



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



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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.

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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—2,840 trillion Indonesian Rupiah (IDR) in 2019¹—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. This 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 which make 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 riverbanks, 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 <u>https://jakarta.bps.go.id/indicator/52/55/1/pdrb-atas-dasar-harga-berlaku-menurut-lapangan-usaha-.html</u> equivalent to approximately 200 billion USD at an exchange rate of USD1 = IDR 14,134 (October 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 15 years (2005-2019) floods caused 137 fatalities and 775 injuries, and displaced 861,563 people living in DKI Jakarta (BNPB 2020). 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*.

Year	Died	Injured	Evacuated
2019	2	0	2,258
2018	2	1	24,617
2017	6	0	9,282
2016	3	0	3,587
2015	0	0	15,178
2014	25	0	95,997
2013	38	0	87,291
2012	1	0	4,384
2011	0	0	1,398
2010	4	238	9,056
2009	0	2	4,403
2008	8	50	66,002
2007	48	484	522,569
2006	0	0	1,308
2005	0	0	14,233
Total	137	775	861,563

Table 1. Impact of floods in Jakarta (2005-2019)

Source: BNPB 2020

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: (i) 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 subnational 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).

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