

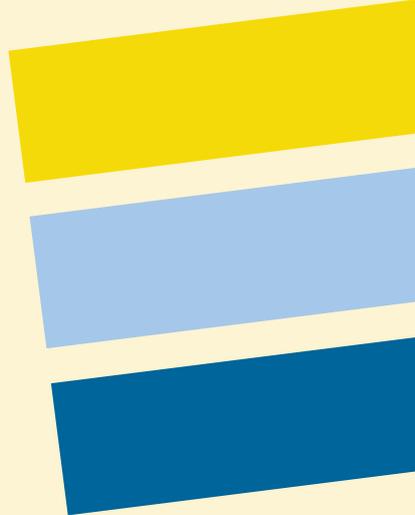


COOL INFRASTRUCTURES



CITY PROFILE: JAKARTA

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ABSTRACT

With a population of 10.56 million, Jakarta is one of the megacities in the emerging economies facing massive problems of urban growth. Despite rapid developments in infrastructure and public facilities, an increased population growth inevitably creates the situation in which Jakarta has to deal with a long list of urban issues, from housing inequality, chronic traffic jams, and environmental pollution. It renders Jakarta to become increasingly vulnerable due to the sheer quantity of human activities and an impending ecological disaster. This paper provides an account of how Jakarta seeks to enhance its resilience against urban

risks and hazards. The purpose of this city profile is twofold. First, it explores the gradual efforts Jakarta has taken to create the conditions for a resilient city that have been shaped by a shift from one leadership to another. Second, it highlights technical, environmental, and organisational challenges Jakarta is facing to achieve its resilience goals. We recommend that more efforts to develop data infrastructures and policy integration to accelerate the transformation process that would transform Jakarta into a truly resilient megacity.

Keywords: resilience, vulnerability, urban risks, megacity, infrastructures, Jakarta



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INTRODUCTION

In the last ten years, Jakarta has embraced the concept of resilience and placed it at the center of its development. As one of the megacities in the emerging economies, Jakarta plays an important role in the global supply chain. This is a consequence of Indonesia's rapid economic growth, especially since the country opened up economic borders widely to foreign investment in the early 2000s (Maning, 2017). Today, 10.56 million people call themselves residents of Jakarta (BPS, 2020). This sheer number of inhabitants makes Jakarta one of the most populated cities in Asia, if not in the world, and the number is counting as urbanisation continues to entice people from all over the country to come and live in the capital. Despite massive development in infrastructure and public facilities, a rapid population growth inevitably creates the situation in which Jakarta has to deal with a long list of urban issues, from chronic traffic jams, annual floods, lack of open green spaces, extreme inequality, urban poverty, and so forth. Sea level rise and increasing temperature due to climate change add to the urgency the Jakarta city government is compelled to address. The bottom line is that Jakarta is increasingly vulnerable due to a sheer scale of human activities and a looming ecological crisis.

As a city aspiring to be further recognised globally, the Jakarta administration is deeply aware of vulnerabilities that constantly threaten the city. In the early 2000s, Jakarta began a long journey to improve public infrastructures to create better environments for residents. This journey has not been an easy one. Challenges

come from all corners, including financial



Figure 1. Jakarta, Indonesia

constraints, internal bureaucratic inefficiency, and the powerful private sector dictating many parts of development policies. Indeed, two city profiles of Jakarta have been published in 2001 (Cybriwski & Ford, 2001) and 2020 (Martinez & Mason, 2020). In this city profile, we wish to highlight one striking feature of this journey: the entire transformation in Jakarta has been an ongoing process in line with political dynamics. This is a key aspect to underline in observing how Jakarta undertook infrastructural developments to address many of the social and economic challenges as a megacity. Accordingly, in this city profile, our goal is two-fold. On the one hand, we aim to examine the gradual steps Jakarta has taken to achieve the conditions for a resilient city. On the other hand, we show that electoral politics have shaped the developments that have occurred.

This city profile is divided into three sections. The following is a description of social and environmental problems plaguing Jakarta. In the second section, we discuss the development



policies the city sought to implement under the different leaderships and highlight the impact their policies have had on urban changes. The last section examines how the Jakarta administration

adopts the framework of a resilient city. Especially important is how the city defines resilience and identifies critical issues that determine the capacity to mitigate urban risks.

A CITY OF MULTITUDE PROBLEMS

As Indonesia's most extensive metropolitan area, Jakarta is an attractive place to live with its access to education and employment. However, the attraction also entails many socioeconomic and environmental problems as the city area expands and develops. The immense population growth and land scarcity in the metropolitan area put pressure on the government to keep up with the demand for various public services and infrastructure from food, housing, mobility, and disaster management (Dewi *et al.*, 2020). Poor planning and management of the city also threaten the livability of the inhabitants as numerous environmental problems occur (Martinez & Masron, 2020). Of several problems Jakarta faces, we identify three critical issues posing the most challenges to the city's endeavour to become more livable and resilient: housing, traffic and mobility, and environmental changes.

Housing

Jakarta Metropolitan Area functions not only as the central place for the national government but also as the centre of commercial and business activities of the nation. Alongside the formal government and economic activities, those working in the informal sector grapple to sustain a decent quality of life. They are

marginalised from affordable housing and reasonable access to numerous services as the central city becomes gentrified. Those working in the informal sectors usually live in informal settlements and make a living in slums, and settled on illegal land, with improper access to electricity, sanitation, and piped water (Colven & Irawaty, 2019; Meilasari-Sugiana *et al.*, 2018). Furthermore, informal settlements are vulnerable to forced eviction as they do not have secure tenancy on the land they inhabit (Nurdiansyah, 2018). Various government initiatives to improve and relocate informal settlements have failed to provide a better quality of living as they are usually displaced from their employment or source of income. Nevertheless, many residents from lower-income households are also vulnerable to other anthropogenic disasters such as flooding and the rise of sea levels in the northern part of Jakarta.

