

Louvain School of Management

**Can a collaborative and comprehensive
framework be developed and implemented
in Southeast Asian coastal cities to
effectively integrate BGI as a flooding
mitigation process ?**

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NOMENCLATURE

AI	Artificial Intelligence
DMS	Disaster Management System
BGI	Blue and Green Infrastructure
MCI	Massive Collective Intelligence
MMC	Mission Model Canvas
VPC	Value Proposition Canva
GIS	Geospatial Information Systems
NBS	Natural Based Solution
MCI	Massive Collective Intelligence
SDG	Sustainable Development Goals

INTRODUCTION

The management of disasters has become a widely discussed topic in today's world, as the number of natural disasters is increasing rapidly and affecting not only developing countries but also developed nations such as the United States and European countries. This is evident from the recurring California wildfires, Florida tornadoes, and the aftermath of the 2021 floods in Belgium, Germany, and the Netherlands. Climate change is contributing to the rise in natural disasters, and there is a strong call for action and change. Disaster management involves mitigating the impact of disasters by preparing and implementing a recovery plan, as it is impossible to avoid a disaster entirely but possible to minimize its effects on society. Effective management can significantly reduce the consequences of a disaster.

The challenges facing the humanitarian world are increasing, including lack of funds, climate change, and lack of coordination, among others. However, these challenges call for innovation and resilience to overcome the disasters together.

This thesis will focus on flooding in coastal cities in Southeast Asia, flooding being one of the most common disasters worldwide, affecting all continents but especially Asia.

Asia is prone to natural disasters due to its location in the "ring of fire", a geologically active area with 75% of the world's active volcanoes and 90% of earthquakes. Moreover, Southeast Asia is located in the Pacific Ocean, a warm water area prone to storms, and the impact of climate change is increasing events such as typhoons. Additionally, Southeast Asia's social aspects, such as rapid urbanization, growing economy, and high population density, make the inhabitants more vulnerable, especially in poorly designed coastal cities. Finally, the lack of disaster Preparedness culture in South Asia further exacerbates the vulnerability of the population.

Through an analysis of three prominent coastal cities—Bangkok, Ho Chi Minh City, and Jakarta—we gained a systemic view of the challenges faced by South Asian Coastal Cities and the recurring issues they encounter. These problems, which contribute to an increased risk of flooding, range from excessive groundwater pumping and insufficient maintenance to deforestation and an overemphasis on engineering-focused solutions.

The recurrence of these issues highlights a genuine lack of knowledge on the subject, as well as a deficiency in urban spatial development regulations. Local governments often prioritize economic growth, placing disaster management as a secondary concern. Unfortunately, this

approach excludes the local population from the decision-making process, leading to the adoption of inadequate or unsupported solutions. The lack of communication between the local government, the affected population, and private companies involved in designing solutions further undermines the city's resilience.

While numerous solutions exist to address this hazard, it is crucial to recognize that flooding in cities is largely a man-made problem. We have gradually removed natural barriers from our urban environments, replacing them with impermeable materials and insufficient solutions. To enhance urban spatial development and increase resilience, a paradigm shift is necessary. It is imperative to reintroduce natural barriers into cities, utilizing a combination of Blue and Green Infrastructure alongside Grey Infrastructure as a long-term solution.

Blue and Green Infrastructure (BGI) is a mitigation solution through Natural Based Solution (NBS) that offers numerous benefits for citizens' health, economic and social aspects, as well as the environment. BGI facilitates the restoration of biodiversity, reduces temperatures, mitigates pollution, and acts as a natural sponge. However, implementing such solutions in fully urbanized cities requires extensive analysis to ensure the appropriate placement and acceptance of the chosen BGI measures by the local population. Geospatial Information Systems (GSI) are indispensable in this regard, enabling accurate mapping of the area and identification of suitable locations based on multiple factors.

In conclusion, the objective of this study is to present a comprehensive and collaborative framework for the integration of Blue and Green Infrastructure (BGI), a mitigation process, in Asian coastal cities. The aim is to effectively minimize the impact of flooding by utilizing BGI measures. The proposed framework will be applicable and beneficial to all Southeast Asian coastal cities.

RESEARCH QUESTION

My research question is: *“Can a collaborative framework be developed and implemented in Southeast Asian coastal cities to effectively integrate BGI as a flooding mitigation process?”*

To address this research question, the study is composed of two parts. The initial phase involves an extensive literature review, exploring multiple pertinent subjects to gain a comprehensive understanding of the topic at hand. Subsequently, the empirical research, constituting the second part, will be undertaken. This phase entails conducting interviews and performing thorough analyses to address the research question effectively.

The first part will initially focus on understanding the various aspects related to disasters, including their definitions and classifications. Subsequently, the literature review will delve into the field of disaster management, with specific emphasis on the Disaster Management System as a framework for analysis.

Moving forward, the study will shift its attention to the subject of flooding, examining its causes and consequences in detail. Additionally, the geographical and meteorological characteristics unique to Southeast Asia, which make it prone to such hazards, will be thoroughly explored. To gain a comprehensive understanding of Asian coastal cities, Bangkok, Jakarta, and Ho Chi Minh City will be specifically studied, allowing for an examination of the current recurring problems they face. These findings will serve as a valuable basis for addressing the research question.

The second part will focus on introducing the concept of Blue and Green Infrastructure (BGI), supported by a case study on the effectiveness of sponge cities in Wuhan, China. Simultaneously, the significance of geospatial data in successful BGI implementation will be highlighted, underscoring its importance.

While numerous studies have been conducted on Blue and Green Infrastructure (BGI), there is a notable dearth of research specifically focusing on BGI implementation in Southeast Asian coastal cities. Most of the existing research primarily centres on developed countries like the United States. However, Southeast Asia presents unique weather patterns, particularly during the monsoon season, which make it challenging to directly compare the solutions required in regions where rainfall amounts are significantly lower than the Southeast Asian average. Furthermore, there is a limited body of studies that consider the perspective of the local population within the BGI implementation process. Understanding the viewpoints and experiences of the local communities is crucial for ensuring the effectiveness and acceptance of BGI initiatives.

The culmination of this literature review will enable the formulation of hypotheses, which will subsequently be tested through interviews conducted during the empirical research phase. Detailed explanations of the methodology employed for the empirical research will be presented in Chapter 7.

PART I: LITERATURE REVIEW

CHAPTER 1: INTRODUCTION TO DISASTER

In this chapter, I will introduce the notion of natural and man-made disasters. Then, I will discuss the worldwide situation concerning disasters. This section will highlight the urgency of the situation.

1.1 WHAT IS A DISASTER

A disaster is defined by the UNDRR¹ as “*A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts*”. (United Nations Office for Disaster Risk Reduction, n.d.)

A disaster is usually man-made or natural. In table 1, we can see the different kinds of disaster that can occur and to which category they belong (Kovács & Spens, 2009).

Disasters can have significant and lasting impacts on communities, including physical damage to infrastructure and homes, loss of life and injury, displacement of people, and economic disruption. They can also lead to long-term psychological and social impacts on individuals and communities (Asif Salam & A. Khan, 2020).

	Natural	Man-made
Sudden onset	Earthquake Hurricane Tornadoes Flood	Terrorist attack Coup d'état Chemical leak
Slow onset	Famine	Political crisis

¹ United Nations Office for Disaster Risk Reduction

	Drought	Refugee crisis
	Poverty	

Table 1: Classification of different disaster (Uhr & Frykmer, 2022)

1.2 ACTUAL SITUATION

Natural disasters have been occurring with greater frequency in recent years, posing a significant challenge to humanity. According to ReliefWeb's report for 2022, the number of natural disasters in 2021 increased by 13% compared to the average from 1991 to 2020. This is an alarming trend that cannot be ignored. Climate-related disasters, such as forest fires, floods or storm, are the most common types of natural disasters that occur worldwide, and they often have devastating effects on communities (Appendix 1)

Moreover, the report shows that Asia-Pacific is the most affected continent by natural disasters, followed by North America (see figure 1). Low-income developing countries are particularly vulnerable to these calamities, as they lack the resources and infrastructure to cope with them effectively. It is a serious concern that such regions are disproportionately affected by natural disasters (Acevedo & Novta, 2017; ReliefWeb, 2022; IFRC, 2023).

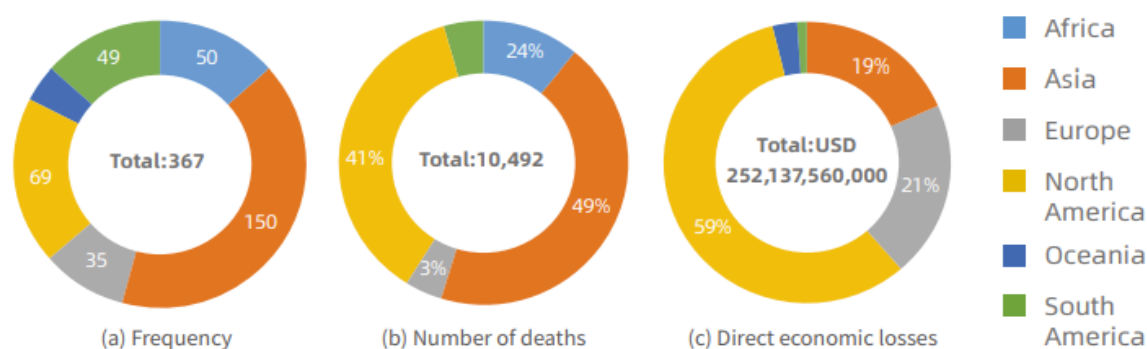


Figure 1: Statistics on the frequency of natural disaster, the number of deaths and direct economic losses by continent in 2021 (Ministry of Emergency Management et al., 2022).

However, the report also highlights some positive developments. The number of deaths due to natural disasters has decreased by a remarkable 81% in the last 30 years. This progress is attributed to improved food security, resilience, and better international and national responses (Ritchie, 2022; IFRC, 2023).

Despite the decrease in deaths, the number of overlapping disasters² is increasing, which increases the consequences if they are close in time or space. The most frequent and costly disaster is flooding, which has resulted in 21,700 deaths and \$4,200 billion in losses between 1980 and 2014. These numbers are staggering, and they highlight the urgent need for Preparedness and disaster risk reduction strategies (Jeevanandam, 2022; ReliefWeb, 2022).

Natural disasters are not the only types of disasters that pose a threat to human life. Man-made disasters, such as famine caused by civil war or political unrest, displacement due to conflict or persecution, and even pandemics like Covid-19, also have significant impacts. Covid-19 has killed more people than any other natural disaster, with a figure reaching 6.5 million victims. Its economic impact will be significant, with an estimated cost of \$12.8 trillion by the end of 2024 (Toplic, n.d.; UNHCR, 2019; IFRC, 2023).

The need for humanitarian help keeps on increasing due to this continuous increase of disaster. According to the Global humanitarian overview (2023), it is stated that 4% of the worldwide population needs assistance which represents an increase of 260% over the last four years.

To mitigate the effects of disasters, it is crucial to take proactive measures such as implementing better disaster Preparedness plans, investing in early warning systems, and taking steps to mitigate the effects of climate change. By working together and acting, we can reduce the impact of disasters and create a safer and more resilient world for future generations. It is not just about minimizing the losses but also creating a world that is more pleasant, peaceful, and conducive to human prosperity.

² disaster that happens at the same time but not necessarily at the same place in the country.

CHAPTER 2: DISASTER MANAGEMENT

Having introduced the big picture, I will now review disaster management and its components. This chapter will show the scope and complexity of this field. I will therefore discuss the challenges that the humanitarian world faces, the different actors, humanitarian logistics, Disaster management system and lastly coordination.

Disaster management plays a crucial role in minimizing the impact of both natural and man-made disasters. This process involves a range of measures and activities that are designed to prepare for, respond to, and recover from disasters. It is a critical process that aims to mitigate the effects of a disaster and ensure that the necessary steps are taken to prevent further damage. The focus of disaster management is on reducing the impact of the event and minimizing the risk to human life, property, and the environment.

The world of disaster management is characterised by several factors, including insufficient information, conflicting information, danger, high stakes, and the need to act quickly while managing various losses. In order to manage disasters successfully, it is crucial to have coordinated efforts from numerous entities and stakeholders, including government organizations, emergency responders, non-governmental organizations, donors and community members (Appendix 2). These efforts are essential to ensure that the disaster management process is as efficient and effective as possible (Uhr & Frykemer, 2022).

In the humanitarian sector, an abundance of challenges has a significant impact. With the unpredictability of humanitarian work, there are always new challenges that arise, and with the involvement of an increasing number of stakeholders, the process can become even more complex (Appendix 3).

Humanitarian logistics (HL) is an integral component of disaster management and plays a key part in ensuring its smooth implementation. Thomas and Kopzack's (2005) definition provide a general understanding of the concept: "HL is the process of efficiently and cost-effectively planning, implementing, and controlling the flow and storage of goods, materials, and related information from the point of origin to the point of consumption, with the aim of alleviating the suffering of vulnerable individuals. The function encompasses a range of activities, including Preparedness, planning, procurement, transport, warehousing, tracking, and customs clearance." Despite its critical importance for disaster relief optimization, many organizations still underestimate its significance and focus solely on fundraising (Kovács et al., 2007). Logistics plays a vital role in this field due to the high level of uncertainty, short lead times,

and diverse supplies and quantities. The increasing frequency of disasters further underscores the vital importance of HL in disaster management.

To enhance an organization's response system and minimize the impact of a disaster, the Disaster Management System (DMS) is designed to encompass four key stages: Mitigation, Preparedness, Response, and Recovery (see Figure 2). While it may not be possible to eliminate the possibility of a disaster entirely, the goal is to be well-prepared to manage a potential incident and respond quickly and effectively to minimize loss of life and property (UNDRR, n.d.; ReliefWeb, n.d.; IFRC, n.d.; University of central Florida, 2022).

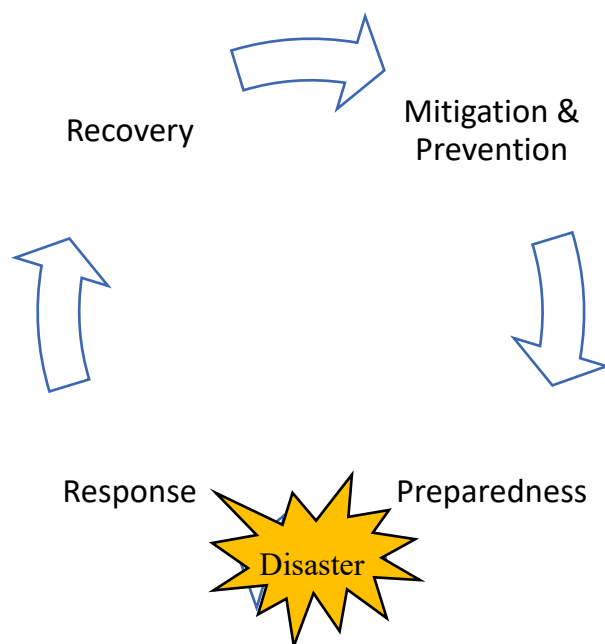


Figure 2: Disaster management system

Mitigation and Prevention

Disasters can be devastating and cause a lot of harm and suffering. However, there are measures that can be taken to reduce their impact on communities such as mitigation and prevention. These measures involve both structural and non-structural actions and require collaboration among local communities, government, and businesses.

Prevention concentrates on taking measures to prevent or minimize the possibility of a disaster, such as early warning systems. Conversely, mitigation focuses on taking measures that reduce the impact of an inevitable disaster, such as emergency response procedures. Prevention helps reduce the probability and severity of a disaster, while mitigation aids in minimizing the loss of life and damage to property (University of Central Florida, 2022; Tulane University, 2022).

Mitigation and prevention are interconnected and collaborate to play a critical role in minimizing the impact of a disaster on a community.

Preparedness

To respond effectively to any potential disaster, the response team must be well-prepared. Therefore, it is crucial to plan for the response phase in advance, which involves identifying available resources, assigning roles and responsibilities, conducting training sessions, anticipating the community's needs, and establishing evacuation routes or emergency water and energy sources on site (University of Central Florida, 2022; Tulane University, 2022).

Contingency planning and logistics are necessary in this field to prepare for any situation. The humanitarian field is overly complex and unpredictable, making logistics crucial for saving lives effectively and efficiently. Logistics plays a critical role in bridging the gap between preparation and response, and its significance is often overlooked. It can determine the success or failure of a mission since this field involves high levels of uncertainty, short lead times, and a variety of supplies and quantities. Past disasters have highlighted the importance of pre-disaster preparation, which is as crucial as investing during the event. Research has shown that poor logistical preparation and a lack of understanding of logistics can lead to mistakes during a disaster (Van Wassenhove, 2006; Kovács et al., 2007).

Response

It begins when a disaster or emergency event is imminent or immediately after its occurrence. It takes all activities to save lives or reduce damages from the event. It includes providing emergency assistance to victims such as evacuation or medical assistance, restoring critical infrastructure such as power or access to water, ensure continuity of critical services such as hospitals. Humanitarian logistics plays a critical role in the response phase by facilitating the delivery of aid, resources, funds, and other necessary supplies (University of Central Florida, 2022; Tulane University, 2022; Uhr & Frykemer, 2022).

Recovery

After the rush, we focalise on stabilising the area and restore all essential community function. It can take years or decades to rebuild psychologically, economically, and physically from such events (University of Central Florida, 2022; Tulane University, 2022).

We can infer from the above that an effective disaster response system is essential, but the involvement of multiple stakeholders can complicate the situation. Coordination is a highly effective method for addressing potential challenges in humanitarian logistics and getting a

smooth disaster management system. Effective coordination can have numerous positive effects on the logistics process, including faster response times, task delegation, better distribution of goods, cost savings, etc. However, there are several barriers to coordination that must be overcome (Appendix 4). Coordination involves both vertical and horizontal collaboration (refer to Figure 3).

Horizontal collaboration refers to the collaboration of other organizations and competitors in the same field who are working towards similar goals. The primary benefit of coordination in this context is achieving economies of scale to reduce costs for individual companies. The Haiti earthquake in 2010 serves as a poignant example of the challenges facing horizontal collaboration. The response effort involved multiple actors, leading to a clogged system. In the film "Inside Disaster Haiti," the initial response was weak, and it took four days for the first international aid. For example, the IFRC planes had to wait several days in neighbouring countries until they could reach Haiti due to the lack of coordination and unclear prioritization of supplies (Asif Salam & A. Khan, 2020). This resulted in overlapping and redundant initiatives and resources, causing delays in the aid response effort (Asif Salam & A. Khan, 2020). These operational boundaries present a range of challenges, including different players with varying resources and beneficiary focuses, varying disaster types and phase focuses, and the reality that not all players can be effectively collaborated with (Kovács & Spens, 2009). However, these challenges can be mitigated through effective coordination and communication between different players.

Vertical collaboration involves external suppliers and collaborations as well as with the affected population, and coordinating with these firms can reduce overall supply chain costs and improve customer service. Effective information sharing is essential across various stages of the supply chain to achieve this (Jahre & Jensen, 2010). For example, following the earthquake in Sulawesi in 2018, the affected population urgently requested shelter as their top priority, but only a small fraction received it. This highlights the challenge of not being present on the ground and communicating effectively with the local population, as their most critical needs may not be heard. Similarly, in Chad, Cox's Bazar, and other locations, individuals in desperate need of humanitarian aid often resort to selling the aid they receive to purchase something else they need more. This serves as a clear indication that the aid being provided does not meet their needs and preferences (Wintour, 2022).

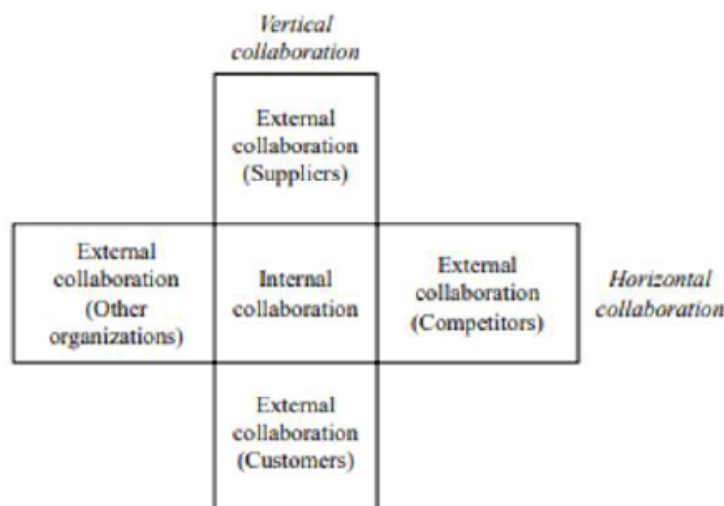


Figure 3: Horizontal and vertical collaboration visualisation (Barratt, 2004)

In conclusion, disaster management is a critical process that aims to mitigate the impact of both natural and man-made disasters. It involves a range of measures and activities that are designed to prepare for, respond to, and recover from disasters through the Disaster Management System (DMS). The focus of disaster management is on reducing the impact of the event and minimizing the risk to human life, property, and the environment. Effective disaster management requires coordinated efforts from numerous entities and stakeholders, including government organizations, emergency responders, non-governmental organizations, donors, and community members. Humanitarian logistics englobe disaster management in order to get an efficient and effective relief efforts.

CHAPTER 3: FLOODINGS IN SOUTHEAST ASIAN COASTAL CITIES

Now we know the global situation and the scope of disaster management. Therefore, we can start to enter the heart of the matter. In this chapter, we will gradually move towards the problem of flooding in coastal cities in Southeast Asia. To do so, I will first introduce the flood phenomenon as well as its causes and consequences. Then, I will focus on Southeast Asia which is one of the regions most affected by this phenomenon. I will explain the reasons why this region tends to face such disasters more than others. Lastly, all these explanations will allow me to highlight the urgent problem of coastal cities in Southeast Asia which are highly vulnerable to floods.

3.1. FLOODING

In 2021, 206 major floods occurred, accounting for 56% of all disasters that year. Compared to the last three decades (1991-2020), the frequency of flooding increased by 48% in 2021 (Ministry of Emergency Management et al., 2022).

A flood is defined as an overflow of water that submerges usually dry land. There are five types of flooding (Appendix 5): River flood, Coastal flood, Storm surge, Inland flooding, and Flash flood.

Flooding is caused by multiple factors; however, some factors will almost automatically cause flooding (Earth Networks, 2023):

- Heavy rainfall: This is the main and simplest cause of flooding. Sometimes the rate or volume are just too high to be naturally absorbed.
- Debris: It can stop or block the flow of water. This is a typical problem in rivers and cities.
- Unsuitable infrastructure: Broken dams or steep channels
- A lack of vegetation: Vegetation is key to slow down and absorb the flow.

Multiple consequences can arise due to floods, such as human fatalities, destruction of infrastructure, economic loss, and health problems. Critical infrastructure like hospitals and telecommunications can be destroyed, leading to the complete paralysis of a city. The destruction of houses and crops can have long-term effects. Moreover, floods can have severe health impacts on the population if access to clean water and sanitation is not restored quickly. Poor or developing countries may suffer more as they have limited access to healthcare and quality products. In addition, these countries may have inadequate warning systems and

governmental organizations, further magnifying the impact of such an incident (World Health Organization: WHO, 2019).

Urban areas, with high population density, limited vegetation, and poor drainage and waste management systems, are particularly vulnerable to flooding, but rural areas are also affected. The intensity of floods depends on two main factors: hazard (flood depth, velocity, and duration) and vulnerability (economic, social, physical, and environmental). The higher the hazard or vulnerability, the higher the consequences (Islam & al., 2016).

$$Risk = Hazard \times Vulnerability$$

3.2 SOUTH- EAST ASIA

In 2020, floods have impacted more than 34.2 million people worldwide, making them the most frequent type of natural disaster (Statista, 2023). Unfortunately, the situation is worsening due to climate change, leading to a rise in frequency and intensity of floods. This trend is projected to continue, as increasing temperatures result in rising water levels and more precipitation due to water accumulation in the atmosphere (Stokes, 2022).

Flooding has a significant impact on Asia, which is the continent that experiences the most severe consequences from this phenomenon. The Pacific-Asia region is highly vulnerable to a range of hazards, including flooding. Nevertheless, some countries are more resilient than others. Japan, for instance, has demonstrated significant capacity to manage disasters and reduce their adverse impacts due to their resources. Therefore, in this paper, I will concentrate on poorer countries in the region of Southeast Asia as they are among the most flood-prone communities (Hamel et al., 2021).

Southeast Asia is composed of eleven countries: Brunei, Myanmar, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. This region is considered one of the most vulnerable to climate change (Appendix 6).

According to statistics, in 2022, Southeast Asia was home to 673.66 million people, with an annual population growth rate of 2%, which is higher than the global average of 1.4%. Most of the population resides in urban areas, particularly along the coastlines, as shown in Table 2 (Asian Development Bank, 2009; Islam & Khan, 2018).

Southeast Asia is known for its robust and rapidly growing economy, with an annual GDP growth rate of 5% from 2000 to 2020, which is higher than the world average of 2.9%. This

growth has helped to uplift many individuals out of poverty; however, the number of people living in extreme poverty remains high (Asian Development Bank, 2009).

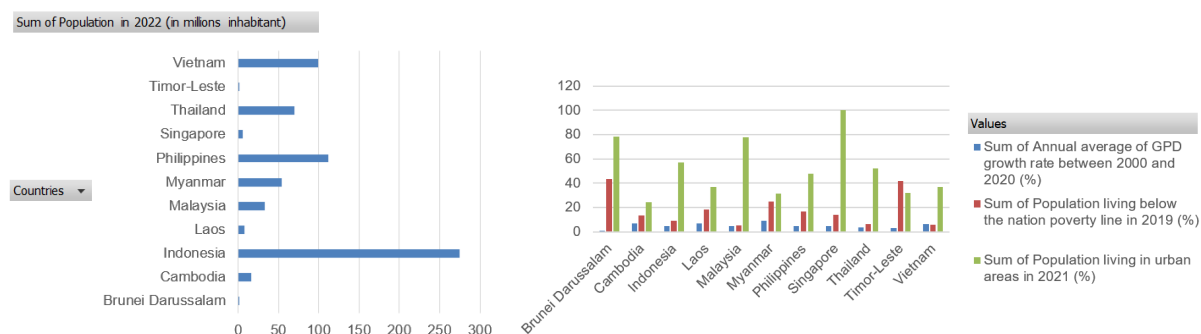


Table 2: Different rates in South-eastern Asian countries (The ASEAN Secretariat, 2021 ; Statista, 2022; Statista, 2023b)

But why are the impacts of natural disaster greater in Southeast Asia?

- The climate is hot and humid. This region tends to have very heavy and dense annual rainfall, monsoons. The amount of water released during heavy rainfall cannot be compared with the quantity of water released in Europe (Hamel et al., 2021; Islam & Khan, 2018).

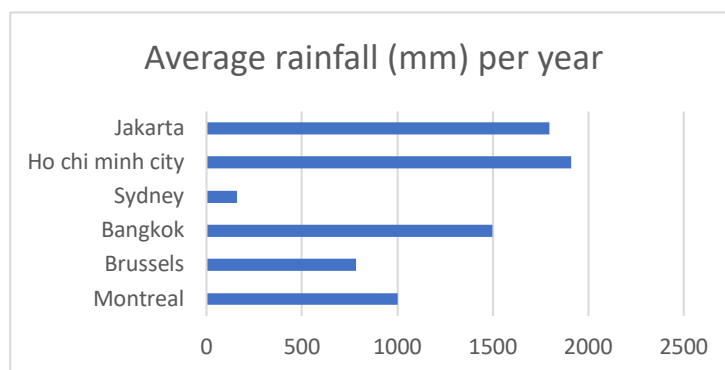


Table 3 : Average rainfall per year in millimetres in different cities ((Total Precipitation - Annual Data for Montréal, n.d.; Weather Spark, n.d. ; World Bank Group, n.d ; Australian Government Bureau of Meteorology, 2023)

- Southeast Asia offers a large variety of natural features. Indeed, the diversity of forests is enormous with tropical and subtropical rainforest, dry forest, and monsoon forest. In addition, the landscape is varied, with large flat areas used for agriculture and large river deltas. We can then identify multiple vulnerable region such as Mekong Delta in Vietnam or Chao Phraya River basin in Thailand.
- The soils have high clay contents and medium to low permeability (Hamel et al., 2021).
- Moreover, this region is in the “Ring of fire” which is a string of volcanoes and sites of seismic activities in the Pacific Ocean (Appendix 7).
- This zone is home to 75% of the world's active volcanoes and 90% of earthquakes. The ring itself doesn't cause directly flooding but the seismic activities can contribute to it

by triggering tsunamis and provoke landslide which will block river stream (Evers & Editing, 2023).

- The Pacific Ocean is a warm water area that tends to develop storms.
- The impact on this region does not only depends on its localisation but also on how people live. Most of the countries in this region have similar characteristics such as large and fast-growing populations with a high percentage of poverty. Moreover, the density of citizen living in cities, especially coastal cities, keeps growing (Wood, 2020). The rapid urbanisation and inadequate planning make those highly dense area more prone to disasters (Islam & Khan, 2018).

3.3 URBANISATION

Urbanization is a significant factor contributing to the vulnerability of the region to flooding, in addition to its location, as previously explained.

Urbanization is a growing trend with 70% of the world's population projected to live in cities by 2050, which poses a challenge for the humanitarian sector and communities. Rapid urbanization, particularly in developing countries with weak urban governance, increases the risk of disasters and crises. Moreover, climate change-induced disasters are on the rise, posing further challenges for cities in terms of quality of life and the full consequences of climate change. Increased water levels, desertification, and droughts will lead to further migration to urban areas, exacerbating urban development problems (Zetter & Deikun, 2009).

