STEPHANIE LYONS

The Jakarta floods of Early 2014: Rising Risks in one of the World's Fastest Sinking Cities

INTRODUCTION

In January and February 2014, the Indonesian megacity of Jakarta was hit by heavy rainfall and flooding that caused the deaths of 23 people and displaced more than 60,000 others (Setiawati 2014; OCHA 2014). This was not the first time that Indonesia's capital and economic centre had experienced the severe consequences of floods. Jakarta is one of the largest coastal cities in South-east Asia, with a long history of exposure to natural hazards and disasters and high vulnerability to climate change (Firman et al. 2011). Floods inundate Jakarta at least annually and are projected to worsen as a result of climate change; in fact, flooding represents the greatest climate- and disaster-related risk to the city, and its most severe floods on record have all occurred within the last twenty years (World Bank 2012b, 1; Douglass 2010, 45).

Situated around a large bay on rapidly subsiding land and floodplains, Jakarta is intrinsically vulnerable to floods and other projected climate change impacts, and this vulnerability is compounded by human activity. The city's large population of poor residents is especially at risk, with communities concentrated in dense, often unstable settlements in some of Jakarta's most flood-prone areas near the bay, rivers, lakes and floodwater retention areas. These risks have been exacerbated by the rapid growth of Jakarta's economy and population, uncontrolled and poorly planned urban development, and long-term environmental degradation, all of which accelerated over the second half of the twentieth century and is continuing today. Many Jakarta residents face both temporary and longer-term displacement each time floods hit the city, and as flooding becomes more frequent, it poses immense challenges for both Jakarta's and Indonesia's governments and a range of non-government actors. From an environment and migration perspective, Jakarta is an example of a context in which natural hazards are *already* displacing communities, while, at the same time, increasing population growth and migration are adding to local environmental degradation, thereby further increasing the risks from both floods and displacement.

This case study examines the floods and resulting human displacement that occurred in Jakarta in early 2014—in the context of the broader, long-term flooding risks posed by climate change—and reviews some of the responses and solutions that have been proposed and employed to date. While there is substantial data available on Indonesia's and Jakarta's environmental vulnerability to floods—and extensive media reporting on communities' experiences of both floods and displacement—it appears that as yet there has been limited explicit or in-depth analysis of the connections between flooding and displacement in Jakarta. While national and local authorities regularly release official data on the number of people affected and displaced by individual flood events in Jakarta, the availability and accessibility of longer-term data and estimates are variable and sometimes inconclusive. This study therefore

draws from a range of secondary evidence provided by international organisation reports (such as from the International Organization for Migration and the World Bank), academic research, Indonesia's national- and city-level government authorities, and local and international news media accounts.

An analysis of the implications of floods and displacement in Jakarta is timely for those actors involved in addressing these problems at the city level, and is also pertinent from national and global policy perspectives. Over recent years, Jakarta's government has been increasingly engaged in measures to mitigate floods and reduce the risks of displacement. Minimising flood impacts was a central election commitment of Jakarta's previous governor, Joko "Jokowi" Widodo, and remains a central focus of his successor, Basuki "Ahok" Tjahaja Purnama, who became governor in October 2014 after Jokowi was elected president of Indonesia (Purnamasari 2013). (In examining action undertaken in Jakarta to date, this study focuses primarily on the Jakarta government, which has provincial-level status and encompasses five smaller authorities, each with local mayors.) With flooding due to worsen as a result of climate change, Jakarta faces an increasingly urgent task in reducing flood risk and avoiding severe consequences for its citizens, including displacement, injury and death. These imperatives are relevant throughout Indonesia and Asia more broadly, where populations and cities are burgeoning. Asia's urban areas are the fastest growing regions in the world; by 2025, Asia will be home to ten of the world's twenty most highly populated urban agglomerations (IOM 2014b).

This study therefore offers insights on flooding and displacement in Jakarta as a rapidly developing, densely populated, climate change-exposed city. It begins by examining the environmental vulnerability and risks faced by the city of Jakarta and its residents. The study then explores experiences of flooding and displacement in Jakarta's recent history, including the floods of early 2014, before investigating key policies and response measures to date, including both flood mitigation measures and community relocation efforts. The study concludes by highlighting key areas for action by governments and other actors to improve the integration, delivery and design of flood-related policies and measures.

1. BACKGROUND AND HISTORY

Environmental vulnerability

As the world's fourth most populous nation and largest archipelago, Indonesia has always been vulnerable to natural hazards (Randall 2013; IOM 2013). Comprising more than 17,500 islands to the north and south of the equator, it is exposed to severe earthquakes, volcanic eruptions and dry mass movements, and suffered devastating human and environmental loss and displacement from the 2004 Indian Ocean tsunami (World Bank 2015b; IOM 2014). Floods comprised almost a third of more than 1,500 disasters recorded in Indonesia in 2014, and have been by far the most frequently occurring type of natural hazard in Indonesia since 1980 (Jakarta Post 2014a; IOM 2013).

Jakarta is one of Indonesia's most disaster-threatened provinces and encapsulates many of the challenges the country faces from climate change and urbanisation in degraded, vulnerable environments (Elyda 2014). "Greater Jakarta", designated as Jabodetabek, is a rapidly growing "mega-urban region" of around 28 million people, located on the northwest coast of the island of Java, which is home to around 54 per cent of the country's total population of almost 230 million (Tarrant 2014; World Bank 2015b). Current population statistics for Jakarta's primary urban area vary depending on how broadly the area is defined, ranging from over 10 million (Sentana 2014) to around 16 million people (Hill 2013). It has been estimated that at least an additional 2.5 million people from surrounding areas commute into Jakarta for work

every day (Firman et al. 2011). Having grown from around two million people in 1960, Jakarta has undergone significant uncontrolled urban development over the past few decades, leading to expanding unstable settlements, water shortages, and increased traffic due to rising car ownership (Douglass 2010, 47; Maclean 2014). It is now one of the ten most densely populated cities in the world, comprising rich residential communities and high-rise developments, as well as dense neighbourhoods of low- and middle-income residents (known locally as *kampungs*) and informal settlements (Tarrant 2014; HRW 2006). As Jakarta is Indonesia's capital and economic hub—generating more than 20 per cent of national GDP and also comprising a large informal sector—disasters in the city have significant consequences for local residents and the country as a whole (Tarrant 2014; McKinsey Global Institute 2012, 14; World Bank 2009).

Figure 1. Jakarta, Indonesia's capital and economic hub, is situated on subsiding land and floodplains around Jakarta Bay, which opens out to the Java Sea.

