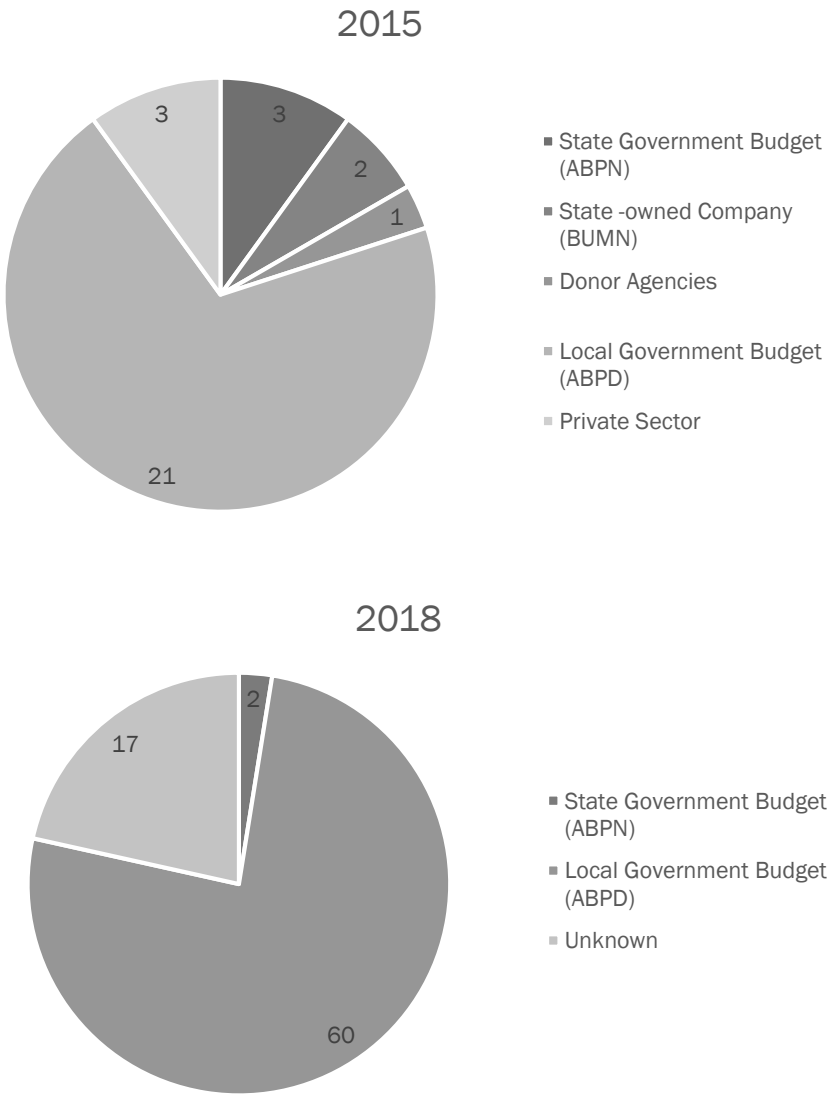
Purpose of relocation

In 2015, purposes of relocation included: construction of reservoirs (1 location), water normalization (12 locations), city parks (1), and other needs (16). In contrast, in 2018 purposes of relocation included: enforcing land regulation (57 locations), knocking down building because of permit violation (16), green lanes (10), city parks (2), and other needs (5). This data shows that in 2015 relocation was more focused on improving Jakarta's surface water system, while in 2018 it was more on improving urban spatial planning (building permits and green open space).

Sources of funding for relocation

The regional budget was the dominant source of funding in both 2015 and 2018. The number of relocation points funded by the private sector decreased from three in 2015 to zero in 2018. In 2018, the total budget was IDR 53.7 trillion for 106 relocation points (regional budget/ *Anggaran Pendapatan dan Belanja Daerah*/ APBD).

Figure 5. Funding sources of relocation (per number of relocation points) in 2015 and 2018



Source: own graph based on LBH (2018)

The report also identifies responses to relocation from the public. Several non-profit organizations spoke out against relocation and in defence of the urban poor. The National Human Rights Committee also closely examined the relocation process. In addition, scholars in architecture and sociology offered alternative solutions, including water-sensitive designs that would allow people to continue living in the flood-prone settlements, arguing that the design would not have any negative impacts on the hydrological pattern of the site. Stakeholders' concerns have pressured the new governor into re-examining the relocation programme. The following section discusses lessons learnt from a previous relocation initiative.

