LUISS

Master's Thesis

Master in Global Management and Politics

Department of Business and Management

Chair of Global History

Urban Resilience and Climate Migration: Socioeconomic Effects on Jakarta's Urbanization

Supervisor

Prof. Rosario Forlenza

Co-Supervisor

Prof. Gianfranco Pellegrino

Candidate

Margherita Francario

766601

Academic Year

2023-2024

Abstract

The term "climate migration" has evolved significantly over the past decades, reflecting the increasing recognition of climate-induced displacement as a critical global issue. This concept, which refers to individuals forced to migrate due to climate change impacts such as severe flooding, land subsidence, and sea-level rise, has profound implications for urbanization, particularly in vulnerable cities like Jakarta. The influx of migrants driven by environmental triggers has reshaped the city's socioeconomic landscape, presenting challenges and opportunities for sustainable urban development. The purpose of this thesis is to examine the socioeconomic effects of climate migration on Jakarta's urbanization, focusing on evaluating the policies and strategies in place to address these challenges while offering recommendations to enhance urban resilience and promote sustainable development. The study will explore historical trends, socioeconomic impacts, and urban policies addressing climate migration. Lastly, this research seeks to provide a comprehensive understanding of how Jakarta can integrate climate migrants into the urban fabric, mitigate socioeconomic disparities, and foster a more resilient city in the face of increasing climate threats.

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Introduction

Motivation and Relevance of the Study

In recent years, the concept of "*urban resilience*" has gained significant traction as many cities across the globe cope with the pressing challenges posed by climate change. This notion has become an essential part of policy and development discourse, influencing how governments, international organizations, and communities address the hardship of climate adaptation and disaster preparedness. This thesis delves into the evolving dynamics of climate migration in Jakarta, a city that embodies the struggle to combine rapid urbanization with the environmental threats of flooding, land subsidence, and rising sea levels. As Jakarta faces increasing environmental hazards, the concept of resilience is often identified as a capstone to ensuring the city's long-term survival and growth.

However, the discourse around urban resilience in Jakarta has contradictions and limitations. On the surface, resilience strategies such as infrastructural development, international collaborations, and community-driven initiatives may seem like credible solutions. Yet, upon closer inspection, these approaches often overlook more profound socioeconomic inequalities, governance challenges, and the complexities of migration as a response to environmental risks. Jakarta's path to resilience reveals the tensions between development goals and environmental sustainability.

This thesis aims to explore not only the strategies implemented to build urban resilience in the city but also to examine their limitations critically. How effective are these efforts in addressing the root causes of climate vulnerability? What role do international organizations and local governance play in shaping the city's response to climate migration? And most importantly, how do these strategies impact the most vulnerable populations, who are often left behind in the race for development?

By assessing the resilience initiatives and their broader implications, this research seeks to stimulate a more subtle understanding of Jakarta's urban challenges. The principle is to foster a critical perspective that goes beyond the surface of seemingly progressive strategies and considers the inherent weaknesses and contradictions of a model that attempts to balance rapid urbanization with the environmental constraints of a changing climate.

Purpose Statement and Research Question

The main purpose of this thesis is to analyse the socioeconomic effects of climate migration on urbanization in Jakarta and to examine how these can be managed through effective policy approaches to promote sustainable urban development. By investigating the challenges and opportunities posed by climate migration, this research aims to provide insights into how Jakarta can build urban resilience while addressing the needs of its most vulnerable populations. Considering this, the following research question and sub-question will be addressed:

RQ: What are the socioeconomic effects of climate migration on urbanization in Jakarta, and how can we leverage policy approaches to promote sustainable urban development?

SQ: How do current urban policies and governance structures in Jakarta address the challenges posed by climate migration, and what improvements can be made to enhance urban resilience?

The response to these questions will explore how climate migration has influenced Jakarta's urban landscape, drawing attention to its dual role as both a challenge and an opportunity for furthering sustainable development. The s argues that effective policy frameworks are essential in addressing the socioeconomic impacts of migration while leveraging this phenomenon to enhance urban resilience. The thesis proceeds with a detailed examination of the historical and contemporary migration patterns in Jakarta, followed by an analysis of the urban policies in place to manage these challenges. Each chapter delves into a specific aspect: Chapter 1 outlines the theoretical and historical context of climate migration, Chapter 2 examines the socioeconomic effects of migration and its role in Jakarta's rapid urbanization, while Chapter 3 critically assesses the current policy responses and urban resilience strategies. The conclusion provides policy recommendations, emphasizing the need for inclusive governance and community-driven approaches to enhance Jakarta's urban resilience in the face of ongoing environmental threats.

CHAPTER 1
Historical Context of Climate Migration

Climate-induced migration refers to the movement of people prompted by the impacts of climate change. These impacts include rising sea levels, increased frequency and intensity of natural disasters, prolonged periods of drought, and other environmental changes. As these conditions deteriorate, they compromise the habitability of affected regions, compelling individuals and communities to relocate in search of better living conditions.

The phenomenon of climate-induced migration is not new, but its scale and urgency have intensified with the accelerating pace of climate change. The Intergovernmental Panel on Climate Change (IPCC) has highlighted that millions of people worldwide are already being displaced by extreme weather events and long-term environmental changes (IPCC, 2014).

1. The Link Between Climate Change and Migration

Nevertheless, the relationship between climate change and migration is still complex, as climate change is only one of several factors influencing migration dynamics. Any migratory movement results from a convergence of multiple factors, with environmental stress mingling with economic constraints, social networks, political contexts, and other causes. Environmental changes can heighten health problems or food insecurity, which may drive migration. In such scenarios, it is challenging to isolate a 'primary' cause, as all the components may mutually reinforce one another. For instance, in environments where political, demographic, or economic pressures are already present, environmental considerations may be more critical when it comes to migration. Conversely, in wealthy and democratic societies, where robust institutions and resources exist to mitigate environmental impacts, climate change is less likely to trigger migration. (Piguet et al., 2011)

Moreover, the interaction between environmental and non-environmental factors can be sequential. People who migrate primarily for economic reasons, for example, might be more vulnerable to future migrations brought on by climate change. Understanding the multiple causes of migration draws attention to the non-direct relationship between migration and climate change, acknowledging the several variables that mediate this relationship. As a complicated environmental process, climate change does not uniformly affect all regions.

Societies have traditionally used organizational, cultural, institutional, technical, and socioeconomic innovations to adapt to shifting environmental conditions. The multitude of

variables involved leads to significant uncertainty and local variability in migration patterns. From a policy perspective, this multi-causality implies that states will not suddenly experience a flood of “environmental migrants” as sometimes anticipated by policymakers. Current patterns will likely influence future migration flows, especially when considering receiving nations in the industrialized world. This does not negate the impact of climate change on migration but accentuates the difficulty in immediately identifying climate change as the only driver. (Piguet et al., 2011)

1.1 Analysing the Driving Factors of Migration

The phenomenon of migration is driven by a range of causes that can be broadly classified into push and pull factors. Understanding the dynamics of migration requires examining these diverse factors, including economic opportunities, social networks, political stability, and environmental conditions. Lee's theory, which offers a fundamental basis for analysing the factors that influence migration decisions, particularly those prompted by climate change, is one of the cornerstone frameworks for understanding migration.

Everett S. Lee's theory of migration, introduced in his seminal 1966 paper "A Theory of Migration," provides an extensive framework for understanding the factors influencing migration decisions. Lee's theory categorizes the elements affecting migration into four main groups: factors associated with the area of origin, factors associated with the area of destination, intervening obstacles, and personal factors. This structured approach allows for a detailed analysis of the intricate interaction of motivations and barriers that individuals face when considering migration.

1. Factors Associated with the Area of Origin:

Factors at the origin can either push individuals to leave, compelling them to leave their home regions or hold them back. They include adverse economic conditions, unemployment, political instability, social unrest, and environmental degradation. On the contrary, positive elements like solid community ties, family connections, and established livelihoods can act as forces that retain individuals in their current locations. In the context of climate change, push factors might include increased frequency of natural disasters, droughts, and sea-level rise, which make living conditions untenable. (Lee, 1966)

2. Factors Associated with the Area of Destination:

These are the pull factors that attract individuals to a new location. They encompass better economic opportunities, political stability, social services, the presence of relatives or friends who have already migrated, and favourable environmental conditions. The allure of improved economic prospects and quality of life often plays a significant role in the decision to migrate. Cities like Jakarta, despite their vulnerabilities, may offer better job prospects, infrastructure, and social networks, drawing migrants from more adversely affected areas. (Lee, 1966)

3. Intervening Obstacles:

The intervening obstacles are the barriers and the factors that might hinder migration and complicate the moving process. Among these, we can find physical distance, financial costs, legal restrictions, and personal circumstances. Lee emphasizes that the distance of the move is a constant obstacle, influencing the overall feasibility of migration. For climate migrants, obstacles might also involve hazardous migration routes, lack of resources, or restrictive immigration policies. (Lee, 1966)

4. Personal Factors:

These refer to the individual characteristics and circumstances of individuals that affect their propensity to migrate, such as age, education, family ties, and personal aspirations. These factors can influence an individual's ability and willingness to migrate. Personal perceptions of push and pull factors, combined with individual resilience and adaptability, play crucial roles in migration decisions. For example, younger individuals or those with higher educational qualifications may be more likely to migrate in response to climate change impacts. (Lee, 1966)

Lee's theory rests on the assumption that the decision to migrate is not only based on the push and pull factors but also on the balance of these factors and the intervening obstacles. Migration occurs when the positive factors associated with the destination outweigh the negative factors of the origin and the intervening obstacles.

In the context of climate-induced migration, this theory can be applied to understand how environmental changes act as push factors while other socioeconomic factors act as pull factors. For instance, severe flooding in rural areas can push residents to migrate to urban

centers like Jakarta, where economic opportunities and better living conditions act as pull factors. However, the intervening obstacles, such as the cost of moving, legal barriers, and the risks associated with migration routes, must also be considered.

Moreover, personal factors such as resilience, adaptability, and existing social networks can significantly influence migration decisions. Individuals with robust social networks in destination cities may find it easier to relocate and integrate, whereas those without such support may face greater challenges.

By incorporating Lee's theoretical framework, it is possible to get a better understanding of the multi-causal nature of climate migration. Despite being a primary driver, climate change interacts with social, political, and economic factors to influence migration decisions in a great variety of ways. The nature of these causal connections brings out the need for comprehensive policies that address not only the environmental drivers of migration but also the socioeconomic and institutional factors that either facilitate or inhibit migration.

1.1.1 From Lee's Framework to Contemporary Understandings

Lee's seminal work laid the groundwork for understanding migration through a lens of push and pull factors. However, as environmental changes have become more pronounced, the need to integrate these changes into migration theories has become evident.

Black et al. (2011) expand on Lee's theory by emphasizing the multidimensional aspects of migration and introducing a new framework that precisely integrates environmental change as a critical determinant. Their approach asserts how different socioeconomic, political, and personal elements interact with increasingly significant environmental factors, shaping migration decisions in different ways.

In this framework, five key categories that influence migration in the context of environmental change are identified:

1. Environmental Factors:

This category encompasses the direct and indirect impacts of environmental changes, such as natural disasters, gradual environmental degradation, and climate variability. These factors act as significant push factors, compelling people to move from affected areas to safer regions. Rapid-onset events like floods, earthquakes, and wildfires trigger short-term displacements, while slow-onset changes like droughts and land degradation can lead to long-

term migration. The availability of ecosystem services—such as food, water, and cultural value—affects livelihood sustainability, influencing migration decisions. Environmental changes also interact with socioeconomic contexts, creating vulnerability and migration responses. (Black et al., 2011)

2. Economic Factors:

Economic factors are a significant influence on both internal and international migration. These include employment opportunities, income levels, and overall economic stability in both the origin and destination areas. But also, wage differentials, income volatility, and employment opportunities drive migration as individuals and families seek better economic conditions. Rapid economic growth in regions like the Pearl and Yangtze River deltas in China, spurred by government policies such as the creation of Special Economic Zones, has led to significant urbanization. However, economic drivers can also be complex, involving not just simple movement from poorer to richer areas but also influenced by personal circumstances like class, ethnicity, and education levels. Economic collapses can trigger reactive displacement, and policies intended to stimulate economic development can have diverse impacts on migration patterns. (Black et al., 2011)

3. Social Factors:

Migrants often rely on established social networks in destination areas to facilitate their move and integration. Social factors include familial and cultural expectations, educational opportunities, and cultural practices such as inheritance and marriage. These factors create specific migration pathways and destinations, often influenced by historical and cultural ties between places. Migration networks, supported by social media and communication technologies, facilitate migration by reducing psychological and social costs and providing ongoing connections between migrants and their origin communities. (Black et al., 2011)

4. Political and Institutional Factors:

Government policies, legal frameworks, and institutional support can either facilitate or prevent migration. Conflicts can lead to displacement both within and across national borders, as seen in many African states and the Middle East. Localized conflicts often push

people to the nearest safe place, and political uncertainties can serve as push factors, whereas political stability can attract immigrants. Government policies, such as enforced relocation or urban development projects, have a significant influence on migration patterns as well. Urban centers like Jakarta can become more appealing travel destinations by implementing policies that support climate migrants, enhance urban infrastructure, and guarantee legal safety. (Black et al., 2011)

5. Personal and Household Factors:

Individual characteristics like age, gender, education, and household dynamics highly affect migration decisions. For example, younger individuals or households with higher educational qualifications are more likely to migrate in response to environmental changes. (Black et al., 2011)

According to Black et al. (2011), understanding migration flows means recognizing how these elements interact between them. They draw attention to the fact that environmental changes frequently serve as a catalyst, amplifying pre-existing social and economic vulnerabilities.

1.2 Environmental-related Factors Driving Migration

Environmental factors significantly shape migration patterns, affecting where and how people live. These factors encompass a wide range of climatic changes, such as temperature fluctuations, varying precipitation levels, weather-related disasters, and ongoing environmental degradation. Each element impacts human settlements and livelihoods uniquely, prompting people to migrate either temporarily as a coping mechanism or permanently as a long-term strategy. In this section, we explore these environmental drivers of migration in-depth:

1. Temperature and Precipitation

Temperature changes have been shown to influence migration patterns robustly. Higher temperatures, particularly in developing countries, often drive people to migrate due to adverse effects on agriculture, water resources, and general livability. Namely, studies indicate that rising temperatures in South America and Africa have led to significant internal and cross-border migration. (Moore, Wesselbaum, 2023) Similarly, variations in precipitation can lead

to water scarcity or flooding, both of which disrupt agricultural productivity and force populations to seek better living conditions elsewhere. However, the evidence on precipitation's impact on migration is inconclusive, suggesting that its effects might be context-specific. (Moore, Wesselbaum, 2023) According to Beine and Parsons (2017), these long-term climatic changes do not uniformly encourage or deter migration. Instead, their impact varies based on the income levels of the countries in which they are originating. To illustrate their point, they explain that in middle-income countries, long-term climatic changes can reduce emigration due to increased financial constraints. In contrast, poor countries, where residents are already financially constrained, show no significant change in emigration patterns due to this type of climate shift. This implies that the ability to migrate is more affected by economic capacity than by the direct desire to leave deteriorating environmental conditions.