Most of Southeast Asian cities are located near rivers or the Pacific Ocean which make them even more vulnerable to rising sea levels, land subsidence, heavy rainfall, and poor urban planning. Jakarta in Indonesia, Manila in the Philippines, Bangkok in Thailand, and Ho Chi Minh City in Vietnam are the most prone to flooding, and the amount of people living in these cities is steadily growing. (Kemp & Meredith, 2021).

Moreover, few Southeast Asian cities have implemented an integrated urban water management plan, and sanitation levels remain alarmingly low in most countries in the region. Informal settlements, which account for up to 50% of the urban population in some countries, lack risk-reducing infrastructure and services, including access to healthcare and emergency services, making them particularly vulnerable to hydrologic hazards like floods and landslides due to their proximity to water bodies and lack of infrastructure to manage water runoff. The

uncontrolled growth of informal settlements may exacerbate water management issues by reducing ecosystem services such as water purification and water retention.

To summarize, the susceptibility of coastal cities in Southeast Asia to flooding is attributed to a combination of natural factors such as location in the ring of fire and monsoons, and anthropogenic factors including rapid urbanization, deforestation, and the proliferation of informal settlements with inadequate infrastructure. Bangkok in Thailand, Ho Chi Minh City in Vietnam, and Jakarta in Indonesia are identified as particularly vulnerable cities, each with its own unique characteristics that offer a general overview into the severity of the current threat in the region.

CHAPTER 4: FLOOD CONTROL IN COASTAL CITIES

In order to understand the extent of the urbanisation and flooding problem, I will focus on 3 coastal cities in Southeast Asia: Jakarta, Bangkok and Ho Chi Minh City. Those 3 cities are among the cities the most prone to flooding in Southeast Asia.

The analysis of each city will include the causes of the floods, the role of the government in managing the floods, and a detailed description of the most affected areas in each city. I will also provide a graphic that will represent the systemic view of the problem.

This section will allow me to highlight the link between flooding and urban spatial management in order to propose concrete IT solutions in the next part of my paper. In the next chapter, I will highlight key factors from this analysis that should be address by technological solutions.

4.1 JAKARTA – INDONESIA

Jakarta, the capital of Indonesia, located on Java Island, has a population of 10.56 million and an urban density of 9576/km². The city is located on the northwest coast of Java and is home to 60% of Indonesia's population, making it the largest city in Southeast Asia and the headquarters of ASEAN (Association of Southeast Asian Nations) (Wikipedia contributors, 2023b).

Indonesia functions as an electoral democracy, although it still grapples with significant corruption. However, efforts are being made to address this issue, and positive changes can be observed. Unfortunately, during the Covid crisis, the government utilized the situation to pass laws that infringed upon numerous rights. Over the past two decades, there has been a rise in radical Islam, leading to increased activism from these groups and further discrimination against religious minorities (Human Rights Watch, 2022a; Gerdt, Izquierdo, & Léon, 2022).

The Southeast Asian Nations association (ASEAN) counts all the country in Southeast Asia except Timor-Leste, a newly independent country. This political and economic association aims to promote intergovernmental cooperation and facilitate business and relation between its members. The community has 3 pillars: Political security, economy et socio-cultural development (ASEAN, n.d.).

Jakarta has 2 unique geographical and meteorological characteristics. First, Java only experiences two seasons, dry and monsoon, with heavy rainfall occurring during the monsoon season from October to April. Second, Jakarta is situated in a lowland area with thirteen rivers flowing into Jakarta Bay, making it prone to local flooding. (Texier, 2008; Pratiwi et al., 2020).

The city faces many challenges such as rapid urban growth, ecological degradation, traffic, ... But the main problem is flooding and the relocation of the capital. The reason behind the planned relocation of Jakarta to the Kalimantan region of Borneo Island is due to the city's subsidence³ caused by excessive pumping of groundwater and the weight of the city itself (Appendix 8) (Voiland, 2021).

According to Lai (2022), Jakarta is sinking at a rate of up to 25 cm per year, which makes it highly susceptible to flooding. In fact, as reported by Voiland (2021), 40% of the northern part of the city is situated below sea level (see Figure 5).

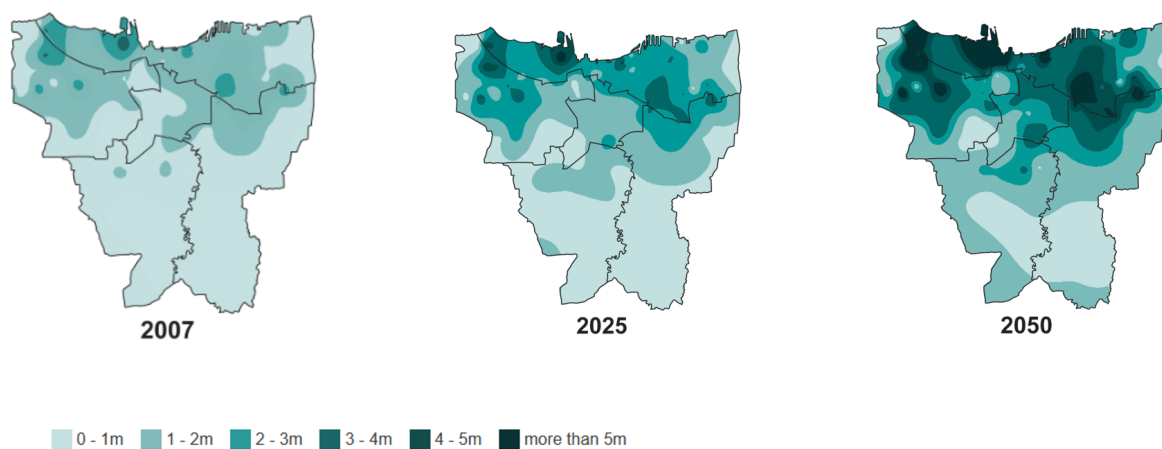


Figure 4 : Jakarta Land subsidence between 2007 and 2050 (Hidayat & Mayuri Mei, 2018)

Borneo Island is a shared territory between Malaysia and Brunei. The Kalimantan region of Borneo Island is being considered as the new location for Jakarta due to its strategic location in the centre of the Indonesian archipelago, which comprises 17,000 islands. This is a significant advantage, as noted by Lyons (2019). However, many criticisms have emerged. In particular, because of the island's location, which is home to an orangutan population and virgin jungle. Fears of deforestation, the expansion of the palm oil industry and of course the degradation of the ecosystem are at the forefront of the debate.

But what are all the reasons for the flood-prone nature of Jakarta?

³ It's defined as the "sinking of the ground because of underground material movement—is most often caused by the removal of water, oil, natural gas, or mineral resources out of the ground by pumping, fracking, or mining activities" (NOAA, n.d.).

The city has experienced flooding since its creation in the 17th century. Over the last few years, Jakarta has experienced a steady rise in the frequency of flooding disasters, which is clear from the data presented in table 2.

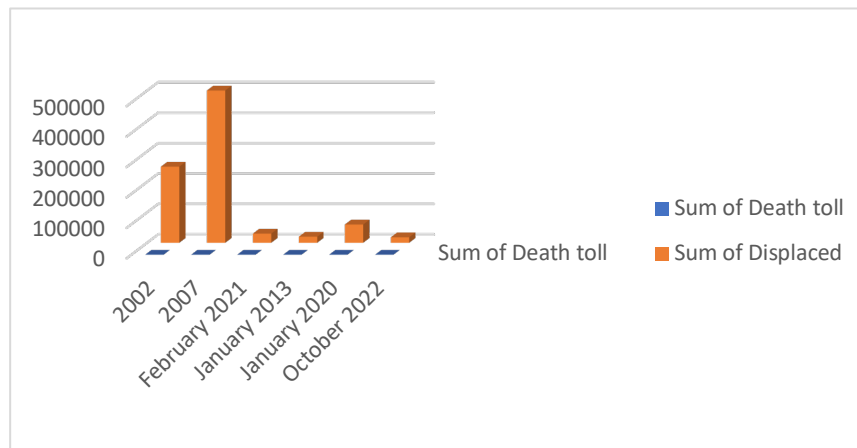


Figure 5: Number of deaths and displaced persons during the floods between 2022 and 2002 in Jakarta

The natural causes are usual for flooding such as rainfall, climate change, etc. However, one thing makes Jakarta quite unprecedented situation: the city is drowning. Indeed, the area below sea level measuring 24,000 square meters can experience more severe flooding when heavy rainfall and high tides occur at the same time. The water level rises in low-lying areas due to the push from high tides, which coincides with the runoff from rainfall in the upland areas flowing down to Jakarta. Additionally, during the monsoon, the low-lying river swells, contributing to the flooding. The city is even more vulnerable because of global warming on heavy rainfall (Voiland, 2021; Pratiwi et al., 2020).

Human activities, such as urbanization, deforestation, and inadequate infrastructure, have contributed significantly to the flooding problems in Jakarta, exacerbating the impact of natural factors like monsoons and the city's geographical location (Table 3).

Indeed, the government has prioritized urban development since 1945, resulting in the construction of numerous buildings, shopping centres, golf courses, and other infrastructure. Unfortunately, these developments have decreased the city's green space, leaving many areas covered in concrete and without vegetation, causing the soil to become waterproof. The excess water from heavy rainfall cannot be absorbed and instead flows into one of the thirteen rivers that empty into Jakarta Bay (Texier, 2008; Wicaksono & Herdiansyah, 2019).

However, the capacity of these rivers is limited due to waste accumulation, which reduces their ability to carry water. The poor population has settled along the rivers, train tracks, and coastline due to the housing crisis, and they dispose of their waste in the river, further reducing its capacity to absorb excess water. Deforestation has only worsened the situation, with Jakarta

only having one-third of the necessary green space to absorb excess water during heavy rainfall. The Spatial Planning Law of Jakarta mandates that 30% of the city's land should be open and vegetated. Regrettably, as a result of intense development, only 10% of the city is currently designated for this purpose. Additionally, the flood infrastructure is poorly maintained (Texier, 2008; Wicaksono & Herdiansyah, 2019).

In order to better understand how Jakarta came to this point, we will look at the evolution of the flood policy in Jakarta.

The influence of Indonesia's former Dutch colony is evident in the construction of the East and West flood management canals. In addition, the urbanization policy implemented in Jakarta since 1945 has led to the development of commercial firms and modern housing, while traditional housing like "Kampungs" have been replaced, displacing the poorer population to the rivers, train tracks and the coast. In 1979, the Government created The National Disaster Management Coordinating Board (Barkonas) to coordinate disaster management which provides a central coordination between thirteen ministries and armed forces. They are supposed to create disaster policy that considers the whole disaster management system.

However, the government's response to floods focuses on engineering solutions like dikes, dams, canals, and sea walls, with little attention paid to prevention or vulnerability reduction. While these solutions can provide quick relief during floods, they have been proven insufficient by numerous studies (Octavianti & Charles, 2019; Texier, 2008). Furthermore, the government's disaster response strategy is centred on evacuation and providing immediate relief, with no long-term solutions to address issues such as water-borne diseases, as evidenced by the widespread cases of diarrhoea, flu, and skin diseases after the 2002 flood (Lai, 2022).

The issue of flood governance remains a significant challenge for the local government, particularly in Jakarta, primarily because they lack the necessary authority and trust from the slum and squatter settlements situated along the riverbanks. These communities do not believe in the authorities and are unwilling to accept their assistance. Many discussions have taken place regarding relocating these vulnerable populations to safer areas. Additionally, the local government lacks the complete authority to mitigate and manage floods. Indeed, the central authorities still control the largest and most flood-prone river in Jakarta, the Ciliwung River.

In an effort to address the issue, the city of Jakarta has attempted to implement several solutions. One such solution was the introduction of a spatial policy for the Greater Jakarta area in 2008, which was later revised in 2020. The policy primarily focuses on restoring green areas, and includes several ambitious measures, such as building three reservoirs, maintaining the west

and east flood canals, and enhancing the functionality of existing lakes and ponds. Despite the necessity of these policies, the Jakarta government is confronted with multiple obstacles, including land acquisition, insufficient community participation, inadequate collaboration with local authorities, and a lack of comprehensive and integrated knowledge of hydrological systems (Nurlambang, 2022). The provincial government of Jakarta has three types of early warning devices. However, some of them did not work during floods event due to lack of maintenance. Multiple association try to get the local population involved in the creation for early warning system in order to increase their awareness at the same time (YAYASAN & Plan International, s. d.). Moreover, a platform called “Peta Bencana” is used during response to floods. Indeed, all the tweets done by the population and sensors data are collected and placed on a real-time flood map which help the response team to adapt their initiatives.

Moreover, before the Great Jakarta implemented laws, the central and regional government, had already developed plan document, spatial planning, etc. However, most of them were not applied.

According to the table below, it is apparent that Jakarta places significant emphasis on mitigation and prevention measures. Nonetheless, while the solutions primarily concentrate on prevention to reduce the severity of potential events, the government's approach to implementing these measures is suboptimal. Although the spatial policy for Greater Jakarta, which includes provisions for green areas, has been helpful, it has failed to produce results due to insufficient awareness and global knowledge on the matter. Local authorities and communities are not actively involved in the efforts due to a lack of understanding and knowledge.

Action	Mitigation & Prevention	Preparedness	Response	Recovery
East and west canals	X			
Engineering solution: dikes, sea walls, ...	X			
Evacuation plan	X		X	
Food and emergency housing			X	

Restoring green areas	X			
Early warning system	X			
Crowd mapping with “Peta Bencana”			X	

Table 3: Disaster management system for Jakarta

In conclusion, Jakarta's sinking condition makes it a unique case, where flooding is significantly affected as 40% of the city lies below sea level. Moreover, the city's colonial history still influences its approach towards flood management. The aggressive urban development policies have led to adverse outcomes, such as deforestation and reduced river capacity. The city's topography further adds to its vulnerability. As seen on figure 6 below, the overly complex situation only makes the risk of flooding higher. Jakarta is vulnerable and the future does not seem promising (Appendix 9).

4.2 BANGKOK – THAILAND

Bangkok, the capital of Thailand, has a population of 10.69 million and is located twenty-eight kilometres North of the Gulf of Thailand. It is situated in the delta of the Chao Phraya River. The Bangkok Metropolitan Administration (BMA) is responsible for managing flood, assist flood victims and support flood operation and prevention measures.

Thailand follows a constitutional monarchy system. However, the country has faced political instability since a coup d'état took place on May 22nd, 2014, led by the military, which has been associated with corruption. The political situation in Thailand remains tense, as the government imposes restrictions on fundamental rights, including freedom of expression and assembly. As an illustration, during the summer of 2020 alone, at least 1,860 citizens were prosecuted for exercising their right to free speech or assembly (Human Rights Watch, 2023). Nevertheless, there is a glimmer of hope for the population with the recent elections, as the progressive "Move Forward Party" secured 151 out of 500 seats in the lower house. Additionally, the appointment of Chad chart Sittipunt, an independent candidate, as the new governor of Bangkok, further alters Thailand's political landscape (Rattanasavee, 2022).

Bangkok has experienced rapid urbanization, with a 30% population growth in central Bangkok and a 66% growth in suburban provinces between 2000 and 2020. This unplanned growth has led to congestion, flooding, and poverty, with 30% of the population living in slums.

Like Jakarta, Bangkok is sinking at a rate of 1 to 2 centimetres per year due to land subsidence. The city is only 0,5 to 1,5 meters above water level. Factors contributing to land subsidence in Bangkok include sea level rise, climate change, the weight of skyscrapers, and groundwater pumping for agricultural purposes and drinking water.

Climate change and sea level rise do not spare the capital. Moreover, Bangkok is located in a particular location that makes it even more prone to flooding:

- The city is located in the low-lying area of the Chao Phraya River Delta. Moreover, the river is eroding, and adjacent land areas are removed so the runoff is even higher.
- The soil is clay which increases water runoff.
- The gulf level is rising from 4mm a year which is higher than the 3.4mm average.
- Heavy rainfall due to monsoon season from August to December.

The reason for its high vulnerability to flooding is also due to human actions such as deforestation, rapid urbanisation, high pollution, etc. As a result, the city gets flooded every 2 to 3 years on average (Laeni et al., 2019 ; Olson & Kreznor, 2021 ; Dangelser, 2022).

The worst flooding so far was the 2011 flooding which lasted 5 months. That event killed eight hundred people and costed a total of 46.5 billion of dollars. This disaster touched Thailand administration to the core and a lot of directives resulted from it. Indeed, the Royal Thai Government's Strategic Committee for Water Resources Management (SCWRM) was charged to develop future prevention plan for flooding. They produced structural measures to prevent or mitigate flooding such as dikes, canals, etc. However, most of the solutions shifted the problem spatially and temporally to nearby river basins which led to public disapproval and loss of confidence in the government. An instance occurred where a dike was constructed alongside the Rangsit Canal, and sandbags were positioned along the road to safeguard central Bangkok from flooding. However, residents living in those areas destroyed the sandbags and hindered officials from repairing them, as they relied on natural downstream drainage to protect their own neighbourhood from flooding. Tragically, numerous lives were lost due to the BMA's failures, including their inability to evacuate people, lack of communication regarding evacuation plans, absence of an early warning system, lack of community engagement and inadequate forecasting (Laeni et al., 2019 ; Olson & Kreznor, 2021).

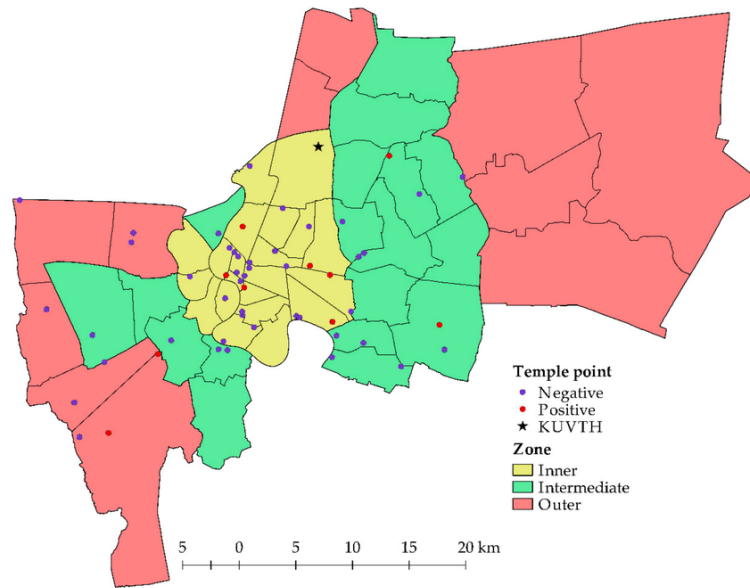


Figure 6: Map of Bangkok and its districts (Olson & Kreznor, 2021)

Moreover, numerous examples, show us that the government prioritizes economic consideration in its approach to flood protection. For example, inner Bangkok, despite being in a low-lying area with direct river routes to the Gulf of Thailand, survived the 2011 floods due to load of protection such as flood dikes. It is considered the most expensive areas and it survived the 2011 floods because of flood dikes protection. Therefore, the low flood risk classification for inner Bangkok does not accurately reflect the geographic reality, given the extensive protection and high land value in that area.

Conversely, the Don Muang district, which has a higher elevation, experienced severe flooding in 2011. This district primarily consists of villages and agricultural land. Predictably, this disparity has caused significant discontent and social unrest in the eastern and western districts, as residents there believe that their elevated locations should shield them from extensive flooding. The government's loss of credibility has consequently resulted in challenges regarding flood risk management (Singkran & Kandasamy, 2016).

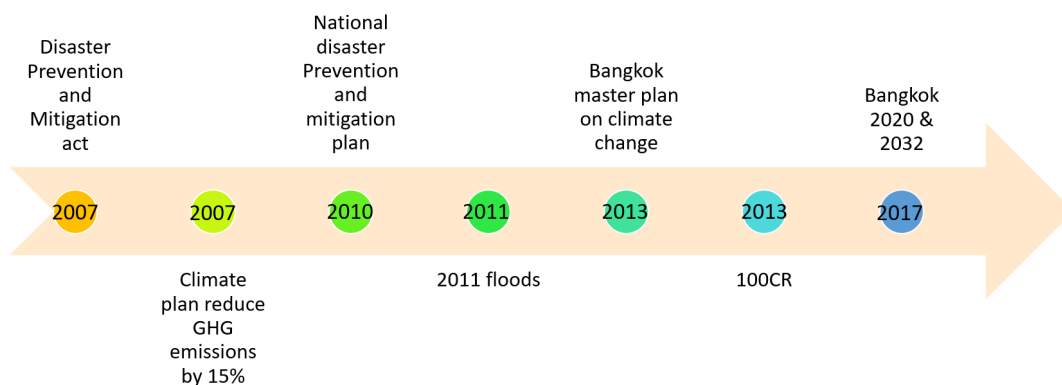


Figure 7: Timeline of Bangkok directives

Bangkok government did not wait until the 2011 disaster to take directives. Indeed, the Bangkok government started to take proactive measures to prepare and mitigate the city for disasters (Figure 7).

In 2007, the government launched the Disaster Prevention and Mitigation act. This law gave power at national, provincial and Bangkok metropolitan level. The BMA got multiple responsibilities such as plan for prevention and mitigation, oversee and train volunteer, procure materiel or tools or vehicle, support local initiative for disaster prevention and establish command centre.

The same year, the BMA introduced its first climate plan with the objective of reducing greenhouse gas (GHG) emissions by at least 15%. However, only one out of the five proposed actions achieved its intended targets.

In 2010, BMAs created the national disaster prevention and mitigation Plan for the period of 2010 to 2014, aiming to protect the city from flooding. Following the devastating floods in 2011, the city made significant investments in physical and engineering infrastructure to redirect overflow towards the sea (Singkran & Kandasamy, 2016).

Subsequently, in 2013, the BMA developed the Bangkok Master Plan on Climate Change, focusing on 4 keys areas: transport, energy, waste and planning. During the same period, Bangkok applied for the 100 Resilient Cities Programme (100RC) launched by the Rockefeller Foundation. This program aims to help cities become more resilient to physical, social, and economic challenges of our century. The 100RC is driven by the Sustainable Development Goal 11 : Sustainable cities and communities (SDG11) (Galderisi et al., 2020 ; The Rockefeller Foundation, 2023).

In 2017, the BMA formulated the Bangkok 2020 and 2032 goals, envisioning the creation of a vibrant city. The government placed particular emphasis on three areas: improving the quality of life, reducing disaster risks, and enhancing adaptation to natural hazards, all while fostering a strong and competitive economy. In this directive, the community engagement in disaster management is more considered to insure proper management and positive impact (Singkran & Kandasamy, 2016 ; Dangelser, 2022).

Despite the existence of multiple directives, the reality in the field differs significantly. Various stakeholders claim that no substantial actions have been taken since the 2011 floods. Despite the creation of over thirty water management agencies, progress remains stagnant. The approach to addressing the problem still relies on temporary, hard engineering solutions. Furthermore, rapid urban growth and deficiencies in planning laws have led to the loss of

natural retention sites and drainage channels in Bangkok. Most of the existing systems are congested due to poor maintenance and waste accumulation, preventing them from operating at full capacity. Furthermore, the presence of slums along rivers amplifies the dangers of flooding, waste build-up, and blockages. The government's failure to enforce settlement laws results in having to address the consequences of these settlements later, exacerbating the issue. Moreover, the absence of a reliable early warning system in the city increases the vulnerability of populations residing in fragile infrastructure near the river (Marks & Thomalla, 2017; Thai PBS World's General Desk, 2022).

According to the table below, it is apparent that Bangkok places significant emphasis on mitigation and prevention measures. Nonetheless, while the solutions primarily concentrate on prevention to reduce the severity of potential events, the government's approach to implementing these measures is suboptimal.

Action	Mitigation & Prevention	Preparedness	Response	Recovery
Engineering solution: dikes, drainage system, ...	X			
Evacuation plan	X		X	

Table 4: Disaster management system for Bangkok

In conclusion, Bangkok faces significant challenges in managing its flooding issues. The city heavily relies on engineering solutions such as dikes and drainage systems, which favour more rich areas like inner Bangkok. This disparity in protection, influenced by economic interest, has led to a loss of trust from residents in other districts. Insufficient engagement of the local population has further compounded the problems in flood management. Although there have been numerous directives and plans to improve the city's condition, the focus has primarily been on engineered solutions. While some consideration has been given to green infrastructure, it remains insufficient. Additionally, the city's sinking issue, caused by land subsidence resulting from groundwater pumping, further exacerbates its vulnerability to flooding. The

natural causes of vulnerability, coupled with the aforementioned factors, have created a complex situation for Bangkok (Appendix 10).

4.3 HO CHI MINH CITY – VIETNAM

Ho chi Minh City (HCMC) is a coastal city in southern Vietnam that counts a population of 9.320 million citizens. It is the most urbanized and biggest city in Vietnam. It serves as a major transportation hub, housing Vietnam's largest port and airport. Situated just 50 kilometres from the Southeast Asian Sea, the city is surrounded by the Saigon River and is in close proximity to the Mekong River delta. The city is touched by monsoon from May to November and semidiurnal tidal regime⁴ from the East Sea.

Vietnam's political landscape is characterized by tension as it is predominantly governed by a single party, the Communist Party of Vietnam (CPV), which imposes severe restrictions on fundamental civil, political, and human rights. The freedom of expression is stifled, evident in the prohibition of competing political websites, among other forms of censorship. Corruption is prevalent, with the CPV maintaining control over the selection of new representatives in recent elections (Human Rights Watch, 2022).

Similar to Jakarta and Bangkok, HCMC has experienced rapid urbanisation. The city is composed of three areas (Duy et al., 2018):

1. Zone 1: This area encompasses 13 districts, including the historic old town.
2. Zone 2: Consisting of six new districts, this zone has witnessed significant residential development since 1997, driven by local government's focus on property investment. The population growth in this zone has been substantial. It is more susceptible to fluvial floods, which increased from 29% to 52% between 2010 and 2015.
3. Zone 3: 5 suburban districts that used to be the agriculture area

⁴ An area has a semidiurnal tidal cycle if it experiences two high and two low tides of approximately equal size every lunar day. (National Ocean Service, n.d.)

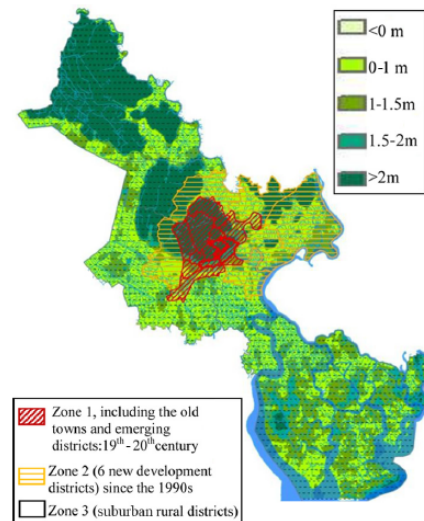


Figure 8: : Map of Ho Chi Minh City and surroundings

As seen on figure 8, the city lies between 0 to 2 meter above sea level. The laws promoting urbanization have led to deforestation and the removal of green spaces along rivers, resulting in significant alterations to hydrological systems due to the rise of impermeable soil.

HCMC had been free from floods until the 1960s, but now over 50% of the urban area is affected. While the city has not experienced floods on the scale of Jakarta or Bangkok, experts warn that if no action is taken, the situation could worsen tenfold by 2050. Currently, most floods are considered a nuisance as they do not paralyze the entire city, but they pose a threat to certain neighbourhoods and hinder economic prospects. Moreover, HCMC is also sinking at a rate of 1.6 centimetres per year due to population growth, urban development, climate change and land subsidence.

The city's flat topography and proximity to multiple rivers increase its flood risk. Data from observation centres at the PhuAn station (in the Saigon River) and the VungTau station (at the river mouth) have revealed significant changes. PhuAn station recorded higher water levels than the previously higher VanTuan station, indicating that the river's waterline has risen. Urbanization, reduction of agricultural and water areas, and land subsidence are among the factors contributing to this increase (Duy et al., 2018; P. N. Duy et al., 2018).

HCMC has several ongoing projects aimed at enhancing the city's value, including an underground metro, new power plants, wastewater facilities, data centres, and a new airport. However, these projects face significant risks due to climate change. It is a common mistake to consider hazard risks later in the city planning process, whereas they should be considered throughout. Despite a Master Plan for Flooding Prevention being in progress since 2016, it is currently four years behind schedule. This plan, costing \$422 million, aims to control water

levels in canals and improve the drainage system's effectiveness, primarily in Zone 1 and districts on the left side of the Saigon River. Unfortunately, the new districts on the right side of the river lack protection (part of Zone 2), despite being residential areas. The current plans rely on constructing sluices and embankments along existing water bodies. However, their effectiveness is questionable due to their limited safety range and high maintenance costs. Furthermore, these plans inadequately consider the impact of climate change. The drainage system was designed to manage rainfall below 100mm, despite a recorded peak of 206mm within a two-hour timeframe in 2016 (Asia Pacific Foundation of Canada, 2023 ; Duy et al., 2018 ; Board, 2021).

Regrettably, due to insufficient funding, all the plans to address urban flooding in Ho Chi Minh City are falling behind schedule. Presently, most solutions focus on costly physical measures, including the construction of dikes and canals, which are estimated to cost up to \$4.4 billion((Asia Pacific Foundation of Canada, 2023 ; Board, 2021).

According to the table below, it is apparent that HCMC heavily relies on engineering solutions while neglecting other measures. This approach poses a concerning and potentially irreversible situation. Urgent prioritization by the government is necessary if HCMC wishes to retain its status as one of Vietnam's economic hubs.

