BRIDGING THE HEAT GAP

Enhancing Collaborative Governance for Urban Heat Island Adaptation in Jakarta's Informal Settlements

P5 Report
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P5 Report of Master Thesis Research
June, 2025
Delft, The Netherlands

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lpdp — lembaga pengelola dana pendidikan

Philip Spangenberg Travel Grant

"Seek first to understand, then to be understood."

Stephen Covey

ABSTRACT

Countries located near the equator, like Indonesia, are more exposed to the risks of rising temperatures, especially in coastal areas. This condition has raised concerns about the effects of climate change, which are increasingly felt in everyday life. In response, various actions have been taken through policy-making, public education, and infrastructure development. These efforts also support the global commitment to the UN's Sustainable Development Goals (SDGs), which aim to guide countries toward a more sustainable and climate-resilient future.

Despite this progress, many climate change efforts in Indonesia still focus on large-scale infrastructure or attempts to mitigate the regular natural disasters. Meanwhile, local-scale adaptation, particularly in the area of housing and settlements, has received less attention. This is a critical issue in informal settlements, where residents face greater challenges in dealing with climate impacts. Therefore, more focus is needed on adaptation strategies that consider these vulnerable areas and everyday living conditions.

In this context, collaboration between different actors, such as government institutions, communities, and other organizations, is important. Climate change impacts numerous aspects of life, and solutions necessitate joint efforts from multiple sectors. Working together can help strengthen responses and make adaptation more effective, especially at the scale of neighbourhoods and households where the effects are directly felt.

This research explores how collaborative action can support climate change adaptation in Jakarta's informal settlements. A qualitative approach is used, including case studies and interviews with involved actors. By applying the collaborative governance framework, the study aims to understand the current implementation of adaptation efforts and identify areas for improvement in future practices.

Keywords
Collaborative governance
Informal settlements
Climate change adaptation
Urban Heat Island (UHI)
Indonesia
Jakarta

ACKNOWLEDGEMENT

Alhamdulillah. All praise to Allah, The One, The Most Merciful. Without His guidance, I would not have had the strength to complete this thesis and master's degree journey.

To my beloved family, Ayah, Ibu, Tsani, Rara, and all my extended family in Yogyakarta and Jakarta, thank you for your endless support, prayers, and wisdom. Though I was far from home, your belief in me has never wavered. You reminded me that I could do this on my own, and that what I was doing truly mattered.

To my mentors, Ellen and Gerard, thank you. I'm forever grateful for the opportunity to work with you. This thesis journey has reshaped how I see things: how trusting the process, letting creativity flow and take its place, can lead to results that are not only complete, but meaningful. Thank you for trusting me to develop and pursue my own topic. This experience will always be a remarkable milestone in my life.

To RUJAK Centre for Urban Studies (RCUS), Mba Dian, Mba Amel, Vidya, and Hana, thank you for introducing me to this deeply insightful topic and connecting me with the remarkable people of Kampung Marlina, the Cooperative of Kampung Marlina, and Jaringan Masyarakat Miskin Kota (JRMK). This research was made possible by you, and is dedicated to you. To the Jakarta Provincial Government, the Ministry of Housing and Settlement Areas, and academia from University of Indonesia, thank you for the conversations that helped shape this research into a broader perspective.

My deepest gratitude also goes to the Indonesian Endowment Fund for Education (Lembaga Pengelola Dana Pendidikan/LPDP) and Philip Spangenberg Travel Grant. Without your support, this thesis would not have found its way to the finish line. Your contributions made it possible for me document the real conditions on the ground, bringing those findings into something enlightening.

To my fellow Indonesian friends in the Netherlands; RH1243 housemates, bkwkwk friends, PPI Delft, Keluarga Muslim Delft, and PK-209 friends, thank you for accompanying me in this journey together, your presence is the true meaning of a home away from home. To my friends at MBE and TU Delft; Summer Buddies, the Inclusive Communities team, MBE 2023 cohort, and everyone I met along the way, thank you for the insights, debates, laughs, and all the moments that turned these two years journey into a once-in-a-lifetime memory. And to my friends back in Indonesia; Anti-FOMO Club, KYUT ND DAY, and Architecture ITS 2013 cohort, thank you for always keeping me going with your never-get-old jokes, despite the distance and five- to six-hous time difference.

I dedicate this thesis to all of you. This journey has reminded me to always have faith; in the process, in prayer, and in myself. Even in the darkest moments, there is always a small light to follow—one that whispers to our heart, telling us what to do. In the end, somehow, that trust brought me to a place far better than I ever imagined.

Delft, June 2025

Amalina Budiati

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INTRODUCTION

This chapter introduces the research by discussing climate change and its impact on urban areas through the Urban Heat Island (UHI) phenomenon, which worsens environmental challenges and disproportionately affects vulnerable groups, such as those in informal settlements. It situates UHI within the broader context of urban climate adaptation, emphasizing its relevance to Jakarta's informal settlements. The chapter outlines the research goal of exploring collaborative governance as a strategy to mitigate UHI impacts, along with the main research question and sub-research questions. Additionally, it highlights the societal relevance and the scientific relevance of filling gaps in the literature on UHI adaptation and collaborative governance.

1.1 BACKGROUND

Climate change is an increasingly pressing reality that affects regions worldwide, with urban centers among the most impacted. Although cities cover just 2% of the Earth's land, they account for 60-80% of global energy consumption and nearly 75% of carbon emissions (Akbari et al., 2015). Many major cities are taking active measures to address these environmental challenges. Coastal megacities in Asia, particularly, face severe consequences of climate change, including intensified storms, flooding, and rising sea levels (Firman et al., 2011).

Alongside these threats, urban areas are also experiencing more pronounced climate change effects than previously thought, with cities acting as harbingers of global warming (Ziska et al., 2003). Urban environments exhibit higher CO2 concentrations and temperatures compared to rural areas, mirroring projected global climate change scenarios (Ziska et al., 2003; McCarthy et al., 2010). This urban-rural disparity is expected to increase, particularly in regions with high population growth and urban heat island (UHI) potential (McCarthy et al., 2010).

The UHI effect, which causes urban areas to have notably higher temperatures than surrounding rural regions, has intensified significantly over the past three decades (Fong et al., 2023; Ufaira et al., 2023). Cities across the globe, including in the Global South countries, face multiple challenges, including exacerbating existing urban issues and increased stress on infrastructure and social services due to climate change (Solecki et al., 2013). In Indonesia, cities such as Jakarta, Medan, Surabaya, Makassar, Bandung, and Yogyakarta now rank in the top 20% globally for high Land Surface Temperatures (BMKG, 2024). This heightened urban heat worsens the challenges faced by vulnerable communities, particularly low-income populations in informal housing, who are disproportionately impacted by these climate-induced risks (Ufaira et al., 2023). In the Global South area with mostly low- and middle-income countries, informal settlements are home to approximately 1 billion people, which are especially vulnerable to climate change impacts due to poor housing quality, lack of basic services, and dangerous locations (Satterthwaite et al., 2020). Therefore, building resilience in these areas requires community- and city-government-led measures to upgrade settlements and address climate risks (Satterthwaite et al., 2020). Enhancing collaboration within the city is a crucial approach to addressing complex urban issues like the Urban Heat Island (UHI) effect.

1.2 PROBLEM STATEMENT

Urban heat islands (UHI) pose significant challenges for cities, particularly in tropical regions like Indonesia. The rising land temperatures worsen urban living conditions, adding pressure to vulnerable communities that live in major cities worldwide with high numbers of urbanization, including Jakarta. The growth of Jakarta's population has accelerated urbanization, which leads to increased surface temperatures and UHI effects (Jumadi et al., 2024). However, these climate change effects drive the national government to place the climate change adaptation on high priority issues, such as sea level rise, extreme weather events, and threats to ecosystems, which is developed according to the need (Sari, 2021). As a result, the rarely planned development in facing the climate change effects on an urban scale level leaves the high-rise buildings and a lack of vegetation characterize the urban configuration, raising outdoor temperatures (Sari, 2021). As mentioned by Intergovernmental Panel on Climate Change (IPCC) (2022) in their report, while the plan from the governmental level still prioritize on the e high-level issues, frequently sidelining the specific needs of vulnerable communities, such as those in informal settlements. Additionally, UN-Habitat (2018) also reported that the informal settlements are disproportionately excluded from adaptation initiatives, despite their heightened vulnerability to climate impacts. This exclusion stems from a lack of inclusive, pro-poor policies and participatory approaches that could effectively address their unique challenges (Satterthwaite, 2020). As a result, certain urban areas remain neglected, leaving informal settlements without adequate adaptation measures, perpetuating inequity in urban climate resilience efforts (UN-Habitat, 2019; Satterthwaite, 2020).

This findings are also supported by Ufaira et al. (2023), stating that Jakarta's current government climate initiatives prioritize flood management, pollution control, and carbon reduction, focusing on industrial regulation, sustainable transportation, and green infrastructure. This phenomenon makes the disadvantaged people who live and work in urban areas prone to extreme heat exposure. Studies also highlight the insufficient integration of stakeholder participation in planning processes, with limited efforts to empower communities to address UHI at the grassroots level (Kurniati & Nitivattananon, 2016). Municipalities or local governments often focus on top-down strategies, such as expanding green spaces or reducing energy consumption, but these efforts lack comprehensive stakeholder engagement and do not align with the specific needs of vulnerable populations (Kurniati & Nitivattananon, 2015). Furthermore, cultural and institutional barriers, as well as insufficient funding and coordination across government levels, have impeded the development of effective collaborative governance frameworks (Mukhlis & Perdana, 2022).

While the current governance system still focuses on the high-priority issues, the residents of informal settlements in Jakarta which are vulnerable to UHI have demonstrated the ability to create communal effort despite the limited source (Salsabila et al., 2023). One of the examples showed by the collaborative actions from non-governmental organizations (NGOs) to support communities that are disproportionately affected by the UHI effects. NGOs like ARKOM Indonesia and the RUJAK Centre for Urban Studies (2024) were implementing collaborations to work with communities to overcome climate change in dense areas. As a result, the project that took place in an informal settlement area (kampung) in Jakarta, Indonesia, was already applying the mutual conception from the workshop, and the public from the area itself is starting to get the impact from the projects.

This disconnect between government initiatives and community needs highlights a critical gap in Jakarta's climate resilience strategies and underscores the need for collaborative, inclusive, and participatory efforts that involve underprivileged communities as active agents in designing and implementing UHI mitigation strategies (Rizki et al., 2024). Without this shift, the ongoing effort could continue and fail to solve the specific problems of UHI in low-income areas. Therefore, this thesis research aims to investigate how collaboration among governmental bodies, community members, and supporting organizations like NGOs can strengthen bottom-up approaches to adapt to the UHI effect in informal settlements by exploring a case study on a project that NGOs

and society have undertaken. This research seeks to contribute to a deeper understanding of sustainable, community-driven solutions for adapting to the urban heat stress in Jakarta's most affected neighbourhoods by exploring the challenges and opportunities within a collaborative framework. Illustration in Figure 1 describes the short problem statement. From the illustration, the findings and real-world case will reveal the dynamics between government bodies and supporting organizations through their understandings and approaches to UHI effects in general and to the affected communities. This condition highlights the problem statement for this research thesis project.

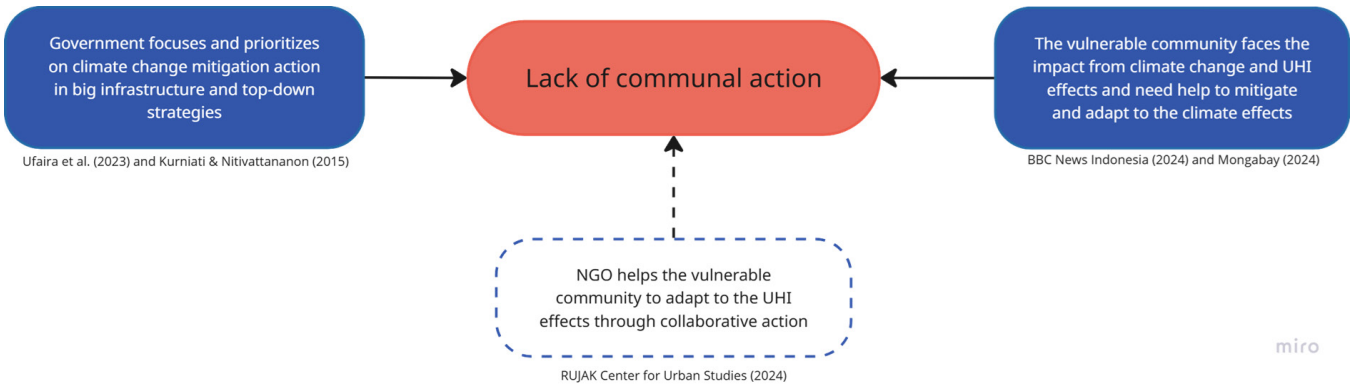


Figure 1. An illustration of a short problem statement (Own work)

1.3 RESEARCH OBJECTIVES AND GOAL

The objective of this research is to gain knowledge and understanding of how collaboration attempts to adapt to the climate change effect on the unprivileged society has been done and what could be improved from the case study project. The focus of this research will take place in the Global South area, focusing on the capital city of Indonesia, Jakarta. The big research objective figure can be seen in Figure 2 below:

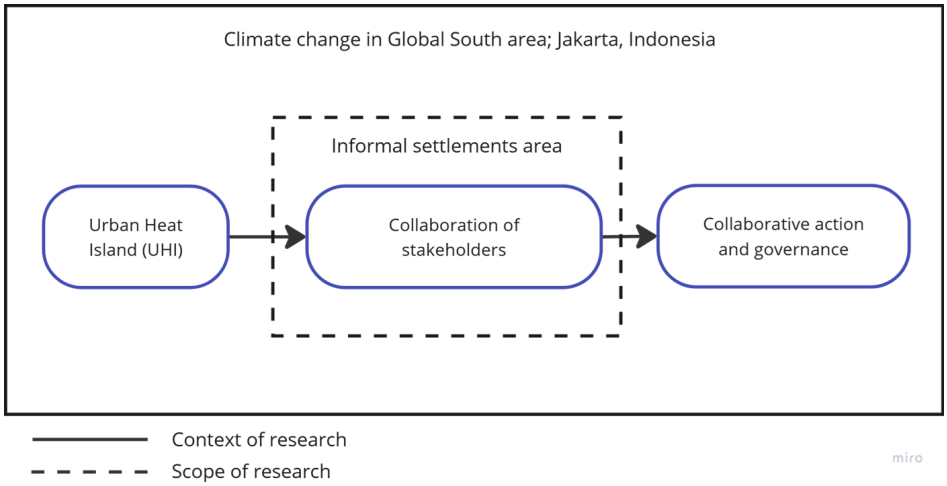


Figure 2. Research objective in this research topic (Own work)

1.4 MAIN RESEARCH QUESTION

The objective of this thesis is to investigate and understand the enablers and dynamics of stakeholders' collaboration in adapting the UHI effect in informal settlement areas. Specifically, the research will address the main question:

To what extent can collaborative governance support adaptation of Urban Heat Island (UHI) effect in informal settlement area in Jakarta, Indonesia?

1.5 SUB-RESEARCH QUESTIONS

To address the main research question, this study breaks it down into three sub-research questions that highlight key aspects of the issue. The analysis follows a modified version of Marcuse's (2009) critical planning framework, originally *Expose, Propose, and Politicize*, which is adapted here as:

- Expose: Identify and analyze the roots of the problem.
- Explore (adapted from Propose): Investigate existing collaboration projects and their dynamics.
- Evaluate (adapted from Politicize): Assess outcomes and suggest improvements for future stakeholder collaboration.

This adaptation reflects the study's aim to understand and assess ongoing efforts rather than propose new political agendas. The modified framework, Expose, Explore, and Evaluate, shapes the sub-research questions below:

SQ 1

How does the Urban Heat Island (UHI) effect impact the informal settlements in Jakarta?

SQ 2

How was collaborative governance implemented in the Urban Heat Island (UHI) adaptation project in informal settlements in Jakarta?

SQ 3

What strategies can be implemented to enhance collaborative governance in adapting the UHI effect in the informal settlement area in Jakarta in the future?

This study is limited to examining urban informal settlement projects that have implemented or are planning to implement solutions to mitigate the UHI effect, as this context is most relevant to Indonesia's urban heat challenges. The specific location of this research project will take place in one or two informal housing area(s) in Jakarta. The study will not cover high-income housing developments or areas outside urban centres.

1.6 SOCIETAL RELEVANCE

This thesis aims to provide a detailed analysis of the role collaboration plays among various stakeholders, including local governments, NGOs, and community membersin addressing urban heat stress. Focusing on a case study of a completed NGO-led project assisting low-income communities in mitigating the Urban Heat Island (UHI) effect in housing, this research will examine both the root causes of UHI impacts on low-income populations and the collaborative processes among stakeholders. By analyzing effective policies and partnership frameworks from the project, the study seeks to identify strategies that build community resilience.

Finally, this research aims to pinpoint limitations within current collaborative efforts and propose alternative approaches to reduce urban heat stress, particularly for low-income communities in the Global South, with an emphasis on Jakarta. Findings from this study could support policymakers, practitioners, and researchers in creating sustainable strategies that enhance environmental equity and improve living conditions for vulnerable populations.

1.7 SCIENTIFIC RELEVANCE

To highlight the significance of this research, it's essential to understand its contributions within a specific academic and practical context. This study addresses a key gap: the misalignment between community needs and government actions in addressing the Urban Heat Island (UHI) effect in informal settlement areas. By examining how UHI impacts these communities and assessing the existing governance approaches, this research will contribute to the discourse on urban governance in the Global South. It will focus on how to effectively integrate community participation into strategies that mitigate urban heat stress in informal settlements. Through insights into the specific challenges and potential opportunities for these communities, this study aims to inform sustainable and resilient approaches to urban planning and environmental justice.

2

LITERATURE REVIEW

This chapter highlights the critical role of community involvement in urban adaptation projects, emphasising the importance of collaborative governance as a theoretical lens to address the challenges of adapting to climate change, especially in the context of Urban Heat Island (UHI). The review begins by examining the conceptual and theoretical foundations of collaborative governance and collaborative planning, before moving on to discuss how these frameworks have been applied in climate adaptation contexts. The chapter then discusses the disproportionate vulnerability of informal settlements to UHI impacts, especially in Jakarta, Indonesia. A conceptual and theoretical framework is presented to structure the study's inquiry and guide its methodology for the subsequent chapter. Finally, knowledge gaps are identified to position this research within existing literature and explain its contribution.

2.1 COLLABORATIVE GOVERNANCE

Governance in contemporary urban settings increasingly emphasizes participatory, multi-actor arrangements. In this modern society, inclusivity and a new form of governance that collaboratively work together with various stakeholders have started to emerge and give new dynamics to the traditional and managerial modes of policy-making and implementation. Collaboration itself is the primary aspect of the government system. Collaborative governance, as it has been acknowledged, is a system that brings public and private stakeholders together in collective forums with public agencies to engage in consensus-oriented decision-making (Ansell & Gash, 2008). In the virtuous cycle and collaboration, the development of face-to-face dialogue, building trust and commitment, and shared understanding has made the forums start to have "small wins" over the growing togetherness, trust, and also interdependence. This interdependence relationship needs to be seen through an integrated collaborative governance framework.

Collaboration to adapt the urban heat might be formulated through various stakeholders. The collaboration might also shift decision-making power from solely the government to a multi-stakeholder approach (Noor et al., 2022). Through an inclusive process, a gap between the government bodies and the current communities might be addressed and discussed. As mentioned by Noor et al. (2002), the collaboration itself might also be a powerful tool in enhancing community participation and achieving collective goals (Figure 3), including the urban heat which happen in a big and wide area.

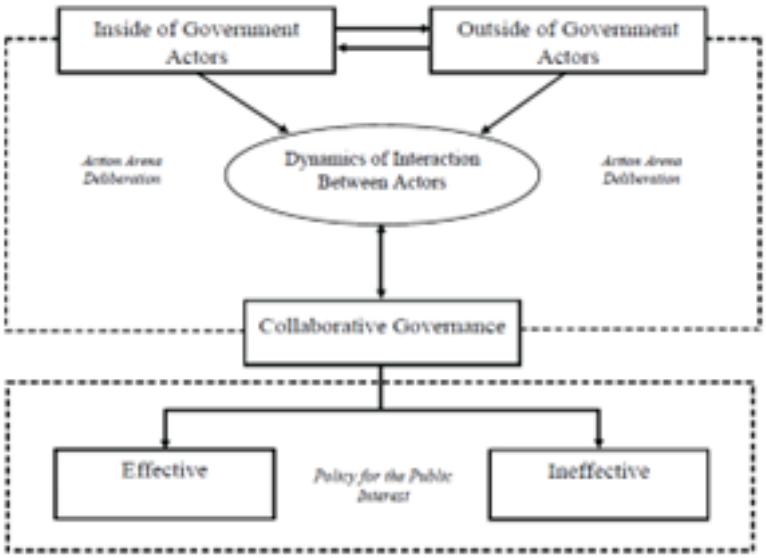


Figure 3. Collaborative governance framework by Noor et al. (2022)

Collaborative governance is a system in which many stakeholders collaborate in one situation to work on the same goal. An integrative lens is needed to develop a useful framework for collaborative governance, better understand, develop, and test the system's theory, and improve practice. The integrative framework from Emerson et al. (2012) as depicted in Figure 4, uses three dimensions that represent the general system context, the Collaborative Governance Regime (CGR), and its collaborative dynamics and actions.

In this framework, collaborative governance is equipped within a system context, a Collaborative Governance Regime (CGR), and also drivers, before addressing the collaboration dynamics that consist of three interactive components: principled engagement, shared motivation, and capacity for joint action. The result of CGR's action can lead to outcomes both within and external to the impacts and the potential adaptation both within the system context and the CGR itself. This framework is an integral system that can be used to examine or analyze an implemented project that is potentially developed in the future.

The General System Context in this framework represents the external conditions that can influence the collaborative process at any stage. These conditions might include economic changes, extreme weather, political events such as elections, or new regulations. Such factors may either create new opportunities or bring unexpected challenges. In this study, the General System Context focuses on the Urban Heat Island (UHI) phenomenon that affects informal settlements in Jakarta.

According to Emerson et al. (2012), the Drivers of Collaborative Governance Regime (CGR) include four key elements: leadership, consequential incentives, interdependence, and uncertainty. These four things are the essential Drivers because they help explain why collaboration starts and how it develops. Over time, the CGR is shaped by two major parts: the collaborative dynamics and collaborative actions.

While other scholars have described collaboration as a linear process, from identifying the problem to setting directions and taking action (Daniels & Walker, 2001; Gray, 1989; Sein & Chavex, 1995), Emerson et al. (2012) suggest a different view. They build on the ideas of Ansell and Gash (2008) and Thomson & Perry (2006), describing collaboration as a cycle that involves repeated interaction and learning. Their framework focuses on the three main parts of collaboration dynamics:

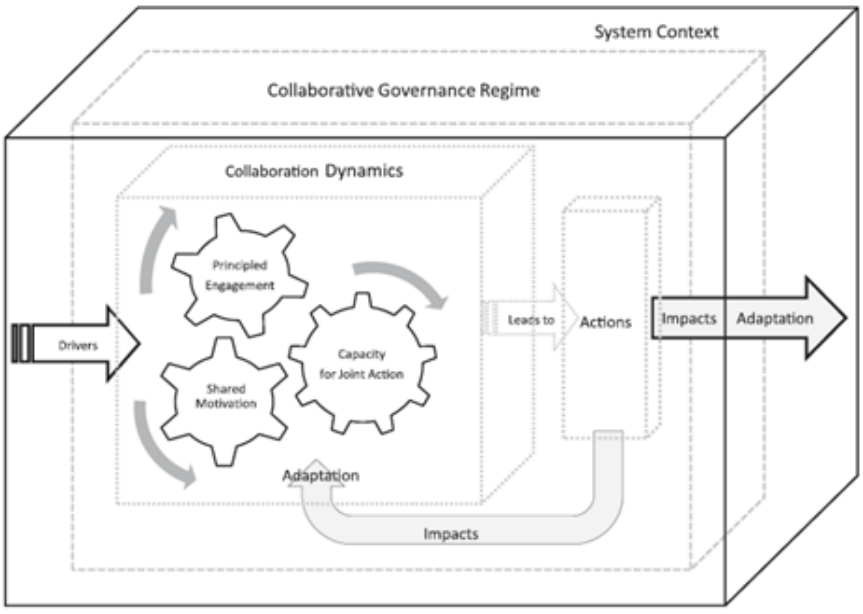


Figure 4. The Integrative Framework for Collaborative Governance (Emerson et al, 2012)

1. Principled Engagement

Principled Engagement refers to how stakeholders or actors take part in defining problems and finding shared goals. It can happen in many settings, such as face-to-face meetings, online discussions, or cross-organization networks. Emerson et al. (2012) describe this as a process shaped by the values, interests, and knowledge that each participant brings. It includes four stages:

- **Discovery**: The stage where participants bring forward their interests, values, and concerns. It involves identifying what matters to each party and what information is needed.
- **Definition**: This stage elaborates the reason for group work to create a common understanding of the issues and agrees on terms, concepts, goals, and how to assess options.
- **Deliberation**: This is the process of open and honest discussion, where people exchange ideas, ask questions, and resolve disagreements. It is essential for ensuring every voice is heard.
- **Determination**: The point where decisions are made, this includes both procedural choices (like how meetings are run) and major agreements on what actions to take.

These elements are not done in a strict order but repeat throughout the collaboration process to build shared purpose and trust.

2. Shared Motivation

This point is initiated by Principled Engagement, and in that sense, it is an intermediate outcome. The aspects of shared motivation includes four key aspects: Mutual Trust, Mutual Understanding, Internal Legitimacy, and Shared Commitment. These aspects help maintain collaboration and are sometimes referred to as part of social capital (Colman, 1998; Putnam, 2000). This motivation often starts with Principled Engagement and once it grows, it can also strengthen future engagement (Huxham & Vangen, 2005). The elaboration of all key aspects are:

- **Mutual Trust**: This grows when stakeholders show they are reliable, respectful, and willing to work together. Trust is essential for reducing fear or suspicion.
- **Mutual Understanding**: It means recognizing and respecting each other's viewpoints, even if there's disagreement. It helps people relate to one another and move forward with empathy.
- **Internal Legitimacy**: This refers to the feeling among group members that everyone involved is credible and that the process is fair. It strengthens the group's commitment to stay involved.
- **Shared Commitment**: When all actors feel responsible for the success of the collaboration, they become more willing to work beyond their own interests and commit to collective goals.

Together, these elements build the emotional and social bonds that keeps collaboration functioning.

3. Capacity for Joint Action

Collaboration should lead to actions that participants cannot achieve alone. Himmelman (1994) explains that collaboration means working together to build each other's capacity to reach the common goals. This capacity starts to form during engagement process and depends on the goals and structure of the group. It is also an important part of empowering the group to take action (Leach, 2006). The main aspects of Capacity for Joint Actions include:

- **Procedural/Institutional Arrangements**: The rules and structures that help manage the collaboration. This includes meeting formats, decision-making methods, and any agreements that guide how people work together.
- **Leadership**: Leaders support the process, help manage conflict, and keep the group focused. Leadership doesn't always come from one person, it can be shared or shift depending on the task.
- **Knowledge**: Information and expertise shared among participants. Collaboration requires open sharing and co-creation of knowledge to solve complex problems.
- **Resources**: This includes funding, time, technical skills, tools, and other support needed to take action. If resources are not shared fairly or are lacking, collaboration may fail to deliver results.

These four aspects support and turn good intentions into real progress.

In the next stage of the collaborative process, Action plays a key role. According to Emerson et al. (2012), an effective Collaborative Governance Regime (CGR) should lead to tangible actions that align with the group's shared goals or theory of action. These actions can include activities such as gaining stakeholder support, informing the public, developing or revising policies, mobilizing resources, assigning responsibilities, and implementing or monitoring projects. Emerson et al. also point out that collaborative actions are often treated separately from the collaborative process in academic literature, which makes it harder to understand their true value. To overcome this, they argue that collaborative actions are more likely to succeed when (1) the group agrees on a shared theory of action, and (2) there is sufficient capacity for joint action, built through earlier engagement and trust-building processes.

Following Action, Emerson et al.'s (2012) introduce Impacts in their framework. Impacts are described as real changes that happen on the ground, similar to what Innes and Booher (1999) refer to as "third-order effects." These impacts are the results of collaborative actions and can be either intended or unintended. They represent changes in the system context, altering existing or expected conditions that were previously seen as problematic or needing improvement. Impacts can appear in many forms, including physical, environmental, social, economic, or political outcomes. They may be short-term and specific or more general and long-term, depending on the goals and context of the collaborative process.

The framework also highlights the potential for Adaptation. Collaborative governance is often promoted for its ability to respond to complex and uncertain problems by encouraging flexibility and learning. Emerson et al. (2012) describe adaptation as the process by which the outcomes of collaboration lead to new insights, new challenges, or shifts in strategy that further reshape the system. This concept is also supported by the adaptive management perspective (Holling, 1978), which emphasizes learning and adjusting under conditions of uncertainty. However, Emerson et al. also note that while impacts are often monitored, the ability of institutions or CGRs themselves to adapt is rarely addressed. When collaboration fails to produce results, stakeholders may demand adjustments to the goals, strategy, or process. If these changes are not made, participation may decline. Fortunately, because CGRs are usually more flexible than traditional institutions, they are better suited to adapt when needed.

To conclude, Emerson et al. (2012) explain that changes can occur at different levels, within the system context, the structure of the Collaborative Governance Regime (CGR), or in the way collaboration is carried out. These adjustments are crucial to ensure that collaboration remains effective, flexible, and responsive, particularly as they are informed by the outcomes of previous actions. The dynamic process of collaboration aims to lead to concrete actions, which in turn lead to impacts, and these impacts foster new understanding; the framework supports continuous improvement. This aligns with the goals of this research, which aims to assess how collaborative efforts in informal settlements address climate-related challenges. It not only helps to assess how well collaboration works but also offers a way to link theory with practice, making it possible to adjust and improve the framework based on real-life situations.

2.1.1 COLLABORATIVE PLANNING

Following the explanation of Action or Collaborative Action by Emerson et al. (2012), Healey (1997) and Satterthwaite et al. (2020) explained that in the context of applying inclusive collaborative planning, this means that resilience-building efforts must not only involve governments, NGOs, and international agencies but also place residents at the center of planning and implementation processes. Furthermore, as explained by Healey (1997), the practice of applying inclusive and participatory governance is essential, making the decision-making processes that actively engage all stakeholders, particularly marginalized groups, ensuring that solutions are equitable and context-specific. Collaborative planning is essential for fostering trust, mutual understanding, and shared ownership of climate resilience strategies. The collaboration among these stakeholders must prioritize participatory planning and decision-making processes to ensure that the voices of informal settlement residents are central to resilience-building efforts. By gradually realising this inclusiveness, resilience strategies can address both immediate needs, such as improving infrastructure and disaster preparedness, and long-term goals, including climate-responsive urban planning (Satterthwaite et al., 2020). The collaborative planning stresses on the importance of breaking down institutional silos and fostering partnerships across different sectors and scales of governance (Healey, 1997).

Despite their vulnerability, the residents of informal settlements often demonstrate remarkable adaptive capacity, engaging in community-driven initiatives to address climate-related risks (Satterthwaite et al., 2020). In their research, these efforts alone are insufficient to build long-term resilience, as systemic inequities, resource limitations, and lack of institutional support constrain them. In the realm of informal settlement in a big capital city, adopting an integrated approach to collaborative planning ensures that resilience-building efforts are both effective and just, empowering communities to address the challenges of climate change with greater agency and collaboration. These efforts must be tailored to the specific needs and contexts of each region, especially in the context of developing informal settlements in Jakarta, Indonesia.

2.1.1 COLLABORATIVE PLANNING IN INFORMAL SETTLEMENTS IN JAKARTA

Following the idea of collaborative planning of Emerson et al. (2012), the collaborative planning concept in a country such as Indonesia has its own characteristics and approach. In order to make collaborative and inclusive governance, participation from civil society plays a significant role. Community participation has emerged as a strategic approach to implementing bottom-up solutions in the making of inclusive projects and policies. In the Global South, where government resources and capacities are often limited, non-government actors such as NGOs and community groups play a central role in governance and resilience-building efforts. As Abbott (1996) emphasizes, over the past 20 years, the role of NGOs in the Global South has become increasingly influential, often taking a more central role in community support than local governments. Unlike in the Global North, where governments tend to lead participatory initiatives, the Global South relies heavily on NGOs to bridge the gap between institutional policies and local needs. Abbott further highlights the contrasting organizational styles of local governments and communities, noting that community participation in local development is frequently supported by NGOs rather than government bodies. This action is also happening in Jakarta, where one of the NGOs there, RUJAK, has already made collaborative action with several informal settlement areas (kampung) societies to get together to face the impact of UHI in their living area (Figure 5).

Figure 5. The collaborative action conducted by Arkom and RCUS (Arkom & RCUS, 2024)

Healey (1997) frames collaborative planning as a process rooted in dialogue and mutual learning, where inclusive and context-sensitive decision-making is essential. In Indonesia, this concept has evolved to reflect local knowledge systems, informal governance structures, and political realities. A notable example is Kampung Susun Akuarium in Jakarta (Figure 6). As Sari et al. (2022) describe, this community-driven redevelopment emerged through an "insurgent" planning approach in which residents, NGOs, and professionals collectively resisted top-down eviction. Rather than accepting government-led relocation plans, the community co-produced a housing scheme that aligned with their social networks and economic needs. They explain the timeline of the case, which occurred after the 2017 Jakarta provincial election that brought in Governor Anies Baswedan, who introduced two new collaborative programs: the Community Action Plan (CAP) and the Collaborative Implementation Program (CIP). CAP aimed to involve residents in planning housing and settlement upgrades, while CIP was designed to translate the plans into action. In theory, these programs positioned residents as active participants in shaping their environments.

However, in practice, the CAP process revealed significant gaps. Sari et al. (2022) noted that while the government promoted collaboration, its procedures rarely involved residents meaningfully. This led the kampung working group and several supporting NGOs, including Jaringan Rakyat Miskin Kota (JRMK), Lembaga Bantuan Hukum Jakarta (LBH Jakarta), Rujak Center for Urban Studies (RCUS), and Urban Poor Consortium (UPC), to advance a final schematic design created during the CAP Preparation phase as the official output of the program. Sari et al. (2022) also describe that despite strong political support from the governor, the implementation struggled due to restrictive procurement regulations, short timelines, and limited flexibility in budget allocations.

Figure 6. Kampung Susun Akuarium, another prioritized kampung in Jakarta (Sari et al., 2022)

They emphasize that these institutional barriers prevented true co-production, as residents were often treated as passive beneficiaries rather than as equal actors, for example, the consultants, who are responsible for multiple project sites, had little time to engage with communities and often failed to consult residents directly. They argue that, despite the governor's explicit political will, the process fell short of true co-production, as residents continued to be viewed primarily as recipients rather than decision-makers in the planning process.

This case demonstrates that professional credentials and political statements alone are not enough to achieve participatory planning in practice (Sari et al., 2022). They add that barriers such as rigid administrative systems, power imbalances, and insufficient time for genuine engagement limit community involvement. In their study, they elaborate that even when collaboration is formally recognized, participation often remains superficial which come to realization of meaningful collaboration requires more than frameworks; it needs mechanisms that allow time for engagement, adaptable funding schemes, and a willingness to challenge dominant ideas about where planning knowledge comes from. As shown in the case of Kampung Susun Akuarium, residents and community architects played an active role as "insurgent planners," showing that grassroots knowledge and mobilization can reshape formal planning practices and outcomes (Sari et al., 2022).

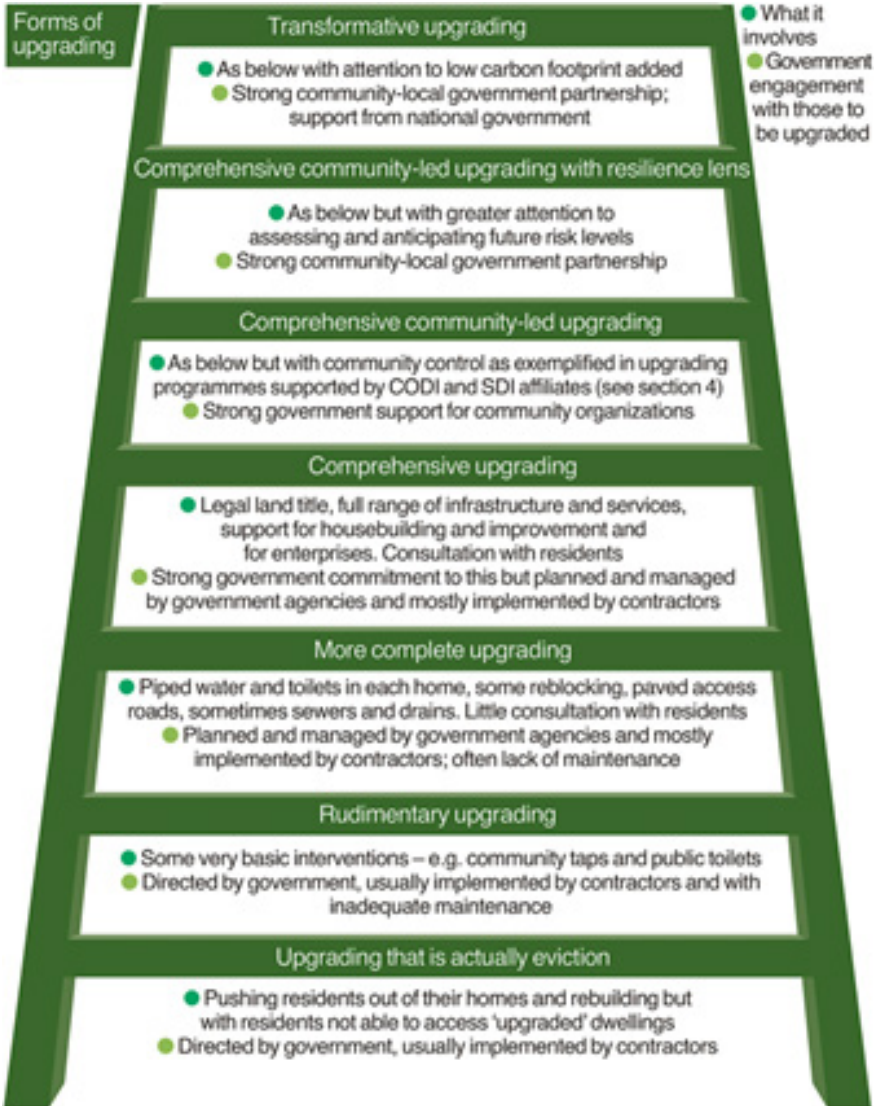


Figure 7. Ladder of Transformation for informal settlement upgrading (Satterthwaite et al., 2020)

The collaborative planning process in Kampung Akuarium reflects the model described in Satterthwaite et al.'s (2020) *Ladder of Transformation for Informal Settlement Upgrading* (Figure 7), where strong government commitment exists, yet the process remains largely controlled by government agencies. Over time, however, collaboration with community organizations begins to emerge. In the context of climate change adaptation, Satterthwaite et al. (2020) stress that local engagement is crucial for building resilience, especially in low-income and informal settlements. They argue that one of the most affordable and effective strategies for reducing climate-related risks is to support residents and community organizations to work alongside local governments through upgrading programs. These programs help address climate threats such as flooding, heat stress, water scarcity, and air pollution, which tend to affect informal settlements the most due to poor infrastructure and substandard housing conditions, such as overcrowding, lack of green space, and poorly ventilated metal roofs, which worsen heat exposure (Revi et al., 2014). Satterthwaite et al. (2020) also highlight that upgrading, when designed collaboratively, can be tailored to local needs and capacities, contributing to both climate adaptation and, in some cases, mitigation. As such, genuine collaborative planning should value community agency, not as a replacement for state responsibility but as a key component of more just and sustainable urban development. In Indonesia, this requires moving beyond symbolic participation and toward co-production, long-term collaboration, and shared decision-making in shaping inclusive urban futures.

2.2 CLIMATE CHANGE AND THE URBAN HEAT ISLAND PHENOMENON IN JAKARTA

2.2.1 CLIMATE CHANGE

Climate change is a global issue with profound and wide-ranging consequences. The scientific consensus attributes it primarily to human activities, especially the release of greenhouse gases. McCarthy et al. (2010) emphasize that climate change is no longer a distant concern but an urgent crisis, causing significant disruptions to ecosystems, economies, and societies worldwide. Rising global temperatures, driven by anthropogenic emissions, have led to more frequent and severe weather events, including heatwaves, wildfires, floods, and droughts. These extreme events disproportionately affect vulnerable regions and communities. Steele (2023) highlights that, despite international climate agreements, global emissions continue to rise, exacerbating the challenges of adaptation and mitigation. Urban areas, in particular, are at the forefront of climate change impacts due to their dense development and increasing land temperatures, which compound existing urban challenges (Solecki et al., 2013).

Urban areas, which generate over 90% of the global economy, house more than half of the world's population, and are responsible for 70% of global greenhouse gas emissions, play a central role in the climate change and sustainability narrative (Solecki et al., 2003). The process of urbanization has been recognized as both a driver of climate change and a critical area for implementing solutions. Urban areas typically experience higher temperatures than their rural counterparts due to factors such as building density, dark surfaces, and reduced vegetation (McCarthy et al., 2010). This phenomenon, known as the urban heat island (UHI) effect, is one of the most significant localized consequences of climate change in cities. The UHI effect exacerbates the impacts of heatwaves, leading to severe health issues, increased energy demand for cooling, and declining air quality. Research by McCarthy et al. (2010) also highlights that warming and extreme heat events caused by urbanization and energy consumption can rival the impacts of doubled CO2 levels in some regions. This underscores the dual threat faced by urban areas: global climate change and localized urban development patterns. As cities expand, UHI effects intensify, further compounding the challenges posed by climate change. Steele (2023) notes that these localized temperature increases not only cause discomfort but also worsen public health outcomes, especially for marginalized urban populations.

The effects of climate change are not evenly distributed. Marginalized communities often bear the brunt of its impacts due to limited resources and adaptive capacities. Ziska et al. (2003) point out that underprivileged populations, particularly in urban and low-income settings, face heightened exposure to climate stressors. Poor infrastructure and limited access to cooling mechanisms make these communities especially vulnerable to extreme heat, rising sea levels, and flooding. In urban areas, elevated CO2 concentrations and higher temperatures also exacerbate public health issues, such as increased pollen production in plants like ragweed, which is a significant allergen. Firman et al. (2011) further underscore the challenges faced by urban communities in developing countries, where rapid urbanization compounds vulnerabilities, leaving these populations disproportionately exposed to climate risks. These challenges are particularly concerning for underprivileged communities, who often lack the resources necessary to adapt or cope with the impacts of climate change.

Addressing these localized temperature increases in urban areas requires innovative and inclusive approaches. Steele et al. (2023) emphasize the importance of tackling the issue of "hot cities" through a transdisciplinary lens, recognizing that climate change is a multifaceted problem requiring diverse expertise and collaboration. They advocate for community-based planning and design strategies that prioritize the needs of vulnerable populations. Such approaches integrate social and ecological dimensions of urban heat and promote creative, ethical solutions to mitigate its effects. Steele et al. (2023) further argue that the urban heat island effect amplifies the impacts of global warming in cities, making it one of the most pressing concerns for urban areas and their inhabitants.