On the other hand, Firman and Fahmi (2017) studied how the rapid development of the Jakarta Metropolitan Area has led to urban sprawling in its satellite municipalities. As housing becomes unaffordable in the city centre the middle and upper-class residential grows in the metropolitan area's periphery. In addition, with the expansion of toll roads during the 1980s to 1990s by the central government, connectivity of the central metropolitan area to the fringe



area improved, further incentivising the creation of suburban development in the wider metropolitan area. Despite the vast development of residential towns on the outskirts of Jakarta in the 1990s, the housing supply has yet to meet the demand of the growing population. Tafriidj (2021) noted that 50% of the middle-class in the Jakarta Metropolitan Area struggles to find a secure and permanent residency. Housing cost rises and the stagnancy of wages have created immense stress for this group to pay rent or mortgage. He highlights the lack of attention that the middle-class face in housing access and diversity of tenancy and suggests devising better formal regulation to cater and protect housing tenants as 80% of Jakarta residents live in rental property.

In sum, the provision of housing needs in Jakarta has proven to be challenging for all income groups. Affordability, security of tenure, and the threat of disasters such as flooding should be tackled by the government and real estate developers to meet the demand for good quality living in Jakarta.

Traffic and Mobility

Although many residential pockets that the central government planned on the outskirts of Jakarta were envisioned to be independent, the primary employment centre remains mostly in the central area of Jakarta, thus putting additional pressure on the traffic connecting them (Firman and Fahmi, 2017). As a result, a majority of Jakarta citizens are stuck in traffic for hours daily. Although some public transportations are available and many other transport infrastructures

are undergoing construction, many still resort to private vehicles as a convenient and safer way to navigate the city and commute to work. Pressure from increasing private vehicle numbers is not met with the appropriate capacity for alternative sustainable mobility options.

Over the decades, spatial and policy changes have led to private vehicle-oriented street networks that encourage the rapid growth of private vehicle purchases and create a car-dependent society. Hidayati *et al.* (2019) explain how Jakarta's urban transformation has yet to accommodate a more sustainable way for access and mobility of its citizens. They also highlight how this system excludes those who do not have access and have limited mobility ability as the city was not planned and designed to be walkable. This study highlights the lack of mobility that Jakarta's transportation system provides and the lack of sustainability approach and inclusivity in the planning and management.

Environmental Changes

The sprawling of the urban areas of Jakarta to provide housing not only creates an issue with the traffic and mobility but also puts pressure on the environment. The rapid urban expansion without significant control has caused a cluster of anthropogenic disasters such as flooding and landslides. Pravitasari *et al.* (2018) studied the expansion of the urban areas of the Jakarta Metropolitan Area to the axis of the Bandung Metropolitan area. They found how the demand for affordable housing had caused many land-use changes from agricultural function to a



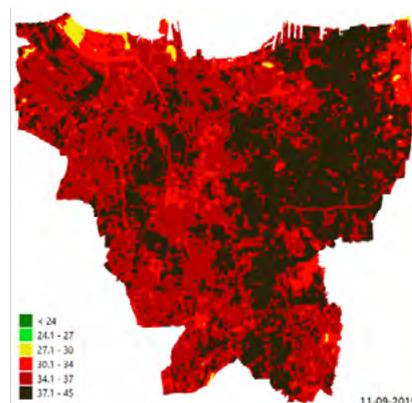
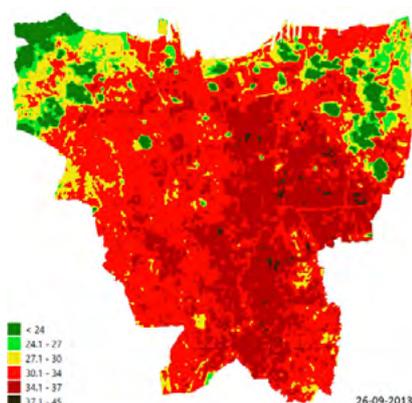
residential function that led to the flooding and landslides.

With the national government incentivising industrial, commercial, and residential development in Jakarta, it led to a significant rise in surface temperature due to the increasing Urban Heat Island (UHI) effect between 2007 and 2013 (Prasasti *et al.* 2015). UHI is most prevalent in areas with intense human activity, such as the central business area, industrial areas, and residential areas with higher densities. Changing climate has increased global temperature. However, urban areas also have additional threats that increase the surface temperature even higher, the Urban Heat Island effect. Coinciding with heat rise is the diminishing green open space in urban areas of Jakarta that has impacted the surface temperature as the UHI effect occurs. A study by Rushayati *et al.* (2018) found that the areas with adequate green open space recorded lower surface temperature with up to 3.2 °C difference with built-up areas dominated by concrete and asphalt that absorbs heat. The data that were used in the analysis of land use and surface temperature were taken from 2000 until 2012, wherein that span of 12 years, 49.7% of green space was converted into other land use.

In another recent study by Putra *et al.* (2021), UHI is studied in relation to the land-use changes between 2008 and 2018. A correlation was found as the increase of the total area affected by UHI is proportional to the rise of built areas in Jakarta. With data from 2008, 2013, and 2018, the study reported that the total areas affected by the UHI were 36.5%, 84.7%, and 85.2%, respectively. At the same time, the built areas in the respective years were 79.2%, 82.9%, and 85.2%. The built-up area in this study includes government facilities, social facilities, roads, and other transportation facilities, industrial and warehouse facilities, commercial and service areas, and housing or residential areas. It was recorded that in 2013 surface temperature ranges from 30.1-34 °C, and in 2018, the temperature on average is higher than 34.1 °C. Figure 2 shows Jakarta’s Land Surface Temperature (2013 and 2019).