2. Weather-Related Disasters

Weather-related disasters such as floods, droughts, storms, and heatwaves are critical push factors for migration. These disasters can destroy homes, infrastructure, and agricultural lands, making areas uninhabitable and prompting people to move. By way of example, floods and extreme temperatures have been identified as significant drivers of migration, pushing people from affected regions to seek safety and stability elsewhere. (Moore, Wesselbaum, 2023) At the same time, some studies have found no significant relationship between certain types of disasters and migration, indicating the need for further research to understand the implications of these effects. (Moore, Wesselbaum, 2023) For middle-income countries, these disasters can also lead to increased migration to former colonial powers. The reasoning behind this is that while natural disasters impose financial constraints that inhibit long-distance migration, they simultaneously create a push factor for short-distance relocation, often to neighboring countries where migration costs are lower. (Beine and Parsons, 2017)

3. Coastal Erosion and Sea-Level Rise

Coastal erosion and rising sea levels are increasingly important factors driving migration, especially for populations in low-lying coastal areas and small island nations. As sea levels rise, coastal regions experience more frequent and severe flooding, loss of land, and salinization of freshwater sources, making these regions less habitable. This environmental

degradation forces coastal communities to relocate to safer inland areas. (Moore, Wesselbaum, 2023)

4. Salinization

Salinization, the process by which water-soluble salts accumulate in soil, can severely impact agricultural productivity, leading to reduced food security and economic hardship. This environmental stressor often forces affected populations, particularly those dependent on subsistence farming, to migrate in search of arable land and better living conditions (Moore, Wesselbaum, 2023).

5. Soil Degradation and Deforestation

Soil degradation and deforestation are considerable environmental factors when it comes to undermining agricultural productivity and contributing to food insecurity, thus prompting migration. Soil degradation, through erosion, nutrient depletion, and pollution, reduces land fertility, making farming less viable and leading to financial hardship. Similarly, deforestation disrupts ecosystems and reduces biodiversity, impacting livelihoods dependent on forest resources. These factors often force rural populations to relocate to urban areas or other countries to pursue better opportunities. (Beine & Parsons, 2017)

6. Water Availability

Changes in water availability due to overuse, pollution, or climate change have a severe impact on migration patterns. In regions where water scarcity becomes severe, communities are often compelled to relocate to areas with more reliable water sources. This type of migration can be internal or cross-border, depending on the severity of the water crisis and the availability of resources to facilitate relocation. Water scarcity, combined with other environmental stresses, can worsen social tensions and lead to conflict-driven migration. (Beine & Parsons, 2017)

7. Agricultural Productivity

A significant channel through which climatic changes influence migration is through their impact on agricultural productivity. Adverse climatic conditions, such as droughts and changing rainfall patterns, can lead to decreased agricultural yields, which in turn impacts income and food security. This economic pressure can act as a push factor for migration, particularly in rural areas dependent on agriculture. For wealthier countries, reduced agricultural productivity may increase the incentive to migrate due to worsening economic conditions and widening wage differentials between home and potential destination countries. (Beine & Parsons, 2017)

To sum up, environmental factors such as temperature changes, precipitation variability, weather-related disasters, coastal erosion, salinization, soil degradation, deforestation, and changes in water availability significantly influence migration patterns. These factors disrupt traditional livelihoods and habitats, forcing populations to move in search of more stable and sustainable living conditions. To effectively establish migration policies and adaptation plans to mitigate the effects of climate change on human mobility, it becomes critical to acknowledge these environmental factors.

1.3 The Historical Development of the Concept of "Climate Refugee": A Human Ecology Perspective

Understanding climate migration requires situating it within a historical-social framework. This perspective integrates geographical, historical, social, and political dimensions. Migration patterns influenced by environmental factors are not novel but have deep historical roots that inform contemporary dynamics.

Agustoni and Maretti (2019) suggest adopting, in this sense, a global human ecology perspective, which involves the integration of historical and geographical dimensions, as well as local and international contexts. Throughout history, environmental changes have significantly influenced migration patterns. For instance, the construction of the Erie Canal in the 1820s revolutionized transportation and trade in the United States, inducing significant migration flows toward newly accessible areas. It significantly shortened the travel time for goods and people between the Atlantic Ocean and the Great Lakes, thereby catalysing economic growth and expansion into the American interior. The construction of the canal, which stretched from Albany on the Hudson River to Buffalo on Lake Erie, involved numerous

engineering feats, relied heavily on manual labour, including many immigrant workers, and employed innovative techniques for the time.

Historically, the canal's completion symbolized American progress and the burgeoning Industrial Revolution. It facilitated westward expansion and the movement of settlers into the Midwest, significantly impacting indigenous populations and reshaping the demographic landscape. Geographically, the Erie Canal transformed New York City into a major port and commercial hub, surpassing other cities like Boston and Philadelphia. It also established Chicago as a critical point of expansion, connecting the East Coast to the Great Lakes and beyond. From a local and global integration perspective, the canal stimulated economic growth, urbanization, and industrialization in cities along its route. On a global scale, it integrated the U.S. into international trade networks, enabling the export of American agricultural products to Europe and the import of European goods and migrants to the U.S. The canal's construction and impact exemplify the interconnections between human activities and their broader ecological contexts, demonstrating how local initiatives can have far-reaching global consequences.

From an ecological standpoint, the canal altered natural waterways and landscapes, showcasing the significant environmental modifications that accompany large-scale infrastructure projects. Therefore, by examining the Erie Canal's history through a global human ecology perspective, it becomes evident how different dimensions are intertwined on so many levels in shaping migration patterns and environmental impacts. (Agustoni, Maretti 2019).

In the context of global migration ecology, contemporary migratory phenomena should be examined through this lens. Within this context, it is possible to identify four primary migratory flows: south to north, north to north, north to south, and south to south. (Withol de Wenden 2017). Since the start of the new millennium, migration towards the south has overtaken northward migration. Most studies focus on migration originating in the south, mainly south-to-north migration from less developed to more developed countries. This is driven by significant discrepancies in income levels, human development index, and general living conditions. (Agustoni, Maretti 2019) Pull factors manifest where geographical separation corresponds to profound income levels, human rights, and life expectancy differences.

South-to-north migration is characterized by a high degree of voluntariness, proactiveness, and permanence, fitting well into Gemenne's three-dimensional model of migration, which considers the voluntariness or forced nature of migration, its intended

temporariness or permanence, and its reactive or proactive nature (Gemenne, 2011). In contrast, south-to-south migration often involves forced and reactive movements with minimal preparation and temporary intentions, frequently resulting in permanent displacement. Such migrations are usually internal, such as from rural areas of Bangladesh to Dhaka, or across a single border, like from Bangladesh to Calcutta. Environmental and climatic factors, geopolitical destabilization, international conflict, and civil war are significant push factors for these migrations. Environmental degradation often leads to conflict, which exacerbates expulsive effects, mainly due to structural transformations at the local level. (Agustoni, Maretti 2019).

A population's vulnerability to environmental and climatic change is closely linked to their way of life, significantly where their means of survival depend on locally accessible resources. Populations reliant on subsistence agriculture or pastoral activities in developing countries are highly exposed to the impacts of climate change, such as desertification, soil salinization, and catastrophic events like tsunamis and floods. Migration, whether reactive or proactive, can be seen as an adaptive strategy in response to these environmental stresses. This historical precedent underscores how environmental factors have long driven human mobility, predating the modern discourse on climate change. Understanding these historical instances is crucial to comprehend the longstanding relationship between environmental changes and migration. (Agustoni, Maretti 2019)

As already stated throughout this chapter, climate migration is deeply connected with many different realities, including social and political ones. Environmental changes intersect with existing social inequalities and political contexts, exacerbating vulnerabilities and influencing migration decisions. In many developing countries, poor governance, lack of infrastructure, and social inequalities amplify the impacts of environmental stressors, compelling people to migrate. This perspective challenges the notion that climate migration is solely a direct response to environmental changes, pointing out the relevance of considering the broader social and political contexts that shape migration patterns. Urban dynamics, particularly in river delta areas in Africa and Asia, are significantly impacted by environmental migration. The phenomenon of urban gigantism, where environmental migrants often move to urban areas, exacerbates the challenges faced by these cities. The concept of the 'delta metropolis' represents urban areas that are both epicenters of economic activity and hotspots of environmental vulnerability. Megacities such as Dhaka in Bangladesh and Lagos in Nigeria face the dual pressures of rapid urbanization and environmental degradation. The influx of migrants seeking better livelihoods strains housing, water, sanitation, and other essential

services, creating a vicious cycle where deteriorating living conditions drive further migration. (Agustoni, Maretti 2019)

1.4 Defining Climate Migrants and the Absence of International Recognition

Although increasingly prevalent, the phenomenon of climate migration lacks an accurate and universally accepted definition, leading to significant conceptual ambiguity. Terms such as environmental migration, climate change-induced migration, ecological or environmental refugees, and environmentally induced forced migrants are frequently used interchangeably in literature. This lack of a clear definition is partly due to the difficulty in isolating environmental factors from other drivers of migration and the link between voluntary and forced migration. For instance, sudden-onset natural disasters like earthquakes or floods clearly lead to forced displacement. However, slow-onset environmental changes, such as desertification, often contribute to migration in more subtle ways, complicating efforts to categorize such movements strictly as environmental migration. (Dun, Gemenne 2008)

The term "climate refugee" was first popularized by Lester Brown in the 1970s and later detailed by El-Hinnawi in 1985. El-Hinnawi described environmental refugees as individuals who are compelled to leave their traditional habitat due to environmental disruptions jeopardizing their existence or quality of life. These disruptions can be natural or anthropogenic, including events such as droughts, floods, deforestation, and desertification (Berchin et al., 2017). In 1993, Myers expanded this definition by highlighting additional factors like global warming and population growth, predicting that up to 150 million people could be displaced by environmental factors by 2050. However, despite the growing number of affected individuals, the term "climate refugee" does not yet have legal standing under international law, which complicates the provision of protection and support for these populations (Berchin et al., 2017). This being said, it seems clear that one of the primary challenges in tackling climate migration is the absence of a specific legal status for climate migrants under international law. The 1951 Refugee Convention, which defines refugees as individuals fleeing persecution due to race, religion, nationality, membership in a particular social group, or political opinion, does not cover those displaced by climate-related events (Berchin et al., 2017). This gap in international law leaves climate migrants without the same protections afforded to traditional refugees, such as the right to asylum and non-refoulement.

Since the 1970s, the discourse on environmental migration has been marked by a divide

between 'alarmists' and 'sceptics.' Alarmists, often from environmental, disaster, and conflict studies, emphasize the role of environmental factors as primary drivers of migration. In contrast, skeptics, primarily from forced migration and refugee studies, argue for a more complex understanding considering multiple factors influencing migration decisions. This divide has historical roots in classical migration theories, which traditionally ignored environmental drivers, and in environmental governance theories, which seldom considered migration flows. Bridging this gap remains a critical research priority to better understand and address these implications within the climate-induced migration context. (Dun, Gemenne 2008)

So, despite the constant growth of climate change's impact on migration patterns, there is no international legal framework specifically recognizing and protecting climate migrants still. The 1951 Refugee Convention, the cornerstone of international refugee law, does not encompass those displaced by environmental factors. Some scholars and policymakers advocate for expanding the Convention's definition to include climate migrants or for the creation of new legal instruments to provide them with similar protection. However, this proposal faces significant opposition, with concerns that it could dilute the protection afforded to traditional refugees and be exploited by governments to reclassify and deny asylum to economic migrants. This debate mirrors past controversies over the recognition of internally displaced persons, highlighting the ongoing struggle to develop adequate legal and policy frameworks for new categories of displaced persons. (Dun, Gemenne 2008)

For policymakers and practitioners, the absence of a clear definition for climate migrants interferes with the development of targeted responses and assistance. Without precise terminology, it is challenging to identify individuals affected by environmental changes and to provide them with the necessary protection and support. An accurate definition would not only facilitate the recognition and assistance of climate migrants but also inform the creation of legal and policy measures to address their unique vulnerabilities. However, efforts to define the discussed concept must balance the need for inclusivity with the risk of overgeneralization, which could undermine protection for those most in need. (Dun, Gemenne 2008)

1.4.1 Overview of the 1951 Refugee Convention and its Relevance to Climate Change

The 1951 Refugee Convention, a cornerstone of international refugee law, defines a refugee as someone who, "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country

of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country." This definition has traditionally been interpreted to exclude those displaced by environmental factors, including climate change because such displacement does not involve persecution by a human agent. (Sritharan, 2023) However, as the impacts of climate change become more severe, the limitations of this definition are increasingly apparent, prompting a re-evaluation of its application.

A significant challenge in applying the 1951 Convention to climate-induced displacement is the absence of a clear persecutor. The Convention's emphasis on persecution necessitates a human agent responsible for the harm, which is not typically present in climate change scenarios. (Sritharan, 2023) For example, while climate change undeniably causes severe damage and forces people to flee, it is often seen as a natural or environmental phenomenon rather than a result of targeted persecution. This gap highlights the difficulty of fitting climate-induced displacement within the existing refugee framework.

Despite these challenges, there is a growing recognition of the need for a more inclusive interpretation of the Convention. Some scholars and legal experts argue for an evolutionary approach that considers the broader socioeconomic and political contexts of climate change impacts. This perspective suggests that systemic human rights violations, such as the denial of economic and social rights, should be factored into the determination of refugee status. (Sritharan, 2023) For instance, individuals from marginalized communities disproportionately affected by climate change might be seen as facing indirect persecution due to state neglect or inadequate protection measures.

Moreover, the "rights-based approach" proposes assessing asylum claims in light of socioeconomic and environmental conditions in the claimant's home country. This approach emphasizes understanding the human rights impacts of climate change, focusing on how these impacts exacerbate vulnerabilities and contribute to displacement (Sritharan, 2023). By shifting the focus from the cause of displacement to the rights violated, this method offers a pathway to potentially recognizing climate-induced displacement within the existing refugee framework.

Emerging jurisprudence and international discussions are increasingly acknowledging the intersection of climate change and refugee protection. The establishment of mechanisms like the Warsaw International Mechanism for Loss and Damage under the UNFCCC reflects a broader recognition of climate-induced displacement as a critical issue (Sritharan 2023). Additionally, some judicial decisions have started to incorporate considerations of environmental degradation and climate impacts when assessing asylum claims, signalling a

potential shift towards a more inclusive understanding of refugee status in the context of climate change.

In essence, whereas the 1951 Refugee Convention currently poses complicated questions for recognizing climate-induced displacement as a basis for refugee status, evolving interpretations and rights-based approaches offer promising avenues for more inclusive protection. Focusing on the human rights implications of climate change and the socioeconomic vulnerabilities it intensifies would provide the potential to expand the scope of the Convention to address the realities of climate-induced displacement better.

1.4.2 The Universal Declaration of Human Rights (UDHR)

The Universal Declaration of Human Rights (UDHR), adopted by the United Nations General Assembly in 1948, determines fundamental human rights to be universally protected. This Declaration, as discussed by scholars like Davies et al., extends these principles to address the emerging challenges posed by climate change, highlighting the intrinsic link between human rights and environmental integrity.