2.2.2 THE URBAN HEAT ISLAND PHENOMENON IN JAKARTA

Jakarta, Indonesia's rapidly growing capital, has witnessed a dramatic intensification of the Urban Heat Island (UHI) phenomenon over the past few decades. According to a study by Putra et al. (2021), Jakarta, spanning 662 km^2 with a population of 12 million, already showed UHI zones with land surface temperatures exceeding 30°C over 84.53 km^2 as early as 1989. The UHI trend has continued to grow, as shown in land surface temperature data between 2008 and 2018 (Figure 8). Over the last century, Jakarta's dense built environment has absorbed and retained more heat, leading to local temperature increases of up to 2.5°C compared to surrounding rural areas (Lestari et al., 2015). High-rise buildings, concrete surfaces, and vehicle emissions exacerbate heat retention and restrict natural cooling processes (Manik & Syaukat, 2015).

A major contributor to Jakarta's UHI problem is the city's rapid urbanization and unplanned land-use changes. As vegetation and water bodies are replaced by concrete infrastructure, the city loses its capacity to regulate heat. Firman et al. (2011) emphasize that this is especially critical in informal settlements, where unregulated development leads to overcrowded, poorly ventilated environments with minimal greenery. These settlements are often located near industrial zones or major roads, intensifying exposure to heat and air pollution.

The UHI effect, where urban areas experience higher temperatures than their rural surroundings, is driven by a combination of climate change, economic development, and local urban conditions (Sharma et al., 2018; Filho et al., 2021; Tyagi et al., 2021). Impervious surfaces like asphalt and concrete, combined with waste heat from vehicles and industry, and limited air circulation due to dense construction, all contribute to increased heat absorption and slow nighttime cooling (Akbari et al., 2015; Oke, 1982). This intensifies energy demand, worsens public health, and increases the risk of heat-related illnesses, especially in high-density areas with limited cooling access (Filho et al., 2021; Tyagi et al., 2021). Figure 9 by Ellipse (2023) further illustrates the simplified mechanics of the UHI effect.

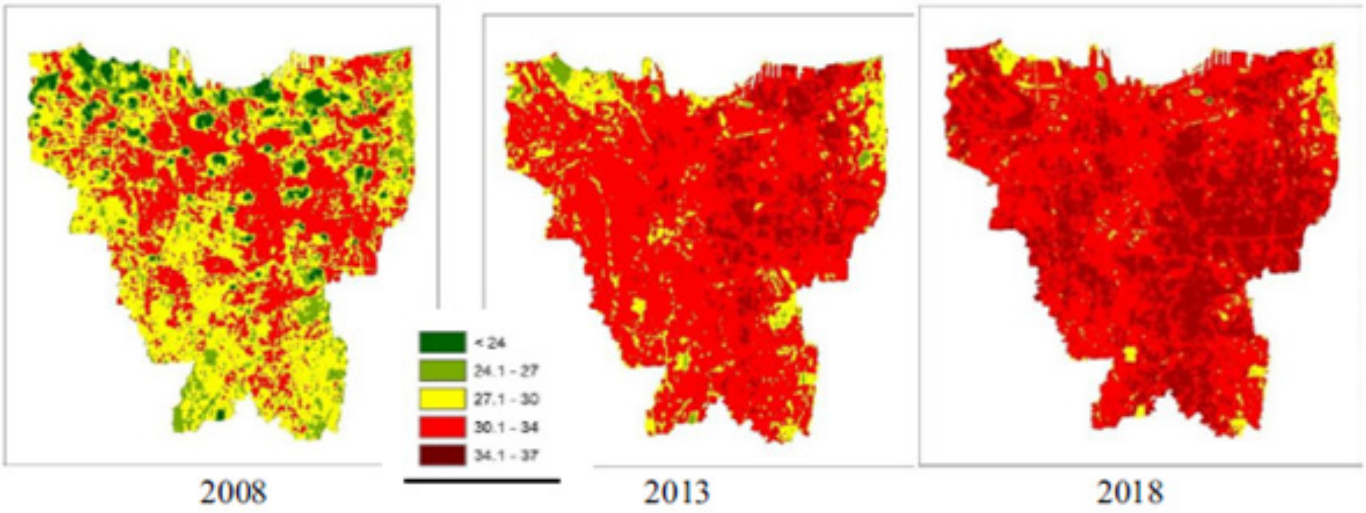


Figure 8. Jakarta's land surface temperature (Source: Central Bureau Statistics, 2009; 2014; 2019; Putra et al, 2021)

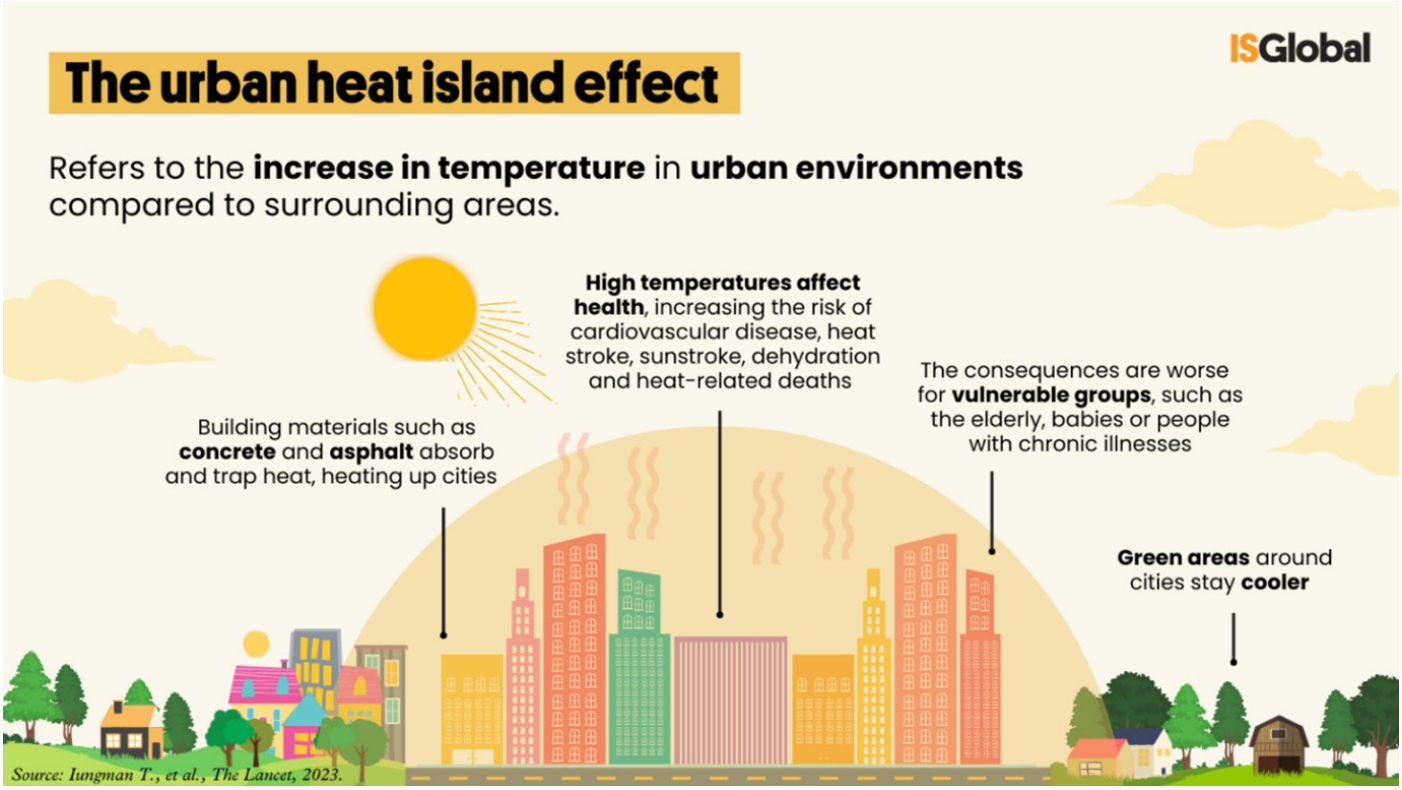


Figure 9. Urban Heat Island (UHI) in a graphic (Source: Ellipse, 2023)

While the UHI effect is a global phenomenon, it is likely to have a disproportionate impact on cities in the Global South, where temperatures are already high and resources to adapt are limited (Giridharan & Emmanuel, 2018). For example, in tropical cities, UHIs are strongest during the pre-monsoon and monsoon nights, which can impact the cooling potential of plants (Giridharan & Emmanuel, 2018). This highlights the need for context-specific UHI mitigation and adaptation strategies that take into account the unique challenges faced by cities in different parts of the world (Filho et al, 2021). The Global South area becomes particularly vulnerable to the UHI effect due to a combination of socio-economic and infrastructural challenges such as:

1. Health Risks
The increased temperatures due to UHI worsen public health outcomes, especially in informal settlements where cooling infrastructure is scarce (Steele, 2023). The bad environmental conditions may lead to heat-related illnesses, such as heatstroke and cardiovascular stress, disproportionately affect marginalized populations (Ziska et al., 2003).

2. Economic Strain
Higher energy demands for cooling strain already limited resources and infrastructure (Firman et al., 2011). Therefore. informal economies, often reliant on outdoor labor, are disrupted by extreme heat, reducing productivity and livelihoods.

3. Environmental Degradation
The poorly planned urban growth leads to increased deforestation and pollution, amplifying local and global climate impacts (Solecki et al., 2013). This could bring to the UHI effect where it also worsens air quality due to increased ground-level ozone production in warmer temperatures.

4. Exacerbation of Inequities
Marginalized communities are more exposed to the effects of UHI due to their concentration in poorly ventilated, overcrowded areas with inadequate access to cooling or healthcare services (Firman et al., 2011). The lack of green spaces and cooling infrastructure in informal settlements intensifies vulnerability, further deepening inequalities (Steele, 2023).

Basu and Das (2004) emphasize that, over the past few years, various studies have explored how people experience and respond to heat stress, particularly in urban environments. These studies highlight the importance of combining both environmental and human factors to understand thermal discomfort and related risks. From their review, three major areas were consistently used to assess human thermal comfort: health, socio-economic, and environmental and building conditions. Their findings emphasize the importance of adopting a transdisciplinary approach, which combines insights from various fields, to better understand the causes and effects of heat-related discomfort.

This comprehensive view not only helps clarify research findings but also provides valuable input for policymakers and urban planners in designing more effective responses to urban heat challenges. The explanation on the main three factors are explained through another literature reviews:

1. Health Impacts

Health Impacts are one of the most direct and critical consequences of rising urban temperatures, especially in informal settlements. Prolonged exposure to heat can increase the risk of respiratory problems, heatstroke, dehydration, and other heat-related illnesses (Arifwidodo et al., 2019). In many cases, extreme heat reduces people's physical activity during the day and limits their willingness to travel, especially for vulnerable groups such as the elderly, children, or outdoor workers. In addition, sleep quality is often affected during hot nights, as poor ventilation and overcrowding in informal housing make it difficult for residents to cool down. These health effects contribute to long-term stress and may reduce the overall well-being and productivity of affected communities.

2. Socio-Economic Impacts

Socio-Economic Impacts are also significant, particularly in low-income urban areas where adaptive options are limited. One key indicator is the increased reliance on air conditioning to reduce indoor heat. However, many households either cannot afford to purchase air conditioning units or are burdened by the higher electricity bills they generate (Arifwidodo et al., 2019). The number and frequency of using AC units reflect the practical coping strategies of residents, as well as the inequalities in access to cooling technologies. These added costs place further strain on already tight household budgets, limiting the ability of families to meet other basic needs, especially during prolonged heat periods.

3. Building and Environment Condition Impacts

Building and Environmental Condition Impacts also play a crucial role in shaping how heat is experienced at the neighborhood level. Poor ventilation, limited air circulation, and the lack of basic cooling features, such as shaded spaces, green areas, or reflective roofing materials, can worsen indoor and outdoor temperatures (Mahadevia, 2004; Salsabila et al., 2023). For example, homes without adequate roof insulation or openings for cross-ventilation can trap heat, making living conditions uncomfortable or even dangerous. At the same time, street layouts and built density influence airflow and surface temperature, with narrow alleys, minimal greenery, and paved surfaces contributing to heat retention. These physical conditions highlight the importance of improving spatial design and building quality in informal settlements to support climate resilience.

Addressing the UHI problem in the Global South, therefore, requires strategies that consider these three domains together. This includes promoting nature-based solutions such as urban trees and green roofs, encouraging inclusive urban design that protects the most vulnerable, and strengthening collaboration among local governments, NGOs, and community groups. In rapidly growing cities, especially those with large informal populations, combining health, economic, and environmental perspectives is essential to ensure equitable and sustainable responses to climate change.

2.2.3 INFORMAL SETTLEMENTS IN JAKARTA ADAPTING TO THE URBAN HEAT ISLAND (UHI) EFFECTS

In light of Jakarta's environmental conditions, rising temperatures, and the intensifying Urban Heat Island (UHI) effect, the city's landscape is contributing to declining quality of life, particularly for residents in low-income neighbourhoods. These informal settlement areas are a common feature in the Global South, where people with limited financial means seek affordable accommodation close to city centers to access employment opportunities (Bredernoord, 2015). Jakarta, one of Indonesia's largest cities, also has many such neighborhoods, inhabited by individuals from various regions of the country who move to the capital in search of better economic prospects (Nurdiani, 2015).

The UHI phenomenon disproportionately affects Jakarta's vulnerable communities, particularly those living in informal settlements. These areas, home to low-income populations, are characterized by substandard housing, limited infrastructure, and inadequate access to cooling systems (Steele, 2023). Residents in these neighborhoods face heightened exposure to extreme heat, leading to severe health outcomes such as heatstroke, cardiovascular issues, and respiratory problems. Ziska et al. (2003) highlight that elevated CO2 levels and increased temperatures exacerbate the prevalence of allergens, further burdening public health in these densely populated areas.

Economic challenges also compound the impact of UHI on vulnerable populations. Firman et al. (2011) note that many informal settlement residents rely on outdoor labor for their livelihoods, making them more susceptible to productivity losses and health risks during heatwaves. Additionally, the increased energy demands for cooling in urban areas strain limited resources, further marginalizing communities with limited access to electricity and affordable cooling technologies (Putra et al., 2021). The cumulative effect of these challenges deepens existing inequities, as wealthier areas are better equipped with green infrastructure and cooling systems, while marginalized communities bear the brunt of urban heat.

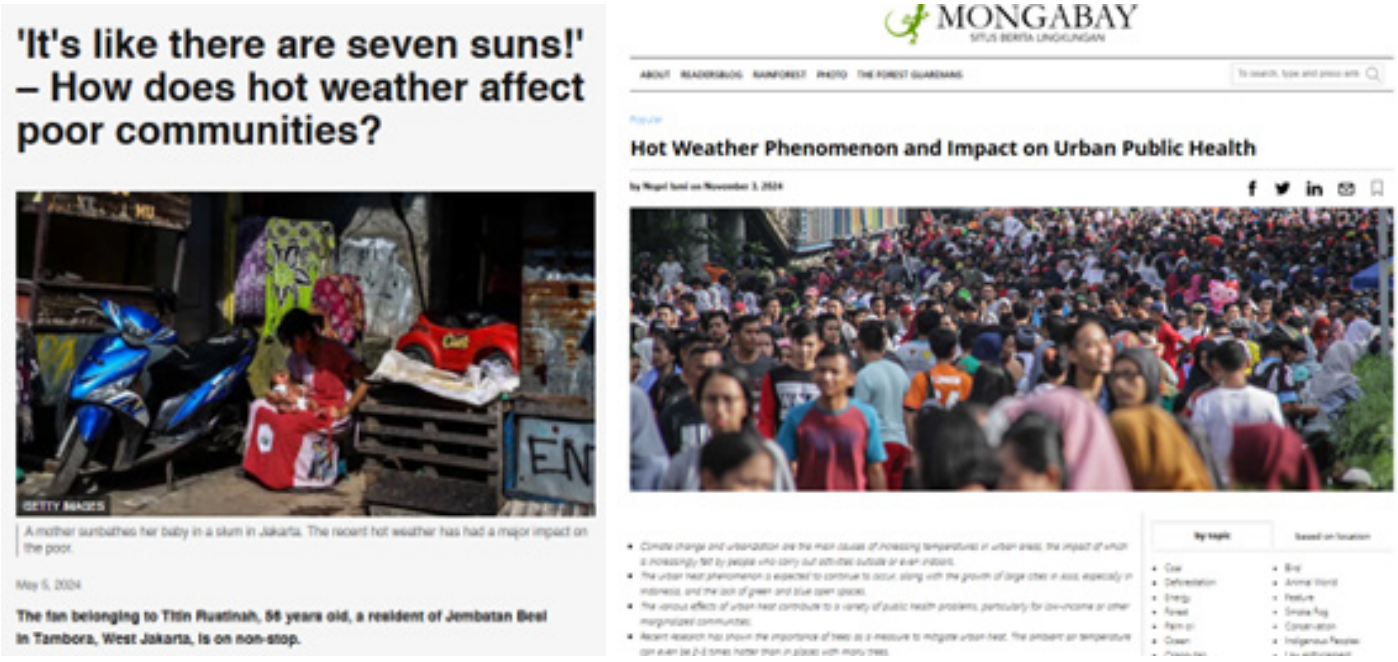


Figure 10. The news and article from BBC News Indonesia (2024) and Mongabay (2024) about the struggle from the low-income communities facing the urban heat island (UHI)

As reported by BBC News Indonesia (2024) (Figure 10), many low-income communities living in densely populated informal settlements are struggling to cope with the recent warming weather. The impact of this temperature change is felt in an aspect that is closely related to many people: the electricity bills. The weight on the electricity bills affects their economic situation, which is crucial to their living situations. The struggling conditions from the low-income communities is supported by an article from Mongabay (2024) (Figure 10) of how the various effect of urban heat contribute to a variety of public health problems, particular for the low-income or other marginalized communities. The data is supported by RUJAK (2024) as can be seen in Figure 11, the number of low-income housing community that affected by climate change has been rising significantly.

The worsening UHI effects in Jakarta underscore the need for targeted interventions that prioritize vulnerable communities. Steele et al. (2023) argue for community-based urban planning approaches that integrate green infrastructure, enhance access to cooling technologies, and promote equitable resource distribution. Low-income communities in Jakarta's informal settlements face significant challenges in coping with the Urban Heat Island (UHI) phenomenon, worsens the difficult living conditions in these densely populated areas. Residents in these settlements often rely on communal efforts and shared spaces to mitigate the effects of extreme heat (Salsabila et al., 2023). In their study, they highlighted how cooling practices, such as creating shaded areas, using shared water resources, or designing semi-open communal spaces, are integral not only to reducing heat exposure but also to fostering social relationships within these communities. However, these practices are constrained by limited resources, poor infrastructure, and lack of governmental support, leaving residents vulnerable to the health and economic impacts of heat stress. This study adds about the real conditions of these communal practices are not merely adaptive strategies but also represent a form of social resilience, as they enable communities to address a shared environmental challenge collectively.

Without external support or broader structural changes, the capacity of the low-income communities to withstand intensifying UHI effects remains precarious, underscoring the need for inclusive planning, collaboration, and support from the government that prioritizes the needs of low-income populations. Collaborative governance involving local authorities, NGOs, and community groups is essential to addressing these disparities and building climate resilience in Jakarta's most affected neighbourhoods.

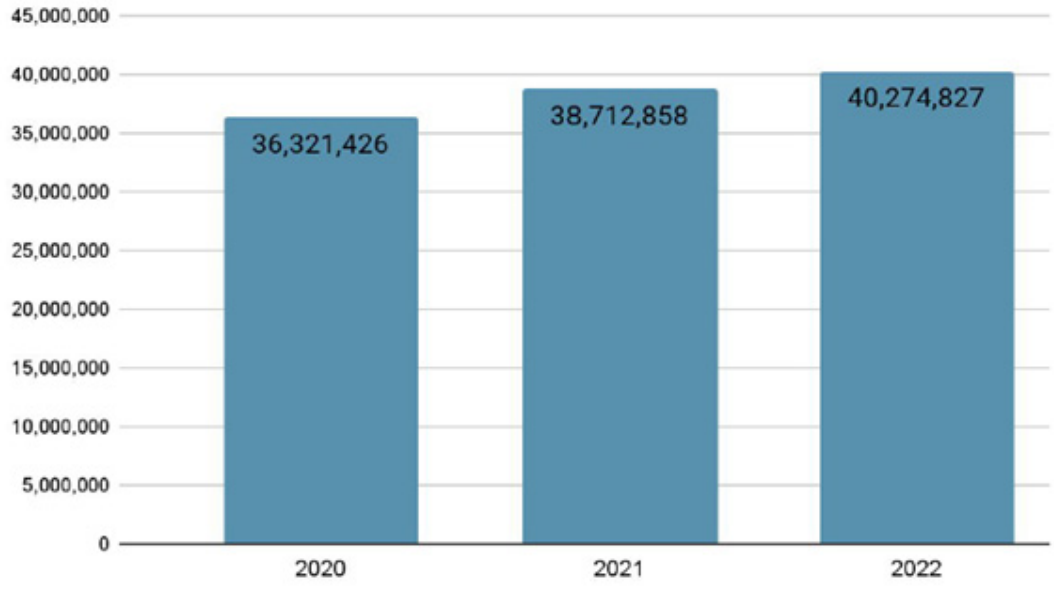


Figure 11. The number of low-income community in indonesia that affected by climate change (Source: RUJAK, 2024)

2.3 THEORETICAL FRAMEWORK

As this research topic focusing on how collaborations may present opportunities and challenges to make the community-driven solutions on urban heat stress in Indonesia, the main topic will be focusing on the Collaborative Governance Regime (CGR) framework and the context of the research as can be seen in Figure 12.

This research applies a focused version of Emerson et al.'s Collaborative Governance Regime (CGR) framework (Emerson et al., 2012) to examine how collaborative dynamics, specifically Principled Engagement, Shared Motivation, and Capacity for Joint Action, which can support effective responses to the Urban Heat Island (UHI) impacts in informal settlements. Rather than applying the full framework in its entirety, the study selectively adapts its components to fit the research context, which centers on the role of stakeholder collaboration in climate adaptation efforts at the local scale. The aim is to understand how institutional interactions influence project implementation and outcomes within the constraints and dynamics typical of Jakarta's informal settlements. The detailed indicators for every collaboration dynamics variable that will be conducted for the research are described in the next page.

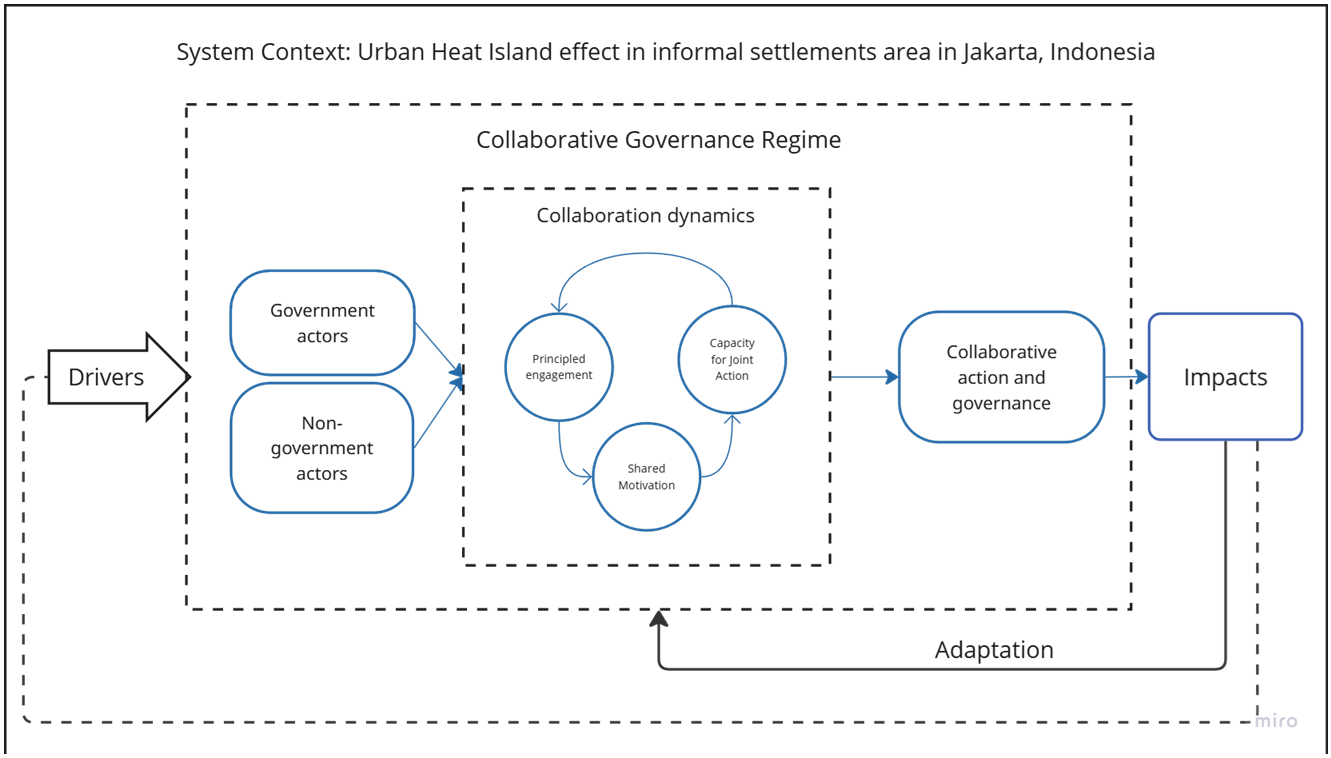


Figure 12. The theoretical framework that will be delved into more on this thesis research (Own work, adapted from Noor et al. (2023) and Emerson et al (2012))

1. Principled Engagement

The original CGR framework defines Principled Engagement through four key processes: Discovery, Definition, Deliberation, and Determination. However, this study emphasizes only Definition and Determination, as these aspects are more closely aligned with the research focus on how stakeholders or actors interpret and negotiate project goals during the implementation of UHI adaptation measures. Unlike Discovery and Deliberation, which often occur earlier in the process or in higher-level planning forums, the selected aspects are more observable within community-level engagement and reflect the concrete steps where project goals are shaped and translated into collective decisions. By narrowing the focus, the research is able to investigate how key actors conceptualize shared objectives (Definition) and make collaborative decisions (Determination), which are particularly relevant for evaluating adaptive strategies in settings where time, resources, and institutional continuity are limited.

2. Shared Motivation

The CGR framework outlines Shared Motivation as including Mutual Trust, Mutual Understanding, Internal Legitimacy, and Shared Commitment. This research refines and combines these into three key dimensions: Willingness to Cooperate, Mutual Trust, and Shared Vision. This adjustment was made to better reflect how motivation is expressed in grassroots or localized collaborations, where formal legitimacy may be less visible, but informal alignment and interpersonal trust play a stronger role.

- **Willingness to Cooperate**: It captures the general readiness of actors to engage and stay involved despite limited incentives.
- **Mutual Trust**: It reflects the quality of social relationships that reduce uncertainty and encourage joint risk-taking.
- **Shared Vision**: It emphasizes a common sense of direction and purpose, which is often necessary to maintain motivation over time, especially in informal and evolving settings.

These adapted indicators align with the everyday expressions of commitment and alignment found in the field, making the framework more responsive to the study context.

3. Capacity for Joint Action

In contrast to the selective approach taken with the previous dimensions, this study includes all four indicators under Capacity for Joint Action: Procedural/Institutional Arrangements, Leadership, Knowledge, and Resources. This is because capacity is considered both a product of the earlier two dynamics and a critical enabler of concrete outcomes. As Emerson et al. (2012) emphasized, the development of joint capacity not only reflects successful engagement and motivation but also enhances future collaboration by making collective action more feasible and sustainable Furthermore, informal settlements often face constraints in all four areas. Investigating them together allows for a more complete understanding of how capacity is built, or limited, through collaborative efforts and how this influences adaptation outcomes in practice.

While to asses the impacts of the before and after the collaborative actions, this research draws from existing literature to operationalize the Urban Heat Island (UHI) impacts in the context of informal settlements in Jakarta:

1. Health Impacts

The components of Health Impacts are xxx (Arifwidodo et al., 2019). From this concept, the research is investigating the Health Impacts on the participants before and after the project in the focus of four indicators: Heat-Related Illness; such as respiratory disease; Less Activity during the Hot Period, Less Daily Travel, and Sleep Deprivation.

2. Socio-Economic Impacts

The components of Socio-Economic Impacts are xxx (Arifwidodo et al., 2019). In this concept, the research focuses on the social and economic impact of Frequency of Ssing Air Conditioner (AC) Unit in the House, Number of Air Conditioner (AC) Unit Owned in the House, and Increased Electricity Bill.

3. Building and Environment Condition Impacts

The components of Building and Environment Condition Impacts have a broad focus as seen on how the environment is impacted on a specific context. However, as the research is focusing in the informal settlement area in Jakarta, Indonesia, a more focused indicators are selected based on the literature analysis from Mahadevia (2004) and Salsabila et al. (2023). There are four indicators to be seen in this concepts, which are Air Circulation of the House, Cool Roofs, Shading Structure of the House, and Street Characteristics

The variable of UHI impacts that can affect the informal settlements, the variables of the collaboration dynamics to be investigated in the study case is detailed further in Appendix 1.

2.4 KNOWLEDGE GAPS

There is a noticeable gap in the development and implementation of actions or policies targeting the Urban Heat Island (UHI) effect, particularly those that directly address the needs of underprivileged communities. While UHI mitigation strategies, such as increasing urban greenery, enhancing building materials, and introducing cooling technologies, have gained attention in urban planning, they often remain inaccessible to low-income households. This disparity arises due to limited government interventions tailored to these communities, which are disproportionately affected by UHI due to inadequate housing, high-density living conditions, and lack of resources to adapt to climate stress. Moreover, existing policies frequently focus on citywide solutions without integrating localized approaches that consider the specific socio-economic and environmental challenges underprivileged neighbourhoods face. Addressing this gap requires understanding the technical aspects of UHI mitigation and exploring collaborative frameworks that empower communities and promote equitable access to cooling solutions.

3

RESEARCH METHOD

After the discussion in the literature review, the following strategies will give a more detail information on how the research has been conducted to investigate the process of collaborative planning and governance for adapting UHI effect in the informal settlements area in Jakarta, Indonesia. This chapter will unpack the research strategy, research design, data collection and analysis, data plan, the operationalisation table, research timeline, ethical considerations, and limitation of the research.

3.1 RESEARCH STRATEGY

This thesis was conducted through a qualitative approach, employing a case study strategy to explore the collaborative governance for Urban Heat Island (UHI) adaptation in informal settlements in Jakarta. This method is chosen as it focuses on understanding complex social phenomena, particularly the dynamics of collaborative governance, the lived experiences of communities in informal settlements, and the multifaceted impacts of the Urban Heat Island (UHI) phenomenon. A qualitative approach allows for an in-depth exploration of contextual factors, stakeholder perspectives, and processes that cannot be fully captured through quantitative methods. It provides the flexibility to analyze subjective experiences, institutional frameworks, and policy implications, which are central to addressing the research questions.

The case study strategy was selected for its ability to investigate contemporary phenomena within real-life contexts, making it valuable for examining the complex relationships central to this research (Irani et al., 1999). Case study also supports the use of various research methods, both qualitative and quantitative, and can follow positivist or interpretivist epistemological approaches (Irani et al., 1999). In line with the research objective of proposing alternative ways to enhance collaborative governance for UHI adaptation, the selected case study focus on a completed project with demonstrable outcomes. To identify a suitable case, the researcher collaborates with the RUJAK Center for Urban Studies (RCUS), an NGO in Jakarta, which has undertaken several collaborative projects with kampungs aimed at mitigating UHI effects.

Following the typology of case study approaches proposed by Blatter & Blume (2008), this research employs the causal process tracing (CPT) approach. CPT focuses on investigating causal mechanisms within a single case, enabling the study to trace the sequence of events, interactions, and processes that connect government agencies, private parties, and communities in addressing UHI challenges. This approach provides a systematic method for exploring how actions and decisions by key actors contribute to observed outcomes, delivering nuanced insights into the governance processes at play.
The selection criteria for the case study were based on socio-economic, health, environmental, stakeholder involvement, and geographical location aspects, ensuring a holistic investigation of the finished project (Basu & Das, 2024). These criteria helped capture the diversity of stakeholder perspectives and assess the project's impact across various governance and community involvement levels. This comprehensive approach ensured that the findings can inform future strategies for fostering collaborative governance in UHI adaptation efforts.

3.2 RESEARCH DESIGN

This study began with an empirical issue observed globally, necessitating an initial understanding of the topic through a deductive logic rooted in a literature review. This phase established the foundational concepts and identified gaps in existing knowledge. As the research progressed, specific observations from the case study were used to answer the research questions, identify patterns, and generate broader insights into collaborative governance practices. This marked a transition to inductive logic, where findings from the case studies inform broader generalizations and theoretical contributions.

To align with this iterative approach, the research adopts the Double Diamond Framework (Design Council, 2019) (Figure 13). This framework effectively represents the process of expanding knowledge through exploratory phases and converging on refined insights. The iterative process involves exploring broad ideas and concepts through literature studies, delving into specific case studies to gather detailed, contextual insights, and refining the findings from case studies through a return to the literature to validate and contextualize results.

This dynamic interplay between deduction and induction ensured a robust methodological approach, enabling the study to address complex research questions while remaining grounded in empirical evidence and theoretical frameworks. Therefore, the application of Double Diamond Framework (DDF) on this research was applied as shown in Figure 14.

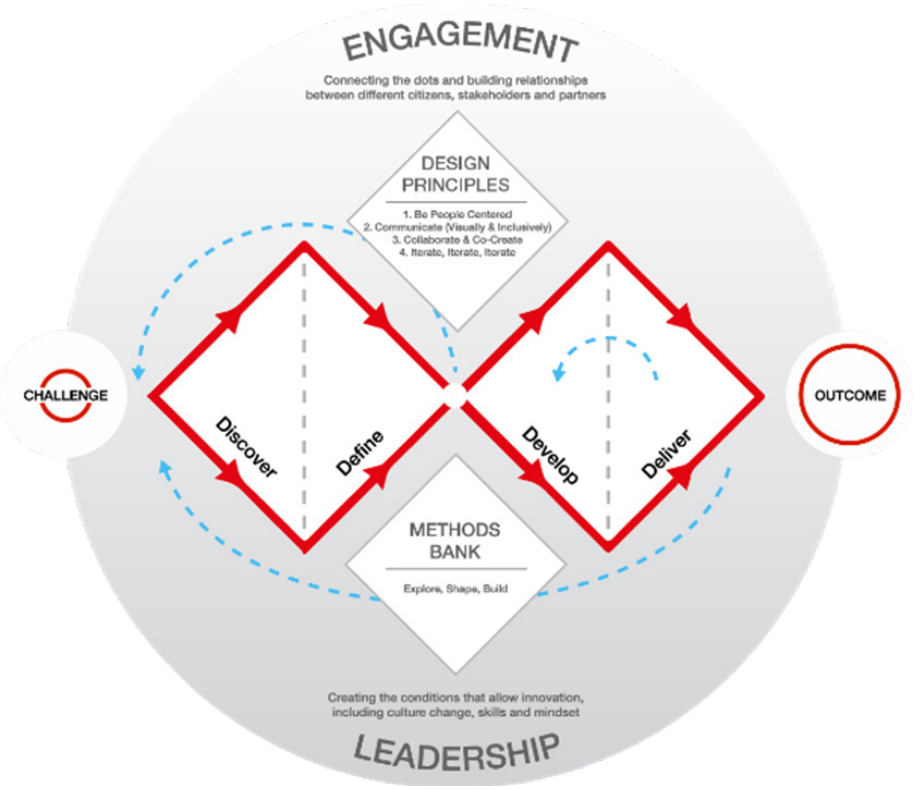


Figure 13. Double Diamond Framework (DDF) (Design Council, 2019)

A clear framework is essential to effectively implement the qualitative research strategy, guiding researchers in defining their research design and structure (Blaikie and Priest, 2019). The realities of a case study are often socially constructed and shaped by the interactions and perspectives of stakeholders, making it vital to adopt a constructivist ontology. This research examines urban heat island (UHI) adaptation and governance through this lens, emphasizing the socially constructed nature of governance challenges and solutions.

This ontological approach was complemented by an interpretivist epistemology, which prioritizes understanding stakeholders' subjective meanings and lived experiences. By focusing on qualitative methods, such as semi-structured interviews, this research aimed to uncover nuanced perspectives often overlooked in quantitative approaches. Furthermore, the study operates within the interpretive paradigm, which valued participatory and context-sensitive methodologies. This paradigm facilitated an in-depth exploration of how collaborative governance frameworks could address UHI challenges in a socially inclusive manner.

The relationship between the Double Diamond Framework (DDF) and the logic of inquiry in this research was detailed in Table 1 below. Each phase of the DDF aligned with the inductive and deductive reasoning processes necessary for exploring and addressing UHI governance in Jakarta's informal settlements.

Table 1. Double Diamond Framework (DDF) description
(Own work, adapted from Design Council, 2019)

Section	Definition	Characteristics	Logic of Inquiry
Discover	Focused on exploring and understanding the problem through literature review	Entailed collecting data to uncover the underlying challenges of UHI adaptation	Inductive
Define	Analyzed and synthesized in-sights from the Discover phase to articulate a clear research framework and problem statement	Organized and interpreted the gathered information. Helped frame the governance gaps and research objectives, guiding subsequent phases	Inductive
Develop	Explored potential solutions and strategies by gathering primary data through qualita-tive methods like question-naires and interviews	Focused on tracing causal mechanisms in the case study and testing hypotheses. Investigate stakeholder actions and collaborative dynamics	Deductive
Deliver	Tested and validated proposed solutions, formulating actionable recommendations to address UHI governance challenges	Refined solutions from the Develop phase. Evaluated their practical applicability, focusing on scalability and inclusivity in collaborative governance frameworks	Inductive/ Deductive

The Double Diamond Framework, as applied in this research, facilitated a systematic and iterative process that aligns with the interpretivist epistemology and constructivist ontology underpinning the study. Each phase contributed to building a nuanced understanding of governance processes and provides a structured pathway for addressing the complex challenges associated with UHI adaptation in Jakarta's informal settlements. By operationalized this framework, the following sub-chapter delved into the methods of data collection and analysis, detailing how qualitative approaches were employed to explore the research questions.

3.2 DATA COLLECTION AND ANALYSIS

The data was collected through a qualitative research method through a Double Diamond Framework (DDF). Following DDF, the research will be conducted through four key stages:

3.3.1 DISCOVER PHASE: LITERATURE STUDY

The first stage, the Discover phase, focused on exploring and understanding the problem through a comprehensive literature study. This involved reviewing academic and gray literature on climate change, the urban heat island (UHI) phenomenon, informal settlements, and collaborative governance, with an emphasis on the Global South and Indonesia. By gathering insights from peer-reviewed articles, reports, and publications, this phase aimed to uncover the underlying challenges and contextualize UHI adaptation within existing theoretical frameworks. This stage identified knowledge gaps, which were essential for shaping the research objectives and subsequent stages. To ensure relevance, the literature study prioritized credible sources published within the last 10–15 years, excluding outdated or irrelevant materials. The Discover phase aligned with the inductive logic of inquiry, as it laid the groundwork for identifying patterns and forming research questions.

3.3.2 DEFINE PHASE: POLICY AND CASE STUDY ANALYSIS

In the Define phase, insights from the Discover phase were synthesized to articulate a clear research framework and problem statement. This involved analyzing urban and climate policies at the local and national levels, focusing on their alignment with the needs of vulnerable communities and their capacity to address UHI challenges. A key component of this stage was the case study analysis of a project by the RUJAK Center for Urban Studies (RCUS). By examining project documentation and governance frameworks, this phase evaluated existing collaborative efforts to understand their strengths and limitations. The Define phase relied on inductive reasoning to refine research objectives, frame governance gaps, and ensured the study addresses context-specific challenges in informal settlements.

POLICY ANALYSIS

In the Define phase, insights from the Discover phase were synthesized to articulate a clear research framework and problem statement. This involved analyzing urban and climate policies at the local and national levels, focusing on their alignment with the needs of vulnerable communities and their capacity to address UHI challenges. A key component of this stage was the case study analysis of a project by the RUJAK Center for Urban Studies (RCUS). By examining project documentation and governance frameworks, this phase evaluated existing collaborative efforts to understand their strengths and limitations. The Define phase relied on inductive reasoning to refine research objectives, frame governance gaps, and ensured the study addresses context-specific challenges in informal settlements.

CASE STUDY ANALYSIS

The research evaluated a prior case study by the RUJAK Center for Urban Studies (RCUS), an NGO in Jakarta, to propose a more open collaborative governance framework. This framework was intended to better support bottom-up adaptation processes in addressing UHI impacts in informal settlements. Through analysis from a brief report and discussion with RCUS about collaborative planning project that has been developed, they mentioned several kampung in Jakarta, such as Kampung Marlina, Muara Angke, and Gang Lengkong. Based on the project's timeline, the only finished project is in Kampung Marlina. Therefore, the study was focused on Kampung Marlina, where a collaborative planning workshop has already been conducted and applied.

3.3.3 DEVELOP PHASE: CASE STUDY INVESTIGATION (FIELDWORK)

In the Define phase, insights from the Discover phase were synthesized to articulate a clear research framework and problem statement. This involved analyzing urban and climate policies at the local and national levels, focusing on their alignment with the needs of vulnerable communities and their capacity to address UHI challenges. A key component of this stage was the case study analysis of a project by the RUJAK Center for Urban Studies (RCUS). By examining project documentation and governance frameworks, this phase evaluated existing collaborative efforts to understand their strengths and limitations. The Define phase relied on inductive reasoning to refine research objectives, frame governance gaps, and ensured the study addresses context-specific challenges in informal settlements.

SEMI-STRUCTURED INTERVIEWS

After collecting data from the literature review, the semi-structured interviews were conducted to further understand the actors' involvement in the case study project. The interviews served as a primary data collection method to understand collaborative governance dynamics and the development of housing adaptive to Urban Heat Island (UHI) effects. The interviews was held in two different ways: presently and through an online meeting platform such as Zoom. The present interviews were held for the actors who available during the researcher's fieldwork stage, while the online interviews were conducted for actors who were not available at that time, making it more flexible for the researcher to schedule the interviews easily. This method provided the opportunity and possibility of not solely depending on being onsite for data collection. Additionally, the semi-structured interviews were conducted in Indonesian to make it easier for actors to answer the questions.

To ensure contextual relevance, the interview approach was tailored into four different groups, including government bodies, NGO representatives, informal settlement residents, and academia. This adaptive strategy encouraged respondents to speak freely, contributing rich, context-specific insights and improving the quality of the data collected. The semi-structured interview plan is described further in Table 2.

In line with Seidman (1998), interviews involving residents of informal settlements were conducted with particular care. By adopting an empathetic and participatory approach, the research sought to understand these stakeholders' lived experiences and their motivations for participating in the project.

The interviews were audio-recorded with consent, transcribed verbatim, and analyzed using Atlas.ti, a qualitative data analysis software. Thematic coding was applied to group responses based on a set of predefined categories derived from the conceptual framework. These included indicators of collaborative governance and the UHI responsive housing. To support the interpretation and visualization of stakeholder relationships and influence flows, Sankey diagram were used. These diagrams were developed based on the coded data to reveal interactions and relative emphasis between themes across different actor groups.