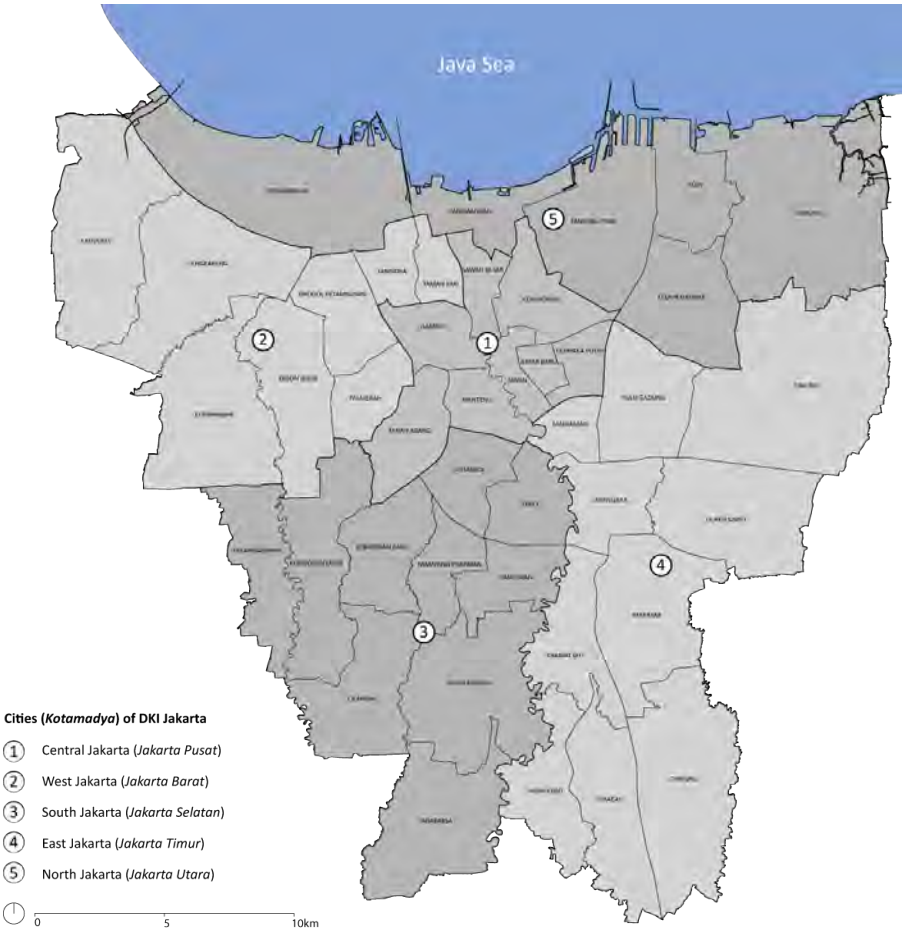

Image: Creative commons.

Located on a swampy plain around the Bay of Jakarta, the city is, in effect, a "sinking bowl" (Tarrant 2014) and is highly exposed to flooding from heavy rainfall and seawater and river water inundation. Much of the ageing technical infrastructure for flood mitigation—including floodgates, canals and a sea wall—has been

unable to accommodate the floods of recent years. As the impacts of climate change worsen, Jakarta's rainfall and flooding are projected to become increasingly frequent and intense (World Bank 2014a). Indeed, floods and flood-related dangers pose the greatest risk to Jakarta of any type of natural hazard: while their occurrence may be predictable, they can be extremely hazardous and hit the city at least annually, typically in January and February at the peak of the rainy season (Tarrant 2014; Maclean 2014; Douglass 2010).

Jakarta's environmental vulnerability to floods can be understood as the product of intersecting natural and human-influenced activities and characteristics (Ekuatorial 2014). Most of the northern part of Jakarta is a floodplain: a lowlying area that should hold and channel water during floods, but cannot safely function due to over-development (Ekuatorial 2014). This is exacerbated by the severe degradation and blockage of the thirteen rivers that flow through the city, along which many of the poorest residents are settled (Hill 2013; Ekuatorial 2014; World Bank 2010). Jakarta is also said to be the world's fastest sinking city: the highly porous land has subsided by around four metres over the last three decades and is now sinking around seven centimetres on average each year as a result of groundwater extraction, concrete-heavy load construction, natural consolidation and tectonic activity (Tarrant 2014; Firman et al. 2011). Due to rapid land use change and development, Jakarta has very few natural drainage sites: its water tables cannot adequately absorb rainfall, and floodwaters and concrete settlements create blockages (Ekuatorial 2014).

Rainfall and sea-level rise compound this vulnerability. In the last decade, extreme rainfall in Jakarta has grown markedly during the peak months of January and February. Rainfall in these months averaged 193 millimetres per *day* in 2013, compared with a recorded average of 400 millimetres per *month* between 1879 and 2002 (Ekuatorial 2014). Forty per cent of Jakarta already lies below sea level, and projections indicate sea levels could rise from 18–59 centimetres by 2100 (Tarrant 2014). A 50centimetre rise in sea level, combined with subsidence in Jakarta Bay, could permanently inundate densely populated city areas that are home to over 270,000 people (Ward et al. 2012, 523; World Bank 2015b).

Much of Jakarta's physical infrastructure and human activity exacerbate these risks. Urban waste is a major problem; most neighbourhoods use local septic tanks or dump waste into sewers that flow into the canals, which have lost up to 75 per cent of their capacity (Tarrant 2014). From everyday garbage to mattresses and refrigerators, overwhelming quantities of human waste clog various canals, floodgates and urban spaces, especially within the kampungs, where embankments have been known to trap floodwaters (Ekuatorial 2014; Maclean 2014; World Bank 2010).

1.2. Groups most vulnerable to displacement in Jakarta

Although flooding is increasingly affecting all Jakartans (the presidential palace was famously flooded in 2013), it is the city's poorer residents who are the most vulnerable, given their location in densely packed, flood-prone areas. While some of these people are migrants to the city and others have lived there for generations, poorer communities are mostly concentrated in low-lying areas near the rivers, canals, retention lakes and bay (Firman et al. 2011). Jakarta's governor said in 2014 that more than 600 community units are prone to flood. According to the Jakarta Disaster Mitigation Agency (BPBD), the most flood-prone areas include seven sub-districts comprising more than 20 smaller community units (Elyda and Dewi 2014).

The majority of people who migrate to Jakarta come from other parts of Indonesia—especially poor and rural regions—in search of better living conditions, and often work in informal sector jobs, such as in food stalls and boatyards (Firman et al. 2011; Tarrant 2014). The World Bank estimated in 2010 that an additional 250,000 people come to Jakarta each year in search of work. Some migrants settle illegally or semi-legally in informal settlements on the precarious edges of rivers and floodwater

retention lakes (Tarrant 2014). Workers, such as those in the construction sector, have been known to move around the city, living wherever work is available (Wilhelm 2011, 130). Studies indicate that some rural-urban migrants follow friends or family to the city, while others migrate alone and send remittances back to their families, and may relocate frequently to find the cheapest accommodation possible (Wilhelm 2011). Some migrants are seasonal and have been known to remain in Jakarta for up to ten months per year, but are often omitted from official figures (UNHabitat 2003, 212). The instability and fluidity of these types of income, employment and housing arrangements suggest that migrants can be acutely vulnerable to floods.

Of course, many flood-vulnerable Jakartans are not migrants, but rather permanent or long-term residents—in kampung Muara Baru, for example, 90 per cent of respondents to a 2007 survey had lived there for more than ten years (Nurlambang 2012, 80). While reliable data on kampungs are scarce, as they do not constitute formal administrative entities, many host a combination of poor, near-poor, working- and middle-class residents, with unstable shelters constructed alongside more resilient permanent buildings (UN-Habitat 2003, 211–212). Since the 1970s, swift urbanisation, increasing land prices and speculation have shrunk these settlements while reducing available land for low-income housing, increasing population density within and around the kampungs (UN-Habitat 2003). Flooding is therefore another type of displacement pressure faced by many kampung residents, along with commercial development and corrupt activities that have forced some residents out of their homes over the past few decades (UN-Habitat 2003; HRW 2006). Kampung Muara Baru offers one example of these communities' vulnerability: located just inside Jakarta's seawall, it is home to more than 100,000 people and already sits almost two metres below sea level (Tarrant 2014). For local residents who must look upwards from their homes to view the sea, daily high tides and enduring high-water marks from past floods are stark reminders of how evacuation and permanent displacement threaten their everyday lives.