The UHI in urban areas of Jakarta increases not only the surface temperature but also the trends of rainfall

Figure 2. Land Surface Temperature for Jakarta in 26 September 2013 and 11 September 2019. Visualisation was based on Landsat-8 Satellite Imagery. Only less than 30% cloud cover images were taken. Temperature (in Celcius) were classified into six classes.





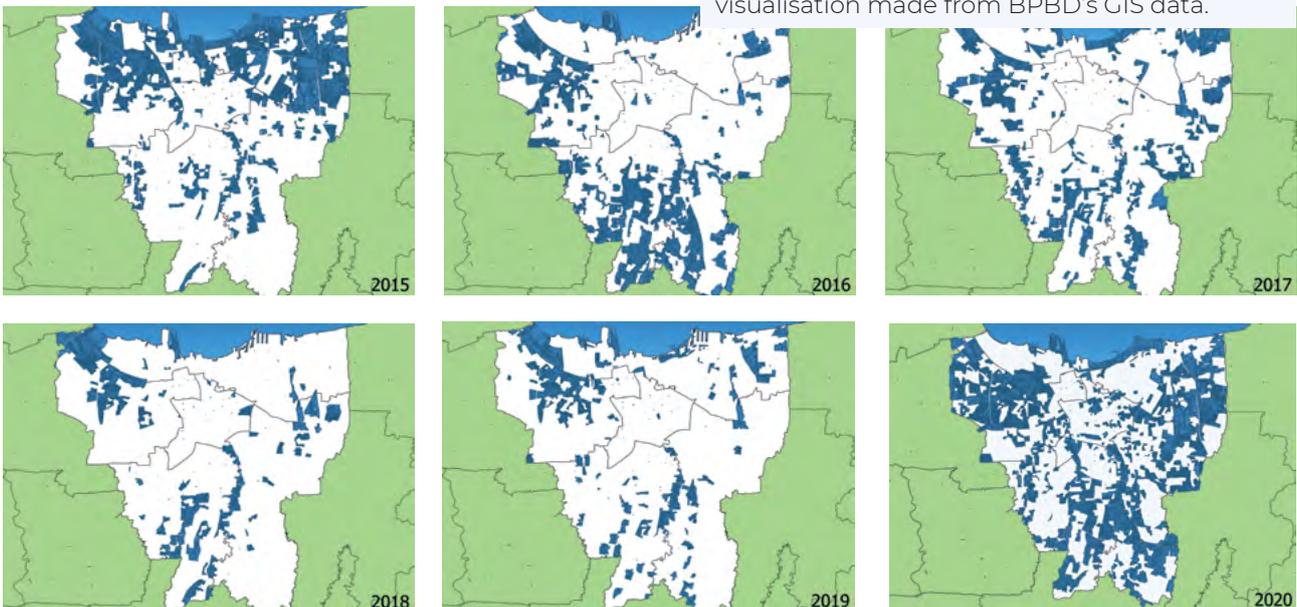
extremes and aerosol concentration (Syamsudin and Lestari 2017). In turn, the increase of rainfall and aerosol concentration is increasing the intensity of flooding in Jakarta. The Meteorology Climatology and Geophysics Agency (BMKG) around Jakarta recorded that aerosols such as SO₂, NO₂, and SPM exhausted from fossil fuel and coal use in transportation and industries was soaring between 1986 to 2012. This increase led to the growing trend of extreme rainfall with the increasing trends of rainfall extremes as indicated by total numbers of 40, 50, 100 mm/year. In contrast, precipitation and aerosol concentration see decreasing trends in neighbouring areas such as Bogor and Citeko.

In addition to the increasing rainfall, many parts of Jakarta are lower than the sea level, and the increasing load of human activity exacerbates Jakarta’s vulnerability to flooding (Dwirahmadi *et al.*, 2019). Moreover, the climate in Indonesia already has a high rainfall rate. In 2015-2016 Jakarta received very dense rainfall in the range of 100-1500 mm per day (Koto and

Negara 2017a). Figure 3 visualises the data of areas affected by flood collected by the Provincial Disaster Management Agency (*Badan Penanggulangan Bencana Daerah - BPBD*) 2015 to 2020. The flood mapping in 2020 slightly changed, as the Governor instructed the BPBD to revise the flood data collection method, which may explain the expanding flood area in the 2020 flood map. The flood definition now expands to runoffs and puddles, as the indicator of success in flood reduction now includes limiting flood duration. Furthermore, this Governor’s instruction also pushes BPBD to collect better and more detailed real-time data that have led to improvement to the disaster management of Jakarta.

Ciliwung River, the largest river crossing Jakarta, is one of the most contaminated in Indonesia. According to the Jakarta Environmental Management Board, 71% of rivers in Jakarta are heavily polluted, and 20% are partially polluted. The poor water and waste management of Jakarta exacerbate the extent that annual

Figure 3. Jakarta Flood Area 2015-2020, visualisation made from BPBD’s GIS data.





flooding in Jakarta threatens the livelihood of its inhabitants. In 2007, 70% of Jakarta's total area was flooded, 190.000 residents had fallen ill due to flooding, and many were displaced from their homes.

Disastrous waste and water management in Jakarta, along with poor sanitation, not only worsened the flood but also imposed a negative impact on public health. Poor sanitation, improper water management, and water pollution are statistically significant to the increased diarrhoea in toddlers based on a recent study by Fitri *et al.* (2020). The severity of water pollution also threatened the quality of water for human consumption but also endangered the coastal ecosystem in the northern part of Jakarta. Pollution from solid waste, toxic chemicals, and increased sedimentation that rivers carry into the ocean are the primary stressor for coral reefs that affect fish and coral health (Kunzman *et al.*, 2018).