Table 2. Semi-structured interview template plan (Own work)

Community (C)	Non-Government Organizations (NG)	Government (G)	Academia (A)
Respondents' identity • Occupation	**Respondents' identity** • Institution • Role of the organisation in the project		**Respondents' identity** • Occupation • Institution
Health • The effect of the extreme heat • Changes in the health or comfort since the project was implemented	**Principled Engagement** • Defining the primary goals and objectives of the project in addressing UHI impacts in informal settlements • Motivation to actively participate in this project • The expected outcome from this collaboration		**Principled Engagement** • The key objectives of this project • The most critical contextual factors influencing the success of this project • Actions or attitude from stakeholders to demonstrate the commitment
Socio-economic • The influenced daily activities or income after the project was implemented • Any economic benefits or challenges resulting from the finished project	**Shared Motivation** • The level of trust in between organizations and between the organizations and the targeted community • The agreement from all actors from the start • The resolvent if there were any conflict of interest during the project		**Shared Motivation** • The role of collaborative governance to share common goals between actors • The best frameworks to resolve conflict between actors in this project
Building and environment • The condition of the house before and after the project • The specific changes to the house or surroundings that made the biggest difference for the inhabitants	**Capacity for Joint Action** • The opinion on how the ability of actors to coordinate and act together • Challenges in mobilizing resources or support for the project		**Capacity for Joint Action** • The key objectives of this project • The most critical contextual factors influencing the success of this project • Actions or attitude from stakeholders to demonstrate the commitment
Overall opinion on the project • Strengths and weaknesses of the project • Improvement for the similar project in the future	**Principled Engagement** • Strengths and weaknesses of the project • The governance structures or process that would work well for this project • Suggested improvement for future collaboration in addressing the UHI impacts		**Principled Engagement** • Governance structure or process recommendation • The importance of monitoring and evaluation in collaborative governance project
	Case study selection • The background of the project • The added value of this project • The possibility to continue the project in the future		**Innovation and Scaling** • Innovative governance approaches to improve collaboration in future UHI adaptation projects • The contribution from experts and/ or academia to strengthen and sustain collaborative governance in this context

RESPONDENT OVERVIEW AND DATA STRUCTURING

A total of 16 respondents were interviewed, comprising both governmental and non-governmental actors in the project initiative. Recognizing the diversity of stakeholder roles, customized interview protocols were developed to align with each group's responsibilities and levels of involvement. This ensured that the questions posed were relevant and meaningful to their particular context, enhancing the depth and relevance of the information gathered. The interview data was recognized into two main analytical dimensions:

1. **Collaborative governance indicators:** covering aspects such as participation, trust-building, and coordination mechanisms.
2. **Housing adaptation to UHI:** Including themes related to thermal comfort strategies, material use, and post-renovation experiences.

This structure enabled a focused analysis while maintaining flexibility to account for the distinct experiences shared by each actor.

OBSERVATIONS

Observations were a critical component of the data collection process, offering unique insights that complement the semi-sturctured interviews. Unlike other methods that rely on self-reported data, observations allowed the researcher to directly witness behaviors, interactions, and environmental conditions in real-time, providing a more objective understanding of the context.

In this study, observations were particularly valuable for assessing the physical and social impacts of the collaborative governance project in Kampung Marlina, such as the use of ventilated spaces, community engagement in daily activities, and the tangible effects of UHI adaptation interventions. By grounding findings in lived realities, observations enhanced the validity of the research and ensured that the nuanced complexities of governance, adaptation, and community resilience are captured.

3.3.3 DELIVER PHASE: DATA ANALYSIS AND DISCUSSION

The final stage, the Deliver phase, synthesized data from the literature study, policy analysis, and fieldwork to develop actionable recommendations. After data collection, responses were transcribed and analyzed using Atlas.ti, allowing for the identification of key themes and relationships. Atlas.ti is a software that facilitates the organization, coding, and visualization of the data, enabling the identification of relationships between themes and the generation of actionable recommendations. Grounded in the iterative phases of the Double Diamond Framework (DDF), this approach ensures that findings are both comprehensive and context-sensitive, providing a robust basis for improving collaborative governance in future UHI adaptation projects.

A combination of inductive and deductive approaches were used to ensure a comprehensive analysis. The inductive approach was applied open coding to identify emergent patterns and themes from the data. The deductive approach, which will be guided by Emerson et al.'s (2012) Collaborative Governance Regime (CGR) framework, d data into predefined themes, such as trust, shared motivation, and capacity for joint action. This allowed the analysis to align with theoretical constructs while remaining grounded in the data.

The triangulation from every source was also done the reliability and validity of findings by integrating them. Semi-structured interviews provided deeper insights into the complexities of collaboration and governance. Observations served as a complementary tool, validating findings and uncovering additional nuances that may not emerge from self-reported data. Together, these methods created a holistic understanding of the collaborative governance processes in the case study.

The qualitative approach captured the issue's complexity by integrating the four key stages assisted by DDF (Figure 14). The combination of these stages was generated a comprehensive understanding of collaborative governance's effectiveness in addressing the UHI impacts, stakeholder dynamics and factors that enhanced or hinder collaboration, and practical recommendations for improving the collaborative governance framework in the future.

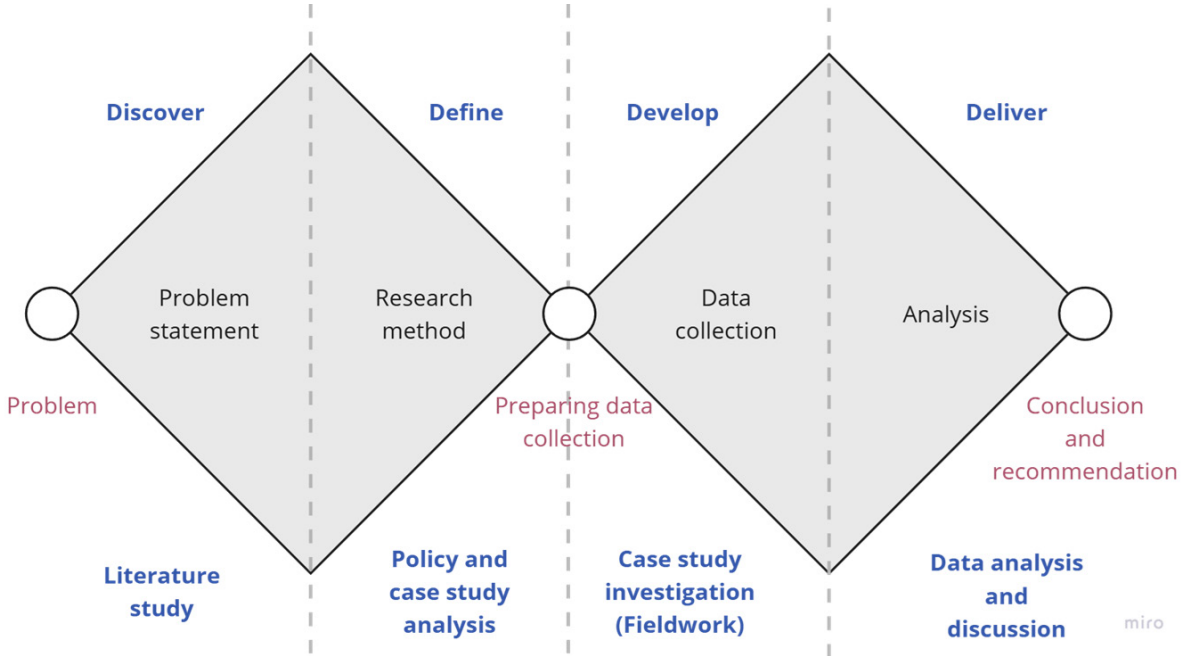


Figure 14. Applied data collection and analysis method on Double Diamond Framework (DDF) (Own work, adapted from Design Council (2019))

3.4 OPERATIONALIZATION TABLE

The literature review outlines three main concepts that form the foundation of this research project. It also identifies the key variables and indicators required to guide the data collection process and support the answer to the main research question. To ensure that the main research question is addressed appropriately, the sub-research questions are further detailed through specific indicators. Based on this, an operationalization table was developed to make the data collection plan more structured, concrete, and easy to follow. Table 3 below presents a summary of the Operationalization Table, while the complete version can be found in Appendix 1.

Table 3. Operationalization table (Own work)

SQ	Concept	Variable	Sub-variable
1	How does the **Urban Heat Island (UHI)** effect **impact the informal settlements in Jakarta**?		
	The socio-environmental effects experienced in informal settlements area due to UHI effects (Adapted from Basu & Das, 2024; Arifwidodo et al., 2019; Mahadevia, 2004; and Salsabila et al., 2023)	Health impacts	
		Socio-economic impacts	
		Building and environment impacts	
2	How was **collaborative governance implemented** in the Urban Heat Island (UHI) adaptation project in informal settlements in Jakarta?		
	Investigating a case study project to understand the stakeholders involvement and the collaborative governance in the project (Adapted from Emerson et al., 2012)	Case study selection	
		Collaboration and collaborative governance process in the project	Principled engagement
			Shared motivation
			Capacity for joint action
3	What strategies can be implemented to **enhance collaborative governance** in adapting the UHI effect in the informal settlement area in Jakarta in the future?		
	Proposed actions to strengthen multi-stakeholder collaboration from project participants and external parties such as experts and academia (Adapted from Emerson et al., 2012)	Collaboration and collaborative governance process in the project	Enhancing principled engagement
			Enhancing shared motivation
			Enhancing capacity for joint action
			Enhancing innovation and scaling

3.5 DATA PLAN

The data plan for this research ensures that the data collected aligns with the research objectives of evaluating UHI adaptation and collaborative governance in Jakarta. The combination of semi-structured interviews and observations were essential for capturing both broad trends and nuanced insights. The FAIR principles ensured that the data is findable, accessible, interoperable, and reusable, enhancing its value for the research community and stakeholders. Additionally, the data management plan is made via DMP online, an online tool offered by TU Delft.

3.5.1 DATA COLLECTION AND STORAGE

The personal data collected are accessible only by the researcher. The participants of the interviews were contacted in advance, and informed consent was given before the interviews began. The complete Interview Protocols are available in Appendix 2. The researcher scheduled meeting for a semi-structured interview session with every respondent. This meetings were set offline for the respondents who were available during the researcher's fieldwork timeline, meanwhile the interviews for respondents who were not available offline were conducted on an online meeting platform.

The respondents from the semi-structured interviews were asked to fill in the consent form for the use and publication of the generalised answers and the use of their anonymous data. Those who did not fill in the consent form were not involved in this research.

The data of the respondents and the interview transcripts are saved in the TU Delft server data, which is TU Delft OneDrive, which is safe and can only be accessed by the researcher. This data will be destroyed after the research has been completed. Therefore, the results are entirely anonymous and the personal data are not available in the storage and the server data.

3.5.2 DATA PROCESSING

SEMI-STRUCTURED INTERVIEWS

All interviews for all respondents were conducted in Indonesian. After the interviews were completed, the recordings were transcribed before being analysed. A summary of each interview was included in every transcription. All the transcriptions were analysed using Atlas.ti software to match with the framework, following both inductive and deductive approaches.

OBSERVATIONS

During observations, all documentation were collected by photos, video recordings, and observation notes. All these data are stored in TU Delft OneDrive and also personal hard disk storage.

DATA SHARING AND PRESERVATION

Personal data are not published. The data will be made FAIR, as shown in Appendix 3.

3.6 ETHICAL CONSIDERATIONS

All responses from participants are managed under TU Delft's Data Management Plan (DMPonline), ensuring secure storage accessible only to the researcher. Data collection methods, including semi-structured interviews and observations, adhere to strict ethical guidelines, with participants providing informed consent before participation.

The researcher prepared structured and relevant questions to align with insights from the literature review, ensuring the research remains focused on its objectives. During interviews, the researcher adopted an open-minded and neutral approach, creating a safe and inclusive environment for participants to share their experiences and perspectives freely. Care was taken to balance the roles and inputs of various stakeholders, such as government actors, community members, and experts, ensuring that all viewpoints are fairly represented. Additionally, the study design included strategies to identify a "middle ground" between different perspectives, particularly the government's role as a policymaker, community members as those directly affected by UHI adaptation efforts, and experts as observers of the policy.

By adhering to these ethical principles, the research not only ensures the credibility of its findings but also emphasizes the importance of ethical collaboration and inclusivity. The more detailed explanation of the ethical considerations of this project is explained under Appendix 2.

3.7 LIMITATIONS

This research seeks to address a gap in understanding the effects of urban heat islands (UHI) on informal settlements in Jakarta, particularly the relationship between collaborative governance and community resilience in such areas. Despite the increasing global focus on UHI adaptation, discussions regarding its impact on informal settlements in the Global South, such as Indonesia, remain limited. While analyzing on the completed project by an NGO that was located in Jakarta, Indonesia, this case study provides a snapshot of community experiences, though it might not represent the broader population of informal settlement residents in Indonesia.

Several practical challenges were encountered during data collection. For instance, not all beneficiaries were available and willing to participate in the semi-structured interviews in person. To address this issue, the interviews were conducted in a group setting, similar to a Focus Group Discussion (FGD), to create a more friendly and dynamic atmosphere. Similarly, challenges occurred with other actors in the semi-structured interviews, as some declined due to time constraints, work commitments, or limited staff capacity to support the interview process. In these cases, an alternative procedure was offered by conducting the interviews online to accommodate their schedule better. Additionally, a literature review about related actor was conducted to gather general insights about their roles and concerns, serving as a complementary source when direct input was not available.

Given these limitations, future research is needed to explore further UHI adaptation in informal settlements on a larger scale, potentially addressing other urban areas in Indonesia. This research highlights the need for ongoing discussion of collaborative governance in urban climate adaptation, particularly in contexts where vulnerable communities are disproportionately affected. To protect participant confidentiality, all collected data will be securely stored on TU Delft's project storage drive, accessible only to the researcher, in compliance with the Data Management Plan (Appendix 3).

4

CASE STUDY: KAMPUNG MARLINA, JAKARTA

This chapter presents an elaboration of the case study in Kampung Marlina, Jakarta, Indonesia. It includes the background, timeline, implementation, and initial analysis of the project before a more in-depth discussion is provided in the following chapter. Data in this chapter helps to clarify on how every actor in the project played their roles and their engagement to the project.

4.1 HISTORY OF KAMPUNG MARLINA, JAKARTA

The living environment in Jakarta reflects both the diversity of its population and the intense pressures of urbanization in a rapidly expanding and densely populated city. Accelerated population growth and urban development, primarily driven by real estate interests targeting middle- and upper-income markets, have contributed to the proliferation of informal settlements (kampungs), due to the persistent lack of affordable housing programs for low-income communities (Nurdiansyah, 2018). The growth of inhabitants around the Jakarta area has been increasing, while in the last 2 years, the increasing number is not significantly changing, only in several sub-district areas (see Figures 15).

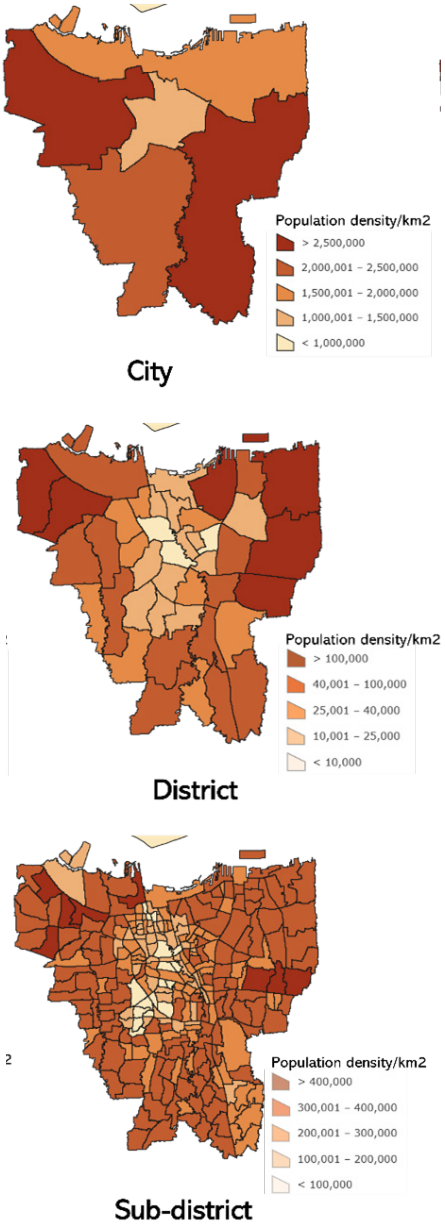
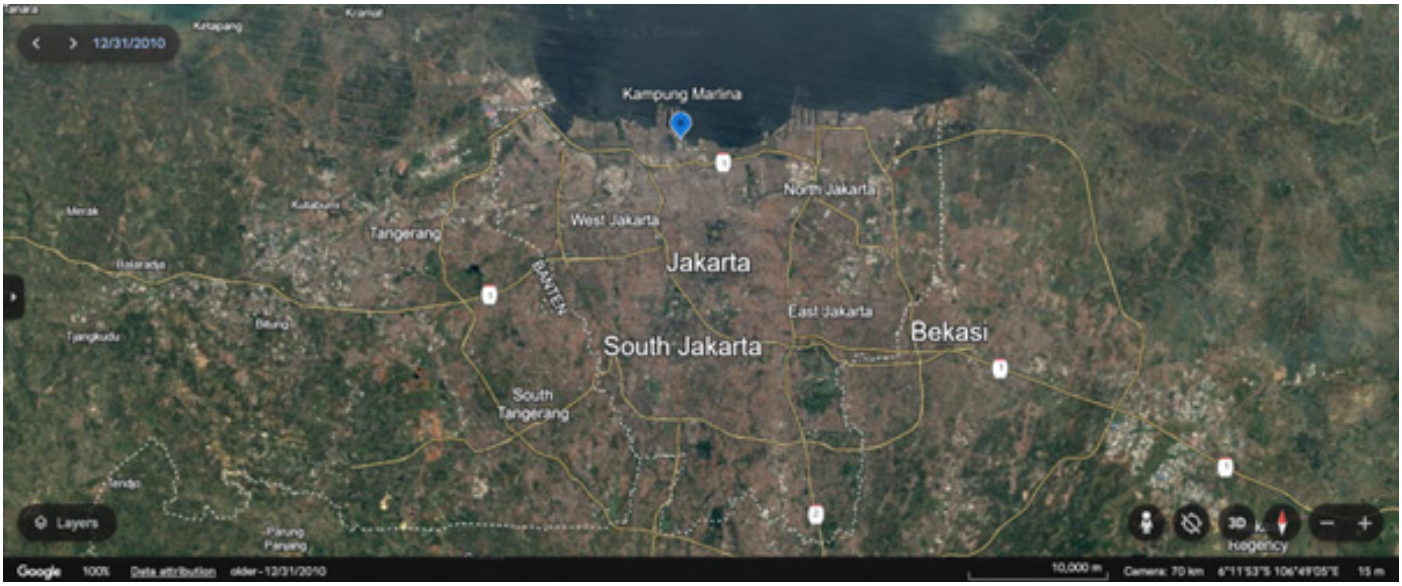


Figure 15. The density map of Jakarta in 2023. Source: Jakartasatu, 2025

One such area of informal expansion is located in North Jakarta, particularly within the Penjaringan Sub-district, which includes the coastal zones of Muara Baru and Pluit. The maps showing the location of Kampung Marlina are depicted in Figure 16 to 18. Historically, Muara Baru was a landscape of swamps and fishponds throughout the 1960s, with limited residential development, local accounts suggest it was home to only 20 to 25 households at the time (Suhartini & Jones, 2023). In the 1970s, industrialization began to reshape the area, introducing factories and warehouses for textile, paper, and packaging industries, progressively replacing the natural environment. Residents who lived near these industrial zones were informally relocated to a nearby area that would eventually be known as Kampung Marlina, where families began to settle and claim land through self-initiated efforts.

2010



2020

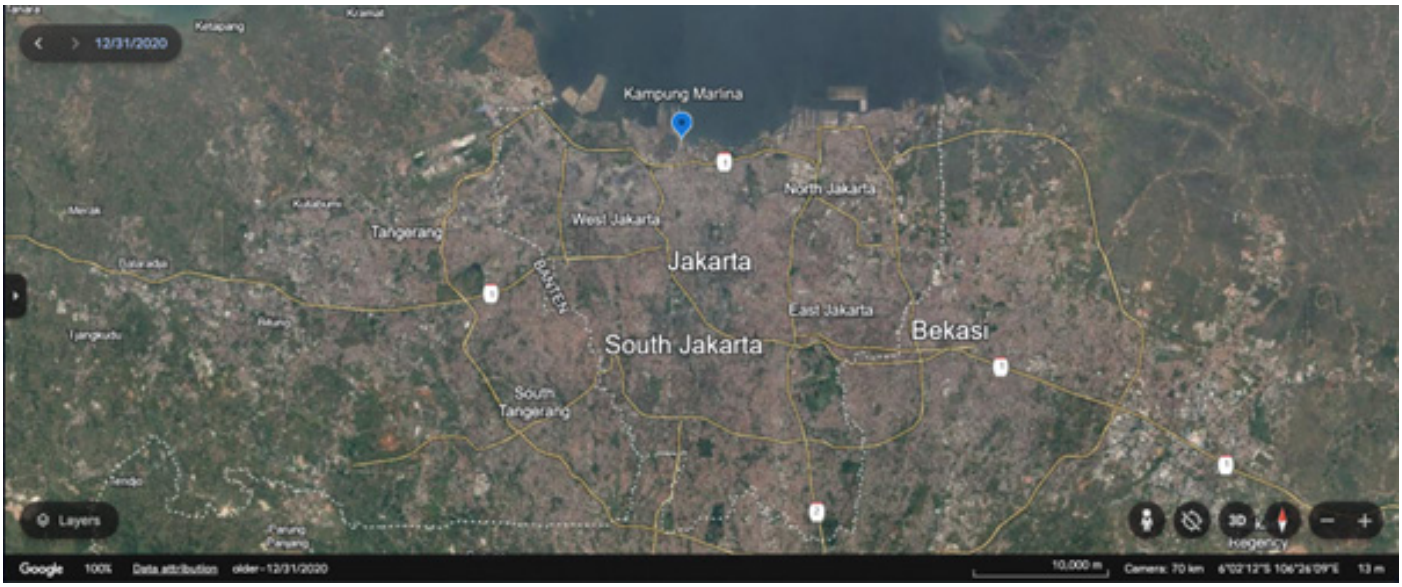


Figure 16. The location of Kampung Marlina in Jakarta Province area in 10 years difference (Source: Google Earth, 2025)

2014

2024

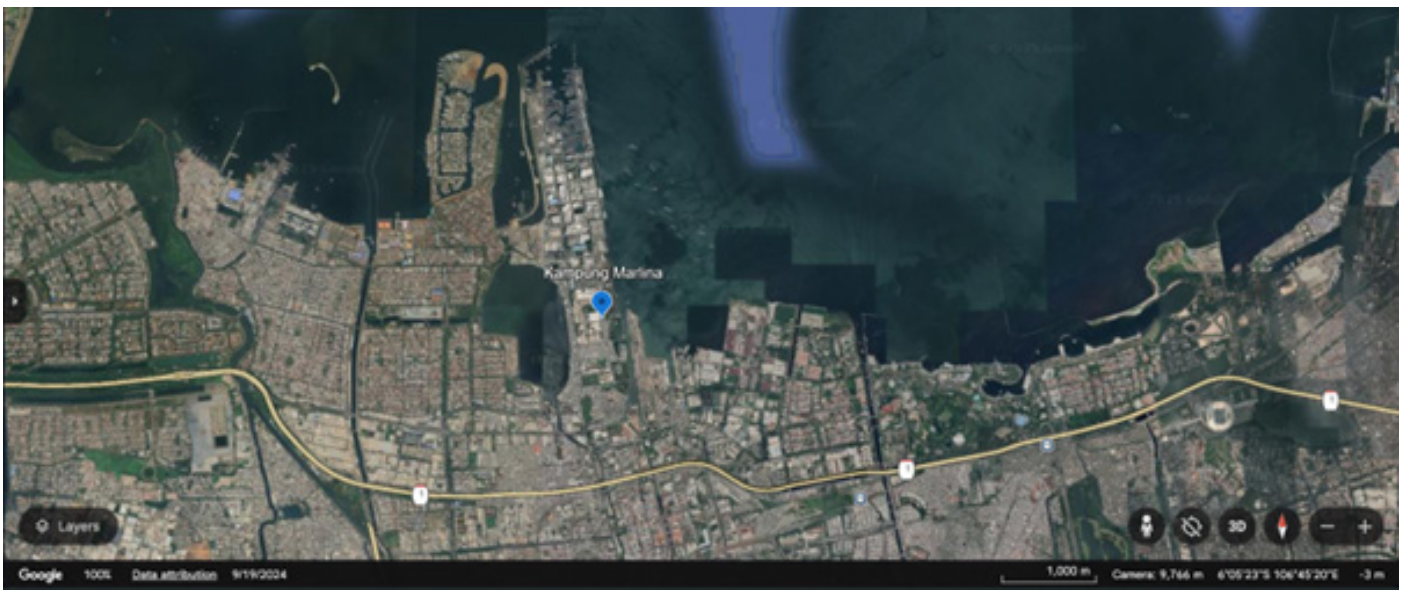
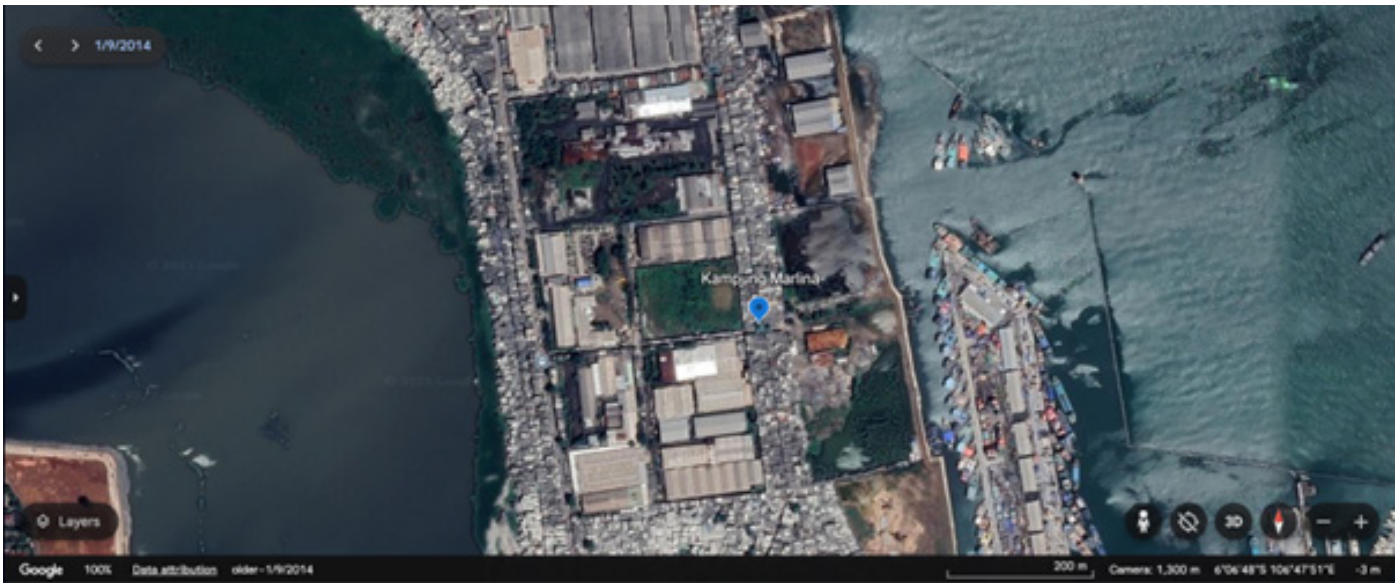


Figure 17. The location of Kampung Marlina in North Jakarta area in 10 years difference (Source: Google Earth, 2025)

Over time, Kampung Marlina has grown into a cohesive and relatively organized community. The settlement today articulates a distinct socio-spatial vision: to serve as a Kampung Penyangga Ekonomi Kawasan Pesisir, an economic buffer for the surrounding coastal region (RCUS, 2023). According to the RCUS (2021), Kampung Marlina exemplifies a self-organized coastal kampung that has sustained itself since the late 1970s. Initially established through self-help housing, residents have gradually developed basic infrastructure and communal spaces. Nevertheless, over 83% of the settlement is occupied by multi-story dwellings, leaving very limited open space (Figure 19).

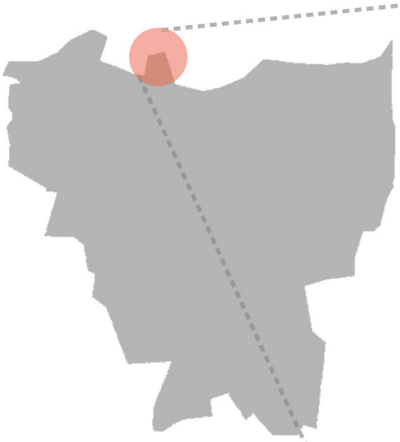
2014



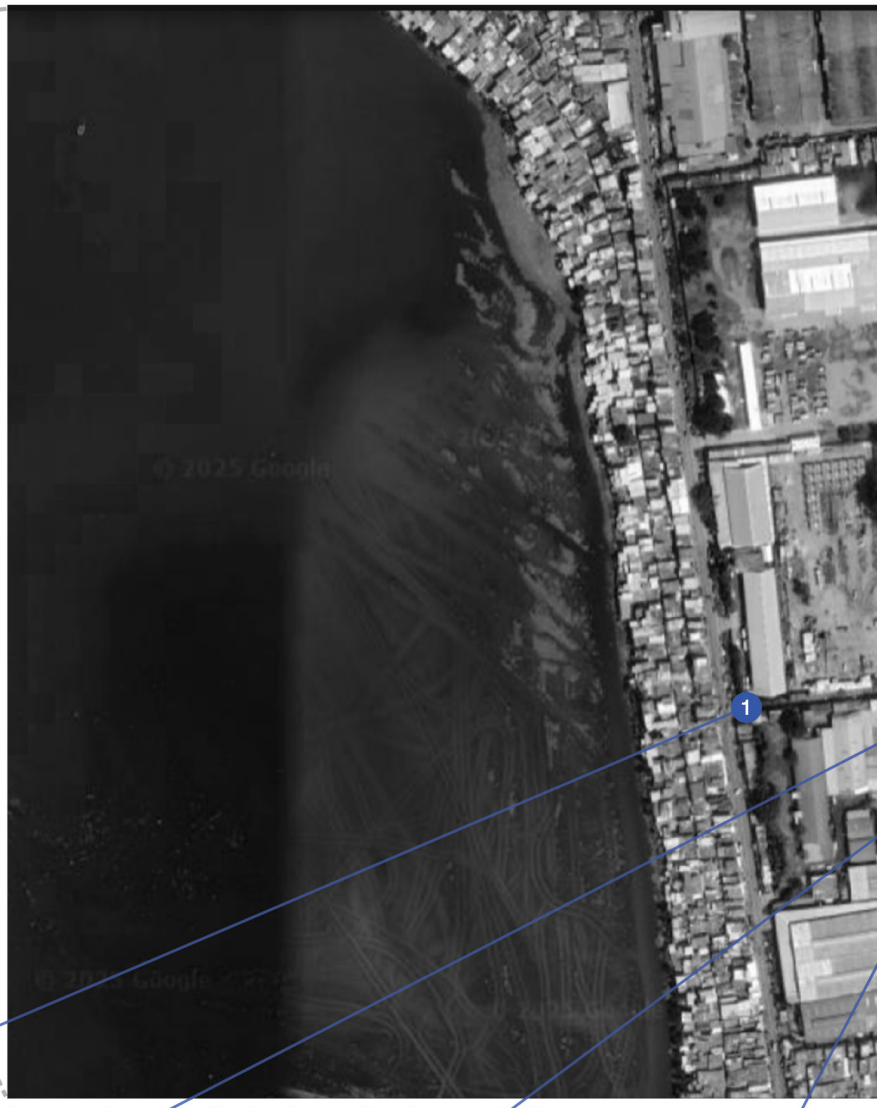
2024

Figure 18. The location of Kampung Marlina in 10 years difference (Source: Google Earth, 2025)

FIELDWORK DOCUMENTATION



Map of Jakarta, Indonesia



Location of Kampung Marlina (Source: Google Earth, 2025)

FIELDWORK LOCATION

Kampung Marlina, Penjaringan District,
North Jakarta, Jakarta, Indonesia

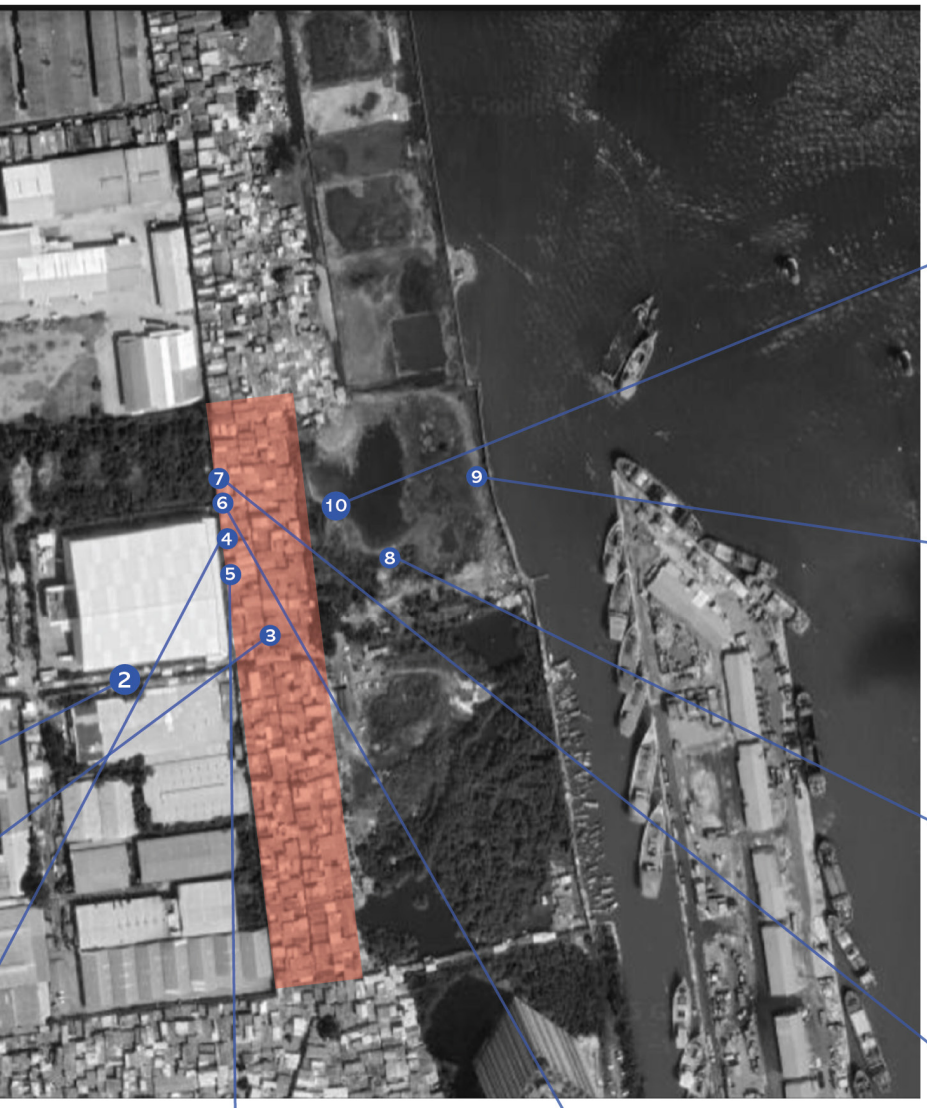
Main road to enter Kampung Marlina

Entrance of Kampung Marlina

Main aisle in Kampung Marlina

A house condition b

Figure 19. The situation of Kampung Marlina. Left to right: The coastal area view can be seen from one of the beneficiaries' h
(Own



The surrounding area of Kampung Marlina

The view of coastal area nearby Kampung Marlina

The surrounding area of Kampung Marlina

efore joining the renovation project

A house condition after joining the renovation project

ome; the main aisle in Kampung Marlina; the situation of the appointed aisle for the renovation project in Kampung Marlina work)

Despite this internal development, Kampung Marlina continues to face structural challenges, including insecure land tenure, frequent flooding, and inadequate infrastructure. While at the same time, the area is particularly vulnerable to poor drainage, insufficient natural ventilation, and restricted access to sunlight within its narrow built environment. In response to these conditions, Kampung Marlina joined the Urban Poor Network (JRMK) in 2004 and began collaborating with civil society organizations such as the Urban Poor Consortium (UPC) and the Rujak Center for Urban Studies (RCUS). These partnerships facilitated participatory planning processes aimed at improving housing quality and enhancing resilience to environmental risks.

According to RCUS (2021), in early 2017, coinciding with the Jakarta gubernatorial election, residents of Kampung Marlina, alongside communities from 24 other urban kampungs in Jakarta, initiated a political contract proposal through JRMK and UPC, aimed at securing a formal agreement from the gubernatorial candidates. This initiative reflected a strong aspiration for a legally binding expression of political commitment toward the urban poor, which was expected to be translated into a five-year governance program should the candidate be elected. RCUS added that later in April 2017, then-candidate for Governor of Jakarta, Anies Baswedan, signed the political contract with JRMK and UPC, outlined five key commitments: spatial planning reform for kampung areas, land tenure legalization, provision of affordable housing for low-income residents, business licensing for street vendors, and livelihood transition support for pedicab drivers. This action was the early stage of the establishment of Community Action Plan (CAP) and Collaborative Implementation Program (CIP), a program that was established to commence a development program in several prioritized informal settlements in Jakarta, where Kampung Marlina is one of the listed area.

Although policy change and institutional recognition have been slow, the case of Kampung Marlina demonstrates the possibilities of community-led urbanism in resisting displacement and shaping more inclusive urban futures. Its development trajectory shows how informal settlements continue to assert their existence and identity within the pressures of modern urban transformation.

4.2 THE CASE STUDY: PILOT PROJECT IN KAMPUNG MARLINA

The case study explores a collective planning effort focused on housing and environmental improvements. The project, titled "Small-scale Area Development of Settlement Area and its Environment in Kampung Marlina, Muara Baru," was developed through the involvement of multiple stakeholders, including Rujak Center for Urban Studies (RCUS), a Jakarta-based non-governmental organization (Figure 20). Kampung Marlina is an informal settlement located in Jakarta, where most residents have lived without formal land tenure. Over the years, RCUS has supported Kampung Marlina through various community-based initiatives. This program marked a new phase in their efforts, designating Kampung Marlina as a pilot project. As a result, it offers valuable insights and lessons for future implementations.

4.2.1 PROJECT BACKGROUND

The planning initiative in Kampung Marlina was initiated by the local community through the Koperasi Marlina Maju Bersama (translated as the Marlina Maju Bersama Cooperative). This cooperative, established by residents with a shared vision of improving their living conditions, played a central role in proposing a redesign of the kampung. Recognising the limitations of informal settlement conditions and driven by a desire to foster better living environments, the cooperative sought external support to realise their aspirations. Responding to a call for proposals issued by the Urban Poor Consortium (UPC), an organisation that provides financial and technical assistance to qualifying kampungs, the community leaders of Kampung Marlina submitted a project proposal. After evaluation, their proposal was selected, securing them both grant funding and technical support from UPC.

Beyond the immediate goal of neighbourhood improvement, the community also viewed this initiative as a strategic step toward attracting additional support from non-governmental actors, such as private donors or NGOs. This approach was particularly important given the ongoing issue of land tenure insecurity in Kampung Marlina. As legal land ownership remains unresolved and is expected to take a prolonged period to formalise, the community understood the need to pursue development efforts that did not solely rely on government intervention. Thus, the proposal was not only about physical upgrading but also a means of leveraging collaborative partnerships to enable progress despite legal and institutional uncertainties.

4.2.2 PLANNING PRINCIPLES

To make this project come true, there is an agreement that was made between the meetings that were participated in by the community of Kampung Marlina. The Principles of Self-Managed Kampung Upgrading Based on the Kampung Marlina Cooperative are as follows:

1. Housing improvements must also be accompanied by environmental improvements.
2. Decision-making is carried out collectively with multiple stakeholders.
3. Upgrading is based on an agreed-upon plan.
4. Financial transparency is essential to build trust.
5. Weekly monitoring is conducted.
6. Mutual cooperation (gotong royong) is encouraged.
7. Homeowners contribute at least 10% of the total cost of home improvement.
8. Roles and responsibilities are clearly divided among all involved parties.
9. The specific needs of each homeowner are accommodated.

The principles became the main goal for this project. When there is something that needs to be addressed, the participants of this project needs to check it again on this planning principles.

4.2.3 DESIGN PRINCIPLES TO ADAPT THE UHI EFFECTS

During the collaborative planning process, discussions between the community and technical advisors from RUJAK resulted in the formulation of three key design principles. These principles were intended to address the overall needs of the neighbourhood, respond to the specific environmental conditions of Kampung Marlina, and accommodate the individual requirements of each household. The principles are as follows:

1. **Roof with natural ventilation**
   - With a continuous system to make it more economical
   - To make a good circulation system that allows the wind from the sea can go through the roof and the terrace

2. **Porous walls**
   - To allow the wind even though there are partitions inside the house
   - Room for stairs or void
   - Allows the circulation in-between floors inside the house to avoid the air circulation becoming too humid

3. **Multifunctional terrace**
   The extra room of the house outside the house will allow the inhabitants to have more interactions with their neighbours, which can also be beneficial and functional to have a mutual public area that can be used for all people living in the neighbourhood.

The application of these concepts are illustrated in Figure 21.

Figure 20. The cover of the project's report (Source: RCUS, 2023)

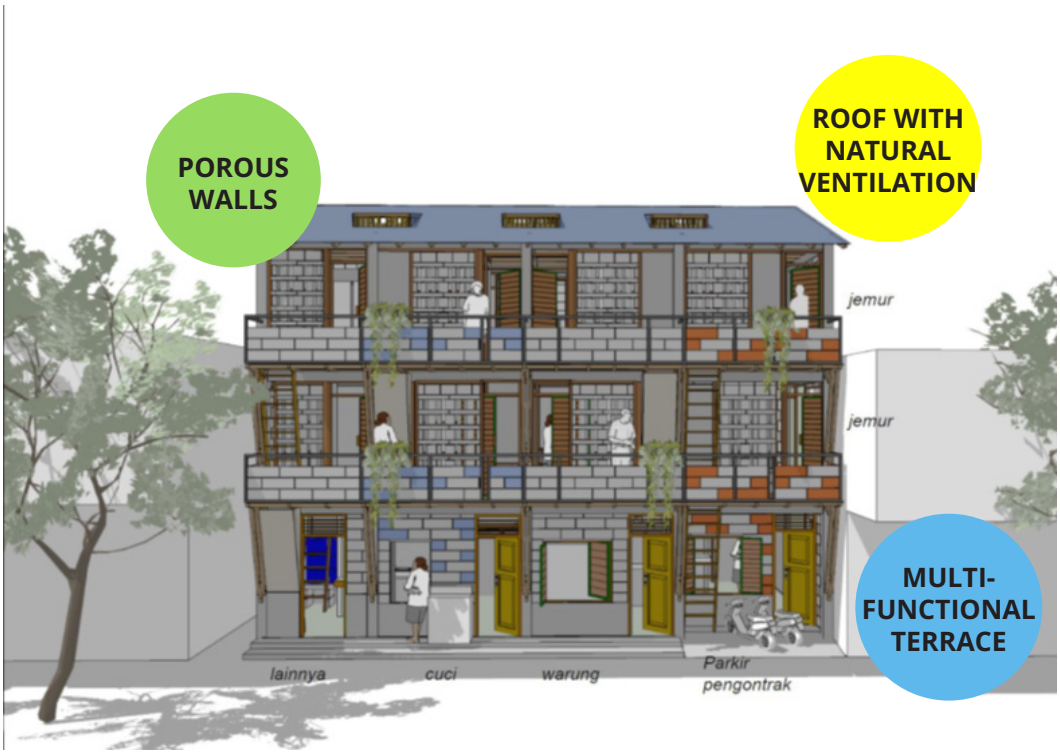


Figure 21. Three housing principles developed by people of Kampung Marlina and RUJAK (RUJAK, 2023)

4.2.4 INSTITUTIONAL FRAMEWORK

Given the project's collaborative nature, a stakeholder analysis was conducted to understand how various actors were interdependently connected, while still retaining a degree of autonomy within the network. Based on secondary data outlining the development and evolution of the collaboration, the involved stakeholders are listed in Table 4.