The UDHR does not explicitly mention environmental rights. However, several articles implicitly support the right to a safe, healthy, and sustainable environment. Article 3 of the UDHR asserts the right to life, liberty, and security of a person, which can be interpreted to include the right to a safe environment. Climate change threatens this right by increasing the frequency and severity of natural disasters, causing sea-level rise, and leading to other environmental hazards that compromise human security and well-being. Furthermore, Article 25 of the UDHR states that everyone has the right to an adequate standard of living, including food, clothing, housing, and medical care. Climate change impacts, including droughts, floods, and extreme weather events, directly undermine this right by destroying homes, reducing food security, and limiting access to essential resources. (Davies et al., 2017)

As already outlined, we are well aware that climate change-induced displacement occurs when individuals and communities are forced to leave their homes owing to environmental changes that make their living conditions untenable and that this displacement can be temporary or permanent and can result from sudden events or gradual processes. The principles delineated in the Declaration on Human Rights and Climate Change stress the importance of addressing the human rights implications of such displacement. The Declaration underscores that climate change disproportionately affects vulnerable populations, including those in less developed countries, small island developing states, and marginalized

communities. It calls for policies that ensure fair and equitable treatment of climate refugees, recognizing their right to seek and enjoy asylum from environmental persecution. (Davies et al., 2017)

Mindful that international law does not provide specific protections for climate refugees and that the 1951 Refugee Convention and its 1967 Protocol delineate the description of a refugee that does not encompass those displaced by environmental factors, The Declaration on Human Rights and Climate Change advocates for an expanded understanding of refugee status to include climate-induced displacement. It highlights the necessity for new international legal tools or the adaptation of existing ones to protect the rights of climate refugees. This includes ensuring their right to life, dignity, and adequate living conditions, as stipulated in the UDHR. (Davies et al., 2017)

Not only, The UDHR, posits that nations, particularly those with historically high greenhouse gas emissions, have an ethical and legal responsibility to support climate refugees. This responsibility is rooted in the principles of justice and equity, acknowledging that those who have contributed least to climate change often suffer its most severe consequences. It calls for international cooperation to develop comprehensive policies and frameworks that address the needs of climate refugees, including mechanisms for relocation, compensation, and adaptation support. These measures should be grounded in human rights principles, ensuring that displaced individuals are treated with dignity and respect. The intersection of the UDHR and climate change makes it clear that the need to recognize and address the human rights consequences of environmental degradation and climate-induced displacement is urgent and requires to be handled as soon as possible. (Davies et al., 2017)

The Declaration on Human Rights and Climate Change serves as a paramount tool for advocating a human rights-based approach to climate policies, giving due weight to the necessity for the protection and support of climate refugees. Through the expansion of the scope of international legal frameworks, the international community can ensure ethical responsibility and better tackle the challenges raised by climate change, preserving the fundamental rights enshrined in the UDHR.

1.4.3 The Action of International Organizations

Various international organizations have been working towards defining and protecting climate migrants. The International Organization for Migration (IOM) describes environmental migrants as people who are forced to leave their habitual homes due to sudden or progressive

changes in their environment adversely affecting their lives or living conditions. (Berchin et al., 2017) However, this definition is not legally binding.

The United Nations High Commissioner for Refugees (UNHCR) has also acknowledged the issue but faces limitations due to the constraints of the 1951 Refugee Convention. The UNHCR advocates for broader interpretations of the Convention to potentially include those displaced by climate change under certain circumstances, such as when climate change exacerbates conflicts or persecution. (Berchin et al., 2017)

Moreover, in 2011, the Nansen Initiative was launched to address the protection needs of people displaced across borders by disasters and the effects of climate change. This state-led, consultative process has produced the Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change, which offers a framework for addressing this issue but lacks binding legal force. (Berchin et al. 2017)

The international community needs to take prompt action and give urgent response to recognize and protect climate migrants steadily endangered by the increasing frequency and the extent of climate-related adversities. Establishing a legal framework would not only provide the necessary protections but also facilitate international cooperation in handling and mitigating the impacts of climate migration. Such a framework could include mechanisms for resettlement, financial assistance, and support for adaptation and resilience-building in vulnerable communities. (Berchin et al., 2017)

While the efforts of organizations like the IOM and UNHCR are commendable, the absence of an internationally recognized legal status for climate migrants continues to leave millions vulnerable. As climate change intensifies, so too will the need for robust legal protections and frameworks to support those forced to migrate due to environmental factors. Only through international collaboration and legal recognition can we hope to adequately address the condition of climate migrants and ensure their safety and dignity in the face of an increasingly unstable climate.

1.5 Migration as an Adaptation Strategy

Some scholars, like Gemenne and Blocher, argue that migration should be redefined and pictured within the context of climate change adaptation. Traditionally viewed as a last resort or a failure to adapt, migration is increasingly seen as a deliberate and strategic response to environmental stressors. This assumption stems from the fact that migration can be both

voluntary and forced, serving as a means to avoid environmental hazards, alleviate resource pressures, and seek better livelihood opportunities. Voluntary migration is often a proactive measure, where individuals or families move in anticipation of future climate risks. This type of migration allows for planned and strategic relocation to areas with better economic prospects, safer environments, and more stable climates. Not only that, but it also provides opportunities to diversify income sources, access education and healthcare, and improve the overall quality of life. Conversely, in the face of forced migration, which occurs as an immediate response to environmental catastrophes - in cases of floods, droughts, or hurricanes - migration serves as a survival strategy driven by the urgent need to escape life-threatening conditions in these scenarios. While often unplanned and fraught with challenges, forced migration can still play a critical role in safeguarding lives and reducing vulnerability to climate impacts.

In addition, it is expected to consider only the impact of migration on migrants themselves, often overlooking the significant dual impact that this phenomenon has on the communities involved as well. For migrants, the relocation can provide immediate relief from environmental stressors and open new avenues for economic advancement. However, the journey and resettlement process can be charged with difficulties, including social integration, cultural adaptation, and potential exposure to new risks in the host environment. Despite these challenges, migrants often gain access to better employment opportunities, education, and healthcare, which collectively contribute to their resilience and well-being. (Gemenne, Blocher 2017)

Origin communities can benefit from reduced population pressure on local resources, leading to enhanced adaptive capacity. Remittances sent by migrants are crucial in supporting the local economy and funding adaptation measures such as infrastructure improvements and sustainable agricultural practices. These financial flows help families invest in education, health, and business ventures, fostering community resilience. As for the destination communities, these can experience positive and negative effects from migration. On the positive side, they benefit from an influx of labour, cultural diversity, and economic contributions from migrants. However, they must also address challenges related to infrastructure strain, social services demand, and integration of newcomers. That is why, in this regard, effective policies and programs are essential to ensure that destination communities can accommodate and benefit from migration flows. (Gemenne, Blocher 2017)

1.6 Policy Recommendations for Adaptive Migration

One of the critical insights from Gemenne and Blocher's work is the gap between the potential of migration as an adaptation strategy and the existing policy frameworks. They pointed out that current migration policies often focus on control and restriction rather than facilitation and support. This way of doing so is driven by a security-centric narrative that views migration mainly as a challenge rather than an opportunity.

For this reason, they advocate for a paradigm shift in migration governance that recognizes and leverages the adaptive benefits of migration. They propose several key policy recommendations, among which:

• Facilitating safe and orderly migration through the development of policies that ensure migration pathways are safe, legal, and well-managed. This includes providing clear legal statuses, protection of migrant rights, and support services.

• Supporting migrant integration through the implementation of programs that facilitate the social and economic integration of migrants in destination communities, such as language training, employment support, and cultural orientation.

• Enhancing origin community resilience, investing in the strength and adaptability of origin communities to reduce forced migration pressures. This involves improving local infrastructure, diversifying livelihoods, and enhancing disaster preparedness.

• Promoting regional development, encouraging migration to secondary cities and less developed regions to balance population distribution and stimulate economic growth in underdeveloped areas.

CHAPTER 2

Urbanization and Growth in Indonesia

This chapter will introduce the historical context of urbanization and growth in Indonesia, including the colonial legacy that formed urban planning and infrastructure and their influence on current challenges. Moreover, this section will also explore migration patterns in the country, particularly how climate change, economic pressures, and socio-political factors have contributed to both internal and international migration trends. Additionally, it will touch upon the urbanization processes, particularly within the Jabodetabek (Jakarta Metropolitan Area) and the Jakarta-Bandung Region (JBR). These regions exemplify the dynamics of rapid urban expansion driven by economic, industrial, and population growth. Through this exploration, it will be possible to assess the intersection between urbanization and migration with environmental vulnerabilities, defining Indonesia's physical landscape and socio-economic fabric.

2. Migration Phenomenon in Indonesia: Current Situation

Indonesia is characterized by significant inter-regional migration flows, resulted predominantly by the country's complicated geography, uneven economic development, and the environmental challenges posed by climate change. In their analysis, Wajdi et al. (2017) point out that while migration within Indonesia has always been a prominent feature of its social landscape, the forces driving this mobility have evolved over time. Historically, internal migration in Indonesia was mainly driven by economic factors, including the search for better employment opportunities and access to improved living conditions. However, in recent decades, environmental factors, such as climate change and environmental degradation, have increasingly started to influence migration patterns more and more. Natural disasters like floods, tsunamis, and volcanic eruptions have displaced communities, pushing people towards more urbanized regions where they seek safety and better prospects.

Rural-to-urban migration is particularly notable in Indonesia, as it reflects the broader trend of urbanization seen across developing countries. Urban centers, particularly Jakarta, have become magnets for internal migrants seeking better economic opportunities. Nevertheless, this influx has also promoted the rise of other problems, including

overpopulation, inadequate infrastructure, and environmental degradation in these urban areas. (Wajdi et al., 2017)

Additionally, projects adopted by the Indonesian government—namely the transmigration program—whose initial objective was to redistribute the population from densely populated areas such as Java to less inhabited islands like Sumatra and Kalimantan—have left a long-lasting impact on the migration landscape. In principle, the program was intended to alleviate environmental pressures. Still, it ended up inadvertently to contributed to deforestation and other environmental issues, aggravating the long-term vulnerability of cities like Jakarta. (Hillmann & Ziegelmayer, 2016)

Even though the program has officially ended, its influence persists in defining migration flows throughout the country. (Wajdi et al., 2017) Therefore, addressing and tackling uneven development and land scarcity remains an essential element driving migration.

In addition to economic and environmental factors, political and social dynamics also significantly impact migration patterns. Regional conflicts, particularly in areas like Aceh and Papua, have aroused temporary and sometimes permanent displacement as people tried to escape from the violence and tumults of the conflict. Regardless of its often smaller scale compared to economic or environmental migration, this type of migration brings out the diverse determinants contributing to mobility within Indonesia. (Wajdi et al., 2017)

The migration situation in Indonesia is highly diverse, with economic, environmental, and political factors all contributing to the movement of people. As the country persists in encountering challenges linked to climate change, particularly within coastal regions, migration will continue to be at the center of both policymakers' and communities' considerations.

2.1 The Dutch Colonization Era

The Dutch colonization of Indonesia, particularly Jakarta, has had lasting effects on the city's infrastructure and urban development. When the Dutch took control of Batavia (current Jakarta) in 1619, they built the city according to European models, especially using Amsterdam as the main example, incorporating canals, drawbridges, and stone walls. However, these designs were not appropriate to Indonesia's tropical climate. The canals, ideally meant to serve as both social and sewage systems, soon became clogged and stagnant owing to the heavy

rainfall and improper soil management, leading to widespread health issues and contributing to the spread of diseases. (Indonesia Investments, 2023)

Over time, informal settlements, known as *kampungs*, began forming around Batavia. In the first place, these were rural areas foreseen for food production to support the city. However, as the migratory phenomenon to Jakarta increased, these areas became overcrowded and neglected, resulting in a situation in which they were missing basic services such as clean water and sanitation. The city's population rapidly increased, driven mainly by economic opportunities, which gave rise to further environmental degradation, including pollution of rivers and the dismissal of green spaces for housing development. (Indonesia Investments, 2023)

The Dutch colonial government tried to resolve the water crisis by offering access to clean water infrastructure, but these improvements were mostly limited to European neighbourhoods. Indigenous communities and other ethnic groups were segregated, with little to no access to safe drinking water. This division deepened the health crisis in Jakarta, with the city earning the nickname *"Graveyard of the East"* due to widespread illness and death arising out of contaminated water. (Indonesia Investments, 2023) This unequal access to water persisted after independence, aggravated by the rapid urbanization under Suharto's New Order regime, which worsened class divides in water access. (Chang & Ross, 2024).

2.1.1 Water Issues Post-Independence: The New Order Era

Following Indonesia's independence, the New Order government under Suharto attempted to modernize Jakarta's water infrastructure. Still, it made very little effort to alleviate the class-based disparities rooted in Indonesian society, spurred during the colonial rule. As Jakarta's population expanded due to internal migration, the kampungs continued emerging around the city, particularly along riverbanks. These informal areas lacked access to proper sanitation and water services and became extremely vulnerable to flooding. The combination of uncontrolled urbanization and a failure to provide righteous water management resulted in the city's infrastructure being stretched beyond its capacity, leaving many of Jakarta's poorest residents vulnerable to environmental disasters (Chang & Ross, 2024).

Eventually, by the 20th century, the colonial government worked towards improving the living conditions by increasing clean water access to the native population. However, this was conditional upon relocation from kampungs, which were considered unsanitary. Despite

attempts to improve living conditions through programs like the Kampung Improvement Program (KIP), spatial inequalities are still a spatial urban issue until our days. (Martinez & Masron, 2020).

Even considering all these efforts, the proper solution to Jakarta's water crisis—purification of river and canal water—was only partially addressed post-colonization. Still to this day, Jakarta strives against polluted urban water systems, relying heavily on groundwater extraction, which, as a result, contributes to land subsidence, aggravating the city's flooding problems. (Indonesia Investments, 2023)

The Dutch colonial legacy in Jakarta is still evident in the city's ongoing struggles with urban planning, water management, and environmental degradation. The city is not able to adapt to climate concerns because of its reliance on antiquated colonial infrastructure, like the canal system, its overpopulation, and the need for better public services.