The people most threatened by floods in Jakarta are therefore likely to face overlapping circumstances that increase their overall vulnerability. From long-term residents to temporary migrants, communities' inherent environmental vulnerability can be compounded by factors such as residents' levels of income, type of work, residency status, shelter, and the extent of their social connections and ties to their district and community. These people may have multiple experiences of displacement by flooding, whether temporary or long-term, within their lifetimes; the implications of this for their physical and mental health and social wellbeing can be profound (Maclean 2014). By reviewing floods in recent history and the 2014 flooding event, the following section examines the environmental and displacement implications in greater detail.

2. FLOODS OF 2014 AND RELATED DISPLACEMENT

2.1. Floods in recent history

Jakarta's annual floods have become more intense, frequent and widespread in recent decades. Following decades of swift population growth in the latter half of the twentieth century, Jakarta's most destructive floods on record have occurred within the last 20 years: in 1996, 2002, 2007, 2013 and 2014 (Douglass 2010, 45; Tarrant 2014).

The 2007 flood was Jakarta's worst on record, and was the first time that a large storm surge—originating from a huge monsoon storm and high tide—flooded the city (Tarrant 2014). As much as 75 per cent of Jakarta was flooded, at least 76 people were killed, disease outbreaks affected more than 200,000 people, and damages amounted to more than USD 900 million (Tarrant 2014; Douglass 2010; World Bank 2014a; World Bank 2015b). It is estimated that at least 1,500 homes were destroyed

(World Bank 2012b). Displacement estimates from the 2007 flood vary from around 340,000 (Douglass 2010; World Bank 2014a) to up to 590,000 (Tarrant 2014). In the neighbourhood of Muara Baru alone, more than 4,000 houses were inundated by at least two metres of water (Nurlambang 2012, 79). Fisheries and businesses lost up to 50 per cent of their incomes, and up to 90 per cent of the local population was unable to go to work (ibid.). In a survey of almost 200 residents after the flood, only around 30 per cent of respondents said they had received flood warnings, and that these had come from neighbours, relatives or friends, rather than the government (Susandi et al. 2011, 5; Nurlambang 2012, 79). After the flood, 24 per cent of survey respondents reported having received government assistance, and 30 per cent said they had received support from non-governmental organisations (NGOs) (ibid.).

The floods of early 2013 were Jakarta's worst since 2007: heavy rainfall broke riverbanks, sending torrents of water into the city centre and inundating the iconic Hotel Indonesia traffic circle (ABC News 2014; Jakarta Post 2015c). While the reported total death toll from the 2013 flooding varies, data from United Nations OCHA (2013) suggest at least 41 people were killed and 120,000 were displaced (Hill 2013; Jakarta Post 2015c).

2.2. Floods of 2014

The Jakarta floods of 2014 underscored residents' vulnerability to displacement and the significant challenges involved in confronting increasingly common and widespread flood events.

On 12 January, after several days' torrential rain led to river overflows and flooding, the Indonesian Government declared a 30-day emergency readiness phase (ABC News 2014; International Federation of the Red Cross 2014). A range of government actors were mobilised: the Jakarta BPBD coordinated the process in conjunction with its national-level counterpart, the BNPB, with further assistance from the military, police and several other agencies that supported evacuation and relief efforts (IFRC 2014).

By 19 January, more than 30,000 residents had been forced to evacuate and at least seven people had died from drowning, electrocution or flood-related illnesses (ABC News 2014; Sentana 2014). Two days later, five more residents had been killed, and the number of displaced people had more than doubled to almost 63,000; many took shelter in more than 250 makeshift displacement centres close to the affected areas, such as mosques and schools (OCHA 2014). At this point, it was estimated that nearly 135,000 people from 100 different urban villages in Jakarta had been directly affected by the flooding (ibid.).

As January drew to a close, the floods had killed 23 people; the majority of deaths occurred in eastern Jakarta, though people were also killed in the north, west, central and southern parts of the city (Setiawati 2014). While thousands of evacuees returned to their homes to recover and clean up, more than 18,500 people were forced to re-evacuate to shelters following more rain and flooding on 3–4 February (ReliefWeb 2014). Some neighbourhoods had already been evacuated nine separate times during the month of January alone, underscoring the instability and unpredictability of many residents' circumstances (Maclean 2014). Some communities, including thousands of residents of Kampung Pulo, were evacuated again later in February due to floods that reached depths of almost three metres (Jakarta Post 2014d).

The floods overwhelmed much of Jakarta's infrastructure and posed major immediate and longer-term risks to safety and health. Flood levels were recorded at between 20 centimetres and 1.2 metres in low-lying areas near the rivers, and reached up to two metres at the riverbanks and up to four metres in some homes (IFRC 2014; Maclean 2014). Hundreds of kilometres of road were made inaccessible by inundation, drainage systems and bridges were damaged or destroyed, and local power was cut in some areas for at least two days, though phone and electricity

services remained intact in other areas (IFRC 2014; ABC News 2014). Many residents fled their homes by wading through the floodwaters or using rubber or makeshift boats. As the death toll implies, strong currents in the floodwaters were particularly dangerous, as the majority of residents did not know how to swim (Maclean 2014). Thousands of houses and buildings were flooded—and some half submerged—by black water containing sewage and waste (IFRC 2014; Maclean 2014; ABC News 2014). This had serious sanitation and health implications, including skin infections, diarrhoea (particularly in children under five years old), and the risk of severe conditions such as leptospirosis, an animal-borne disease that is spread through bacteria in water and can be fatal (Maclean 2014). Following this flood and others, residents said the floodwaters inside their homes took up to two weeks to subside (Maclean 2014).

After the February floods had abated, the BNPB estimates they had incurred around USD 407 million in damages to the city and led to a 0.4 per cent spike in inflation, which reached 1.07 per cent (Ekuatorial 2014; Elyda 2014).

Additional floods that hit Jakarta in the ensuing months of 2014 provide further examples of how flooding is becoming a more frequent event throughout the year in Jakarta. For instance, three months later, in May 2014—just before the start of Jakarta's traditional "dry season"—parts of the city were flooded once again. In Kampung Pulo, heavy rainfall burst the banks of the Ciliwung river, and, although residents' homes were inundated by up to two metres of water, no deaths or evacuations were reported (Wardhani and Elyda 2014). Several months afterward, following the city's brief dry season, the flood season was said to have started early, when unexpectedly heavy rainfall and floods hit the city in November (Elyda and Dewi 2014). On this occasion, more than 20,000 people were affected and at least 1,000 evacuated to temporary shelters (ibid.).

These flood events offer additional insights into how residents responded and adapted in 2014 to increasing incidences of flooding, and the resulting implications for evacuation and displacement. Recent accounts suggest that some residents are reluctant to evacuate their homes during floods, preferring instead to remain and employ various methods to cope and adapt. In Kampung Pulo in May, it was reported that many residents had not left their homes, but had simply moved onto the second floors of their houses to avoid the floodwaters (Wardhani and Elyda 2014). It is common for locals to prepare by moving their belongings above the anticipated flood lines, with some residents stowing valuable household items and chickens on the elevated railroad tracks that run parallel to their districts (Ika 2014; Maclean 2014). Media reports suggest that Jakartans who have lived in such districts for years are highly aware of the floods' increasing frequency, and some have developed their own methods of preparing for floods, including sharing information and tips with neighbours and packing their own "survival kits" (ibid.). They are also accustomed to post-flood clean up and recovery, which can take weeks (Jakarta Post 2013a).

However, it should not be assumed that such approaches to coping with or adapting to floods can guarantee residents' safety or necessarily reduce the likelihood of displacement. A media interview with one local resident suggests that some people may believe they are "safe" to remain at home as long as the flood levels have not reached two metres; another local resident said her children swam in the floodwaters after school and "enjoyed" the floods (Wardhani and Elyda 2014). Given the significant inherent health and safety dangers of Jakarta's floodwaters, these anecdotes highlight the importance of distinguishing suitable adaptation measures from risky practices and behaviours that may arise where locals have come to view severe flooding as routine or even banal events (ibid.; Maclean 2014; Zein 2015).