Action	Mitigation & Prevention	Preparedness	Response	Recovery
Engineering solution: dikes, drainage system, ...	X			

Table 5: Disaster management system for Ho Chi Minh City

In conclusion, Ho Chi Minh city is grappling with the consequences of rapid urbanization and heightened vulnerability to flooding. As a result, the city is dealing now with floods. The geographical characteristics as well as climate change only exacerbated its vulnerability. The current flood mitigation plan primarily relies on physical engineering solutions such as dikes and canals. However, these approaches face criticism due to their limited effectiveness, high maintenance costs, and insufficient adaptation to climate change impacts. Despite ongoing

efforts to improve the city's infrastructure and value, inadequate funding, and delays in implementing flood prevention measures present significant challenges (Appendix 11).

4.4 CONCLUSION

The analysis of coastal cities in Southeast Asia, namely Jakarta, Bangkok, and Ho Chi Minh City, highlights several recurring issues. Although the thesis acknowledges the significance of natural causes of flooding, such as sea level rise and climate change, it does not directly address these issues. Consequently, my research will not specifically target these aspects, despite their utmost importance. However, it is worth noting that the solutions proposed in my thesis may indirectly contribute to addressing climate change, thereby offering potential benefits.

These three cities share a common lack of long-term solutions and ineffective law enforcement in managing flooding. The table below illustrates the recurring problems associated with flood management.

Problem	Impact on the city
Waste	Clogged water runoff and drainage infrastructure
Weight of the city	Land subsidence
Ground water pumping	Land subsidence
Lack of maintenance	Poor drainage infrastructure, insufficient warning system, not using full potential of water system
Deforestation	Removing wetlands, increase permeability of the soil
Settlement along riverbeds	Increase waste in rivers, clogged infrastructure, wetlands removed
No implication of local communities	Loss of local knowledge, reduce the chance of successful system
Focus on engineering solution	No adapted to climate change, need high maintenance, low security level, short term fix

Lack of Preparedness	No evacuation routes, lack of training, lack of available resources
Lack of urban spatial development law	Green area removed, illegal settlement, construction in flood prone area
Lack of early warning system	Increase negative results

Table 6: Recurrent problems towards flooding management in Southeast Asia coastal cities

Many of the listed problems are interconnected and often worsen each other's effects. The absence of effective communication and coordination with local communities amplifies the impact of issues such as waste accumulation, deforestation along riverbeds, and settlement in vulnerable areas. Due to the lack of awareness about the comprehensive flooding problem, the communities fail to recognize the gravity of the situation or do not feel included in the challenge. Additionally, the government's measures often fall short of addressing the actual challenges faced by these communities. For instance, instead of providing affordable alternatives to illegal settlements along rivers, the government proposes costly social lodgements, further alienating the affected population. Consequently, the communities may feel compelled to rely solely on themselves for solutions. The population's lack of involvement and ownership of the problem stems from the absence of citizen-centric decision-making by local authorities.

Furthermore, the local government shares responsibility for inadequate enforcement of laws and neglecting ongoing infrastructure needs. While substantial investments are made in engineering solutions, insufficient maintenance undermines their effectiveness. Some experts argue that these quick-fix engineering approaches merely delay the problem, serving as political victories during the current term. However, as witnessed in Bangkok, these government-led solutions face resistance from affected communities.

Another crucial issue is the general lack of knowledge among the residents. All three cities are experiencing land subsidence following similar patterns. Despite grappling with recurring flooding for an extended period, the overall understanding of the problem remains limited. Consequently, the proposed solutions are often inadequate and fail to address the long-term challenges. Basic initiatives like evacuation routes and early warning systems are sorely lacking.

In conclusion, this analysis presents a systemic perspective on the problems faced by Southeast Asian coastal cities. By understanding the interconnected nature of these issues, we can adopt an approach that facilitates the identification of suitable solutions, ultimately benefiting the overall objective of this thesis.. The lack of coordination, overreliance on engineering solutions, and absence of effective urban spatial planning emerge as three key components to explore further. To ensure the relevance of this approach, I will challenge certain hypotheses through interviews with field experts.

CHAPTER 5: URBAN SPATIAL DEVELOPMENT

In this chapter, I will delve into the intricacies of urban spatial development solutions. These solutions will be thoroughly examined and supported by a case study to demonstrate their applicability to our specific situation.

Given that floods are common and expensive disasters, significant attention is directed towards finding solutions. Various existing solutions, such as sound-based systems for water leak detection or node sensors for flood warning systems, are already in place. Satellite data has proven to be a crucial element in mitigating flood impacts by serving as a surveillance system. However, Southeast Asia's unpredictable weather patterns make the region particularly challenging. Nonetheless, satellite data can aid in identifying vulnerable areas and establishing safe evacuation routes, providing valuable insights for flood management. These data play a crucial role in creating evacuation plans, prioritizing strategies, conducting risk assessments, and determining optimal positions for drainage systems, making them vital for disaster mitigation, the first DMS phase.

5.1 BLUE AND GREEN INFRASTRUCTURE

However, my study does not solely focus on satellite data analysis. As observed in the case studies of Jakarta, Bangkok, and Ho Chi Minh City, these cities heavily rely on engineering solutions, often referred to as grey infrastructure. Grey infrastructure presents several issues such as high implementation and maintenance costs, limited safety measures, and inadequate adaptability to climate change. These solutions have been criticized by experts as temporary fixes. As the number of floods event increase, grey infrastructure should not be the only solution used but should instead be combined to other type of solution such as Blue and Green Infrastructure (BGI).

Blue and Green Infrastructure (BGI) is a component of Nature-Based Solutions (NBS). While there is no universally accepted definition of NBS, there is a shared understanding of its purpose. NBS encompasses concepts that harness the power of nature to address environmental, societal, and economic challenges. These solutions can be implemented in both rural and urban settings. A diverse range of NBS options exists, including BGI, Sustainable Urban Drainage Systems (SuDs), water-sensitive urban design (WSUD), and low-impact development (LID). These concepts serve as alternatives to traditional grey infrastructure, offering more sustainable and nature-oriented approaches.

The green infrastructure concept has emerged in the 1990s. It is defined by UNDRR (2017) as “strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services, such as water purification, air quality, space for recreation and climate mitigation and adaptation, and management of wet weather impacts that provides many community benefits”. Green infrastructure encompasses various elements such as vegetation parks, riverbanks, green roofs and walls, wetlands, permeable pavements, and urban forests.

On the other hand, blue infrastructure is a recent concept that emphasizes water-based solutions. It encompasses coastal areas, floodplains, mangroves, coral reefs, rivers, lakes, artificial water channels, and urban wastewater networks (UNDRR, 2020).

Although the idea of green and blue infrastructure is not entirely new, the loss of natural barriers in urban areas due to urbanization makes it crucial to reintroduce green spaces and natural absorbers. Extensive research has been conducted and consistently demonstrates the effectiveness of this mitigation infrastructure in managing runoff and improving societal resilience (see table 8). During periods of intense precipitation, BGI plays a vital role in processing water through methods such as infiltration, evapotranspiration, or runoff reuse. This helps alleviate strain on aging or undersized sewer systems, as highlighted by Li et al. (2020).

Practice/ Benefit	Reduce flood risk	Improved water quality	Increase water supply	Improved air quality	Habitat and aesthetic co-benefits
Green and blue infrastructure	Yes	Yes	Yes	Depends	Yes
Grey Infrastructure ⁵	Yes	Depends	Depends	No	NO

Table 7: : Benefits of Green and Grey infrastructure

As we can see on the table above, BGI are contributing to sustainable goals . BGI are indeed linked to SDG 13.1: “Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries”. Indeed, this infrastructure has a positive impact on the air quality, water quality and heat waves (United Nations Sustainable Development, n.d.).

⁵ It can be dams, dykes, floodwalls, water pumps, drainage facilities, sewage treatment plants.

5.1.1 WUHAN CASE – SPONGE CITIES PROGRAM

In 2015, China initiated a significant project known as the "Sponge Cities Program," which selected 16 cities as pilot areas to study and implement green infrastructure. The initial testing phase spanned three years, with an annual budget of 63 million dollars per city, aimed at infiltrating and reusing 70% of stormwater. This program gained attention and popularity, with similar initiatives emerging in Washington DC, New York City, Barcelona, Lisbon, and other cities (Li et al., 2020).

China, like other rapidly urbanizing regions, faced increasing flood and drought challenges. Since 2008, floods and water shortages have become more frequent, prompting the national government to assist lower-level governments in adopting sponge city measures. The national government outlined compulsory standards, provided technical guidelines, direct funding, and facilitated peer-to-peer learning among participating cities.

To illustrate the overall impact of the Sponge Cities Program, I will focus on Wuhan, the capital city of Hubei Province. Wuhan has experienced a rise in flood events and escalating water pollution. In 2014, four out of the eleven rivers in the city failed to meet water quality standards. Then, in 2016, a week-long rainfall of 600 millimetres (over half the annual average) led to severe consequences. One million residents were affected, 263 thousand were evacuated, the cost reached 750 million dollars, and tragically, 15 people lost their lives.

To address these challenges, a total of 389 projects were launched in Wuhan to meet the program's requirements, covering an area of 38.5 square kilometres within the city. Various measures were employed, combining green infrastructure such as urban gardens, parks, and green spaces to redirect water away from urban areas with selected grey infrastructure, including the construction of two rainwater pumps and the repair of thirteen water channels.

Type of Benefits	Explanation
Cost of the project	2.1\$ billion which is less expensive than upgrading the drainage system of the city that cost 2.7\$ billion
Social	Happiness, creates jobs

Health	Improve public health, enhance air and water quality, reduce pollution
Environmental	Reduced carbon emissions, enhanced natural cooling, improved biodiversity conservation

Table 8: Benefits of Sponge Cities Program

Green infrastructure offers more than just a solution to flooding and water scarcity; it provides additional benefits that contribute to human well-being. By creating healthy and green public spaces, it positively impacts social factors such as happiness. Green infrastructure also plays a role in mitigating climate change by acting as carbon sinks and cooling down urban areas. Furthermore, it improves overall health by reducing air and water pollution, and it helps in reducing flood risks, pollution, and heat waves (refer to Table 9). Furthermore, NBS has been demonstrated to be 50% more cost-effective compared to traditional grey infrastructure, as depicted in the aforementioned table. Surprisingly, despite this advantage, the world economic forum reveals that only a mere 0.3% of the annual \$5 trillion investment in urban infrastructure is allocated to NBS (Aki-Sawyer et al., 2023).

The Sponge Cities Project is particularly noteworthy because it has been implemented in already developed urban areas. Often, such initiatives are primarily introduced in new development areas. However, the project has faced various challenges, including coordination issues, the need for tailor-made solutions, and difficulties in data sharing. Given that the project operates at a local level, it has not yet been fully integrated into a comprehensive approach within regional urban planning. The successful implementation of these solutions requires access to a wide range of data, including environmental conditions, socioeconomic factors, and engineering procedures. However, such comprehensive data is currently not readily available (Oats et al., 2020).

In conclusion, this project has demonstrated the effectiveness of BGI in addressing various types of disasters, including floods, heat waves, and drought. Furthermore, the benefits of this mitigation infrastructure extend beyond disaster mitigation, as they have a substantial impact on the well-being of neighbourhoods and contribute to improved public health. These types of infrastructure represent a cost-effective, long-term investment that enhances the overall ecosystem.

5.2 GEOSPATIAL AI

This section will provide an overview of data-based disaster management resources, with a specific focus on flooding. I will explore various solutions and their benefits in order to compile a comprehensive toolbox tailored for Asian Coastal Cities.

Artificial intelligence solutions offer a wide range of capabilities to address hazards effectively. These include tracking, mapping, remote sensing techniques, geospatial analysis, drone technology, deep learning, machine learning, telecom, hot spot analysis, smart city urban planning, and transportation planning. The success of these methods relies on their effective implementation and utilization (Abid et al., 2021).

Geospatial data encompasses information that describes objects or features in a specific location, combining location information with the characteristics of the object or event, along with temporal data. Geospatial Information Systems (GIS) provide graphical and visual tools crucial for research, forecasting, and evaluating flood warnings. These tools enable the development of comprehensive prevention and mitigation measures, strengthening disaster management efforts (IBM, n.d.). GIS is widely recognized as the most reliable technique for geospatial data analysis and environmental planning. By leveraging GIS, crucial information can be obtained and analysed to allocate resources appropriately. Real-time or near real-time access to accurate and reliable spatial data is vital in disaster management at all stages (Appendix 12).

Flood mapping plays a crucial role in flood risk management by identifying vulnerable areas. This knowledge enables urban planners to make informed decisions and avoid constructing critical infrastructure, such as hospitals or schools, in high-risk zones. Furthermore, effective communication and raising awareness among populations living in flood-prone areas empower individuals to protect themselves during such events.

Mapping disaster risk can be challenging due to the unpredictable nature of hazards. A comprehensive understanding of the entire Disaster Management System is necessary for accurate risk assessment. While geospatial data, complex GIS, and hydrological models are commonly employed to study flood vulnerability, the application of machine learning in this domain is relatively new. However, the implementation, understanding, and maintenance of these models can pose challenges and incur significant costs. Fortunately, advances in technology have led to the emergence of lightweight tools, such as remote sensing and open-source high-quality geospatial data, reducing operational costs and expanding their use across broader areas (Naskar, 2021; Mojaddadi et al., 2017 ; Abid et al., 2021).

When studying flood vulnerability, factors such as rainfall, slope, land use and land cover (LULC), elevation, normalized difference vegetation index (NDVI), topographic wetness index (TWI), soil-adjusted vegetation index (SAVI), k-factors, river distance, road distance, standardized precipitation index (SPI), and population density are commonly considered. However, it is essential to also incorporate other critical factors, including habitat loss, biodiversity loss, air quality pollution, runoff potential, income, unemployment rates, and the percentage of elderly population, among others. These additional factors play a pivotal role in effectively implementing BGI practices, especially in urbanized cities where socio-economic factors and urbanization-related pressures are significant considerations (Van De Ven et al., 2016 ; Beloqui, 2022).

Artificial intelligence plays a crucial role in creating flood prediction systems and monitoring potential scenarios during heavy rainfall events. Leveraging social media platforms like Twitter has become a valuable source of crowdsourced data for improved situational awareness. Effective implementation of BGI is vital to reap the social, health, and environmental benefits, and GIS serves as a valuable tool in achieving this objective.

5.3 CONCLUSION

In conclusion, geospatial data serves as a valuable tool for mapping targeted areas and supporting every stage of the disaster management system. Our focus on Blue and Green Infrastructure (BGI) centres around the mitigation and prevention phase. Geospatial Information Systems (GIS) play a crucial role in mapping the area and extracting valuable insights on its ecological aspects. BGI has demonstrated its effectiveness in various cases, such as the successful implementation of the sponge cities program in Wuhan, China. The positive impacts of BGI extend to health, environment, and social well-being. When combined with traditional grey infrastructure, BGI enhances the resilience of cities.

BGI proves particularly useful in addressing flooding, heatwaves, and droughts as it acts as a sponge, reducing temperatures and pollution levels in the area. However, these solutions are complex and require thorough preparation. To maximize their effectiveness, collaborative planning with local government and representatives from affected neighbourhoods is essential.

PART II: EMPIRICAL RESEARCH

CHAPTER 6: METHODOLOGY

This chapter provides an explanation of the data collection and analysis methods employed, as well as the participants involved in the research. Additionally, a comprehensive description of the framework used to analyse the data and make informed decisions is provided.

6.1 GENERAL METHODOLOGY

As it has been said in Part I, there are multiple causes for flooding in Asia Coastal cities. Therefore, multiple hypotheses can be defined and investigated to validate if they can improve or even solve the situation on a long-term basis.

Hypotheses are presented in Chapter 7. I want to keep a systemic view on the problem leading to a framework usable by multiple Southeast Asian major coastal cities.

6.2 FRAMEWORK AND QUESTIONNAIRE

To support me in formulating my hypotheses, I am using the Value Proposition Canvas (VPC). This canvas is a subset of the Mission Model Canvas (MMC). The VPC will also help me to write my interview guide.

The Mission Model Canvas (MMC; Appendix 13) is an adaptation of the Business Model Canvas (BMC), specifically suited for organisation fulfilling a mission and not focused on earning money, which matches the context of this thesis. (Osterwalder, 2016):

The Value Proposition Canvas (VPC; Appendix 14) supports a more detailed analysis of two elements of the MMC: the Value Proposition and the Beneficiaries. It zooms in on the value proposition to elucidate the relationship between different beneficiaries. The VPC gives us the opportunity to ensure that the solution brought take into consideration the beneficiaries insight. By utilizing both the VPC and MMC, one can obtain a comprehensive understanding at the mission level while also gaining detailed insights into each beneficiary at the "product/market fit" level (Osterwalder, 2016).

The VPC provides a valuable framework to validate our stakeholders interest in our solution. The analysis of the three cities has enabled me to develop a sufficient understanding of flooding in the region. This systemic approach allows me to present a general framework that can be

utilized by all Southeast Asian coastal cities, with necessary adaptations to be made by local governments, of course.

I will then validate the desirability of my hypotheses through interviews conducted with subject matter experts. Throughout the interviews, the VPC will assist me in assessing the ongoing relevance of the hypotheses based on the responses provided by the experts.

The interviews will adhere to a semi-directive structure with no formalised questions, meaning that the questions will be organized around predetermined themes based on my hypotheses. However, the specific order and wording of the questions will not be fixed. This format allows for an interactive exchange between me and the interviewees while also providing flexibility for their input (Jennings, 2005).

6.3 SAMPLE SIZE AND COMPOSITION, AND INTERVIEW PROCESS

In order to carry out this research, the first step was to decide which type of profile was needed and more appropriate to answer the questions.

I decided that I needed 4 types of profile: local government (GOV), local population (POL), expert in BGI (EXPB) and finally an expert in geospatial data (EXPS) as it can be seen on the table below. I have chosen these profiles in order to keep a systemic view on the problem. Each point of view will get me closer to a general understanding. Indeed, the point of view of the local population and local government is crucial in order to get the opinion of the locals towards flooding management and NBS. Then, experts in both BGI and geospatial data are needed in order to understand better the implementation process of such infrastructure as well as the barriers encounters during some of their project.

The representatives of each of the four profile types were identified either through the author of a literature review I read or through companies that I found interesting to interview. Since my thesis focuses on Southeast Asia, I managed to establish contact with two individuals residing in Bangkok, François Wautier and Jirasak Saebang, as well as one person living in Jakarta, Amanda Widyaputri. Their insights are precious to my research, despite being only three individuals, as they provided valuable perspectives. Additionally, I had the opportunity to meet Dr. Liping Dai, a teacher at Utrecht University, who is also invited to teach at Wuhan University, Xiamen University, and Sun Yat-sen University, all located in China. Lastly, I connected with Lucy Oats, a PhD student specializing in sustainable governance of urban service delivery, who has conducted research on the Wuhan Case and is currently completing

her field studies in Kenya. As you can see, I was determined to incorporate a diverse range of thoughts and cultures into my thesis in order to broaden my perspective.

I have selected 4 profiles represented by 7 participants. Each of them is presented in table 8.

Participant	Function	Company	Duration (min)	Group representative
Lucy Oats	PhD Student	Delft University, Kenya	76	EXPB-POL
Dr. Liping Dai	Water governance professor	Utrecht University, Utrecht	58	EXPB-Gov
Sandra Soares Frazao	Lecturer in hydraulics and head of the civil and environmental engineering department	UCLouvain, Louvain-la-Neuve	48	EXPB-EXPS
Martin Duval	Co-founder & Co-president	Blue Nove, Paris	88	POL
François Wautier	Senior Software Engineer	ScreenCloud – Digital Signage, Bangkok	35	POL
Jirasak Saebang	Director of engineering	ScreenCloud – Digital Signage, Bangkok	40	POL
Amanda Widyaputri	Profitability and sustainability analyst	Pinhome, Jakarta	15	POL

Table 9: Participants to the interview (Gov = local government ; POL = local population ; EXPB= expert BGI ; EXPS= expert geospatial data)

The questions in the interviews are formulated based on the hypotheses developed from the literature review. At the beginning of each interview, I establish rapport by introducing myself and providing a brief overview of my thesis. This includes explaining the context and purpose

of my research. Additionally, I inquire about the interviewee's professional background, career trajectory, and areas of expertise. From there, the focus of the questions swiftly transitions to the interviewee group appurtenance.

I ensure that the interviews maintain a coherent flow, allowing for a smooth transition between different topics while focusing on the core theme of collaborative BGI implementation.

6.4 DATA ANALYSIS METHOD

After conducting the semi-directive interviews, each interview was transcribed and documented (refer to Appendix 16).

In chapter 8, I will delve into the opinions of the interviewees using the thematic analysis method, which is employed to analyse qualitative data. I will carefully examine the transcripts of the interviews to identify common themes or patterns that emerge across the interviews. By utilizing this method, I aim to avoid any potential confirmation bias when formulating my analysis (Caulfield, 2022).

Finally in chapter 9, I will discuss the versatility of collaborative intelligence through the whole disaster management system. Then, by demonstrating the potential of such technology, I will then go through the specific use of this innovation in BGI implementation.

CHAPTER 7: HYPOTHESES

This chapter presents the VPC and the various hypotheses that are being evaluated for validation or invalidation. They will be analysed thoroughly in Chapter 9.

7.1 THE VALUE PROPOSITION

As stated in the methodology overview, the empirical research is structured around the Value Proposition Canvas (VPC). The VPC gives me the opportunity to test the desirability of my proposition, its market-fit. The ultimate proposition is called the « Collaborative Resilient Urbanism Kit » aimed at reducing the impact of floods, heat waves, and droughts. This toolkit provides support and guidance for effective collaboration and implementation of BGI within the city, addressing the specific needs and objectives of the government. However, I will only assess its desirability and not its feasibility and viability. Indeed, those two perspectives are treated in the MMC and not the VPC and this thesis will focus on the VPC alone.

While the government will be the primary beneficiary of this toolkit, it is crucial to emphasize the importance of collaboration between local governments and the local population for the success of the project. To actively involve the population in the decision-making process, I have developed a VPC (Appendix 15) that represents the viewpoints of the local population regarding collaborative BGI implementation.

Despite the extensive benefits of BGI, Southeast Asian governments continue to allocate substantial funds towards grey infrastructure. This indicates a limited understanding of urban development and flood management in the region. The "Collaborative Resilient Urbanism Kit" aims at providing a systemic approach to implementing BGI in a collaborative manner within their cities. Its purpose is to demystify the process, enhance comprehension, and facilitate adaptability, thereby encouraging Southeast Asian governments to embrace BGI as a more effective solution.

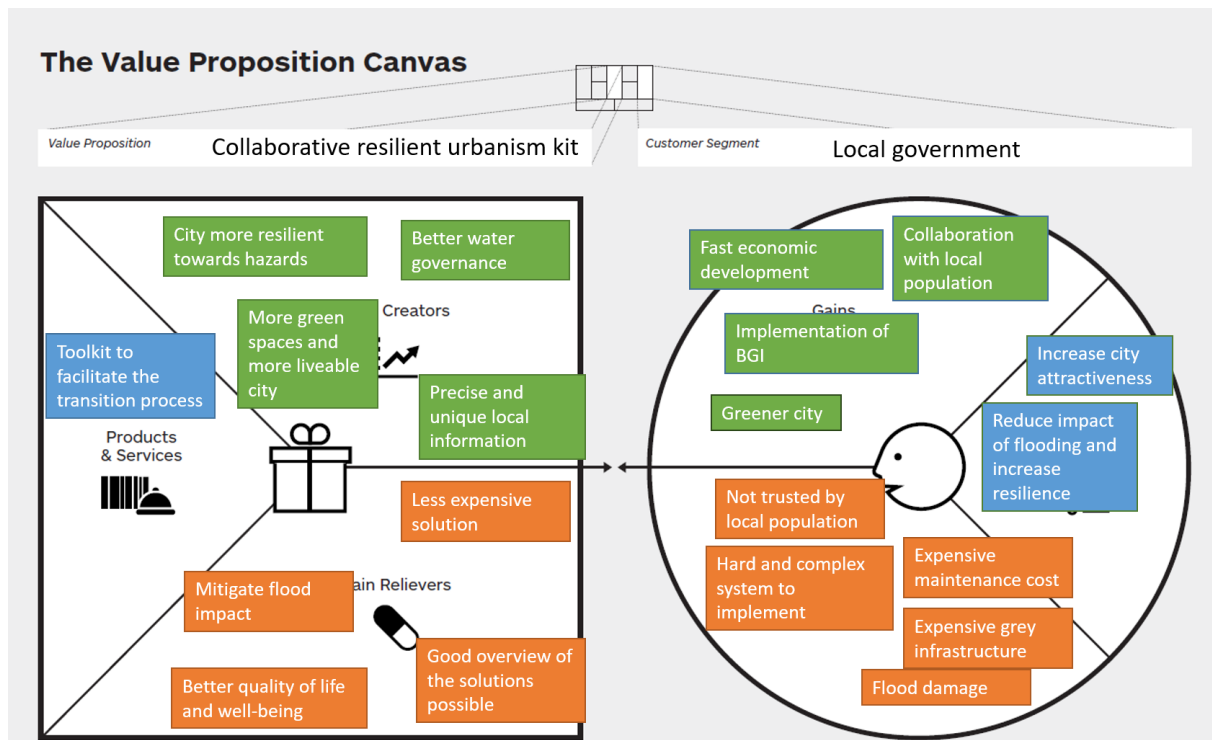


Figure 9: Local government VPC (right side Green = Gains ; Blue= Customer Jobs; Orange = Pains / Left side Green= Gain Creators; Blue = Product & Services; Orange= Pain Relivers)

Figure 9 illustrates the alignment of the Value Proposition Canvas (VPC) with local government incentives.

The Gain creators directly correspond to the gains sought by the government. These gains include the collaboration with local population and enhancing the city's appeal by creating more green spaces and improving overall quality of life, including health benefits.

The Product and Services offered through the Collaborative Resilient Urbanism Kit align with the customer jobs of the government.

The Pain relievers effectively address the government's pains. BGI solutions are proven to be more cost-effective than traditional grey infrastructure, not only in terms of initial investment but also in terms of long-term maintenance costs. By implementing BGI, the government can mitigate flooding risks and reduce damages to the city, resulting in substantial cost savings in disaster response. Additionally, the implementation of BGI improves the environment and liability of affected neighbourhoods, leading to increased happiness and trust among residents toward the government's visible and sustainable actions.

7.2 HYPOTHESIS

After analysing the literature review and the two VPC presented above, I have defined 5 hypotheses resulting from both VPC that will be tested during the interviews :

H1: “ The population's needs are misunderstood and unheard.”

H2: “The population would like a greener, more pleasant city.”

H3: “The population is intrigued by NBS as a new way to fight natural hazards.”

H4: “Population trust and implication is a key factor for long term impact and data accuracy.”

H5: “A vertical collaboration between the government and the population would give valuable insight in BGI implementation that could not be learned with geospatial data.”

H6: “Geospatial analysis can be a barrier to BGI implementation.”

H7: “A city has a limited number of BGI possibilities due to the lack of space available.”

CHAPTER 8: FINDINGS OF THE INTERVIEW

This chapter presents the results obtained during the semi-directive interviews. The transcripts of each interview are available in Appendix 16.

As explained in the methodology, I used a thematic analysis. This chapter is then structured along five themes discovered during the interviews: co-creation; population discontent, substantial data base, massive Collective Intelligence and BGI location. Those five themes will be address in the sections below.

8.1 CO-CREATION

Throughout all of my interviews, a recurring theme has been the significance of government and local population involvement in a project for long-term effectiveness. Referred to as “co-creation”, this business concept is increasingly utilized as a means to engage citizens. Co-creation, a concept established in 1990, is defined as “the active flow of information and ideas among five sectors of society: government, academia, business, non-profits and citizens - the Quintuple Helix - which allows for participation, engagement, and empowerment in developing policy, creating programs, improving services, and tackling systemic change with each dimension of society represented from the beginning” (Agusti et al., 2017).

Originally designed to engage consumers in the innovation of new products, co-creation empowers customers by shifting the balance of power. It possesses several characteristics, including innovation, collaboration, diversity, hierarchy-flattening, multi-directional, mutually beneficial, and transparency. Cities and citizens engage in co-creation for various reasons, such as obtaining population input and equality, empowering citizens, fostering responsive government, increasing citizen awareness, enhancing efficiency, achieving cost savings, managing risks, and creating value through innovation.

Traditionally, the government invites public input on pre-determined plans, but what if we granted the public more power to engage in public discussions? Co-creation extends beyond mere public participation; it provides an opportunity to be heard, represent oneself, exercise political rights, and influence decisions (Agusti et al., 2017). As mentioned by Lucy Oats (Interview 1), we can envision co-creation between the government and communities, as well as between different governments.

However, is this concept suitable for Southeast Asia? In this region, there are recurring issues (refer to table 5 in section 4.4) that arise in coastal cities. One of the major problems is the

ineffective communication with local communities, hindering the understanding of their actual needs and failing to raise their awareness about the overall situation. There is a genuine necessity to establish trust and ensure that local communities are heard to foster effective initiatives.

8.2 POPULATION DISCONTENT

I conducted interviews with three individuals living in Southeast Asia coastal cities: a Thai resident in Bangkok (Interview 6), a Belgian expatriate who has been living in Bangkok for 27 years (Interview 5), and an Indonesian resident in Jakarta (Interview 7). All three interviewees confirmed a lack of trust in their local governments, as well as their disaster management skills. They expressed the belief that the government's solutions are ineffective and insufficient. The political systems in Southeast Asia are highly hierarchical, leaving them feeling unheard and disconnected from the decision-making process. One interviewee, Jirasak, even expressed fear of investing in Bangkok due to sea level rise and climate change, describing it as a gamble against the future.