2.2 Driving Factors of Urban Growth in Jakarta Metropolitan Area

1. Demographic Factors

Jabodetabek, the Jakarta Metropolitan Region - which includes satellite cities like Bekasi, Depok, and Tangerang - has undergone rapid population growth, namely one of the primary drivers of urban expansion. In 1900, the old Batavia had a population of merely 150,000. By 2005, the Jakarta Metropolitan Area had expanded to over 14 million inhabitants, occupying just 0.3% of Indonesia's land area but housing 10% of its population. (Rukmana, 2008)
Between 1993 and 2010, the urban area increased significantly due to high in-migration from other regions of Indonesia, especially from rural areas. This surge in population is mainly due to economic opportunities in the manufacturing and industrial sectors located in the suburbs of Jakarta. Notably, the inflow of labor to these industrial zones created new housing developments, including planned new town projects. For instance, Cikarang, located in the Bekasi district, has become a central industrial hub, attracting workers from across Indonesia and leading to increased urban expansion in the eastern suburbs of Jakarta. (Pravitasari et al., 2015)

2. Infrastructural Drivers

Infrastructural development is another significant driver of urban expansion in the region. The construction of public facilities, industrial estates, and transportation infrastructure, particularly toll roads, has encouraged urban sprawl. As an example, the Cipularang toll road, which connects Jakarta to Bandung, facilitated rapid development along this corridor, leading to suburban growth in areas previously disconnected from the urban core. The expansion of housing projects and commercial developments near these new infrastructures has contributed to the sprawling nature of Greater Jakarta. (Pravitasari et al., 2015)

3. Natural Elements

The natural environment also plays a part in modeling urban expansion, especially regarding flood risks. Areas prone to flooding, just like those near rivers, tend to undergo less urban growth compared to flood-free zones. For example, in the southeastern part of Jabodetabek, urban expansion has avoided proximity to rivers due to the high risk of flooding. This has been particularly evident in the Bogor Regency, where urban areas have grown away from riverbanks, contributing to the uneven spatial distribution of urban growth. (Pravitasari et al., 2015)

4. Economic and Global Influences

One of the major driving forces of urban expansion is economic growth. As Jakarta established itself as Indonesia's financial hub, attracting both domestic and international investments, large-scale infrastructure projects such as highways, flyovers, and commercial centers have driven the city's spatial growth. (Martinez & Masron, 2020). Not only did the city’s relevance boom at the national level, but it also gained status as a global city, closely connected to international markets and economic networks, which further contributed to its urbanization. The global demand for industrial goods produced in the suburbs has pushed the development of industrial estates and manufacturing zones, specifically in the peripheral areas. While Jakarta itself has become more disconnected from local drivers of urbanization, its suburbs have suffered the burden of expansion owed to these global economic pressures. This trend underlines the spatial variation of urban expansion within the region, where local and international forces interact to shape the city's growth patterns. (Pravitasari et al., 2015)

Moreover, the economic concentration in Jakarta is even more pronounced than its demographic weight would suggest. In 2005, the capital accounted for 16.9% of Indonesia's total GDP, up from 14.9% in 2000. This contribution is particularly inclined towards specific sectors: Jakarta accounted for 62.1% of the nation's financial and business services output, 26.2% of construction, and 23.1% of trade, hotels, and restaurants. While some manufacturing has relocated to Jakarta's periphery, the broader metropolitan region still accounted for 23.5% of Indonesia's manufacturing output in 2005. (Rukmana, 2008)

This economic primacy has created a self-reinforcing cycle of growth and investment. Infrastructure, human capital, and financial resources have continued to be concentrated in Jakarta, further enhancing its competitive advantages over other regions. Government policies, including restrictions on capital and trade markets, have often favored Jakarta-based firms. This has allowed central bureaucrats and politicians to uphold control over rent-seeking opportunities in key economic sectors. (Henderson, 2003; Rukmana, 2008)

2.3 Urbanization in the Jakarta-Bangung Region (JBR)

The urbanization of Jabodetabek and the Jakarta-Bandung region reflects broader trends of rapid urban expansion driven by industrialization, population growth, and infrastructure development. While Jabodetabek showcases the challenges of managing metropolitan sprawl, the Jakarta-Bandung region illustrates the merging of two distinct urban hubs, forming a continuous urban belt. Though different in scale and specific dynamics, both these regions contribute to the overall urban transformation of western Java, emphasizing the need for integrated regional planning to address common challenges such as infrastructure strain, environmental degradation, and socio-economic disparities. It is worthwhile to analyse the urbanization trends in both areas, to explore the common points and differences.

The Jakarta-Bandung Region (JBR) constitutes a paramount example of mega-urbanization in Indonesia. This process started meaningfully between the 1980s and 1990s, fostered by infrastructure development and foreign and domestic investments. The merging of Jakarta and Bandung metropolitan areas has created a continuous urban belt spanning roughly 200 km, erasing the traditional delimitations between urban and rural spaces. This transformation has significantly impacted land use, socioeconomics, and environmental matters. (Firman, 2009)

- Population Growth

Among the determining features of urbanization in JBR is the drastic population growth in suburban and peri-urban areas surrounding Jakarta. At the same time, the core city has seen a slower rate of population increase. By 2004, the population across the Jakarta-Bandung Region exceeded 32 million people, with surrounding cities like Bekasi, Tangerang, and Bogor experiencing even higher growth rates. These areas function as dormitory towns for workers commuting daily into Jakarta, intensifying transportation challenges and resulting in massive congestion. The increasing demand for housing, industrial spaces, and commercial services has driven the expansion of urban areas. Many prior rural areas have been transformed into residential developments, industrial estates, and commercial hubs, indicating the transition of land use from agriculture to urban functions. (Firman, 2009)

- Land Use Change

The shift from agricultural land to urban development land has been a crucial event in the JBR, culminating in environmental degradation and a decrease in water recharge areas. Industrial expansion and the construction of new towns on the outskirts of Jakarta and Bandung have enhanced these tendencies, with large stretches of agricultural land being lost to speculative investments. This rapid conversion of land has also significantly impacted the region's water resources, giving rise to the risk of flooding and contributing to the subsidence of land in certain areas. (Firman, 2009)

The imbalance in land use management has created socio-environmental challenges, notably as industrial projects and new housing developments interfere with natural areas without adequate planning or consideration for sustainability. Uncontrolled urban sprawl and industrial activity continue to stress the local ecosystem, worsening the impacts of climate change (Firman, 2009)

- New Towns and Socio-economic Segregation

Another feature of JBR's mega-urbanization is the rise of "new towns", planned urban areas developed to accommodate the rising middle and upper classes. These new towns are

characterized by exclusive residential zones, often with better infrastructure and services than nearby informal settlements. Nonetheless, these developments have augmented spatial and social segregation phenomena, as wealthier residents move into self-contained enclaves while poorer communities remain marginalized in underserved areas. Despite the original purpose of these new towns was to be intended as self-sufficient, they are often dependent on the metropolitan center, resulting in a commuter-based relationship with Jakarta. This trend has generated spatial disparities within the region, where access to quality infrastructure, housing, and services is heavily deviated toward wealthier populations, exasperating even more social inequalities. (Firman 2009)

- Infrastructure Development

Infrastructure development contributed to the urbanization of the JBR. Key projects, such as highway expansion, transportation links, and industrial zones, have facilitated greater regional integration between Jakarta and Bandung. The construction of major highways, including the Jakarta-Cikampek toll road, has improved connectivity between urban centers, enabling the transportation of goods, services, and people across the region. Even so, this infrastructure development has also accelerated problems such as traffic congestion, pollution, and further land degradation. The magnitude of urbanization has outpaced the competency of local authorities to manage growth in a practical way, resulting in inadequate public services and insufficient planning for sustainable development. (Firman, 2009)

2.4 Pathways to Sustainable Urban Development

As the Jakarta-Bandung region continues to urbanize, it faces several challenges related to sustainable development. The pressures of rapid population growth, land conversion, environmental degradation, and infrastructure strain require a coordinated approach to regional planning. Local governments must collaborate on managing urban sprawl, protecting agricultural land, and developing infrastructure that can accommodate future growth while ensuring environmental sustainability. (Martinez & Masron, 2020)

Policy changes have heavily influenced Jakarta's spatial planning. For example, decentralization policies following the Asian Financial Crisis in the late 1990s shifted governance responsibilities to local authorities. This change affected Jakarta's urban management and capacity to address the growing challenges of urbanization, especially when

discussing infrastructure and service provision. Recent efforts to address these issues include attempts to integrate participatory approaches in urban planning, although the effectiveness of these initiatives remains limited due to institutional and political constraints. (Martinez & Masron, 2020)

Decentralization policies have shifted some control to local governments, but without stronger coordination and comprehensive planning, the region risks unsustainable development. Efforts must balance economic growth with environmental protection and social equity to address the long-term challenges posed by mega-urbanization in JBR. (Firman, 2009)

In line with these challenges, the rapid urbanization of Jakarta during the 20th century saw the replacement of green spaces along riverbanks with impervious surfaces, which disrupted the natural flow of water and exacerbated flooding. Migrants moving to Jakarta in search of work ended up settling in *kampungs* outside the reach of official water service providers. These areas became breeding grounds for waterborne diseases and additionally intensified class disparities and imbalances. Poor residents often relied on subsurface water extraction, which contributed to land subsidence, increasing the city's vulnerability to tidal floods and other water-related disasters. (Chang & Ross, 2024)

This dual development pattern has resulted in a highly segregated urban landscape. Gated communities with modern amenities exist in proximity to dense, underserved informal settlements. The suburbanization process has been shaped by government policies favoring large developers and subsidized housing finance programs that primarily benefited higher-income groups. Meanwhile, attempts to control in-migration through legal restrictions have proven ineffective, as the economic pull of the capital continued to draw people from across Indonesia. (Leaf, 1994; Rukmana, 2008)

2.5 The Roots of Jakarta’s Climate Vulnerability

The city’s vulnerability results from a combination of geographic, socio-economic, and infrastructural factors. From a geographical point of view, Jakarta is situated on a low-lying coastal plain, making it particularly susceptible to sea-level rise. The city is also intersected by 13 rivers that flow into the Java Sea, further exacerbating the risk of flooding. Infrastructurally, the city's rapid expansion has outpaced the development of adequate drainage systems and flood defenses, leaving it ill-equipped to handle the increasing impacts of climate change. As climate change accelerates, the frequency and magnitude of extreme weather events, just like

heavy rainfall and coastal storms, are expected to increase, placing further strain on Jakarta's already overstretched infrastructure. These environmental challenges, along with socio-economic disparities, are likely to drive significant migration within and beyond the city. (Firman et. al, 2011)

The roots of Jakarta's environmental challenges can be traced back to its colonial past, particularly the urban planning decisions made during the Dutch colonial era, as previously explained in the chapter about colonialism in the country. At that time, Jakarta was designed with a clear divide between the well-planned European quarters and the overcrowded, poorly maintained native *kampungs*. The canals built to serve as transportation routes and flood management systems were overlooked over time, leading to sediment buildup and water stagnation. This neglect, combined with the segregationist policies of the colonial government, is the result of the persistent socio-environmental inequalities that continue to plague Jakarta today. (Dewi et al., 2017; Meshkani, 2024)

Following Indonesia's independence, successive governments attempted to modernize Jakarta, often at the expense of the kampung residents. President Soekarno's ambitious spatial plans and later urban renewal projects led to the displacement of thousands of *kampung* residents as the government sought to transform Jakarta into a modern metropolis. These policies often ignored the needs and rights of the kampung inhabitants, viewing them as obstacles to progress rather than as integral parts of the city's social and economic fabric. This approach has continued into the present day, with many flood control and urban development projects leading to the forced eviction of kampung residents, further consolidating these communities' social and environmental vulnerabilities. (Meshkani, 2024)

Re-examining these historical and current challenges through the lens of environmental justice, make it clear that addressing Jakarta's flooding problem requires technical solutions and a more equitable and inclusive approach to urban planning and development.

2.6 Contemporary Flood Risks

Today, Jakarta is recognized as one of the fastest-sinking cities in the world, with parts of the city subsiding by as much as 7 centimeters annually. This collapse, driven mainly by excessive groundwater extraction and the weight of concrete-heavy developments, has left large portions of the city below sea level, making it even more prone to flooding. The city’s physical infrastructure, including its aging flood mitigation systems such as canals, floodgates, and

seawalls, is inadequate to an increasing extent to handle the intensity and frequency of floods aggravated by climate change. (Lyons, 2015)

The history of flooding in Jakarta is a testament to these compounded vulnerabilities. Some of the most devastating floods on record happened in 1996, 2002, 2007, 2013, and 2014, each event highlighting the city's increasing vulnerability to natural disasters. The flood of 2007 was catastrophic, submerging up to 75% of the city, displacing hundreds of thousands of people, and causing significant economic losses. These events point out the persistent challenges Jakarta faces as it continues to grow and urbanize in an environment that is becoming more and more hostile due to climate change. (Lyons, 2015)

Furthermore, Jakarta's susceptibility to climate risks is well-documented in both national and international environmental reports. The Intergovernmental Panel on Climate Change (IPCC) has also highlighted how megacities like Jakarta are on the frontline of climate-related risks. (IPCC, 2014)

Jakarta’s current water issues are worsened by the impacts of climate change, which is intensifying flood patterns. The city's location, situated on a delta, is already prone to fluvial and tidal flooding, but climate change has exacerbated these trends. Rising sea levels, increased rainfall intensity, and land subsidence have made Jakarta one of the most vulnerable cities in the world to flooding. Even considering the large-scale projects being implemented to manage these risks, these efforts have often failed to address the systemic problems of land use and unequal development, which continue to disproportionately affect the city’s poorest residents. (Chang & Ross, 2024)

2.6.1 Challenges to Jakarta's Sustainability

1. Urban Growth

The rapid growth of Jakarta has outpaced the city's ability to provide adequate infrastructure and environmental management, leading to severe sustainability challenges. Annual flooding has become increasingly destructive, with the February 2007 floods inundating 70% of the city, causing 57 deaths, displacing 450,000 residents, and resulting in an estimated US$1 billion in economic losses. Even considering that flooding is partially owed to Jakarta's low-lying geography and monsoon climate, it has been accentuated by the conversion of water catchment areas, inadequate drainage infrastructure, and subsidence caused by groundwater extraction. (Rukmana, 2008)

2. Land subsidence and sea level rise

Land subsidence poses a severe long-term threat to Jakarta's viability, especially in the northern coastal areas. Measurements between 1993 and 2005 found that parts of North Jakarta had sunk by 2.5 meters, while central Jakarta subsided by 1.02 meters. This subsidence is primarily driven by excessive groundwater extraction, as 66,000 gallons are estimated to be withdrawn annually from Jakarta's aquifers. Due to the limited access to piped water supply, most residents depend on groundwater for their daily needs (Rukmana, 2008). In areas like Bukit Duri and Kampung Melayu, where the land has sunk significantly, the risk of severe flooding during heavy rains is exceptionally high (Andreas et al., 2019; Meshkani, 2024).

The city's rapid development has also led to the loss of green spaces and water catchment areas within Jakarta and surrounding regions. This has reduced natural water absorption capacity, contributing to both flooding and groundwater depletion. Despite plans to expand Jakarta's canal system following major floods in 2002, infrastructure investment has fallen behind the pace of development. This infrastructure deficit expands beyond flood control to transportation, waste management, and other critical urban systems. (Rukmana, 2008) The dual threat of sea-level rise and land subsidence has already led to more frequent and severe flooding, particularly in coastal and riverine areas. Scholars like Firman et al. (2011) have pointed out how these floods not only disrupt daily life but at the same time cause long-term damage to infrastructure, such as roads, bridges, and homes, that are critical to the city's functioning. This damage frequently brings a situation of loss of livelihood, particularly for those engaged in informal employment, which is prevalent in Jakarta’s poorer communities. Therefore, many residents are forced to migrate to less vulnerable areas within the city or even other regions, seeking safety and stability.