3. RESPONSES TO FLOODS AND DISPLACEMENT

Having outlined Jakarta's vulnerability and the complexity and scale of the implications of floods in the city, this case study now examines some of the policy frameworks and response measures that have been proposed and employed in recent years. As Jakarta's flooding implicates several complex policy areas, this study does not seek to provide an exhaustive account of all pertinent measures at the local, provincial, national and international levels. Instead, it highlights some of the notable policies that have been established and key efforts that have been undertaken in recent years to address Jakarta's flooding and related displacement problems. The proliferation of such measures over the last decade suggests that people in Jakarta—from leaders and government officials to NGOs and local residents—are broadly aware of these challenges and the need to address them, yet many efforts to date have not been well designed or coordinated (World Bank 2012b).

3.1. Overarching government frameworks and policies

Indonesia and Jakarta have a number of overarching strategies and policies in place on climate change adaptation (CCA), disaster risk reduction (DRR) and urban planning, each with implications for managing the short-, medium- and long-term risks from floods.

Following the 2004 Indian Ocean tsunami, the Indonesian government adopted a more comprehensive national approach to DRR, devoting attention to disaster prevention, preparation, emergency response and post-disaster recovery (World Bank 2012a, 40). Indonesia has also been active at the regional and global levels within the Hyogo Framework for Action—developing national action plans on disaster management and DRR—and has ratified the Association of South-East Asian Nations (ASEAN) Agreement on Disaster Management and Emergency Response (IOM 2013, 244; World Bank 2012b). As noted above, since 2008, disaster management has been coordinated at the national level by the National Disaster Management Agency, known as BNPB, which since 2010 has also had counterpart agencies at the provincial level known as BPBDs (ibid.). Jakarta therefore has a provincial-level BPBD agency. While Indonesia is clearly conscious of the need for comprehensive DRR policies, a representative from the national BNPB suggested in 2014 that some parts of the government still viewed disaster mitigation as primarily a matter of emergency response, rather than as a long-term process of planning and investment (Elyda 2014).

In 2013, Indonesia developed its National Action Plan for Climate Change Adaptation (known as RAN-API) which includes short-term priorities and intends to "harmonise and operationalise" all of Indonesia's national and sectoral adaptation plans (Republic of Indonesia 2013, i). The RAN-API reflects an effort to synthesise CCA planning with related policies: recognising the links with growth and development, the government has expressed an aim to integrate adaptation action into Indonesia's third National Medium-Term Development Plan, for the period 2015-19 (ibid.). Notably, as of 2014, Indonesia did not have a specific funding mechanism for CCA; instead, implementation was financed by "overall development" funds at the national, provincial and district levels, drawing on both domestic and international funding sources (ibid., 17). It is unclear whether these funding arrangements have the capacity to ensure sufficient long-term funding for CCA at every level of government. In addition, Firman et al. (2011, 5) observed that much of Indonesia's climate change expertise had traditionally been concentrated at the national level—such as in the National Council of Climate Change and ministries—and that there was still limited climate change expertise at the Jakarta government level. Any provincial-level CCA plans developed in recent years have mainly been ad-hoc, occurring as part of the individual actions of different government agencies (World Bank 2012b, 7).

In the context of strategies such as Indonesia's National LongTerm Development Plan 2005-2025, in 2010 Jakarta created a Spatial Plan for 2030, which integrated climate change to a minor extent and highlighted the areas of the city at greatest risk from flooding (World Bank 2012b, 7). Nurlambang (2012, 82) notes that the Spatial Plan does not address the displacement issues from climate change, nor meet broader equity imperatives. The boom of private sector developments in Jakarta and the resulting emphasis on private sector interests over recent decades has not been resolved (ibid.; World Bank 2012b).

While the need to synthesise DRR, CCA and urban development plans is widely acknowledged at the international level and noted by the Indonesian government, the existing separate frameworks are not well integrated or coordinated (UNDP 2015, xiii; UNISDR 2015; World Bank 2012b; Republic of Indonesia 2013; Firman et al. 2011). This applies at both the national and provincial levels, and is also reflected in the large number of government agencies responsible for different aspects of flood and climate change-related actions, which must collaborate on planning and mobilise quickly to confront hazards and disasters (World Bank 2012b; Firman et al. 2011; Ward et al. 2012, 521–22). The establishment of the Jakarta BPBD at the end of 2010 signalled the government's recognition of the need for a designated disaster agency, though the BPBD's precise powers and role were not clearly delineated within government, and coordination problems persist (World Bank 2012b, 7; Elyda and Dewi 2014).

Despite Indonesia's significant numbers of rural-urban migrants and the displacement potential of natural hazards both in Jakarta and elsewhere in the country, there is no specific national policy or legislation on internal displacement (Randall 2013; IDMC 2013). According to the Internal Displacement Monitoring Centre (IDMC) (2013), the national BNPB is accountable for people displaced by both natural hazards and "social conflicts", while the Ministry of Social Affairs is responsible for relief during emergencies. Relevant legislation includes a disaster management law (2007) and another on handling social conflicts (2012), which empowers local authorities and the military to decide how to manage social unrest and conflict (ibid.). This lack of detailed directives, coordination and oversight from the national level means that displacement policies are largely ad-hoc, and this may in fact increase the potential for internally displaced people's rights to be violated, especially with regard to the return to and protection of their property (ibid.). Moreover, IDMC has highlighted that a number of relevant European Union-funded programs run by NGOs ended in 2013 because no major crises had caused mass internal displacement in Indonesia in recent years. This suggests that current policy settings on relocation and displacement may be unclear, incomplete and possibly under-prioritised at both the national and local levels.

Policy settings at the national and Jakarta levels therefore do not demonstrate strong conceptual or practical connections between the challenges of environmental degradation, migration and displacement. However, it should be noted that while Jakarta does not have an overarching displacement policy, in recent years its government has taken a number of decisions and measures on community relocation due to flooding.

3.2. Flood mitigation plans and projects in Jakarta

After Jakarta's devastating floods in 2007, Indonesia's president formed a taskforce to expedite urgent technical interventions and address the flooding challenge over the long term (Tarrant 2014). The taskforce considered two dramatic possibilities that would have directly confronted Jakarta's inherent flood and displacement problems, yet entailed huge consequences. These options included abandoning the northern part of the city around the bay, or moving the capital to another location at a higher elevation in southeast Java or on another island (ibid.). Both ideas were rejected because of Jakarta's established role as Indonesia's capital and economic centre, and

the according cost and upheaval: the cost of abandoning north Jakarta alone was estimated at USD 220 billion in assets (ibid.). According to media reports, the task-force decided to focus initially on strengthening Jakarta's existing canals as well as its coastal defences, triggering the acceleration of various technical measures as well as the creation of the National Capital Integrated Coastal Development (NCICD) Master Plan, a major infrastructure and urban development programme supported by the Dutch government (ibid.; Tarrant 2014).