Adding to these environmental issues is the air quality problem. Air pollution in Jakarta is mostly related to human activities (Kusumaningtyas *et al.* 2018), specifically from pollution generated by industrial and traffic activities. Evidence suggested the air quality during Eid Fitri (Kusumaningtyas *et al.*, 2018) and large-scale social restriction in the first wave of COVID-19 in Metropolitan Jakarta (Pramana *et al.*, 2020) showed a significant reduction of pollutants compared to the typical business days. Strict government intervention in controlling air pollution. This is an important public health hazard as constant exposure to bad air quality is hazardous, especially for children (Amalia *et al.*, 2017). In the end, the various pollution problems in Jakarta require

transformative intervention, especially as it endangers the most vulnerable groups of the inhabitants across age, income level, and other socioeconomic challenges.

With the increasing awareness of how air pollution affects human health, in December 2018, several Jakarta citizens called *Inisiatif Bersihkan Udara Koalisi Semesta - IBUKOTA* (Coalition of Clean Air Initiatives), took an initiative that could push the government to reduce air pollution. This initiative led to a lawsuit that put the President of Indonesia, Governor of DKI Jakarta, Governor of Banten, Governor of West Java, Minister of Environment & Forestry, Minister of Health and Minister of Domestic Affairs as the defendant (Nathania and Fadhillah, 2020). The IBUKOTA Coalition argued that the government was negligent in giving the citizens their right to clean air quality.

After two years of court trials, delayed trials and mediation sessions between the citizens as plaintiffs and government bodies and agencies as the defendants' party, The Panel of Judges of the Central Jakarta District Court passed a guilty verdict to the defendants in September 2021 (Mangihot, 2021). The judges conclude that the defendants were proven to have violated National Law Article 32 of 2009 on Environmental Protection and Management and the violation of the human right for the citizens to have a good quality living environment. Immediate action and revision of related policy & regulation were demanded from the defendants.



Road to Changes

In this part, we highlight the ever-changing strategies of Jakarta's governance in post-reform Indonesia to overcome "chronic stresses and acute shocks" that occur from time to time (Figure 4). Before we continue, we have to understand several things: the legacy of the authoritarian "New Order" regime, the policymaking process, and stakeholders at the sub-national level all contribute to the policymaking.

Although after the 1998 reform, Indonesia has entered an era of democratisation and decentralization, the legacy of Suharto's authoritarian regime is still intact in some areas of policymaking. First, 'an extensive bureaucratic machinery and highly-codified legal system' seen in the rigid hierarchy of laws and convoluted planning system still followed today (Datta, Nurbani, & Satria, 2018). On top of that, informal activities are also occurring. The existing political relationship and practices remain intact, resulting in a more competitive, complex, and often confusing set of political relationships (Blomkamp, Sholikin, & Nursyamsi, 2018). At the sub-national level, the particular planning policies should comply with national direction amid regional autonomy (*otonomi daerah*).

When the 1997 monetary crisis severely hit Indonesia, it resulted from disorganised, centralised economic planning (p.383) by Bappenas, or National Development Planning Agency (Fuady,

2012). After *reformasi*, the authority to manage the national economy (budgeting, or economic planning in general) was shifted to The Ministry of Economy and The House of Representatives (DPR), making Bappenas only focused on national planning through a series of policies. These policy are mainly Long-Term Development Planning Policy (*Rencana Pembangunan Jangka Panjang/RPJP*) in every 20 years, Mid-Term Development Planning Policy (*Rencana Pembangunan Jangka Menengah/RPJM*) in every five years, and National Government Work Plan (*Rencana Kerja Pemerintah/RKP*) every year. These three policies, more or less, determine the direction of sub-national level government development planning. Indeed, provincial, city, or district governments have their authority to manage their resources through their development planning policy (*Rencana Pembangunan Jangka Menengah Daerah/RPJMD*). But after 2004, under National Act No.32/2004, and more recent National Act No. 23/2014, the development of sub-national development planning should be synchronized with national planning albeit not in every aspect. Issues such as regional income, regional taxes, cultural issues, are still controlled totally by sub-national governments.

The compilation of an RPJMD document is carried out by a combination of bottom-up and top-down inputs. Every sub-national RPJMD should raise the issues specific to each sub-national government,

Figure 4. The leaderships of Jakarta from 1997 to 2022

usually raised by each Local Government Working Unit. After being compiled, those issues are discussed in public, multi-stakeholder meetings, namely *musrenbang* or development plan deliberation. Those local issues were listed and stratified at the said meeting based on the national priority mentioned in RPJP and RPJMN. After it is done, it should be authorized by Bappeda or Regional Development Planning Agency and Local House of Representatives (DPRD, mainly for budgeting purposes) and then listed in Regional Government Work Plan (*Rencana Kerja Pemerintah Daerah/ RKPD*), which is released each year. Every sub-national government office and the working unit then comply with their region RKPD. In short, to create a series of policies related to urban resilience, the process took a long time even to create the policy, not to mention other things such as the process of implementation or transactional politics that often occur during the policymaking process.

The involvement of various actors with different interests and agendas during development planning policymaking processes makes the implemented regulations, particularly at RPJMD, convoluted and sometimes fails to address the issues at hand. In terms of urban resilience issues, of which many aspects are, in the words of Rittel and Webber, wicked problems (Craig, 2020), the iteration of each policy cycle should be fast and flexible enough to keep up with the problem paces. This is especially visible during the leadership transition from one governor to another, which we discuss below.