3. Rainfall

In addition to sea-level rise, there is also the impact of changing rainfall patterns on Jakarta's vulnerability, particularly during the monsoon season, which overwhelms the city's inadequate drainage systems. The situation has gotten worse due to climate change, which has increased both the intensity and unpredictability of rainfall. The city is experiencing increasingly erratic weather, with periods of intense rainfall followed by protracted dry spells. These changing patterns contribute to the city's flooding problems, as the existing drainage systems are

incapable and inadequate of handling the sudden influx of water during heavy rains. The combination of inefficient drainage and land subsidence means that floodwaters often remain for extended periods, leading to secondary issues such as waterborne diseases and the contamination of drinking water supplies. (Firman et al. 2011)

This has made it imperative for local authorities to improve drainage systems and implement more effective water management strategies to mitigate the impacts of such extreme weather events. (Meshkani, 2024)

4. Waste Disposal and River Blockages

The accumulation of waste in Jakarta's rivers and canals is another significant contributor to the city's flooding issues. With a population of over 10 million, the city generates enormous amounts of waste daily, a substantial portion of which ends up in the waterways. This waste clogs the rivers and canals, obstructing the flow of water and leading to a situation of overflow during heavy rains. Efforts to address this issue, such as the formation of the Orange Army for sanitation and dredging programs supported by the World Bank, have had limited success due to the sheer scale of the problem and the need for continuous maintenance and public education. (Meshkani, 2024)

Another significant factor is the destruction of natural barriers like mangroves, which once protected against coastal erosion and flooding. Jakarta's rapid urbanization has led to the conversion of these coastal ecosystems into residential and commercial developments, further exposing the city to the dangers of coastal inundation. (Hillmann & Ziegelmayer 2016)

5. Socio-Economic Structure

Jakarta’s vulnerability is further compounded by its socio-economic structure. As previously explained, the city's poorest residents are the most affected by climate change. Many live in informal settlements with little to no access to essential services like clean water, sanitation, and healthcare. These communities are often the first to be displaced by flooding and other climate-related disasters, yet they have the fewest resources to recover or relocate. (Firman et al., 2011) The uninterrupted environmental degradation, coupled with social and economic inequalities, creates a situation where migration is not just an option but a necessity for many.

The social and economic disparities in Jakarta mean that the poorest residents bear the burden of environmental risks, further entrenching their vulnerability. Despite efforts by the government to address these challenges, such as the introduction of flood mitigation projects and community relocation plans, the effectiveness of these measures has been hampered by poor planning, lack of coordination, and inadequate resources (Lyons, 2015).

The existing literature on climate change and urban vulnerabilities draws attention to the multi-varied nature of the challenges faced by cities like Jakarta. Informal settlements, characterized by inadequate infrastructure and vulnerable housing, are particularly at risk of flooding, especially as climate change enhances the frequency and severity of extreme weather events. Various scholars have discussed the role of poor urban planning, deforestation, and inadequate waste management in worsening the flood risks in these areas. Additionally, it is of great importance to integrate community resilience into flood mitigation strategies and the need for comprehensive land-use management to reduce flood risks. (Satterthwaite et al., 2020; Wise et al., 2014) However, there remains to be a severe gap in addressing the social justice implications of these environmental challenges, particularly concerning the displacement and relocation of vulnerable communities in response to flooding and other climate-related risks.

6. Socio-Political Factors

What is more, the challenges posed by climate change in Jakarta are not only physical but also socio-political. The government's response to these challenges has been compartmentalized and often reactive, focusing on short-term fixes rather than long-term solutions. Scholars advocate for a more integrated approach that tackles the root causes of Jakarta's vulnerability, such as the aforementioned uncontrolled urbanization, poor infrastructure, and social inequality. Without such an approach, the document Jakarta will continue to face increasing migration pressures as the impacts of climate change worsen. (Abdillah et al., 2023)

In the 20th century, Indonesia's government introduced – as mentioned earlier - the *transmigrasi* program to address overpopulation in Java and reduce pressure on the island's fragile environment. Although the program relocated millions of people, it failed to mitigate the environmental degradation in urban centers like Jakarta. The program also resulted in unintended consequences, such as the degradation of ecosystems in less populated regions and conflicts with indigenous populations. (Abdillah et al., 2023)

2.7 Migration as an Adaptation Strategy: Jakarta's Case

Urban resilience in the context of climate change refers to the ability of metropolitan areas to withstand and adapt to the various impacts of climate change, like rising sea levels, extreme weather events, and other environmental stresses. (Abdillah et al., 2023)

To this day, the city continues to struggle with the legacy of these historical migration patterns alongside the new realities of climate-induced displacement. As environmental degradation intensifies and extreme weather events become more frequent, the Indonesian capital witnesses an increment in both temporary and permanent migration flows. For many, migration is not only a strategy for survival but also an adaptive response to the interconnection of environmental, social, and political pressures that define life in Jakarta. (Abdillah et al., 2023)

Given the environmental and socio-economic pressures, migration is increasingly considered an adaptation strategy for Jakarta's residents. In the face of repeated flooding and land loss, many families move to safer areas, either within the city or other regions. This migration is often a last resort, driven by the failure of existing adaptation measures to provide adequate protection against the worsening impacts of climate change. Migration in Jakarta is both a reactive and proactive response to environmental changes. Some residents move in anticipation of future risks, seeking to evade the worst effects of climate change. In contrast, others are forced to relocate after their homes and livelihoods are directly affected. This trend is likely to continue and even accelerate as climate conditions deteriorate further, placing additional pressure on the city's infrastructure and social systems. (Varrani & Nones, 2018)

2.8 Path Forward: Sustainable Water Management and Urban Planning

In recent years, Jakarta has undertaken significant infrastructure projects aimed at reducing flood risk. The government has proposed several large-scale engineering solutions, such as the construction of sea walls and the Jakarta Giant Sea Wall project, aimed at protecting the city from future flooding and the building of artificial islands. However, these projects are expensive and have faced delays and criticism regarding their environmental and social impacts. Critics argue that these ultramodern engineering solutions do not address the root causes of Jakarta's water problems, such as unsustainable urbanization and the lack of green infrastructure. These projects often prioritize the wealthier parts of the city, further entrenching

inequalities and leaving the poorest residents, often living in flood-prone areas, at greater risk. (Chang & Ross, 2024)

There is also a growing recognition that these structural solutions need to be complemented by more sustainable approaches, such as improving the city's drainage systems, enforcing regulations on groundwater extraction, and enhancing urban planning to diminish the impact of floods. (Chang & Ross, 2024)

More must be done to address the crucial issues that plague the city. Solutions should include equitable land use planning, improved access to clean water for all residents, and the restoration of natural floodplains and green spaces. Sustainable development, especially focusing on green infrastructure, will help reduce the persistence and severity of floods while promoting social and environmental equity. Only by addressing climate change and unequal development's historical legacies can Jakarta become more resilient to future environmental challenges (Chang & Ross, 2024).

Infrastructure projects alone cannot solve Jakarta's water challenges. To truly build resilience, the city must address the historical inequalities that have affected its water management policies and invest in sustainable, equitable solutions that prioritise environmental protection and social equity.

2.8.1 Growth Redistribution and Regional Balance

To achieve more sustainable urban development in Indonesia, there is an urgent need to redistribute growth away from Jakarta and foster the development of other urban centers. Countries like China and India offer potential models, as their economic growth has been driven by multiple large urban agglomerations rather than a single dominant city. As previously addressed, unlike Beijing or New Delhi, Jakarta serves as the center of nearly all aspects of Indonesian life - political, economic, cultural, and transportation. (Rukmana, 2008) Strategies to rebalance Indonesia's urban system include relocating certain government functions away from Jakarta, as Malaysia did in moving its administrative capital to Putrajaya. More substantially, addressing rural poverty and creating economic opportunities in other regions will be fundamental to reducing migration pressure in Jakarta. The implementation of laws about regional autonomy in 1999 has thus far had a limited impact on the distribution of urban population and economic activity. (Rukmana, 2008)

Without significant policy interventions to promote more balanced regional development, Jakarta is likely to face fastening sustainability challenges. Its steady, rapid growth will further strain infrastructure and cause environmental degradation, potentially compromising Indonesia's overall economic performance. As Henderson (2003) has argued, excessive urban concentration can become costly to national economic growth beyond a certain point. Achieving a more sustainable urban future for Indonesia will require breaking the cycle of condensed growth in Jakarta and promoting the development of a more diverse and balanced urban network across the archipelago.

CHAPTER 3

Urban Resilience Strategies in Jakarta

This section explores how Jakarta has attempted to balance economic development with the need for sustainable, long-term solutions to environmental risks, particularly flooding. The chapter elaborates on the historical context of urban growth in Jakarta, beginning with the development policies of the Suharto era and followed by the effects of decentralization and public participation efforts post-reformation. Furthermore, it will highlight the governmental approaches and policy gaps that had an impact on the city's vulnerability to natural disasters, including the limitations of large-scale projects like the Great Garuda Sea Wall. It also addresses the critical role of international support and collaboration, emphasizing the influence of international organizations over Jakarta's climate resilience efforts. This chapter offers an evaluation of Jakarta's attempts to build a resilient urban environment in the face of growing climate threats through a combination of technical solutions, improved governance, and community-based initiatives.

3. A Rapid Expansion

Over the past two decades, Jakarta has undergone a rapid transformation, reflecting a broader trend of urbanization in Southeast Asia. Jabodetabek has become one of the most rapidly urbanizing regions in the world. This urban expansion is not limited to the city center but extends deep into the formerly rural peripheries. The rapid growth of this area has been driven mainly by a combination of population increase, economic opportunities, and aggressive real estate development. (Silver, 2024)

What were once separate cities and rural settlements have become absorbed into the sprawling urban landscape. The process of urbanization in Jakarta has been closely tied to infrastructure development, such as the construction of highways, toll roads, and other transportation facilities. However, while these investments have facilitated the growth of the city's economy and allowed the movement of goods and people, they have also come at a significant cost. The displacement of local communities, the conversion of agricultural lands, and the growing inequality between the urban core and the peripheries are critical issues that urban planners and policymakers continue to face. (Silver, 2024)

Contrary to these infrastructural developments, peri-urban settlements in the region frequently lack basic amenities including clean water, sanitation, and affordable housing. That is why, the rapid expansion of the city is accompanied by growing socioeconomic disparities between the wealthier urban areas and the less-served peri-urban regions. (Silver, 2024) The rise of exclusive, gated communities in the urban periphery reflects the increasing social fragmentation in Jakarta's expanding metropolitan region. This phenomenon has been referred to as the rise of "*new urbanism"* in cities like Depok and Bekasi, where modern housing developments coexist with underdeveloped informal settlements. (Silver, 2024)

Jakarta's rapid growth is part of a broader urbanization trend seen across Southeast Asia. In line with the projections from the Asian Development Bank, the region is expected to see an additional 1.1 billion people living in cities by 2030. Countries such as Indonesia, Thailand, and Malaysia are already predominantly urban, and this trend shows no signs of slowing. (Silver, 2024) In Indonesia specifically, the urban population has grown to about 60% of the total population, much of it concentrated in megacities like Jakarta. This growth is driven not only by natural population increase but also by rural-to-urban migration as people move to cities in search of better economic opportunities. The positive aspects of this urbanization include increased employment, greater economic productivity, and a significant reduction in poverty. However, rapid urbanization also brings about numerous challenges, particularly in providing the necessary infrastructure to accommodate the growing urban population. Despite substantial economic growth, Indonesia continues to face an urban infrastructure deficit, with public services such as transportation, housing, and waste management often falling behind the needs of the expanding population. (Silver, 2024)

This pattern of growth is not limited to Jakarta. Other regional cities like Bandung, Semarang, and Surabaya have experienced similar transformations, where rapid urban expansion into rural peripheries has led to the conversion of agricultural land into urban developments. This has contributed to increased environmental degradation and put further pressure on already strained urban services. (Silver, 2024)

The spatial transformation seen in these cities raises critical questions about the sustainability of the current urbanization model and the long-term impacts on both the natural environment and socioeconomic conditions.

3.1 The Suharto Era and the Urban Planning

In the latter half of the 20th century, particularly during the Suharto era (1967-1998), Jakarta went through a significant transformation made to position the city as a symbol of Indonesia's modernization. Suharto's regime was characterized by a heavy focus on economic development driven by neo-liberal policies, which prioritized market mechanisms over state-directed approaches. These policies encouraged foreign investment, leading to the construction of high-rise buildings, mega malls, industrial estates, and toll roads that reshaped the city's landscape. (Salim, Kombaitan, 2009; Cybriwsky, Ford, 2001)

Jakarta's development during this period was driven by a technocratic vision, focusing on economic expansion rather than environmental sustainability or equitable urban planning. The Suharto regime's shift towards market-driven economic liberalization meant that the government's role was increasingly to facilitate investment rather than directly implement development plans.

One of the principal aspects of this period was the issue of flood management. In response to frequent flooding, Jakarta's government, in collaboration with international consultants like Nedeco from the Netherlands, developed the 1973 Master Plan for flood control, which proposed significant infrastructure projects such as the East and West Flood Canals. However, despite the early planning, the construction of these canals was delayed for decades, reflecting the gap between planning and implementation during the Suharto era. This disconnect was further exacerbated by urban sprawl, as illegal housing along rivers and the reduction of designated water catchment areas contributed to worsening flood risks. (Chandramidi, 2013)

With the rapid and rising urban growth and with private developers continuing to build in areas designated initially for environmental preservation, the city's vulnerability to flooding increased. These developments highlight the conflict between private sector interests and public environmental planning, where profit-driven urban growth often jeopardises long-term resilience. (Chandramidi, 2013)

Another significant issue during this period was the decline in water catchment areas. The 1985-2005 Master Plan for Jakarta reduced the allocation of land for water catchment from 37.2% to 25.85%, and this was further decreased to 13.94% in the subsequent revision of the spatial plan in the 2000s. This reduction, driven by the conversion of green spaces into commercial and residential developments, interfered with increasing the city's vulnerability to flooding. (Chandramidi, 2013) Overall, the government's reliance on private sector investment,

coupled with the lack of integrated planning across different levels of government, has left a legacy of inequality, environmental degradation, and urban vulnerability to natural disasters.