GOVERNMENT (G)

Government actors refer to institutions that hold formal authority to regulate and make decisions over the physical and legal aspects of an area. The government actor possess the authority to formulate and implement policies affecting land use, settlement development, and urban planning.

1. **National Government: Ministry of Housing and Settlement Area**
   As a national-level institution, the ministry is responsible for setting policies and regulations related to housing and settlement development across Indonesia. Although its direct involvement in Kampung Marlina may be limited, its policies form the legal and institutional framework that guides all settlement upgrading projects, including those in informal contexts.
2. **Local Government: Jakarta Provincial Government**
   As the local authority, the Jakarta government plays a crucial role in urban planning, infrastructure provision, and policy implementation within the city. While Kampung Marlina faces ongoing issues related to land tenure that complicate formal support, the provincial government remains a key actor in terms of potential legitimization and long-term integration into official city planning schemes.

NON-GOVERNMENT ORGANIZATION (NG)

In the project of Kampung Marlina, these actors contribute through financial support, technical expertise, advocacy, research, and community mobilization, filling critical gaps in governance and service provision, especially in contexts where formal government support is limited or delayed.

1. **Non-Governmental Organizations (NGOs)**
   - **Urban Poor Consortium (UPC)**
     UPC served as a primary facilitator in this project, providing both financial support and technical assistance. Through its open proposal call, UPC enabled communities like Kampung Marlina to access resources that are typically difficult to obtain without formal legal status.
   - **RUJAK Center for Urban Studies (RCUS)**
     RCUS contributed through research-based advocacy and urban planning expertise, helping to ensure that the redevelopment plans aligned with broader goals of sustainable and inclusive urban development.
2. **Community-Based Organizations (CBOs)**
   - **Advocation of Urban Poor Network (Jaringan Rakyat Miskin Kota/JRMK)**
     As an advocacy group representing urban poor communities, JRMK supported Kampung Marlina by strengthening their organizational capacity and ensuring that the community's voice remained central during project design and implementation.
   - **Cooperative of Kampung Marlina (Koperasi Marlina Maju Bersama)**
     This cooperative emerged from within the community itself and played a leading role in initiating the project. It was responsible for preparing the proposal submitted to UPC and continues to coordinate local efforts throughout the redevelopment process.
3. **Non-Structural Government Agency**
   - **The National Zakat Board (Badan Amil Zakat Nasional/BAZNAS)**
     Though not a formal government agency, BAZNAS operates under national endorsement to manage zakat (charity-based) funding. Its involvement indicates potential funding support for community welfare, especially in cases where formal budget allocations are constrained.

Table 4. Actors in the case study and their roles (Own work)

Actor	Role	Group
National government Ministry of Housing and Settlement Area	Government Actor	Government (G)
Local government Jakarta Provincial Government	Government Actor	
Non-Government Organization		Non-Government Organizations (NG)
RUJAK Center for Urban Studies (RCUS)	Non-Government Actor	
Urban Poor Consortium (UPC)	Non-Government Actor	
Asian Coalition for Housing Rights (ACHR)	Non-Government Actor	
Non-structural Government Agency The National Zakat Board (*Badan Amil Zakat Nasional/BAZNAS*)	Non-Government Actor	
Community Based Organization		
Advocation of Urban Poor Network (*Jaringan Rakyat Masyarakat Kumuh Kota/JRMK*)	Non-Government Actor	
Cooperative of Kampung Marlina (*Koperasi Marlina Maju Bersama*)	Non-Government Actor	
Community Residents and beneficiaries of the project in Kampung Marlina	Non-Government Actor	Community (C)
Academia University of Indonesia	Non-Government Actor	Academia (A)

COMMUNITY (C)

The residents in Kampung Marlina are both the primary beneficiaries and active participants in the project. Their lived experiences, aspirations, and everyday practices inform the project's design and implementation. Community engagement remains essential to ensure relevance and long-term sustainability.

ACADEMIA (A)

Academic actors such as the University of Indonesia may be involved in monitoring, evaluation, or capacity-building activities, especially in the topic of informal settlement areas in Jakarta. Although they were not directly involved in the case study project, their insights and views help the researcher to gain a broader understanding of informal settlement upgrading.

The implementation of the redevelopment project in Kampung Marlina involved a diverse range of stakeholders from both governmental and non-governmental sectors. Each actor contributed according to their institutional capacity, mandate, or community position. Their collaboration reflects a multi-actor approach necessary for upgrading informal settlements where legal, financial, and social complexities often intersect.

4.2.5 STAKEHOLDER MAPPING

A stakeholder analysis is further illustrated in Figure 22 using a power-interest matrix to map the roles and influence of each actor.

Based on the progression of the project, the stakeholder mapping is analyzed using a power-interest matrix. This matrix illustrates how each actor engaged with the project, reflecting both their level of influence (power) and their commitment or involvement (interest):

GOVERNMENT (G)

Government Bodies are positioned in the upper quadrants due to their institutional authority. The National Government (Ministry of Housing and Settlement Area) appears in the High Power–Low Interest quadrant, indicating it holds formal power but had limited involvement in the project. In contrast, the Local Government (Jakarta Provincial Government) is situated in the High Power–High Interest quadrant, reflecting its initiating role and active engagement throughout the project.

NON-GOVERNMENT ORGANIZATION (NG)

- **Community-Based Organizations (CBOs)**, such as the Advocacy of Urban Poor Network and the Cooperative of Kampung Marlina, are placed in the High Interest–Low Power quadrant. These actors were highly involved and invested in the outcomes, although they had limited formal authority to influence decisions directly.
- **Non-Government Organizations (NGOs)**, including the RUJAK Center for Urban Studies (RCUS), Urban Poor Consortium (UPC), and the Asian Coalition for Housing Rights (ACHR), also fall within the High Interest–Low Power quadrant. Despite lacking institutional power, their strong advocacy roles and technical support made them critical partners in supporting the community and facilitating collaboration.
- **Non-structural Government Agencies**, like BAZNAS, are placed in the Low Interest–Low Power quadrant. Their limited role in this particular project reflects both a lower level of involvement and influence.

COMMUNITY (C)

The Community, specifically the people of Kampung Marlina, are positioned in the High Interest–Low Power quadrant as well. Although they had minimal formal power, they were the primary stakeholders affected by the project and showed strong interest and engagement in the process.

ACADEMIA (A)

Academia, represented by the University of Indonesia, is also located in the High Interest–Low Power quadrant. Their interest in the project was likely driven by research and knowledge-sharing objectives, contributing valuable analysis and support.

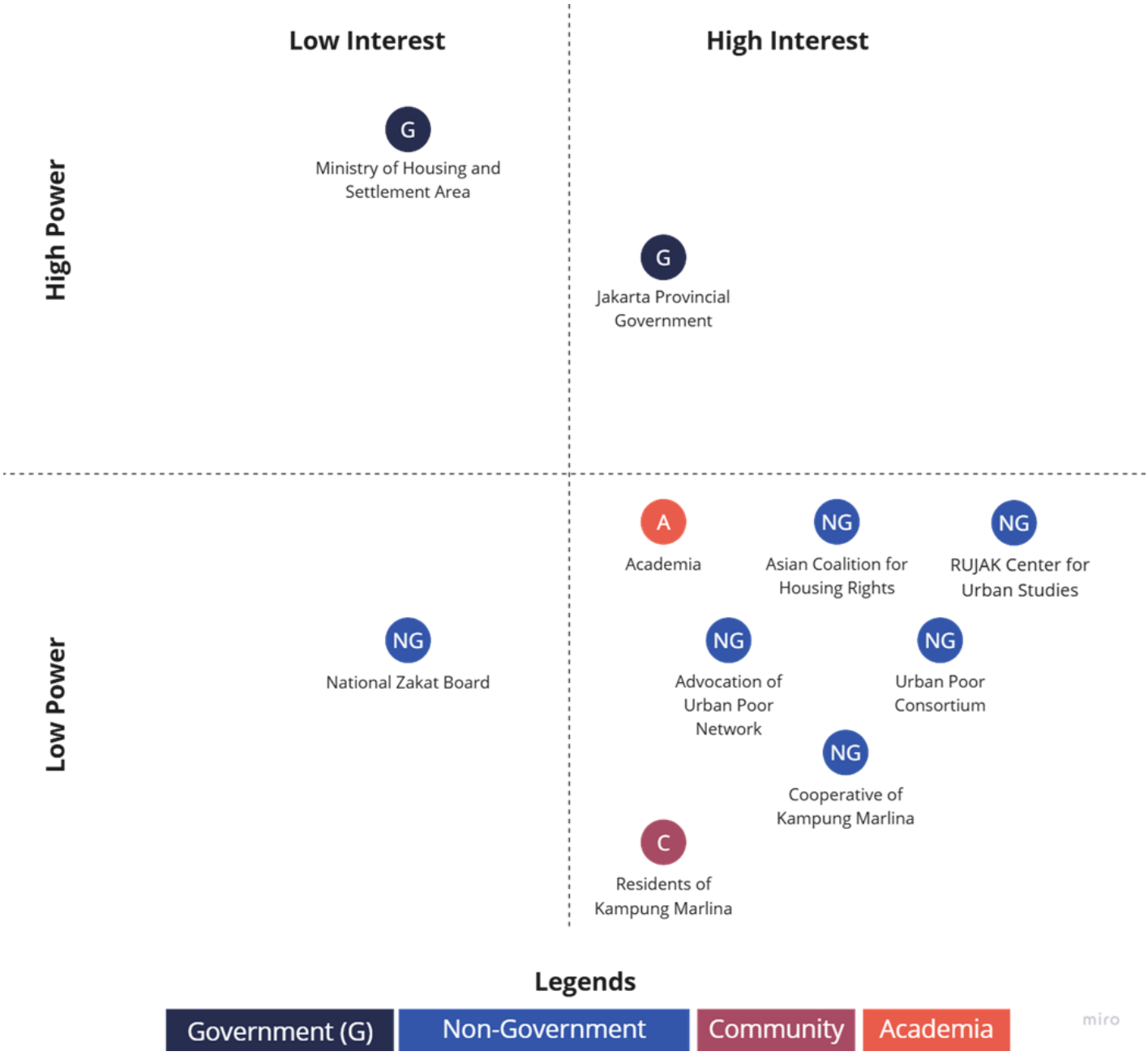


Figure 22. Power-Interest Matrix (Own work)

4.3 GOVERNANCE OF THE PROJECT

To work collaboratively in this project, the process can be distributed into several stages. Every stage will be elaborated in more detail through every sub-chapter below.

4.3.1 THE INITIATION PROCESS

The initiation process was developed by the local government of the Jakarta Provincial Government in 2017. The process was started by a collaborative initiative program by the government, the Community Action Plan (CAP). This process was then continued by the appointed NGO, Cooperative, and Kampung, which were involved in this project. The detail timeline is shown in Figure 23.

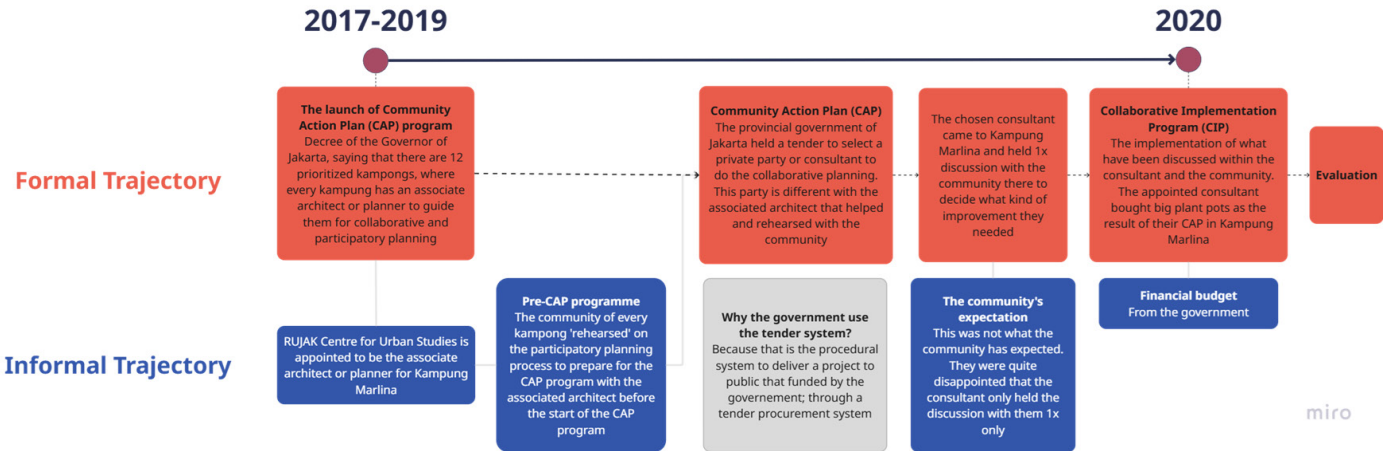


Figure 23. A short diagram of initiation process (Own work, adopted from RCUS (2023))

4.3.2 SELECTION PROCESS

During the selection process, the Cooperative of Kampung Marlina played a central role in identifying and selecting eligible participants for the redevelopment project. The cooperative was responsible for gathering potential beneficiaries and applying a set of criteria to determine their eligibility. The selection was based on three main requirements:

1. **The individual must reside in the designated project area**
2. **The individual must be an active member of the cooperative**
3. **The individual must be willing and able to contribute financially to the project**

Based on these criteria, the cooperative conducted outreach to eligible residents and invited them to participate in the collaborative project. Those selected were also encouraged to actively engage in the process by attending regular weekly meetings, ensuring continuous communication and participation throughout the project's development.

4.3.3 COLLABORATIVE PLANNING PROCESS

After identifying the potential participants for the project, the next step was to explore more concrete actions through a structured community planning process. This planning stage was carried out through discussions and deliberations involving multiple actors. Each phase of the process, outlined in the stages below, was guided by collective decision-making, moving step by step from exploring alternative design arrangements to preparing for the construction phase. Throughout these stages, relevant actors or stakeholders were actively involved, ensuring that the planning process remained inclusive and collaborative. In summary, the involvement of these actors in the deliberation process is illustrated in Table 5 below.

Table 5. The implementation stages as explained in the project's report (Own work, adopted from RCUS (2023))

IMPLEMENTATION STAGES

Stage	Goals	Agenda	Actors
1 Study of Alternative Arrangement Models	*What kind of arrangement is suitable for the Kampung Marlina area?*	1. Formulation of Kampung Marlina's vision 2. Mapping of area, buildings, and kampung infrastructure 3. Presentation of study results 4. Determining the type of arrangement to be carried out 5. Selecting strategic arrangement locations in Kampung Marlina	NG RUJAK Center for Urban Studies NG Cooperative of Kampung Marlina C Residents of Kampung Marlina
2 Agreement on Planning Principles	*What is the ideal condition of the house and environment we aim to achieve through this arrangement?*	1. Conduct meeting with the Cooperative and homeowners 2. Discuss the planning concept with homeowners 3. Measure length and width of the alleys and houses 4. Discuss the principles of ideal housing and environment 5. Draw up the needs of each household	NG RUJAK Center for Urban Studies NG Cooperative of Kampung Marlina C Residents of Kampung Marlina
3 Finalization of Design and Budget Plan	*Agreeing on the design results and creating a joint budget plan*	1. Discuss individual house designs 2. Select materials 3. Develop the Joint Budget Plan (*Rencana Anggaran Biaya/RAB*) 4. Agree on the mechanism for loan repayment	NG RUJAK Center for Urban Studies NG Cooperative of Kampung Marlina C Residents of Kampung Marlina
4 Operational Mechanism and Construction Preparation	*How actors such as homeowners, cooperatives, supervisors, builders, and others share roles*	1. Agree on contribution value and cooperative loans 2. Homeowners deposit contribution funds into the cooperative 3. Homeowners search for temporary rental housing (2 months) and find builders 4. Cooperative appoints supervisors 5. Homeowners, builders, and architects mark property boundaries 6. Homeowners store usable materials from their old houses	NG RUJAK Center for Urban Studies NG Cooperative of Kampung Marlina NG Project supervisor from Cooperative NG Builders C Residents of Kampung Marlina
5 Construction Phase (Implementation)	*Begin housing development construction for homeowners who are ready*	1. Community work (gotong royong) to dismantle houses 2. Construction process begins 3. Weekly evaluation involving homeowners, cooperative, builders, JRMK, UPC, and associate architects from RUJAK	NG Urban Poor Consortium NG Advocation of Urban Poor Network NG RUJAK Center for Urban Studies NG Cooperative of Kampung Marlina NG Project supervisor from Cooperative NG Builders C Residents of Kampung Marlina

4.3.4 FINANCIAL FRAMEWORK

This sub-section explains how the project was financed and how the financial responsibilities were managed among the involved actors. It includes the funding flow during implementation and the repayment arrangement to the cooperative.

FINANCIAL SCHEME

The project received its main funding through a grant from the Asian Coalition for Housing Rights (ACHR) under the SELAVIP Program. The funds were first transferred to the Urban Poor Consortium (UPC) and then passed on to the Cooperative of Kampung Marlina as the local implementing body. The cooperative managed the budget, distributed materials to the beneficiaries, and coordinated with a construction supervisor. Additional support was provided by BAZNAS, which contributed to cover material costs. This flow ensured that funding reached the community level while maintaining accountability and transparency, as shown in Figure 25.

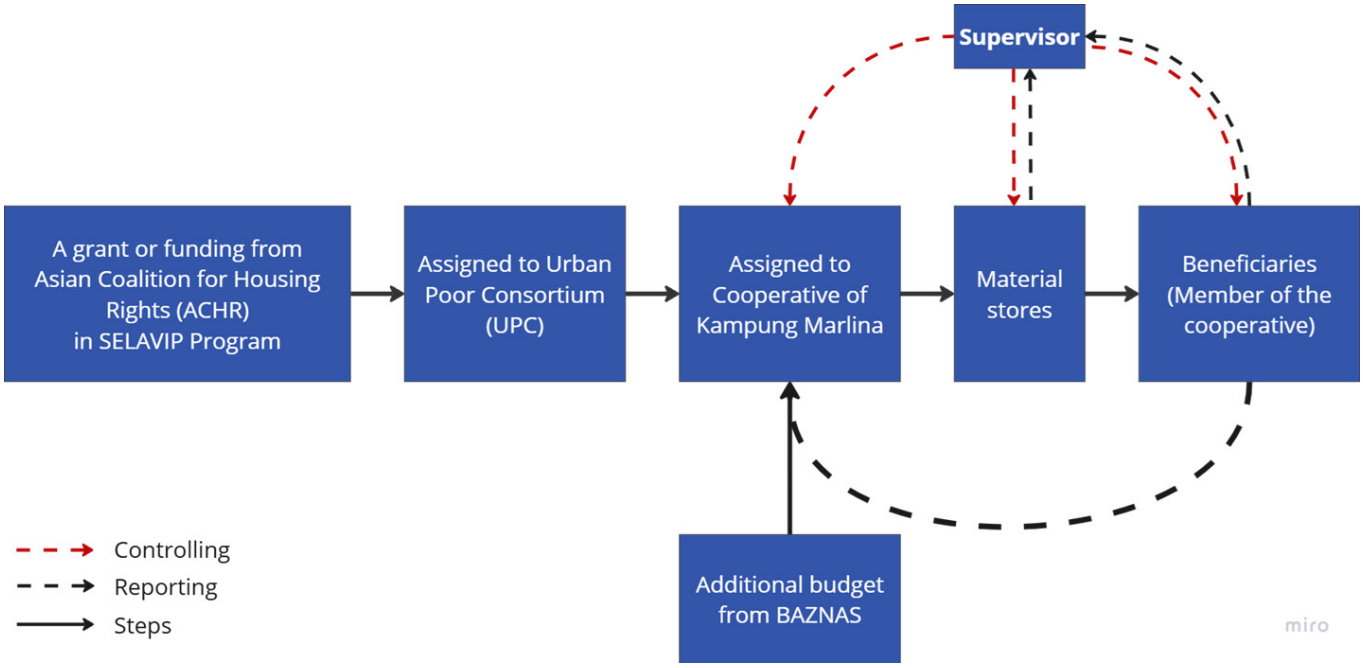


Figure 25. Financial scheme on the project. (Own work, adapted from RCUS (2023))

REPAYMENT SCHEME

To support long-term impact and shared responsibility, the project used a revolving repayment scheme. Once the houses were ready for use, the beneficiaries (cooperative members) began to repay their share through regular contributions. These repayments were collected by the Cooperative of Kampung Marlina, supported by the Urban Poor Network, and passed through the national cooperative system to benefit other future members. This system allowed the funds to be reused within the community, promoting fairness and sustainability, as illustrated in Figure 26.

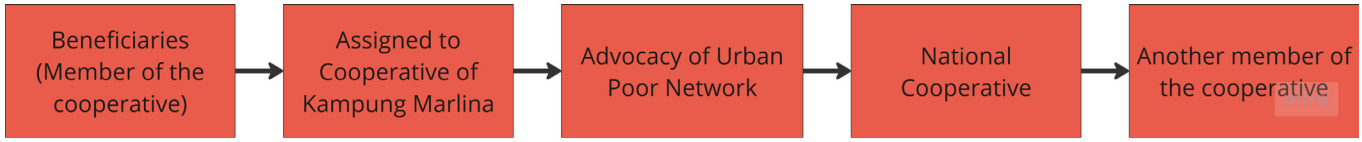


Figure 26. Repayment scheme on the project (Own work, adapted from RCUS (2023))

4.3.5 REALISATION PROCESS

This stage refers to the actual construction phase. Compared to the earlier planning stage, more actors were involved in the implementation, including material suppliers, supervisors, funders, and community members. The Cooperative of Kampung Marlina remained at the center of coordination, but the process also required close collaboration with external partners to ensure timely and efficient construction.

4.3.6 UTILISATION

The utilisation phase started once the houses were finished and ready to be lived in. At this stage, the beneficiaries returned to their homes and began their loan repayments. This phase signified the shift from construction to everyday use, emphasizing the importance of both the physical improvements and the financial responsibilities involved. The present condition of the beneficiaries' houses is shown in Figure 27 and 28. Meanwhile, Figure 29 illustrates the current state of the Kampung Marlina area, highlighting its proximity to major coastal infrastructure.

Figure 27. One of the house of the beneficiaries of the project. There is an existing house of Kampung Marlina, next to the beneficiary's house, that was not involved in the project (Own work)

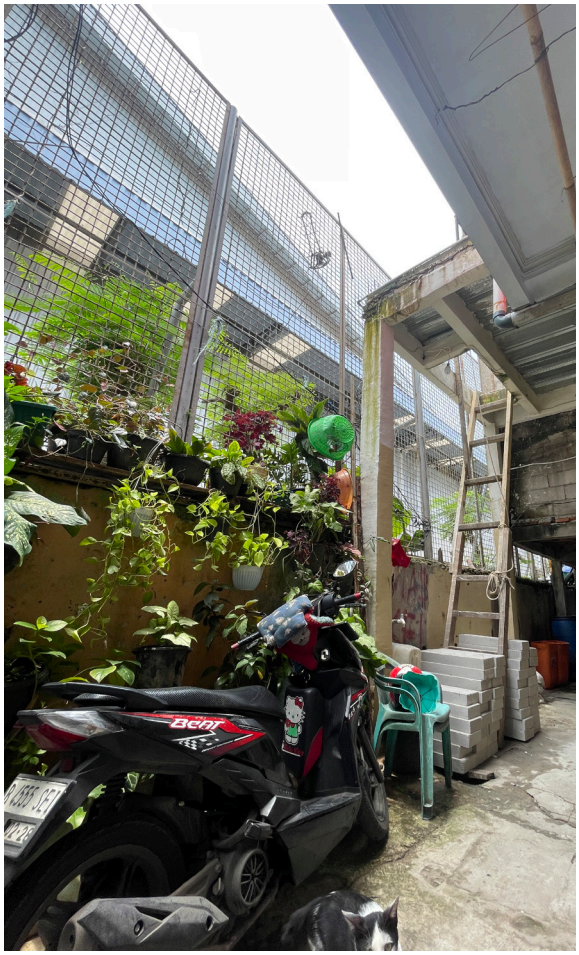


Figure 28. In one of the beneficiaries' house, the resident starts to put some houseplants, something that they can not do before the renovation project implemented (Own work)

Figure 29. The current situation of Kampung Marlina neighbourhood (Own work)

4.4. EXISTING POLICY FRAMEWORKS FOR CLIMATE CHANGE AND INFORMAL SETTLEMENT UPGRADING

Following the case study overview, this section reviews relevant policies and programs initiated by the government actors that address climate change and the upgrading of informal settlements at both national and local levels. These frameworks are essential to understand, as they provide critical institutional and regulatory context prior to conducting the data analysis. The selected policies and initiatives discussed below are those most closely aligned with the core themes of this thesis and the interventions observed in Kampung Marlina. The following discussion is structured to discuss the national level policies and local level policies.

4.4.1 NATIONAL POLICIES

Table 6 below shows the national policies regarding the research context.

Table 6. List of national policies regarding the research context (Own work)

No.	Policy	Details	
1.	**Law No.1 of 2011 on Housing and Settlement Areas**	This foundational law mandates the state to ensure access to adequate housing and settlement for all citizens, including slum dwellers. It establishes the right to participate in housing development and empowers local governments to improve substandard housing and upgrade informal settlements.	
2.	**Ministerial Regulation No. 14/PRT/M/2018 on Slum Prevention and Upgrading**	Derived from Law No. 1/2011, this regulation provides technical guidelines for local governments to conduct slum upgrading. It includes principles of environmental sustainability, spatial integration, and community participation, supporting programs like KOTAKU and contributing indirectly to climate resilience. The realization of this regulation is depicted into two main programs of the ministry that focus on informal settlement upgrading:	
		Indonesia National Slum Upgrading Project (NSUP/ KOTAKU)	A national program led by the Ministry of Public Works, which focuses on the development of slum areas, specifically on infrastructure such as roads, sanitation, drinking water, drainage, and public space. NSUP/KOTAKU is a World Bank-supported program integrating community-based upgrading into national development. This collaborative program outlines a collaboration between the Indonesian government and international partners aimed at improving infrastructure and services in slum areas through community-based approaches.
		Government Stimulant Assistance for Self-Help Housing (Bantuan Stimulan Perumahan Swadaya or BSPS)	A national program led by the Ministry of Housing and Settlement area, providing financial and technical support to low-income households, focusing on improving their housing conditions through self-managed construction or renovation. The program held annually as it is one of the main programs in the Ministry to help low-income households who are the primary beneficiaries of the housing assistance. By focusing on this demographic, the program aims to promote inclusive and self-managed housing improvements aligned with national housing adequacy goals.
3.	**Ministerial Regulation of Environment and Forestry (Permen LHK) No. 12 of 2024**	The policy governs the implementation of Indonesia's Nationally Determined Contribution (NDC) in addressing climate change. It outlines procedures for greenhouse gas (GHG) inventory, climate vulnerability and risk assessments, and the national registry system for tracking mitigation and adaptation actions. It also establishes standards for measurement, reporting, and verification (MRV) to ensure transparency and accountability. While it does not specifically target the housing sector, the regulation provides a legal framework for integrating climate adaptation into spatial planning and community-based initiatives. In this regard, it directly supports the implementation of the Program Kampung Iklim (ProKlim) by offering institutional and regulatory backing for local climate actions, particularly those involving informal settlements and low-income communities. The implementation of ProKlim is also adapted in Jakarta which addressed under the website of https://rendahemisi.jakarta.go.id/.	

4.4.2 REGIONAL POLICIES

The regional policies in Table 7 presents Jakarta's specific climate and housing policies.

Table 7. List of regional policies regarding the research context (Own work)

No.	Policy	Details
1.	**Jakarta Climate Adaptation Plan (RAD-API)**	A strategic framework developed by the provincial government to address climate impacts through local adaptation initiatives, especially in vulnerable areas such as informal settlements.
2.	**Governor's Decree No. 33 of 2024 on Improving Settlement Quality**	This decree is derived from the Ministerial Regulation No. 14/PRT/M/2018 on Slum Prevention and Upgrading. This decree mandates participatory slum upgrading, emphasizing community institution-building, spatial planning, and land tenure reform. It includes provisions for environmental improvement, infrastructure design, and cross-sectoral collaboration, although UHI is not specifically mentioned.
3.	**Governor's Regulation No. 90 of 2021 on Low Carbon Development Plans**	This regulation translates Indonesia's Paris Agreement commitments into local action. It promotes mitigation and adaptation through vertical housing, expansion of green open spaces, and infWrastructure improvements for heat-affected urban areas. This regulation was established three years before the launch of Ministerial Regulation of Environment and Forestry (Permen LHK) No. 12 of 2024. As of now, there has not been new policy that explicitly derived from the Ministerial Regulation No. 12 of 2024 in the Jakarta Provincial Government.

The findings on the policies and programs above show that both the national government and the Jakarta provincial government have made efforts to address climate change and improve informal settlements. Although these regulations already exist, it is essential to examine more closely how they are actually implemented on the ground, particularly in the case of Kampung Marlina. This analysis helps to understand how different actors work together in the project and how the policies support real community needs. The next chapter will explore this further by looking at how the case study project and the policy frameworks are connected in the practice of collaboration in Kampung Marlina, based on insights from interviews with the actors involved in the project.

5

FINDINGS AND ANALYSIS ON THE CASE STUDY

This chapter presents the main findings from the fieldwork in Kampung Marlina. It provides a closer look at how the community and other involved actors have responded to the Urban Heat Island (UHI) effects, based on data gathered through interviews. The analysis focuses on how collaboration has taken place in the project, using a structured framework while also exploring new insights that appeared during the research.

5.1 RATIONALE FOR CASE STUDY SELECTION

The selection of Kampung Marlina as the focal case study was not only based on its practical relevance and completion status, but also on its alignment with established criteria for qualitative case studies. These criteria, drawn from the literature and reflected in the operationalization table (Appendix 1), include: being studied in context, having clear boundaries, allowing for in-depth investigation and offering multiple sources of evidence (Blatter & Blume, 2008).

To validate the selection, a semi-structured interview was conducted with the RUJAK Centre for Urban Studies, which was analyzed according to these six indicators. The results, shown in the Sankey diagram and summary table below (Figure 30), reveal that the project in Kampung Marlina was consistently described as a context-rich, bounded, and well-documented case with strong multi-actor involvemwent. The most frequently referenced criteria were *Studied in Context* (7 counts) and *Selecting the Case* (6 counts).

These findings reinforce Kampung Marlina's suitability as a case study that supports the research objective: to explore collaborative governance for Urban Heat Island (UHI) adaptation in informal settlements. With the case study boundaries clearly established, the following section explores how the UHI effect is experienced within Kampung Marlina. The strong emphasis on contextual relevance and evidence-based documentation highlights the depth and richness of the project's implementation process, making it analytically robust for the framework applied in this thesis.

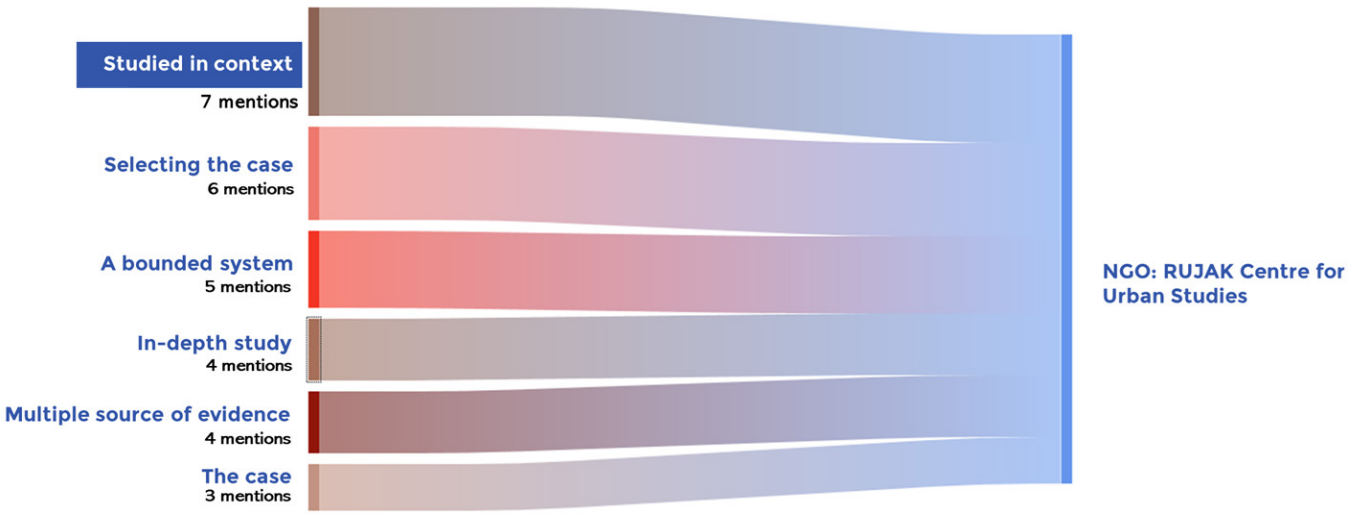


Figure 30. The result on case study selection analysis

5.2 UNDERSTANDING THE UHI IMPACT IN KAMPUNG MARLINA

This section highlights how residents of Kampung Marlina experience the Urban Heat Island (UHI) effect in their daily lives. The findings are drawn from interviews and field observations, focusing on the physical, social, and economic impacts of heat in the settlement.

5.2.1 HEALTH IMPACTS

The indicators of health impacts (Figure 31) were mentioned more frequently by the Residents of Kampung Marlina, with Heat-Related Illness cited five times, followed by *Less Activity During the Hot Period* and *Less Daily Travel*, each mentioned six times, and *Sleep Deprivation* mentioned once. These responses indicate that the UHI effects are significantly felt in residents' everyday lives, particularly in terms of their physical well-being and daily mobility. The way these indicators are articulated highlights how heat stress has started to influence both behavior and bodily comfort, reducing outdoor movement and disrupting activity routines during extreme heat periods. During the interviews, the respondents mentioned how the high temperature of the area is somehow related to the illness, even though it is not affecting the respondents directly. Additionally, they also shared about how the condition of the near-coastal area is affecting their access to qualified clean water.

Although the health-related questions were not asked directly, these responses show that the Cooperative holds some awareness of heat-related behavioural impacts. However, the limited reference to physical health indicators such as illness or sleep deprivation suggests that the Cooperative may not fully reflect the embodied experiences of the residents. While they serve a representative role in planning and coordination, this difference in emphasis indicates the importance of incorporating resident narratives more directly into adaptation planning and policy framing.

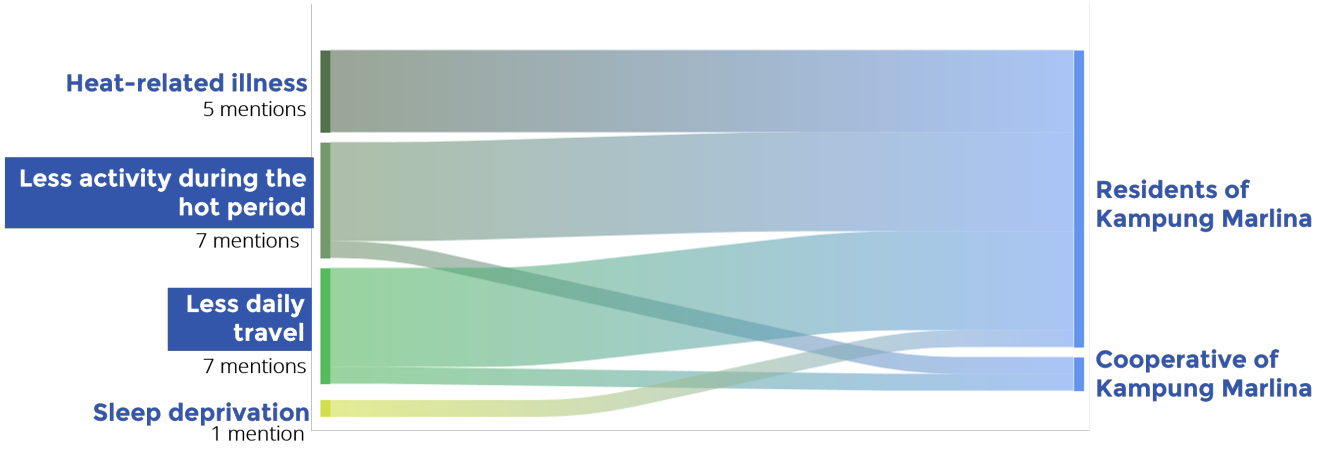


Figure 31. Health Impacts factors that affected residents in Kampung Marlina (Own work, derived from Atlas.ti)

5.2.2 SOCIAL IMPACTS

The UHI effects in Kampung Marlina have also brought several social and economic impacts to its residents. Based on the selected indicators (Figure 32), the *Increased Electricity Bill* was mentioned most frequently by the residents of Kampung Marlina, with a total of four mentions. These responses suggest that the need for cooling during hot periods has increased energy usage, which then affects the household economy, especially for those who live with limited financial resources. An additional observation from fieldwork revealed that post-renovation homes are now more physically open, particularly those facing communal aisles. This increased openness appears to have strengthened informal social interactions, contributing to greater social cohesion among residents (Figure 33).

Even though these social and economic impacts were not mentioned as often as the building and environmental indicators, the findings show that the residents are still experiencing a set of indirect impacts from UHI. These impacts are not always visible, but they affect the daily life of the community, physically, socially, and economically. While the cooperative representatives captured some of these issues, the residents' responses showed more clearly how the increased heat affects their spending and comfort at home. This suggests the importance of considering not only the physical environment but also the financial pressures that come with adapting to a hotter living condition.

Figure 32. The results of seeing how Social-Economic Impacts affecting the Residents of Kampung Marlina (Own work, derived from Atlas.ti)

Figure 33. The living condition around the renovated house (Own work)

"We tend to stay inside the house rather than go out. We prefer to do everything indoors because the living environment outside is less comfortable."

Respondent A,
Residents of Kampung Marlina

5.2.3 BUILDING AND ENVIRONMENT IMPACTS

Drawing from the residents' interviews above, it examines how physical comfort, health impacts, and socio-economic pressures shape the everyday realities of living in a dense and high-heat environment and how these conditions form the backdrop for subsequent collaborative governance efforts. This pattern indicates that residents are more sensitive to the microclimatic and environmental conditions around them, likely because of their daily exposure to heat stress. As shown in the Sankey diagram (Figure 34), the difference in focus between residents and institutional actors reveals a gap in perception, suggesting that everyday concerns at the community level are not always reflected in the priorities set by higher-level planning processes. Many respondents mentioned that, before the renovation, their houses received very little direct sunlight. Most households had covered their homes with heavy shading materials to create privacy and security, which also limited airflow and light.

Field observations confirmed this account. Before the project, the houses were built very closely together with little space in between. Materials like corrugated metal sheets enclosed the spaces tightly, as shown in Figure 35, creating dim and poorly ventilated conditions. After the renovation, however, some areas were opened up, allowing more sunlight to enter and air to circulate more freely. As shown in Figure 36, the new spatial arrangement provides improved exposure to natural light and a greater sense of openness. These physical changes not only support better thermal comfort but also improve how residents experience and use their everyday spaces. This shows how adaptation efforts can have a broader impact beyond technical solutions, they also shape how people live and feel in their homes.

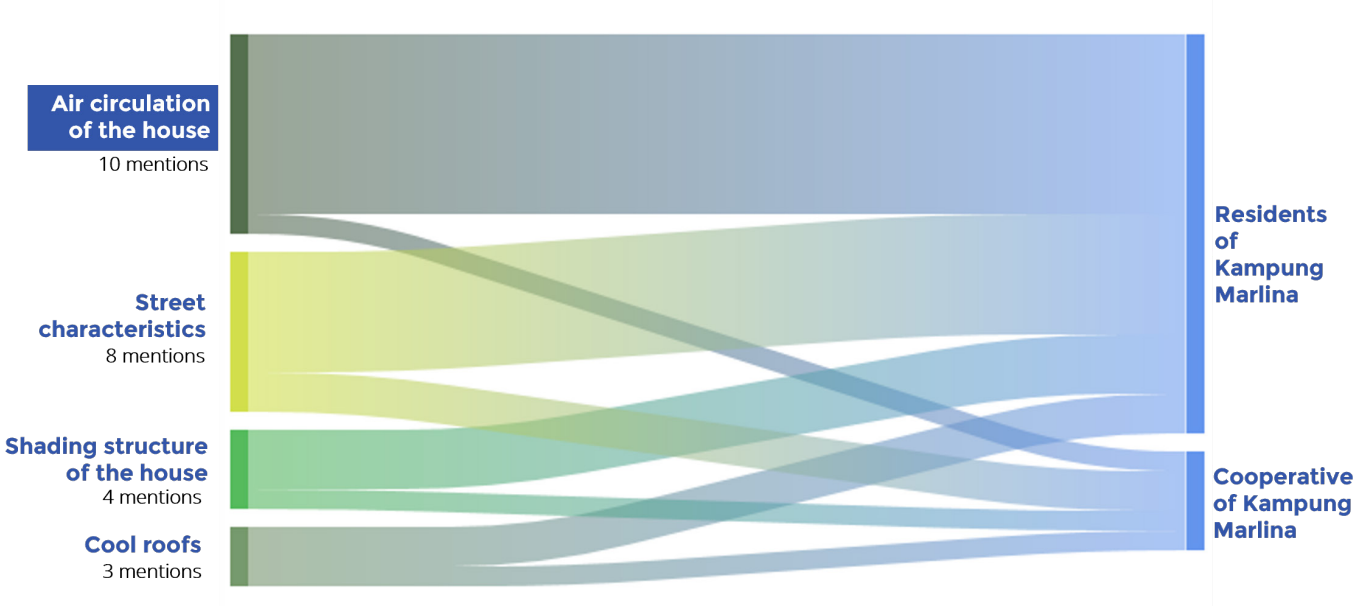


Figure 34. Results on seeing the effects of UHI in informal settlements area through interview (Own work, derived from Atlas.ti)

Figure 35. The unrenovated house from the resident who did not participated to the project (Own work)

Figure 36. The renovated house after joining the project (Own work)

5.3 COLLABORATIVE GOVERNANCE PRACTICES IN THE PROJECT

This section presents how collaboration among different actors unfolded during the project, using Emerson et al.'s (2012) framework. The analysis is grouped into three principles: principled engagement, shared motivation, and capacity for joint action.