Furthermore, two of the interviewees highlighted the inadequate vegetation in their cities compared to places like Malaysia or Singapore. These cities actively combat climate change and enhance urban resilience by incorporating nature-based solutions alongside traditional infrastructure. The three citizens compared the pleasant atmosphere of European cities to their own, which they perceive as dirty, corrupt, and suffocating. While the Thai government is actively constructing new infrastructure such as trams and trains, there is a lack of urgency and appropriate response to the impending threat of sea level rise. Misplaced investments are being made in infrastructure that fails to address the emergency situation. Urbanization continues unabated in Jakarta and Bangkok, with empty land being developed without considering the consequences. The interviewees believe that their governments' priorities are misplaced, despite the visible effects of urbanization such as frequent floods and land subsidence visible in the streets.

Nevertheless, strikes are occurring, reflecting the discontent of the population. Interestingly, it is primarily the younger generation that is leading these protests, while the older generation still carries the trauma of the student activists' massacre in Bangkok in 1976, as François Wautier mentioned. All three participants stressed the population's desire to be listened to and have their needs addressed through meaningful actions that can effectively improve their lives and alleviate their deep-seated concerns about the future, which currently appear bleak. Jirasak aptly stated, "*Any measures taken for our protection would be good*".

Therefore, thanks to literature review and to the interviews we can indeed validate Hypothesis 1: *“The population's needs are misunderstood and unheard”* and Hypothesis 2 : *“The population would like a greener, more pleasant city”* as well as Hypothesis 3 : *“The population is intrigued by NBS as a new way to fight natural hazards”*. Hence, the VPC of the population can be validated (see Appendix 14).

8.3 SUBSTANTIAL DATA BASE

As mentioned earlier, the hierarchical nature of government in Southeast Asia grants significant power to the authorities, resulting in top-down decision-making with little consideration for public opinion. Dr. Liping (Interview 2) highlighted that the short four-year mandates of political representatives make it even more challenging to garner support for long-term projects. Politicians prioritize political relevance for their party, making it crucial to address how to generate interest from local governments in nature-based solutions for their cities on a long-term basis. Certainly, the limited duration of mandates also impacts European politics, among other factors. However, Southeast Asia faces a greater number of hurdles to overcome compared to European countries, primarily due to the pervasive issue of corruption already stated in the case study of each city in Chapter 4.

Professor Soares Frazao (Interview 3) emphasized the importance of building trust and convincing the government about the efficacy of natural based solution. Given that these projects are long-term in nature and their effects are not immediately visible, it requires time to develop the necessary infrastructure and nurture natural elements. Although nature-based solutions are generally less costly than conventional grey infrastructure, they still require significant investment without immediate monetary returns. However, as Lucy Oats mentioned, the returns come in the form of improved livelihoods, including human capital with better health and lifestyles, as well as natural capital with a greener city. Additionally, these projects can create job opportunities, such as restoring mangroves for sustainable shrimp farming. Therefore, as reiterated by Dr. Liping and Professor Soares Frazao, it is essential to gather substantial data on successful cases and their benefits to reassure the government and encourage them to embark on long-term projects.

Without a long-term vision, there is a risk of undertaking short-sighted projects that eventually get forgotten and abandoned, as exemplified by China's previous green initiatives that lasted only two mandates. Changing mindsets and demonstrating the value of nature-based solutions through data and tangible examples are crucial. The significance of data has been emphasized

by numerous experts, including Debarati Guha-Sapir, Director of the Centre for Research on the Epidemiology of Disasters (CRED) and Professor at the School of Public Health of the Université catholique de Louvain (UCLouvain), who won the Blue Planet Prize for her ongoing research in creating an extensive database of all disasters. Concrete examples and accurate data-driven comparisons across regions enhance credibility and garner serious attention from decision-makers.

The next challenge lies in proving the efficiency of nature-based solutions, which is not an easy task. Since these approaches are relatively new (introduced in 2015), there is a tendency for the term to be misused and for it to become a trendy buzzword. Furthermore, due to the novelty of these solutions, there is a lack of hindsight to quantify their long-term benefits, making it challenging to convince private entities to invest significant amounts of money in projects with limited insights.

Dr. Liping's study on the Wuhan Sponge City program provided valuable insights. Although the project has shown effectiveness, it is currently too early to accurately measure its overall impact on the city's resilience. However, the significance of this program, being extensive in nature, can serve as motivation for future projects. Quantifiable data and conclusive results are crucial in convincing others to adopt similar initiatives. As Professor Soares Frazao pointed out, it becomes more challenging to persuade individuals of a solution's effectiveness when its outcomes cannot be quantified or monetized. The consequences of nature-based solutions often revolve around creating sustainable livelihoods rather than generating direct income.

Malaysia and Singapore were highlighted by the three residents as exemplary cases of integrating nature into cities to enhance resilience. Professor Soares Frazao also acknowledged Malaysia and Singapore as examples of governments plagued by corruption yet still implementing measures that transcended multiple electoral cycles. It is noteworthy that Malaysia has experienced multiple Prime Ministers who curtailed freedom of speech and assembly, while also expressing discriminatory views towards immigrants and the LGBT community (Human Rights Watch, 2023a). Similarly, Singapore has imposed restrictions on fundamental rights, empowering the parliament to remove online content deemed inappropriate according to their standards (Human Rights Watch, 2022b). This indicates that despite the prevalence of corruption, the implementation of NBS to mitigate the effects of climate change and minimize hazards impact can indeed be a viable option for other cities as well. Both Singapore and Malaysia have formulated green action plans to align with the UN's 2030 Sustainable Development Agenda, leading to significant measures aimed at enhancing urban

resilience (Jabbar, 2023; Singapore Green Plan, n.d.). However, it is worth noting that neither of them has effectively incorporated the population in the decision-making process. While individuals are encouraged to participate and contribute individually, there is a lack of consideration for the needs and opinions of the population as a whole.

Furthermore, it is crucial to emphasize that the problem at hand needs to be approached holistically. In the case of Wuhan, Dr. Liping highlighted that neglecting the social aspect resulted in certain areas of the city benefiting from BGI becoming more expensive. Consequently, residents in those areas were forced to relocate to poorer regions as they could no longer afford to live there. This displacement merely shifted the problem elsewhere. This observation was also echoed by Lucy Oats and Professor Soares Frazao, who noted that failing to adopt a holistic perspective only results in the problem being transferred to a different location. Similarly, in the literature review, a similar issue was identified in Bangkok, where flood protection measures were primarily implemented in affluent areas. As a result, water was redirected towards poorer areas that should not have been susceptible to flooding based on their location and elevation. The government essentially shifted the problem of flooding to these impoverished regions, leading to discontentment among the residents and significant damage to infrastructure done by the population as a sign of protest.

8.4 MASSIVE COLLECTIVE INTELLIGENCE

However, one question remains unanswered: how can we effectively engage in the process of co-creation? Co-creation involves five essential steps outlined by Gouillart and Hallet (2015):

1. Identify target communities.
2. Build engagement platforms.
3. Foster interaction among stakeholders
4. Enable individual experiences.
5. Assess new value.

To navigate through these steps successfully, I received valuable assistance from Martin Duval during Interview 5. Without technology, this process can be quite exhausting. Fortunately, numerous applications are currently used to gather public opinions. Indeed, traditional data collection methods often fail to keep up with changes and is often gender biased. Nevertheless, we must ensure that people have the means to fully express themselves. This is where Collective Intelligence comes into play.

The National Endowment for Science Technology and the Arts (NESTA) defines Collective Intelligence as “*the process through which a large group of individuals gather and share their knowledge, data, and skills to tackle societal issues*”. With advancements in digital solutions, Collective Intelligence has evolved significantly and help address growing complexity of challenges. Modern technologies offer us the opportunity to collect vast amounts of data, whether through satellite information or mobile phone data, for instance. These data provide us with an incredible wealth of information that we simply need to learn how to harness effectively. There are numerous methods available to gather pertinent data through technology such as crowd mapping or crowdsourcing for example, and one such approach recommended by Martin is Massive Collective Intelligence (MCI).

As Martin explained, there are 4 steps in MCI operation:

1. Alignment Understanding Awareness: In this initial step, data collection provides an opportunity to understand the needs of the population and raises awareness about the topic on which their opinions are sought. The objective is to align everyone towards a common direction, ensuring clarity and comprehension regarding the problem at hand.
2. Ideation: By analysing the data gathered in the first step, collaborative solutions are co-constructed.
3. Co-decision: After compiling all the potential solutions, a decision must be made regarding which solution to pursue and why. This step involves choosing the most viable option among the alternatives.
4. Co-action: This final step involves implementing the chosen solution collectively.

These four steps ensure that everyone's voice is heard and that they actively participate in the decision-making process. It is important to establish a mutual agreement between the stakeholders and the government. The government commits to providing information at each stage of the project, explaining their choices to the participants. This ensures that participants are kept informed about the progress and maintain a sense of involvement, fostering long-term commitment. Additionally, the government pledges not to consume excessive amounts of time. The entire project, from its launch to completion, can be done within six months, which is a relatively short timeframe. Furthermore, stakeholders must understand that their ideas or solutions may not necessarily be adopted. The primary goal is to understand the problem and the underlying need, with the understanding that the solution will be long-lasting.

The data collection phase utilizes a hybrid approach in order to crowdsource information. Both online measures and physical activities are conducted simultaneously to encourage widespread

participation and prevent any segments of the population from being isolated. Physical workshops are organized to address issues such as limited access to digital devices, language barriers, or lack of education. These activities enhance inclusivity, particularly when targeting marginalized populations. Technologies play a crucial role in collecting and analysing data. For instance, machine learning facilitates the creation of online open debates or surveys with open-ended questions, which can be quickly analysed through content categorization using semantic analysis. Certainly, online measures are the ones that facilitate the massive aspect. The absence of participant limits allows for extensive scalability, and with the aid of technology, unstructured data can be efficiently analysed through semantic analysis techniques. Humans still play a vital role in the final analysis, but the workload is significantly reduced, saving time, and improving effectiveness and inclusivity.

To encourage population participation in the process, it is essential to carefully target the intended audience. Physical activities should be strategically located in areas with the aim of increasing relevant participation. Furthermore, as Martin aptly pointed out, it is important to balance the narrative of a pessimistic future. Communication efforts should highlight positive examples on both small and large scales.

The potential applications of Collective Intelligence are vast. By employing this methodology, a city demonstrates its ability to harness Collective Intelligence, leading to more resilient and innovative solutions. This confirmed hypothesis number 4 : *“Population trust and implication is a key factor for long term impact and data accuracy”* as well as hypothesis number 5 : *“A vertical collaboration between the government and the population would give valuable insight in BGI implementation that could not be learned through the use of geospatial data”*. Indeed, by being involved in the whole process, the local population appropriate the project and involve themselves in it. Moreover, the data collection phase gives us access to data that we could not get through any geospatial data analysis.

However, Martin and Lucy Oats have highlighted a potential hurdle: the challenge of persuading politicians who do not believe in these methods and are convinced that they already possess knowledge of their population's wants and needs. Convincing leaders of the effectiveness, time-saving benefits, and the potential to enhance population awareness becomes a more arduous task compared to persuading the general public. Indeed, in my interviews with residents from Jakarta and Bangkok, I received notable feedback indicating their interest in participating in the creation of directives. Two residents expressed their enthusiasm, and one specifically highlighted the potential involvement of youth in such initiatives. While this viewpoint represents the opinions of just three residents, it is an encouraging sign that there is

already a positive inclination towards active participation in these processes. However, despite our best intentions, there may be resistance from politicians and population who remain steadfast in their beliefs and are hesitant to embrace these methodologies.

As mentioned earlier, the most compelling approach to persuade the government relies on data and compelling evidence. Therefore, it becomes crucial to gather additional evidence that showcases the effectiveness of Collective Intelligence in humanitarian settings, building upon the successful examples of Malaysia, Singapore, and Wuhan's natural-based solutions. An illustrative example is the launch of the "e-Democracia" platform by the Brazil National Congress in 2009. This platform actively encouraged public participation in the formulation of various bills, such as the "Youth Statue Bill," which incorporated 30% of its final text through crowdsourcing contributions from young people across the country. Another promising instance took place in Aruba in 2008, where the government initiated a deliberative exercise to shape a vision for the island by 2025. Over half of the island's population participated, resulting in a national strategy that transcended political cycles due to its widespread popular support (Peach et al., 2021)

In summary, MCI serves as an inclusive application of technology that aids in comprehending complex systems. It proves to be an ideal tool for adapting to systemic risks while also introducing innovative forms of accountability and governance. This approach enables the acquisition of new data sources, facilitates the rapid understanding of emergent problems, accelerates progress by harnessing Collective Intelligence, and fosters a broader network of innovators.

8.5 BGI LOCATION

The field preparation phase is a time-consuming necessary work in the process. Before initiating data collection for the initial step of Collective Intelligence, extensive groundwork is required, including the task of securing government involvement.

Since the government's involvement has already been discussed in the previous section, I will now focus on the study preparation. The primary objective of this intervention is to gain insights into people's sentiments regarding flooding and their opinions on NBS, especially BGI. To achieve this, it is crucial to conduct comprehensive studies on the city itself.

Both the literature review and my interview with Professor Soares Frazao (Interview 3) helped in my understanding of the types of studies that need to be conducted in order to identify suitable locations for implementing NBS solutions within a city.

First, it is essential to conduct a hydrological study of the situation, considering various criteria such as soil type, ground elevation, road placement, drainage systems, etc. These parameters provide a comprehensive understanding of the city's hydrological conditions and identify areas prone to flooding. Geospatial data for such studies are increasingly accessible through open-source platforms like NASA's "EarthData," offering precise data with a minimum resolution of 30 meters by 30 meters. It is worth noting that these types of studies are similar to those conducted for canals or dams, and the techniques involved are not new or intimidating. While these studies can be exhaustive, if a thorough study has already been conducted in the city, running new scenarios within the program can be completed in minutes or a few hours, depending on their complexity. However, a complete hydrological study of the city from scratch can take several months to finish. This paragraph then dismisses the hypothesis number 5 : *“Geospatial analysis can be a barrier for BGI implementation”* since it is an obligatory step for any water related infrastructure.

Next, the generated map will assist in identifying suitable neighbourhoods within the city to implement Nature-Based Solutions (NBS). These neighbourhoods will serve as locations for physical activities aimed at gathering population knowledge and opinions. As mentioned by Dr. Liping, urban flooding is primarily caused by human activities, such as population density and inadequate drainage and pumping systems. Professor Soares Frazao further explained that a city's drainage system has a fixed capacity. Since much of the city's soil is impermeable, it reduces the water absorption capacity of the ground, resulting in more water entering the drainage system, which then overflows during heavy rainfall. The solution lies in promoting water infiltration by creating more green spaces. However, it is important to recognize that the soil also has its limits, necessitating the implementation of various types of solutions. For instance, trees play a role in temperature reduction, facilitate water infiltration, and reduce surface water runoff through their leaves. Similarly, green walls can absorb water during rain events, preventing excessive water from saturating the soil. Dr. Liping emphasized the importance of a synergistic approach that combines both grey and green infrastructure to enhance the overall resilience of the city. This paragraph does not confirm hypothesis number 7 : *“A city has a limited number of BGI possibility due to the place available.”*. Indeed, the number of solutions is not limited, we have to get more creative on how to implement them which can lead to the creation of new innovation.

Subsequently, once the location and opportunities are identified, the initiation of the first phase of the MCI process starts. It is crucial to bear in mind that this phase revolves around "Alignment Understanding Awareness." Both the survey and the workshop should encompass these three essential characteristics. A well-rounded approach is to develop a scenario that

encompasses both positive and negative outcomes, aiming to create a vision of a desirable future, as elucidated by Martin. Our objective is not to demoralize people, but rather to demonstrate that a promising future is within reach and that we require their assistance to bring it to fruition.

Moreover, to ensure maximum and representative participation, it is crucial not to overlook certain important details. As Martin mentioned, identifying the appropriate channels to reach the population is vital for the successful implementation of the first phase. Street workshops, for instance, are more effective when conducted by local residents who are familiar to the community, rather than unfamiliar or foreign workers. Another key consideration is selecting the right social media platform to disseminate information about the workshops and survey links. For example, in Thailand, YouTube is widely used, while in Indonesia, Facebook is more popular. Allocating efforts to the wrong communication channels can be time-consuming and ineffective.

Additionally, as emphasized by Lucy Oats, ensuring gender equality and diversity across different generations is essential to capture a comprehensive range of perspectives and needs. The experiences and requirements of a 40-year-old woman differ significantly from those of a 16-year-old boy. The greater the diversity present, the better the outcome will be in terms of representing everyone's lives and needs effectively.

8.6 CONCLUSION

The increasing complexity of cities necessitates new approaches to urban development. Rapid urbanization has transformed cities into complex, nonlinear, adaptive, and networked systems. Implementing single interventions in such complex systems may not yield the desired results and can even lead to unforeseen consequences. Moreover, it has been demonstrated in various cases that large-scale urban projects without public participation often result in public backlash.

In Southeast Asian countries, taking into consideration the population is frequently overlooked. However, during the interviews, residents expressed their desire to participate in shaping the future of their cities. They have doubts about their local governments' prioritization of their best interests, particularly given the urgent need for action. Despite corruption being prevalent in these regions, positive examples in Malaysia and Singapore demonstrate that mitigation measures for climate change and hazard management are achievable. Involving the public in such significant endeavours, as observed in Aruba, can transcend political cycles due to widespread participation and belief in the project.

MCI represents a citizen-oriented approach that emphasizes data empowerment. The utilization of diverse data sources enables policymakers to comprehend the complexity of the situation. Furthermore, involving citizens in the decision-making process provides an opportunity to identify microtrends and address the long-term needs of the population.

Despite the extensive list of benefits associated with such actions, many leaders remain sceptical. Therefore, data becomes even more crucial in persuading decision-makers of the effectiveness of such projects. Natural-based solutions do not always yield immediate monetary returns and require long-term investments. Thus, the collection of necessary funds relies on data and establishing trust with the public and private sector. Traditional silos need to be dismantled to introduce new systemic approaches in complex environments and foster population trust and participation.

CHAPTER 9: DISCUSSION

In this chapter, I will begin by showcasing the effectiveness of Collective Intelligence in the humanitarian field. Following that, I will concentrate on the Mitigation and Prevention phase of the DMS, demonstrating how MCI can play a pivotal role in significantly enhancing the implementation of BGI.

9.1 COLLECTIVE INTELLIGENCE TROUGH THE DMS

Within this section, an exploration of existing Collective Intelligence innovations in the humanitarian field will be undertaken. The purpose is to gain insights into the potential of such technologies within this domain. Notably, as Collective Intelligence innovations have already been employed successfully, their utilization provides us with confidence in their capacity for further application. Nevertheless, it is essential to note that, as of yet, no use of Collective Intelligence has been observed in collaborative endeavours toward Natural Based Solution (NBS).

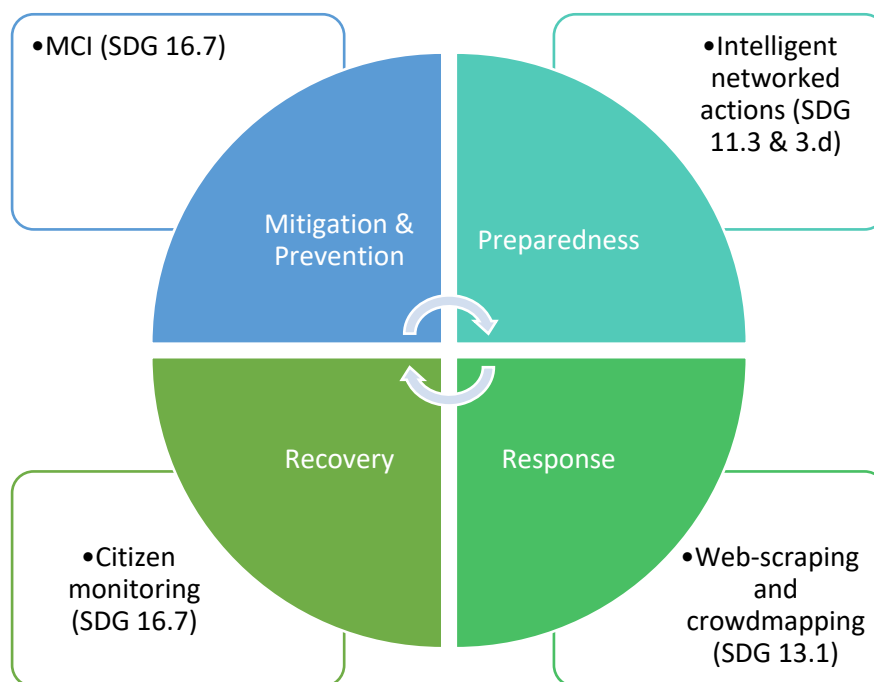


Figure 10: DMS and Collective Intelligence

Collective Intelligence, as depicted in Figure 10, is a versatile set of tools applicable in various scenarios throughout the Disaster Management System (DMS). Moreover, Sustainable Development Goals (SDG) are present through the whole DMS as well, making Collective Intelligence a sustainable solution.

Firstly, in the Mitigation and Prevention phase discussed in Chapter 8, the use of Massive Collective Intelligence (MCI) proves to be valuable. MCI serves as a tool to optimize the utilization of available data and facilitate co-creation with communities. This enables decision-makers to make informed choices regarding concrete solutions for enhancing flood mitigation in cities and promoting the development of greener and more enjoyable urban spaces. MCI matches with SDG 16.7 : “Responsive, inclusive, participatory decision-making at all levels ». Indeed, MCI brings together different stakeholders in order to take collaborative decisions.

Moreover, in this context, SDG 13.2 et 13.3 are covered as well : « Integrate climate change measures into national policies, strategies and planning » and « Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning ». Indeed, the goal of MCI is to integrate those collaborative choices into concrete actions. Moreover, by involving the population in the decision-making process, they will be made sensitive to the topic (United Nations Sustainable Development, n.d.).

Moving on to the Preparedness phase, the objective is to effectively respond to potential disasters which are complex systems. While training first responders like the police, firefighters, and healthcare professionals is often emphasized, there is also a potential in harnessing the influence of platforms on individual behaviour to protect people. A prime example is the community-driven navigation map, WAZE, which combines GPS location data and game features to alert users of potential road hazards. This platform has successfully influenced driving behaviour among its 50 million members. Such intelligent networked actions can prove useful in disaster Preparedness by establishing a city's central nervous system through the integration of sensors and citizen-generated data. This type of actions are indeed linked to SDG 3.d: “Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks” (United Nations Sustainable Development, n.d.).

In the Response phase, several platforms already exist to combine web-scraped data and citizen-generated data. For instance, the UN-developed research prototype called MIND (Managing Information for Natural Disaster) analyses information from sources such as Twitter, Google search, Open Street Map, Wikipedia, and news publications. This vast amount of data aids informing humanitarian responses, including planning and logistics, during a disaster. The number of platforms analysing tweets or Facebook posts to enhance disaster response is continually growing. The data provided by affected communities during such operations is invaluable, as they are the first to experience the disaster. By sharing information

such as flood levels, measures can be implemented accordingly, such as deploying additional pumps. Additionally, Jakarta's "Peta Bencana" platform, as explored in the literature review, serves as a notable example of crowd mapping. It combines official data and tweets posted by the population to create real-time flood maps, influencing the city's response. The Response phase follows the SDG 13.1 : “Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries” (United Nations Sustainable Development, n.d.).

Lastly, during the Recovery phase, which aims to stabilize affected areas, involving citizens in monitoring the implementation and outcomes of policies or actions is rare. This approach allows for community engagement and critical infrastructure monitoring. One could envision a platform where citizens can review the actions taken to obtain the "ground truth" of the implemented measures. This platform would be connected to a Geographic Information System (GIS), ensuring a continually updated and detailed map of the area. It would serve as a direct link between the community and the authorities (Peach et al., 2021). As the mitigation and prevention phase, the Recovery phase follows the SDG 16.7.

As demonstrated, GIS plays a pivotal role in numerous Collective Intelligence measures, underscoring the significance of open-source geospatial data. By enhancing the availability of official data and integrating citizen-generated data, the accuracy and effectiveness of measures can be significantly improved. With an understanding of the diverse applications of this technology, we can now delve into the main focus of this thesis: the Mitigation and Prevention phase.

9.2 BGI AND MCI

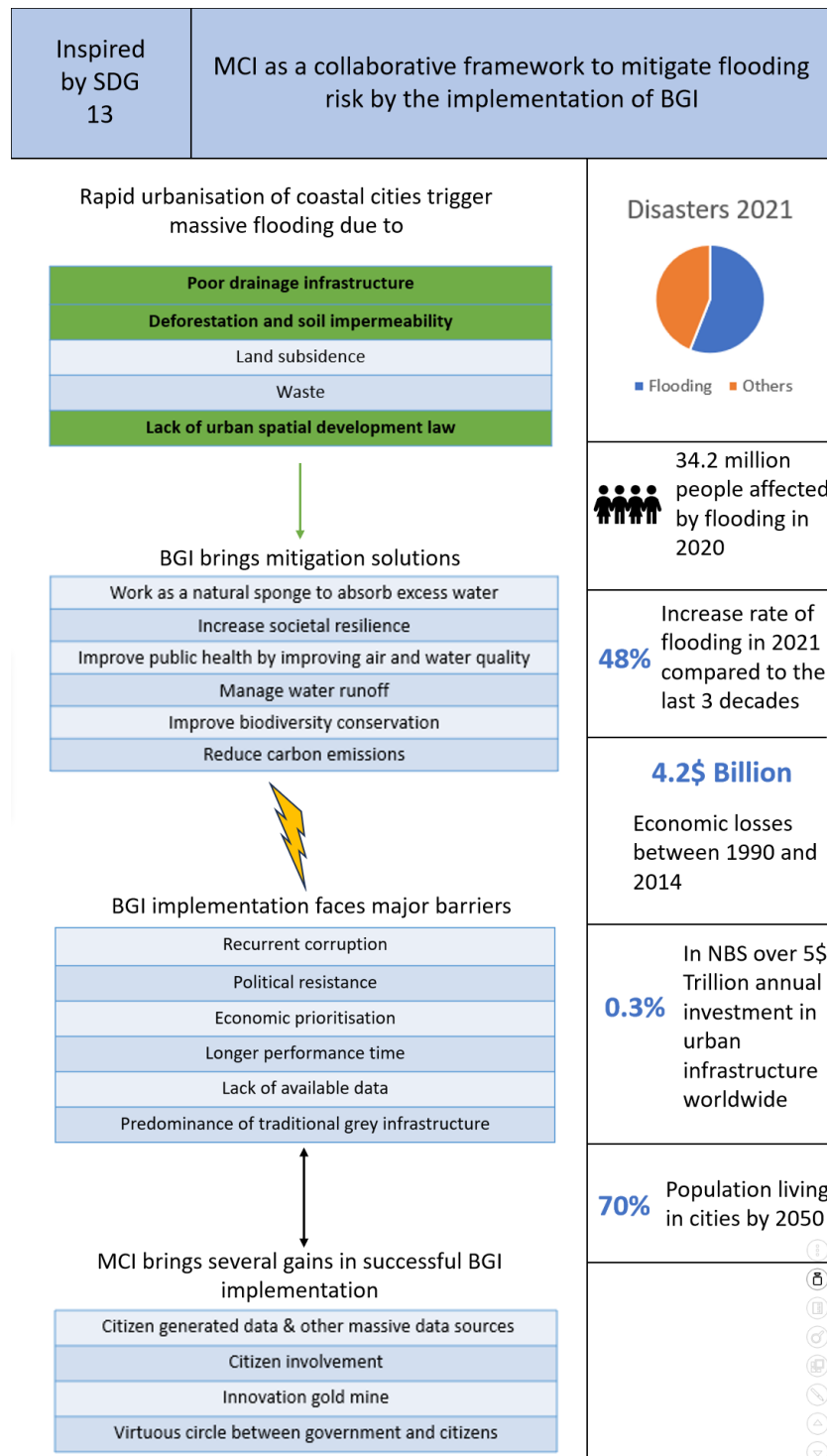
The DMS Mitigation and Prevention phase is crucial to minimize the impact of a disaster on a community. The measures taken involve both structural and non-structural actions and require collaboration among local communities, government and businesses in order to get sustainable actions. BGI is a mitigation process that encompasses a wide range of natural and semi-natural network that create environmental benefits. In our case, we are focusing on flooding mitigation where BGI can help a lot and have long term effect thanks to its extensive advantages, such as enhancing societal resilience, managing water runoff, reducing carbon emissions or improving air quality, etc. However, even though the list of benefits of such infrastructure is long, decision-makers remain unconvinced due to the scarcity of data and insufficient project evaluations. Most of the time, grey infrastructure is prioritised over BGI despite its higher cost and limited adaptability to climate change.

While there might not be a secret potion to instantly convince local governments of the effectiveness of this mitigation solution, we have several tools at our disposal to make a compelling case. Firstly, available data and success stories need to be showcased, as it has been done in this thesis multiple times. Then, geospatial data is not only useful for mapping out areas suitable for BGI implementation, it can also be used to forecast scenarios. These projections can demonstrate the potential impact of flooding in the absence of BGI and the risks associated with sea-level rise and increased flooding rates in their city. Those three tools can be compelling to showcase the emergency of the situation and the need to respond differently to the situation.

However, the question arises: how can Massive Collective Intelligence (MCI) facilitate the successful implementation of BGI? The voice of the population is as loud and crucial as the gathering of data. Citizens who reside in urban areas directly experience the impact of environmental hazards on their daily lives. During interviews, members of the local population expressed feeling ignored or left behind when it comes to addressing climate change concerns. They possess valuable ideas for adapting and transforming their cities, which often go unheard. Indeed, the combination of citizen-generated data with all other available data enhances the accuracy of the information at hand, thereby increasing the likelihood of making informed decisions and promoting active involvement of the local community.