Thereafter, in 1997, Indonesia faced a severe currency crisis that significantly affected its economy and political landscape. The World Bank described Indonesia as being in a "deep crisis", remarking how the country, which had enjoyed rapid growth and poverty reduction for decades, was now on the verge of economic collapse. (World Bank, 1998)

The crisis abruptly held back infrastructure projects, resulted in a collapse in the real estate market, and severely diminished foreign investment. (Silver, 2008) Additionally, it caused a political crisis that culminated in the fall of Suharto's regime in 1998, putting to an end more than three decades of authoritarian rule. The following four years of political instability were marked by Indonesia's first steps toward regional autonomy and fiscal decentralization through the enactment of Laws 22/1999 and 25/1999, providing opportunities for a more inclusive political and economic framework. (Firman, 2002)

As previously discussed, before the crisis, Suharto's government was characterized by a strong emphasis on government-driven initiatives, often coupled with market-driven economic liberalization. His administration prioritized economic development, with major infrastructure projects to increase investment and growth. However, this approach led to spatial conflicts, with public interests frequently compromised in favor of private development, mainly when it came to land use in Jakarta. Despite awareness among urban planners of the city's vulnerability to flooding, development projects continued in areas that were meant to serve as water catchment zones. (Firman, 2002)

The dichotomized approach to Jakarta's urban planning, where technical solutions were implemented without sufficient regard for ecological considerations, reflected the broader governance style of the Suharto era. Plans and regulations, especially those concerning land use control, were weakly enforced, and the government gave limited priority to addressing long-term urban resilience needs. The technocratic nature of planning that integrated high-level expert knowledge to deal with issues such as flooding was counterbalanced by the prioritization of economic growth and development. (Silver, 2008)

3.1.1 Decentralization and Public Participation

In the aftermath of the 1997 crisis, the government under President Habibie, Suharto's successor, embarked on reforms that decentralized power and gave local governments

significant administrative autonomy. The Regional Administration Act of 2004 granted local governments control over most policy areas, with the national government retaining jurisdiction over key areas such as foreign affairs and defense. (Hudalah, Woltjer, 2007)

This decentralization was aimed at fostering democratic governance and promoting public participation in spatial planning, a shift from the top-down processes of the Suharto era. Public participation, legally enshrined within Indonesia's framework since the Spatial Planning Act of 1992, expanded further after the reforms. Laws passed in 2004 emphasized the public's right to participate in the planning process, with stakeholders allowed to influence decisions at various levels of government. (Silver, 2008)

However, in practice, many planning processes still favored technocratic approaches, with public input coming only after the initial stages of planning. The involvement of local communities in decision-making was often limited to the later stages of planning, restricting their ability to shape development from the outset. (Chandramidi, 2013)

In contradiction with these initiatives, the reality of public participation in Indonesia's planning system remained problematic. Coordination between different levels of government and various stakeholders was often insufficient, as seen during the 2007 flood in Jakarta. Disputes between the governor of Jakarta and the governor of West Java over the causes of the flood shed light on the lack of effective coordination in managing shared resources such as rivers (Chandramidi, 2013).

Without strong collaboration between neighbouring regions, efforts to build urban resilience were undermined. Post-reformation, several successful community-driven initiatives demonstrated the potential for public participation. For instance, the Prokasih Clean River Program in Jakarta, launched in the late 1980s, involved collaboration between local communities, industries, and the provincial government and managed to significantly reduce pollution levels in the Ciliwung River within three years (Firman, Dharmapatni, 1994). Such initiatives showed that communities could play a critical role in urban resilience efforts with proper coordination and government support.

3.2 Governmental Approach and Policy Gaps

Jakarta's long-standing issue of flooding has been met with what can be described as government inertia. This pattern dates back to colonial times and continues to persist into modern-day governance. The city has faced recurrent and severe floods, with limited long-term

action taken by the authorities to address the root causes of these disasters. Caljouw et al. (2005) discussed how the government's reaction to floods has historically been slow, with significant flooding events quickly fading from the public and government's attention. The authors observed that after the 2002 flood, which caused widespread devastation, there was a lack of sustained efforts to prevent future flooding. Although there were initial responses from bureaucrats, the public had little clarity about the concrete plans or decisions taken to protect the city from similar disasters in the future.

This inertia continued despite warnings, with public and governmental discussions about flood management gradually fading away after the immediate crisis passed. For instance, the garbage blamed for exacerbating the flooding remained largely unaddressed in the city's waterways, and discussions about protecting water catchment areas dissipated. The tragedy of 2002 was quickly forgotten, and two years later, in 2004, the government still had not implemented the necessary measures to safeguard against future floods. (Caljouw et al. 2005)

This recurring pattern of inadequate action became drastically evident when an even more significant flood hit Jakarta in 2007. Steinberg (2007) described the 2007 flood as affecting 60% of the city, displacing 430,000 people and causing the deaths of 80 individuals. The National Development Planning Agency estimated the damage to be US$ 453 million, highlighting the immense economic and social costs of the government's failure to act decisively following the 2002 flood. The fact that this flooding event was worse than its predecessor outlined how no effective measures had been put in place to prevent a similar catastrophe.

One of the core issues contributing to the government's inertia was the problematic construction of the East Flood Canal, a major project designed to alleviate flood risks in eastern Jakarta. The development of the canal was affected by complications, including land ownership disputes and uncontrolled land speculation, which increased prices for the land where the canal was supposed to be built. These delays, along with inadequate coordination between the central and local governments over responsibilities, prevented timely progress. As a result, personal and political interests overshadowed the public good, with land speculators taking advantage of the project's delays. This inertia extended into the city's budgeting practices. (Chandramidi, 2013)

In 2007, Jakarta's governor at the time, Sutiyoso, remarked that the city allocated funds for flood management only, when necessary, as flooding was seen as a natural phenomenon occurring every five years. Such statements reflected the government's reactionary stance, where action was only taken in response to immediate crises rather than proactively addressing

the deeper causes of flooding. This approach also illustrated a lack of higher learning or institutional memory, as past flood events failed to spark comprehensive policy reforms or preventative measures (Steinberg, 2007).

While the government's sluggish response continued, local communities began to take matters into their own hands. In 2002, the residents of Pluit, an area severely affected by flooding, lost faith in the government's ability to address the issue. They pooled resources to buy pumps and manage the flooding themselves. Their efforts proved successful during the 2007 flood, as the area remained largely unaffected despite widespread inundation across the city. However, in subsequent years, illegal encroachments on Pluit's water catchment areas led to a deterioration of these community efforts, and by 2013, the area flooded once again, demonstrating that local initiatives could only go so far without broader governmental support. (Chandramidi, 2013)

Community-driven actions were also seen in the Sunter and Kelapa Gading areas during the 2002 flood. These neighbourhoods faced a conflict over flood management, as the closing of a floodgate would save one area from flooding at the expense of another. Because of the lack of adequate government intervention, local businesses and residents appealed to private security measures to protect their properties, further illustrating the conflicts between local actors driven by the government's failure to provide sufficient flood control. (Caljouw et al. 2005)

The government's inertia in dealing with flooding is indicative of broader governance challenges in Jakarta. The legal frameworks introduced after Suharto's reformation showed the willingness to involve participatory approaches and stakeholder inclusion in planning processes. Nevertheless, these frameworks have often failed in practice. The persistent focus on technical solutions, without adequately addressing the social aspects of urban planning, has hampered efforts to create effective and sustainable flood management systems. Furthermore, the government's inability to prioritize flood resilience over economic development has left Jakarta vulnerable to repeated disasters despite the clear need for long-term, integrated planning.

3.2.1 The Giant Sea Wall Project

The Giant Sea Wall project, also known as the Great Garuda Sea Wall in Jakarta, is a monumental effort aimed at protecting the city from severe flooding and land subsidence,

which have been major issues due to Jakarta's location on a delta and its rapid urban development. To tackle these issues, the Indonesian government initiated the National Capital Integrated Coastal Development (NCICD) plan, in which the Giant Sea Wall is the centerpiece. Initiated as part of a bilateral cooperation between Indonesia and the Netherlands, the project represents not only a large-scale infrastructural solution but also a symbol of postcolonial identity, blending Indonesian aspirations with Dutch technical expertise. (Permanasari, 2019)

The NCICD plan, which emerged from a collaboration with Dutch experts, includes three phases. The first two phases focus on strengthening the existing coastal defenses, including upgrading, and extending the current sea walls. The third and most ambitious phase involves the construction of a massive offshore sea wall, approximately 25 km long, to create a giant artificial lagoon in Jakarta Bay. This wall, designed to act as a dam, would protect the city from tidal floods and storm surges while also functioning as a water reservoir, allowing the management of freshwater from the city's 13 rivers. (Permanasari, 2019)

The design and concept of the Giant Sea Wall have evolved over time. Initially envisioned as a purely functional flood defense system, the project was later reimagined as part of a broader urban development plan. The offshore area created by the sea wall would serve as the foundation for new urban developments, including luxury housing, commercial centers, and even artificial islands in the shape of the Garuda bird, Indonesia's national emblem. These urban developments are intended to showcase Indonesia's modern aspirations while providing the city with much-needed housing and infrastructure to support its growing population. (Permanasari, 2019)

The project, as much as ambitious in scope, has faced criticism and controversy, particularly regarding its symbolic design, which was created by Dutch experts—ironically, Indonesia's former colonial rulers. The Indonesian government has embraced the Giant Sea Wall project as both a practical solution to Jakarta's sinking issues and a powerful statement of the nation's growth and modernization, regardless of how this move remarked the complexities of its postcolonial identity. (Permanasari, 2019)

Another contentious aspect is the socioeconomic implications of the project. Critics point out that the project, which involves the development of luxury housing and commercial spaces, primarily benefits Jakarta's wealthier residents. At the same time, low-income communities living in flood-prone areas may not see the same benefits, as many of these communities are located along the rivers and coastal areas most vulnerable to flooding, and their displacement to make way for new developments is a key concern. Thus, the project has

been viewed by some as prioritizing the interests of the wealthy at the expense of marginalized populations. (Winarso et al., 2015)

Moreover, another significant concern is the environmental impact of constructing such a massive structure in Jakarta Bay, particularly the potential harm to local ecosystems, including the destruction of mangroves and the disruption of marine habitats. Environmentalists argue that rather than relying on large-scale engineering solutions, Jakarta should focus on more sustainable strategies, such as restoring mangroves, improving drainage systems, and regulating groundwater extraction. (Permanasari, 2019)

In addition to these challenges, the project has been afflicted by delays and funding issues. The estimated cost of the Giant Sea Wall is over $40 billion and securing sufficient investment has been difficult. Although the Dutch government and private companies have provided technical expertise and some funding, the scale of the project requires significant financial support from the Indonesian government, international organizations, and private investors. The difficulties of land acquisition and stakeholder coordination have further delayed progress, particularly in the construction of the East Flood Canal, a crucial part of the broader flood management system. (Permanasari, 2019)

Even if the Giant Sea Wall project represents a bold attempt to protect Jakarta from the worsening impacts of climate change and land subsidence, it also shows how challenging it is to balance large-scale infrastructural development with environmental sustainability and social equity. The project remains a work in progress, and its ultimate success will depend on the government's ability to address the concerns of critics, secure adequate funding, and ensure that all of Jakarta's residents share the benefits of the project.

3.2.2 The Symbolism behind the GSSW

In analysing the also-called Great Garuda Sea Wall (GGSW) project, Emma Colven (2017) illustrates how the infrastructure initiative is driven by a manifold "techno-political network" that intermingles political and economic interests, engineering expertise, world-class city aspirations, and Jakarta's colonial history with the Netherlands. At the heart of the project lies Jakarta's ambition to modernize and transform itself into a global metropolis, with the sea wall serving not only as a flood defense mechanism but also as an emblem of the city's modernization. The project is backed by Indonesia's political elites, who view it as an opportunity to attract private investment and develop real estate, further boosting Jakarta's standing as a world-class city. The potential economic gains from creating the waterfront area

appeal to both private investors and political figures looking to present Jakarta as a modern and international city.

A critical aspect of the GGSW project is its reliance on Dutch engineering firms and expertise, reflecting Jakarta's colonial past and its ongoing postcolonial ties with the Netherlands. The Dutch have historically influenced Jakarta's water management strategies, and their involvement in this project continues the tradition of leveraging Dutch expertise to solve Jakarta's hydrological challenges. This reliance on Dutch firms reinforces a postcolonial relationship between the two countries, with Dutch government funding and technical knowledge playing a central role in determining Jakarta's flood defense strategies. While the project is presented as a necessary response to Jakarta's worsening flooding problems, yet it is criticised for prioritizing large-scale infrastructure solutions without addressing the root causes of flooding, particularly land subsidence caused by excessive groundwater extraction. The focus on monumental engineering projects, reminiscent of previous eras of Jakarta's modernization efforts, exemplifies once again the city's continuing pursuit of large-scale, technocratic solutions that serve the interests of both political elites and private developers while putting aside more integrated and sustainable approaches to flood management. (Colven, 2017)

3.3 International Support and Collaboration

The obstacles posed by climate change, urbanization, and environmental degradation in Jakarta cannot be addressed by local governments alone. The scale and complexity of these issues require international cooperation and support. The involvement of international organizations is paramount in providing the necessary expertise, funding, and policy frameworks to help cities like Jakarta build resilience against climate-related risks.

International collaboration brings not only technical solutions and financial resources but also encourages the sharing of best practices and innovative strategies for sustainable urban development. Engaging the international community allows Jakarta to align its policies with global climate action goals, encompassing environmental, social, and economic dimensions. Moreover, the engagement of global institutions draws attention to the interconnected nature of climate challenges, bringing out that local impacts, such as those experienced in Jakarta, are part of a greater global issue. Addressing these challenges requires a coordinated response that includes the active participation of local communities, national governments, and the

international community working together to create resilient and sustainable cities for the future.

3.3.1 Environmental Policies within ASEAN

The under-discussion of climate change within ASEAN's environmental policies stems from factors that limit the integration of climate change and migration issues into regional frameworks. One of the primary reasons is ASEAN's traditional approach to environmental governance, which focuses more on short-term, immediate environmental threats, such as forest fires, transboundary haze, and deforestation, rather than on long-term systemic issues like climate change. This focus is mainly owed to the urgency of managing recurrent environmental crises that impact member states' economies and public health more directly than the slower, gradual impacts of climate change. Consequently, climate change and its broader implications, such as climate-induced migration, often take a backseat in ASEAN's environmental discourse. (Marthin, Budiman, 2020)

Another factor contributing to the under-discussion of climate change in ASEAN is its fragmented governance structure. Different from the European Union, ASEAN lacks a cohesive and binding framework for addressing environmental issues at the regional level. This fragmentation is hampered by the principle of non-interference in the domestic affairs of member states, which limits the ability of the ASEAN Secretariat to enforce or even propose comprehensive climate policies. Member states prefer to maintain sovereignty over environmental decision-making, which weakens the overall regional response to transboundary issues like climate-induced displacement (Marthin, Budiman, 2020)

The lack of institutional capacity within ASEAN to address issues like climate-induced migration further prevents the discussion of climate change in the region. Various working groups and forums have been established by ASEAN to address environmental issues, but unfortunately these platforms are often underfunded and need more political clout to influence national policies. Moreover, climate migration is not yet perceived as a pressing concern by many ASEAN nations, particularly those less directly impacted by sea-level rise or extreme weather events. This turns out in a situation where climate change adaptation and disaster risk reduction remain compartmentalized from broader migration and human security frameworks. (Marthin, Budiman, 2020)

ASEAN's reliance on fossil fuels and its member states' relatively weak commitments to climate mitigation under the Paris Agreement also contribute to the absence of attention to

climate change in its policies. Many ASEAN countries, including Indonesia, Malaysia, and Thailand, are heavily dependent on coal and other fossil fuels to guide economic growth. This dependence makes it difficult for the region to commit to the kinds of ambitious climate policies needed to address both emissions reductions and the impacts of climate change, such as migration. Without significant shifts in energy policy, climate change remains under-prioritized in ASEAN's environmental agenda. (Marthin, Budiman, 2020)

Furthermore, the region's reluctance to engage with international refugee and migration frameworks highlights the political sensitivities surrounding migration in ASEAN. Only a few member states, such as Cambodia and the Philippines, have ratified the 1951 Refugee Convention, and the region lacks any comprehensive framework for dealing with migration, let alone climate-induced migration. This reluctance is complicated by political sensitivities around sovereignty and border control, which further restrict the discussion of migration in the context of climate change. (Marthin, Budiman, 2020)

Ultimately, the under-discussion of climate change in ASEAN's environmental policies derives from a tendency that prioritizes short-term environmental crises and economic development over long-term challenges like climate change and migration. The fragmented nature of ASEAN's governance and its member states' reluctance to commit to binding climate action and migration frameworks has resulted in a regional policy landscape that is poorly prepared to address the growing challenges posed by climate change.