4. Relocation as adaptation: The case of Waduk Pluit

As part of the city-level adaptation strategy, the government of DKI Jakarta has implemented several large-scale flood protection projects that impact the lives of slum dwellers. Due to the increasing intensity of floods, it seeks to normalize all water bodies, including reservoirs, and dredge rivers to provide more space for water and avoid extreme floods. One of the adaptation projects is the

normalizsation of Waduk Pluit, a reservoir established in the 1960s that has narrowed due to sedimentation. Low-income urban dwellers occupy the banks of the reservoirs in informal settlements. As part of the normalization effort, the government relocated informal dwellers living in Waduk Pluit and its surroundings. Below are findings on the relocation of Waduk Pluit residents to vertical social housing in Marunda (20 kilometers from Waduk Pluit) and Muara Baru housing (near Waduk Pluit). The analysis focuses on social justice in the context of transformative adaptation.

4.1. The relocation process and its challenges

Relocation of low-income urban dwellers in Waduk Pluit started in early 2013, immediately after a severe flood. Muara Baru, a *kampung* near Waduk Pluit, was one of the most severely inundated areas for two weeks. Thousands of families were evacuated to shelters and depended on external aid to survive due to a loss of income from their routine jobs. The governor of Jakarta at the time personally persuaded affected *kampung* residents to move to vertical social housing. He made regular trips, often referred to as *blusukan*[4], to the *kampung*. He invited the affected households to his office to discuss relocation options. The vice governor also visited the shelters and encouraged people to move to social housing. Through this approach, the affected communities felt that the leaders respected them.

The relocation process highlights the importance of proximity of resettlement housing to the original settlement. In the initial phase of resettlement in Muara Baru, the affected community had the options to move to vertical social housing or to find their own housing. Many members of the community initially rejected this plan, as the vertical social housing was in Marunda, 20 kilometers away from Waduk Pluit. In response, the government offered ID card applications[5] and fully furnished apartments as incentives. After a prolonged dialogue that was initiated in early 2010, only 35 out of hundreds of families agreed to move to Marunda after the flood in January 2013. They became an example for more families to follow.

In the following year, the government developed vertical social housing right in Muara Baru. Muara Baru social housing was reserved for families with a house originally on the water and a Jakarta identity card. While Marunda social housing was further away, it offered employment opportunities through low skilled jobs in the industrial zone. Such opportunities, along with ID cards and furnished apartments, however, were not available at the Muara Baru social housing. In the end, however, the close proximity to the original *kampung* made Muara Baru housing the preferred option among the affected families.