The NCICD plan has the potential to reduce both flood and displacement pressures on Jakarta by constructing a "Giant Sea Wall" and reclaiming land, but was facing an uncertain future as of 2015. Expedited following the 2013 floods, the USD 40 billion project would build a new 35-kilometre seawall and 17 artificial islands in the shape of Indonesia's national symbol, the garuda bird (Tarrant 2014). The islands would close off Jakarta Bay and include new residential and business developments for up to one million residents and workers, aiming to reduce pressures on Jakarta's existing land area (ibid.; Japan Times 2014). The project would also create one large storage lake for floodwaters in Jakarta Bay, fed by onshore pumping stations. While this plan ostensibly aims to address both flooding and displacement by fundamentally transforming Jakarta's urban layout and creating new settlement areas, it has stirred long-held concerns about the continued prioritisation of private interests in Jakarta's planning and disregard for the needs and circumstances of poorer residents (Elyda 2015). Indonesia's outgoing economic minister launched the first phase of the plan only days before his government left office in October 2014, and in early 2015 the project was proceeding (Dewi 2014; Jakarta Post 2015a; Jakarta Post 2015b). However, in April 2015, the Indonesian government called for the suspension and review of land reclamation efforts under the NCICD (Elyda 2015). This followed objections from certain neighbouring regional administrations which said they were unwilling to supply sea land for the project, as well as revelations that the Jakarta government had already granted building permits to large private developers (ibid.). While Jakarta's government subsequently indicated the project may proceed regardless, its future appears uncertain (Wardhani 2015).

Although a detailed exploration of Jakarta's myriad other infrastructure improvement plans is beyond the scope of this case study, the city has been expediting a range of notable other measures to reduce the risks of flooding and displacement. The height of Jakarta's existing sea wall was raised in 2008, but is today almost subsumed by high tides in some sections, due to the combined impacts of subsidence and sea-level rise (Tarrant 2014). The World Bank is also supporting a USD 190 million project to address urgent flood issues through dredging, embankment fortification, and restoration of priority canals, flood ways and water retention ponds, led by the Ministry of Public Works in Jakarta (World Bank 2014a). The project includes an explicit commitment to provide adequate housing and transitional support to locals required to relocate due to the project (World Bank 2012c). In February 2015, the project was reported to be around one year behind schedule (World Bank 2015). Jakarta's former governor previously stated that these measures will be effective during "normal" heavy monsoons, but are unlikely to prevent floods under extreme conditions (Hill 2013). The government is also trying to address land subsidence in multiple ways. A moratorium on the construction of new malls was introduced as part of an attempt to ease traffic and reduce the number of unnecessary large concrete developments that are currently contributing to subsidence, though this has not been comprehensively applied or enforced (Tarrant 2014). Concurrent efforts to convince residents to stop extracting groundwater and instead use the city's piped water system have also been difficult to enforce, as many people access free groundwater illegally and perceive Jakarta's piped water as expensive, dirty and unreliable (ibid.).

While Jakarta faces a tremendous long-term challenge in implementing suitable technical infrastructure for floods, there is also a central role for early warning

systems and community-based approaches to information sharing and disaster education, which are helping Jakarta residents to better understand, prepare for and respond to floods. The city's existing early warning systems use mobile phone messaging to warn district representatives about imminent floods. In recent years, NGOs, researchers and the Jakarta government have been developing smart phone applications that use government and community-provided data to help residents monitor risks during floods and become more resilient over the long term (Peta Jakarta 2015; PMI 2015). These innovative solutions build on extensive efforts to increase local communities' capacity to respond to flooding—including community-based risk assessments, disaster response teams, contingency planning, and training in how to act safely during floods and clean homes to reduce health and sanitation risks (ARC 2015; Maclean 2014). Local Jakartans' experiences during the 2014 floods (as noted above) underline the continuing need to widely disseminate such community-focused measures and training.

The overarching difficulties encountered to date in establishing adequate infrastructure and systems to address flooding reflect broader underlying governance issues in Jakarta and at the national level, especially poor implementation, enforcement and—as noted above—inadequate coordination between agencies and other actors. After becoming Jakarta's governor in October 2014, Ahok publicly called for improvements in all three areas to expedite flood mitigation, and said in November 2014 that "[a]ll agencies and working units actually know what they have to do when a flood comes. But they are not well managed and coordinated" (in Elyda and Dewi 2014). World Bank analysis suggests these issues also apply at the national level; in 2012, it observed there had been an insufficient focus on DRR and prevention measures, and that BNPB lacked the confidence of line agencies in coordination efforts (2012a, 40). It suggested that existing fiscal capacity and legal frameworks could adequately support effective disaster risk management, but that the Indonesian government needed to prioritise the implementation and enforcement of regulations and improve its operational capacities (ibid.).

3.3. Response measures during the floods

Beyond the policy frameworks and ongoing infrastructure interventions in Jakarta, authorities and supporting organisations implement a range of practical response measures during floods. During the floods of early 2014, the Indonesian government announced it had the existing capacity "to respond to both short and longer-term needs created by the floods including emergency shelter" (IFRC 2014, 1–2). As part of contingency planning, the Jakartan authorities had already distributed emergency response supplies in villages before the rainy season began, including food, non-food items and water (ibid.). Further supplies were deployed as needed during the floods. A range of actors provided evacuation and relief assistance, including NGOs, which helped to establish shelters, open field kitchens, and distribute hygiene supplies and other emergency kits (IFRC 2014; USAID 2014). Temporary displacement from evacuation was thus relatively well managed through the preparation of temporary evacuation shelters, which were used multiple times by some residents (ReliefWeb 2014).

The government also carried out cloud seeding: a process whereby substances are inserted into incoming clouds from military planes, with the aim of causing heavy rains to fall over the ocean *before* they reach Jakarta (Ika 2014). The government later claimed that this process reduced rainfall by up to 32 per cent during the 2014 floods, though scientists have questioned the accuracy of reported results of cloud seeding in general (Elyda 2014; Rochmyaningsih 2013).

In addition to the flood mitigation policies and measures outlined above, Jakarta's government and municipal administrations have started to remove settlements and relocate people in some of the city's poorest and most flood-prone areas. Authorities have cited flooding as the central reason for the measures, arguing that people cannot

live in the highly exposed, informal or unstable settlements that currently encroach on the edges of rivers and waterways. Apart from being repeatedly flooded, such settlements can also inhibit floodwaters from flowing, draining and receding effectively. The relocation measures may thus be seen as an effort to avoid future flood-induced displacement and rehabilitate flood-prone areas (Wardhani and Elyda 2014). At the same time, the relocations constitute a form of permanent displacement for local people who have well-established lives and livelihoods in these areas. For some city dwellers, the relocation process has been coercive and raised long-standing land rights issues (Maclean 2014; Wilson 2014). It has triggered numerous controversies about the government's consultation processes and relocation methods, the number of people implicated, the livelihoods of affected communities, the state of alternative housing, and access to suitable compensation, resettlement and work opportunities (Maclean 2014; Purnamasari 2013).

Given the highly dense and commonly informal living arrangements of many of Jakarta's most flood-vulnerable communities, it is difficult to identify precisely how many people have been affected by the relocation measures to date, and unclear exactly how many have been excluded from or judged ineligible for alternative housing by the government. The Jakarta Residents Forum has suggested that the government removed more than 19,000 people from their homes in 2013, and fewer than 40 per cent were offered alternative accommodation (Wilson, 2014). Indonesia's land tenure, ownership and access rights are complicated and have long been compromised by corruption; furthermore, up to 80 per cent of all housing in Indonesia is "informal or self-help based", meaning many communities' housing arrangements are insecure (ibid.; HRW 2006). It is not possible within this case study to closely examine broader links in the context of Jakarta's land and property issues. Yet these relocation measures clearly compound long-standing housing uncertainty for many poor communities, and other political, social and economic interests have likely driven government relocation efforts, in addition to flood risks and environmental vulnerability. It is notable that large commercial buildings and luxury housing estates in the same areas (such as near the highly vulnerable Pluit dam) have reportedly remained "untouched by the administration's policy interventions", even though such developments are known to exacerbate flood hazards (Wilson, 2014, 2).