Massive Collective Intelligence (MCI) can play a vital role in elevating these ideas and fostering a stronger bond between the government and its citizens. By leveraging the collective knowledge and creativity of the community, MCI can help identify innovative solutions and strategies for implementing BGI effectively. Through inclusive and collaborative efforts, BGI projects can gain broader support and be better tailored to meet the needs and concerns of the people they serve. Integrating the insights and perspectives of the population into the decision-making process can lead to more resilient and sustainable urban environments that effectively address the challenges posed by climate change and so the increase of urban flooding.

Figure 11 illustrates the benefits of incorporating Massive Collective Intelligence (MCI) in the implementation of BGI. This fact sheet highlights the critical nature of the situation and demonstrates the interconnectedness of the concepts explored in this thesis. As previously mentioned, Sustainable Development Goals (SDGs) are inherent throughout the DMS and are also intertwined with BGI implementation. Specifically, BGI aligns with SDG 13.1, while MCI is associated with SDGs 13.2 and 13.3. Together, they collectively support the overarching objective of SDG 13: "Take urgent action to combat climate change and its impacts."



The fact sheet displays several numbers, already stated in the literature review, on the right side, highlighting the severity of flooding as a major threat, the rising urban population, and the inadequate investment in NBS.

On the left side, it first highlights the challenges arising from rapid urbanization. The three green boxes represent issues that BGI implementation can effectively address due to its numerous advantages. However, the implementation process may face multiple barriers such

as the lack of available data, recurrent corruption and the predominance of traditional infrastructure. Fortunately, the use of MCI offers a pathway to partially overcome these obstacles.

This factsheet effectively summarises how we can answer the research question : « *Can a collaborative framework be developed and implemented in Southeast Asian coastal cities to effectively integrate BGI as a flooding mitigation process?* ». Indeed, MCI is a collaborative framework that will help coastal cities to implement BGI in their mitigation process in order to reduce flooding impact.

CHAPTER 10 : LIMITS

During the process of writing this thesis, I encountered several barriers and limitations that affected the study. One significant limitation was the presence of initial bias. From the beginning, there was a predetermined inclination towards geospatial urban development and NBS, which influenced the research direction.

Another challenge arose when selecting Southeast Asian countries, as language barriers became evident. Many websites were either not translated into English or relied on approximate automatic translations, which hindered the data collection process.

Additionally, it was challenging to avoid being influenced by my European point of view. Understanding and accounting for the cultural, religious, and mindset differences was difficult, as it is challenging to fully comprehend a culture I have never personally experienced.

Furthermore, despite conducting seven interviews, the sample size was relatively small. While the interviewees provided valuable insights for my research, obtaining a more objective perspective would have required the participation of a larger number of individuals, especially from local populations. However, gathering a significant number of responses to a questionnaire from people who are not from the researcher's country can be challenging, especially when contacts in Southeast Asia were limited. Moreover, I could not verify with relevant stakeholders my ideas.

Lastly, the topics of nature-based solutions (NBS) and disaster management are relatively new, resulting in limited available data and ongoing experimentation. This scarcity of data makes it difficult to maintain an objective viewpoint or provide multiple cases to support the research findings.

In summary, this theme proved to be extensive and intricate to grasp. However, the journey of exploring it was enriching, despite my initial lack of knowledge on the subject. I am grateful for the patience and guidance provided by professionals, who helped shed light on this complex system.

GENERAL CONCLUSION

This thesis provides an extended perspective on the flooding-related challenges faced by Southeast Asian coastal cities, highlighting their interconnected nature and the need for a systemic approach to flooding. The identified issues of coordination, overreliance on engineering solutions, massive deforestation, land subsidence, waste management and inadequate urban spatial planning stand out as key components.

The management of disasters, particularly in coastal cities in Southeast Asia, is a pressing issue that requires urgent attention. The increasing frequency of natural disasters, exacerbated by climate change, poses significant challenges to these cities and their populations. The lack of a disaster Preparedness culture further contributes to the vulnerability of these cities.

The lack of coordination and effective communication with local communities exacerbates problems such as waste accumulation, deforestation along riverbeds, and settlement in vulnerable areas. This disconnect prevents communities from fully understanding the gravity of the situation and feeling included in the challenge. Additionally, government measures often fail to address the actual needs of these communities, further alienating them. This underscores the importance of citizen-centric decision-making by local authorities to foster involvement and ownership of the problem.

Insufficient maintenance and neglect of ongoing infrastructure needs by the local government contribute to the challenges faced by these cities. While substantial investments are made in engineering solutions, the lack of proper upkeep undermines their effectiveness, leading to recurring problems. This calls for a shift from quick-fix approaches to long-term planning and maintenance.

To address these challenges, a collaborative approach involving local government, communities, and experts is essential. The integration of Blue and Green Infrastructure (BGI) with traditional grey infrastructure emerges as a promising solution. BGI acts as a sponge, reducing flooding, heatwaves, and droughts while enhancing the overall resilience of cities. However, effective implementation requires thorough planning and collaboration.

The involvement of the population in the decision-making processes is critical. Public participation ensures the continuity and acceptance of projects beyond political cycles. Massive Collective Intelligence (MCI) is a collaborative framework that can be used. Indeed, this innovation improves problem solving by giving a chance to other stakeholders to be part of the

decision-making process and share their creativity and opinion. The population will feel involved in the process and it will create a sense of ownership towards the project creating a virtuous circle between the government and the local population.

Furthermore, the utilization of diverse data sources empowers policymakers to understand the complexity of the situation and make informed decisions. Data plays a pivotal role in persuading decision-makers and establishing trust with both the public and private sectors.

In conclusion, dismantling traditional silos and adopting systemic approaches are necessary to address the challenges faced by Southeast Asian coastal cities. By prioritizing citizen involvement through the use of MCI, promoting data-driven decision-making, and integrating BGI into urban planning, these cities can enhance their resilience and mitigate the impacts of climate change. The path towards sustainable and liveable coastal cities lies in collaborative efforts, transparency, and long-term investments.

3 THINGS TO REMEMBER

As this thesis presents a comprehensive exploration of a complex topic, it can be challenging to grasp the overall picture and identify the key aspects that are truly significant. In my perspective, here are the three main points that are worth highlighting and remembering:

1. The future outlook for coastal cities and urban resilience: With rising sea levels and increasing urbanization, coastal cities are becoming increasingly vulnerable to flooding. It is crucial to recognize that many urban flooding issues are mainly man-made, resulting from factors such as overcrowding, inadequate maintenance, and excessive groundwater pumping. Prioritizing urban resilience and adopting adaptive strategies are vital to mitigate the impacts of climate change. Without taking critical measures and diversifying solutions, decision-makers decrease the overall quality of life of their citizens and jeopardize the future of their cities.
2. The significance and understanding the role of BGI in coastal cities: BGI serves as a crucial mitigation strategy to minimize the impact of flooding while also addressing other environmental concerns such as temperature regulation and drought mitigation. BGI offers a range of benefits, including combating deforestation and enhancing the effectiveness of mitigation processes. Integrating BGI with traditional grey infrastructure is essential for maximizing resilience and addressing recurring problems in coastal cities.

3. The need for collaborative and comprehensive framework: Throughout the study, the significance of actively involving the local population has been emphasized. By engaging the community in the decision-making process, valuable insights into ground-level realities and micro-trends can be obtained. This involvement not only ensures the population's support and long-term commitment but also enhances the overall success of the project. Collaborative frameworks such as MCI enable a more inclusive and effective approach to address the challenges faced by coastal cities.

FUTURE RESEARCH

While I was writing my thesis, I realised that multiple other research on the subject could be done. While there may be other themes worth exploring, I believe the following three themes are particularly relevant. Each of these themes requires a scientific approach and the development of dedicated platforms.

COASTAL CITIES OF TOMMOROW

My research primarily focuses on coastal cities, but it is widely recognized that some of these cities will become uninhabitable within the next century or even longer due to rising sea levels. Therefore, it is intriguing to investigate the sustainability and future prospects of these "future coastal cities". Exploring how these cities can be fully adapted to their changing environments becomes a compelling area of study, particularly considering that they may evolve into the next megacities. This research would specifically delve into the realm of resilient urban spatial development with solution such as NBS. This study aims to understand and propose strategies for ensuring the long-term viability and resilience of these coastal.

COLLABORATIVE RESILIENT TOOLKIT

The MMC framework comprises three pillars: desirability, feasibility, and viability. While my thesis has primarily focused on exploring the desirability of the value proposition, I have not yet addressed the crucial aspects of feasibility and viability. As a result, I propose that these two areas be considered as potential subjects for future research in order to create the collaborative resilient toolkit. Convincing stakeholders and ensuring long-term sustainability requires a thorough examination of these dimensions. It is worth noting that my research has already provided some initial insights and identified potential barriers in relation to feasibility and viability.

MCI FIELD TEST

Data availability is a critical requirement, as emphasized by numerous experts throughout my research. Open source should be the standard approach rather than an exception when it comes to data accessibility.

Nevertheless, the effectiveness of the data collection methods I proposed remains unverified, lacking an objective assessment. To address this, conducting a case study to test the implementation of the toolkit would be valuable. Such a case study could provide a concrete and positive example to present to local governments, aiming to persuade them of the efficacy of this approach. Considering the openness of the new mayor of Bangkok towards public opinion and his desire to improve the city, initiating a field case in Bangkok could be a promising starting point.

To begin with, I suggest selecting a small neighbourhood in Bangkok that is deemed suitable for BGI or other NBS based on flooding maps and other relevant criteria. By focusing on a specific location, we can evaluate the feasibility and effectiveness of the framework in a tangible manner, showcasing its potential benefits to the local community and government.

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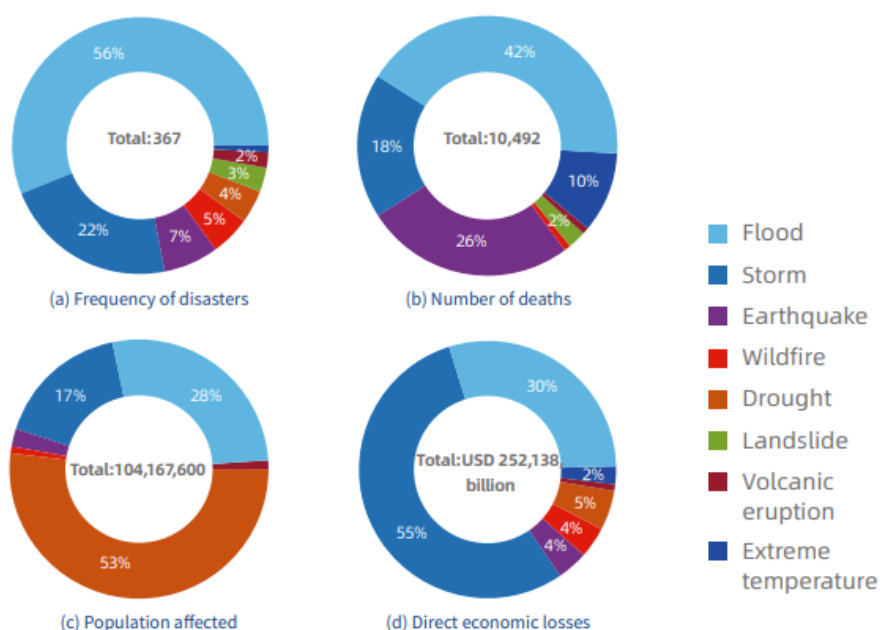
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APPENDIX

APPENDIX 1 : STATISTIC ON THE FREQUENCY OF NATURAL DISASTER

Statistics on the frequency of the disasters, the number of deaths, the percentage of the population affected and direct economic losses by type of natural disaster in 2021.



(Ministry of Emergency Management et al., 2022).

APPENDIX 2 : DIFFERENT STAKEHOLDERS

Stakeholders	Role	Mitigation & Prevention	Preparedness	Response	Recovery
Academic community	- Education to increase awareness. - Research - Developing knowledge base and share best practice	X			
Governmental bodies & disaster	- Training - Coordination	X	X	X	X

respond organisation	• Location of supply • Population awareness and education • Formal agreements with corporate sector for supply and warehouse				
Non-governmental bodies	• Donation and funds • Emphasize community support and participation. • Aid and food supply • Local disaster planning • Public awareness • Advocacy • Assessment procedures to study susceptibility & level of risk exposure	X	X	X	X
Donors	• Donate money • Donate supply that are appropriate for the disaster			X	X
Community	• Cooperation • Develop local capacities. • Develop psychosocial support	X	X	X	X

(Sahat et al., 2016)

APPENDIX 3 : CHALLENGES IN THE FIELD OF DISASTER MANAGEMENT

Subject	Challenge	Overcome
Humanitarian Logistics as a Business (Kovács & Spens, 2009)	Unpredictability of demand, timing, location, type, and size	Statistical Preparedness
	Sudden large demand which requires short lead times	Coordination

	high stakes associated with the timeliness of deliveries	Funding
	lack of resources in terms of supply, people, technology, transportation capacity, and money.	
Operational boundaries (Kovács & Spens, 2009)	Different players have different resources they prioritise	Coordination
	Players differ in which beneficiaries they focus on	
	Various players focus of different disaster types	
	Lack of community engagement	
	Focus on alternate parts of the disaster phase	
	Not all players can be collaborated with	
Development (Kovács & Spens, 2009)	Low recognition of logistics	Preparedness
	Inadequate training	
	Inadequate infrastructure	Funding
	Lack of data	Coordination
	Lack of collaboration	
	lack of standards and indicators	
Trends	Growth in people affected in humanitarian disasters (UNHCR, 2022)	Funding
	More occurrences of humanitarian disasters (EM-DAT, 2022)	

	Climate change increases humanitarian disasters (van Aalst, 2006)	Worldwide collaboration
Environnement	Environmental degradation can lead to or aggravate conflicts or crises (International Committee of the Red Cross, n.d.)	Mitigation
	Affected population don't received what they need (Wintour, 2022)	Localisation
	Urbanisation brings a concentration of activities and people (Zetter & Deikun, 2009)	Cities planning

APPENDIX 4 : BARRIERS TO COORDINATION

Barrier	Sub Barriers
Management barriers	Lack of collaborative and strategic planning
	Lack of commitment from top management
	Lack of clear policy for coordination
	Shortage of expert logisticians
Technological barriers	Lack of funds for investment in IT
	Poor IT infrastructure
	Manual supply chain
	Disparity in IT facility among actors
	Lack of technical assistance to members of HSC
Cultural barriers	Lack of trust among actors
	Inadequate information sharing among actors
	Cultural difference among actors
	Lack of freedom to share, enhance and create knowledge
People barriers	Insufficient time to share knowledge
	Inefficient training to members of HSC
	Poor skills (interpersonal, verbal/written communication and computer skills)
	Resistance to change and adopt new skills
Organizational barriers	Improper organizational structure to share and enhance knowledge
	Low priority for retention of skilled and experienced workers
	Insufficient resources to provide knowledge sharing opportunities to workers

APPENDIX 5 : TYPE OF FLOOD

Type of flood	Definition	Causes
---------------	------------	--------

River flood	Occurs when water level rise over the top of riverbanks due to excessive rain	• Excessive rain • Persistent thunderstorms • Ice jam • Combined rainfall and snowmelt
Coastal flood	Inundation of land areas along the coast caused by higher than usual high tide and worsened by heavy rainfall and onshore winds	• Tropical cyclones • Tsunami
Storm surge	an abnormal rise in water level in coastal areas, over and above the regular astronomical tide, caused by forces generated from a severe storm's wind, waves, and low atmospheric pressure	• Wind • Waves • Low atmospheric pressure
Inland flooding	moderate precipitation accumulates over several days, intense precipitation falls over a short period, or a river overflow because of an ice or debris jam or dam or levee failure.	• Rainfall • Snowmelt • Water blocked by debris, ice or dams
Flash flood	heavy or excessive rainfall in a short period of time, generally less than six hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through riverbeds, urban streets, or mountain canyons	• Rainfall rate • Rainfall duration

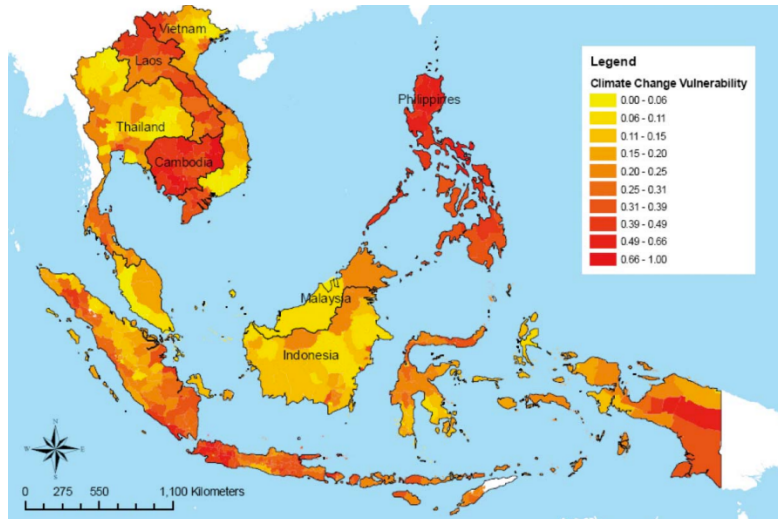
(NOAA National Severe Storms Laboratory, n.d.)

(Earth Networks, 2023)

Legend :

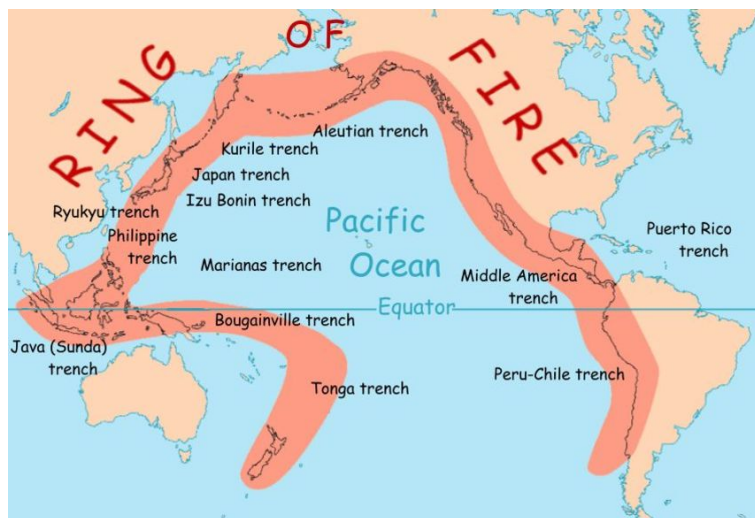
Red = Most common type of flood

APPENDIX 6 : MAP OF CLIMATE CHANGE VULNERABILITY IN SOUTHEAST ASIA



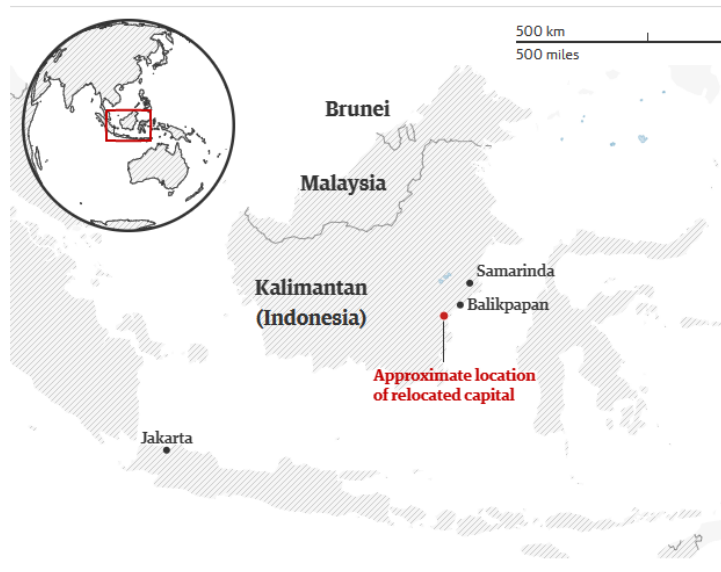
(Islam & Khan, 2018)

APPENDIX 7 : MAP OF THE RING OF FIRE



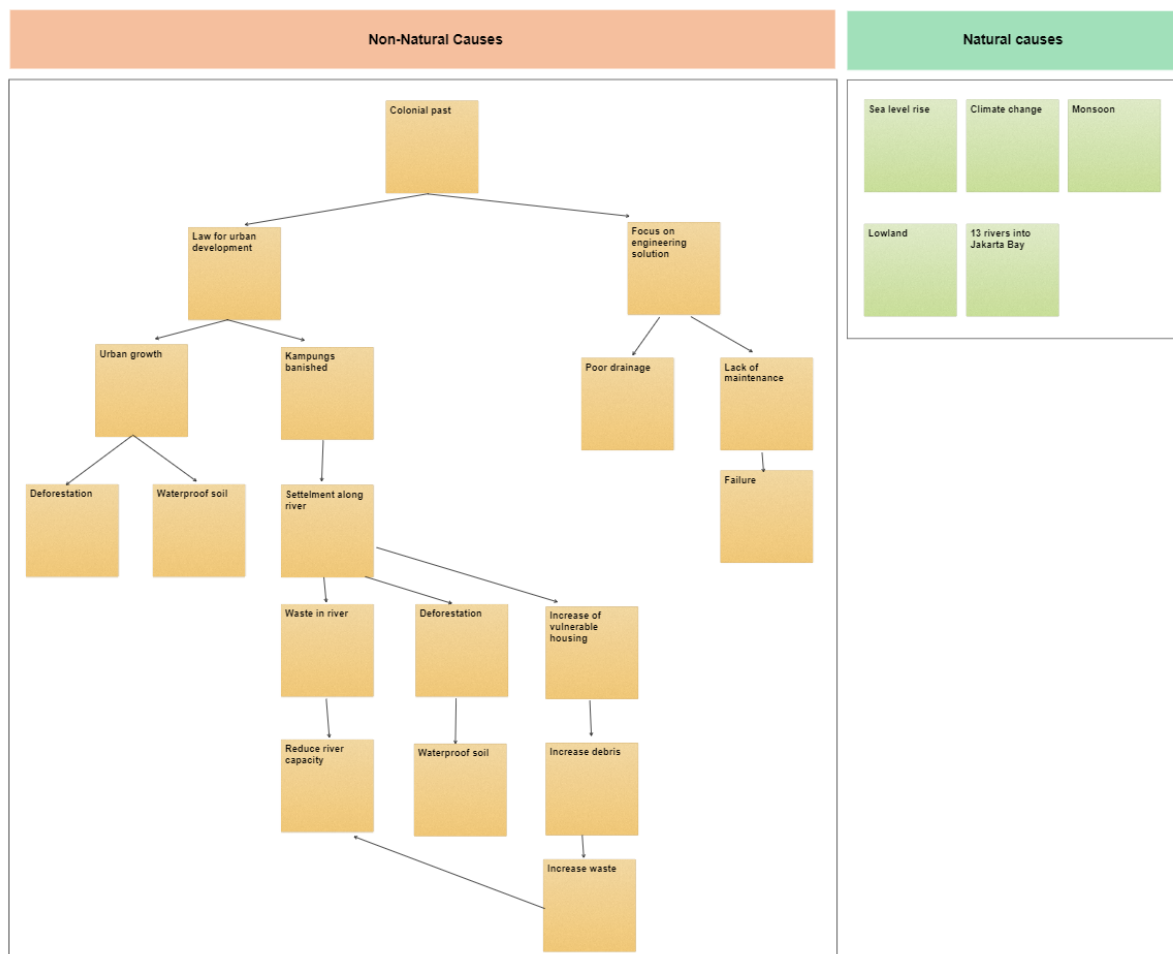
(Evers & Editing, 2023).

APPENDIX 8 : MAP OF JAKARTA AND ITS NEW LOCATION ON BORNEO ISLAND IN THE KALIMANTAN REGION

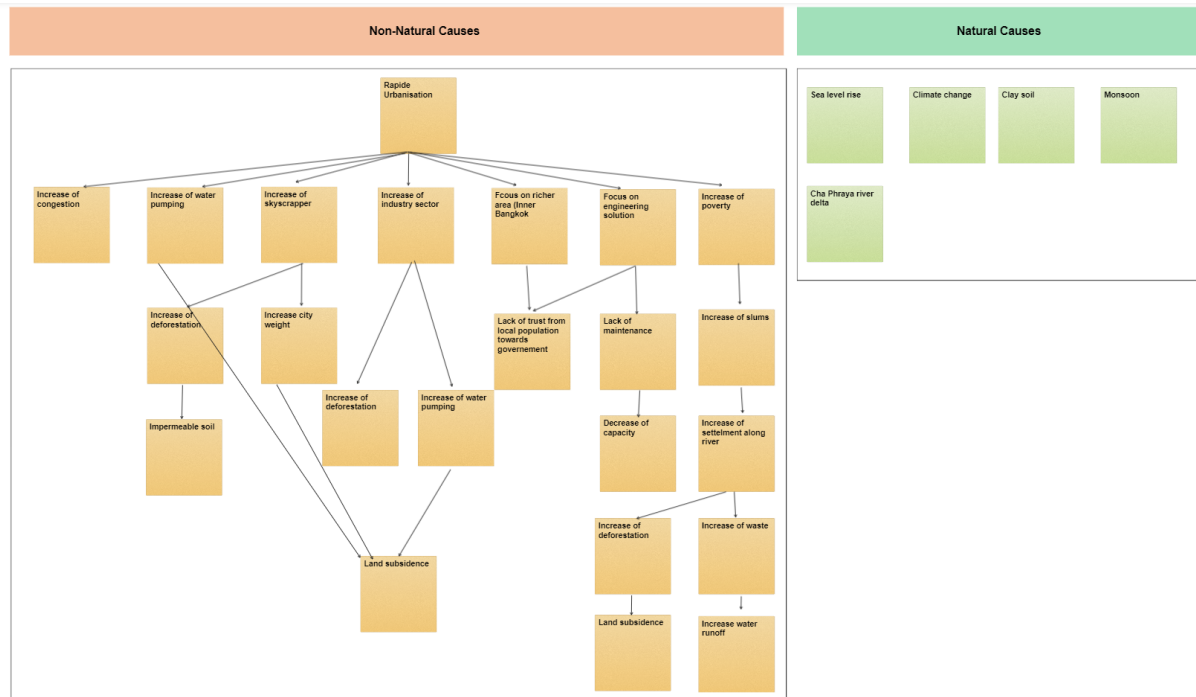


(Voiland, 2021)

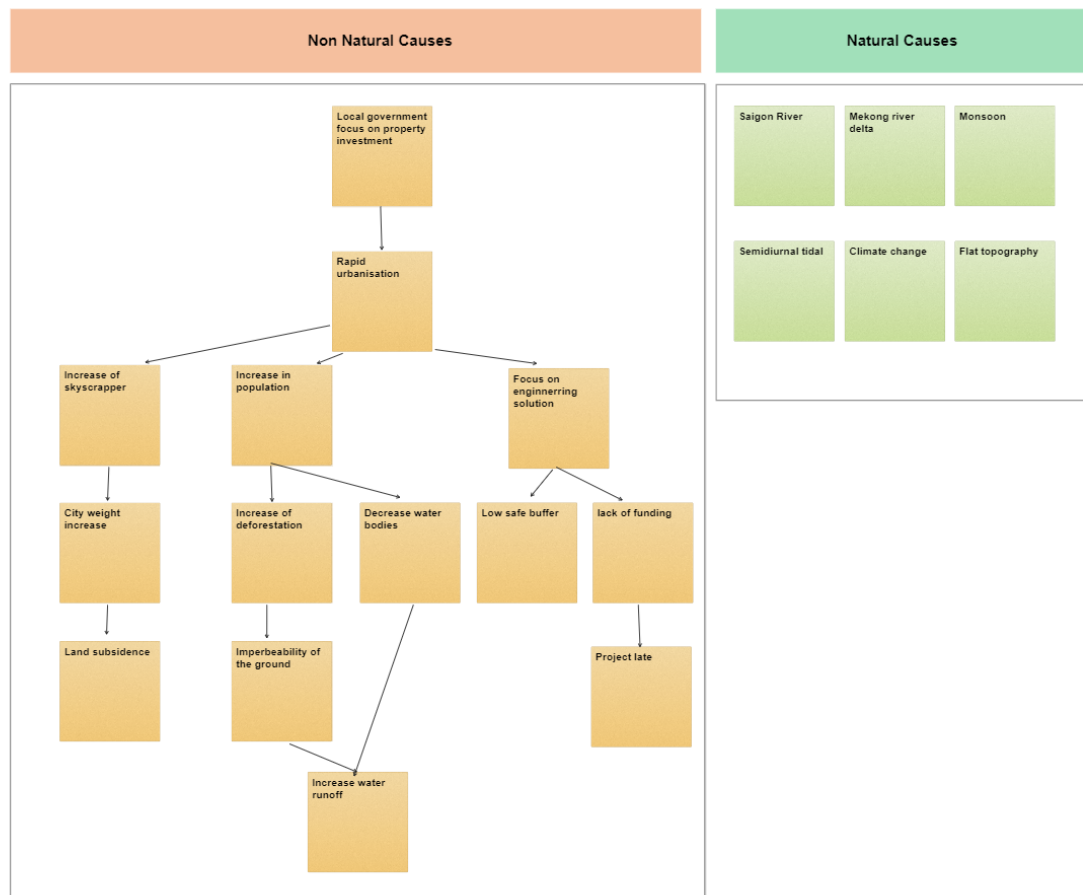
APPENDIX 9 : SYSTEMATIC VIEW OF THE FLOODING PROBLEM IN JAKARTA



APPENDIX 10 : SYSTEMATIC VIEW OF THE FLOODING PROBLEM IN BANGKOK



APPENDIX 11 : SYSTEMATIC VIEW OF THE FLOODING PROBLEM IN HO CHI MINH CITY



APPENDIX 12 : GEOSPATIAL SOLUTIONS ACCORDING TO DISASTER MANAGEMENT SYSTEM

Solution/DMS	Mitigation & Prevention	Preparedness	Response	Recovery
Safe exit/access route			X	
Status of touched communities			X	
Social media activity		X	X	X
Weather analysis	X			
Anticipate needs by mapping		X		
Debris removal			X	
Evaluation of the impacts			X	
Spotting victims			X	
Crowdsourcing			X	
Communication through GIS			X	
Mapping resource and infrastructure	X			
Early warning system	X	X		
Create emergency plan	X	X		