3.3.2 Key Insights from the World Bank

The World Bank's report on "Jakarta: Urban Challenges in a Changing Climate" highlights several critical findings regarding Jakarta's rapid urbanization, its vulnerability to climate change, and the importance of addressing urban poverty. Jakarta has undergone significant urban expansion, with almost one-quarter of its land converted from non-urban uses like agriculture and wetlands to industrial, commercial, and housing developments. The city has seen a 60% decrease in undeveloped space between 1992 and 2005. This urban growth has accentuated constraints such as traffic congestion, informal settlements, inadequate clean water access, solid waste management problems, and severe flooding. (World Bank, 2011)

Jakarta is especially vulnerable to climate-related risks, with 40% of the city's land, primarily in the north, lying below sea level. This area is prone to tidal flooding, storm surges, and the projected rise in sea levels due to climate change. Increased rainfall intensity and global

temperature rises, coupled with the urban heat island effect, further intensify the city's susceptibility to floods. The urban poor often live in informal settlements along the coast and waterways and are the most vulnerable to these flood risks. Despite their vulnerability, the poor play a crucial role in the economy, as much of Jakarta's informal economy relies on unskilled labour from these communities. (World Bank, 2011)

Furthermore, the report explains that any long-term solution to Jakarta's climate vulnerabilities must involve the active cooperation of local communities, especially the urban poor. Although the Jakarta government has initiated efforts, such as building large flood canals and sea walls, much more needs to be done to integrate climate change considerations into all sectors. Policies should be guided by better information, community-level insights, and collaboration between the city government, neighbouring provinces, and local communities to address the impacts of climate change effectively. (World Bank, 2011)

Viewing climate change adaptation as an opportunity to refocus priorities and improve urban resilience can lead to future planning in which Jakarta can incorporate data-driven policies, enhanced community participation, and improved coordination across sectors. This will help the city tackle both its climate-related risks and its pressing issues of urban poverty.

3.3.3 World Bank Initiatives for Climate Resilience

The World Bank's initiatives in Jakarta, oriented to addressing the city's urban challenges posed by climate change, showcase a versatile approach aimed at reducing flood risks and building resilience among vulnerable communities. Given Jakarta's vulnerability due to its geographical position on a sinking coastal plain, compounded by issues of land subsidence, over-extraction of groundwater, and inadequate drainage infrastructure, the World Bank has designed comprehensive measures to enhance urban resilience and mitigate the impacts of flooding. (World Bank, 2011)

A primary focus of the World Bank's interventions is to mitigate flood risks through significant infrastructural improvements. The project includes upgrading existing flood canals, such as the East and West Flood Canals, to improve water flow during heavy rainfall, particularly in the flood-prone areas of North Jakarta. Furthermore, the development of a sea wall along the coastline aims to protect against rising sea levels and tidal surges, which increasingly threaten Jakarta's coastal areas. These infrastructure upgrades are designed to not

only manage immediate flood risks but also to future-proof the city against the intensification of climate impacts. (World Bank, 2011)

Equally important in the World Bank's strategy is the integration of local communities into the resilience-building process. Recognizing that the poorest communities in Jakarta are disproportionately affected by climate change, the project prioritizes community-driven initiatives. This includes setting up early warning systems for floods and supporting local canal dredging efforts. The construction of elevated housing in flood-prone areas is another measure that seeks to protect low-income households from recurrent flooding. By involving communities in the planning and execution of these strategies, the World Bank ensures that these populations have a stake in the city's climate resilience efforts. (World Bank, 2011)

Urban planning is another pillar of the WB's project, as it demonstrates the need for sustainable development practices that consider Jakarta's environmental vulnerabilities. The project promotes the protection of green spaces, which serve as natural water absorption areas, and fosters sustainable urbanization to mitigate the urban heat island effect and manage stormwater. The partnership between the World Bank and Jakarta's local government facilitates the incorporation of climate resilience into broader urban planning frameworks, ensuring that new developments adhere to sustainable practices that can reduce long-term climate risks. (World Bank, 2011)

In addition to infrastructure and community engagement, this program also addresses socioeconomic disparities, reducing poverty and vulnerability in Jakarta's informal settlements. These areas are often the hardest hit by flooding due to their lack of infrastructure, poor sanitation, and limited access to clean water. Improving living conditions in these neighbourhoods and basic services such as waste management and sanitation, reflects the World Bank’s strives towards easing the overall vulnerability of Jakarta's poorest residents.

3.4 Sustainable Urbanization Policies

Sustainable urbanization policies are critical in shaping Jakarta's future as the city faces increasing challenges from climate change. To build resilience, especially for its vulnerable coastal communities, a combination of cost-effective technical solutions and improved governance is essential. While infrastructure projects like river dredging, embankments, and floodgates are necessary to mitigate flooding, they must be implemented alongside strategies that enhance local governance, community involvement, and economic resilience. Like this,

Jakarta can not only address immediate environmental threats but also create a more sustainable and equitable urban environment. The following sections will delve into specific recommendations and strategies that combine technical interventions with social and economic policies to ensure a comprehensive response to the city's climate-related challenges.

Cost-effective technical solutions, such as river dredging, embankments, and floodgate construction, are identified as vital in reducing the vulnerability of coastal communities to floods and other climate-related disasters. Due to inadequate dredging efforts in the past, these improvements are deemed essential for building resilience, especially in highly vulnerable areas like Kamal Muara and Kalibaru.

Embankment construction is another important technical intervention highlighted in the study. These embankments act as barriers to prevent floodwaters from inundating vulnerable communities, especially those situated near rivers and along the coastline. Although constructing embankments can be costly, their role in protecting densely populated and economically vital areas is considered indispensable. In addition to protecting against tidal flooding, embankments also safeguard against river overflows, ensuring better security for the communities that are most at risk. (Purnomo et al., 2024)

Floodgate construction is also considered a necessary infrastructure project for controlling water flow and mitigating flood risks. By regulating the amount of water that enters certain areas during periods of heavy rain or high tides, floodgates help to minimize the impact of floods. Purnomo et al. argue that floodgates, when combined with embankments and dredging, can offer a better and more comprehensive solution to flood management in Jakarta, especially in areas where land subsidence has worsened flood risks. A significant recommendation concentrates on improving access to clean water, particularly in regions affected by saltwater intrusion. Technological solutions like reverse osmosis are suggested to enhance water quality and protect public health. Building freshwater facilities and upgrading drainage systems are critical measures to ensure long-term resilience against both flooding and water scarcity, particularly in areas that are repeatedly affected by such climate-related challenges. (Purnomo et al., 2024)

While these technical adaptations come with significant financial costs, they are fundamental in ensuring the long-term resilience of Jakarta's coastal regions. Given the city's growing vulnerability to climate-related disasters, investments in this type of infrastructure are also essential to protect the most at-risk communities. (Purnomo et al., 2024)

In addition to these infrastructure developments, the importance of local community involvement is also considered key in addressing the impacts of climate change. Community-

driven initiatives, such as fostering local businesses in green mussel processing and brick manufacturing, have been suggested as effective ways to boost the adaptive capacity of these communities. Supporting small-scale industries through training programs and capacity-building efforts can enhance economic resilience, reducing the community's dependence on external aid and mitigating the effects of climate-related shocks (Purnomo et al., 2024).

An important aspect of climate adaptation is integrating technical interventions with community-based strategies. Physical infrastructure solutions must be complemented with social strategies that actively engage local populations. Educating communities on flood risks, developing early warning systems, and establishing accessible platforms for information sharing are recommended as ways to foster greater resilience and ensure that local populations are equipped to deal with future climate threats. (Purnomo et al., 2024)

Governance challenges, like the need for coordination between different levels of government and insufficient community participation, also need to be addressed. Purnomo et al., (2024) suggest that better coordination between local, provincial, and national bodies, coupled with active community engagement, would help improve the effectiveness of adaptation strategies. Strengthening governance frameworks and ensuring that policies are designed and implemented in consultation with affected communities are cardinal steps toward more resilient coastal management.

Finally, a long-term approach to policy development is strongly recommended. Governments are urged to integrate climate change adaptation into all sectors, ensuring that local authorities and communities work together toward sustainable solutions. Revising policies to prioritize the protection of vulnerable populations, particularly those in informal settlements, since they are often the most exposed to climate disasters and making targeted and inclusive policy measures seems to be critical for building resilience in urban environments and increasing self-sufficiency. (Purnomo et al., 2024)

3.4.1 Addressing Jakarta's Ecological and Economic Challenges: A Four-Point Plan

Over 40% of Jakarta's land lies below sea level, exacerbated by the depletion of aquifers through legal and illegal wells. Daly and Testolini (2019), highlight the need to rehabilitate the underground water systems as a fundamental solution to the city's sinking problems. By integrating nature with urban infrastructure, Jakarta can restore its ecological balance while

promoting economic growth. This vision for modernization relies on rehabilitating both the underground water systems and the city's physical infrastructure.

These scholars propose a comprehensive, data-driven strategy to regenerate Jakarta's urban fabric. They outline a four-point plan aimed at restoring water balance, linking eco-corridors, retrofitting urban infrastructure, and reviving Jakarta's identity as a sustainable metropolis. This plan integrates natural systems into urban planning to mitigate flooding risks and promote resilience. (Daly, Testolini, 2019)

1. Restoring Water with Wetlands and Blueways

The rehabilitation of Jakarta's water systems is central to addressing land subsidence and flooding. The introduction of wetlands and blueways will help capture, filter, and return water to the aquifers, restoring the city's groundwater conditions. The Ciliwung River corridor, along with flood control canals, will serve as the main components in this system, which aims to prevent untreated water from entering waterways. (Daly, Testolini, 2019)

2. Eco-Corridors and Green Fingers

Eco-corridors will link responsible agriculture with Jakarta's urban heart. These green corridors will serve as heat sinks, filter air, and provide open spaces for pedestrians. The design includes a variety of ecological networks, such as wetlands, parks, bioswales, and rain gardens, all of which will contribute to cooling the city, improving air quality, and creating vibrant, connected neighborhoods. (Daly, Testolini, 2019)

3. Retrofitting Urban Infrastructure

Retrofitting the city's existing infrastructure could be a way to optimize energy efficiency and reduce carbon emissions. This involves adopting renewable energy sources such as geothermal energy, algae biomass harvesting, and supporting electric vehicles. These initiatives will contribute to Jakarta's efforts to reduce its environmental footprint while promoting sustainable urban growth. (Daly, Testolini, 2019)

4. Reviving Jakarta as a Sustainable Metropolis

Jakarta's cultural and historical identity is central to its future as a sustainable city. Along the authors, integrating mass transit networks, restoring waterways, and creating eco-corridors can envision a Jakarta that preserves its heritage while embracing modern, sustainable development. The plan is focused on the creation of vibrant public spaces that blend commerce, culture, and environmental sustainability (Daly, Testolini, 2019).

Lastly, Daly and Testolini (2019) present several case studies to illustrate the implementation of their proposed design strategies. For example, the Pertamina Headquarters near Merdeka Square is designed as a low-carbon, sustainable building that integrates bio-remediation strategies to clean river water and enhance the surrounding environment. Another case study, the revitalization of Fatahillah Square, focuses on preserving Jakarta's historical roots while improving its connectivity and resilience through new transit links.

The proposed urban plan seeks to balance environmental sustainability with economic growth by leveraging the city's natural and cultural assets. Focusing on water management, green infrastructure, and community-driven development can transform Jakarta’s ecological crisis into an opportunity for long-term urban rejuvenation.

3.5 Limited Prioritization of Climate Change in Policymaking

According to Nurlambang et al. (2011), even with the increasing awareness of climate change impacts on the city, particularly flooding and rising sea levels, there remains a significant disconnect between policy rhetoric and tangible action. They provide a critical analysis of the current policy landscape in Jakarta regarding climate change and migration, mainly focused on the gaps between policy formulation and implementation.

Climate change is not yet a priority in Jakarta's policymaking framework. Although climate-related risks such as flooding, land subsidence, and rising sea levels have become more frequent and severe, the city's policies continue to operate under a "business as usual" mindset. The authors argue that climate change is often treated as a secondary issue, subordinated to more immediate economic concerns. This need for prioritization is evident in Jakarta's development trajectory, where economic growth, real estate development, and infrastructure expansion are often given precedence over environmental sustainability and resilience planning (Nurlambang, 2011).

Despite having a legal framework, such as the Law on Environmental Protection and Management (Law No. 32/2009), which mandates the inclusion of climate change considerations in development planning, the implementation of these regulations remains weak. Even if Jakarta's long-term development plans, such as the Spatial Plan 2030, mention climate change, there is insufficient integration of climate resilience into the city's planning and budgetary processes. This failure to incorporate climate adaptation and mitigation into policy frameworks reflects a broader issue of institutional inertia and limited political will. (Nurlambang, 2011)

Jakarta's policy priorities remain unbalanced and oriented towards economic development, even at the expense of environmental sustainability. Large-scale infrastructure projects, such as the expansion of ports, reclamation projects, and real estate developments along the coastline, have been justified as necessary for boosting economic growth. However, these projects exasperate the city's environmental vulnerabilities, particularly in coastal areas that are already at high risk from sea-level rise and flooding. (Nurlambang, 2011)

This prioritization of short-term economic gains over long-term sustainability demonstrates once again the broader neoliberal economic model adopted by the city, which favors privatization and market-driven growth.

3.6 Recommendations for Policy Reforms

One of the key policy failures identified in the document is the inconsistent application of the Strategic Environmental Assessment (SEA). Although the SEA is mandated under Indonesian law to guide all major development projects, it is often ignored or inadequately applied in Jakarta's urban planning processes. SEA, which should act as a tool for integrating climate change considerations into policy and development projects, is frequently sidelined in favor of immediate economic gains. This lack of enforcement and oversight results in projects that increase the city's vulnerability to climate change rather than enhancing its resilience. (Nurlambang, 2011)

For example, the construction of new highways, residential developments, and industrial zones in flood-prone areas continues unabated despite warnings from environmental experts about the risks of worsening floods and land subsidence. Without a stronger commitment to implementing the SEA and enforcing land-use regulations, Jakarta will

continue to face unsustainable urban growth that compounds its environmental challenges. (Nurlambang, 2011)

Nurlambang (2011) provides several recommendations for improving Jakarta's policy approach to climate change and migration. First, he advocates for the need of a more integrated approach to climate resilience, where climate change adaptation is mainstreamed into all sectors of urban planning and development. This requires a shift from viewing climate change as an additional challenge to be addressed separately to treating it as a central concern that must be integrated into all aspects of governance and planning.