Last Military Leadership (1997-2007)

Sutiyoso was appointed as the eighth governor of Jakarta in October 1997. Like most of his predecessors, he was an army general in charge of the Jakarta Regional Military Command (Kodam Jaya). When Sutiyoso came to office, the circumstances in Jakarta in 1997 were volatile in terms of the political and economic situation (Silver 2008). Sutiyoso inherited a wide array of major projects that had been initiated since the late 1960s, but which were either still in planning stages or were just beginning to be implemented, such as the subway project, the waterfront city in northern Jakarta, and the commercial megaprojects at Kemayoran (Silver, 2008). Despite all of the instabilities, the very first action Sutiyoso undertook was to clear slum housing at Ciliwung Riverbanks, which he further expanded to the city centre. This policy relocated slum inhabitants to the low-income housing outside the city, particularly to the Parung Panjang housing complex, part of a national plan prepared by the State Minister of Public Housing (Silver, 2008). After relocating slum inhabitants outside the city, Sutiyoso's following action was to create a public transport that connects Jakarta to nearby cities. In the early 2000s, Sutiyoso pushed the initiation and accelerated the construction of 7 lanes for the Transjakarta, the city's bus rapid transit system brand, popularly called "busway" (Susanto *et al* 2020). Busway became Sutiyoso's best-known legacy that is enjoyed by millions of commuters up to now.

In the area of environmental policy, Sutiyoso implemented three hallmark actions. First is the slum housing clearing at Ciliwung Riverbanks aimed to normalize river flow to surmount Jakarta's flood problem. The second is to overcome Jakarta's flood problems by proposing Jakarta's Sea Wall, which was later taken over by the national government (Ladjar, 2020). Lastly, he took a controversial move by fencing many green open areas, including the National Monument (Monas), preventing street vendors from entering the areas (Silver, 2008). Worth mentioning is the initial construction of the West and East Flood Canal, which aims to divert floods from rivers around Jakarta to the sea. This particular project was under national government authorities (under the name of National Strategic Project), while sub-national governments act as project implementers (PUSDATIN PUPR, 2003). During his governor tenure, Sutiyoso was known to engage with citizens actively. Towards the end of his term, he launched an SMS centre and an interactive radio program, which facilitated his administration to respond to Jakarta residents' complaints and reports quickly.

Technocratic Leadership (2007-2012)

Fauzi Bowo was a Deputy Governor of Sutiyoso before running for the governor position and winning the first direct governor election in 2007. Claiming to be the expert on urban progress, Bowo easily won the elections with the support of most political parties. Under Fauzi Bowo's leadership, most of his programs continued what Sutiyoso had done before. Nevertheless, he took different approaches

in handling Jakarta's problem, focusing on severe floods and traffic problems. For the former, he started a program called Jakarta Emergency Dredging Initiative (JEDI) to normalise river flow. At the same time, the latter was addressed in the initiation of Mass Rapid Transit (MRT) construction. Another continued infrastructure development under Bowo's leadership was the construction of several non-toll flyovers to reduce vehicle traffic. In addition, he built railway connections to nearby cities by commuter train under a new "blue-lane" on top of the already established commuter line train. Other than these, Bowo aimed to relocate slum inhabitants to vertical housing (known as *rumah susun*). However, the plans were not executed smoothly because of the conflicting authorities between the national and sub-national governments around the program.

Work-oriented Leadership (2012-2017)

In the 2012 governor election, Bowo was challenged by Joko Widodo, popularly called Jokowi, who arose from his position as the mayor of Surakarta, a small town in Central Java. Bowo was defeated, and Jokowi became the Jakarta governor with a promise of solving Jakarta's many problems that Bowo seemed to have failed to achieve. Bringing allegedly grounded approaches, Jokowi's first action was to create a more work-oriented governing style by focusing on improving the wellbeing of Jakarta residents, such as the creation of Health and Smart Card (Kartu Jakarta Sehat dan Kartu Jakarta Pintar) (Ruman, 2014). These two cards were distributed to Jakarta citizens as a government subsidy to the public health and education sectors. Jokowi

also implemented the people-oriented approach in infrastructure development. For instance, he refrained from evicting residents who live in slum areas (Utami, 2013). In terms of mobility infrastructures, Jokowi managed to implement various projects inherited from the previous government, namely the construction of non-toll flyovers and the MRT subway (Galih & Arnani, 2019). He also persuaded inhabitants of riverbanks and reservoir slums to move to vertical housing (Salim, 2013) while continuing the JEDI project to tackle annual floods (Tambun, 2013).

In 2014, Jokowi ran for president, and he was replaced by his deputy, Basuki Tjahaja Purnama, widely called Ahok. He is a Chinese Indonesian politician who has a strong character in governing. In general, Ahok's leadership resumed what Jokowi had started. He relocated slum inhabitants to vertical housing and dredged the rivers to normalise river flow (Sari, 2016). He managed to make improvements, especially in integrating existing public transportations that aim to reduce private vehicles (Aziza, 2015). Ahok is more famous for his strict action against corruption and misuse of government budgets. He pushed more transparent governance by enabling citizens to visit his office any time to build connections with Jakarta residents. He also provided a channel for public reports on any issues of urban development. He was strongly committed to using digital technologies to turn Jakarta into a modern city. In 2017, Ahok failed to extend his term in the governor election, after which he was sentenced to two years in prison for blasphemy.

People-oriented Leadership (2017-2022)

Anies Baswedan came to office as the Jakarta governor after winning in a two-round election in 2017. Baswedan was the minister of education in Jokowi's first-term administration, which he held only for two years before he was reshuffled. He then decided to run for governor. Under Baswedan's leadership, Jakarta saw a dramatic turn toward tackling housing, traffic, and environmental problems. Once again, a change of direction in development occurred. To accelerate his development programs, Baswedan formed the Governments Team to Accelerate Development (TGUPP) which functions to "centralise" strategic development programs (Puspita, 2017).