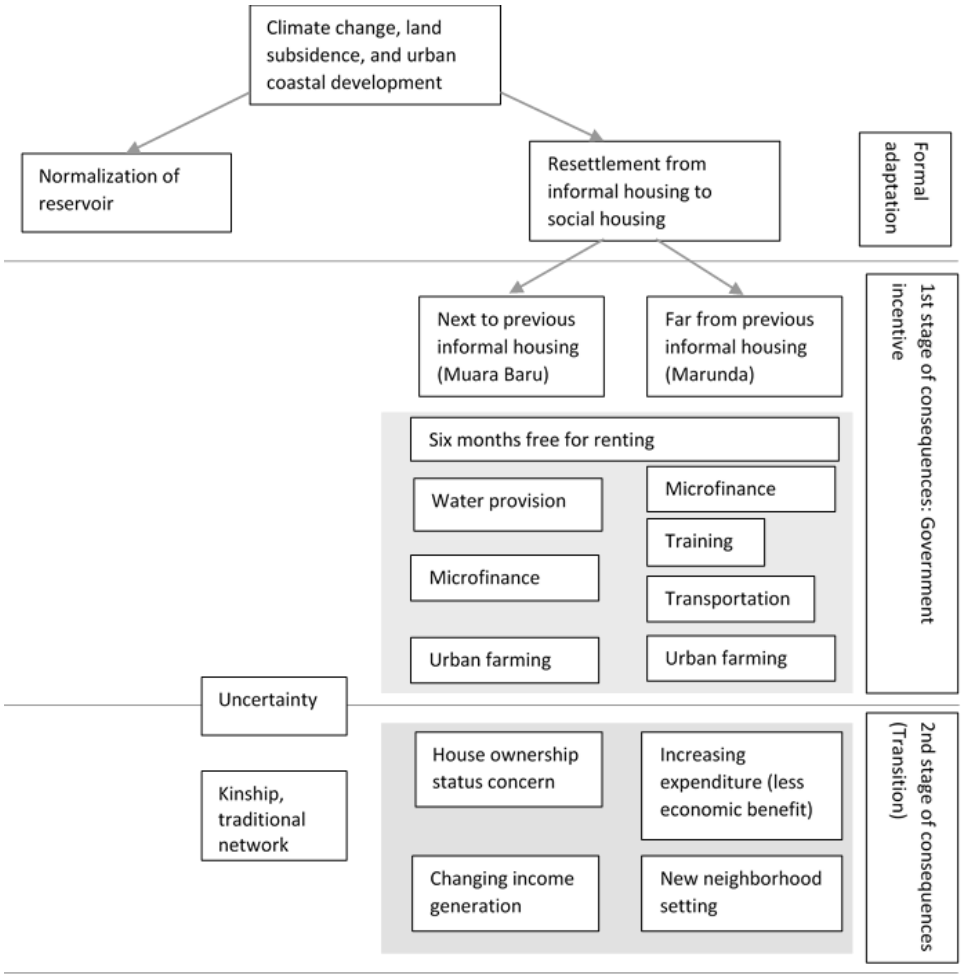
Regardless of relocation destination, the transition to vertical housing has not completely improved the conditions of *kampung* residents. Both Marunda and Muara Baru social housing are rental housing. The government prefers a rental system in order to better maintain the quality of the buildings and encourage the renters to ultimately move out to their own houses. However, the rental system with regular payments is a challenge for the relocated families, whose income is unstable. In contrast, in the informal settlement, these households were used to a flexible payment system built on mutual trust and understanding among the dwellers.

Moreover, in the case of Muara Baru, access to clean water remains a challenge. In the informal settlement, residents bought water from street vendors. Water cost IDR 20,000 per day, roughly one third of their daily average income. Water in social housing in Muara Baru was in short supply. Thus, most residents still have to buy water from street vendors for daily use. The price of water, however, is higher reflecting the additional costs incurred by vendors to distribute water to apartments on the upper floors.

[4] *Blusukan* means an in-depth field visit.
[5] In the initial plan, social housing was only available to those with a Jakarta identity card. Many, however, did not have one.

In addition, the overall process of relocation lacked participation. There was no space for affected households to negotiate or address changes in kinship networking, neighbourhood setting and economic opportunities. Therefore, after the first six to twelve months, or at the end of the initial free renting period, residents started falling behind on their rents and getting fines from the management office. Many relocated families thus decided to return to the informal settlement and lease the apartment unit to another tenant.

Figure 6. Formal adaptation steps from government incentive to transition in Muara Baru and Marunda



Source: Own draft

4.2. Communication, transparency and voluntariness

An ideal relocation project involves a complicated and often time-consuming process from planning to implementation (Fernando 2010). There are at least four stages of relocation, namely: planning and recruitment; adjustment; community and economic formation; and handover and implementation (Scudder 2005). In the case of Jakarta, the process has taken place without participation in planning and with a shortened adjustment period. As such, while affected *kampung* residents respect the provision of formal housing, a better relocation process would better accommodate their lives and livelihood systems. The differences between dwelling in an informal settlement and living in formal vertical social housing can result in difficult situations. The unstable incomes of informal workers do not match the strict monthly payment system. Moreover, vertical housing reduces social interaction that was central to life in an informal settlement.

Moreover, the relocation processes studied lack participation and transparency. According to our interviews with residents of Muara Baru, the relocation decision came as a surprise to them. The community had had several meetings with a non-profit organization about slum upgrading, but the topic of relocation was never brought up. People were aware that they lived in a flood plain that should be free from human activities, yet they had also lived there for more than 3 decades with a strong sense of attachment to place. Over 30 years the neighbourhood system had become well established and income generation was well sustained. The lack of information on relocation gave rise to rumours, particularly regarding compensation. Different strands of information circulated within the community. The local neighbourhood board stated that they had distributed information to the people, yet respondents revealed that the information had not reached the entire community.