Scenarios creation	X	X		
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APPENDIX 13 : MISSION MODEL CANVAS

The Mission Model Canvas

Mission/Problem Description:
Designed by:
Date:
Version:

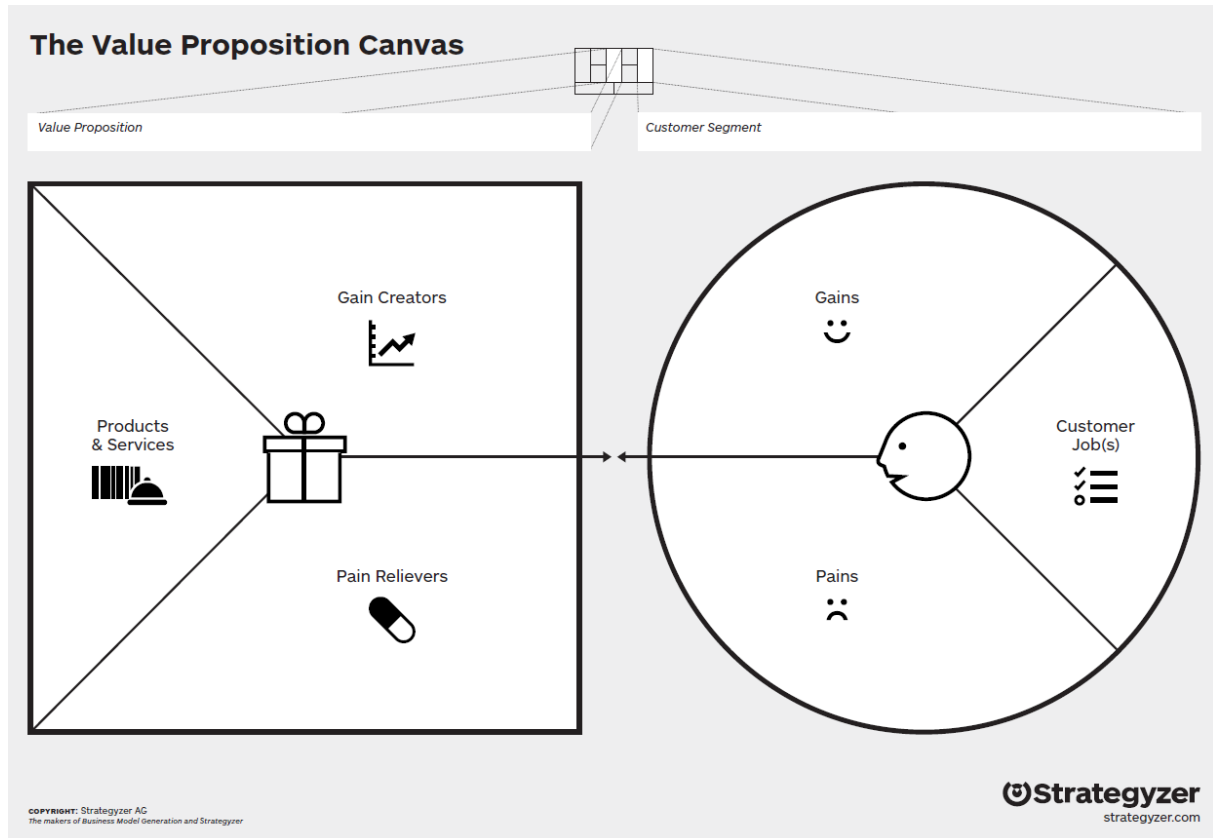
Key Partners	Key Activities	Value Propositions	Buy-in & Support	Beneficiaries
	Key Resources		Deployment	
Mission Budget/Cost		Mission Achievement/Impact Factors		

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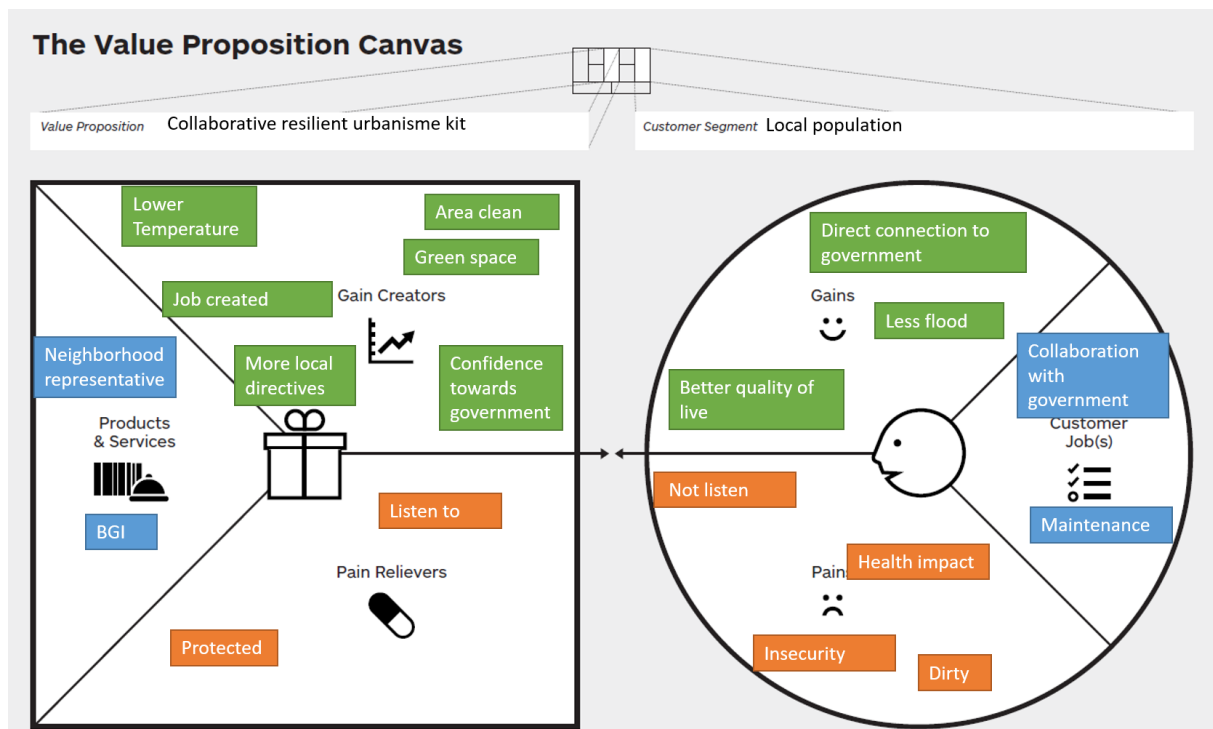
DESIGNED BY: Strategyzer AG & Steve Blank.
The makers of Business Model Generation and Strategyzer

Strategyzer
strategyzer.com

APPENDIX 14 : VALUE PROPOSITION CANVAS



APPENDIX 15: LOCAL POPULATION VPC



APPENDIX 16: INTERVIEWS TRANSCRIPT

INTERVIEW 1: LUCY OATS

L : How are you?

LO : Hi, I'm good. How are you?

L : I'm really good. Well, yeah, I'm. I was happy this morning when I saw that you accepted the. Invite. I was like, yes.

LO : OH good. I'm so sorry about last week. I really, I promised. I know it's easy to say. That, but it's never happened to me. Before. I'm sorry I'm in the. Last stages of my PhD and I'm.

L : OK, I don't know what happened, but I'm back. Sorry. So, you were saying that you were on the last day of your PhD?

LO : Yeah, I'm just in the final stages of my PhD and at the same time I'm also doing some extra research, so I'm just really a little bit all over the place and I'm really sorry and. Thank you for your patience.

L : You're welcome. And don't worry, I mean, I get it. What you're doing there looks really nice and fun, so. So, I mean.

LO : It's really fun. Yeah, it's really nice. Yeah. Yeah, no. But I'm sorry. But the but the irony is that I'm also doing quite a lot of interviews at. The moment and I know exactly how frustrating it. Is to get people to Agree to a time. And everything. So, I keep thinking of you. Like oh no, this is how Lucille feels like.

L : It was. It was really hard as well to plan like interviews because I interview a lot of people who are actually living in Jakarta or Bangkok, and it was crazy to find a time that was matching like both of our schedule and for which I didn't have to wake up at like 2:00 AM. In the morning.

LO : Got but super interesting that you've been able to speak to people also. I was wondering that was I was interested in whether or not you had been able to also spend some time in or at least speak. To people who were working in Southeast Asia as well.

L : Yeah, well, my parents and also my Erasmus Sweden helped a lot. So, I met a few Indonesian friends I met. I made a few Indonesian friends while I was on my Erasmus in Sweden, and so I contacted them and they also gave me the number of some of their friends, so I had multiple interviews with them. And then one of the best friends of my dad lives in Thailand, has lived there for 30 years and he's married with a Thai, and he gave me the e-mail of multiple of his friends. And so, I was able to interview them and also his daughter, who was actually famous in Thailand.

Lo : Glad that it's well, it sounds like it. Sounds like you've. Already done loads of the work, Sir. Congratulations.

L : Thanks.

OK. Well, that's good. OK, well, then we'll start an interview. So well, I think the first thing that would be nice is for you to introduce yourself and explain a little bit about your project you're working on currently.

Lo : Yeah, of course. So yeah. So, I'm currently a PhD candidate at Delft University of Technology in the Netherlands. My research is considering how social and environmental. Objectives can be brought together. Through the provision of basic infrastructure services. So, I primarily look at water waste. Energy, transport and housing infrastructure and very. And a more specifically focused on waste management and housing infrastructure specifically. And when I. Say bringing together social and environmental objectives, I'm specifically looking at. Or more specifically looking at. Infrastructure that can be considered climate compatible, that can in some ways address climate change goals. So, either through adaptation or mitigation. And for social goals, I mean that can in some way address developmental goals. So, I'm mostly working countries in the so-called Global South and I'm looking at how infrastructure can improve human well-being in those in, in settings where poverty is generally quite prevalent. But I do that in quite a broad. Way so for example. Something I've worked quite I've worked quite a lot with waste, waste picker cooperatives and they're not considered climate change friendly infrastructure in the sort of traditional sense, but actually in in India, for example ways picking cooperatives. Are the main recycling infrastructure. They're the main the main. Means through which were slightly occurs in many cities. So yeah, it's looking at the land and of course supporting waste picking cooperatives to perform their services in an even better way can also contribute improvements in their well-being so their occupational health, for example. They're primarily women from the. Urban poor communities, so it's also got some. Sort of gender. Dimension to it. So that's the sort of social. Side of things. So broadly speaking, that's Sort of the. The like headlines of my work. It's not specifically focused on blue-green infrastructure, although I have. Come across that. As you saw in the. Wuhan case study, for example, and yeah. Other than that, I'm sort of. Generally familiar with kind of the blue-green infrastructure literature. But not super into it, so I'm not sure exactly how helpful I'll be for you, but let's see. Let's see about that. But yeah, that's sort of broadly what my research is on at the moment and has. In before I was working on my PhD, I was working for the University of Leeds in a research consortium that was looking at really similar. Similar issues, so sort of how government it was, specifically looking at how governments could support. Infrastructure that met both climate and development objectives. So, for the past six years I've been in that kind of. Field and the sort of research that you've seen in the. Right hand case.

L : OK. Perfect. Nice. Uh, well, I will explain a little bit further my thesis. So have a better idea. So, for me it's about Co creation in Southeast Asia. So Southeast Asia has a lot of problem with flooding. I mean, Africa kind of become the next place. Also, for that kind of disaster. The hot new place. UM and one problem that was really like, I think the main problem I solved multiple streams of problem put together so that there was flooding. The problem of coastal cities, that there is more and more urbanisation, there's more and more people moving to city. Is the problem of flooding in in coastal cities that mainly flooding in cities are actually main man-made? It's because of because most of the flooding for the moment it's not because of sea level rise. I mean the city won't be there at one point because of the sea level rise. But for the moment, it's mainly man-made. It's a lot of, like, bad urban planning. The fact that they are pumping water and all that. Things so all of that. Put together, I was kind. Of like, OK, this is kind of like a big topic. So, I got interested in how we could well, make those cities more flooding resilient and also to push forward the date. That they will all have to leave. Those kinds of cities. And how to Co create those infrastructure so everybody is, I mean is happy with it. It's like a synergy in the whole city and it's kind of big. I mean, it has to be tough in Africa

as well with that is corruption. And also, with our they're with Buddhism and some of them their mentality they are really like fatalists, they're just like OK it's happening who cares. I mean, we're going to all die, blah, blah blah. It's really like that or they don't really want to talk about it, or they don't trust their government. Anymore, but at the same time, you can see in Malaysia or in Singapore, the whole thing is getting way better. Yeah. So, it's a whole like study about how to Co create those kinds of infrastructures. So, there's more trust towards the government also a lot of public gets more aware and also to get like the dynamic shift. In this country to have like kind of like a I mean to keep the whole city going, you have to keep *****, canals, all those like big engineering infrastructure. But to make it more resilient, you have to. Put back nature into it. So, it's how to. Bring this and in a long-term sufficient way, because, well in Wuhan for example, the problem is, is it going to last? but the goal is to keep it kind of like a holistic. View and then give the phases to our student next year. So, it would kind of be like a phase that would go on and on until when well there are done with all the topics but so yeah, it's kind of like the first time. They do a topic like that. And so, yeah, kind of looking and everything.

Lo : Yeah, trying to create an overview it's I mean it is a huge topic, absolutely, but also a super interesting one and. And I think every sort of study in that vein helps every study on that. Every small study helps. But are you looking? So, you said you're looking from a sort of holistic perspective are looking for specifically kind of from? Like, more from a governance perspective, like you're looking at the actors involved in the decision making or you're looking more from like a community specific perspective or a technical engineering.

L : So, it's so it's more I'm really interested. So, for the population point of view. I had it a lot. Of all the people. So, I talked to you, but it's also like nice to know if you have other ideas on how to bring the population towards all those infrastructure like, yeah, like you said, linking social and environment for infrastructures. So that's nice as well because there's probably lots of things I don't know. But the governments' part is super interesting for me because there's. There's multiple time like OK, how can we truly get the government involved on the long term? So yeah, if you can help me on that, that would be amazing.

Lo : I think we'd be very, very rich famous people if us. Could, if we could answer that question today, yeah.

L : The so yeah, it's, I mean, I know I want to have like the big conclusion because it could be such a huge. Research, but yeah, it's keeping it an overview and if I get mostly the point of view of the population, then it's fine. It's the next project will be more on the governmental side and maybe it will be someone who's to the law who will do it, who knows.

Lo : Yeah, yeah, it could be totally different. Yeah. No, that totally makes sense. And it's quite interesting, actually, because this conversation, if you took out. Yeah. If we took out Indonesia or if we took out Southeast Asia could be the exact same and we took out flooding and blue-green infrastructure and just replaced it with what I'm working on. It's the almost the exact same conversations that I'm having here in. Kenya. So, I'm working on slum upgrading in Nairobi but. The exact same thing. There's so much coming from the community level, there's so much innovation and organisation and lobbying and advocacy for improvement and for addressing climate change and for addressing social. Needs coming from various community levels across Nairobi and across Kenya, but the link with government is what's needed to make that. To yeah.

And to and to for the. Continuity as well, right? So, there could be a really interesting project. In particular, in a particular slum that lasts 2 years or four years or two months or whatever. But when that, when that ends, it's not being embedded in like more that in these sorts of more local government structures and local governance structures. And so, the project ends and the benefits end. So, and that's what you're seeing again and again and there's so much learning like between different communities. So, I'm not sure if that's something you've been. Seeing in in Southeast Asia as well, but there's so much engagement between different neighbourhoods in different cities, but it's not happening. A coordinated level and I think that could be something that the government could really do to. To support this. Without, without having to make a huge investment is to say, well, OK, there is all this stuff happening on the ground across different cities, across different communities, and we could be a coordinating body, a facilitating body to help bring those different initiatives together for learning, for Co creation. But the learning especially is just. What I'm seeing is just so invaluable. People are really, really. You know people in one. Settlement really wants to hear how things are going in another settlement and replicate those ideas or make them fit their own context. But they're having to organise all of that themselves, and if there was this coordinating body at the government level, local or national government level?

L : Right.

Lo : Yeah, I don't know, I. Don't know which country are you working in specifically or more generally, or is or is it?

L : Indonesia. So, I focus mainly on Thailand, Vietnam and Indonesia because they all have. Different, I mean different religion and social aspect and also different. Typography. So how the land is so it gave like a general idea on how it is in Southeast Asia. I wanted to add Manila, but then I stopped because it's like it's getting a little bit too big, but you can see that's mainly like the same problem repeating and repeating again and again. So, it gives a general ID. Why those cities are problematic and give also kind of a clue of what the other like what kind of problem are probably happening in those other cities. At one point you're like, OK, those three cities with different kind of politics, with different culture, with different religion. They all have the same the same problem and the same. I mean it's always the same thing again and again and just like, OK, I mean, except some different. And it's basically always the same thing and also, it's always the same way they want to treat the poor population. They want to remove them from the river and then they're like, yeah, go in those social building but still too expensive for them then the population. Gets rebellious and destroys some of the things they installed. UM, so there's a lot of things like for example, I think it was in in Indonesia, they banned the traditional housing, the Kampung. So, it's like the house and the pilot, but those are super resilient compared to the other types of houses because they're really high and so. In terms of flooding are fine and now to have more and more problems since then because there's more people living on the side of the river. But there's more. There's more trash every time that there's floods, everything is just washed away, so there's even more debris in the water. So, it's just like a whole cycle. So yeah, and I mean none of them point out that there's anything like that. Like, yeah, there's people fighting for ways, but it didn't seem like it was huge. Huge. And I guess that's maybe also the different I mean to live in huge cities, most of them were like were educated and they just, yeah. They're like, yeah, there's NGOs, there's like, small things, but a lot of people are afraid of the government. Like in Thailand, most of their parents, they knew

like the, I mean there was like this at the university. They did like kind of like a rebellion and a lot of people got killed and most of them as their parents' generation. So, like in that. And people who are like, 50-40, fifty years old, they are scared of the government. They are scared that their children would go against the government because for them that happened because of that. So, they are also like really kind of afraid. So yeah. It's so I thought about it. But also, Co creation between different governments in Southeast Asia. When you think about Malaysia, maybe like kind of having because they have the Isaac. It's like it's a Southeast Asian association for a better future, basically. So, there is also this thought, but yeah, it's quite difficult actually to understand like how to make it all work. But yeah, we'll see.

Lo : Yeah, I like you. I like your idea of Co creation between different governments though as well. So that's yeah, I mean, again, whether or not it will be taken up or you know or how much it's happening anyway, I don't know. But I do think that there's. Like, yeah, like I was saying, I do think that there is a lot of. Emphasis on learning. And on sharing and on Co creation. But a lot of it is a lot of, I think a lot of that place is a burden also on local communities and on and off and on populations that are already quite marginalised. So actually, to say it, Co creation doesn't need to only be happening on the grassroots level. Co creation should also be happening and sharing this sharing should also be happening. At all sorts of different levels in the in the governance chain I think would be really would be a really, really interesting contribution theoretically. To talk about that. A little bit more and what sort of learning that could look like between different governments between or also between governments and communities within Indonesia and Thailand and so on. And yeah, again, my, my, I'm not super familiar with. The with the. Southeast Asian context, but from a sort of I don't know, from a maybe like academic. Lens and again this is from my own background. I don't know if you're familiar with Shaq Dwellers, international SDI. It's like this sort of global. You know who they started in India in I think in Mumbai I can't remember anyway as like a collection of women saving savings groups who were working together to kind of be a sort of former cooperative that sort of supported each other in the slums. And it's now this kind of it's now in like. Hundreds of me. Don't know 10s or hundreds of countries worldwide in almost every sort of low-income country has an SDI. Branch. But the reason I bring it up is they have this really interesting model where they try to facilitate learning between different countries indeed. So, it might be interesting to look into, there's quite a lot of literature, especially in the journal. There's a journal called Environment and Urbanisation, and there's quite a lot of. I can always share this if this is useful by the way. Afterwards I can write it down. There's quite a lot of publications on them on their model, and what's particularly interesting is that they really, yeah, they really encourage learning between different government, between different countries. But in every time, they do that they what they also really want is for example. If people from Kenya are going to people from India, they get somebody from Kenya, from a community, somebody from an NGO and somebody from local government and somebody from national government. So, they don't just send for example, just the community they send really like a mix of from Kenya to India. And then it encourages. This interaction between Kenya and India, but also between within the Kenyan team, somebody from national government is suddenly on this like international mission with somebody from a community and they become.

L : Yeah, closer and.

Lo : Yeah, they become closer, and they become not just a community member and a government member, but they become the delegation from Kenya. So, they're part of. The same group. Anyway, there's just quite a lot of interesting things, and then it's, so it's between levels within a country, but also then cross country. Learning and that's yeah, it's.

L : Yeah, that that could be. Interesting to get the full name of the journal. That would be nice.

Lo : I'll share that. Yeah, I'll. Share that in some sort of key, OK and some key, yeah. And it I don't know, I don't know 100% how useful that would be for you, but anyway, it's just it was just reflecting on what you were saying about this sort of Co creation between different. Countries, as well as between different levels within countries. So

L : Yeah. No, but it's interesting because if I like the most positive cases that happen, the better it is. For me to just prove. That that worked. That is actually already happening. Thing we can learn from this, and this is how this would work, but maybe we can put this for this situation. I mean the whole thing gets better.

Lo : Exactly. It's sort of really. I think in this I. Think and maybe that's also linked to another interesting point within this kind of broader like mega infrastructure dialogue, which is that with the with a lot of this sort of blue-green infrastructure it's. This huge technical or. Yeah, development and actually a lot of change in adaptation is going to have to be incremental. It's going to be really small scale and mm-hmm. You know, it's the accumulation, the accumulation of hundreds and thousands of, of small initiatives that that add up to, to make. A bigger hole. Is, is equally as important and the blue-green infrastructure is really important too. But a lot of the time that's taken as kind of this sort of. Technical fix right, I think. A sort of silver bullet that doesn't actually exist. But it's our if we build. This I don't know if you're. Familiar with and I don't actually know the status of it, but the Garuda. Project. Have you heard of that one in Indonesia? It might be it. Might be old news now and I think it never happened, but at one point they were talking about building Garuda as the national bird of Indonesia. I think it's a mythical bird and they were talking about building a whole new island. I think in front of Jakarta. In the shape of a Garuda.

L : Oh, yeah, yeah, yeah. They talked about it, but it's not really happening anymore.

Lo : No, and I think I think it, I think it was so much resistance against it because it was like just it was just this, it was just a technical project basically it was like here, we're going to build this and it was and it is an amazing technical suggestion to build an entirely new island in the shape of a bird that then protects Mainland Jakarta from the worst of the flooding. But what it would have done would have flooded. Most of the coastal areas, which is where mostly the poor were living, it would have flooded just like a thousand hundreds of thousands of people, maybe even more millions of people who were living in kampongs on the coast. And the land on the island itself was designed to be sold as luxury housing. So, it's just this kind of.

L : Now it's. Yeah. Now it's not this anymore. It's just like a sea wall. And but they're putting a lot of sand, but it's not the shape or the thing anymore. It's just like, basically a wall. But there's a lot of people who criticise it also because of the problem of sand and the way that it's not just working and basically already all of. I don't know if it's South of north, but the coastal line of Jakarta is already below sea level, yeah. So, they're kind of like anyway, even though you put

sand in a sea wall, it's already too late for like 33% of the city. So that just, I mean the wall will. Maybe be held for 10 years.

Lo : Yeah, exactly. And I think, I think, I think also my understanding of it is. That it's designed to solve an environmental problem and not a social problem. So, my understanding was that that, that that could also create flooding elsewhere and for example. And the flooding elsewhere is almost always in a low-income area, so it's just. It's just misplaced. It's just displacing the problem mostly to an area that's already. Extremely vulnerable and. Yeah, that's I, I don't know exactly the status of the project anymore, but I yeah, I know, I know. That's the sea wall. Also, in Manila. I think something similar, and I think it's also mostly Dutch engineering companies that are private Dutch engineering companies that are responsible for that design, which is a little bit interesting.

L : Yeah, but for most of the thing in Jakarta it's Dutch companies because of the colonial past. It's still looked the Netherlands like OH, it's gold.

Lo : Yeah. Yeah, exactly. And it is, I mean, the Netherlands is renowned for its water. Engineering infrastructure and so it should be it. It's fantastic but.

L : It's not adapted, no.

Lo : Yeah. How to. Exactly. Exactly how to situate that in the local context is just not being. And I think that also you also said something about for example like the, the, the, the housing on stilts being banned or not being you know, and I think that also made me think about. Again, this is not specifically blue-green infrastructure related necessarily, and a little bit maybe more from my own back. And, but there's also this aspect that you could talk about, which is sort of the types of knowledge that are actualised we talk about planet adaptation. You know that that's also, like you said, it's also super adaptive because it's on stilts and but it's not. Adaptive in a high-tech sense. So, it doesn't fit the global narrative of adaptation being this kind of really innovative, exciting, high tech modern.

L : Yeah, intervention. And I also read this.

Lo : Yeah. Again, it's something that you see in slump reading. You know, there's a lot of, there's a lot of knowledge within the community, but if it's. If it doesn't fit this sort of narrative of it being high tech, it's not. People are interested in it, so I think there's some interesting things you can think about in terms of what sort of knowledge is valued and local knowledge and. What sort of adaptation strategies are considered?

L : But I met. I mean, you worked with her on the Wuhan case, Doctor Liping.

Lo : OH yeah great. Yeah. I was going to ask if you spoke to her.

L : Yeah. Yeah, it was. It was nice. And she said a lot about the problem that natural based solution is kind of trendy for the moment. So, a lot of people called everything natural based solution, even planting of flower and. So, she was like, yeah, so you have also to talk a little bit about that that. Yeah, the. The definition is not global. A lot of people think about it differently and just like also its super hard to convince people that you know, just making a huge park with that kind of trees and having a river with this type of. Of slope will be super beneficial because. It's like you kind of come with a super easy solution almost for a big problem, and love people

don't seem like ohm this is going to work because then you have this huge canal and all those things and then you're just coming with a park and yeah. And just like, for the moment, there's a lot of projects but. It's still like we still don't have a long-term view on it and the problem is also financing this thing because you don't have immediate results. It's not something you can monetize, so it's also the fact that shows like it's super hard to convince people and also private firm to invest in such a long-term thing that they're not sure it's going to work. And so, it's just kind of like, yeah, when you want to convince private firms, you have to have a huge book. With almost everything that's going on and all those little positive things that happen, but there's always a question. Yeah. But in 20 years, but at the same time, if you just start in 20 years, it's too late. So, this whole paradox.

Lo : Yeah. Yeah, it's really, difficult. It's complex. I think at the same time, I think those are the. Negative things about. It being trendy. And I think they're really, really important and probably more important than what I'll say next. But what is also useful, especially for lower income countries, is that because it's trendy, it does attract a lot of funding and investment, sort of from national government and so on. So, if that's, or if that can be utilised in a way where you know there's, I don't know, and also multilateral development institutions like the World Bank and I and so on. If, if they all are interested in. Nature based solutions, so I think the trendy, I think the problems of it being trendy probably outweigh this. But on the other hand, there is. There are opportunities available to sort of leverage that. Interest, I guess as well if that can be done in a. Way that really. Mm-hmm. If that can be done in a way where it sorts of. Really is like used to kind of have a. At least a local level impact, there's. I guess a benefit in that sense.

L : Yeah, but there was something I was wondering with your studies, is that so at one point, I was like, maybe also something that can attract the government is to say that it can create jobs depending on which type of green infrastructure you install. Like if you have a huge park, it's stupid, but you might need like four or five people who just take care of the park and. You're that, you know, it's just, I mean, if you just leave the nature be depends on the kind of nature you put because some of them just take care of themselves. But like you still have to cut down sometimes some stuff or cut some branches. This. I mean, there's stuff to do so. I was like, maybe I mean, it's kind of small compared to the whole price, but it can be interesting to be like. But if you sell all of it, you might need a team of like 15 people that take care of it full time. I'm sure that everything is working. And blah blah. And that can be given to local population. And so yeah, I was thinking with everything that you have done for the moment with social environment through like infrastructure, if you saw like opportunities to make like jobs out of it to make kind of like monetize this whole thing.