Holding a PhD in political science, Baswedan holds different views on solving infrastructural and environmental problems in Jakarta. So different that some people may find his approaches to be controversial. For instance, Baswedan stopped the normalisation project that Jokowi and Ahok initiated to reduce floods in riverbanks. He then introduced the concept of "naturalisation", referring to rebuilding the ecosystem around the river, hoping that the water can be easily absorbed into the ground. This concept received many criticisms due to severe floods in early 2020 and 2021 (Hamdi, 2021). Another example is the housing policy. Instead of building vertical housing (*rusunawa* and *rusunami*) to be rented by low-income residents, Baswedan decided to erect low-cost housing with zero down payment for a purchase (Velarosdela, 2021). In 2021, he completed two towers of low-rise housing in the



waterfront neighbourhood four years after Ahok evicted hundreds of families in that area. Another success is seen in seamlessly integrating all modes of public transportations through JakLingko. This system connects more extensive public transportation such as MRT and busway with local feeders across the city (Firmansyah, 2018). Using a tagline of “Jakarta a city of collaborations,” Baswedan’s administration emphasises what he considers as people-oriented urbanism that pays attention more to the needs of the lower-class population.

In the last fifteen years, Jakarta has seen five times of leadership change that shape the direction of development and progress in the city. Ever since Indonesia’s political systems shifted from military authoritarianism to electrical democracy, it has changed how Jakarta

was governed as well. In every election, the transition from one governor to another has considerable implications on the agenda of leadership and direction and priorities of urban developments in the capital. On the one hand, we see discontinuities of programs whenever a new governor comes to office. However, on the other hand, electoral competitions give incentives for political leaders to perform well in governance and respond to the needs and demands of their constituents. Such a pattern of political relations benefits Jakarta as a whole because every governor seeks to make significant contributions to improve the life quality and the well-being of Jakarta residents. This, in turn, has positive effects on socioeconomic benefits and environmental improvements and the city’s long-term ability to mitigate urban risks and vulnerabilities.



BUILDING RESILIENCE

Climate change has been the primary source of potential challenges and vulnerabilities for Jakarta in the last decade. Realising the growing risk caused by long-term ecological transformations, especially in urban areas, the Jakarta government decided to take initiatives to improve the resilient capacity of the city in responding to abrupt crises and future disasters. This provides an entry point for the adoption of the resilience framework in city governance.

Jakarta began to realise the importance of disaster resilience when *Badan Daerah Penanggulangan Bencana* or the Provincial Agency for Disaster Management (BPBD) was formed to

coordinate disaster responses in February 2011 based on several legal frameworks. Among others is the Presidential Decree No. 8 in 2008 on the formation of The National Disaster Management Agency, which is a lesson learned in the aftermath of the 2004 Asian tsunami that killed 250 thousand people in Aceh Province. The decree commands sub-regional or provincial governments to have their own disaster management agency to support its national counterpart. Three years later, the Jakarta Government issues the Local Regulation (Peraturan Daerah) No. 9 in 2011 and Governor’s Regulation No. 26/2011, resulting in the BPBD. This agency is responsible directly to Jakarta’s Governor. It is led by the Secretary of





Governor as an ex officio and funded by the Provincial Budget.

Jakarta's BPBD has three main roles: 1) to minimize the risk of disaster, 2) to increase the awareness and preparedness of Jakarta inhabitants toward potential disaster, and 3) to increase the capacity to manage and overcome the aftermath of a disaster. These roles are aimed to achieve the goal of Jakarta's resilience towards disaster, as described in their vision. On a day-to-day basis, Jakarta's BPBD is responsible for providing guidelines and standardisation for disaster management and rehabilitation, informing and educating about disaster data, potential and other information to the public, and in times of disaster, helping the citizens and distributing the aid and assistance.

Ten years after its inception, BPBD has proven to be effective in responding to a variety of disaster events, reducing the potential risk of more fatalities and economic losses. The most frequent disaster BPBD responds to is heavy floods, which occur almost every year. In the efforts to reduce the flood risk, BPBD has installed sensors and communication networks across the vulnerable areas. While BPBD contributes the urban resilience of Jakarta, institutional issues remain plaguing its operation, thus affecting its overall capacity to enhance Jakarta's resilience. Djalante and Thomalla (2012) have highlighted the issue of funding and assistance that hinder the commitment and progress of disaster resilience at the sub-national level in Indonesia. In addition, Djalante *et al.* (2012) also raised the concern on the provincial agency's lack of qualified personnel and technical capacity that leads to the heavy

reliance on the national government and international NGOs support. Some issues persist in Jakarta's effort to be more resilient in the disaster management dimension. In a 2018 report of BPBD (Laporan Kinerja Instansi Pemerintah, LKIP), the lack of a holistic approach to disaster management may have caused the low effectiveness in preparing, managing, and rehabilitating the city when a disaster occurs. This includes the poor management of information that is systematic, integrated, and accurate.

However, some significant progress has been shown to improve BPBD's capacity to handle disasters with the help of multiple stakeholders and better use of technology. For instance, Jakarta adopted the smart city concept manifested the Disaster Information Management System (DIMS). It is a collaboration between the government, university, and private entities to enhance BPBD's technological capacity. The compilation, analysis, and visualisation of data from this system have helped BPBD improve their planning, response, decision making, and evaluation of the disaster response, especially for flooding (Sitinjak *et al.*, 2018). Wahyuningsih and Suswanta (2021) have also noted the active involvement of the agency in social media. They have contributed to better information awareness to the public before, during, and after the disaster happened. This helped the agency promptly coordinate with related stakeholders and institutions during a disaster.