The government stepped up its latest relocation efforts in 2013 with a particular focus on high-risk, low-income areas around rivers, dams and retention ponds (Jakarta Post 2013a; Maclean 2014). Authorities have removed settlements and other structures from around the waterways to clear out sedimentation and debris, increase the depth and width of rivers, and create more "green" space (Jakarta Post 2014c). Government approaches to community consultation and the removal of homes have varied significantly. In 2013, Jakarta's then-governor, Jokowi, was reported to have consulted personally with residents from near the Pluit dam, and said that authorities should be taking a "softly-softly approach" and initiating a dialogue with communities (Dewi 2013b; Dewi 2013c). Yet residents facing relocation in 2014—such as those from Condet in east Jakarta—said they had not been informed or consulted about their relocation, and that their land rights were being violated (Jakarta Post 2014c). Similarly, some residents in Pela Mampang in south Jakarta said in August 2014 that they had received only two days' notice that their properties would be removed, while the mayor maintained that the communities had been consulted one week before the demolition (Kelety 2014b). In addition to short consultation periods, residents also reported that authorities had proceeded with the demolitions despite locals' continued protests and concerns (ibid.). Some residents sought assistance from Indonesia's National Commission on Human Rights, which argued that far more people were facing eviction and relocation than the government data suggested (Pernamasari 2013; Dewi 2013b; Wilson 2014).

While certain residents have welcomed the opportunity to move from the flood-prone areas into alternative housing, some have found the settlements unsafe or poorly suited to their everyday needs. For example, some apartments are too small for relocated families, leak regularly due to inadequate construction or maintenance, or lack access to sufficient amounts of clean water (Jakarta Post 2014b; Kelety 2014a). One government official noted some buildings were in a poor condition before they were transferred to the city administration (Jakarta Post 2014b). Some residents must travel over 20 kilometres daily between their new homes and work or school; while Jakarta's government committed in 2013 to providing free boat services to connect these areas, such arrangements are not universally available to resettled communities (Jakarta Post 2013a; Wilson 2014). Some residents have indicated that these issues are still outweighed by the safety the new settlements provide from frequent floods and evacuation (Jakarta Post 2014b).

Uncertainty persists for people that have been unwilling or unable to move from high-risk areas or resettle in alternative housing as part of the relocation measures. As noted above, many locals settled in Jakarta's most flood-prone areas because of the readily available work opportunities in the city's centre. Some are reluctant to move because they have strong familial, cultural and economic ties to these areas, and therefore insist they can continue to live with the floods (Maclean 2014; Tarrant 2014). Many also say they cannot afford the deposits or rents for alternative housing, or have suggested that the compensation amounts offered by the government for previously occupied land and property are too low (Jakarta Post 2013a; Wardhani and Elyda 2014). The government has emphasised that people who do not hold Jakarta residency cards are ineligible for government-supported resettlement (Tarrant 2014; Kelety 2014c; Wardhani and Elyda 2014). In 2014, the government evicted illegal street vendors from several areas, despite acknowledging their role in meeting the needs of low-income workers (Kelety 2014c). The governor stated that only registered Jakarta residents were eligible for low-cost apartments and vendor licences, and said the government was working with neighbouring jurisdictions of Java to discourage migration to Jakarta (ibid.).

These accounts show that relocation efforts to date have been fraught. In some cases, the relocation measures have left poor communities with limited options and arguably higher vulnerability to floods, and have failed to offer equitable and inclusive solutions for improving communities' resilience to floods and other climate change impacts.

CONCLUSION

By examining the policies and measures adopted in recent years to mitigate flooding and displacement in Jakarta, this case study illuminates a number of areas for further work and improvement by both government and non-government actors.

It is clear that governments at each level should better integrate relevant policy frameworks to improve Jakarta's ability to respond to environment-induced displacement and migration. Given the hitherto limited integration of Indonesia's current DRR, CCA and urban planning frameworks and the absence of a formal national policy on internal displacement, there is scope for Indonesia to review and synthesise its policies relating to environment-induced displacement and migration. The implications of existing national migration policies and practices should also be considered. This also applies at the Jakarta level, where holistic decision-making is needed on city planning, flood mitigation infrastructure, community resettlement, and overall migration patterns. Natural hazard- and disaster-induced displacement and permanent relocation already occur regularly in many parts of the country, and therefore merit a concerted policy framework that supports national consistency

and protection of human rights in the event of flooding and displacement. The Indonesian government has already acknowledged the need to integrate and "mainstream" climate change throughout its policies, and this should support coherent links between measures to mitigate flooding (along with other extreme weather events) and flood-induced displacement at the national, regional and local levels.

Jakarta's government should review and address gaps in policy coordination, enforcement, and implementation of flood mitigation and flood response measures. As outlined above, actors involved in managing flooding and displacement in Jakarta broadly agree on the need for improvement in each of these areas. This applies to both the planning and implementation of flood mitigation measures and response strategies during severe flooding. Jakarta's government could improve coordination by more clearly delineating and communicating the roles and responsibilities of agencies and other organisations (such as NGOs that regularly support flood relief), and improving these actors' capacity to fulfil their mandates and work together. As the World Bank (2012a, 40) has highlighted, the BNPB should be clearly empowered to coordinate line agencies during flooding. The delay of the NCICD Master Plan also suggests a need for stronger coordination between the Jakarta government, regional governments and the national government as well as private sector actors and international donors.

Measures to relocate residents in highly flood-prone areas should be conducted as part of a long-term strategy that prioritises consultation, equity and social inclusion. As the approaches and experiences described above demonstrate, Jakarta's relocation efforts to date have been ad-hoc and exclusionary for many communities. While the measures may have removed some residents from immediate flood risks, they have included inconsistent and rushed consultation methods, placed some communities in problematic alternative housing, and have actually increased uncertainty and instability for some of Jakarta's poorest and most vulnerable residents, including migrants. People who are removed from their homes in high flood-risk areas but are not assisted in finding alternative housing face grave social and economic insecurity and—without secure shelter and access to basic social services—are likely to remain highly vulnerable to floods. As noted above, while resettled populations may no longer live in flood-exposed homes, many have had to abandon their old communities, face unsafe conditions in their new housing, and continue to return daily to flood-prone areas in order to work. One particularly crucial issue is the lack of conclusive, accessible data on how many people may need to move; these data are needed to support evidence-based decision-making on relocation and resettlement. The government should engage communities in relocation proposals from the outset, to support their resettlement in safe housing and protect their access to income and employment opportunities. Relocation efforts must also account for poor and unregistered people to ensure they are not left behind. These principles—while certainly challenging and complex to fulfil—are not new; they are included in the involuntary resettlement policies of existing flood mitigation programs, such as the World Bank project outlined above (World Bank 2012c), and could in fact form a useful basis for extending and improving Jakarta's overall approach to relocation and displacement issues.

Governments, NGOs and international organisations should also urgently focus on building residents' knowledge and capacity to respond safely to flooding, particularly where relocation is not an immediate or feasible option. The 2014 floods showed that many Jakartans still face major health and safety risks from flooding, and many have a limited understanding of appropriate adaptation and resilience strategies. There is thus an urgent need to build on the important and often innovative methods that are being used in Jakarta—from community-based information gathering and dissemination, to training in DRR and CCA concepts and practices—to strengthen the capacity and resilience of Jakarta's hundreds of thousands of vulnerable residents.

This is particularly important in the context of continuing relocation efforts, which are in danger of creating perverse incentives for some residents to remain in unsafe housing for fear of losing their homes, communities or livelihoods. While not all residents may be able to move, there is also scope for smaller-scale, more immediate measures that increase the technical resilience of communities (such as renovation of existing housing structures to make them safer and more resistant to storms and floods).