5.3.1 PRINCIPLED ENGAGEMENT DURING THE PROCESS

The principle of Principled Engagement explores how different actors define the problem, express commitment, and decide to participate in collaborative efforts. In Kampung Marlina, these dynamics were shaped by both contextual urgency and institutional roles.

For community actors, particularly residents and the cooperative, engagement was grounded in lived necessity. Facing extreme heat and poor housing condition, residents joined the project with strong determination. As shown in the Sankey diagram (Figure 37), high frequency in Definition of the Context and Determination to Join the Project reflects this deep-rooted involvement. Participation was not only verbal or procedural; many residents actively contributed labour during construction. However, through the interview session, the residents shared how differing levels of construction knowledge among residents, builders, and associate architects led to miscommunication and coordination issues.

The Cooperative of Kampung Marlina functioned as a governance structure that guided principled engagement from within the community. Their use of musyawarah dan mufakat (deliberation and consensus) ensured that discussions remained inclusive and decisions transparent, allowing the participatory process to run smoothly at the local level.

For actors from NGO and CBO, such as RUJAK and JRMK, they were less vocal in expressing personal commitment but played a foundational role in structuring engagement. RUJAK helped the community articulate a "big vision" during early planning and supported the participatory framework. JRMK, on the other hand, emphasized the importance of early government inclusion to ensure process legitimacy and policy alignment. Their contribution demonstrates how NGOs and CBOs often engage indirectly through tools, facilitation, and strategic coordination.

From the government side, principled engagement was framed more as an extension of formal responsibilities, particularly within the context of Jakarta's Community Action Plan (CAP) and Collaborative Implementation Program (CIP). Local officials described their involvement as programmatic, linking it to mandates and inter-agency coordination. Although less embedded than community actors, their role was essential for legitimacy and resource alignment.

Academic stakeholders participated primarily in a facilitative role, supporting community actors through planning tools and knowledge-sharing. Their engagement was instrumental in shaping frameworks, though their own motivations or institutional positions were not as strongly verbalized during interviews.

These varied expressions of engagement suggest that while the principle of collaboration was broadly shared, its meaning and manifestation differed across stakeholder groups. Residents engaged out of necessity, NGOs enabled structures, and government actors ensured institutional fit. Recognising and aligning these forms of engagement is critical for fostering genuine collaboration.

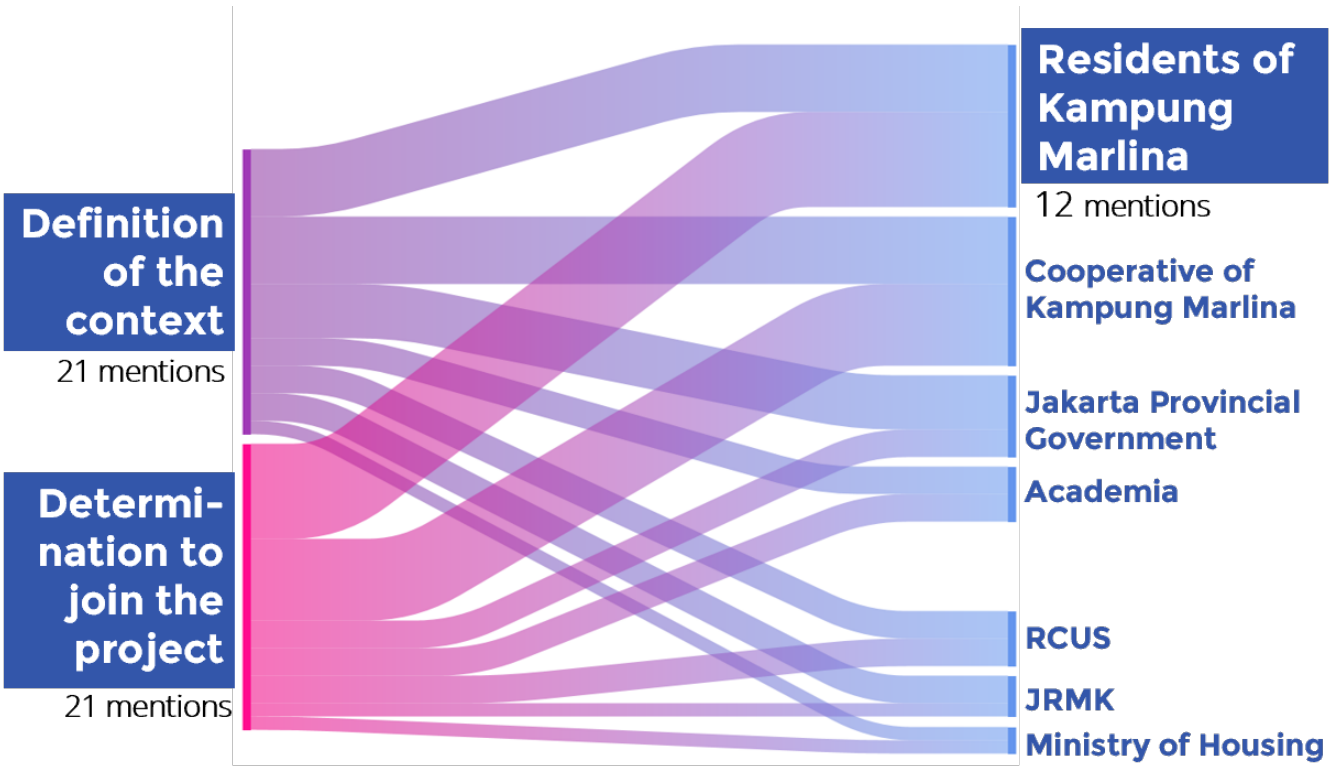


Figure 37. Analysis results on Principled Engagement indicator (Own work, derived from Atlas.ti)

5.3.2 SHARED MOTIVATION IN EVERY INVOLVED ACTOR

The principle of Principled Engagement explores how different actors define the problem, express commitment, and decide to participate in collaborative efforts. In Kampung Marlina, these dynamics were shaped by both contextual urgency and institutional roles.

For community actors, particularly residents and the cooperative, engagement was grounded in lived necessity. Facing extreme heat and poor housing condition, residents joined the project with strong determination. As shown in the Sankey diagram (Figure 38), high frequency in Definition of the Context and Determination to Join the Project reflects this deep-rooted involvement. Participation was not only verbal or procedural; many residents actively contributed labour during construction. However, through the interview session, the residents shared how differing levels of construction knowledge among residents, builders, and associate architects led to miscommunication and coordination issues.

Shared Motivation centers on relational trust, shared goals, and the willingness to work together. In Kampung Marlina, this dimension of collaboration revealed important asymmetries in how different stakeholders internalized the project. At the community level, shared motivation was deeply rooted in everyday realities. Interview responses indicated strong alignment under *Willingness to Cooperate* and *Mutual Trust*, as visualized in Figure 35. Residents described a culture of mutual help and a belief that only through joint effort could the project succeed. The Cooperative of Kampung Marlina reinforced this alignment by coordinating participation, resolving internal conflicts, and submitting collective funding proposals, such as to UPC, for implementation support. While for NGO and CBO actors, including RUJAK and JRMK, demonstrated shared motivation through structural and strategic contributions. RUJAK helped develop a shared vision that guided planning beyond the immediate project. JRMK maintained confidence in the participatory process but noted that long-term motivation could be undermined without more sustainable financial and institutional support, particularly from the government, as mentioned during the interview process.

Government actors shared the broad goals of the initiative but approached collaboration more from a system perspective. One notable insight from interviews was the recognition of NGOs as community associates, signalling a shift in how public actors perceive civil society, as partners embedded in the community rather than external intermediaries. This relational framing enhances mutual trust, even if the government's role in day-to-day collaboration was less hands-on. For academics, they supported shared understanding through participatory workshops and the co-development of tools. Their contributions helped establish common reference points for discussion, although their presence in emotionally or socially driven collaborations especially in this case study project, was less pronounced.

Together, these findings show that while motivation to collaborate existed across all stakeholder groups, the nature and source of that motivation varied. Community actors were driven by survival and solidarity; institutional actors by alignment with policy frameworks and programmatic logic. This divergence underscores the importance of continuous dialogue and recognition of different forms of commitment in sustaining shared motivation.

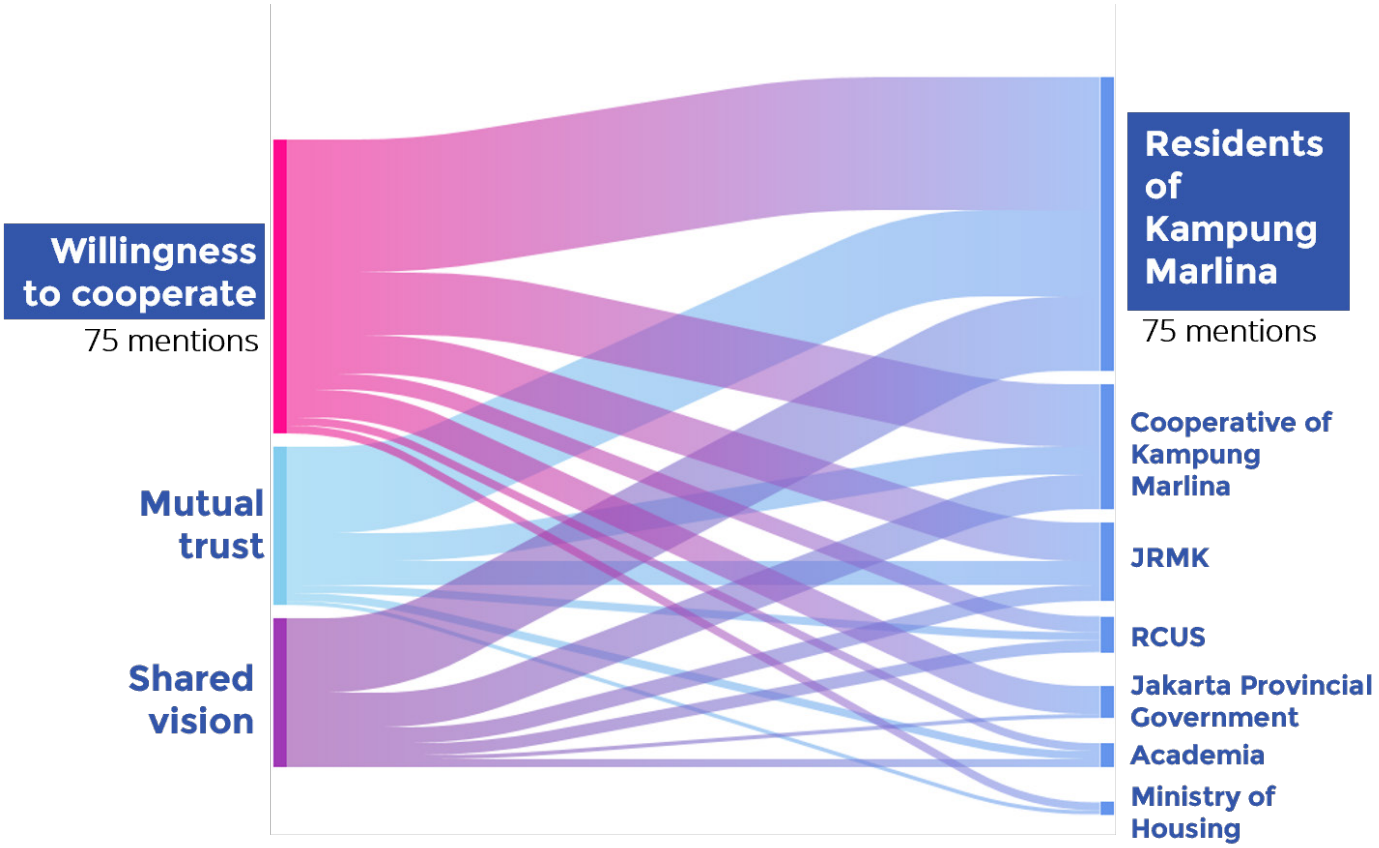


Figure 38. The result on Shared Motivation indicator mentioned during interviews (Own work, derived from Atlas.ti)

5.3.3 CAPACITY FOR JOINT ACTION IN THE CASE STUDY

The ability to implement collaboration hinges on shared structures, resources, knowledge, and leadership, what Emerson et al. (2012) call Capacity for Joint Action. In Kampung Marlina, this capacity was unevenly distributed, but synergistic when actors' contributions were aligned.

Residents and the cooperative expressed the strongest focus on Procedural Arrangements and Resources, as reflected in Figure 39. Their engagement emphasized the need for transparency and predictability, particularly during implementation. However, their interviews also revealed technical and logistical challenges, especially during the construction phase. During the interview, the residents of Kampung Marlina shared about the misalignment in expectations between residents, builders, and associate architects exposed a lack of shared technical understanding, which complicated coordination.

The Cooperative of Kampung Marlina played a stabilizing role, managing financial accountability, translating resident needs, and communicating with funding partners. Their leadership was essential for keeping the process grounded and responsive to local needs.

Among NGOs and CBOs, RUJAK and JRMK helped build institutional capacity through the use of participatory design tools and stakeholder facilitation. However, both recognized limitations in execution. On the interview session, RUJAK noted the absence of baseline data (e.g., on temperature or ventilation) that could have helped quantify adaptation outcomes. They also flagged budget overruns as a key lesson for future projects, pointing to the need for stronger financial and construction management systems.

Government actors supported the project by helping it follow existing procedures and policies set by Jakarta's planning programs. During the interviews, they also highlighted some of the main challenges, such as unresolved land ownership issues. These problems continue to make it difficult for the government to invest entirely in informal areas. One valuable insight from the interviews was the idea that even small or informal actions can have a significant impact. Sharing updates or information with other actors can help build trust and improve cooperation between the government, NGOs, and the community. However, academic participants supported implementation through strategic advice and technical inputs.

Overall, the capacity for joint action in Kampung Marlina was built through the combination of different strengths from each actor and the way they adjusted to one another. Some challenges appeared, mostly because of differences in technical knowledge or unclear policies.

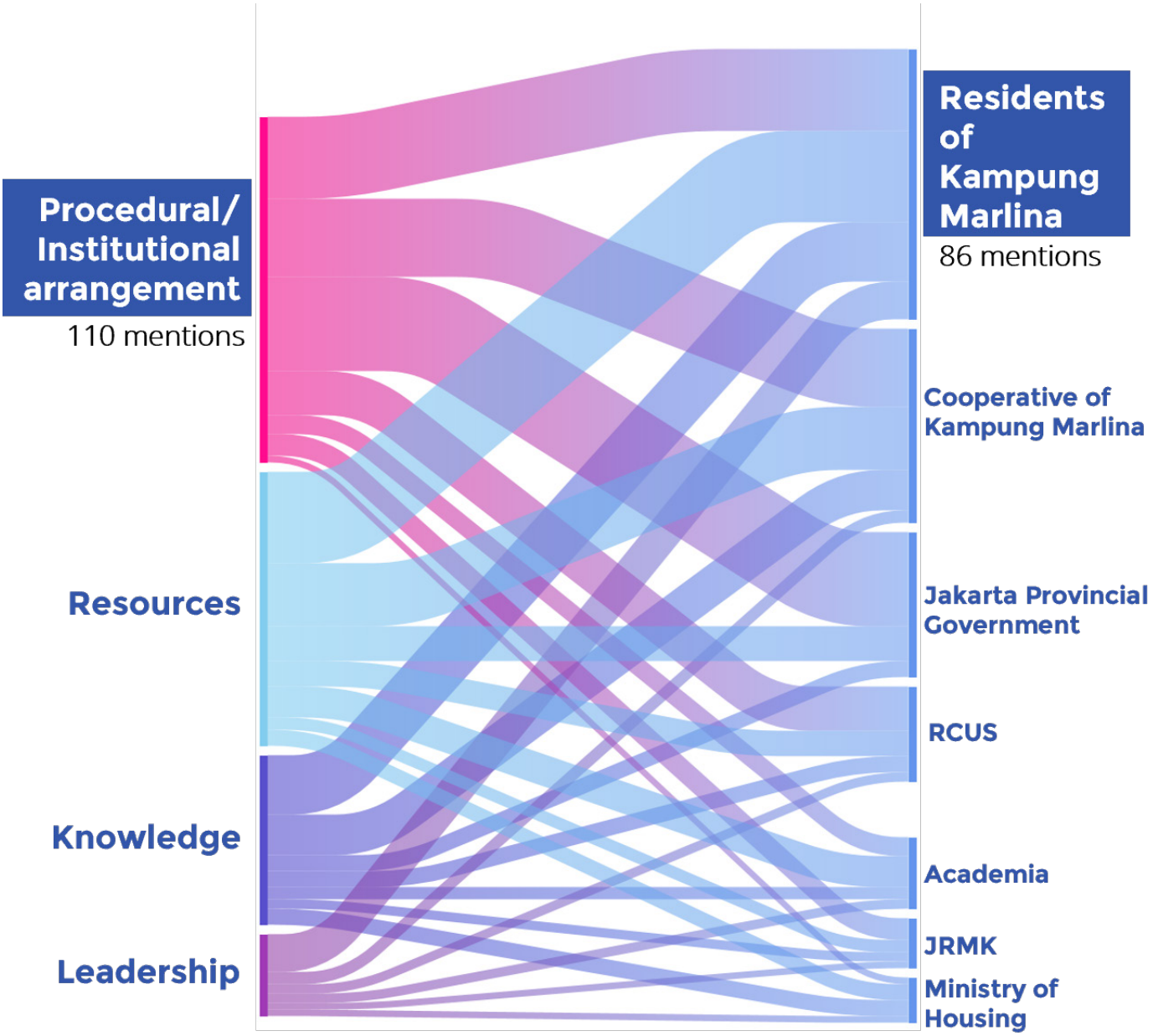


Figure 39. The results on Capacity for joint action shows a high number compared to the other two indicators of Dynamics of Collaborative Governance
(Own work, derived from Atlas.ti)

5.4 THE STRATEGIES TO ENHANCE COLLABOERATIVE GOVERNANCE IN THE CASE STUDY

This section outlines how collaborative governance in the case study can be improved. Based on feedback from involved actors, it highlights key strategies to enhance engagement, motivation, capacity, and innovation in future projects.

5.4.1 ENHANCING PRINCIPLED ENGAGEMENT

The analysis of *Enhancing Principled Engagement* includes two indicators: *Enhancing Definition of the Context* and *Enhancing Determination to Join the Project* (Figure 40). These indicators were mentioned equally, showing a balanced interest across stakeholders. The Ministry of Housing and Settlement Area was the most active contributor, despite not being directly involved in the project. This suggests that higher-level institutions are increasingly interested in improving how engagement is framed, particularly for future replication or policy integration.

On the other hand, responses from residents and the Cooperative of Kampung Marlina were limited under this category. Although they were highly involved in the project, their contributions did not strongly reflect on how the engagement process itself could be improved. This may indicate that for community members, participation is often seen as a given, or an immediate response to need, rather than something to be formally enhanced.

This difference shows a potential gap between institutional discourse and community practice. While government and academic actors focus on establishing principles for future scaling, non-governmental actors prioritise practical involvement. Bridging this gap may require more inclusive reflection tools, where communities are encouraged to evaluate and articulate their own approaches to participation.

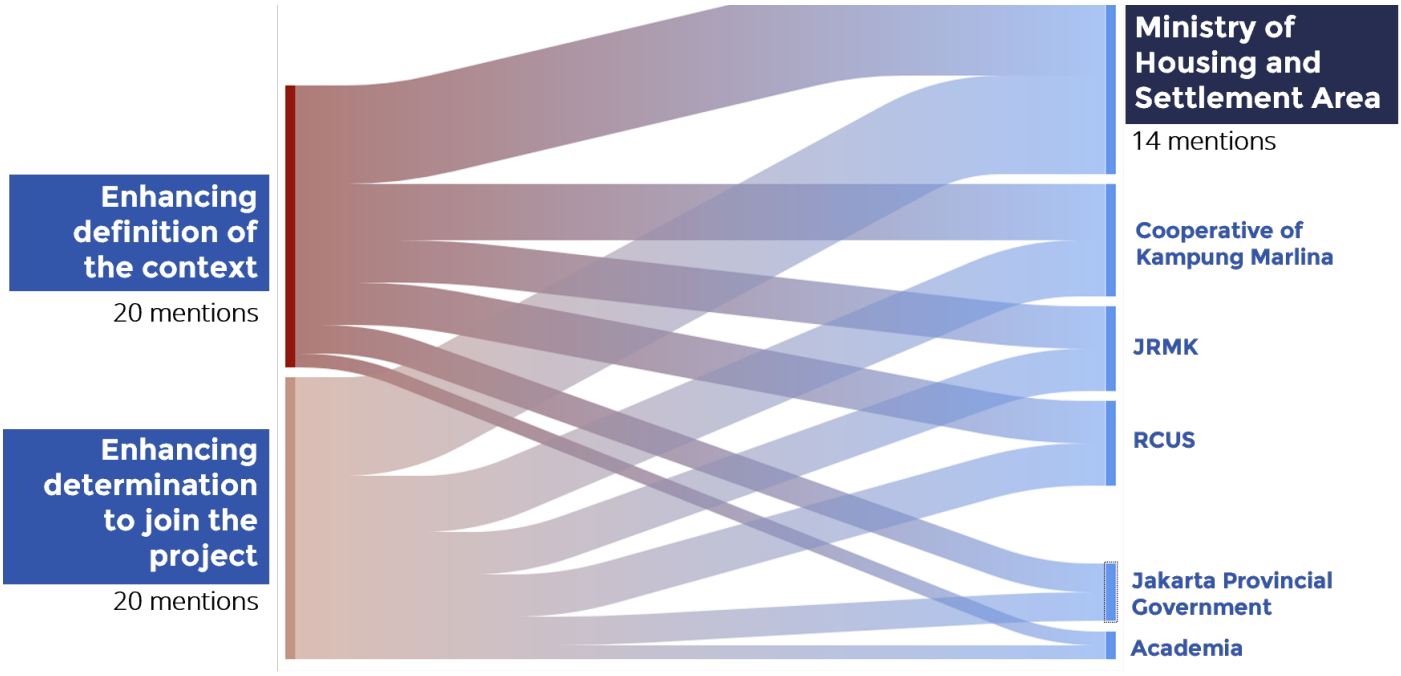


Figure 40. Analysis of the first indicator: Enhancing Principled Engagement (Own work, derived from Atlas.ti)

5.4.2 ENHANCING SHARED MOTIVATION

The principle of Enhancing Shared Motivation was assessed through three indicators: *Enhancing Willingness to Cooperate*, *Enhancing Mutual Trust*, and *Enhancing Shared Vision* (Figure 41). The highest frequency of responses was observed under *Willingness to Cooperate*, particularly among residents and cooperative members, indicating strong internal motivation and emotional commitment to the project. Their responses often reflected everyday collaboration and a deep sense of ownership.

The Cooperative of Kampung Marlina played a key role in maintaining this motivation, ensuring that internal discussions were open and that contributions from households were fairly coordinated. These actors helped maintain trust within the community, but also extended that trust outward by actively communicating with NGOs and external partners. This shows how shared motivation can be maintained through both internal relationships and external representation.

Institutional actors, including the Ministry of Housing, also contributed under this dimension. Their input emphasized the value of building trust and cooperation at a broader governance level. However, the nature of their responses was more focused on strategic alignment than on emotional or lived experiences. This contrast highlights the importance of recognizing different types of motivation and ensuring that formal actors support, rather than overlook, the social dynamics that sustain participation.

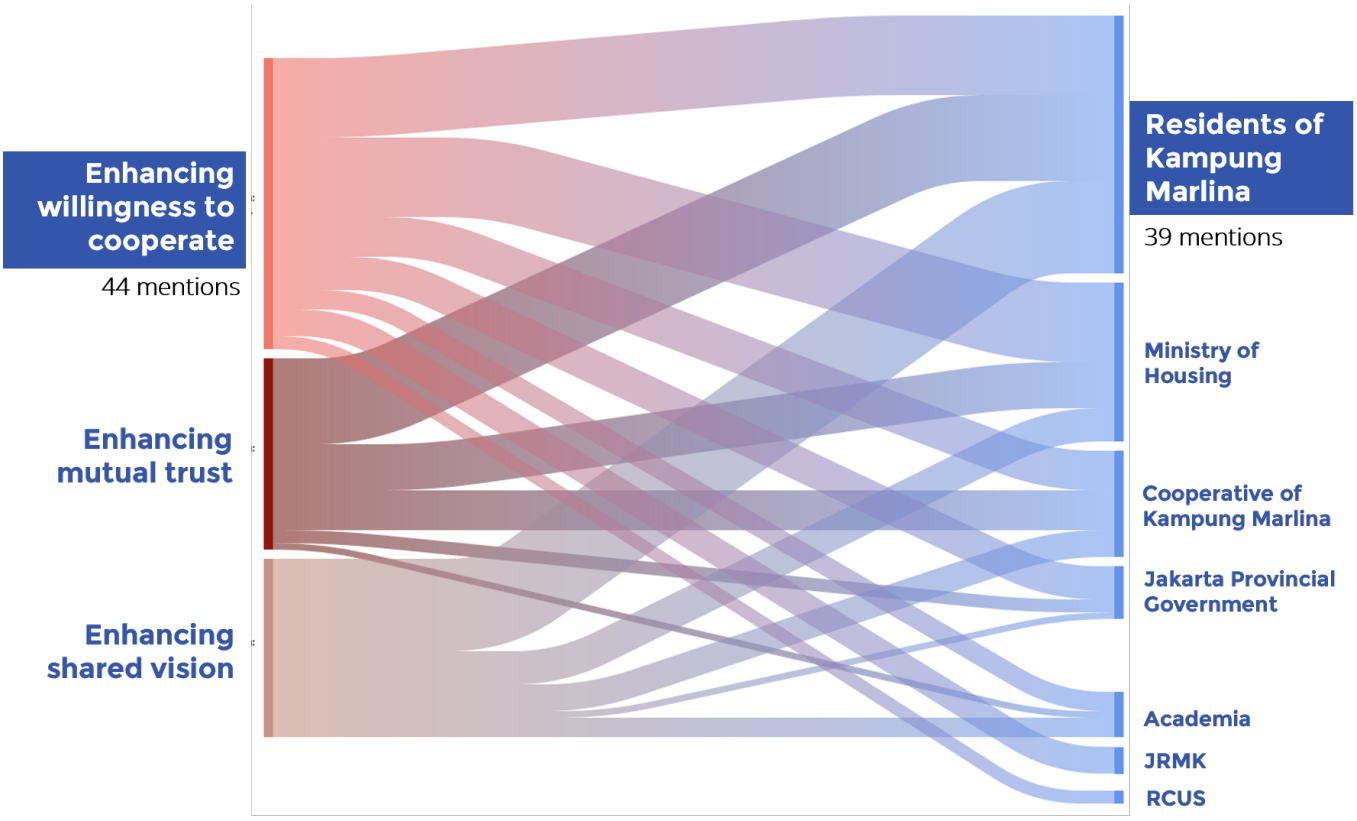


Figure 41. The interview results on Enhancing Shared Motivation indicators (Own work, derived from Atlas.ti)

5.4.3 ENHANCING CAPACITY FOR JOINT ACTION

The analysis of Capacity for Joint Action used four indicators: *Procedural/Institutional Arrangements*, *Resources*, *Knowledge*, and *Leadership* (Figure 42). The most frequently mentioned indicator was Procedural Arrangements, reflecting that actors prioritised transparent processes. The residents and cooperative highlighted issues around technical misunderstandings during construction and the need for better communication and guidance throughout the implementation stage.

The cooperative managed community coordination and helped translate local needs to external actors, including funders. Their leadership ensured that the project moved forward even when technical or financial issues emerged. At the same time, they also noted the importance of having more support in understanding construction processes and monitoring expenses. This shows that while community leadership is strong, it also needs more technical backing.

Institutional and academic actors focused on building systems that support long-term collaboration. The government emphasized land legality and coordination mechanisms, while academics and NGOs discussed the lack of baseline data and cost management strategies. These findings suggest that joint action can be strengthened by improving the connection between community-based leadership and technical/institutional support, ensuring all actors can work effectively with shared understanding and tools.

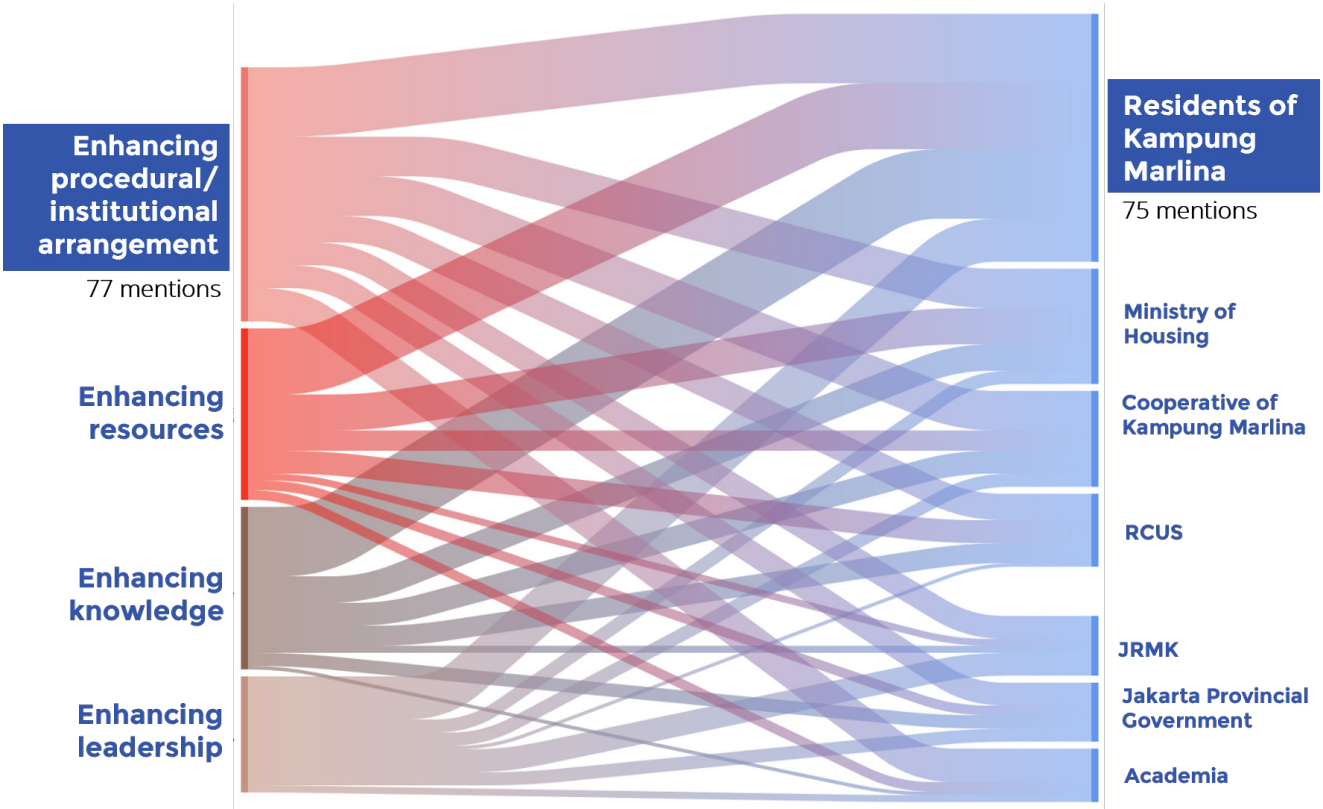


Figure 42. The results on analysing the principle of Enhancing Capacity for Joint Action (Own work, derived from Atlas.ti)

5.4.4 ENHANCING INNOVATION AND SCALING

The final principle, Enhancing Innovation and Scaling, was analyzed using two indicators: *Enhancing Innovation in the Governance Approach* and *Enhancing the Role of Experts and Academia* (Figure 43). Most responses in this category came from institutional and academic actors, particularly the Ministry of Housing and the University of Indonesia. Their responses reflected a strong interest in experimenting with new governance strategies and using expert knowledge to support participatory models.

Community actors, especially residents, did not contribute significantly to this category. This could be because innovation and scaling are often seen as abstract concepts that do not directly relate to the immediate challenges faced during the project. As discussed during the interview process, residents indicated collaboration based on the results, such as better housing and comfort, rather than on future models or system design. This shows a gap in how innovation is perceived between grassroots and policy-level actors.

However, this also opens a valuable insight: innovation can only succeed if it is grounded in the real experiences of the community. Future efforts to scale collaborative governance should include more structured ways for communities to participate in reflection and experimentation, making sure that new ideas are both relevant and practical. This can help align innovation goals across actors and ensure that scaling does not compromise the quality of engagement.

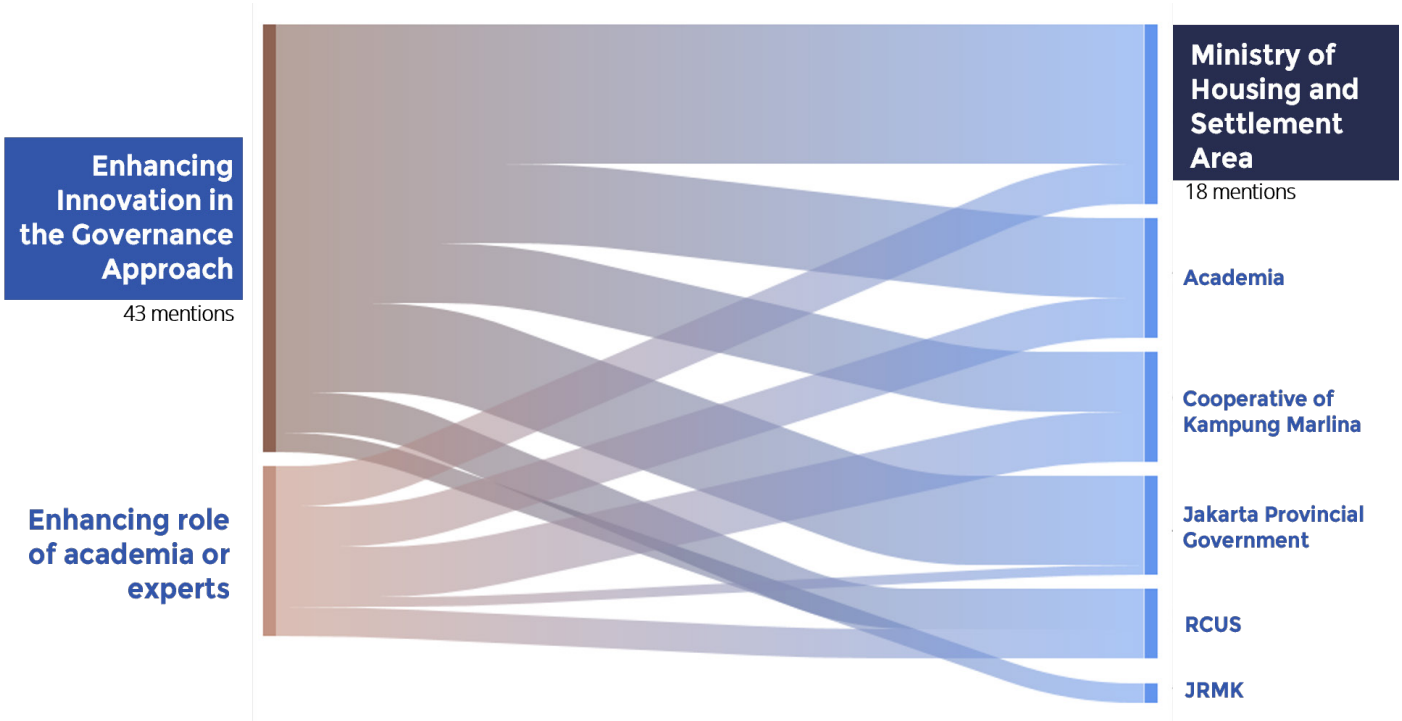


Figure 43 The analysis on the principle of Enhancing Innovation and Scaling (Own work, derived from Atlas.ti)

5.5 SUMMARY OF KEY FINDINGS

The findings indicate that the semi-structured interviews offer insights into three main aspects:

1. **The first focus** of the interviews reveals that the residents and beneficiaries of the project in Kampung Marlina are indeed affected by the Urban Heat Island (UHI) phenomenon. The renovation project has had positive impacts on their health, socio-economic conditions, housing quality, and surrounding environment.

2. **The second focus**, which explores the collaborative governance process, shows that each actor involved in the project had different understandings shaped by their level of involvement. Residents and the cooperative in Kampung Marlina demonstrated strong principled engagement and shared motivation, often based on lived experience and mutual trust. Their participation was action-oriented and supported by informal forms of governance. The NGO and CBO mainly played a bridging role between the community and institutional actors, supporting both the planning phase and the implementation. Government bodies contributed by facilitating systems, setting policy directions, and providing technical tools, though their role was often centered on planning, monitoring, and achieving long-term goals.

3. **The third focus** looks into enabling future strategies for collaborative governance. Most actors emphasized the importance of procedural and institutional arrangements, along with calls to enhance innovation in governance approaches and to involve experts or academic institutions. The data also shows that while government actors, NGOs, and CBOs were more engaged in innovation and scaling, residents were less involved in these aspects. W

These key findings highlights the importance of understanding the effects of climate change on informal settlements through the lens of collaborative governance, as proposed by Emerson et al. (2012). However, while the project was generally successful, there remains room for further review and refinement of the interview results to strengthen the analysis. This points to a need for better alignment between practice and policy, particularly in how participation is conceptualized and supported across different levels.

In conclusion, the findings stress the need to maintain a balance between community involvement and institutional support. Strengthening collaborative governance in similar initiatives requires clear procedures, inclusive planning processes, continuous communication, and closer integration between daily practices and long-term strategies. These insights form a solid basis for improving future initiatives in UHI adaptation and informal settlement upgrading.

5.6 ANALYSIS ON FINDINGS

Drawing on insights from both interviews and field observations, the analysis provided a deeper understanding of how collaborative governance was operationalized in the project and the extent to which it contributed to Urban Heat Island (UHI) adaptation in informal settlement areas. To enrich this interpretation and critically assess the underlying dynamics, findings were triangulated with literature from academic sources and policy documents, the project's report, and semi-structured interviews (Figure 44), situating the project within broader governance and climate adaptation frameworks. As Denzin (1978) and Carter et al. (2014) argue, triangulation strengthens the validity of qualitative findings by enabling convergence across different types of data, mitigating potential biases associated with single-source reliance.

The triangulation also aligns with the Deliver phase of the Double Diamond Framework (DDF), where diverse insights are synthesized to inform both practical and theoretical contributions. At this stage, the analysis ensures a more balanced and context-sensitive understanding of the case. Through this approach, the discussion moves beyond existing findings to investigate how climate adaptation is framed, negotiated, and practised in Jakarta's informal settlements, therefore supporting a more evidence-based and multidimensional response to the research questions.

The following discussion applies a triangulation approach to examine the findings in relation to the core concepts presented in Chapter 2 and the three sub-research questions. These include: the impact of the Urban Heat Island (UHI) effect on informal settlements, the process of collaborative planning and governance within the case study project, and potential strategies to strengthen collaborative planning and governance in future initiatives. These three areas are explored using insights from the literature review, the project report, and the semi-structured interviews.

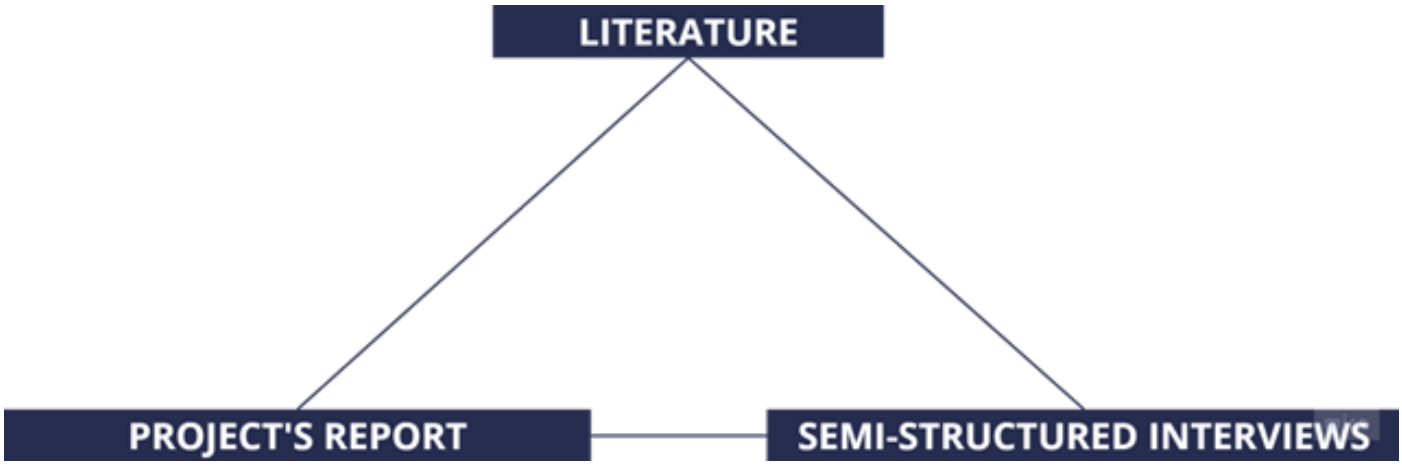


Figure 44. Triangulation to support the Deliver phase of this research (Own work)

5.6.1 PROJECT'S IMPACT ON THE URBAN HEAT ISLAND (UHI) EFFECT IN KAMPUNG MARLINA

As discussed in the literature review, the Urban Heat Island (UHI) effect is strongly experienced by residents in Kampung Marlina, a coastal settlement located near the port area in Jakarta. This condition is reinforced by findings from interviews and field observations, where residents shared that living in high temperatures has become a normalized experience. This is understandable, considering their long-term exposure and limited access to alternative housing or climate adaptation knowledge. In response, RCUS integrated this reality into their design by incorporating several adaptive features to address these environmental conditions. A detailed overview of this analysis is presented in Table 8.

From a policy perspective, climate change mitigation and adaptation efforts have been formalized at various levels of governance. Nationally, Indonesia has committed to international frameworks such as the UN Sustainable Development Goals (SDGs) and the Paris Agreement, which was ratified through Law No. 16 of 2016. At the city level, this commitment is reflected in Governor's Regulation No. 90 of 2021 concerning the Climate Resilient and Low Carbon Development Plan. This regulation outlines sectoral priorities, including housing and informal settlement upgrading, and calls for collaborative actions among multiple stakeholders (Jakarta Provincial Government, 2021). Despite this framework, most of the actual implementation has focused on flood control, energy efficiency, wastewater management, and large-scale infrastructure projects like green buildings and mass transportation (Jakarta Climate Action Plan, 2021).

RUJAK, as a central NGO involved in the Kampung Marlina project, supported community-based design interventions that improved housing conditions and helped residents cope with extreme temperatures. Interview data revealed that many residents noticed a reduced reliance on air conditioning, which in turn lowered their electricity costs, suggesting an improvement in thermal comfort. However, as noted in the project documentation (RCUS, 2023), a systematic comparison of conditions before and after the renovation was not conducted, making it difficult to quantify the full impact.