The creation of the national and provincial disaster management agencies across the country resulted from the Indonesian government's commitment

to disaster resilience. In fact, Indonesia has long taken the concept of resilience seriously, albeit in more ideological sense as encapsulated in the Agency of National Resilience (Lemhanas). Recently, resilience gained a new meaning more linked to the ability to withstand crises and changes in the environment. This new definition of resilience has only been newly introduced in Indonesia in the last several years. Further, the National Development Planning Agency (Bappenas) formally released a document on Indonesia's Climate Resilience Development Policy. It focuses on four sectors of resilience: marine and coastal resiliency, water resiliency, agriculture resiliency, and health resiliency. The document provides a detailed explanation of the plans and actions toward building national resilience. It serves as a reference and guidance, especially for government bodies that are working on the issues.

In line with the national government's efforts on building resilience across multiple sectors, the Jakarta government followed suit. In 2019, it released Jakarta Resilience Strategy (JRS), a document that follows the Resilient Cities Network Jakarta has participated since 2016. This non-profit network connects cities around the world to bring knowledge, practice, partnership and funding through the involvement of city government, urban practitioners, and communities in building the city's resilience.¹

To produce JRS, serial discussions were organised and attended by many stakeholders, including public agencies, private entities, communities, nonprofit

organisations, and international bodies whose main activities are related to urban developments of Jakarta. In a series of meetings, they were asked to build a map on crucial issues of resilience for Jakarta. These different groups of people took part in the three stages of the program. First, they identified key challenges Jakarta is facing through workshops, surveys, and intensive discussions. Second, they formulated the vision and strategies for the future of Jakarta. Lastly, they proposed a road map and strategy to achieve the goals. It took almost 3.5 years to complete the process involving analysing 200 programs from the participating stakeholders and more than 50 sessions with more than 1000 stakeholders.

The City Resilience Framework (CRF) formulated by consulting company Arup with support from Rockefeller Foundation became the primary reference in the formulation of JRS. It emphasises seven urban qualities Jakarta intends to achieve: *reflective, resourceful, inclusive, integrated, robust, redundant, and flexible*. These are believed to be the underlying features that attain resilience in the city system. In addition to the CRF, the formulation of JRS incorporates existing local and national policies and international policy frameworks that facilitate the resilience agendas. This includes the UN's Sustainable Development Goals, the Paris Agreement, Habitat's New Urban Agenda, Indonesia's National Act on National Long-term Development Planning Policy, and Jakarta's Local Planning Policies and Regulations.

¹ For detailed information, see resilientcitiesnetwork.org

JRS is considered an important milestone because it sets out the vision of Jakarta as a resilient city that aims to provide equal opportunities to all its citizens for safe, healthy, happy, and prosperous living through innovative policy and adequate public service.² To realise this vision, three pillars are required. These pillars are encapsulated in three campaign slogans: *Well-Prepared Jakarta* (focusing on disaster management), *Healthy Jakarta* (focusing on access to clean water and better waste management), and *Connected Jakarta* (ensuring information and mobility accessibility). To carry out the whole program, a *Chief Resilience Officer* (CRO) is appointed. This position is ex-officio to Deputy Governor for spatial planning and environment. The CRO is thus in charge of formulating action plans and engaging stakeholders to implement the plans.

The importance of JRS comes from the fact that it provides transformative steps toward enhancing the resilient capacity of Jakarta in dealing with urban risks. The current administration plays a crucial role in taking the necessary steps to conceptualise and implement the resilience framework as one of the priorities in the city's development programs. This is quite unprecedented given the fact that in previous governments, the initiatives towards resilience were scattered, unorganized, and split across government agencies due to a legacy of the New Order centralized government that imposed a rigid and highly codified legal and planning system. This centralised government hindered the problem-solving process in cities to face dynamic and fast-paced

changes. Thus, JRS is a culmination of a long process of changes to create a more transparent, collaborative, inclusive, integrated, and resourceful urban planning and development in Jakarta.³

JRS has laid out the initial path of Jakarta's journey to a resilient city. Subsequently, after completing this document, in early 2020, Baswedan's administration formed a specialised team that works on the mitigation and adaptation to climate change. This team is responsible for planning, implementing, monitoring, and evaluating climate change mitigation and adaptation action plans. The head of the team would respond and report to the Governor. The issue of resilience has also started to gain traction, as indicated in the recent 2021 Government Work Plan (RKPD). The plan explicitly mentions pursuing the "advancement of urban resilience" as the primary development target to be achieved by all municipal agencies and authorities. It sets goals and action plans more specifically to preserve through the pandemic while improving public service, disaster preparedness, and economic recovery.

Will Jakarta be able to achieve its goal of becoming a resilient city? This is not easy to answer. Despite all the efforts the city has made to conceptualise and formulate the agendas and plans for resilience, the realities of city governance are complex. Some of the significant challenges lie within the bureaucratic structures of the Jakarta government. For example, Firman *et al.* (2011) note how Jakarta cannot still be proactive rather

² Interview with Oswar Mungkasa, Jakarta 16 December 2019.

³ *Idem.*



than reactive to potential hazards and disasters triggered by climate change. At least three reasons why this is the case: data availability and related assessment; comprehensive spatial planning; and institutional capacity. These three challenges are elaborated as follows.