The events of early 2014 underlined the risks posed by floods and displacement in Jakarta, which are becoming an increasingly frequent and severe problem due to the intersecting processes of climate change, ongoing environmental degradation, and poorly planned urban development. Even in the event of immense interventions to ease progressive land subsidence, the megacity's geographic position means it will remain acutely exposed to sea-level rise, flooding and other extreme weather events in the coming years. Fundamental changes to human activity and behaviour are required if the city is to remain and continue to grow. This demands the urgent design and implementation of effective infrastructure measures and other mitigation solutions, as well as measures that can help to reduce both short- and long-term displacement from flooding.

The experiences of 2014 also demonstrate that many of the city's most vulnerable residents have low resilience to floods and climate change, and remain at high risk of displacement. While the task facing Jakarta is clearly immense and requires a strategic approach over the long term, there are also important immediate opportunities to expand and intensify existing measures that build local residents' capacity to respond to floods, and thereby reduce the number of people that are killed, injured and displaced by major flood events.

REFERENCES

Books and reports

- ARC. 2015. 'Indonesia'. *American Red Cross*. http://www.redcross.org/what-we-do/international-services/where-we-help/asia/indonesia.
- HRW. 2006. *Condemned Communities: Forced Evictions In Jakarta: III. Background*. Human Rights Watch. http://www.hrw.org/reports/2006/indonesia0906/3.htm.
- IFRC. 2014. *Information Bulletin: Indonesia: Floods*. International Federation of the Red Cross and Red Crescent Societies. https://www.ifrc.org/docs/Appeals/rpts14/IDfl300114.pdf.
- IOM. 2013. *Disaster Risk Reduction Compendium: Asia*. IOM. http://publications.iom.int/bookstore/index.php?main_page=product_info&cPath=1&products_id=977.
- IOM. 2014b. *Human Rights, Climate Change, Environmental Degradation And Migration: A New Paradigm*. Issue In Brief. IOM. http://publications.iom.int/bookstore/index.php?main_page=product_info&cPath=49&products_id=1067.
- McKinsey Global Institute. 2012. *The Archipelago Economy: Unleashing Indonesia'S Potential*. McKinsey & Company. http://www.mckinsey.com/insights/asia-pacific/the_archipelago_economy.
- Nurlambang, T. 2012. 'Public Policy Matters On Climate Change And Migration In Indonesia: The Case Of Jakarta City'. In *Climate Change, Migration And Human Security In Southeast Asia*, 1st ed., 74-83. S. Rajaratnam School of International Studies. http://www.isn.ethz.ch/Digital-Library/Publications/Detail/?id=151217.
- OCHA. 2013. *Monthly Humanitarian Bulletin: Indonesia*. OCHA. http://www.un.or.id/documents_upload/newsletter/2013%2001_%28EN%29_Humanitarian%20Bulletin.pdf.
- OCHA. 2014. *Update On Jakarta Floods As Of 21 January 2014*. http://reliefweb.int/map/indonesia/indonesia-update-jakarta-floods-21-january-2014.
- ReliefWeb. 2014. *Indonesia - Jakarta Flooding (ECHO Daily Flash 5 February 2014) Report*. ReliefWeb. http://reliefweb.int/report/indonesia/indonesia-jakarta-flooding-echo-daily-flash-5-february-2014.
- Republic of Indonesia. 2013. *National Action Plan For Climate Change Adaptation (RAN-API) Synthesis Report*. Republic of Indonesia. https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/programme-info/RAN-API_Synthesis_Report_2013.pdf.
- UNDP. 2015. *Strengthening Disaster Risk Governance: UNDP Support During The HFA Implementation Period 2005-2015*. UNDP. http://www.undp.org/content/undp/en/home/librarypage/crisis-prevention-and-recovery/strengthening-disaster-risk-governance.html.
- UN-Habitat. 2003. *The Challenge Of Slums: Global Report On Human Settlements 2003*. UN-Habitat. http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=1156.
- USAID. 2014. *Indonesia: Disaster Response And Risk Reduction*. USAID.
- Wilhelm, M. 2011. *Approaching Disaster Vulnerability In A Megacity: Community Resilience To Flooding In Two Kampungs In Jakarta*. https://opus4.kobv.de/opus4-uni-passau/frontdoor/index/index/docId/175.
- World Bank. 2009. *Climate Resilient Cities: A Primer On Reducing Vulnerabilities To Disasters*. World Bank. http://siteresources.worldbank.org/INTEAPREGTOPURBDEV/Resources/Primer_e_book.pdf.
- World Bank. 2012a. *FY2013-2015 Country Partnership Strategy For Indonesia*. World Bank. http://documents.worldbank.org/curated/en/2012/12/17559441/indonesia-country-partnership-strategy-period-fy13-fy15.
- World Bank. 2012b. *Jakarta Case Study Overview: Climate Change, Disaster Risk And The Urban Poor*. http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1306291319853/CS_Jakarta.pdf.
- World Bank. 2012c. *World Bank Supports Flood Mitigation Efforts In Jakarta*. http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:23088802~menuPK:34466~pagePK:34370~piPK:34424~theSitePK:4607,00.html.
- World Bank. 2015a. *Jakarta Urgent Flood Mitigation Project (P111034) Implementation Status & Results Report*. World Bank. http://www.worldbank.org/projects/P111034/jakarta-urgent-flood-mitigation-project?lang=en.

Articles

- Douglass, M. 2010. 'Globalization, Mega-Projects And The Environment: Urban Form And Water In Jakarta'. *Environment And Urbanization Asia* 1 (1): 45-65. doi:10.1177/097542530900100105.
- Firman, Tommy, Indra M. Surbakti, Ichzar C. Idroes, and Hendricus A. Simarmata. 2011. 'Potential Climate-Change Related Vulnerabilities In Jakarta: Challenges And Current Status'. *Habitat International* 35 (2): 372-378. doi:10.1016/j.habitatint.2010.11.011.
- Susandi, A, D Pratiwi, T Suwarto, and M Tamamadin. 2011. 'Adaptive Behavior Assessment Based On Climate Change Event: Jakarta'S Flood In 2007'. http://www.eepsea.org/o-k2/view-item/id-410/Itemid-385/.
- Ward, P. J., W. P. Pauw, M. W. van Buuren, and M. A. Marfai. 2012. 'Governance Of Flood Risk Management In A Time Of Climate Change: The Cases Of Jakarta And Rotterdam'.*Environmental Politics* 22 (3): 518-536. doi:10.1080/09644016.2012.683155.