Lo : Yeah. Yeah, I wouldn't say. I wouldn't say it was monetising it. I would. Say it was. Generating livelihoods, which I think is quite different, so I think, yeah, I think. Yeah, and but I. I totally get what you mean, I think. Yeah, I think monetising it is maybe something a little bit different. Maybe it's when you're talking about whether you can generate revenue. Maybe tax revenue or for example, people pay to use a service or whatever is when you can actually generate profit from a service. And I think there's a whole discussion which we're obviously touching on there about whether that should be the case or not from blue-green infrastructure. Should it be? Should it be generating profit? I don't know, but it. I think there is definitely an easy way to say I think it. I think you could argue that it. Should generate livelihoods, and that

also depends on your world view and you. I don't know which perspective you're taking, like you could also say you think it should generate profit. If you're like coming from like quite a I don't know, neoliberal perspective, but I think it's, it's easy to say it should generate. Some sort of livelihood. And that should be either. That could be, that could be in different ways, right that. Could be creating. Jobs for sure. Or it can be. Improving the conditions of existing jobs. It can be. Also, through sort of capacity building, so I think a really interesting model that I've seen before in. I think it. Was solar power, I think. It was solar power in a. In an informal settlement was that a programme, a project provided training for five technicians. In the informal settlement and. Their job was to every each five had to train another five people and so it sort of had this cascading effect where and they, you know and then and up to a certain point obviously that doesn't continue to be successful forever because you have an informal assessment where everybody can do solar and you know no need for any more no demand for anymore but. It was this cascading model. So ultimately you train people who then become trainers, who then and then you have. Then you're sort of developing this kind of domestic solar industry at the same time as you're generating jobs in the solar industry. Which is also especially interesting because I think lots of countries who are looking at solar, for example, don't have that domestic expertise. A lot of that expertise has to come from China is like the big solar actor, so a. Lot of but if you've got low lower income countries especially. Yeah, in Africa. But I would imagine this could also be applicable in Thailand and Vietnam and Indonesia way of training. You're also developing capacity in a new. Field I'm not sure exactly what that could be for blue-green infrastructure, but for example I don't know green. Roofs or something? You train five people to start to know the plants or to be able to develop green roofs, and they train five more and you know, then you're all developing this industry. And creating livelihoods. And I think it can also. Be done through. Yeah, protecting existing livelihoods, and I think that's really that's a little bit more difficult to link. But you know, if you're talking about with blue-green infrastructure, I guess fishing could be like a really a more like tangible link to make, OK, you don't necessarily have to create new livelihoods, but how can you protect traditional values or? I guess there is a huge fishing population. Yeah. So, can the blue-green infrastructure be built in a way? With that improves those livelihoods, I think could be really.

L : That there there's a case in Vietnam with mangroves, so there's a lot of, like shrimp industry over there. But most of the time it takes like so much rice and thing because there's no nothing for the shrimps to eat out of. And so, there's a whole project to bring back fishing and I don't know if you call it shrimping for the shrimps ha-ha, but. It's to get them in. The men grow, and so because of the whole nature and everything, and also like some of the fish eating the shrimp and the whole thing, it becomes sustainable, and you bring them back shrimp. But in a sustainable way as well as fish who are healthy and not. Fully disgusting because of waste and stuff. So, there's a whole project made of that. And also, mangrove is super good for sea level rise and also to keep all the sediments and everything so that that was something as well. But it's true that for. For there, I mean, fishing is huge industry over there, so that can be also a good thing to point out more.

Lo : Yeah, and I think. Yeah, I think what you were just talking. About is really interesting. Because to buy traditional or by conventional understandings of infrastructure, I guess. You know, reintroducing some shrimp is not in infrastructure or, you know, or reintroducing it. It's not an infrastructural intervention. It's really like natural, but it is actually. Yeah, contributing to this part of this sort of more blue-green infrastructure. Yeah. So, I think that I think there's

some interesting discussions we had around that, but for. Sure, linking to. Fishing and to hmm. I mean other sorts of livelihoods. But yeah, I think I think, I think it's really important nowadays that. Any infrastructure should not just be a. Piece of concrete or? Mm-hmm. A park or whatever it whatever it is, it shouldn't just be an engineering intervention. It should be really, really embedded into the social and cultural context within which it exists, and I think livelihood is a key entry point for doing that, either creating jobs or protecting existing jobs. Or creating livelihoods or protecting existing livelihoods, I think could be a really. Like is a really. Basic step for doing that. So how does the infrastructure link with that? I think is, yeah.

L : Yeah, but there's also something that the Thai and Indonesian points out is, I mean most of them travelled outside of well Southeast Asia. So, it's so Europe. And I like it's something so cool in Europe, you can go out in the middle of the day, eat your salad in a park and you're not that far away from your office. And it's actually possible to be in the park to go there. And you know it's going to take if Google Maps says it's going to takes 15 minutes, it takes 15 minutes. Because in Jakarta, even though the airport is not that far away, you have to almost start six hours before because you have no clue how long it's really going to take. There's so much noise all the time. Time there's not that many parks and most of the parks you can just go there really early really late because it's just grass that there's no shades and so they're like it's not pleasant to live there, except if you're really rich and you are part of those like kind of like closed village. Hey, OK. Little problem with the Wi-Fi.

Lo : That could be my end as well.

L : Me too. Or if it if. It does it there again. I will get somewhere else. In my house. But yeah, so that was interesting as well because one of the main things from blue-green infrastructure is also to create better habitats. That's nicer to live in. You have the temperature is lower, you have better water, better air quality. It's also more pleasant to see greens around you, and yeah, so there's also this whole thing that's also bringing livelihood generated livelihoods, but it also. Uhm, well, it creates a better life, I guess. Uh. So yeah. I mean, I don't know with all of your project right now and everything that you are doing it. You know, with the kind of infrastructure that you saw, if there's like. Like a certain type of strategy that people use to engage this whole thing, if there's like key success or challenge players like to kind of have a general idea, even though it's not linked to BGI because. Every time that you bring new type of infrastructure, a new way of thinking in the country that's not used to most of the time, it seems like it's the same kind of barriers and challenge and.

L : Yeah. Yeah, I think they're quite similar and I and I wonder if I don't know, maybe blue-green infrastructure can transcend some of those, because I think for me, the biggest challenge that you always see is this. This perception or this idea about what constitutes good infrastructure and I think that's kind of really linked to this. Kind of modern city global city. Smart city. All these narratives that are really, really popular and dominant kind of at the sort of global level now that are city should look a certain way. European City looks, for example, and then other cities in the world. They they're not going to look the same. They shouldn't look the same. But at the moment, everything sort of on this path were.

L : OK.

Lo : I guess this ideal this, this modern ideal of what infrastructure should be that kind of dominates the narrative about what, what infrastructure should look like, and if an infrastructure. Service based intervention doesn't fit that model. Then it's considered less good, and it's often not funded or yeah, at best it's not funded. At worst, it's bulldozed. You know, maybe like the campus, for example, the campuses have been in existence for ages and suddenly they're being suddenly they're considered. Bad, but it's not as simple as saying whether they're good or bad. You know what you can say is bad is that people, they're. People live there often because they're marginalised. But that in itself doesn't mean that the livelihoods of those people are performing are bad, or that the social networks that they have are bad or. That their infrastructures are bad. But just because it doesn't fit this modern city, this global city agenda, then it's being bulldozed effectively. Yeah, figuratively or literally, literally. And so, I think. That's a huge challenge and maybe linked to that is. Maybe linked to that is. Is money and resources. So many countries that I work in, especially but. I guess it's, I don't know. I don't know exactly. In Thailand, Vietnam, India. Because I. Think they're wealthier. Their governments are much wealthier, but they're still not wealthy. So, there's this room need to attract private in private investment in infrastructure because most city governments and national governments are under resourced, they just don't have the capacity to build infrastructure at the scale. And so, there's this need for private investment, but private investment is linked to this global city agenda that we were just talking about, like the Smart city agenda. So that investment is only available for. These high tech. Solutions and it's not available for yeah, for the mangrove sort of initiatives or for the waste picker cooperative initiatives? And so, funding is also pushing cities in a specific direction infrastructure wise. So that's another big challenge I see Successes. Yeah, I guess. I mean, a lot of my work has been around studying local success stories. I'm trying to think of some more like large scale success stories, but most of the success stories that I've seen, I mean it sounds quite simple, but involve kind of an element of code creation. I guess they involve government actors who are willing to do something that is not necessarily part of the norm or is not necessarily. Conventional they usually involve. Civil society actors who have lobbied and who have served as an intermediary actor between government and community-based actors. You know, they involve research consortiums who often bring in funding to showcase initiatives at their early levels and so on. And they involve very organised local actors, usually in in my case, usually in communities of. The urban poor. But I think that's happening in all sorts of communities. You know, you see it also in Russia dam and Amsterdam. There are all sorts of like community-based initiatives going on, who in in response to kind of global challenges. But I yeah, I don't know. This is where I struggle because I don't know how you really make that happen, right? You know, this is where I find. It really difficult and it's also saying that a. Community has to. Be organised before their infrastructure or their initiative can be upscaled, which is also not really fair and there's a lot of issues around it, but I think this sort of multi stakeholder. The Co creation.

L : Let's shoot it. For that I met someone. It's in France. It's a Collective Intelligence company, so I don't know if you know Collective Intelligence. So, the goal is so before we had not really, I mean we didn't have a lot of technology and things so. It would, it would say, I mean, it took so much time to actually ask opinion of everyone. So, what they actually do is that they help companies or governments to get the opinion of the group that they want. So, for example, one thing that they did a few, I mean that they're working on for the moment is in the Lyon. So, there's a whole thing they want to add a new metro. Wow. And well before starting this huge

project that's going to, I mean cost millions, they want to be sure that all of the stops and the place where they stop is actually what people think is better and. And yeah, to ask, because sometimes you feel like, oh, I should be there. But you realise maybe you should change your route a little bit. And so, the whole thing is that you create a whole survey online for people who are online and like to respond online. But it's not like the usual Google survey. Uh, it's actually something. It's the kind of survey where they kind of try to send stabilise you. On a specific topic, but really ask you your opinion like you can write the whole text if you. And it's like there's no amount and the whole AI is going to cheque all the answer. I kind of do like a whole summary. So, everything is done online is super easy because no one, I mean no one alive. I mean, it's a whole technology is. Structuring it and that takes up to two months and during those two months and specific area. So, what they always do is with the company or the. UM, the city that wants to do those kinds of projects is to actually grid the whole cities and be like, OK, where do you really want to get people opinion? Where is it the most important? And so, there's at the same time there's thing happening on the ground, but in those parts. So, for example, for the metro that they dated on both of the routes that they were thinking of because they were only going to do 1 route and so they, so they had those. Underground activities for two months and so at the end to have one month to analyse all those data and the goal is to keep the loop with everybody who was involved because most of the time the problem is that when the government asked for help. Then you don't know what really happened. You gave ideas, solution, thing that happened and then you don't know. So, the whole thing part of it is to actually keep the population in the core creation. So, in the beginning you ask them what they think about it, their ideas. Then you Co create solution. So, there's people we can ask to go to the next step, so you Co create solution. Then you could decide about the solution. So maybe you have 150 solutions, and you can only go down to 10 because 150 is too big, but. Since the beginning, you tell people. I mean, it's kind of like a contract. I will keep you in the loop. You will always know what's happening. You will know why your decision was not taken into consideration, but you will always know what's happening. And so that's kind of good because since the beginning. It's, I mean you can obviously direct. Where you want the solution to go, but it's it kind of helps to get ideas from all about everyone. The survey is for everybody in the city and then the underground activities are for special neighbourhood. Of course, if you're not from that neighbourhood, you can also come, but it's to target those people. And at the end have this huge data that gives. And good overview of what people think, what people values, and so the goal is to really adapt the solution, so they have a solution portfolio in the beginning is to adapt those solution based on what people want. Because I know if you're thinking about. I know for green infrastructure you were thinking about making the river larger with some trees next to it and then you realise that what everybody wants is a huge park with maybe a core something there. Then you realise, OK, maybe this is more adapted than blah blah. And so, it's also to add them. At the beginning, so the core creation is along the whole way and never really stopped. It started to gather and continue together.

Lo : OK. Yeah, I think this. I can't remember. I don't remember. The article or. If it's a body of literature, there's like some discussion on the different levels of Co creation, right? So, you can have. There's, I think I think it's something like informing is at the beginning, so government might just inform communities and cities and residents about what they're doing. And sometimes governments will label that as Co creation. But actually, that's just informing. That's just telling in advance. This is what we're going to do. And then the next level is like

participating or something. So, it's maybe a little bit more like informing and getting feedback on them. Plans and maybe they make some minor adaptations, but nothing huge based on that community feedback. And I don't know how many different levels there are, but effectively like it goes from just telling at the beginning and to yeah, code design at the end of Co creation and that's this sort of real like, OK, we're we are doing this together. We are identifying the problems together. We're identifying the solutions together and we're implementing the solutions. Together and there's sort of. This whole yeah. Yeah, I don't know what's the word trajectory from kind of informing at the very lowest level to Co-designer of something at the highest level, but I think yeah, it sounds like a little bit like what you're talking about there, which is just this idea that it it's not, it's not enough to just say, OK, great. Thanks for your input. Thanks for information. You'll never hear how that's been used, but actually to take that. And meaningful and like ongoing partnership is where the real value in that sort of in that sort of governance model is, yeah.

L : May I because he said that basically. The place where it's harder to start this kind of initiative is place where they used to ask a lot about population opinion and then nothing happened, and they didn't know what happened and then actually telling them that this time they will know it's super hard because. A lot of people don't want to participate, or they just don't believe you that. Like, yeah, but they always tell the same, yeah. And it's almost easier to start somewhere where nothing happened than somewhere where actually thing happened and so yeah, they said that for that Europe is quite can be quite tough because there's a lot of places where they actually ask people opinion so many times but no clue.

Lo : Yeah. Yeah, exactly. Yeah, exactly. Yeah. But at the same time in Europe, there's in general much higher level of trust in government already. So, it's the, you know, it's. Yeah, it's weird. Like I always. I always struggle with this. You know, if somebody came. To if I live in Amsterdam, at home and if somebody came, if somebody from the domain to the municipality in Amsterdam came to me and said, can you help us Co design a new waste management strategy, I'd say no because I'm not interested in doing so because I trust that you will do one that works for. Me, you know. Where is in a lot of countries. Like Thailand and like Kenya where I'm working the sort of the emphasis is actually on the citizen. Was to come up with that themselves. So, it's a really interesting like, I mean, that's sort of more like a moral or ethical discussion, like how much participation should be encouraged and what we can expect for it. I mean, even if I did have to participate in it, I couldn't do. It because I don't know the technical. Requirements. So that's where you really need this sort of like multi stakeholder thing. But yeah, I don't know. And the trust that you're mentioning at the beginning trust is so important and having that level of trust, it's so difficult to study or to build or to, you know, it's so easy to say, oh here's this.

Lo : Yeah, here's this. Sea wall that we're building, you know there's a right or a wrong way to build a sea wall, but there's not a right or a wrong way to build. Trust and it's so difficult to study it or to incentivise it or to measure it or. To create it. So yeah, I don't. Know what the answer is still.

L : It's true that more and more I think about it more. I know that in my conclusion there's going to be all like this thing. Is like still don't know, still don't know.

Lo : I think what? Yeah, no, I feel the same. Actually, it's really interesting since starting the PhD to finishing it when you start your PhD, you think, oh my God, I'm going to create this amazing answer to this really complex question. You know, by the end of your PhD you might know a little. Bit more about the problem, but you like. It's just, you know, it's so it's so difficult to answer. But I think was interesting in the conversation that we're having today and hopefully in your in your will generally what has evolved like we still don't know the answer but what has evolved is that. There's this awareness now of the need to think holistically and the need to embrace this complexity thinking. And it's still not fully taken hold yet. But I think that has changed like it even since I've started working in infrastructure, but also people who I've spoken to who have been working in. Or in at least in academia and infrastructure for. For decades, you know, 20 years ago, the discussion would have been does this create a job? Yes or no, but now the discussion is like, OK, does this protect the livelihood? Does this create livelihoods? What sort of livelihoods is it a livelihood that people want? What are the environmental impacts? What are the other social impacts? Who's involved? How is the decision made? There's way more complex to deal with, but I think this like embracing of this complexity thinking is. It is a step in the right direction.

L : So now it's amazing. Well, I think we kind of, I mean by just talking in general, we kind of covered everything actually. Uh, yeah. Because we talked about a lot of stuff.

Lo : Yeah, we did, yeah, it was. Really interesting. No, and I think. Yeah, I just, I I'm really. I'm yeah. I wish you all the best with finishing the thesis because I think it's really like, yeah, we were just talking. I think it's really important to take. That holistic approach just makes it makes it quite difficult to come up with like concrete recommendations. So, if you need to do that, then. I think there's some really interesting stuff around. Like, yeah, having a government or having some sort of coordinating body cause, like you were saying, it's so difficult to keep an. It's so difficult for one person to keep a Birds Eye view of. Everything that's going on, so when you're having this holistic approach, there really should be some sort of coordinating body, whether that's at local or national government level or someone else, I don't know. I think that's something interesting and also how to how to make these. Different relationships between different stakeholders meaningful on this trust angle. I don't know. It's really difficult, but I think that I think those are those are those are the two most well you said loads of interesting stuff, but those two things I thought were really like particularly meaningful and could be linked to kind of concrete recommendations if you have to make them. As part of your thesis. I think so.

L : Well, if I can make concrete recommendation is the best, but at the same time, like one of the goals is to keep a holistic view, but also to kind of give like a. It's kind of like a toolkit for UM. If I was like the government and I want to introduce this kind of thing, how do I do it so? But this also like so that's also the problem and I have to kind of still see how I will tackle it is like the. OK, it kind of talks like, oh, the government is already in it. So, I have to have like a whole. Parts where I talked about the fact that it's already tough to make the government aware of that and willing to do it, but it's also like a whole part, but OK, like if I'm into those things or if I'm if I want to. I know if I'm the population and I want the government to listen how whether all of my possibility's kind of.

Lo : Yeah, exactly. Yeah, exactly. It's not as yeah. No, that's what I'm saying. Yeah, just singing, like, a lot of the things that I'm saying, having a government coordinating body is a great idea. But if the governments. Not already on board. What's the point? Yeah. It's really difficult.

L : So, the I mean I like I know that the whole thing that I'm bringing is kind of like utopic and the fact that I mean you, you have to hope that the government is on board that blah blah. So, there's a whole a whole part in my conclusion where I will. Probably criticise my own analysis by saying like I know like because of this, this, this and that the whole project can be compromised if they're not so yeah, it's kind of like, really. Yeah, it's utopic. Kind of, but at the same time I'm like it's maybe good. I mean, yeah, I'm just 23 years old, so I'm.

Lo : Yeah, I think it's most important as well. I mean, I think. Yeah, I think it's easier to go into this sort of study by saying nature-based solutions are the solution, like nature-based solutions are the best infrastructure. This is how this is exactly how it should be implemented and that that like just sort of tunnel vision would be way easier than taking this holistic approach where you understand all the challenges and all the different viewpoints and everything. And I think it's. Yeah, when I think also, I think there are many, many people. That have worked. In in infrastructure for 60 years that still don't know the answers, it's. Really complex because. It's so subjective and there's so many. Angles from which to consider it so. I think taking. A holistic approach is the most important thing that we can do. At the moment and. Hopefully that thinking also evolves because. The solutions still aren't happening at the scale that we need them I guess, but at the moment it, yeah, at least the holistic approach is a step in the right direction, I think so. So don't you think it's really good and I wish you all the best with writing it up and everything.

L : Thank you. Good luck with the end. Of your PhD. And yeah, and enjoy. Like, I don't know how long you're still staying in Kenya.

Lo : I'm going to be here for another. Two months? I think so, yeah, yeah.

L : Oh, so you still have a little bit to enjoy.

Lo : Still a little while, yeah.

L : Yeah. Thanks. And one thing that you mentioned that I think would be nice is the journal from SDISA.

Lo : Yeah, yeah, yeah. I'll send a. Yeah, exactly. I'll send. I'll send that later today. Yeah.

L : OK, cool. That. That would be nice and well. Yeah. Thank you very much for the call. I was really interesting and nice and, well, good luck for your busy week then.

Lo : Yeah, yes. And you 2 and yeah. Well, keep in touch. We'll speak again in the future.

L : OK. OK. Perfect bye. See you.

INTERVIEW 2: DR. LIPING DAI

Lu : Hello, good morning. Can you hear me?

Li : Yeah, I can hear you. Can you hear me?

Lu : Yeah. Yeah. Clear.

Li : Hey, nice to meet you.

Lu : Nice to meet you too. Have you? Do you have a great Day so far.

Li : Yeah, yeah, I have read your questions, but I'm not sure if I can answer all of them.

Lu : Ohh that's fine, there's no problem.

Li : OK, let's see. Where is it? Because I have thousands of emails I need to search again.

Lu : Well, I have it as well, so I can ask you the question.

Li : As you want. Yeah, yeah, yeah, yeah. See, I can try to search. Yes. Oh yeah, I found it.

Lu : Perfect. So could you tell me a little bit about your research. Yeah. On what you do with also like the difference between the Netherlands and China, because I read that you are invited Professor in some schools over there. So, I think that's quite interesting. And like some projects that are more interesting for my research Is the sponge city project with Wuhan and preventing and controlling land subsidence in Shanghai. Those like 2 projects, that's super interesting for me because I talk about it in my thesis. So, if I could have more insight of what you did and difference between, yeah, water governance and Netherlands and China that. Would be great.

Li : OK, I tried my best. Yeah. No, I cannot see. At the meantime the screen and my e-mail. So wait a second, I make the Windows smaller. Now I can see both.

Lu : Yeah, the first, could you tell us the experience and the research in what governments comparison between Netherlands and?

Li : Well, well, first we start from the problems. The problems are similar. For example the flooding and the land subsidence. But the purchase are indeed very different And have you been to China?

Lu : No, it's in my plan. I'm planning a big trip in Asia next year, but yeah, I haven't been there yet.

Li : Yeah. What's your impression about China? I mean, from your research perspective.

Lu : Well, it's kind of it can be really different Because in a political aspect and what we see on what we see on TV and everything, I don't really have a good image. But when I started to study like what they did in Wuhan and everything was like, I mean that's kind of great. I mean They did something that nobody did yet And the huge level and how they did the whole thing. If I was pretty cool. So I don't know my opinion on China is quite mixed.

Li : Yeah, I think probably you are right. You see everything is happening at the top level. So China is a very top town country for almost all the big decisions are made at the central level then. Then they go through the levels until the implementation level. So for everything, actually, no matter what the governor is, or land subsidies or other Environmental Protection issue.

The rationale behind is the same. It's top down. I think I will answer more your more questions at mid time. Yeah, it's a, it's a. It's like a central bone behind everything, which supports the whole country is a Top down as long As you have the political willingness of power at the central level, I would say Almost everything can be done. I give you an example, it's not really related to Environmental Protection or water governance. Is about the birth control, you know. In the past, every family Every couple was allowed to only have one child So that was also from the top down. It's very efficient. So, at the top level, it said OK, we will control our population at a certain number. Then this number will be cut in how to say in pieces and assigned to every provinces, so every provinces then assigned the budget again to every county. The population needs to be controlled in the various small units as the mayor or even the the village or neighbourhood you need to control the birth ticket so no matter what approach you use, of course that that there were many unhuman approaches. And you need to control the birth rate, and now I'll come back to the Environmental Protection. OK, later come to the economic development. It's the same rationale, the same approach. So, every county, neighbourhood Even every I mean the the larger scale industry got their target for developed the economics. So, by the end every unit got their target their implement implemented. In the Environmental Protection goes and what the governance and Sponge city is the same at the central level. You see if you read the sponge city. You read all the or quantify the numbers control 70% of 30%. So, this type is and break it down to every level until the end every unit Has its own target for the purchase. That can be a bit creative Not always. Not always good, because they the the only thing is that they need to reach the target. They achieve the target, so in some practises for example the sponge cities, the water quality I give you a concrete example. At lower level it's not just On City programme is another programme in which requires the water quality must be achieve a certain qualified quantified target. So what they did at the very local level at county level. Let's say along the riverbanks within 60 days with within 6 metres shouldn't be any infrastructures. But due to the historical regions, there are many. There were many local restaurants, grocery shops and some houses And but the rule is there from now on, within 6 metres there's nothing should be there, so they just demolished it.

Lu : Oh OK.

Li : With the one year I think was summer or few months, everything was demolished within 6 metres and the water quality was indeed largely improved. But actually the problems OK, the water quality problems are solved, but the other problems were created. Because the faster demolish demolition that people were not happy And you cannot imagine it's even without the settled compensation and say, OK, you come to register. Your, your, your Loss to the governments and we will make a compensation plan and we'll compensate you, but this Is it's kind of bullshit. So you see the problems are not solved, just transferred to another sector. So in Sponge cities they are somehow the same. It's if you look In general this this approach works very well. They use this approach in almost every sector as long as they have a target, then they break down. They assign to the local units. And they you are Responsible for implementing it, no matter how. Right. And if you see the Dutch government, are you Dutch? Sorry.

Lu : No, I'm Belgian, but I mean it's next to my house, so I kind of know it. I have multiple friends from the Netherlands and.

Li : OK.

Lu : I go there quite often.

Li : I can Not compare the Netherlands with the Belgium. I only talk about cases and Netherlands. You see, the Netherlands is very decentralised. At the central level, you don't have concrete quantify the goal. You only have a goal. OK, we will reach a climate proof and waterproof etcetera. But at the central level is not clear what that what that what that means. And the most of the initiatives that were taken over by the municipality is very decentralised. This is the main difference between the Netherlands and the. And the China or the many of the Asian cities, because I was involved in the project about what law revision in Vietnam. So I saw more or less the same something happening.

Lu : OK.

Li : I don't know which question I have on.

Lu : But that that's super interesting to know that basically over there it's always top down. But should it in my research I'm mostly like focused on Bangkok, Ho Chi Minh City and Jakarta and China joined the project because of the sponge city project. That was super interesting for me, made sure that when I looked at everything they did, every time it looked like it was from top to bottom and that's why in my whole research. I want to see how we can integrate the local population in all those projects. Because you could see that every time it's missing and that's some in Bangkok. Some of the local population destroyed some infrastructure to prevent flooding because it was preventing A richer neighbourhood. But their neighbourhood would be more hurt if this project this infrastructure was still there, so they would actually destroy. It so it's like, OK, there's really something to do here. And on the Wuhan project you worked with Lucy Oates And I'm going to talk with her on Thursday, so.

Li : OK that's nice.

Lu : So and she's working on a similar project, but in Africa for the moment. So that's super cool, because for the local population, how to integrate, integrate it in all this infrastructure, she could give me like a huge Help, but yeah, that's something I saw. It's really like top from bottom and I'm like, OK, how can we integrate this whole holistic behaviour? So, it's something that everybody integrates and it's more well.

Li : Yeah, I think that you really need to Look in depth about the political culture, because this is the central thing. And if you talk about involving public or stakeholders, I will say in China. Or in in in Asian countries, let's say in India or in China with big population, it will be always difficult. Yeah, this is the one problem, the other issue is that actually this is not also not yeah, although I'm a lawyer, I always need to go back to the political culture, so involving stakeholders, especially involving public is not the political tradition. In many Asia, especially Asian countries, especially in China. It comes to the legitimacy. So, where is the legitimacy produced? For example, in the Netherlands or in general in European countries you, see? Yeah, all the projects took very long time because they need to discuss and sit down, find the problems and discuss, discuss. Endless discussion. And in China, you say everything is, is, is very quick. They build up a hotel in a week, something like that. So, I think this is a legitimacy. So here people accept that as long as the Process is is correct, it's right? So, everyone was engaged. So, the process right and the outcome outcome seems not so important because this is a core decision So the legitimacy here lies in the process. But in many Asian countries, especially in

China, I think the legitimacy lies in the outcome. So no matter what you do, OK, you, you, you finally build the city. Waterproof or climb proof and general public will Of course there are some. I mean some, some always. Some groups protested. But I I'm talking about the the majority, the general public will accept it if the outcome Is correct that the whole process is, yeah, can be tolerant. This is also a kind of political culture or or culture Thing I think. So all these things are embedded in the project.

Lu : OK. OK. And that's interesting to know to have a look like it have this perspective, OK, and for Wuhan and Shanghai? Uh, could you Tell me a little bit more about like the whole project and your involvement in it.

Li : Yes, I work more on sponge city than land subsidence. Maybe I will start from yes from Sponge City would be easier. So for Wuhan, actually is not much Different from other cities in China in terms of the approach. It's also top down as if you have read my article, I think it has been written there. The main problem in Wuhan was the time pressure back to my article back to the time when I did further research there the sponge Is is was still a new concept So it was very difficult. On the one hand, the government required because it involved the local developers, the the municipalities and the design, urban design companies or institutes But they all need to serve the government, the government setting their line, not the local government. The central government. You know, if they don't finish it, they can have serious consequences. So they need to and There were a lot of pressure on each party. You know, communication always costs time. A lot of time. If they don't have enough time, they just, yeah, cut this part of they didn't communicate efficiently. This is one thing they don't have time. The other thing is the fragmentation between the Governmental departments, for example, especially between the water department and the Environmental Protection Department. When I was there, I went with academics But I I'm A research I was a researcher and they did their consultancy job And we need we needed to cooperate with the municipality, both the people from water Department and Environment Department, and we wanted to organise a workshop together. It was so difficult By the end, we still didn't succeed to organise a workshop together with people from 2 departments. So what? What did we do? We present the same things in front of two times in front of the two depart departments, and I can imagine that they didn't communicate with each other. At least efficiently, so this this was The programmes happening in the ground. First, the communication. A stakeholders involvement? Not. Not no, no, no time. Then the fragmentation and there were no like overarching group to manage all the things. And and also the. Yeah, the as the project level there was so many projects Small projects, I think 400 or something. Yeah, they cuddle in the small projects, but this small project was designed separately. So the design design separately they could achieve the project target individually, but when you put them all together. Because I don't know like chemical stuff. So they. Yeah, as a whole they couldn't the achieve the the the project target. So this is also the technical problem I cannot say. Much because I don't understand much, but this is what I heard.

Lu : OK.

Li : So it's all the barriers, but for for me personally, I think the timer pressure is the the number one, cause if you don't have time. And you you will. Yeah, you will. Yeah. Cut off many things.