Interviews with project beneficiaries highlighted improvements in various aspects of their daily life, including health, socio-economic conditions, housing quality, and the surrounding environment. Interestingly, residents also described benefits not captured in the original indicators that was developed from Mahadevia (2004) and Salsabila et al. (2023), such as the renovation of homes with higher ceilings, which made their houses feel more comfortable.

To conclude, the implementation of this project has been giving an improved living condition for the residents in Kampung Marlina, adapting to the UHI impacts in their environment. The design principles applied by RCUS was sufficient for them. However, the national and local regulation has not presented the necessary instrument to support this action and the living environment of informal settlements.

Table 8. Triangulation analysis on the first concept (Own work)

LITERATURE: ACADEMIC LITERATURE	LITERATURE: POLICY REVIEW	PROJECT'S REPORT	SEMI-STRUCTURED INTERVIEWS
HEALTH IMPACTS	The consideration to overcome the health impacts is unaddressed in the policies	Health impacts were not considered before or after the project.	High temperatures were seen as normal and health impacts were not given much attention before the renovation project
SOCIO-ECONOMIC IMPACTS	The consideration to overcome the social impacts is unaddressed in the policies	The comparison on the social impacts was not addressed in the planning principles	The residents experienced improved social impacts after the renovation project
BUILDING AND ENVIRONMENT IMPACTS	The adaptation attempt is directed at vertical housing development	Adaptation attempt applied through the design principles	The renovation project made a positive impact on the residents' houses

5.6.2 ANALYSING THE PROJECT'S PROCESS THROUGH THE INTEGRATIVE FRAMEWORK OF COLLABORATIVE GOVERNANCE

This section applies the integrative framework of collaborative governance by Emerson et al. (2012) to assess how the project process unfolded, particularly through the perspectives of different actors involved. A detailed breakdown of this analysis is provided in Table 9.

From the policy review, the government institutions have started to formalize participatory planning practices. Governor's Decree No. 33 of 2024 offers a structured framework for upgrading informal settlements. It outlines key stages including project initiation, site selection, community engagement, and evaluation. A core feature of this framework is the alignment of community input with project objectives to encourage inclusive participation. Notably, Article 14 emphasizes the importance of the "Preparing the Community" phase, which requires local authorities to ensure transparent information-sharing and open communication with affected communities. This policy shows an effort to embed collaborative principles into the formal planning process (Jakarta Provincial Government, 2024). However, while this reflects principled engagement and shared motivation among stakeholders, the framework still lacks clarity in how it will build practical capacity for joint action. The institutional arrangements are outlined but not supported with specific mechanisms for implementation.

As Abbott (1996) points out, NGOs often aim to empower communities by helping them achieve better living conditions. According to the project report by RCUS (2023), this empowerment was reflected in the way design principles addressed the challenges of high temperatures in informal settlements. The introduction of context-sensitive design elements, such as natural ventilation, porous wall materials, integrated stairwells, and multifunctional terraces, demonstrates principled engagement in action. These features align with the Adaptability component of the 5A Principles of Adequate Housing (Ayala et al., 2023), ensuring that homes can respond to both environmental and social changes. Engagement was further reinforced by the project's participatory process, which included weekly meetings that enabled residents to refine design ideas and monitor progress, building shared motivation and encouraging their active contribution.

The project's collaborative efforts, as recorded in the RCUS report (2023) and supported by semi-structured interviews, began informally in 2012. By 2017, the collaboration was formalized through Jakarta's participatory upgrading initiatives under the Community Action Plan (CAP) and Collaborative Implementation Program (CIP) (Sari et al., 2022). Although Sari et al. focus on Kampung Susun Akuarium, a similar timeline and approach were applied in Kampung Marlina. Joint efforts among the provincial government, RUJAK, JRMK, and UPC involved early activities such as community mapping, needs assessments, and participatory planning workshops. These efforts enabled residents to articulate their aspirations and directly contribute to shaping the project, laying the foundation for a community-led transformation. This approach emphasized bottom-up planning and supported inclusive urban development.

In conclusion, while the policy framework signals progress toward more participatory planning, it still places much of the responsibility on communities to adapt, without fully requiring government actors to engage with local perspectives. The introduction of the CAP and CIP represents a meaningful shift toward collaborative governance by involving multiple stakeholders and encouraging stronger engagement. However, the element of capacity for joint action, as viewed through the policy lens, still requires further attention. Genuine collaboration must involve a two-way process empowering communities while also preparing institutions to integrate grassroots insights. This process aligns with Satterthwaite et al.'s (2020) Ladder of Transformation for informal settlement upgrading, which suggests a shift from Community-Led Efforts to Community-Led Upgrading with A Resilient Lens. As collaboration deepened, so did principled engagement and shared understanding among actors, leading to co-learning and a collective motivation to successfully complete the project.

Table 9. Triangulation analysis on the second concept (Own work)

LITERATURE: ACADEMIC LITERATURE	LITERATURE: POLICY REVIEW	PROJECT'S REPORT	SEMI-STRUCTURED INTERVIEWS
PRINCIPLED ENGAGEMENT	The encouragement of understanding the context is mainly addressed to the community	The principled engagement is engaged through the weekly meeting process as one of the planning principles	The principled engagement was expressed in various ways across different actors
SHARED MOTIVATION	The policies mention involving different stakeholders in collaborative projects	Willingness to cooperate is addressed by the formulation of planning principles	The Residents of Kampung Marlina shared their big interest in this indicator and the government actors showed the result in the contrary
CAPACITY FOR JOINT ACTION	Procedural/institutional arrangement for joint action is addressed in the policies.	The planning principles are addressed as the procedural/institutional arrangement	All actors agree that enhanced procedural/ institutional arrangement can be an effective tool

5.6.3 INTERPRETING FINDINGS TO ENHANCE FUTURE STRATEGIES

This subchapter is using Emerson et al.'s (2012) integrative framework too to discuss about the future possibilities and strategies to enhance the collaborative governance process in the future projects. The brief explanation of this analysis can be seen in Table 10.

From the policy review, the government has begun to institutionalize collaboration within urban upgrading efforts. Documents such as Governor's Regulation No. 90 of 2021 and Decree No. 33 of 2024 promote multi-stakeholder participation and establish procedural clarity in planning processes. However, despite these formal intentions, community participation is often framed as a tool to support pre-set institutional agendas. While the policies reflect elements of principled engagement and a desire to build shared motivation, they fall short in supporting capacity for joint action. Capacity-building efforts are mostly directed at the community, with limited attention to the need for institutional actors to adapt, reflect, and incorporate community knowledge into internal procedures. As a result, the policies miss an opportunity to institutionalize co-creation and mutual learning. Future strategies should not only specify participation processes but also build structures that enable all actors, community, government, and intermediaries, to engage on equal terms.

The project's report from RCUS (2023) provides more grounded and tangible examples of how collaboration can be enacted in practice. Activities such as participatory mapping, weekly design meetings, and flexible planning decisions demonstrated strong principled engagement and shared motivation. A notable example is how the Cooperative of Kampung Marlina was entrusted to lead the realisation phase, an approach that could be replicated in future projects. However, the report also highlights key limitations. One of the main gaps was the absence of a systematic before-and-after thermal assessment, which made it difficult to quantify the direct impact of the design interventions. Moreover, during construction, some miscommunications occurred, particularly between the builders and residents, many of whom were women who lacked technical knowledge. These issues illustrate that while community participation was encouraged, the process was not always matched, even after the weekly meeting process. RCUS has acknowledged these gaps and has already taken steps to improve future processes. Strengthening the tools for co-design and supervision, especially for residents, can help bridge this gap, ensuring local knowledge is better integrated into technical aspects of project delivery.

Findings from the interviews further complement the analysis, offering diverse yet interrelated perspectives from key actor groups: government, NGOs, community members, and academia. Government actors emphasized the importance of clearer procedures and stronger institutional coordination across departments, highlighting structural clarity as key to sustaining future collaborative projects. NGO representatives pointed to the need for innovation and adaptability, particularly through expert facilitation and technical capacity-building, to make the heat stress of the climate change adaptation efforts more practical and scalable. Community members, in contrast, stressed the value of trust, sustained dialogue, and the inclusion of their lived experiences in planning. They also expressed the importance for government presence, seeing it as a sign of legitimacy and seriousness to involve in the project, implicitly making the residents of Kampung Marlina have more trust on the project. Interestingly, academic respondents echoed this view, suggesting that government engagement should go beyond symbolic involvement and be integrated into a more responsive and flexible institutional structure. They also highlighted the importance of documenting lessons learned and translating them into actionable models to support broader implementation. One suggestion from this group was to restructure governmental support, potentially through a dedicated agency or funding model, so that informal settlement projects are not constrained by annual budgeting cycles. These perspectives reinforce Emerson et al.'s (2012) view that capacity for joint action requires not only appropriate structures and tools but also long-term commitment, shared learning, and flexibility across institutional boundaries.

In conclusion, the triangulation of policy reviews, project documentation, and stakeholder interviews paints a comprehensive picture of the conditions necessary to strengthen collaborative governance. While each source reflects different dimensions, policy, practice, and lived experience, they converge on the need for more inclusive engagement, institutional adaptability, and cross-sector knowledge integration. Moving forward, urban adaptation projects should shift from participatory models that rely on community compliance to governance systems that actively support co-creation, power-sharing, and sustained collaboration. These findings correspond to the final phase in Emerson et al.'s (2012) framework, where impacts and adaptations become central to the future of collaborative governance regimes.

Table 10. Triangulation analysis on the third concept (Own work)

LITERATURE: ACADEMIC LITERATURE	LITERATURE: POLICY REVIEW	PROJECT'S REPORT	SEMI-STRUCTURED INTERVIEWS
ENHANCING PRINCIPLED ENGAGEMENT	The encouragement to understand the context is addressed but mainly appointed to the community	The commitment from RCUS to present the collaborative planning process is shown with the detailed actions for the residents	The most vocal to speak up about this is the national government. However, residents did not give much answer about this.
ENHANCING SHARED MOTIVATION	There is an article that explains about multi-stakeholder participation	The encouragement to willingness to cooperate is presented through giving the most significant trust to the Cooperative to handle the selection process	The residents of Kampung Marlina give the most responds to this variable, focusing about the Willingness to Cooperate.
ENHANCING CAPACITY FOR JOINT ACTION	The encouragement to build up capacity is mentioned mostly for the community	The discipline routine of doing the deliberation process as part of the procedural arrangement is addressing the willingness to enhance every actor's capacity	All actors supported that improving procedural arrangement is the key to make the work more effective
ENHANCING INNOVATION AND SCALING	There is no explanation in the reviewed policies about any possibilities for future development	RCUS tends to make improvements on the measurement of before and after the project, and operationalization of the construction	Most responds came from the national government and academia, showing their interests in experimenting with new governance strategies using expert

5.6.4 THE PROJECT'S COMPLETE TIMELINE

Based on insights from both the semi-structured interviews and field observations, it becomes clear that a deeper understanding of the project's timeline is essential for interpreting the findings more thoroughly. While the project report from RCUS (2023) provides a general overview of the project's timeline, it is through the interviews and direct engagement in the field that a more complete narrative emerges, one that clarifies not only what happened at each stage, but also the reasons of those steps taken and how actors responded to different circumstances. This deeper layer of understanding highlights that through the timeline (Figure 45), it shows not only a sequence of events but a complete overview where collaboration was continuously negotiated, shaped, and implemented.

The visual timeline (Figure 45) distinguishes between formal and informal trajectories, offering a clear lens through which the dynamics of collaborative governance can be understood. The formal trajectory illustrates the role of government actors, particularly through the launch of the Community Action Plan (CAP) and Collaborative Implementation Program (CIP) in 2017. These initiatives followed structured procedures, such as a tender process for the consultant selection and budgeting, which reflect how the government formalized its involvement through institutional frameworks. However, the final output of the CIP in 2020 did not meet residents' expectations. The consultant, appointed through a formal tender process, delivered large concrete plant pots to Kampung Marlina, an outcome that was perceived by the community as wasteful and disconnected from their actual needs. Following this, and with encouragement from local authorities, the residents established the Cooperative of Kampung Marlina to facilitate land ownership and support future housing development under a collective legal entity.

However, these formal actions alone were insufficient. Alongside them, the informal trajectory captures the continuous and strategic roles of non-governmental actors, particularly RCUS, the Urban Poor Consortium (UPC), and the newly formed Cooperative. These groups supported the community in participatory mapping, spatial planning, and proposal development.

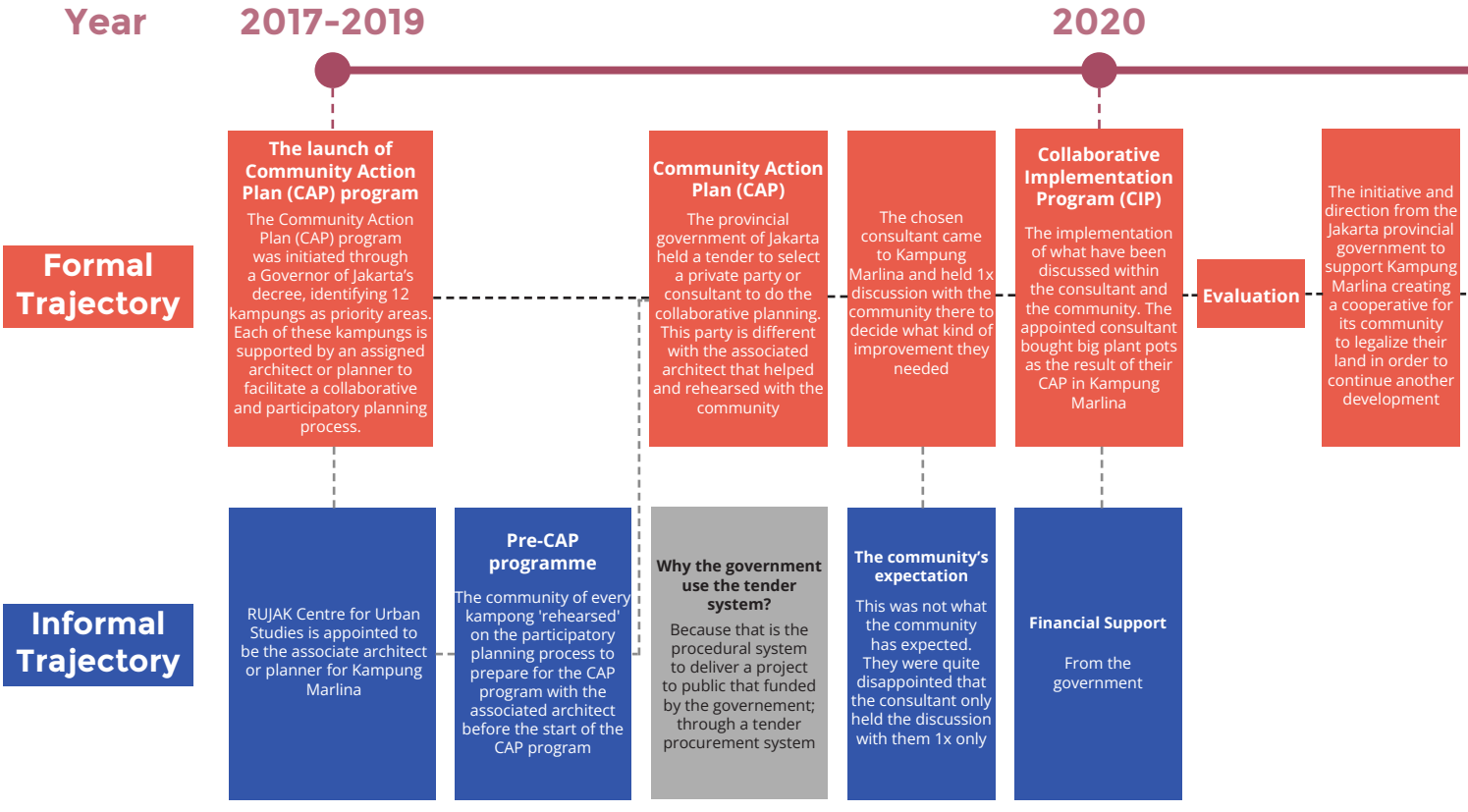
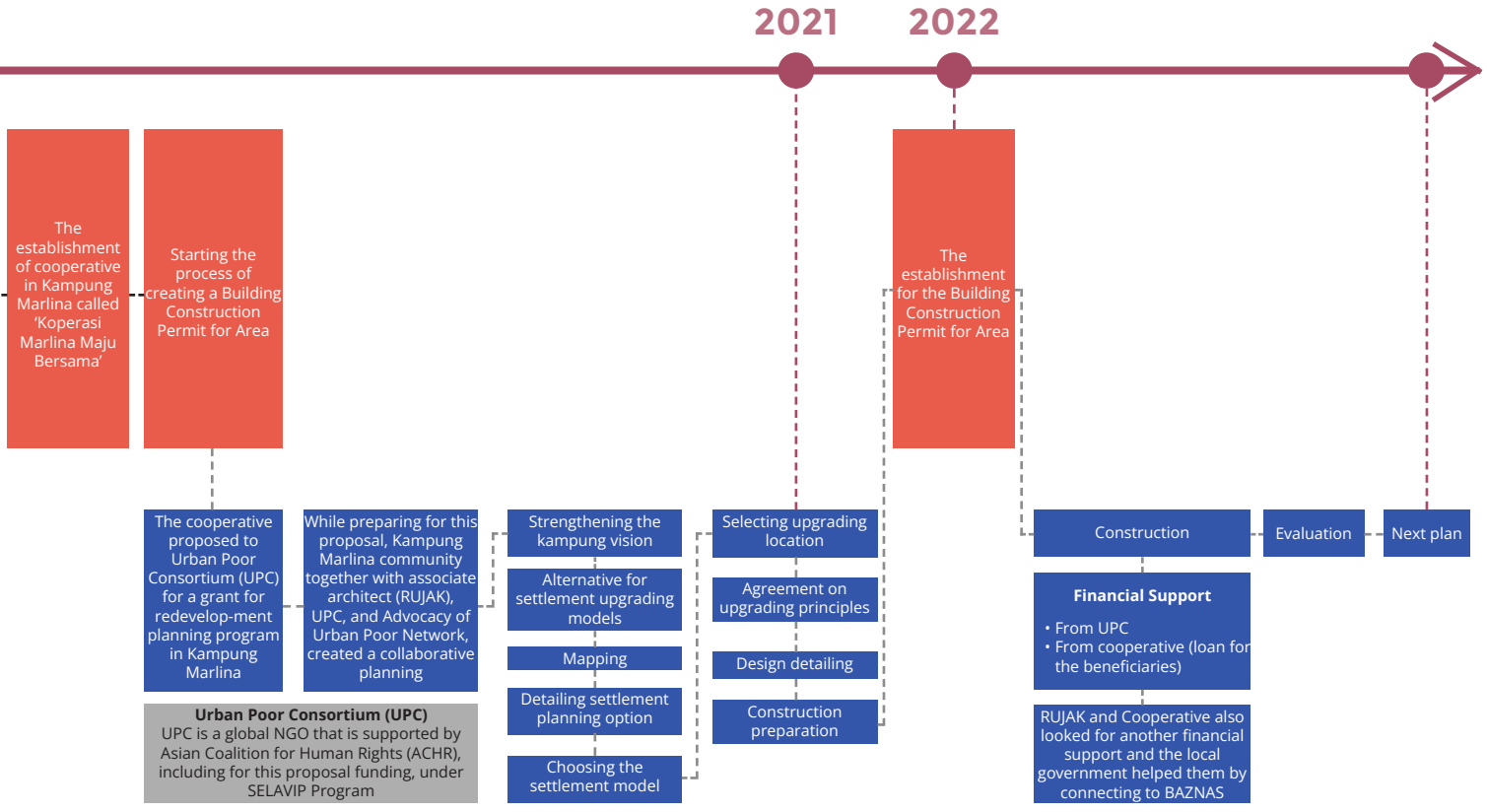


Figure 45. A complete timeline of how the project was imp

A sustained collaboration between Kampung Marlina's residents and these NGOs was central to translating the earlier participatory planning sessions from the Pre-CAP programme into a practical roadmap. After forming the Cooperative, residents sought funding from the Asian Coalition for Housing Rights via the SELAVIP program. The ongoing preparation and planning processes fostered a strong alliance between the NGO and community groups, driven by shared goals and consistent interaction.

What the timeline ultimately shows is that the interdependence between formal and informal actors was not limited to a single phase. It unfolded as an adaptive process across multiple years. From early visioning workshops in 2017 to the construction phase in 2022, cooperation between actors was needed at every step. A critical milestone was the issuance of the Communal Construction Building Permit by the Jakarta Provincial Government in 2022, which allowed construction to proceed. This milestone, rooted in earlier participatory plans, illustrates how formal institutions can enable more flexible development pathways in informal settlements. During the prolonged delay in securing this permit (2020–2022), it was the community-led and NGO-driven efforts that kept the process moving forward. These actors bridged institutional gaps, translated top-down processes into community-led action, and maintained coordination between stakeholders. Therefore, this case highlights that the informal trajectory was not only a supplement but a proactive force that sustained project continuity. It reflects how governance in urban adaptation is not only about formal policy but also about relationships, shared ownership, and long-term cooperation. This is consistent with Emerson et al.'s (2012) view of collaborative governance as an iterative process where trust, shared motivation, and joint capacity are continuously developed.

In summary, the timeline is more than a sequence of events. It reveals how collaborative governance was constructed and experienced over time, extending beyond scheduled meetings or formal procedures, as it emerged through daily interactions, decision-making, and problem-solving among multiple actors. This layered and evolving process offers important lessons for designing future adaptation projects in informal settlement contexts. Collaborative governance, in this case, was not just a theory applied, it was a practice enacted.



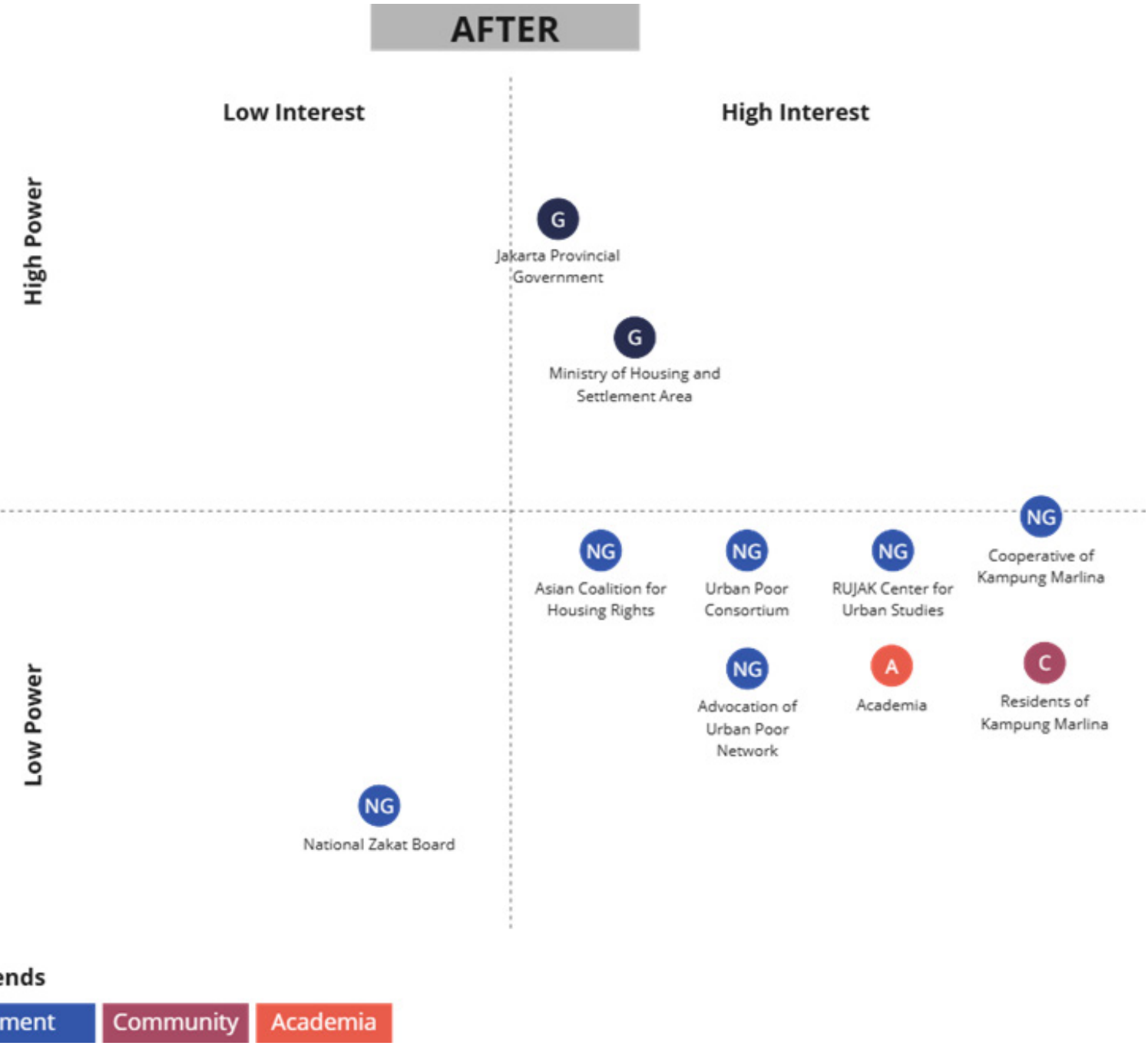
lemented in Kampung Marlina (Own work)

5.6.5 ANALYSIS OF THE ACTORS' ROLE

As the triangulation analysis and the complete timeline were developed in the previous subchapter, this subchapter explains how the role of every actor was described and how it differs after the analysis process. The distribution of roles among actors in this project was primarily discussed in Section 4.2.4. The most active actors were those who directly participated in planning and implementing the collaborative project. Each actor played an important role in supporting the residents of Kampung Marlina to complete their housing improvements. However, challenges still remain in aligning the responsibilities and expectations of different stakeholders, resulting on the different position on the power-interest matrix (Figure 46).

Figure 46. The comparison of power-interest matrix, be

The figure above presents the shifting positions of stakeholders before and after the project, using a power–interest matrix to illustrate changes in influence and involvement. In the 'before' stage, government actors held high formal power but showed limited interest, suggesting minimal engagement despite their authority. Most NGOs, community members, and academia appeared in the lower quadrants, reflecting fragmented involvement and weak influence. This reflects the early stage of collaborative governance, where, as Emerson et al. (2012) describe, institutional actors dominate while grassroots actors have yet to be fully mobilized. However, In the 'after' stage, the matrix shows visible shifts across nearly all actors, reflecting increased participation and evolving roles throughout the project. These movements are described in detail below:



fore and after analysing data of the project (Own work)

GOVERNMENT (G)

Government bodies remain in the high-power quadrants due to their formal authority. The Ministry of Housing and Settlement Area sits slightly lower than the Jakarta Provincial Government, indicating its national mandate but limited local involvement. On the other hand, The Jakarta Provincial Government moves to a higher place, showing how they actually hold a high power even though their involvement was limited during the project.

NON-GOVERNMENT ORGANIZATION (NG)

- **Community-Based Organizations (CBOs)** also made a little shift. Interestingly, the Cooperative of Kampung Marlina moves to a higher position, as they had an important role on local organizing, proposal development, and coordination between community and institutional actors, which acts such a project manager. The Advocacy of Urban Poor Network remains in the same position, showing their interest and contribution on this project.
- **Non-Government Organizations (NGOs)**, which are RUJAK Center for Urban Studies (RCUS) and the Asian Coalition for Housing Rights (ACHR) remain in their position in general. Urban Poor Consortium (UPC) shifts slightly upward, reflecting deeper engagement in participatory planning and project facilitation. Their role was crucial in connecting institutional processes with community priorities.
- **Non-structural Government Agencies**, or The National Zakat Board (BAZNAS) placed differently, a little lower than before. Despite potential financial support, they did not engage meaningfully in the project. involvement and influence.

COMMUNITY (C)

The Residents of Kampung Marlina show a significant upward shift in interest, now closely aligned with the Cooperative. As the primary beneficiaries, they demonstrated sustained interest and active involvement, showing a big interest and improvement on their understanding of the context, willingness to cooperate, and wishes on the future, although their influence was mediated through the Cooperative and supporting NGOs.

ACADEMIA (A)

Represented by the University of Indonesia, academia moves slightly higher in interest. Though not directly involved, they contributed critical reflections and knowledge during interviews, linking this case to broader informal settlement contexts in Jakarta.

These shifts also reflect a significant transformation in trust relations over time. As explained by Ansell and Gash (2008), trust is not a precondition for collaboration but develops gradually through repeated interaction, transparency, and mutual recognition. In the early stages, trust was limited, particularly between government bodies and community actors, which is visible in their distant positions in the 'before' matrix. However, through continuous dialogue, shared decision-making moments, and inclusive planning activities, such as the weekly design meetings discussed in the project report, trust began to grow. While RCUS as the main NGO conducting the collaborative planning process, as trust deepened, power dynamics began to rebalance. Actors who were previously perceived as peripheral, such as residents and the Cooperative of Kampung Marlina, gained legitimacy and a stronger role in the governance process. Cooperative of Kampung Marlina became more significant to manage all the process. This shift from facilitation to shared governance demonstrates how community-led structures, when supported appropriately, can take on greater responsibility. It aligns with Satterthwaite et al.'s (2020) view of informal upgrading progressing from top-down interventions toward community-led resilience building. The 'after' matrix shows a closer alignment between power and interest, marking a stronger foundation for future collaborative governance built on mutual trust, capacity, and responsibility.

6

DISCUSSION

This chapter presents an overview of the research process, seeing it from the beginning of the process, to the analysis on the findings from data collection. This chapter is divided into five sub-chapters that present the overview of the used theoretical framework, the connection to the current situation, and the overview of the research design framework, along with the limitations and possible recommendations for future research and collaborative governance.

6.1 COLLABORATIVE GOVERNANCE IN PRACTICE: REFLECTION ON THE COLLABORATIVE GOVERNANCE FRAMEWORK AND BEYOND

Building on the previous discussion, this section interprets how the findings of this research reflect broader impacts and adaptation needs, as described in Emerson et al.'s (2012) integrative framework of collaborative governance. The framework suggests that collaboration does not only influence immediate outputs but can also lead to wider systemic outcomes, affecting physical, social, economic, environmental, and political aspects. In retrospect, the first focus area of the semi-structured interviews, how residents experience and respond to changes in their environment, can be seen as part of the impact of the collaborative governance process itself. Whether these impacts emerged through full or partial involvement of actors, the most important point is that the governance system developed to deliver the project generated tangible effects in Kampung Marlina. This aligns with Emerson et al.'s (2012) theory, which is supported by Innes and Booher (1999), describes collaborative impacts through first-, second-, and third-order effects, or "results on the ground." The positive and thoughtful responses from many residents during interviews suggest that collaboration fostered a sense of ownership and awareness, even among those not formally involved in decision-making.

A consistent finding across the triangulated data is the strong emphasis on procedural and institutional arrangements as the foundation for joint action. All actor groups, government, NGOs, community, and academia, recognized this as crucial. Emerson et al. (2012) note that these arrangements must exist at both the intra- and inter-organizational levels. They also describe collaborative institutions as typically less hierarchical and more fluid compared to traditional bureaucracies. This distinction became evident when comparing the policy review with the project's documentation. While the government approach remains more formal and top-down, NGOs facilitated a more horizontal and flexible structure, enabling participants to engage based on their roles and capacities. This difference reflects not only governance preferences but also the institutional nature of each actor. Though Emerson et al. (2012) do not elaborate this contrast in depth, their ideas are supported by Bryson, Crosby, and Stone (2006) and Huxham and Vangen (2005), who emphasize that the structure of collaboration must match the context and capacity of those involved. In this case, the combination of formal and informal governance styles enabled more inclusive participation and allowed the collaborative planning process to adapt over time.

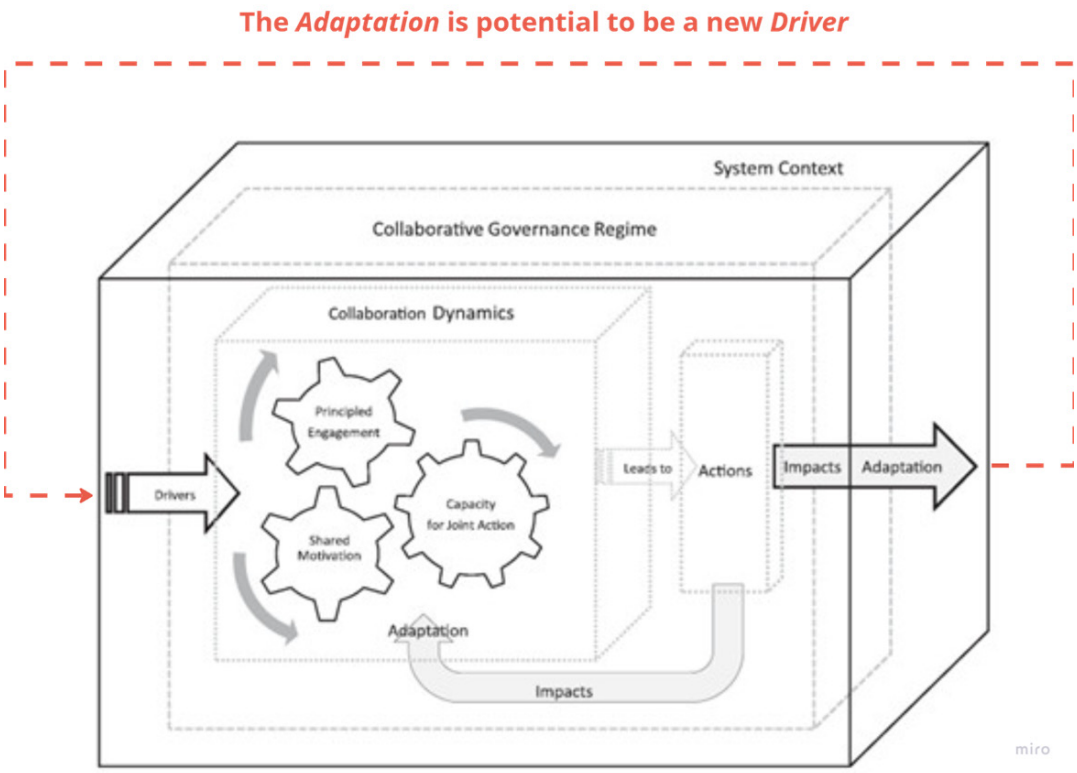


Figure 47. Cross-checking on the theoretical framework (Own work, adapted from Emerson et al. (2012))

An important yet unplanned insight arose during the field visits: the upgraded houses appeared to support more frequent and open interactions among neighbours. Residents were observed spending time outside, chatting, or welcoming others into their homes, behaviours that were reportedly uncommon before the renovation. This shift indicates that better spatial design and housing quality can foster not just physical comfort, but also social connection and well-being. Such outcomes support the idea that housing design is closely linked to climate adaptation and community resilience, extending the collaborative impact beyond its technical or material objectives.

In terms of adaptation, this collaborative governance system should not be seen as fixed. If similar projects are to be replicated in other settlements, or expanded further within Kampung Marlina, adjustments will be necessary to ensure continued participation and relevance. Emerson et al. (2012) highlight that adaptive capacity is essential in collaborative regimes (Figure 47), particularly when applied to place-specific challenges like the Urban Heat Island (UHI) effect. Since UHI impacts vary across contexts, adaptation strategies must remain flexible and responsive to local conditions. The process must also be revisited and refined to avoid declining participation or the exclusion of new beneficiaries.

6.2 TRANSFORMING INFORMAL SETTLEMENTS THROUGH COLLABORATIVE ADAPTATION: REFLECTIONS ON UHI AND THE COLLABORATIVE PLANNING PROCESS

The Urban Heat Island (UHI) effect in informal settlements like Kampung Marlina increases thermal stress due to dense housing, limited greenery, and poor airflow. Yet for many residents, these conditions are normalized, making their risks less visible. The renovation project in Kampung Marlina, though limited in scope, did more than improve physical housing, it helped raise awareness of environmental quality and design. From interviews and field visits, it became clear that the intervention helped residents better understand their living environment and imagine future improvements. The widened alley and better airflow created a noticeable impact even for those not directly involved.

While the project was only able to deliver improvements to a few houses, the broader plan to revitalize the entire corridor was embedded in the collaborative planning process. These small improvements created a more open and breathable alley, showing how modest interventions—when rooted in collaboration, can shape more adaptive microclimates. If scaled up, this could help reshape the area into a more resilient and socially connected space.

As seen from the project's complete timeline, the collaboration of government and non-government actors was developed with the start of process is already showing how the Provincial Government of Jakarta supported the prioritized kampung development through Community Action Plan (CAP) and Collaborative Implementation Program (CIP) programs (Sari et al., 2022), supporting the establishment of Cooperative of Kampung Marlina, the release of Collective Building Permit for Kampung Marlina to support the legalisation of the land tenure for the residents in Kampung Marlina. At the same time, the non-government actors developed the collaborative planning with the community, making them the lead of this process, which leading to developing the collaborative planning and design process as the community needed. This whole practical actions fit to the criteria of Comprehensive community-led upgrading. However, if it traced back before it was all implemented, the pathway of formal trajectory of by including the formal tender process after CAP to start the CIP program and implemented by the consultant, with a less-involved community in the process, this process can also be put under Comprehensive upgrading stage. It brings to the idea of how the collaborative planning and governance is already started, but still needs a lot of development, leaving this project's process lies in between Comprehensive upgrading stage and Comprehensive community-led upgrading. Therefore, to make this process more feasible to arrive at the next step ladder's of Comprehensive community-led upgrading with resilience lens until the higher one, Transformative upgrading, both of the government and non-government actor needs to do some steps gradually in the whole governance process of this adaptation to climate change project.

For government actors, the process calls for more adaptive and flexible institutional tools. While local government participation has improved, further support for community-led initiatives is needed. Instead of bringing in external consultants after the CAP stage, future implementation could strengthen the existing community-led planning developed by RCUS and the Cooperative. Government actors could shift from directing the process to enabling and monitoring it, allowing more space for community ownership and leadership. Over time, adapting results from such projects into drivers for system-level change could help establish a more resilient form of collaborative governance.

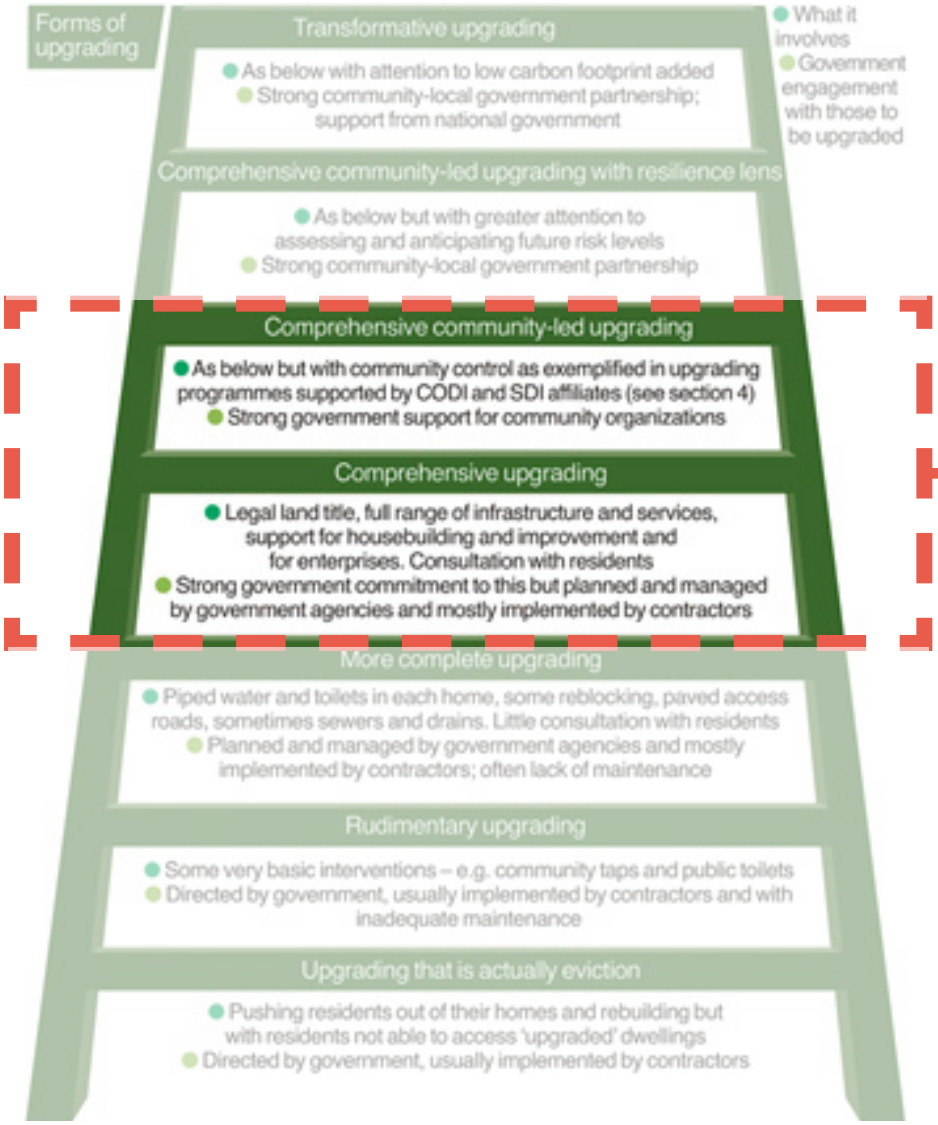


Figure 48. Cross-checking on the Ladder of Transformation (Own work, adapted from Satterthwaite et al. (2020))

However, rigid annual budgeting and procedural rules still limit what government institutions can do. For more advanced step towards the Transformative upgrading, one suggestion that came from interviews with academics is to explore an independent agency model with the status of public organization under such a government body, that could support informal settlement upgrading without being tied to annual procurement rules. This independent agency model could give more freedom than a conventional government institution, while at the same time, they still have a direct access to the government resources. For example, applying a more advanced move would be to explore a model like Thailand's Community Organizations Development Institute (CODI), an independent public organization that supports community-led upgrading through flexible funding and sustained engagement (Boonyabancha & Kerr, 2018). By developing this agency model, this would allow for long-term, community-centred projects to grow and adapt over time.

On the side of non-government actors, as the collaborative planning process has been incorporated since the beginning of the project, practical innovations must be introduced to strengthen the evidence base of their interventions. While the current project focused on participatory design and spatial improvements, future efforts could also incorporate more tangible measurements as a more advanced effort to make the adaptation projects more evidence-based and adaptive to the environmental situation, making it more comprehensive towards the Comprehensive community-led upgrading with resilience lens. For example, measure the temperature differences pre- and post-intervention in the beneficiaries' houses and the surrounding environment. Participatory design also needs to be complemented with a participatory workshop to enhance the beneficiaries' capacity about adequate house construction, to support them during the construction phase. Such metrics could strengthen the case for scaling up adaptive housing, particularly under Jakarta's UHI-prone conditions.

For the next advanced move, towards the Transformative upgrading, future projects could aim for a neighborhood-scale adaptation plan. This would involve understanding spatial, environmental, and social dynamics across a wider area. Such a step would need more time, resources, and collaboration from multiple stakeholders. When the government actors has applied the independent agency to support the community-led planning, it can support this process, to make the collaborative planning and governance of this adaptive actions to climate change can be applied in a bigger scale (Figure 48).