The absence of proper information dissemination led to perceived unfairness among the affected families. Since not everyone was entitled to vertical social housing, information was very important in the process. Those with no access to social housing had to prepare to move to other places. Eviction was so hasty that many households did not have enough time to prepare and thus lost assets.

There was also little communication and information about relocation housing itself. The eviction took place while vertical social housing was still under construction. Respondents were uninformed of the status of the housing waitlist. Moreover, the distribution of housing followed a lottery system except for the families with special needs, which was a big challenge for many families whose use of space varied. For instance, fishermen and those with jobs that require special devices and equipment need special storage in their house; street vendors need storage space for carts or wagons outside the house. The lottery system, however, did not take these needs into account.

Moreover, residents also faced the challenge of limited support for adjustment. Figure 6 shows the different stages of adaptation of the affected population along with support from the government. While households which relocated to social housing benefited from free rent for the first six months, they need more time to adjust to the new living conditions. Scudder (2005) argues that the adjustment stage lasts until the affected community has successfully achieved economic or community formation. In the following stage, relocated families will decide whether they will stay or move. Indeed, due to the lack of support for adjustment, one of our respondents shared his decision to move back to the informal settlement. When rent became payable after the first six months when rent was free, his family fell behind on the monthly payment. They then leased the apartment to relatives who have a monthly salary and familiarity with the rental system.

In general, whereas people agree that relocation should provide access to better housing, from non-permanent to permanent housing, it is not in line with *kampung* dwellers' expectations and needs. Only a few respondents indicated that they moved to social housing voluntarily; whereas most highlighted that they had no other choice.

4.3. Economic impacts of relocation

Relocation does not only influence people's living conditions but also affects their economic well-being. On one hand, relocation often results in a decrease in income, both for those who move and those who stay. Workers in the informal economy, such as street vendors in Muara Baru, immediately lost income as their customers moved to new housing. Others experienced a change in the market. A female street food vendor who is responsible for three children shared how she has less control over the diversity of foodstuff since moving to Marunda. She has to limit the type of food she sells to reduce negative competition and share the market with other food vendors:

> *"When I was still in Muara Baru, I sold any type of food from snacks to main dishes. But now, I only sell the main dishes (gado-gado and gorengan) because the snacks should be for others. We can choose one type of product to allow others to sell another product.*

> *Because the people here are still few so the buyers are also not as many as in Muara Baru. That is why my income decreased, but it is enough for daily basic needs for me and my children."*

Those who were used to gaining extra income from renting out rooms in the *kampung* since the 1970s and 1980s lost this source of income as they themselves became renters under the social housing system. For example, a resident in Muara Baru said:

> *"I had more than ten rooms for rent when I was in an informal settlement in Waduk Pluit, and I got money from that. But now I have to pay for myself."*

On the other hand, expenditure has also increased for many. For those living in Muara Baru, an additional stress comes from higher spending on clean water, which they have to purchase from private vendors. Those living in Marunda report having to pay more for transportation as the new housing is further away from their original place of work. While the government provides free transportation from Marunda to Muara Baru to support employment, the transportation schedule hardly matches people's extremely varied working hours. This leads to a variety of coping strategies, including the following:

> "*I stay here (in Marunda) with my children while my husband stays in Muara Baru. He sleeps anywhere, sometimes in the security office, sometimes in a friends' house because he works many jobs which are sometimes in the middle of the night, and sometimes very early in the morning. That makes him having to commute from here.*".

Indirectly, relocation alters people's livelihoods by disrupting their social network. It is through kinship, social capital and a strong social network that new dwellers become part of a settlement and its informal economy can grow. Equally it is social capital and collective action, resulting from informality, which contribute greatly to risk management and crisis resolution, be it a flooding event or an economic shock. Therefore, many affected families refuse to move and many who move eventually return due to the extreme changes in both social and economic conditions.

4.4. Typology of the most vulnerable groups in North Jakarta in the context of relocation

The previous sections portray the process of relocation and its outcomes to illustrate the nature of adaptation in Jakarta. Relocated families respond differently in the different phases of relocation. Some adjust to the new housing, while others move back to the informal settlement. Responses vary depending on their livelihood characteristics and existing power relations, which can be categorized into the following three types. The typology is based on residents' initial housing status in the informal settlement. This classification helps analyse how relocation affects the life of low-income urban residents within the context of climate change adaptation.