Second, there is a call for stronger collaboration between different levels of government, particularly between Jakarta and its neighboring provinces. Given that many of Jakarta's rivers originate outside the city, and that urbanization is rapidly expanding into peri-urban areas, provincial governments need to work together to manage environmental risks and coordinate climate adaptation efforts. (Nurlambang, 2011)

Finally, the author advocates for greater public accountability and transparency in the planning and implementation of climate adaptation projects. This implies developing mechanisms for monitoring the effectiveness of adaptation programs and ensuring that the voices of local communities are heard and incorporated into policy decisions. Fostering a more participatory and inclusive approach to climate resilience, can allow Jakarta to begin to address its environmental vulnerabilities in a way that is equitable and sustainable. (Nurlambang, 2011)

3.7 Community-based Adaptation Strategies

Communities located in flood-prone areas face many obstacles, yet vulnerable populations find ways to organize and maximize their capacities to return to normal activities. Their recovery goes beyond relying solely on social and economic resources, as they draw upon cultural factors that significantly influence their responses to hazards and disasters. Beliefs, behaviours, values, and attitudes shape how communities perceive and react to risk, guiding their actions and decisions during and after disasters. Culture explains why some people become more vulnerable while others manage to survive under constant risk. These cultural elements give meaning to people's lives and influence their choices in livelihoods and settlement patterns, which in turn shape their resilience strategies.

Nevertheless, climate change-induced extreme events are and will remain a challenge for disaster risk management. Therefore, it is important to establish a strong management

scheme that focuses on boosting community resilience, especially within challenging urban settings like Jakarta. While resilience is understood differently depending on the context and is often designed to suit specific environments, research on the practical concept of a flood-resilient community in Jakarta still needs to be explored further.

Dwirahmadi et al. (2019) examined the concept of a flood-resilient community in Jakarta from the perspectives of disaster risk reduction (DRR), climate change adaptation (CCA), and development agencies. Building flood resilience in this context requires integrating both human and technical aspects, which are at the foundation for managing urban flood risks.

1. Awareness

One of the key operational features of a flood-resilient community is flood risk awareness. This implies understanding the hazards, the factors that increase vulnerability, and the capacities available to prevent or reduce damages. Awareness serves as a foundation for community preparedness, making people more alert and responsive to flood risks. In an environment like Jakarta, this is critical, as the city's rapid urbanization and environmental challenges, such as land subsidence and improper waste management, have aggravated flood vulnerabilities. Educating the community on the impact of these factors and how they can minimize risks is a major aspect of building resilience. (Dwirahmadi et al. 2019)

2. Ability to Respond

The ability to respond to floods is another important characteristic. This requires community readiness to act during flood events, facilitated by effective risk communication from authorities. For instance, platforms like PetaJakarta.org have been introduced to provide real-time flood updates, helping communities make timely decisions. Moreover, local measures such as storing essential supplies, preparing for evacuation, and involving in communal clean-ups are examples of how communities in flood-prone areas enhance their capacity to cope with flood events. (Dwirahmadi et al. 2019)

3. Recovery Capacity

Recovery capacity, which refers to a community's ability to rebuild after a flood, is crucial for resilience. In Jakarta, economic impacts disproportionately affect lower-income

families, making recovery more challenging for these households. Strengthening social capital, such as fostering community cooperation through traditional practices like gotong royong (mutual assistance), has been shown to accelerate recovery efforts. This social cohesion not only aids in the immediate aftermath but also sustains long-term resilience. (Dwirahmadi et al. 2019)

However, in the context of Jakarta, several barriers undermine the efforts to build a flood-resilient urban community. One significant challenge is the lack of financial capacity, which limits the ability of local governments and communities to invest in flood-prevention infrastructure and mitigation measures. This issue is further complicated by the ongoing rapid urbanization that has led to poor urban planning and inadequate infrastructure. As already explored throughout this elaborate, the unplanned settlements in flood-prone areas have increased the city's vulnerability to flooding. At the same time, the improper management of drainage systems has made it difficult to mitigate flood risks effectively. Another critical challenge is the excessive reliance on groundwater, leading to significant land subsidence. This subsidence worsens flood vulnerability as lower-lying areas become even more prone to inundation during heavy rainfall or tidal flooding. Communities in Jakarta often lack awareness and education about the long-term impacts of this unsustainable practice, which hinders efforts to address the root causes of flood risks. (Dwirahmadi et al. 2019)

In addition, a significant social constraint is the dependency mentality that has developed among some communities, which makes it harder for self-sufficiency and resilience to develop. Many residents wait for external assistance during flood events rather than actively preparing or participating in flood risk mitigation efforts. This reliance on government and NGO support for immediate relief weakens long-term resilience and hinders community-driven recovery processes. (Dwirahmadi et al. 2019)

Furthermore, governance challenges, including unclear roles and responsibilities among stakeholders, have hindered coordination in disaster risk reduction and climate change adaptation efforts. This institutional fragmentation leads to conflicting agendas between local, provincial, and national authorities and between different sectors responsible for disaster management. The lack of coordination makes the implementation of coherent and sustainable flood resilience strategies much more difficult. (Dwirahmadi et al. 2019)

Addressing these challenges requires a strategy that connects improved governance, community education, and infrastructural investments. Besides that, these efforts must also involve local communities in decision-making processes to ensure that resilience-building measures are culturally and contextually appropriate for the people most affected by flooding.

3.7.1 Response to Flood Events: An Example of Community Resilience from Kampung Melayu

Kampung Melayu, situated along the Ciliwung River in East Jakarta, has historical roots dating back to the 17th century. Initially established by Malay communities, the area has transformed into a multicultural urban village, with most residents now being internal migrants from other parts of Java. Despite the floods, the community has developed strong socio-cultural and historical ties to the area, which have become vital to their resilience. The river itself has been significant in their livelihood, initially as a trade route and now supporting small businesses like street vending. The area's history and community bonds have contributed to a deep connection to the place, making relocation efforts problematic. (Rahmayati et al., 2017)

Flood events, particularly the devastating 2007 and 2013 floods have repeatedly displaced Kampung Melayu residents. Despite government interventions, such as temporary shelters, evacuation zones, and the 2012 Flood Contingency Plan, the community has shown resistance to relocation. The residents prefer staying in place, moving to higher floors or safer zones within their neighborhood when necessary. Their reluctance to relocate stems from both practical concerns, such as loss of livelihood, and their strong emotional and cultural ties to the area. The community's response to floods includes strategies like moving valuables to higher ground and establishing makeshift shelters within local structures like mushollas - small mosques. (Rahmayati et al., 2017)

3.8 The Role of Socio-Cultural Factors

Rahmayati et al. (2017) argue that socioeconomic factors alone do not fully explain the community's resilience; instead, the cultural and historical connection the ties of these people to their place. This connection helps people adapt and survive and relocating them would not only disrupt their livelihood but also their cultural identity. Examples from nearby Kampung Pulo, where residents were relocated to high-rise flats, show that displacing communities from their cultural context can lead to economic and social insecurity. Therefore, the scholars

advocate for solutions that address these deep-rooted connections and avoid permanent dislocation.

Moreover, their research promotes a community-led design approach to address the challenges faced by Kampung Melayu during flood events. Involving the community in the design process of temporary shelters and disaster response systems showcases the importance of maintaining the community's connection to their place. A participatory way of doing ensures that the community's needs, preferences, and cultural values are considered, increasing the likelihood of successful and sustainable outcomes. The study also suggests practical solutions like portable shelters that can be easily deployed and stored in times of need. (Rahmayati et al., 2017)

It is possible to affirm that the resilience of the Kampung Melayu community is deeply rooted in their socio-cultural and historical connection to the area. This connection strengthens their ability to survive and adapt to annual flood events, making relocation an unsatisfactory solution. Instead, there is a need for community-led, participatory design interventions that allow residents to remain in place while addressing the challenges of flooding. This pattern can be applied not only in Jakarta but also in other flood-prone urban areas across the Asia-Pacific region. (Rahmayati et al., 2017)

Lastly, when considering disaster response, the resilience strategies in flood-prone urban areas must consider the cultural, historical, and socioeconomic factors that have leverage on community identity and survival mechanisms. Community-led solutions maintain the connection to place while improving infrastructure and disaster preparedness.

3.8.1 Cultural Practices of Mutual Cooperation: Gotong Royong

One of the most prominent cultural practices among vulnerable communities is gotong royong, which translates to "mutual cooperation." This practice is deeply embedded in Indonesian society and symbolizes a powerful coping mechanism in times of disaster. In the context of floods, gotong royong manifests as collective actions such as cleaning communal drainage systems, building makeshift flood barriers, and helping neighbors evacuate or safeguard their belongings. During the 2013 floods, this cultural practice allowed residents to rapidly respond to rising waters, preventing greater loss of property, and ensuring the safety of vulnerable community members like the elderly and children (Surtiari et al., 2017).

Gotong royong fosters a sense of solidarity and shared responsibility within the community, which strengthens social cohesion. This cultural bond creates informal networks of support that are activated during crises, allowing residents to pool resources, share information, and provide emotional and practical assistance to one another. The practice is not only a means of immediate disaster response but also a form of long-term resilience that enables the community to rebuild and recover more quickly after floods. (Surtiari et al., 2017)

When talking about gotong royong, we can draw an example from the community of Muara Baru. This population is ethnically diverse, with strong kinship ties among ethnic groups such as the Buginese, Bantenese, and others. These ethnic networks provide a crucial layer of support during flood recovery, as they facilitate access to resources, information, and social capital. After a flood, families often rely on their extended kin networks for temporary housing, financial support, and help with rebuilding. This kind of assistance is typically informal and driven by cultural norms of reciprocity and obligation, where members of the same ethnic group feel a strong responsibility to support each other in times of need.

These kinship networks are also important to deal with formal systems of aid and government assistance. Ethnic leaders, who are respected within the community, often act as intermediaries between government agencies and community members, helping to ensure that aid reaches those who need it most. In some cases, they negotiate with local authorities to secure benefits for undocumented residents or those living in informal settlements who may otherwise be overlooked in official disaster relief efforts. (Surtiari et al., 2017)

Also, religious beliefs are core in influencing communities' in Muara Baru in their ways of perceiving and responding to flood risks. Many residents interpret floods through the lens of religious fatalism, believing that such events are acts of God and are, therefore, beyond human control. This belief system, while offering comfort and a sense of spiritual resilience during times of hardship, can also act as a barrier to proactive disaster preparedness.

For example, some residents are less inclined to invest in long-term protective measures, such as floodproofing their homes or participating in disaster preparedness training, because they believe that floods are inevitable and that their fate is ultimately in God's hands. This cultural attitude can hinder the community's capacity to adapt to increasing flood risks associated with climate change, as it discourages forward planning and risk reduction efforts. The challenge, therefore, lies in balancing the community's religious values with practical strategies for enhancing resilience. (Surtiari et al., 2017)

Another important cultural element highlighted by Surtiari et al. (2017) is the concept of cultural memory. In Muara Baru, the community has a long history of experiencing floods,

and many residents draw on their memories of past events to inform their responses to future floods. For instance, older residents share stories and lessons learned from previous floods, which helps younger generations understand how to protect their homes and families when floods occur.

This cultural transmission of knowledge is essential in building the community's adaptive capacity. However, Surtiari et al. (2017) also point out that this reliance on past experiences can sometimes create a false sense of security. Some residents believe that because they have survived previous floods without significant consequences, they will continue to do so in the future, even as the frequency and intensity of floods increase due to environmental changes. This mindset, rooted in cultural resilience, may lead to self-indulgence and a lack of preparedness for more severe flood events.

3.8.2 Cultural Barriers to Relocation

Another factor significantly influencing community resilience is the cultural connection to place. Many residents of Muara Baru have lived in the area for generations and have developed a strong attachment to their land despite its vulnerability to flooding. This cultural bond to place makes residents resistant to government-led relocation programs, even when these programs offer safer housing in flood-free areas. (Surtiari et al., 2017)

Moving away from Muara Baru would mean for many residents losing their homes but also severing their ties to their cultural heritage, social networks, and livelihoods. The economic activities that sustain the community, such as fishing and small-scale trading, are deeply tied to the coastal environment, and relocating inland would disrupt these traditional ways of life. For this reason, many inhabitants choose to remain in flood-prone areas despite the risks, prioritizing cultural continuity over physical safety. (Surtiari et al., 2017)

Jakarta's urban resilience strategies show significant efforts in tackling flooding and climate risks, but many challenges persist. Historical factors, including policy inertia and the prioritization of economic growth over environmental sustainability, have left the city exposed to repeated disasters. Large-scale projects like the Great Garuda Sea Wall, albeit the aspirations, reiterate a tendency to privilege monumental infrastructure rather than integrated and sustainable approaches.

International support and community-driven initiatives offer hope for a more comprehensive and participatory resilience strategy. Yet, there is a clear need for more robust

governance, better coordination among stakeholders, and deeper integration of local communities in planning processes. Ultimately, Jakarta's path to resilience requires not only technical solutions but also a cultural shift towards long-term sustainability, collaboration, and adaptability in light of ongoing environmental challenges.

Conclusion

The examination of urban resilience strategies in Jakarta reveals the hardhsip and limitations intrinsic to the city's approach to climate adaptation. Many policies and projects have been put into place, but they typically follow a top-down, infrastructure-heavy approach. This method, might address some immediate concerns, but it often forgets about deeper structural issues and the most vulnerable communities. The inclusiveness of marginalized populations, especially those living in informal settlements, remains one of the primary challenges. Jakarta's resilience strategies are often framed within a model that prioritizes large-scale development over the needs of those who are disproportionately affected by climate change.

A top-down approach to resilience can be effective in terms of governance and resource mobilization, however more is needed in order to address local realities. Urban resilience needs to be more dynamic, integrating both macro-level interventions and community-driven solutions. Many community-led initiatives in Jakarta have shown potential, yet they are often excluded in favour of larger infrastructural projects. This disconnect between governmental strategies and grassroots efforts weakens the overall impact of resilience policies.

Additionally, the role of international organizations in Jakarta's climate resilience strategies cannot be understated. These bodies provide critical financial and technical support, but their solutions often need better alignment with local contexts. The lack of coordination among different levels of government—local, provincial, and national—further complicates the implementation of these strategies. Coherent, integrated interventions are necessary to ensure that resources are used effectively and that policies are responsive to the needs of all residents, not just those in wealthier areas.

In conclusion, while Jakarta's efforts to enhance urban resilience are commendable, they often reflect the limitations of an attitude to prioritize large-scale development projects. To move forward, a more holistic model is required—one that factors in the voices of marginalized communities, fosters better coordination among different levels of governance, and balances the need for both short-term infrastructural improvements and long-term environmental sustainability. Jakarta's urban resilience strategies must evolve to genuinely address the root causes of vulnerability and ensure that solutions are both equitable and sustainable.

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