To conclude, the Kampung Marlina case shows that UHI adaptation in informal settlements must go beyond physical upgrades. It requires systems that are flexible, inclusive, and rooted in everyday life. The project opened up new possibilities and demonstrated how shared learning and ownership can support meaningful change. Still, sustaining this progress depends on the ability of both systems and actors to evolve. Structures that support iterative learning and shared leadership will be key to achieving future adaptive outcomes. This also leads to a reflection on the research journey, which is discussed in the next section using the Double Diamond Framework (DDF).

6.3 REFLECTING ON THE RESEARCH PROCESS: DOUBLE DIAMOND FRAMEWORK AND EMERGING DIRECTIONS

As discussed through the lenses of Emerson et al. (2012) and Satterthwaite et al. (2020), sustaining collaborative adaptation requires more than institutional support, it also depends on how knowledge is generated and structured. In this context, the research process itself can be seen as part of the collaborative learning system. This thesis was guided by the Double Diamond Framework (Design Council, 2019), which served not only as a research structure but also as a reflective tool to think through complexity and iteration.

The Double Diamond Framework (DDF), originally developed in the field of design, helped frame the research process into four main phases: *Discover, Define, Develop*, and *Deliver*. In this study, the *Discover* phase began with an open-ended exploration of the climate risks facing informal settlements, which was then narrowed in the *Define* phase through literature review and formulation of research questions, leading to the development of an operationalization table that structured the data collection. Once the interviews and document reviews were completed, the *Develop* phase involved unpacking the data, analyzed the findings. Finally, the *Deliver* phase consisted of writing the analysis and discussion chapters, where the insights were synthesized into strategic reflections on governance, adaptation, and collaborative planning.

As the research evolved, it became clear that a linear two-diamond process did not fully capture the emergent nature of knowledge generation in this case (Figure 49). The interactions with data, actors, and theory were not static; they invited deeper interpretation and reflection beyond the planned scope. This suggests the possibility of a third "diamond" in the process, an iterative stage of learning and feedback, where new questions and directions from this research conclusion and recommendations can emerge. This could be useful for framing future research, especially in dynamic governance contexts where problems evolve alongside solutions.

In conclusion, while the integrative collaborative governance framework was helpful in analyzing how actors worked together, it paid less attention to the broader contextual drivers shaping those interactions. Issues like land tenure uncertainty, institutional rigidity, or even the political conditions were found very likely to play a significant role in shaping procedural and institutional arrangements, as the informal settlements have complex issues to be solved. These underlying structural conditions, often beyond the scope of the formal governance process, need to be more fully integrated into future research models. The adapted use of the DDF in this thesis illustrates how iterative and reflective approaches can support not just research design, but also critical thinking about what collaboration means, how it can evolve in the face of long-term adaptation needs.

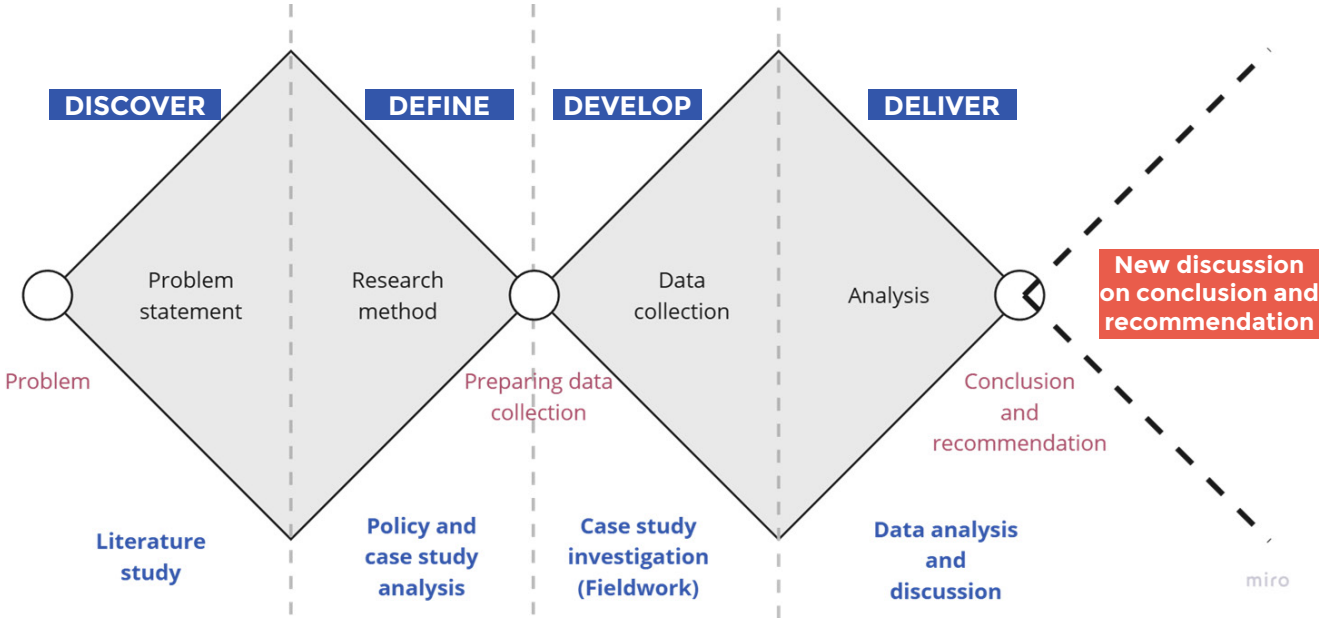


Figure 49. Foreseeing the future process guided by the Double Diamond Framework (Own work)

6.4 LIMITATIONS AND PATHWAYS FOR FURTHER EXPLORATION

The research has several limitations. First, looking back at the use of theoretical framework in this research, it was only capturing the collaborative governance dynamics. While Emerson et al.'s (2020) framework has an integrative framework, another component such as *General System Context*, *Drivers*, *Impacts*, and *Adaptations*, can be delved into more. For example, the structural challenges such as land tenure or political constraints can be incorporated as a *General System Context* or *Driver*. Therefore, future research could integrate complementary perspectives to address these broader drivers.

Second, looking at the data collection process, this research focuses on a single project that specifically located in one specific area with limited direct beneficiaries, which may constrain broader generalizations. Also, the study did not include technical measurements like temperature or energy use. Incorporating such indicators would strengthen the environmental case for UHI adaptation and help quantify the benefits of spatial interventions. Future studies could expand the scope across multiple sites or assess changes over a longer time.

Third, still looking back to the data collection process, the semi-structured interviews process were unable to gather all the data from the involved actors. Therefore, the secondary data helped to fill in the gaps, reduced the completeness of the actor map. However, the interviews also revaled a wide range perspectives, which could lead to a bias in the analysis process.

Lastly, looking back to the data analysis process, the analysis relies heavily on interviews with involved actors. While triangulated with documents and field observation, this may introduce bias or partial perspectives. Including disengaged or less-involved voices could enhance understanding of participation gaps and project inclusivity.

Despite these limitations, this thesis offers a foundation for future inquiry. It underscores the need for more flexible governance models and stronger institutional support for community-driven adaptation. Further research may explore how to embed such flexibility into formal systems, and how to legitimize informal actors as co-creators of resilience.

7

CONCLUSION

This chapter presents the conclusions from the previous analysis between the primary data (semi-structured interviews) and the secondary data, including the literature, project documentation, and relevant policy, to answer the main and sub-research questions. These answers are provided concisely, as the detailed analysis and discussion have already been presented in the previous chapter.

SUB-RESEARCH QUESTION 1

How does the Urban Heat Island (UHI) effect impact the informal settlements in Jakarta?

Urban Heat Island (UHI) effect is a climate change-related phenomenon that causes urban areas, especially large cities like Jakarta, to become significantly warmer than their surrounding rural areas. This effect is caused by increasing urban development, which replaces natural surfaces with buildings, roads, and other heat-retaining materials. The impact of UHI is experienced by both formal and informal settlements. In Kampung Marlina, the case study of this research, residents are exposed to high temperatures daily. However, many residents were not aware that this heat was part of a broader environmental issue until the project took place. For them, high temperatures were a normal part of life. This highlights the need for awareness-raising and targeted adaptation strategies in informal settlements.

SUB-RESEARCH QUESTION 2

How was collaborative governance implemented in the Urban Heat Island (UHI) adaptation project in informal settlements in Jakarta?

Collaborative governance in the Kampung Marlina project was implemented primarily through the efforts of non-governmental actors, which led participatory planning and facilitated coordination among stakeholders. While the government provided essential regulatory support, such as the communal building permit, its involvement remained limited in direct planning and implementation. Using Emerson et al.'s (2012) framework, the project demonstrated principled engagement and capacity for joint action through community meetings and shared resource management. However, shared motivation across sectors was less evident, as formal institutions were not fully aligned with community-led objectives. The collaboration remained largely informal and project-specific, lacking institutionalisation within Jakarta's broader urban governance system.

SUB-RESEARCH QUESTION 3

What strategies can be implemented to enhance collaborative governance in adapting the UHI effect in the informal settlement area in Jakarta in the future?

To enhance collaborative governance in adapting to the Urban Heat Island (UHI) effect in Jakarta's informal settlements, several key strategies can be identified from this research. Based on the triangulation analysis, one essential strategy is to improve procedural and institutional arrangements by adopting more flexible and inclusive governance approaches. This includes creating mechanisms that allow for innovation in how collaboration is structured and managed across different actor groups.

The case study project shows that collaborative planning, though largely initiated by non-government actors, was able to meet the immediate needs of residents, especially in improving housing conditions to better cope with UHI impacts. However, to make such efforts more effective and sustainable, the collaboration process must evolve into a more comprehensive and transformative model. This involves not only ensuring alignment of shared goals among actors, but also embedding the collaboration into a system that is responsive to climate risks, adaptive over time, and capable of scaling up.

MAIN RESEARCH QUESTION

To what extent can collaborative governance support adaptation of Urban Heat Island (UHI) effect in informal settlement area in Jakarta, Indonesia?

Collaborative governance has the potential to meaningfully support UHI adaptation in Jakarta's informal settlements by encouraging solutions that are locally driven and responsive to specific contexts. The case study in this research, UHI adaptation project for informal settlements in Kampung Marlina, shows that both government and non-government actors contributed to the project, although much of the collaborative planning was led by non-governmental organizations. However, when examining the full timeline of the project, it becomes clear that these actors complemented one another, despite the government's involvement being limited to the early stages of the process.

This evolving collaboration highlights the possibility of developing future projects with a more structured and inclusive governance approach. With improved systems and coordination from both government and non-government sides, future initiatives could be better positioned to support local adaptation strategies. Given that UHI impacts vary significantly depending on the local environment, future collaborative efforts should remain flexible and open to local initiatives, resources, and capacities that reflect the specific needs of each area.

8

RECOMMENDATION

This chapter presents recommendations to support collaborative governance in adapting to Urban Heat Island (UHI) impacts in Jakarta's informal settlements. Based on the findings from Kampung Marlina and supported by relevant literature, the recommendations address key challenges related to actor capacity, institutional coordination, and long-term continuity. Rather than proposing broad policy changes, the focus is placed on practical and context-specific actions that can support inclusive planning, mutual learning, and adaptive governance.

8.1 APPLY PARTICIPATORY AND LONGITUDINAL RESEARCH APPROACHES TO DEEPEN COLLABORATIVE GOVERNANCE UNDERSTANDING

To strengthen the understanding of governance processes in UHI adaptation, this research recommends applying participatory and longitudinal methods in future projects. This approach allows for in-depth engagement in a specific location while capturing how collaboration evolves over time. It offers not only a more grounded view of stakeholder dynamics but also a way to test and refine governance frameworks in real contexts.

This recommendation is proposed based on two key observations. First, looking back to this research' limitation, conventional short-term studies often fail to reflect the slow and complex nature of building collaboration, trust, and institutional learning, especially in informal settlements. Second, as seen in Kampung Marlina, collaboration may appear successful at the surface but lacks continuity or follow-up after project implementation. Longitudinal methods can fill this gap by providing insight into how collaborative arrangements unfold, adapt, or stagnate over time.

Drawing on Emerson et al.'s (2012) Integrative Framework, this recommendation sees governance impacts not as an endpoint, but as a potential new driver for the next phase of collaboration. When applied iteratively, these methods can support adaptive governance cycles and help build new approaches suited to evolving challenges. To implement this, future projects can adopt tools such as repeated focus groups, governance diaries, timeline mapping, and participatory action research (Figure 50). These methods should be embedded from the beginning of a project and facilitated jointly by researchers, community members, NGOs, and possibly planning officials. The goal is to make reflection, learning, and adaptation an ongoing part of the governance process.

These tools are useful because they:
- Capture how trust and coordination develop over time;
- Address limitations of one-time interviews and outsider perspectives;
- Provide insights to improve planning, policies, and institutional design.

The benefits of applying this recommendation are both practical and strategic. It creates more substantial evidence for what works in collaborative governance, helps identify enablers and constraints in institutional coordination, and builds a clearer pathway for improving inclusive and adaptive planning. For government actors, the insights produced can inform more context-sensitive policymaking. For non-government actors, it strengthens their role as active participants in shaping long-term governance outcomes.

Possible collaborators include urban poor networks, NGOs, local planning offices, and academic research labs with experience in action-based and longitudinal studies.

Figure 50. Illustration on developing this research on to longitudinal and participatory approaches in Kampung Marlina (Own work)

8.2 STRENGTHENING SHARED CAPACITY FOR BALANCED COLLABORATIVE GOVERNANCE

The second recommendation is to strengthen shared capacity between government and non-government actors to support more balanced and effective collaborative governance. This recommendation is proposed in response to the strategic insight gained from this research: the need for a renewed approach in governance processes through improved procedural and institutional arrangements.

The case of Kampung Marlina showed that while NGOs and community groups played a leading role in initiating and driving the project, the absence of consistent government engagement limited institutional continuity and long-term integration into formal planning frameworks. At the same time, community actors faced challenges in navigating technical planning processes and influencing higher-level policy discussions. This illustrates differing levels of involvement and readiness among actors. Collaborative governance, however, requires commitment from all actors, it cannot be sustained if one group bears the majority of responsibility. Encouraging a more active role from government actors must go hand-in-hand with empowering non-government actors, particularly community organizations and local groups, to strengthen their confidence, policy literacy, and technical capacity. Improving both sides will contribute to a more resilient, inclusive, and adaptable governance system.

To achieve this, structured spaces and tools should be developed to support joint learning, skill-building, and relationship-building across actors. These may include:

- Co-designed planning workshops involving architects, technical experts, builders, and community members.
- Capacity-building sessions on UHI risks, climate adaptation, and spatial planning tools.
- Regular multi-actor forums (e.g., quarterly) to review progress, share feedback, and address challenges together.
- Documentation and sharing of good practices to support replication in other settlements.

These activities should not stand alone as one-time initiatives but should be embedded within existing planning frameworks, such as the Community Action Plan (CAP) and the Collaborative Implementation Program (CIP). Integrating the proposed agenda into these programs can help ensure that the resulting action plans are more aligned with community needs, while also gradually moving away from conventional procurement models that rely on external consultants or contractors. At the same time, local government bodies are encouraged to transition from a directive role to one that supports and enables collaborative efforts. NGOs and academic institutions can play a crucial role in shaping inclusive approaches that position communities as central actors, ensuring their needs are accommodated. This shift can lay the groundwork for governance that is not only more collaborative but also more comprehensive, resilient, and transformative, especially as cities face the growing uncertainties of climate change.

This recommendation offers two main benefits (Figure 51). First, it promotes shared responsibility and reduces reliance on a single actor, making governance processes more stable and sustainable. Second, it enables both government and non-government actors to progress together toward a more advanced stage of collaboration, in line with the Ladder of Transformation (Satterthwaite et al., 2020), where joint action becomes part of an institutionalized approach rather than a one-off project. With more clearly defined roles and improved capacity on all sides, communities will be better positioned to deliver adaptive and locally driven responses to climate-related issues such as the Urban Heat Island (UHI) effect.

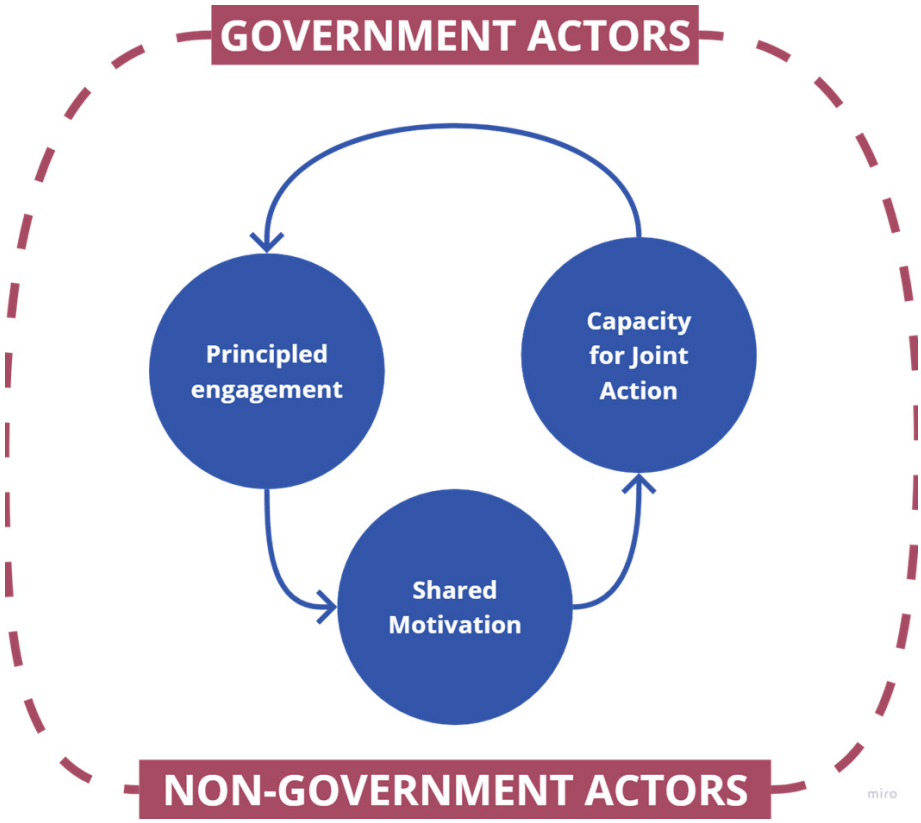


Figure 51. The illustration of shared capacity in between actors to strengthen the collaborative governance (Own work)

9

REFLECTION

This chapter unfolds the whole experience of doing this thesis research, as seen from the author's point of view. The explanation will be uncover this thesis research relation to the academic program and track, the data collection process, overall process, feedback from mentors, and the value of the approach and findings.

RELATION TO THE ACADEMIC PROGRAMME AND TRACK

My graduation topic, collaborative governance for climate adaptation in informal settlements, connects well with different aspects of the MSc AUBS programme. It begins with the wider issue of climate change and then focuses on a specific case in the Global South, looking at how informal communities adapt to heat-related risks in Jakarta. This shows how local problems are tied to global challenges.

The project fits strongly with the Inclusive Communities theme group, especially its aim to support safer and more inclusive urban environments. My research goal, bringing governments, NGOs, and communities to work together, matches this focus. I received important support through lectures, readings, and discussions with theme group coordinators, which helped me develop my theoretical framework and research structure. These interactions pushed me to think more critically about collaboration in informal settlement planning.

Within the Management in the Built Environment (MBE) track, my work relates to topics like housing, governance, and sustainable development. MBE focuses on how to manage buildings and urban systems, not just through design, but through planning, stakeholder engagement, and policy. My thesis looks at how informal housing can be upgraded by improving coordination between actors, which fits well with the MBE approach.

Finally, within the MSc AUBS programme, the research contributes to wider debates about climate adaptation, spatial justice, and the future of urban development in the Global South. By using Jakarta as a case study, the project adds to the programme's goal of exploring diverse, underrepresented urban areas and building practical knowledge from real-world contexts.

REFLECTION ON THE RESEARCH PROCESS

Looking back, going through this research process has been such a meaningful journey for me. It was full of ups and downs, yet it taught me the value of trusting the process, even when I felt lost or unsure, I kept believing that I would eventually reach the finish line.

Choosing the topic was a personal decision, shaped by my interest in housing and my experience working in both government and non-government institutions in Indonesia. At first, I was curious about many emerging issues, like the housing crisis, adaptive reuse, or the impacts of climate change, but after getting support from RUJAK Center for Urban Studies (RCUS), the direction became clearer. Studying a real case in Jakarta gave me the opportunity to understand not only what happened in the field, but also the structural and procedural barriers that continue to exist. I have always seen informal settlements as places with untapped potential and the idea that these areas are now also affected by climate change made this topic even more urgent and relevant.

After completing the literature review and preparing my methodology, I began the fieldwork in Kampung Marlina. I was welcomed by the residents with openness and kindness, which made the interviews feel natural and productive. Their familiarity with researchers really helped the process. Interviews with NGOs such as RCUS, Advocacy for the Urban Poor Network (Jaringan Rakyat Miskin Kota/JRMK), and the Kampung Marlina Cooperative gave me insight into how community coordination actually works in practice. Even though I was not able to meet the Urban Poor Consortium (UPC), the input from other stakeholders gave me a good understanding of the project. Interviews with government actors were more challenging due to their limited involvement, so I adjusted my approach to maintain a neutral tone while still exploring their views. I also spoke to academic experts, which helped me reflect on my findings and gain more confidence in my direction.

The research used a triangulation method, combining interviews, policy and literature review, and project documentation. This helped me see the issue from different angles. Using the Emerson et al. (2012) framework provided a strong foundation for exploring institutional dynamics, motivation, and planning processes. The findings led me to propose strategies such as participatory and longitudinal methods, as well as joint capacity-building. Writing the *Discussion* chapter was the most challenging part. It forced me to look at everything from a higher perspective and connect the dots, something I had not thoroughly experienced before. That back-and-forth between the literature and my data helped me understand things more deeply and sharpened both the focus of this research and the relevance of my recommendations.

REFLECTION ON LEARNING PROCESS

Coming from an architecture and design background, I've always been used to working towards a clear final design from the very beginning. This research flipped that mindset. Doing qualitative research taught me to trust the process, to be open to what emerges along the way, and to focus on understanding before deciding what the outcome should be. That shift was unfamiliar, but extremely valuable, and I feel very grateful to have experienced this way of learning.

Looking back on the research process from the beginning, I feel really grateful that this process could be supported by many people and the team; RCUS, UPC, JRMK, the people in Kampung Marlina, Jakarta provincial government, and the Ministry of Housing and Settlement Area. I feel that the decision to choose my own research focus and questions and developed independently is also one of the factors that making this research process is meaningful for me. I chose this topic based on both academic curiosity and personal experience from my working experience working in the field of housing and settlement area. It has always been my determination to explore about communities, human habitat, and their settlement areas.

The guidance from Ellen and Gerard was essential. They challenged me to refine my framework, narrow my focus, and push my thinking further. There were many moments where I still felt unsure, even up to the P4, but their feedback helped me stay on track. When they encouraged me to take a more 'helicopter view' in the *Discussion* chapter, something clicked (Figure 49). I finally understood what I had been doing all along. That realization helped me see the bigger picture and gave me more confidence in my academic thinking. I know I was not always fast in processing things, but I am truly grateful Ellen and Gerard trusted me to work through it. I never imagined I could finish this kind of research process, but I'm proud that I did.

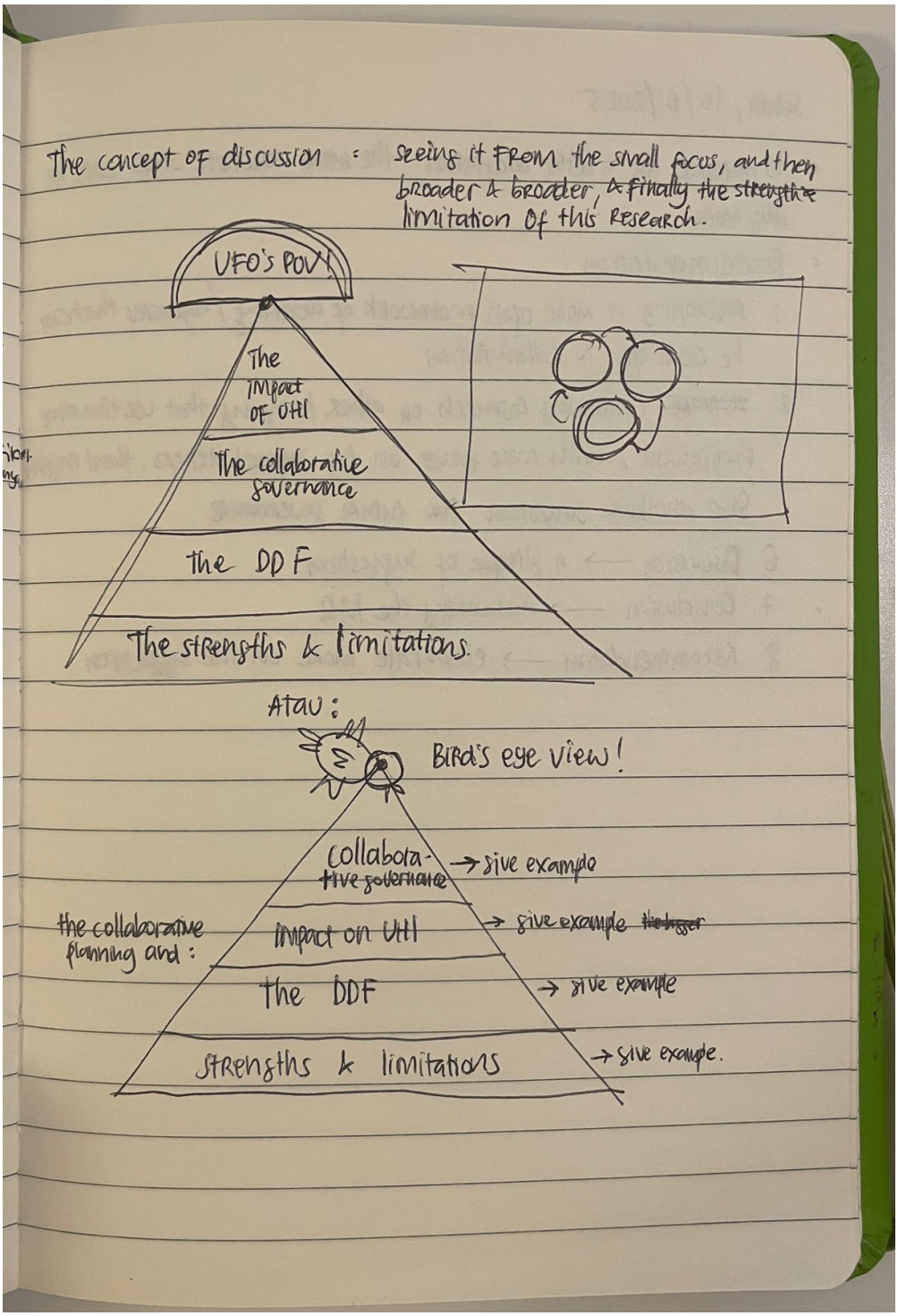


Figure 52. Own sketch on discovering how to write the Discussion chapter (Own work)

ACADEMIC AND SOCIETAL VALUE OF MY WORK

Academically, I believe this thesis contributes to the broader discussion on collaborative governance in informal settlements in Indonesia. It applies established governance frameworks to a real case while offering context-specific recommendations. The project also highlights how participatory process could support the collaborative planning and governance, extensively to do the longitudinal methods, an area that still open to big opportunity to be explored in urban climate adaptation studies.

From a societal perspective, the research offers a flexible framework that could support more inclusive planning. It emphasizes shared responsibility and the need to strengthen both government and non-government capacities. These ideas are especially relevant for agencies, NGOs, and cooperatives working in climate-vulnerable areas. Ethical considerations were important throughout the process, I made sure to get informed consent, respect anonymity, and stay aware of the power dynamics between actors. Rather than simply collecting data, I wanted this research to contribute meaningfully to the broader conversation on participatory planning and upgrading.

TRANSFERABILITY AND BROADER USE

Although this research focused on a single case, I believe many of its lessons are transferable. Informal settlements across Indonesia, and even in Southeast Asia, face similar challenges related to governance, unequal resources, and climate risks. I've read how cases in countries like Thailand share similar dynamics, which suggests that the principles in this research could be adapted elsewhere. Recommendations like shared capacity-building, embedded learning, and collaborative planning are not tied to one specific location.

Of course, transferability must always consider local context. The goal is not to replicate a model, but to use a flexible framework that can evolve with different institutions, communities, and environments. I hope this research can be a helpful reference for future participatory projects, policymaking, or academic studies, especially for those aiming to create more inclusive, adaptive, and community-led approaches to informal settlement upgrading in response to climate change.

TWO ADDITIONAL REFLECTION QUESTIONS

- **How would the research differ if it were approached from another lens, such as urban design?**

If this research were conducted from an urban design perspective, it would likely result in a significantly different methodology, analytical framework, and set of outcomes. The current study is shaped by the lens of the Management in the Built Environment (MBE) track, which emphasizes governance, institutional coordination, and strategic planning rather than spatial or physical design. Although the topic remains the same, an urban design approach might prioritize physical spatial configurations, thermal comfort design strategies, or built environment morphology, providing more ideas on the spatial analysis and design. While the result will be different, if this research is done through the lens of urban design, this research could offer a more comprehensive result, which not only weighted on gaining a deep understanding of the theory, analysing primary data from the data collection process, and holding a deep discussion of the analysis results, but complement the result with a spatial design idea that could engage more for the participants and actors involved.

- **Why did you choose collaborative governance as the main framework for this research?**

Collaborative governance feels central to how I understand cities and how change can happen within them. I have always been curious about how different actors, governments, communities, NGOs, and experts, with their own interests and capacities, can come together to address shared challenges. In complex issues like informal settlement upgrading or climate adaptation, no single actor can act alone, which is why I find multi-actor collaboration so important. This framework allowed me to explore those dynamics from a more neutral position, observing how perspectives align or diverge, and how trust and coordination are built over time. Looking at climate change through this lens helped me see how differently it is understood and experienced by different stakeholders, whether as a policy challenge, a technical issue, or just a part of daily life. Collaborative governance gave me the tools to make sense of that complexity and propose strategies that are not only relevant to this case, but flexible enough to be adapted in other contexts. It also shaped how I see my role going forward, not just as a researcher or planner, but as someone who can help create space for dialogue, learning, and connection between diverse actors.

REFERENCES

Abbott, J. (1996). Sharing the City: Community participation in urban management. Earthscan. https://lib.ugent.be/en/catalog/rug01:000420092
Akbari, H., Cartalis, C., Kolokotsa, D., Muscio, A., Pisello, A. L., Rossi, F., Santamouris, M., Synnef, A., Wong, N. H., & Zinzi, M. (2015). Local Climate Change and Urban Heat Island Mitigation Techniques – The State of The Art. Journal of Civil Engineering and Management, 22(1), 1–16. https://doi.org/10.3846/13923730.2015.1111934
Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory, 18, 543-571. https://doi.org/10.1093/JOPART/MUM032.
Arifwidodo, S. D., Chandrasiri, O., Abdulharis, R., & Kubota, T. (2019). Exploring the effects of urban heat island: A case study of two cities in Thailand and Indonesia. APN Science Bulletin, 9(1). https://doi.org/10.30852/sb.2019.539
ARKOM Indonesia & RUJAK Centre for Urban Studies (RCUS). (2024). Community-based Passive Cooling Collaboration in Indonesia. Project Proposal.
BBC News Indonesia. (2024). 'It's like there are seven suns!' – How does hot weather affect poor communities?. https://www.bbc.com/indonesia/articles/cj7m9xgk3gxo
Basu, T., & Das, A. (2024). Systematic review to address the effect of urban heat island and outdoor thermal condition on human comfort in small and medium cities of Global South. In Climate change management (pp. 141–157). https://doi.org/10.1007/978-3-031-58261-5_6
Blaikie, N., & Priest, J. (2019). Designing social research: The Logic of Anticipation. John Wiley & Sons.
Blatter, J., & Blume, T. (2008). In search of co variance, causal mechanisms or congruence? towards a plural understanding of case studies. Swiss Political Science Review, 14(2), 315–356. https://doi.org/10.1002/j.1662-6370.2008.tb00105.x
Boonyabancha, S., & Kerr, T. (2018). Lessons from CODI on co-production. Environment and Urbanization, 30(2), 444–460. https://doi.org/10.1177/0956247818791239
Bredenoord, J. (2015). Sustainable Housing and Building Materials for Low-income Households. Journal of Architectural Engineering Technology, 2016, 1-9. https://doi.org/10.4172/2168-9717.1000158.
Brinkmann, S. (2013). Qualitative Interviewing. Oxford University Press.
Bryson, J.M., Crosby, B.C., and Stone, M.M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. Public Administration Review 66:44–55.
C40 Cities. (2022). Socially Inclusive Climate Adaptation for Urban Revitalization Project in Jakarta. https://www.c40.org/case-studies/c40-good-practice-guides-jakarta-socially-inclusive-climate-adaptation-for-urban-revitalization-project/
Cahyo, K.N. (2024, June 26). Peringatan Hari Lingkungan Hidup Sedunia, BMKG Ajak Civitas Akademika ITS untuk Mitigasi Urban Heat Island | BMKG. BMKG | Badan Meteorologi, Klimatologi, dan Geofisika. https://www.bmkg.go.id/berita/?p=peringatan-hari-lingkungan-hidup-sedunia-bmkg-ajak-civitas-akademika-its-untuk-mitigasi-urban-heat-island&lang=ID
Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. Oncology Nursing Forum, 41(5), 545–547. https://doi.org/10.1188/14.ONF.545-547
Colman, J. S. (1988). Social capital in the creation of human capital. American Journal of Sociology, 94(Supplement), S95–S120.
Daniels, S. E., & Walker, G. B. (2001). Working through environmental conflict: The collaborative learning approach. Westport, CT: Praeger.
Design Council. (2019). Framework for Innovation - Design Council. https://www.designcouncil.org.uk/our-resources/framework-for-innovation/
Denzin, N. K. (1978). The research act: A theoretical introduction to sociological methods (2nd ed.). McGraw-Hill.
Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. Journal of Public Administration Research and Theory, 22(1), 1–29. https://doi.org/10.1093/jopart/mur011
Filho, W. L., Icaza, L. E., Neht, A., Klavins, M., & Morgan, E. A. (2017). Coping with the impacts of urban heat islands. A literature based study on understanding urban heat vulnerability and the need for resilience in cities in a global climate change context. Journal of Cleaner Production, 171, 1140–1149. https://doi.org/10.1016/j.jclepro.2017.10.086
Firman, T., Surbakti, I. M., Idroes, I. C., & Simarmata, H. A. (2011). Potential climate-change related vulnerabilities in Jakarta: Challenges and current status. Habitat International, 35(2), 372–378. https://doi.org/10.1016/j.habitatint.2010.11.011
Fong, C. S., Manavvi, S., Priya, R. S., Ramakreshnan, L., Sulaiman, N. M., & Aghamohammadi, N. (2023). Traits of adaptive outdoor thermal comfort in a tropical urban microclimate. Atmosphere, 14(5), 852. https://doi.org/10.3390/atmos14050852

Giridharan, R., & Emmanuel, R. (2018). The impact of urban compactness, comfort strategies and energy consumption on tropical urban heat island intensity: A review. Sustainable Cities and Society, 40, 677–687. https://doi.org/10.1016/j.scs.2018.01.024
Gray, B. (1989). Collaborating: Finding common ground for multiparty problems. San Francisco, CA: Jossey-Bass.
Google Earth. (2025). [Google Earth location of Kampung Marlina, Jakarta, Indonesia]. Retrieved April 19, 2025, from https://earth.google.com/earth/d/1HW8_zubm13ueFUL2hWYvEkfQxFw55_6z?usp=sharing
Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017, January). Case study research: Foundations and methodological orientations. In Forum qualitative Sozialforschung/Forum: qualitative social research (Vol. 18, No. 1). https://doi.org/10.17169/fqs-18.1.2655
Healey, P. (1997). Collaborative Planning. Shaping Places in Fragmented Societies. Vancouver, UBC Press, 338 p. (ISBN 0-7748-0597-8). Cahiers De Géographie Du Québec, 42(115), 140. https://doi.org/10.7202/022725ar
Holling, C. S. (1978). Adaptive environmental assessment and management. New York, NY: John Wiley & Sons.
Huxham, C., & Vangen, S. (2005). Managing to collaborate: The theory and practice of collaborative advantage. New York, NY: Routledge.
Innes, J. E., & Booher, D. E. (1999). Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. Journal of the American Planning Association, 65(4), 412–423. https://doi.org/10.1080/01944369908976071
Intergovernmental Panel on Climate Change (IPCC). (2022). Chapter 6: Cities, Settlements and Key Infrastructure. Intergovernmental Panel on Climate Change Sixth Assessment Report. https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-6/
Irani, Z., Ezingeard, J.-N., Grieve, R. J., & Race, P. (1999). A case study strategy as part of an information systems research methodology: a critique. International Journal of Computer Applications in Technology, 12(2/3/4/5), 190. doi:10.1504/ijcat.1999.000203
Jakarta Provincial Government. (2020). Climate Village Program (Program Kampung Iklim/Proklim) – Jakarta Low Emission. https://rendahemisi.jakarta.go.id/action/detail/34/program-kampung-iklim-proklim
Jakarta Provincial Government. (2021). Governor's Decree No. 90/2021 on Climate Resilience and Low-Carbon Development. Jakarta: Biro Hukum Provinsi DKI Jakarta. https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5c8ab5851647e100801756a3/6202a1c646bc45ff9730fa76/files/Jakarta_Governors_Decree_No_90_2021.pdf?1644339654
Jakarta Provincial Government. (2021). Jakarta Climate Action Plan 2021–2050. Jakarta: Jakarta Low Emission Development Initiative. https://rendahemisi.jakarta.go.id/reports
Jakarta Provincial Government. (2024). Governor's Decree No. 33 of 2024 on the Upgrading of Informal Settlements. Jakarta: Biro Hukum Provinsi DKI Jakarta. https://peraturan.bpk.go.id/Download/371617/PERGUB%20No.%2033%20Tahun%202024.pdf
Jakartasatu. (2025). Population Density Map of Jakarta. [Demographic map]. https://jakartasatu.jakarta.go.id/portal/apps/webappviewer/index.html?id=cb9a4fb36c4e4919a426d698d5af8f54
Jumadi, N., Sari, D. N., Fikriyah, V. N., Pratama, B. A., Wardah, H., Madani, D. T., Priyono, K. D., Hadibasyir, H. Z., Danardono, N., & Saputra, A. (2024). Influence of urban growth on urban heat island phenomenon around Jakarta, Indonesia: Insight from Depok and South Tangerang city. IOP Conference Series Earth and Environmental Science, 1291(1), 012001. https://doi.org/10.1088/1755-1315/1291/1/012001
Kurniati, A. C., & Nitivattananon, V. (2015). Strategies for Mitigating Urban Heat Island Effects in Surabaya, Indonesia. ASEAN/Asian Academic Society International Conference Proceeding Series. https://core.ac.uk/download/pdf/267559038.pdf
Kurniati, A. C., & Nitivattananon, V. (2016). Factors influencing urban heat island in Surabaya, Indonesia. Sustainable Cities and Society, 27, 99–105. https://doi.org/10.1016/j.scs.2016.07.006
Leach, W. D. (2006). Collaborative public management and democracy: Evidence from Western watershed partnerships. Public Administration Review, 66(Supplement), 100–110.
Lestari, S., Moersidik, S. S., & Syamsudin, F. (2015). Study on heat Island effect induced by land use change increased temperature in Metropolitan. Journal of Mathematical and Fundamental Sciences, 47(2), 126–142. https://doi.org/10.5614/j.math.fund.sci.2015.47.2.2
Mahadevia, D. (2024). Heat adaptation and health in the informal housing—An exploratory research in Ahmedabad, India. Sustainable Social Development, 2(4), 2461. https://doi.org/10.54517/ssd.v2i4.2461
Manik, T. K. (2017). The impact of urban heat islands: assesing vulnerability in Indonesia. British Journal of Environment and Climate Change, 7(02), 119-134. https://www.iied.org/10721iied