Figure 7. Three types of livelihood profile

Type 1	Type 2	Type 3
• Urban dwellers for more than three decades • Rent a home • Informal sector	• Urban for more than three decades • Having a home and rooms for rent • Informal sector	• Urban dwellers for around two decades • Rent a home • Informal sector

Source: Own draft

Type 1 residents are people who are likely to accept relocation since they have been already been in rental housing for over three decades. One woman shared her happiness upon receiving the keys to an

apartment in vertical social housing. She compared the informal settlement to Marunda social housing, where she pays half as much rent. She agreed that the payment system in vertical social housing is strict but she said had been adjusting to the new system. Upon leaving the informal settlement, she also left her job as a street food vendor in Muara Baru and got a new job in Marunda as a cleaning person. Her story exemplifies the positive outcome for type 1 residents.

Type 2 residents, however, experience worsened socio-economic conditions. Having to move out after over three decades of living in the *kampung*, these residents, particularly those who have power in the informal settlement, lose income as they can no longer rent out rooms. They have to pay rent themselves, which they did not have to do in the *kampung*, and often find themselves on the verge of unemployment. However, as senior residents in the *kampung*, they still have power and good relationships with neighbours, enabling them to easily find a new home when they decide to move out of the social housing.

Type 3 tells the story of people who paid rent in the *kampung* and have no access to vertical social housing. As mentioned earlier, the government gave social housing priority to people with a Jakarta ID card which is often not the case for type 3 residents. Some of them are lucky enough to sublease from those who move out of vertical social housing. One of our respondents, a worker in a fishery firm in Muara Baru, was able to rent a room in a four-room social housing unit from their relative. However, the illegal nature of this living arrangement means that they are always under the threat of inspection and eviction by the local government.

Overall, relocation justice is part of the right to the city and the right to housing. However, many urban poor residents do not have a Jakarta ID card and consequently lack access to formal housing. Transformative adaptation would address this root cause of vulnerability. The opportunities offered by the new governor for slum dwellers to participate in the Community Action Plan provide an entry point to transformative adaptation. However, as shown in the case of Waduk Pluit, relocation is still *the* adaptation response, with little participation and poor communication.

5. Conclusion and outlook

Adaptation in Jakarta revolves around the question of the scale of adaptation, the dynamics of development, and the relationship between the government and informal settlements. Climate change, sea level rise and land subsidence exacerbate the complexity of urbanization in Jakarta. At the planning level, the vision for Jakarta is a city free from flooding and drowning. The state sees *kampungs* as one of the causes of flooding as they occupy green and water spaces that could otherwise be used as retention space for flood waters or as a location for flood protection infrastructure. Relocation, thus, becomes an intuitive solution, despite its adverse consequences for the affected community. As the case of Waduk Pluit demonstrates, after relocating and resettling elsewhere, people are subject to new risks as they struggle to adjust to the new environment. There is little improvement in their coping capacity. Relocation as an adaptation pathway raises serious questions of social justice.

Our study found that the current relocation programme falls short of transformative adaptation. This is especially apparent in the second stage of adaptation, as residents adjust to the new neighbourhood system and environment. Instead of addressing long-term vulnerability and risk, the relocation of Waduk Pluit has resulted in continued vulnerability. Instead of increasing access to public services and reducing vulnerability, the resettlement fails to meet specific needs of the urban poor and informal workers, resulting in difficulties in the adjustment process.

From this study, there are three pathways for adaptation in Jakarta. The first pathway provides formalized housing for relocated residents. The provision of social housing involves a transition from the informal system of the *kampungs* to the formal system of rental housing, which means a fundamental change in the lives of the urban poor. The second pathway proposes on-site slum upgrading by

legalizing existing land uses without resettlement. One option is to rebuild the existing informal settlement into a disaster-friendly settlement with so-called amphibian housing which adjusts according to the water level, preventing the housing from flooding. A third adaptation option is non-action, which might lead to space contestation between the private sector and/or the government and the poor.

Based on our study, Jakarta is currently following the first pathway. While the government attempts to formalize *kampungs* by providing access to formal housing, it fails to reduce long-term vulnerability and risks because community needs are not met. Urban poor populations may have the capacity to cope with recurrent flooding but have only limited capacity to adapt to sudden changes in their social and physical environment. Therefore, instead of becoming less vulnerable to future risks, many relocated families remain trapped as they find their way back to the hazard-prone areas.

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