Press articles

- ABC News. 2014. 'Tens Of Thousands Displaced In Deadly Jakarta Floods'. *ABC News*. http://www.abc.net.au/news/2014-01-20/an-tens-of-thousands-displaced-by-deadly-floods-in-jakarta/5207586.
- Dewi. 2013a. 'Kampung Project A Test For City To Provide Housing For Urban Poor'. *Jakarta Post*. http://www.thejakartapost.com/news/2013/05/06/kampung-project-a-test-city-provide-housing-urban-poor.html.
- Dewi. 2013b. 'Jokowi Sits At Same Table With Pluit Dam Residents'. *Jakarta Post*. http://www.thejakartapost.com/news/2013/05/22/jokowi-sits-same-table-with-pluit-dam-residents.html.
- Dewi. 2013c. 'Jakarta Prepares To Move Squatters To Allow For Flood-Prevention Work'. *Jakarta Post*. http://www.thejakartapost.com/news/2013/01/25/jakarta-prepares-move-squatters-allow-flood-prevention-work.html.
- Dewi. 2014. 'Ahok Skeptical About Giant Sea Wall Project'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/11/03/ahok-skeptical-about-giant-sea-wall-project.html.
- Ekuatorial. 2014. 'BNPB : Seven Culprits Of Jakarta'S Oods'. *Ekuatorial*. http://ekuatorial.com/en/disaster/bnpb-seven-culprits-of-jakartas-floods#!/story=post-9572.
- Elyda. 2014. 'BNPB Wait For Governor To Act On Flooding'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/11/29/bnpb-wait-governor-act-flooding.html.
- Elyda. 2015. 'Central Govt Halts Jakarta Reclamation'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/04/13/central-govt-halts-jakarta-reclamation.html.
- Elyda and Dewi. 2014. 'Red Alert: Jakarta Hit With Early Flooding'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/11/21/red-alert-jakarta-hit-with-early-flooding.html.
- Hill, E. 2013. 'Indonesia'S Ambitious Plans To Reduce Jakarta Flooding'. *Floodlist*. http://floodlist.com/asia/plans-reduce-jakarta-flooding.
- Ika, A. 2014. 'Flooding In Jakarta: The Numbers'. *Wall Street Journal*. http://blogs.wsj.com/briefly/2014/11/28/flooding-in-jakarta-the-numbers/.
- Jakarta Post. 2013a. 'Residents In Flood Prone Areas Ready To Be Relocated'. *Jakarta Post*. http://www.thejakartapost.com/news/2013/02/01/residents-flood-prone-areas-ready-be-relocated.html.
- Jakarta Post. 2014a. '566 People Killed By Natural Disasters In 2014: BNPB'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/12/31/566-people-killed-natural-disasters-2014-bnpb.html.
- Jakarta Post. 2014b. 'Relocated Riverbank Squatters Gripe About Apartment Conditions'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/02/17/relocated-riverbank-squatters-gripe-about-apartment-conditions.html.
- Jakarta Post. 2014c. 'Ciliwung Riverbank Residents Protest Eviction Plan'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/06/07/ciliwung-riverbank-residents-protest-eviction-plan.html.
- Jakarta Post. 2014d. 'Flood Displaces Kampung Pulo Residents Again'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/02/24/flood-displaces-kampung-pulo-residents-again.html 1/2.
- Jakarta Post. 2015a. 'S. Korea Offers $10M Aid For Giant Seawall'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/01/23/s-korea-offers-10m-aid-giant-seawall.html.
- Jakarta Post. 2015b. 'Tender Begins For Sea Wall'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/02/14/tender-begins-sea-wall.html 1/2.
- Jakarta Post. 2015c. 'The Week In Review: Drowning Jakarta'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/02/15/the-week-review-drowning-jakarta.html.
- Japan Times. 2014. ''Great Wall Of Jakarta' Planned To Combat Floods In Sinking Capital'. *Japan Times*. http://www.japantimes.co.jp/news/2014/10/16/asia-pacific/science-health-asia-pacific/great-wall-jakarta-planned-combat-floods-sinking-capital/#.VSt8ExOUfXE.
- Kelety. 2014a. 'Clean Water A Luxury At Pluit Low-Cost Apartments'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/07/12/clean-water-a-luxury-pluit-low-cost-apartments.html.
- Kelety. 2014b. 'Mampang Squatters Evicted To Widen River'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/08/19/mampang-squatters-evicted-widen-river.html.
- Kelety. 2014c. 'Illegal Vendors Face Ongoing Expulsions, Confiscations'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/08/09/illegal-vendors-face-ongoing-expulsions-confiscations.html.
- Maclean, D. 2014. 'Flooding and Jakarta's Urban Poor'. *The Diplomat*. http://thediplomat.com/2014/05/flooding-and-jakartas-urban-poor/?allpages=yes&print=yes.
- Purnamasari, D. 2013. 'Human Rights Activists To Monitor Pluit Flood Relocations'. *Jakarta Globe*. http://thejakartaglobe.beritasatu.com/news/jakarta/human-rights-activists-to-monitor-pluit-flood-relocations/.
- Rochmyaningsih. 2013. 'Is Cloud Seeding Preventing Further Flooding In Indonesia?'. *Scidevnet*. http://www.scidev.net/global/earth-science/news/is-cloud-seeding-preventing-further-flooding-in-indonesia-.html.
- Sentana, M. 2014. 'Flooding In Jakarta Displaces Thousands Amid Continuing Rain'. *Wall Street Journal*. http://blogs.wsj.com/indonesiarealtime/2014/01/19/flooding-in-jakarta-displaces-thousands-amid-continuing-rain/tab/print/.
- Setiawati, I. 2014. 'Flood Death Toll Rises To 23 People'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/01/27/flood-death-toll-rises-23-people.html.
- Tarrant, B. 2014. 'Special Report: In Jakarta, That Sinking Feeling Is All Too Real'. *Reuters*. http://www.reuters.com/article/2014/12/22/us-sealevel-subsidence-jakarta-sr-idUSKBN0K016S20141222.
- Wardhani. 2015. 'Jakarta Insists Coastal Reclamation Will Go Ahead'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/04/30/jakarta-insists-

coastal-reclamation-will-go-ahead.html.

- Wardhani and Elyda. 2014. 'Flood Hits Kampung Pulo, Again'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/05/24/flood-hits-kampung-pulo-again.html.
- Wilson. 2014. 'Floods, Housing Security And Rights Of Jakarta'S Poor'. *Jakarta Post*. http://www.thejakartapost.com/news/2014/02/08/floods-housing-security-and-rights-jakarta-s-poor.html.
- Zein. 2015. 'The Danger Of Floods Becoming Routine'. *Jakarta Post*. http://www.thejakartapost.com/news/2015/02/11/the-danger-floods-becoming-routine.html 1/4.
- Websites
- IDMC. 2013. 'Indonesia: Internal Displacement In Brief'. *IDMC*. http://www.internal-displacement.org/south-and-south-east-asia/indonesia/summary.
- IOM. 2014a. 'Where We Work: Indonesia'. http://www.iom.int/cms/en/sites/iom/home/where-we-work/asia-and-the-pacific/indonesia.default.html?displayTab=latest-news&v=1392752313000.
- Peta Jakarta. 2015. 'Petajakarta.Org/Banjir'. http://petajakarta.org/banjir/en/.
- PMI. 2015. 'Ready To Face Disaster With #Siagabencana Applications'. *PMI*. http://www.pmi.or.id/index.php/component/k2/item/474-siap-hadapi-bencana-dengan-aplikasisiagabencana.html.
- Randall. 2013. *Moving Stories: Indonesia*. UK Climate Change and Migration Coalition. http://climatemigration.org.uk/moving-stories-indonesia/.
- World Bank. 2015b. 'Indonesia Dashboard'. *World Bank*. http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=IDN.
- World Bank. 2014a. 'Jakarta Urgent Flood Mitigation Project/Jakarta Emergency Dredging Initiative Project'. *World Bank*. http://www.worldbank.org/en/results/2014/09/10/jakarta-emergency-dredging-initiative-project.
- World Bank. 2014b. 'Reducing Extreme Poverty In Indonesia'. http://www.worldbank.org/en/country/indonesia/brief/reducing-extreme-poverty-in-indonesia.

Visuals

- (Figure 1.) Wikipedia. 2009. Jakarta subdistrict. Creative commons Attribution-ShareAlike 3.0 Unported. http://en.wikipedia.org/wiki/Jakarta#/media/File:Jakarta_subdistrict.png
- World Bank. 2010. *Jakarta Flood*. Video. https://www.youtube.com/watch?v=UjzeW5BtgNA.