Marcuse, P. (2009). From critical urban theory to the right to the city. City, 13(2–3), 185–197. https://doi.org/10.1080/13604810902982177
McCarthy, M.P., Best, M.J., & Betts, R.A. (2010). Climate change in cities due to global warming and urban effects. Geophysical Research Letters, 37. https://doi.org/10.1029/2010GL042845
Mongabay. (2024). Hot Weather Phenomenon and Impact on Urban Public Health. Mongabay.co.id. https://www.mongabay.co.id/2024/11/03/fenomena-cuaca-panas-dan-dampak-kesehatan-masyarakat-perkotaan/
Mukhlis, M., & Perdana, R. (2022). A Critical Analysis of the Challenges of Collaborative Governance in Climate Change Adaptation Policies in Bandar Lampung City, Indonesia. Sustainability. https://doi.org/10.3390/su14074077
Noor, M., Suaedi, F., & Mardiyanta, A. (2023). Collaborative Governance: Suatu Tinjauan Teoritis dan Praktik. Bilding.
Nurdiani, N. (2015). The Characteristics of Residents at Low Cost Housing in Jakarta - Indonesia and their Culture to Green Principles. Applied Mechanics and Materials, 747, 105 - 108. https://doi.org/10.4028/www.scientific.net/AMM.747.105.
Oke, T. R. (1982). The energetic basis of the urban heat island. Quarterly journal of the royal meteorological society, 108(455), 1-24. https://www.patarnott.com/pdf/Oake1982_UHI.pdf
Putnam, R. (1995). Bowling alone: America's declining social capital. Journal of Democracy 6:65–78.———. 2000. Bowling alone: The collapse and revival of American community. New York, NY: Simon Schuster.
Putra, C. D., Ramadhani, A., & Fatimah, E. (2021). Increasing Urban Heat Island area in Jakarta and it's relation to land use changes. IOP Conference Series Earth and Environmental Science, 737(1), 012002. https://doi.org/10.1088/1755-1315/737/1/012002
Republic of Indonesia. (2016). Law No. 16 of 2016 on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change. Jakarta: State Secretariat. https://peraturan.bpk.go.id/Details/41667/uu-no-16-tahun-2016
Revi, A., Satterthwaite, D., Aragón-Durand, F., Corfee-Morlot, J., Kiunsi, R. B. R., Pelling, M., ... & Sverdlik, A. (2014). Chapter 8: Urban areas in field. Climate Change, 535-612.
Ritchie, J., Lewis, J., McNaughton Nicholls, C., & Ormston, R. (Eds.). (2014). Qualitative Research Practice: A Guide for Social Science Students and Researchers (2nd ed.). Sage Publications.
Rizki, A., Tumuyu, S., & Rushayati, S. (2024). The Impact of Urban Green Space on The Urban Heat Island Phenomenon – A Study Case in East Jakarta, Indonesia. Geoplanning: Journal of Geomatics and Planning. https://doi.org/10.14710/geoplanning.11.1.31-42.
Ross, Paula T., & Zaidi, Nikki L. Bibler. (2019). Limited by our limitations. Perspective on Medical Education, 8(4), 261–264. https://doi.org/10.1007/s40037-019-00530-x
Rujak Center for Urban Studies. (RCUS, 2021). Kampung Marlina: Melindungi Eksistensi Diri di Tengah Pembangunan Masa Kini. Retrieved from https://rujak.org/kampung-marlina-melindungi-eksistensi-diri-di-tengah-pembangunan-masa-kini/
Rujak Center for Urban Studies. (RCUS, 2023). Penataan Setempat Kawasan Hunian dan Lingkungan Kampung Marlina, Muara Baru. [Project Report].
Salsabila, S., Amir, S., & Nastiti, A. (2023). Cooling as social practice: Heat mitigation and the making of communal space in Jakarta's informal settlements. Habitat International, 140, 102924. https://doi.org/10.1016/j.habitatint.2023.102924
Sari, D. P. (2021). A review of how building mitigates the urban heat island in Indonesia and tropical cities. Earth, 2(3), 653–666. https://doi.org/10.3390/earth2030038
Sari, A. N. I., Hermintomo, A., Irawaty, D. T., & Tanny, V. (2022). Participation within the Insurgent Planning Practices. In Routledge eBooks (pp. 58–72). https://doi.org/10.4324/9781003318170-7
Scott, A.A., Misiani, H., Okoth, J., Jordan, A., Gohlke, J., Ouma, G., Arrighi, J., Zaitchik, B.F., Jjemba, E., Verjee, S., et al. (2017). Temperature and heat in informal settlements in Nairobi. PLoS ONE 12, e0187300.
Seidman, I. (1998). Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences. Teachers College Press.
Selin, S., & Chavez, D. (1995). Developing a collaborative model for environmental planning and management. Environmental Management, 19(2), 189–195.
Sharma, A., Woodruff, S., Budhathoki, M., Hamlet, A. F., Chen, F., & Fernando, H. J. S. (2018). Role of green roofs in reducing heat stress in vulnerable urban communities—A multidisciplinary approach. Environmental Research Letters, 13(9), 094011. https://iopscience.iop.org/article/10.1088/1748-9326/aad93c/pdf
Solecki, W., Rosenzweig, C., Hammer, S.A., & Mehrotra, S. (2013). The urbanization of climate change: Responding to a new global challenge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315770369-18/urbanization-climate-change-responding-new-global-challenge-1-william-solecki-cynthia-rosenzweig-

stephen-hammer-shagun-mehrotra
Suhartini, N., & Jones, P. (2023). Beyond the informal: Understanding Self-Organized Kampungs in Indonesia. In The Urban Book Series. Springer. https://doi.org/10.1007/978-3-031-22239-9
Thomas, C. W., & Koontz, T. M. (2011). Research designs for examining the impact of community-based management on natural resource conservation. Journal of Natural Resources Policy Research, 3(2), 97–111. https://doi.org/10.1080/19390459.2011.557887
Thomson, A. M., & James P. (2006). Collaboration processes: Inside the black box. Public Administration Review 66:20–32.
Tyagi, A., Kumar, M., Bhan, S. C., Magotra, R., & Sharma, Y. (2021). Review of urban heat Islands: monitoring, forecast and impacts. VayuMandal, 47(2), 1-29. https://climateandcities.org/wp-content/uploads/2022/04/Review-of-UHI.pdf
Ufaira, R., Amir, S., Indraprahasta, G. S., & Nastiti, A. (2023). Living in a hot city: thermal justice through green open space provision. Frontiers in Human Dynamics, 5. https://doi.org/10.3389/fhumd.2023.1237515
United Nations Human Settlements Programme (UN-Habitat). (2018). Pro-Poor Climate Action in Informal Settlements [Thematic Guide]. In UN-HABITAT THEMATIC GUIDE. https://unhabitat.org/sites/default/files/2019/05/pro-poor_climate_action_in_informal_settlements-.pdf
United Nations Office for Disaster Risk Reduction (UNISDR). (2018). United Nations Office for Disaster Risk Reduction 2018 Annual Report. https://www.preventionweb.net/files/64454_unisdrannualreport2018eversionlight.pdf
UN-Habitat. (2020). Informal Settlements and Climate Change: Adapting to a Changing Climate in Urban Areas. Nairobi: United Nations Human Settlements Programme. https://unhabitat.org/sites/default/files/2024/11/wcr2024_-_full_report.pdf
Wilkinson, S., Ghosh, S., & Pelleri, N. (2022). Mandatory or voluntary approaches to green roof implementation: a comparative study among some global cities. Journal of Environmental Planning and Management, 67, 334-355. https://doi.org/10.1080/09640568.2022.2113768.
Ziska, L. H., Gebhard, D. E., Frenz, D. A., Faulkner, S., Singer, B. D., & Straka, J. G. (2003). Cities as harbingers of climate change: Common ragweed, urbanization, and public health. Journal of Allergy and Clinical Immunology, 111(2), 290–295. https://doi.org/10.1067/mai.2003.53

APPENDIX

APPENDIX 1

Operationalization Table

RQ1: How does the **Urban Heat Island (UHI)** effect impact the **informal settlements in Jakarta**?					
Concept	**Variable**	**Sub-variable**	**Indicator**	**Data Collection**	**Source of Information**
The socio-environmental effects experienced in informal settlements area due to UHI effects	Health impact		- Heat-related illness - Sleep deprivation - Less daily travel - Less activity during the hot period	- Analysis of documents - Questionnaire - Semi-structured interview	- Literature review - Community group
	Social-economic impacts		- Number of Air Conditioner (AC) owns in the house - Frequency of using AC unit in the house - Increased electricity bill	- Analysis of documents - Questionnaire - Semi-structured interview	- Literature review - Community group
	Building and environment impacts		- Shading structure of the house - Air circulation of the house - Cool roofs - Street characteristics	- Analysis of documents - Questionnaire - Semi-structured interview	- Literature review - Community group

RQ2: How was **collaborative governance implemented** in the Urban Heat Island (UHI) adaptation project in informal settlements in Jakarta?					
Concept	**Variable**	**Sub-variable**	**Indicator**	**Data Collection**	**Source of Information**
Investigating a case study project to understand the stakeholders involvement and the collaborative governance in the project	Case study selection		- The case - A bounded system - Studied in context - In-depth study - Selecting the case - Multiple sources of eveidence	Analysis on the past projects by NGO in Jakarta (RUJAK Center for Urban Studies)	NGO in Jakarta (RUJAK Center for Urban Studies)
	Stakeholder types		- Stakeholder types - Stakeholder roles in the project - Stakeholder relationship	Questionnaire	- Non-government actors in the case study project - Government actors in the case study project
	Collaboration and collaborative governance process in the project	Principled engagement	- Definition of the context - Determination to join the project	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project
		Shared motivation	- Mutual trust - Shared vision - Willingness to cooperate	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project
		Capacity for joint action	- Procedural/Institutional arrangement - Leadership - Knowledge - Resources	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project

RQ3: What strategies can be implemented **to enhance collaborative governance** in adapting the UHI effect in the informal settlement area in Jakarta in the future?					
Concept	**Variable**	**Sub-variable**	**Indicator**	**Data Collection**	**Source of Information**
Proposed actions to strengthen multi-stakeholder collaboration from project participants and external parties such as experts and academia	Collaboration and collaborative governance process in the project	Principled engagement	- Definition of the context - Determination to join the project	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project - Experts/academia
		Shared motivation	- Mutual trust - Shared vision - Willingness to cooperate	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project - Experts/academia
		Capacity for joint action	- Procedural/Institutional arrangement - Leadership - Knowledge - Resources	Semi-structured interview	- Non-government actors in the case study project - Government actors in the case study project - Experts/academia
		Innovation and scaling	- Innovation in the governance approach - Role of experts and/or academia to strengthen the collaborative governance process	Semi-structured interview	Experts/academia

APPENDIX 2

Interview Protocol **(English)**

Opening Statement

Welcome,

You are being invited to participate in a research study titled 'Bridging the Heat Gap: Enhancing Collaborative Governance for Urban Heat Island Adaptation in Jakarta's Informal Settlements'. This study is being done by Amalina Budiati from the TU Delft.

The purpose of this research study is to study how the collaborative governance system could enhance collaborative actions in our society, especially to combat the rising temperature effects in the informal settlements area, and will take you approximately 90-120 minutes to complete. The data will be used for analysis on how the involved actors comprehend the urgency of urban heat island (UHI) effect and how can collaborative governance can be optimized to combat this climate change. We will be asking you to fill in some opinions about the project from Kampung Marlina that has been completed.

As with any interview activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. We will minimize any risks by keeping the result of this semi-structured interview anonymous. The recording data will remain anonymous and be stored on the secured Project Storage of the TU Delft. The audio recording will be deleted after the project is finished.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions.

For any other questions or comments, please use the contact information of the researcher below.

Amalina Budiati (a.budiati@student.tudelft.nl)

Interview Protocol **(Indonesian)**

Pembukaan

Selamat datang,

Anda diundang untuk berpartisipasi dalam penelitian berjudul *'Bridging the Heat Gap: Enhancing Collaborative Governance for Urban Heat Island Adaptation in Jakarta's Informal Settlements'*. Penelitian ini dilakukan oleh Amalina Budiati dari TU Delft.

Tujuan dari penelitian ini adalah untuk mempelajari bagaimana sistem tata kelola kolaboratif dapat meningkatkan aksi kolaboratif dalam masyarakat, khususnya dalam mengatasi dampak kenaikan suhu di kawasan permukiman informal. Wawancara ini akan memerlukan waktu sekitar 90-120 menit untuk diselesaikan. Data yang dikumpulkan akan digunakan untuk menganalisis bagaimana para aktor yang terlibat memahami urgensi dampak *urban heat island* (UHI) serta bagaimana tata kelola kolaboratif dapat dioptimalkan untuk menghadapi perubahan iklim ini. Kami akan meminta Anda untuk memberikan pendapat terkait proyek Kampung Marlina yang telah diselesaikan.

Seperti dalam setiap kegiatan wawancara, terdapat risiko kebocoran data. Namun, kami akan berusaha semaksimal mungkin untuk menjaga kerahasiaan jawaban Anda dalam penelitian ini. Kami akan meminimalkan risiko dengan memastikan bahwa hasil wawancara semi-terstruktur ini tetap anonim. Data rekaman akan tetap anonim dan disimpan di *Project Storage* yang aman milik TU Delft. Rekaman audio akan dihapus setelah proyek selesai.

Partisipasi Anda dalam penelitian ini bersifat sukarela, dan Anda dapat mengundurkan diri kapan saja. Anda juga bebas untuk tidak menjawab pertanyaan tertentu jika merasa tidak nyaman.

Jika Anda memiliki pertanyaan atau komentar, silakan hubungi peneliti melalui informasi kontak berikut:

Amalina Budiati (a.budiati@student.tudelft.nl)

Terima kasih atas kesedian Anda sekalian.

APPENDIX 3

List of questions for interview with **Non-Government Organization (RCUS)**

1. Discussing the case study

Indicators	Questions in English	Questions in Indonesian
The case	• Can you describe the Urban Heat Island (UHI) adaptation project implemented in this informal settlements? • Can you tell us more about the process? For example, the timeline of this project. The preparation, execution, finalisation in the end, the specific activities and outcomes, and the project evaluation? • What were the biggest challenges in implementing this project?	• *Bisa ceritakan proyek adaptasi Urban Heat Island (UHI) yang telah diterapkan di permukiman informal ini?* • *Bisakah Anda menjelaskan lebih lanjut tentang prosesnya? Misalnya, garis besar timeline proyek ini. Bagaimana tahap persiapan, pelaksanaan, penyelesaian aApa tantangan terbesar yang dihadapi dalam mengimplementasikan proyek ini?*
A bounded system: the collaborative governance system	• Who were the key stakeholders involved in this project, and what were their roles? • How was the collaboration among stakeholders, especially NGOs, the government, and the community, coordinated? • Did you have any framework to govern the relationship of the stakeholders? • Were there any formal mechanisms (e.g., MoUs, local policies, or regulations) governing this collaboration?	• *Siapa saja pihak yang terlibat dalam proyek ini, dan bagaimana peran dari setiap pihak?* • *Bagaimana koordinasi di antara stakeholder, terutama antara NGO, pemerintah, dan komunitas dijalankan?* • *Apakah ada framework tertentu untuk mengatur hubungan antar-pihak di proyek ini?* • *Apakah ada mekanisme formal (misalnya MoU, kebijakan, peraturan lokal) yang mengatur kerja sama ini?*
Studied in context	• To what extent was this project adapted to the specific needs of the local community? • What unique factors of this location influenced the design and implementation of the project? • How did the local social, economic, and environmental conditions impact the project's success?	• *Seberapa besar proyek ini disesuaikan dengan kebutuhan spesifik komunitas lokal?* • *Apa faktor-faktor unik dari lokasi ini yang mempengaruhi desain dan implementasi proyek?* • *Bagaimana kondisi sosial, ekonomi, dan lingkungan di daerah ini mempengaruhi keberhasilan proyek?*
In-depth study	• What primary approaches were used to assess the project's impact on the community? • Were there any academic studies or research supporting the project's approach? • How was the effectiveness of this project evaluated?	• *Apakah ada metode khusus yang digunakan untuk memahami dampak dari proyek terhadap komunitas sekitar?* • *Apakah ada studi akademik atau riset lain yang mendukung pendekatan proyek ini?* • *Bagaimana kefektifan proyek ini dievaluasi?*
Selecting the case	• Why was this location chosen for intervention? • Were there specific considerations in selecting this area compared to other areas experiencing UHI effects? • How can the experience from this project be applied to similar cases in other locations?	• *Mengapa lokasi ini dipilih sebagai lokasi intervensi?* • *Apakah ada pertimbangan khusus dalam memilih daerah ini dibandingkan dengan daerah lain yang juga mengalami efek UHI?* • *Bagaimana proses dan pengalaman dari proyek ini bisa digunakan untuk kasus serupa di lokasi lain?*
Multiple sources of evidence	• What were the main sources used to understand the conditions before and after the project? • How was the success of this project evaluated? • How was the local community involved in data collection and providing feedback on the project?	• *Apa sumber utama yang digunakan untuk memahami kondisi sebelum dan sesudah proyek?* • *Apakah ada data kuantitatif atau kualitatif yang mendukung keberhasilan proyek ini?* • *Bagaimana keterlibatan komunitas lokal dalam mengumpulkan data dan memberikan evaluasi dan masukan terhadap proyek?*

List of questions for interview with **Non-Government Organization (RCUS)**

2. Dynamics collaboration within actors in the case study project

Sub-variables	Indicators	Questions in English	Questions in Indonesian
Principled engagement	**Discovery of the context**	What do you know about the UHI effects that affect the living conditions of informal settlements in Kampung Marlina?	*Bagaimana Anda mengetahui tentang dampak Urban Heat Island (UHI) yang mempengaruhi kondisi kehidupan di permukiman informal atau kampung di Kampung Marlina?*
	Definition of the context	How did you define the key challenges related to Urban Heat Island adaptation in informal settlements?	*Bagaimana Anda mendefinisikan tantangan utama terkait adaptasi Urban Heat Island di permukiman informal?*
Shared motivation	**Shared vision**	What was the main visions that guide this collaboration?	*Apa visi atau tujuan bersama yang mengarahkan pada proyek ini?*
	Willingness to cooperate	Did this main vision give you and your institution a clear pathway to collaborate into this project?	*Apakah visi ini memberikan penjabaran yang baik untuk meyakinkan Anda dan institusi Anda untuk berkolaborasi di proyek ini?*
	Mutual trust	From the elaborate visions above, did they convince you and your institution to let other actors take their part based on their responsibilities to work on this collaboration project?	*Apakah dari visi yang dijabarkan di atas meyakinkan Anda untuk mempercayakan tanggungjawab pada pihak lain untuk menjalankan proyek kolaborasi ini?*
Capacity for joint action	**Procedural/ Institutional arrangement**	• How was the mechanism to collaborate arranged between your organization and other actors? • Did this mechanism make it easier for you to collaborate in this project?	• *Bagaimana mekanisme kolaborasi diatur antara organisasi Anda dan aktor lainnya?* • *Apakah mekanisme ini mempermudah Anda untuk berkolaborasi pada proyek?*
	Leadership	• Based on the division of responsibilities explained above, who took the leadership role of this project? • How did this leadership influence decision-making and project outcomes?	• *Berdasarkan pembagian tanggung jawab sebelumnya, siapa yang sering mengambil peran sebagai pimpinan pada proyek ini?* • *Bagaimana model kepemimpinan ini mempengaruhi pengambilan keputusan dan hasil proyek?*
	Knowledge	• How was the knowledge level of every actor? • By the existed mechanism and leadership, how was knowledge shared among actors? • Did it support every actor's knowledge to work on together within this project?	• *Bagaimana tingkat pengetahuan para aktor?* • *Dengan mekanisme dan kepemimpinan yang ada, bagaimana proses sharing knowledge dilakukan di antara pihak-pihak terkait?*
	Resources	With the existed mechanism, what types of resources (financial, technical, human) did your organization provide for this initiative?	*Jenis sumber daya apa (keuangan, teknis, manusia) yang organisasi Anda sediakan untuk proyek ini?*
Opinions on Governance and Project Outcomes	**Strength, weakness, opportunity, and threats in the process**	What were the strengths, weaknesses, opportunities, and threats of the mechanism or governance system in this project?	*Apa kelebihan, kekurangan, potensi, dan ancaman yang ada dalam mekanisme atau sistem tata-kelola dari kolaborasi proyek ini?*

List of questions for interview with **Non-Government Organization (RCUS)**

3. Enhancing strategies for the implemented case

Sub-variables	Indicators	General question	Questions in English	Questions in Indonesian
Principled engagement	**Discovery of the context**	After collaborating in this project, did you have **other findings that change** your understanding about the UHI effects?	• After collaborating in this project, did you have other findings that change your understanding about the UHI effects that affect the living conditions of informal settlements in Kampung Marlina? • What strategies can be implemented to better understand the specific challenges of informal settlements before initiating a collaborative project? • How can your institution improve its approach to assess local needs and environmental conditions?	• *Setelah berkolaborasi dalam proyek ini, apakah Anda menemukan hal baru yang mengubah pemahaman Anda tentang dampak Urban Heat Island (UHI) terhadap kondisi kehidupan di permukiman informal di Kampung Marlina?* • *Strategi apa yang dapat diterapkan untuk lebih memahami tantangan spesifik yang dihadapi oleh permukiman informal sebelum memulai proyek kolaboratif?* • *Bagaimana institusi Anda dapat meningkatkan pendekatannya dalam menilai kebutuhan lokal dan kondisi lingkungan?*
	Definition of the context		What steps can be taken to ensure all actors in this project agree on a common understanding of the challenges and priorities?	*Langkah apa yang dapat dilakukan untuk memastikan semua aktor dalam proyek ini memiliki pemahaman yang sama mengenai tantangan dan prioritas proyek?*

List of questions for interview with **Non-Government Organization (RCUS)**

Shared motivation	**Shared vision**	Did the main vision help to align the project's goals with various actors? If it didn't, what can be improved to encourage the collaboration between actors and maintain trust, transparency, and accountability within actors with different interests?	How can actors align their organizational goals with the broader vision of UHI adaptation and community resilience?	*Bagaimana para aktor dapat menyelaraskan tujuan organisasi mereka dengan visi yang lebih luas mengenai adaptasi UHI dan ketahanan komunitas?*
	Willingness to cooperate		• What strategies can be implemented to encourage ongoing collaboration between government, NGOs, and private sector actors?	• *Strategi apa yang dapat diterapkan untuk mendorong kolaborasi yang berkelanjutan antara pemerintah, NGO, dan sektor swasta?*
	Mutual trust		• What strategies can be used to build and maintain trust among stakeholders with different interests? • How can transparency be improved to reduce skepticism and ensure accountability in collaborations?	• *Strategi apa yang dapat digunakan untuk membangun dan mempertahankan kepercayaan di antara pihak yang memiliki kepentingan berbeda?* • *Bagaimana cara untuk meningkatkan transparansi dalam proyek untuk mengurangi skeptisisme dan memastikan akuntabilitas dalam kolaborasi?*
Capacity for joint action	**Procedural/ Institutional arrangement**	What can be improved to improve the mechanism so that the leadership model, knowledge-sharing platform, and sharing resources work best to ease the decision-making process and give the best outcome?	What can be improved from the existing formal structure (e.g., MoUs, governance frameworks) to strengthen long-term collaboration? How to do that?	*Apa yang bisa ditingkatkan dari jenis perjanjian formal yang sudah ada? (misalnya, MoU, kerangka tata kelola) yang dapat memperkuat kolaborasi dalam jangka panjang? Bagaimana caranya?*
	Leadership		What leadership models work best in this multi-stakeholder collaboration, especially to ease the decision-making process and to give the best outcomes?	*Model kepemimpinan seperti apa yang paling efektif dalam kolaborasi yang melibatkan banyak pihak seperti ini?*
	Knowledge		What mechanisms can be established to improve collective knowledge, learning, and collaboration?	*Seperti apa platform untuk knowledge-sharing yang tepat, yang dapat dibangun untuk meningkatkan kolaborasi dan pembelajaran kolektif?*
	Resources		Was the existing mechanism already effective in providing resources for this project? How can it be improved to ensure the project's success?	*Model pendanaan atau berbagi sumber daya seperti apa yang dapat diaplikasikan untuk meningkatkan keberlanjutan dan efektivitas proyek seperti ini agar berhasil?*

APPENDIX 4

List of questions for interview with **Community and Non-Government Organizations**

1. Impact of UHI effects in the study case location

Sub-variable	Indicators	Questions in English	Questions in Indonesian
Health impacts	Heat-related illness	Before the project, did you or your family experience het-related illness due to extreme heat? For example, dehydration, rapid heartbeat, or fever.	*Sebelum ada proyek ini, apakah Anda atau keluarga pernah mengalami masalah kesehatan akibat suhu panas? Contoh, dehidrasi, degup jantung yang begitu kuat, atau demam tinggi.*
		After the project, have these heat-related illness improved?	*Apakah setelah proyek ini, kondisi kesehatan Anda membaik?*
	Sleep deprivation	Before the project, did the heat make it difficult for you to sleep?	*Apakah sebelum proyek, Anda sering mengalami kesulitan tidur akibat panas?*
		After the project, do you sleep better at night?	*Apakah setelah proyek ini, Anda bisa tidur lebih nyenyak di malam hari?*
	Less daily travel	Before the project, did extreme heat prevent you from going outside for work or daily activities?	*Sebelum proyek ini ada, apakah panas ekstrem membuat Anda sulit bepergian untuk bekerja atau aktivitas lain?*
		After the project, is it easier for you to go outside during hot day for work or daily activities?	*Apakah sekarang Anda merasa lebih nyaman bepergian meskipun cuaca panas?*
	Less activity during the hot period	Before the project, did the heat reduce your ability to do daily activities at home or work?	*Apakah sebelum proyek ini, Anda merasa sulit melakukan aktivitas sehari-hari karena cuaca yang panas?*
		After the project, have you been able to do more activities despite the heat?	*Apakah sekarang Anda bisa melakukan lebih banyak aktivitas meskipun cuaca panas?*
Social-economic impacts	Number of Air Conditioner (AC) owns in the house	Before the project, did you own an air conditioner?	*Sebelum ada proyek ini, apakah Anda memiliki AC di rumah?*
		After the project, do you feel to own an AC?	*Apakah setelah proyek ini, Anda merasa perlu memiliki AC?*
	Frequency of using AC unit in the house	Before the project, how often did you use an AC or fan?	*Sebelum ada proyek ini, apakah tagihan listrik Anda tinggi karena penggunaan AC/kipas?*
		After the project, has your AC/fan usage decreased?	*Apakah setelah proyek ini, Anda lebih jarang menggunakan AC/kipas?*
	Increased electricity bill	Before the project, how much was your electricity bill? Is this mostly used for cooling appliances?	*Sebelum ada proyek ini, berapa tagihan listrik Anda? Apakah ini mayoritas penggunaannya untuk alat-alat pendingin ruangan?*
		After the project, how much is your electricity bill? Has it reduced than before?	*Setelah proyek ini, bagaimana tagihan listrik Anda? Apakah berkurang dari sebelumnya?*
Building and environment impacts	Shading structure of the house	Before the project, how much shade did your house have?	*Sebelum ada proyek ini, apakah rumah Anda memiliki naungan seperti pohon, untuk mengurangi panas?*
		After the project, has your house become cooler due to better shading?	*Apakah setelah proyek ini, rumah Anda terasa lebih sejuk karena naungan tambahan?*
	Air circulation of the house	Before the project, how was the air circulation in your house?	*Bagaimana kualitas sirkulasi udara dalam rumah Anda sebelum proyek?*
		After the project, has the air circulation improved?	*Apakah setelah ada proyek ini, sirkulasi udara dalam rumah Anda membaik?*
	Cool roofs	Before the project, how hot did your roof make your house?	*Sebelum ada proyek ini, apakah atap rumah Anda menyerap panas?*
		After the project, has the roofing change (if any) helped cool down your house?	*Apakah perubahan pada atap (jika ada) membantu mendinginkan rumah Anda?*
	Street characteristics	Before the project, how much did the street environment contribute to heat?	*Sebelum ada proyek, apakah kondisi jalan dan lingkungan sekitar (misalnya kurangnya pepohonan, jalan beraspal panas) memperparah kenaikan suhu?*
		After the project, have changes in the street (like shading or open spaces) reduced the heat?	*Apakah ada perbaikan di lingkungan sekitar (misalnya lebih banyak naungan dan ruang terbuka) yang membuat area ini lebih sejuk?*
Additional reflection questions		• How satisfied are you with the changes brought by the project by RCUS?	• *Seberapa puas Anda dengan perubahan yang dibawa oleh proyek dari RCUS ini?*
		• Do you think the project effectively reduced heat in your home and surroundings? • (Open question) Would you recommend similar projects in other communities?	• *Menurut Anda, apakah proyek ini efektif dalam mengurangi panas di rumah dan lingkungan sekitar?* • *(Pertanyaan terbuka) Jika proyek serupa diterapkan di tempat lain, apakah Anda akan merekomendasikannya?*

List of questions for interview with **Community and Non-Government Organizations**

2. Dynamics collaboration within actors in the case study project

Sub-variables	Indicators	Questions in English	Questions in Indonesian
Principled engagement	**Discovery of the context**	What do you know **about the UHI effects that affect the living conditions of informal settlements** in Kampung Marlina?	*Bagaimana Anda mengetahui tentang dampak Urban Heat Island (UHI) yang mempengaruhi kondisi kehidupan di permukiman informal atau kampung di Kampung Marlina?*
	Definition of the context	How did you **define the key challenges** related to Urban Heat Island adaptation in informal settlements?	*Bagaimana Anda mendefinisikan tantangan utama terkait adaptasi Urban Heat Island di permukiman informal?*
Shared motivation	**Shared vision**	What **was the main visions** that guide this collaboration?	*Apa visi atau tujuan bersama yang mengarahkan pada proyek ini?*
	Willingness to cooperate	Did this main vision give you and your institution **a clear pathway to collaborate** into this project?	*Apakah visi ini memberikan penjabaran yang baik untuk meyakinkan Anda dan institusi Anda untuk berkolaborasi di proyek ini?*
	Mutual trust	From the **elaborate** visions above, did they convince you and your institution **to let other actors take their part based on their responsibilities** to work on this collaboration project?	*Apakah dari visi yang dijabarkan di atas meyakinkan Anda untuk mempercayakan tanggungjawab pada pihak lain untuk menjalankan proyek kolaborasi ini?*
Capacity for joint action	**Procedural/ Institutional arrangement**	• How was the **mechanism to collaborate** arranged between your organization and other actors? • Did this **mechanism make it easier for you to collaborate** in this project?	• *Bagaimana mekanisme kolaborasi diatur antara organisasi Anda dan aktor lainnya?* • *Apakah mekanisme ini mempermudah Anda untuk berkolaborasi pada proyek?*
	Leadership	• Based on the division of responsibilities explained above, **who took the leadership role** of this project? • How did this leadership **influence decision-making and project outcomes**?	• *Berdasarkan pembagian tanggung jawab sebelumnya, siapa yang sering mengambil peran sebagai pimpinan pada proyek ini?* • *Bagaimana model kepemimpinan ini mempengaruhi pengambilan keputusan dan hasil proyek?*
	Knowledge	• How was the **knowledge level** of every actor? • By the existed mechanism and leadership, how was **knowledge shared among actors**? • Did it **support every actor's knowledge** to work on together within this project?	• *Bagaimana tingkat pengetahuan para aktor?* • *Dengan mekanisme dan kepemimpinan yang ada, bagaimana proses sharing knowledge dilakukan di antara pihak-pihak terkait?*
	Resources	With the **existed mechanism**, what **types of resources (financial, technical, human) did your organization provide** for this initiative?	*Jenis sumber daya apa (keuangan, teknis, manusia) yang organisasi Anda sediakan untuk proyek ini?*
Opinions on Governance and Project Outcomes	**Strength, weakness, opportunity, and threats in the process**	What were the **strengths, weaknesses, opportunities, and threats** of the mechanism or governance system in this project?	*Apa kelebihan, kekurangan, potensi, dan ancaman yang ada dalam mekanisme atau sistem tata-kelola dari kolaborasi proyek ini?*

List of questions for interview with **Community and Non-Government Organizations**

3. Enhancing strategies for future projects

Sub-variables	Indicators	General question	Questions in English	Questions in Indonesian
Principled engagement	**Discovery of the context**	After collaborating in this project, did you have **other findings that change** your understanding about the UHI effects?	• After collaborating in this project, did you have other findings that change your understanding about the UHI effects that affect the living conditions of informal settlements in Kampung Marlina? • What strategies can be implemented to better understand the specific challenges of informal settlements before initiating a collaborative project? • How can your institution improve its approach to assess local needs and environmental conditions?	*Setelah berkolaborasi dalam proyek ini, apakah Anda menemukan hal baru yang mengubah pemahaman Anda tentang dampak Urban Heat Island (UHI) terhadap kondisi kehidupan di permukiman informal di Kampung Marlina?* • *Strategi apa yang dapat diterapkan untuk lebih memahami tantangan spesifik yang dihadapi oleh permukiman informal sebelum memulai proyek kolaboratif?* • *Bagaimana institusi Anda dapat meningkatkan pendekatannya dalam menilai kebutuhan lokal dan kondisi lingkungan?*
	Definition of the context		What steps can be taken to ensure all actors in this project agree on a common understanding of the challenges and priorities?	*Langkah apa yang dapat dilakukan untuk memastikan semua aktor dalam proyek ini memiliki pemahaman yang sama mengenai tantangan dan prioritas proyek?*
	Deliberation of the project	From this findings and **from your institution**, do you want **to create new strategies or improve your approaches** to make this collaboration more effective? Do you have any suggestions on **what policies should be improved** to make **every stakeholder can get benefits to increase the engagement** of the project?	What mechanisms can be introduced to improve communication and decision-making among stakeholders? – Shared vision?	*Mekanisme apa yang dapat diperkenalkan untuk meningkatkan komunikasi dan pengambilan keputusan di antara para pemangku kepentingan?*
	Determination to join the project		• What incentives or policies could encourage stronger commitment from stakeholders in collaborative projects? • How can the benefits of collaboration be effectively communicated to potential partners to increase engagement?	• *Insentif atau kebijakan apa yang dapat mendorong komitmen yang lebih kuat dari setiap aktor yang terlibat?* • *Bagaimana manfaat dari kolaborasi ini dapat dikomunikasikan secara efektif untuk meningkatkan ketertarikan pihak-pihak yang ingin terlibat berkolaborasi?*

List of questions for interview with **Community and Non-Government Organizations**

Shared motivation	**Shared vision**	Did the main vision help to align the project's goals with	**How can actors align their organizational goals with the broader vision of**	• *Bagaimana para aktor dapat menyelaraskan tujuan organisasi*
		various actors? If it didn't, what can be improved to encourage the collaboration between actors and maintain trust, transparency, and accountability within actors with different interests?	UHI adaptation and community resilience?	*mereka dengan visi yang lebih luas mengenai adaptasi UHI dan ketahanan komunitas?*
	Willingness to cooperate		What strategies can be implemented to encourage ongoing collaboration between government, NGOs, and private sector actors?	• *Strategi apa yang dapat diterapkan untuk mendorong kolaborasi yang berkelanjutan antara pemerintah, NGO, dan sektor swasta?*
	Mutual trust		• What strategies can be used to build and maintain trust among stakeholders with different interests? • How can transparency be improved to reduce skepticism and ensure accountability in collaborations?	• *Strategi apa yang dapat digunakan untuk membangun dan mempertahankan kepercayaan di antara pihak yang memiliki kepentingan berbeda?* • *Bagaimana cara untuk meningkatkan transparansi dalam proyek untuk mengurangi skeptisisme dan memastikan akuntabilitas dalam kolaborasi?*
Capacity for joint action	**Procedural/ Institutional arrangement**	What can be improved to **improve the mechanism** so that the **leadership model, knowledge-sharing platform, and sharing resources** work best to **ease the decision-making process** and give **the best outcome?**	**What can be improved** from the existing formal structure (e.g., MoUs, governance frameworks) to strengthen long-term collaboration? How to do that?	***Apa yang bisa ditingkatkan*** *dari jenis perjanjian formal yang sudah ada? (misalnya, MoU, kerangka tata kelola) yang dapat memperkuat kolaborasi dalam jangka panjang? Bagaimana caranya?*
	Leadership		What **leadership models work best** in this multi-stakeholder collaboration, especially **to ease the decision-making process** and **to give the best outcomes?**	*Model kepemimpinan seperti apa yang paling efektif dalam kolaborasi yang melibatkan banyak pihak seperti ini?*
	Knowledge		What **mechanisms can be established to improve collective knowledge**, learning, and collaboration?	*Seperti apa platform untuk knowledge-sharing yang tepat, yang dapat dibangun untuk meningkatkan kolaborasi dan pembelajaran kolektif?*
	Resources		Was **the existing mechanism already effective** in providing resources for this project? How can it be improved to ensure the project's success?	*Model pendanaan atau berbagi sumber daya seperti apa yang dapat diaplikasikan untuk meningkatkan keberlanjutan dan efektivitas proyek seperti ini agar berhasil?*

APPENDIX 5

List of questions for interview with **Local Government**

Sub-variables	*Indicators*	*List of questions in Indonesian*	*List of questions in English*
Principled engagement	***Discovery of the context***	Apakah terdapat program atau kebijakan dari Pemerintah Provini DKI Jakarta yang ditujukan kepada permukiman informal di Jakarta dengan fokus untuk beradaptasi pada perubahan iklim, khususnya pada peningkatan suhu permukaan di kawasan perkotaan atau urban heat island (UHI)?	Are there any programs or policies from the Provincial Government of DKI Jakarta that are specifically aimed at informal settlements in Jakarta with a focus on adapting to climate change, particularly in response to increasing urban surface temperatures or the Urban Heat Island (UHI) effect?
	Definition of the context		
Shared motivation	***Shared vision***	Apa visi besar yang dijabarkan oleh Pemerintah Provinsi DKI Jakarta pada program ini?	What is the overarching vision outlined by the Provincial Government of DKI Jakarta for this program?
	Willingness to cooperate	Apakah dengan visi tersebut Pemerintah Provinsi DKI Jakarta dapat menarik banyak pihak untuk bekerja sama atau berkolaborasi pada program ini?	Does this vision enable the Provincial Government of DKI Jakarta to attract various stakeholders to cooperate or collaborate in the program?
	Mutual trust	Apakah visi tersebut juga dapat memberikan distribusi pembagian peran yang merata pada pihak-pihak yang berkolaborasi pada program ini?	Does this vision enable the Provincial Government of DKI Jakarta to attract various stakeholders to cooperate or collaborate in the program?
Capacity for joint action	***Procedural/ Institutional arrangement***	Bagaimana prosedur atau mekanisme bagi masyarakat, lembaga, atau pihak swasta agar dapat berpartisipasi pada program ini?	What are the procedures or mechanisms for communities, institutions, or private actors to participate in this program?
	Leadership	Bagaimana peran Pemerintah Provinsi DKI Jakarta dalam program ini?	What role does the Provincial Government of DKI Jakarta play in this program?
	Knowledge	Apakah prosedur atau mekanisme ini dapat menjadi sarana yang baik untuk berbagi informasi dengan berbagai pihak yang terlibat dalam program ini?	Can these procedures or mechanisms serve as an effective means of sharing information with the various stakeholders involved in the program?
	Resources	Bentuk bantuan apa yang diberikan oleh Pemerintah Provinsi DKI Jakarta pada proyek tersebut?	What forms of support are provided by the Provincial Government of DKI Jakarta for the project?
Opinions on Governance and Project Outcomes	***Strength, weakness, opportunity, and threats in the process***	Selama program atau kebijakan ini dijalankan, apa yang menjadi kendala dan bagaimana program atau kebijakan ini dapat ditingkatkan ke depannya?	What forms of support are provided by the Provincial Government of DKI Jakarta for the project?

APPENDIX 6

List of questions for interview with **National Government**

Sub-variables	*Indicators*	*List of questions in Bahasa Indonesia*	*List of questions in English*
Principled engagement	***Discovery of the context***	Dari sisi Kementerian atau Pemerintah pusat, bagaimana pemahaman mengenai kawasan permukiman, terutama permukiman kumuh, dalam menghadapi perubahan iklim?	From the perspective of the Ministry or central government, how is the understanding of settlement areas, especially informal settlements, in facing climate change?
	Definition of the context		
Shared motivation	***Shared vision***	• Dari studi kasus di Kampung Marlina, dapat dilihat bahwa aktor-aktor non-pemerintah telah memiliki prinsip yang sama untuk menyukseskan proyek ini, namun aktor pemerintah masih belum terlalu terlibat. Lalu, apa yang perlu dilakukan oleh/terhadap aktor pemerintah agar dapat memiliki *shared motivation* yang sama dengan aktor non-pemerintah? • Dari sisi aktor pemerintah, seberapa besar peran *shared motivation* untuk menyukseskan sebuah program kolaborasi?	• From the case study in Kampung Marlina, it can be seen that non-government actors already share common principles to ensure the project's success, while government actors are still not fully involved. So, what needs to be done by or for government actors so that they can have the same **shared motivation** as non-government actors? • From the government's perspective, how important is the role of shared motivation in the success of a collaborative program?
	Willingness to cooperate		
	Mutual trust		
Capacity for joint action	***Procedural/Institutional arrangement***	• Seberapa besar peran pemimpin dalam proyek seperti ini? Apakah dengan bergantinya pemimpin di institusi, mempengaruhi pendekatan proyek-proyek yang dilakukan atau sama saja? • Apa yang dibutuhkan setiap aktor agar dapat terlibat secara kooperatif pada proyek sejenis? • Dari segi prosedur, bagaimana mekanisme yang baik jika proyek ini akan dilanjutkan di Kampung Marlina atau kampung-kampung lain, supaya proses *sharing-knowledge* dan *reseource-knowledge* dapat terlaksana seimbang dan merata ke seluruh aktor yang terlibat?	• How significant is the role of leadership in a project like this? Does a change in leadership within the institution affect the approach of similar projects, or does it remain the same? • What does each actor need in order to be involved cooperatively in similar projects? • From a procedural standpoint, what would be an effective mechanism if this project were to be continued in Kampung Marlina or other similar neighborhoods, so that knowledge-sharing and resource-sharing processes can take place fairly and equitably among all involved actors?
	Leadership		
	Knowledge		
	Resources		
Opinions on Governance and Project Outcomes	***Strength, weakness, opportunity, and threats in the process***	Dari sisi pemerintah, apakah ada beberapa kelebihan, kekurangan, peluang, maupun ancaman yang dapat diantisipasi jika proyek di Kampung Marlina ini akan diadakan kembali?	From the government's point of view, what are the strengths, weaknesses, opportunities, and threats (SWOT) that could be anticipated if the Kampung Marlina project were to be carried out again?

APPENDIX 7

List of questions for interview with **Academia**

Sub-variables	*Indicators*	*List of questions in Indonesian*	*List of questions in English*
Principled engagement	***Discovery of the context***	Dari sisi akademisi, sejauh apa pemahaman apa saja yang perlu dipahami oleh setiap pihak yang terlibat untuk dapat menyukseskan proyek sejenis?	From the perspective of academics, what level of understanding is needed by each party involved to ensure the success of similar projects?
	Definition of the context		
Shared motivation	***Shared vision***	• Dari studi kasus di Kampung Marlina, dapat dilihat bahwa aktor-aktor non-pemerintah telah memiliki prinsip yang sama untuk menyukseskan proyek ini. Dari pandangan akademisi, seberapa besar peran *shared motivation* untuk menyukseskan sebuah program kolaborasi? • Lalu, apa yang perlu dilakukan oleh/terhadap aktor pemerintah agar dapat memiliki *shared motivation* yang sama dengan aktor non-pemerintah?	• From the case study in Kampung Marlina, it can be seen that non-government actors already share common principles to support the project's success. From an academic point of view, how significant is the role of shared motivation in the success of a collaborative program? • Then, what needs to be done by or for government actors so that they can have the same shared motivation as non-government actors?
	Willingness to cooperate		
	Mutual trust		
Capacity for joint action	***Procedural/Institutional arrangement***	• Seberapa besar peran pemimpin dalam proyek seperti ini? • Apa yang dibutuhkan setiap aktor agar dapat terlibat secara kooperatif pada proyek sejenis? • Dari segi prosedur, bagaimana mekanisme yang baik jika proyek ini akan dilanjutkan di Kampung Marlina atau kampung-kampung lain, supaya proses *sharing-knowledge* dan *reseource-knowledge* dapat terlaksana seimbang dan merata ke seluruh aktor yang terlibat	• How important is the role of leadership in a project like this? • What does each actor need in order to be involved cooperatively in similar projects? • From a procedural standpoint, what would be an effective mechanism if this project were to be continued in Kampung Marlina or in other similar neighborhoods, so that knowledge-sharing and resource-sharing processes can be implemented fairly and evenly among all involved actors?
	Leadership		
	Knowledge		
	Resources		
Opinions on Governance and Project Outcomes	***Strength, weakness, opportunity, and threats in the process***	Dari sisi akademisi, apakah ada beberapa kelebihan, kekurangan, peluang, maupun ancaman yang dapat diantisipasi jika proyek di Kampung Marlina ini akan diadakan kembali?	From an academic perspective, what are the strengths, weaknesses, opportunities, and threats (SWOT) that could be anticipated if the Kampung Marlina project were to be conducted again?

APPENDIX 8

FAIR Principles

Principle	Approach
Findable	• Each dataset (e.g., interview transcript, fieldnote) is systematically named using a consistent format (e.g., Interview_KpMarlina_R1_2025). • A structured folder system is used locally to organize the data by type (interviews, fieldnotes, coding results).
Accessible	• The full data remains confidential and is only accessible by the researcher. • Anonymized summaries and aggregated insights may be shared in publications or presentations. • If future researchers request access, it will be subject to ethical clearance and written permission by the researcher
Interoperable	• The coding system follows a thematic structure informed by the Emerson et al. (2012) collaborative governance framework. • Controlled vocabulary is used for themes (e.g., "Trust," "Institutional Arrangement") to allow integration with future qualitative datasets. • Internal notes and memos document code definitions and their relation to theory.
Re-usable	• Methodological documentation includes data collection tools (e.g., interview guides), ethical considerations, and analysis steps. • While raw data is not shared, synthesized findings and coding structure can be re-used in future research by the author or collaborators. A comprehensive README file accompanies the dataset, explaining its structure, methodology, and potential limitations, enabling future researchers to use it in similar studies.