First, the amount and quality of data and assessments that could be the basis for Jakarta's planning and resilience strategies are largely inadequate. Jakarta has data drawn from Geo-Spatial Information (GIS,) but it only marks the land use for spatial planning. Moreover, the existing maps and data lack the depth of how it connects to social and economic data. Exacerbating this is information shortage in types and depth of scale on climate change data. Data and information are scattered in different authorities and institutions, making it arduous to build thorough and meaningful analysis in building the city's resilience. As Firman *et al.* (2011) point out, Jakarta has limited mapping and assessment of socioeconomic vulnerability due to the current or forecasted ecological transition, especially in the micro-level analysis. The present study primarily focuses on the physical impact of a disaster or potential hazard without a deep and comprehensive analysis of the social and economic implications. Without proper vulnerability assessment, fast and short-term solutions are prone to be devised that only increase the vulnerabilities of the citizen in the long term, especially those in the lower economic group with limited resources to support themselves (Surtiari *et al.*, 2020).

As problems and challenges in Jakarta are complex and varied, the mainstreaming of climate change and

resilience in spatial planning and public policy becomes even more critical. Further, as climate change is more likely to affect the most vulnerable communities, adaptive and more proactive climate change policy and institutional framework are integrated to tackle and improve socioeconomic development and equity (Varrani and Nonnes, 2018). To mitigate, plan, coordinate and better manage urban problems that are relevant and coherent in Jakarta, an interdisciplinary approach must be adopted that also involves public and community engagement (Rahmayati *et al.*, 2017). Nevertheless, with data and information being scattered throughout different government bodies, strategies to various issues are also dealt with by different authorities without substantial coordination. Without effective coordination among government bodies and other public and private stakeholders, it is impossible to truly build resilience in the megacity.

The adoption of digital technology is an example. As explained in the previous part, flood is one of the biggest problems in Jakarta that are complex and require thorough planning and management from various stakeholders and sectors. Jakarta decided to rely on digitalisation to deal with this difficulty by implementing the smart-city framework (Widiachristy and Rachmanto 2021). The use of digital platforms is meant to simplify and ease the management of water and flood in the metropolitan area of Jakarta. An early warning system (EWS) was installed to inform local officials on water levels during the rainy season. However, the innovative technology was slightly too complicated for government officials. As a result, the information delivered through the mobile

application of the EWS is hard to digest and provides little clarity for the public to interpret the sort of action needed when the flooding started.

A great challenge also comes from outside the bureaucracy. As Surtiari *et al.* (2020) emphasise, integrated stakeholder engagement must also be joined with strong leadership and collaboration to successfully adapt the resilient solution. It requires strong government willingness and commitment to achieve significant and transformative outcomes with non-governmental stakeholders, which thus far are still lacking. The ability to convince non-governmental actors is seen in the case of the green open space policy, which plays a crucial role in environmental resilience. Setiowati *et al.* (2018) point out how the government seems reluctant to aim for higher goals and put the necessary effort and action due to the vested interest in commercialising public spaces. The city master plan only targets 11.7% of green open space to achieve, wherein in 2018, the area ratio was 4.65%. This number is much lower than suggested in the National Law Act No. 26 of 2007, which targeted at least 20% of provincial areas to be green open space.

On top of the challenges is the institutional capability for building resilience against chronic issues such as climate change and subsidence (Firman *et al.* 2011). Although Jakarta officials are generally aware of issues and challenges, better knowledge is needed for the city's decision-makers and executors to understand the myriad of details of the building process of urban resilience. In this respect, the city administration needs more advanced research and studies to be able to accurately analyse the risk and adaptation strategy for the rapidly changing environment of Jakarta. Coordination and cooperation with neighbouring municipalities in the Jakarta Greater Area are crucial in establishing comprehensive and integrative solutions.

With the immense challenges and pressures as the centre of power and economy of the nation, Jakarta is still struggling to deal with myriad problems and changes as the city grows and develops. New issues will emerge just as the COVID-19 pandemic has reminded us. Jakarta must take the necessary measures to become more resilient and prepared for the growing risks of disruption and disturbance.

CONCLUSION

As one of the most rapidly growing megacities globally, Jakarta faces enormous challenges in providing a sustainable living environment for millions of its residents. Like many other emerging cities, Jakarta has to deal with two significant sources of urbanisation problems. On the one hand, the rapid growth of population, both natural and internal migration, has

increased the magnitude and volume of socioeconomic tensions that the city is compelled to address in its development policies. On the other hand, the ongoing changes in the environment, including air, land, and sea, are pressing the city government to urgently implement more ecologically oriented programs to defuse an inflating bubble of urban risks, which may



otherwise explode in an unprecedented disaster. The resilience framework is thus adopted by the city government, a concept that is generally believed as a panacea for coping with future uncertainties.

The adoption of the resilience framework in Jakarta's development policies and projects has been guided by the JRS, a document resulting from collaborations between government experts and stakeholders. The release of the JRS was timely and hailed by a rising optimism among the officials and non-governmental entities, as they assumed that the efforts towards building Jakarta's resilient capacity would become more meaningful. Such a rosy stance is reasonable because the looming ecological crisis's measures were sporadic, scattered, and less organised for years. Nonetheless, the commitment of the Jakarta leadership plays a central role in pushing for the implementation of the resilience agenda that would prepare the city to anticipate potential disruption caused by climate change and population growth.

Notwithstanding all the achievements in conceptualising and implementing the resilience strategy, problems and challenges remain. This is true especially when it comes to the fact that Jakarta is still plagued by bureaucratic inefficiency, which incredibly affects its performance to realise its own long-term goals. The use of digital technology was meant to accelerate the intended transformation. Thus, an array of digital platforms were built to streamline the processes in each project and program related to resilience enhancement, such as flood canal construction, flood emergency reports, and water pipe leakage. While these technologies prove helpful to facilitate communication and coordination between government officials and residents, it does not necessarily solve the problem that lies in data systems required to support the policymaking process of urban resilience. This is the fundamental problem Jakarta has to address in truly enhancing its resilient capacity. This requires more efforts in building data infrastructures, and policy integration are needed to boost Jakarta's transformation process into a resilient city.



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