Lu : Yeah, yeah, that's true. And do you feel like time pressure? It's also something that's put like on a project in our country, like you worked a little bit in Vietnam.Is it something that's

there as well, like when you start a project, it has to be done in. I don't know six months and that's the the time frame and you have to do it in six.

Li : Well, Vietnam story is it? Yeah. The hash timeline. Sometimes we we needed to work on holidays and we we respected the deadline. But they didn't respect their line. And they they have A lot of flexibility at the government official levels. So they could easily change the the the meeting time and the the deadlines and the ask for something spontaneously. So we didn't like the project, especially the culture, but as I'm from that kind of culture, I could understand. It Is the the again, is the Political culture or social culture? It's a hierarchical society. So for example, in Vietnam, in in China. The high level government officials officials enjoy A lot of I I wouldn't say authority but a power So they can change things easily, spontaneously.

Lu : OK. Yeah, that's that's. Yeah, that's that's so different from. Yeah, it has to be because it's so different from our side like multiple times when I was looking at some stuff I Was like, what the heck is this? So different than from Europe and everything. And also I was in there, I did my erasmus in Sweden. And so over there. It's also like, so different with what is happening over there and sometimes like, oh, my God, if you put Swedish in those things, they would get crazy.

Li : It's it's very difficult. I give you an example. It's nothing related to to to the water research. It's just daily life. The students and professors. So in China, most of the professors, they don't make appointment with students. They would say OK today. I'm in office. You can come so as students, probably you you go and you you go and you you you see someone someone in his office you wait out outside the door can be hours can be half day can be if it's important for you it can be one day is normal. This kind of hierarchy between the professor and the student is really normal. I wouldn't say everyone does so, but it's really normal. So if you zoom out in the whole society, it's the same. So the people who are in the high level enjoys more power.

Lu : OK. That's well, good to know. And well, I think we could dive a little bit more into well, it's more related to Wuhan than because it's a sponge city programme. So specifically blue-green infrastructure. That's on what I focus on my thesis. That's is it's it's blue-green infrastructure and how to integrate them and also how to make the whole process a little bit more easy because it's I mean on the engineer side it's a lot and it's quite heavy and. Because of that, a lot of people are Discouraged to do it. Even though it's less expensive than building dikes and stuff, it's still it's still quite a lot to do. So I was wondering, like for you, what were like the key factors for BGI? So blue-green infrastructure and also like. I mean, since you are a specialist in water governance governance, like for how do you relate it to flooding mitigation? And I don't know if you had to convince some people as well on their efficiency. Like, what is your stance toward BGI and water governance and floodings?

Li : Yeah. If you look at the project levels. Is indeed effective, but I need to go back because Sponge city is only one of the programmes, the green programme. There are many other programmes. For example, to I think I also mentioned in the article, they need to change the agent fives and also improve other facilities. These kind of projects provide synergies to each other. So by the end, you don't really know how much percent Responsibility contribute to the mitigation or adaptation. But if you look at the project size, it's indeed effective. For example, there were, I don't know, it was in my article or not the the the a big park which was formed from. Yeah. But one thing I didn't mention was gentrification. So once the part became green

greener, the real estate, the the price also increased double or triple. And who people who lived there, they couldn't enjoy. I mean the convenience, not the convenience. They couldn't afford the the life slowly, so they were forced to move out. This is called a gentrification, so that's what I said. OK, one problem has been solved. The flooding or the garbage, but some other problems have been.

Lu : OK.

Li : But this is another research, but if you took the project, yes, it's effective. If I took the drivers and barriers, I don't know whether this is what you asked. Sometimes I lost it.

Lu : Yeah, yeah, yeah. That's also interesting for me. For me, it's like the key factors, but it's also drivers, buyers, that's interesting to know, like the whole, like, holistic view on the project.

Li : The drivers as we have been discussed a lot, is the political relevance. They want to do, they don't care. Many other things, they just do it. It can be done very quickly and the various they, no, they there's no almost no private finance first. Yeah you mentioned Sustainability, whether the projects can be sustainable. I'm not sure because first they don't have money. Second, I am not sure whether the maintenance policies and measures are in place because they were, they were not in place when I did the field research. And secondly, no. Thirdly, I yeah, I need to go back to the the the the political, political culture again, sorry. Because I think really this is the the the core part you know the Chinese government officials there were only they are only on chair for four or five years and afterwards they will go to other provinces on other places, so generally there are also research supports this. Generally, the chairs, when they're on chair, they really want to have a big achievement because this will be beneficial for them in terms of promotion so that they did very much, but after 5 or four years. Yeah, the leaf. They actually don't care too much about the maintenance, don't care too much about the long term vision. So if you talk about whether the sponge cities can be sustainable. If from this point of view, I think it's very difficult is because the the the biggest driver is the political motivation. One don't when they don't have such thing, it's very difficult to sustain the effect. This is one thing. Second, enable to sustain the effects. You need enough money. You need to mobilise a lot of financial support from the central government, from local governments itself, especially from private parties and the the PPP. The scheme, but now the Not many things are in place, for example, whether The private parties can feel safe to invest in such long term projects, especially when they I've already knowing Guess the government officials. The political willingness might be gone in the short term.

Lu : OK.

Li : I would say 2 important factors. One is the political motivation, one is finance.

Lu : Yeah. So if political motivation is not created on the long time like this is a really important project for our country as as important as I don't know kind of make development and stuff like that, it might just be gone by the end of their mandate.

Li : Yeah, yes. But nowadays they don't do this, so. But this problem exists. And if you look, you look back a long run from, yeah, few decades, you see such programmes sponge cities or smart cities or or or Garden City. Is this this kind of crap? Programmes will only last for few

years. I don't know how long from city will exist there. Slowly, slowly, perhaps. Yeah, nobody talked about It and this is What happened in history? I don't know. We'll have response.

Lu : OK. OK. So yeah, it is a tendency, OK. Yeah, but no, it's good because I really want to have a holistic view of like this whole research might be like a research for also other Students. So the goal for me is more like to create. So I'm an industrial engineer is more to create the projects on like how to integrate people, how to do it and blah blah. But of course I'm not a architecture engineer, I'm not specialised in Green infrastructure. So the goal would be to give this math that is is then to someone Else who would Do more like the well, the practical parts of the green infrastructure and natural base infrastructure and how to integrate them and more. This part, this technical part I cannot do. So yeah, it's. I mean it's a master thesis, so we probably will never see the day of life. But but it's it's more it. It's kind of fun because it's it kind of like show us how to create a project and also how hard it is because it could be a doctorate And not just some after thesis, but it's really nice to learn how many things can be possible and maybe the conclusion of this whole project will be well, it's possible. But the involvement of local population because of this, this and that, it's almost gone. The only thing you can hope for is that the government will put it aside and maybe it will be more like incentives to keep this project alive and maybe in that in that side. In that Channel you will have local population and also for the maintenance of all those buildings maybe to create jobs while you can create kind of a link between. Those two sides, two sides that way. But yeah, of course. There's. I think there's multiple hypotheses that I have and I had with my promoter that will be denied because, well, we didn't think about that aspect of the culture. And well, we're not from from there. So of course there's a lot of things that I guess we we don't really get it right away because for us it just seems Non-natural, just like why would you do it that?Way it's because it's So different, but it's it's nice to learn how different it is and just be like, OK, well or what's nice view will not be cannot be applied. So how can we switch our mindset to It's something that can actually work. So yeah, that's also a lot of work for me, because every time I'm like, don't think as a European, don't think as a European.

Yeah, yeah, I think here it would be more about the future of the. I mean, in water governance in general, do you see like have you like an idea of what would be like the future topics in Asia, maybe with floodings or do you see like this?

Li : Topic. There's a little bit more on the table on the political side. That's something that Coming and it's more people are more aware and it's and also with floodings. Is it something that talking a little bit more on how to prevent it and mitigate it more than having a direct response when it's happening? Yeah, if you talk what in general is always 3 problems too, too much, too less, too dirty. And I think now too little I I think now. Yeah, it's still it was too little because you can feel that the drug And jobs. I've been talking more and more, but of course the other two aspects also equally important, the quality and the quantity, class and quality. Yeah, it it really depends. So we cannot really generalise say that which are which are the new trend. I think they are Equally important, it depends on your context.

Lu : OK, OK and umm, uh, do you feel like natural based solution is something it's more talking talked about or it was more like a trends at that time and now it's kind of gone or is it something it's kind of coming to their mind that there's also green infrastructure?

Li : Infrastructure and of course, great infrastructure that have always been there. But is it something that's more coming to their mind? Well, the nature based solutions are also new concept since 2015. So you look at the Sun City actually they were not called NBS and rainproof cities and client proof they were not called NBS. Now everything is called. This because and this is especially at the EU level, it's financial support, financially supported by the many projects are supported by for recent 2020. So it's an it's kind of Trend to call Everything as NBS but NBS has many definitions. I'm not sure when people call it NBS. They really mean that or not. Well, NBS definitely is a new trend. I mean, it's very fancy to join In the pool. But the the, the the purchases are actually still the old purchase your green infrastructure and green blue infrastructure. Yeah, I don't know Whether I have answered your question.

Lu : No, no, it's it's good to know that it's there, but it's more like you said trend and probably people don't know what they were talking about when they talked about it because on the whole like logistic, humanitarian logistics side and everything, it's also the. Problem, like a lot of people, actually don't know what they're talking about when they say Humanitarian logistic. They're just like actually can be so many things and you could see that the definition on the website of Red Cross UN and MSF is actually not even the same. So you were just like, OK, we start on the wrong foot here, but yeah, it's it's good. And so that was something we're thinking with my promoter is that do you feel like corruption? Is something that affects all those projects.

Li : Well, I I teach the course of what law and governance I give assignments to students every year. During the past few years, I have seen that in many countries, especially in Africa. Africa countries corruption happened. Yeah, very often and Also affected the the Projects. But in China, as long as I know, there are less corruption. But yeah, back to the NBA's topic. Responsibility for topic and corruption. That's not not corruption, but something else. For example, in in in China you can use the Sponsor City project. If you you achieve some effects, you can use that whole programme to mobilise more funding. For example, from the central government. But this funding was supposed to use on sponsor city projects in the future, but then you Somehow some I don't know how. What they do then they don't use this funding which were generated from sponsor City, from small city programme they use funding is something else. So this is not a corruption but they this is how they play the the fundings. And at the first individual level, corruption in China? No, I I'm not aware of that because the consequence Of corruption? Yeah, it's it's huge.

Lu : OK.

Li : Especially the because China is the one party country policy, the the the Communist Party, the party discipline is very strict so You can easily go to gaol. But I would. I would. I wouldn't say that there there's no corruption, but I don't know.

Lu : okay And for the economic side of all these projects, do you feel like for long term viability of the project they should integrate uh private sector because you said they don't have enough money and that's also like a problem in Jakarta, Bangkok Hashim and it's like they don't have money. And so do you feel like the only way for long term viability of this project is to actually insert private sector in the whole thing?

Li : Yes and no. Yes, because not because in China they don't have money or in Asian countries, actually in Europe I was in Conference 2 days ago talk about the NBS Finance finance and you see. Yeah. The the the long term effects cannot be insured. So it's really difficult to mobilise the private private parties. This is the this is the threat. Now you need to as a country you need to do more, for example to have more stable legislation or regulation for the public private partnership and to ensure the certainty to provide the certainty for the private. This but this these kind of things want to be solved overnight. It can take a very long time. I think what would be more efficient to look? Yeah, not only the the finance part, but the core creation in order to to sustain the the effects or sustain the projects. Because if like what you said, if you were not involved in the projects and the the the infrastructure infrastructures can be damaged or destroyed by the public, so if your involvement I was in the sightseeing in the project is a small neighbourhood.

That that actually Is a small neighbourhood with the park or small forest, which provided by diversity, also recreation. They were mentioned very well and with low cost because they involved all those. Not all seems or I'm not sure, but the stakeholders and they considered, for example, the gender balance in the corporation for example. Moms with the children, what kind of facilities they like and the men for the jeans, those kind of things. They also consider the, the, the balance of gender. So in that case, the park Is going very well. Low maintenance cost and also sustainable management. So it's not about not only about the the finance part. That park was actually financed by the government, but now with the low maintenance cost. There's this book added.

Lu : That's interesting because it means. That by integrating so all stakeholders actually the maintenance after was not, I mean it's still a project from the government but the maintain was done by the local population because they were integrated in the whole process. OK, that's cool. Because it's actually what I'm I'm trying to study and how to create it because of course I don't think I'm gonna like, I mean, it's impossible to change the whole city, but if it's how to create like those holistic projects and at one point because the maintenance is super important, if you just. This this park be and at one point it will just be trash and the be useful anymore. And the whole point of also creating happiness and a better life for the people around this is getting lost. So that's That's nice. So the whole like the, the the stakeholders were involved during the whole process and they are the ones who did the maintenance and ensure That what was Actually, given was something useful for them.

Li : Yeah, yeah, yeah. If you are interested in this part, you can cheque out the the code creation literature. There's also a lot of case studies and discussions behind this core creation.

Lu : OK. And how did they do like the whole like with so the government funds the project, but how do they do like the whole thinking about this project in corporation, how do they how?

Li : Did they do it? Sorry.

LI : In that case, the park was abandoned by by a railway company because the railways are not used anymore and they left. Then the government bought back the land And start to grow trees and And also that neighbourhood was the low income neighbourhood. I I I don't Know clearly how they started, but the story was was that it's abandoned place the government brought back and they somehow have the study funding. Yeah, the the the land was abandoned. There were

neighbourhood. They start to grow like wait for the gardens Along the just Not in scale, just here a little bit here a slot. They started from from that and then government bought it back and started to to To systematically design this, this, this, that, that place, the architecture or urban designers are involved in also the stakeholders. So slowly, slowly became like this.

Lu : OK. That's that's nice to know. OK, they bought bike there, OK. OK, that's that's good to know. But yeah, I will look more, but on Co creation literature because it's really could be interesting to dive a little bit more in this kind of literature for the for the rest.

Li : Yeah, sort of positive examples and take as your studies.

Lu : OK. And uh, yeah, so that's that's good as well. I'm looking at everything that we already talked about. So I don't ask it again that that's something do you feel like the level of awareness and knowledge about? Uh flooding? Uh is uh high? Or is a little bit basic in Asia?

Li : What? What? What's what's sorry I didn't.

Lu : So do you feel like, do you feel like the awareness and knowledge about flooding in Asia is high, like they have a really good knowledge about it or is it quite basic?

Li : In Asia, I don't know. I can say something about China and the Netherlands. So if you compare Chinese to the Dutch, definitely their awareness is much lower because in in Netherlands, everyone can talk about the flood. But these two countries also have a common assumption. It assumes that the responsibility of managing flows should be the state. So in China as well. So the state should be. Well, actually, yes. In the in the law, it's written, the state is responsible for managing the flag and protecting people. Both in the Netherland in China, individuals don't realise they can also contribute to mitigate the plants, for example, to have less left garden or to green roofs. If you compare to this two is aspects that people do much better, especially the municipality. You can get subsidies from the green roofs and. If you remove your tile within the summer, remove the remove removed our tiles from our garden. You can exchange plants in the I think in Belgium. Also such a programme it's called Tahoe Weapon.

Lu : OK. Oh, yeah. That's maybe for the. Uh, the Dutch part of Belgium and in the French part it's it's quite different. It's almost like if there's two country in one.

Li : OK. This is is interesting programme. I think it's very interesting, like our one dial can exchange 2 plants at the most. You can deliver 10 tiles. So we exchange like, yeah, 20 plants. Have this kind of things that's that is subsidised by Dutch government, but in China, because you don't have this kind of things, local government won't want to finance these things. So this two Side Story on the one hand people. Don't have awareness on the other hand, as governments, you don't have to enhance this kind of awareness. But if you see look back the long run, the awareness has been increased very much. There are also some research to support it, but in general I would say It's still too low.

Lu : OK. OK, that's good.

Li : And also in the Netherlands, although it's high, but it's not high enough, still has.

Lu : To yeah, there's always room, that's for sure. OK. And for for you, what could be like? So when we talked about Co creation, what are like the key factors to for you to? Creates a Co creation and that's that would work.

Li : I think It's really a tired process you need To talk to people Always talk to people who live there. Understand what they really need. And that's the most important factor. As long as you make something What they need, and that can be sustained.

Lu : OK. That's good. Yeah, that's nice. OK, well. I asked everything I needed to ask, so I don't know if you have anything to add on floating. What our government, what our governance Co creation or natural based solution that you think could be interesting for me to know.

Li : Do do you already have your research question?

Lu : Yes, I'm going to put. I'm going to put it in front of my eyes because it's long.

Lu : If you ask, a generalist too, is too general. I cannot answer it, but if you have a question I I can see if I can help give you some tips.

Lu : How can the implementation of Blue and Green infrastructure in fully urbanised Southeast Asian coastal cities be affectively facilitated and accepted by the local population to enhance resilience against flooding?

Li : Oh, that's a big question.

Lu: Yeah, it's huge and we'll probably like kind of like we talked about it with my promoter and we'll probably like kind of slim down the the question. But yeah, the goal is to keep like a really holistic view on the whole situation. So it's kind of hard to know, to know, dive too much. In the project and try to keep like this holistic view on the whole Thing, because the goal is then to give it to other people that would dive in specific topics of the whole question. So yeah.

Li : Yeah, I think. But I don't know if I can give any deep. I think no matter in which City because you talk capital cities. It's already very many and you first you need to understand the causes of the problem. For example, in China urban flooding. As many it's actually not caused by well, especially caused by the the the grey infrastructure as it's many it's not the main reason. It was mainly caused by the the agent, the agent use structure on the ground, the pipes. So if you change that, it's already Helped a lot. So it's not a differently because a grey infrastructure, in other words, it's that you you build everything green, you don't change the pipes, it's still the they won't work, at least won't work effectively. So first you need to understand the what caused the problems in these different cities. It's really because they're packed too much, or only because they pepped too much, or because the underground infrastructures, or because something else. So that there would be different approaches. I'm afraid the blue-green obstructor Alone is not enough.

Lu : OK.

Li : Or you cannot. Evaluate how much percent it contributes to the whole thing. I don't know unless you ask me.

Lu : No, I think that's that's Indeed really important to keep in mind. That's all the infrastructure that are already there should be maintained and also well well used, yeah, it's. But when I am I

read a lot about the blast floodings. In multiple cities and every time you're like, yeah, but this canal didn't work because of this. These pipes were all clogged because of waste. And this this alarm system was not maintained, so it didn't even work and so you realise that there's a lot of things that are already there. It's simply not working, so that's of course something that I'm going to talk about. But that's also why I'm trying to see how well with cooperation, how blue-green infrastructure can part in a really, like, holistic process, so. Maintenance kind of become natural and I feel like in green infrastructure since and it's something, I mean it's it's something that's physical, that's quite hard to repair. That's can be really costly as well. I mean it's super expensive to repair some of them. That in natural based solution you have.

Li : But this feels great. Sorry for the interruption, otherwise I forget it's not necessarily true that it's hard to maintain. For example, the the park I I talked it's it's almost maintained by itself it's it's called maintained by nature itself. So once the whole system. There and the the, the, the. I don't know how to say that that by diversity there. You don't need to put A lot of efforts that matter by themselves.

Lu : OK. And yeah, it's. I'm thinking it's good to know. Yeah, that can be interesting as well. OK. Yeah. Yeah. OK. OK. I keep that in mind. This this project is huge. There's too many things going on in my head. I'm just like, OK, this and that. I mean, I don't feel like I have more question to ask. Any how I guess if I have a question that pops up later I could send you the question. Yeah, and and thank you for all the tips. I will look at it to. Yeah, To make it even better.

Li : Yeah. Good luck for your writing. I would like to read your your your final.

Lu : OK, OK. Well I will send it To you for sure. OK. OK. Well, thank you very much. It helped me a lot and have a great day.

Li : Yeah, you too. I also learned very much From you, OK.

Lu : Well, that's good as Well, thank you and I will send to you my thesis. It will probably be in August, so you know, so yeah.

Li : Thanks. Thanks. Bye. Thank you.

Lu : Bye Thanks

INTERVIEW 3: SANDRA SOARES FRAZAO

L : Bonjour, vous allez bien ?

S : Oui oui très bien. J'ai un autre appel à 18h donc faut pas trop trainer.

L : Okay pas de soucis.

S : Mais explique le contexte de. Tout au moins.

L : Oui, oui, oui, oui bien sûr. Donc voilà donc moi je suis allé à la LSM, j'ai fait ingénieur de gestion, et. Alors on va dire que je n'ai pas le parcours typique d'ingénieur de gestion qui veut terminer chez des Deloitte ou Mackenzie. J'ai mis énormément en question mes études et ce pourquoi je voulais les utiliser. Voyez et donc aucun, je suis allée en Suède, à LTH, dans la

faculté d'ingénieurs de Lund et là et c'est aussi pour ça que me postulé là-bas, ils ont tout un une partie ingénieur qui est ingénieur pour la gestion des désastres naturels et donc c'était super intéressant parce que voilà, j'étais avec des ingénieurs architectes, des ingénieurs civils, des ingénieurs. Ben, voilà de gestion comme moi. Ça été super enrichissant et ça été le début de mon intérêt pour l'humanitaire et les désastres naturels. Donc j'ai voulu réaliser mon mémoire dessus mais plus spécifiquement vers les inondations. Je suis assez intéressée par tout ce qui est relié à l'eau. Enfin, je trouve ça hyper intéressant et enfin, j'ai toujours aimé l'eau de son général, mais je trouve, c'est une force tellement intéressante et tellement puissante. Et. Et donc on continue dans toutes mes recherches, c'est comme ça que Ben voilà. On Asie particulièrement en Asie du Sud-Est, c'est à dire, c'est une zone qui est assez prône aux inondations, aux sécheresses. Enfin voilà, y a y a plein de contextes qui rendent la zone assez compliquée, donc je me sers assez aux villes côtières ou la plupart. Ben voilà le problème de la montée des eaux. Les villes, en fait, qui sont en train de Ben de couler et donc je me suis intéressé en fait, à comment les infrastructures naturelles, donc les Blue Green infrastructure, commencent à pourrait venir en complément des infrastructures grises pour faire en sorte que les villes deviennent plus résilientes et en fait enfin, toutes les analyses montrent que à un moment, Bangkok ça n'existera plus, hein. Mais comment faire en sorte que ce ces dates soient quand même prolongées pour pouvoir faire la transition petit à petit ? Et c'est rendre la vie des gens de là-bas. Plus plaisante, mais clairement, on sera dans ma conclusion que Bangkok. Enfin, je crois, d'ici 100 ans, allez, 150 ans, c'est fini.

S : Je prends aussi l'exemple de Jakarta, oui, c'est déjà en train de déplacer la capitale.

L : Oui ouais, mais ça, c'était assez enfin chouette. J'ai rencontré beaucoup d'Indonésiens durant mon Erasmus qui viennent de Jakarta et donc je les ai recontacté. On a parlé de tout ça. C'était assez intéressant d'avoir leur point de vue vis-à-vis de tout ça via la détresse et en fait, ils essayent tous de d'avoir des boulots en Europe pour quitter l'Indonésie. Parce que cela bah Bangkok dans 25 ans, ce sera la même chose et tout ça donc et puis, les régimes très hiérarchiques les intéressent plus. Mais donc voilà, c'est arrivé aussi à tout ça, de comment on fait rendre la transition aussi plus facile et aussi en fait au final, donner un exemple très extrême t'essaies d'en des conditions assez extrêmes de ce qui pourrait être utilisé dans de. Parce que souvent, le problème c'est que on fait des tests. Ben voilà aux Pays-Bas, mais la quantité de pluie qui a Bangkok et la quantité de pluie qui est aux Pays-Bas, c'est pas comparable et donc c'était vraiment essayer de prendre ce cas assez extrême et de voir comment on peut implémenter tout ça en cocréation pour que la population comprenne aussi mieux. Parce que là j'ai beaucoup de thaï. Beaucoup d'Indonésiens en fait, qui ne comprenaient pas non plus l'urgence de la situation, à quel point en fait ça, ça n'allait pas et qui sont très fatalistes. Et donc voilà de comment amener tout ça dans une façon de cocréation pour amener les infrastructures naturelles de façon light, acceptée de tous, et aussi amener une sorte de processus de transition long terme. Donc, voilà, ça c'est un gros thème. Je sais que je m'intéresse en énorme terme. Thèmes, pardon mais ça m'intéresse super fort. Enfin, c'est hyper intéressant, mais je reste dans une vue très systémique du problème. Je n'ai pas très fort.

S : Oui, ne pas directement dans les solutions, c'est.

L : C'est plus une sorte de plan. Comment intégrer ça ? Il y a énormément du coup sur la cocréation de comment amener le fait que les gens comprennent mieux de comment décider d'où on met quelque chose, et cetera. Donc c'est vraiment un plan très long terme, mais c'est un

peu donner une direction et donc et aussi quelque chose que je trouve assez important, c'est de montrer que même. Si oui, un moment y aura plus Bangkok et cetera de comment ramener aussi de de l'espoir dans toute cette chaîne de que les enfin que voilà que ça n'a que d'enlever cette image fataliste et de voir ce qui peut être aussi tirer de tout ça et d'imaginer des futurs meilleurs parce qu'il va falloir s'adapter, hein ?

S : OK, donc oui. Et du coup, quel genre de question est-ce que tu vas me poser ?

L : Alors donc voilà, moi j'ai fait une gestion pour voilà tout ce qui est gestion en tel projet, la Cocréation, tout ça de comment amener les gens dans. Dans le bain, ça n'a pas trop de soucis, mais moi le moment où je deviens un peu plus à court bien sûr, c'est pour tout ce qui est. Mais voilà enfin plus Ben les infrastructures en tant que telles, comme on les installer, les données géospatiales comme on les utiliser et donc c'est plus vers tout ça que ce sera tourné. Parce que voilà moi sur ça, Ben je manque un peu de notions. Et donc voilà, je me disais qu'en premier, ce serait peut-être pas mal que vous introduisiez en général et vous dites sur quel travail vous êtes en en cours pour le moment sur quelle ? Recherche, voilà, voilà.

S : Ok. Et Ben, donc moi d'abord j'enseigne l'hydraulique ici à l'EPL à l'école technique de Louvain, donc tout ce qui est en lien avec les écoulements d'eau et avec des recherches qui sont vraiment orientées sur les crues et les inondations. Modélisation de la propagation des crues, des inondations avec. Ou sans transport de sédiments puisque quand les sédiments sont charriés par les rivières, ça peut provoquer des dégâts encore pires, sa maison inondée d'eau claire, ça peut juste sécher, inonder d'eau avec de la boue. C'est encore pire et donc on mène pas mal de recherches assez fondamentales là-dessus pour caractériser les écoulements. Mais alors, il y a aussi toute une série d'applications, on est en cours maintenant puisqu'en Belgique, on a connu de grosses inondations en 2021 et donc il y a plusieurs communes belges qui se posent la question aussi de la manière d'adapter le territoire à des conditions qui pourraient se reproduire. Parce que. C'est clair que ce n'est pas un événement isolé, ça, ça peut se reproduire. Et donc on est, on est amené à travailler enfin là je suis en train de finaliser un projet avec les urbanistes du create. On a été mandaté pour travailler sur les communes de Rochefort marche et Nassogne pour comprendre ce qui s'est passé suite aux grosses pluies de de 2021. Comprendre l'origine des débordements. Donc on travaille sur les communes de de marche Rochefort et Nassogne. Ou on a refait des modélisations d'écoulement pour essayer de réfléchir aussi à ce qu'on peut adapter. Donc typiquement les questions que se posent les communes, c'est, il y a des zones qui ont été touchées et qui n'étaient pas dans les cartes de zones inondables. Pourquoi est-ce qu'elles peuvent encore être inondées ? Est-ce qu'on peut autoriser à reconstruire là-bas ou pas ? Comment est-ce que on doit reconstruire là-bas ? Est-ce qu'il faut construire autrement et. Ce qu'on peut ? Par l'aménagement du territoire, essayer de réduire les risques. Donc ça, ce sont les choses dont je m'occupe et en parallèle de ça, je travaille sur un projet avec Bill Wiese, donc Bill web. C'est l'ancien CSTC qui est en charge de l'établissement des normes en Belgique. Alors on s'est rendu compte qu'en Belgique on a une norme pour calculer la résistance des bâtiments en face aux charges dues au vent par exemple, mais rien pour les charges du HALLEUX et donc là il y a un projet financé par le fédéral Pour essayer de de réfléchir à la manière d'avoir une norme pour calculer les efforts du HALO puisque on va pas pouvoir empêcher toute construction où reconstruction en zone inondable, on a des bâtiments qui sont dans des zones inondables, donc qu'est-ce qu'on peut faire pour les, pour les protéger sans devoir les raser ? Et donc tu dirais que ça c'est un peu complémentaire ? Il y a d'une part l'idée

de d'un naturaliste solutions ou des armes bleues, bleues et vertes. Où là, Ben on travaille à l'échelle de l'aménagement du territoire pour le rendre plus résilient, mais en même temps, on doit réfléchir aux infrastructures et aux habitations qui sont déjà dans des endroits sujet aux inondations ou en zone inondable. Et qu'est-ce qu'on peut faire pour les protéger ? De quoi est ce qu'on peut les protéger ? Essayer d'évaluer le niveau de protection, par exemple à Rochefort enfin, Jemelle, une des questions qui se posent, c'est, est-ce que ça vaudrait la peine de construire un mur de protection le long de là de la was si on le construit ? Ben. Si on devait se protéger d'une crue comme celle de 2021, ça ne sert à rien les gens. Voir un mur gigantesque devant eux. Et puis ça ne va pas forcément tout régler, mais un mur plus petit et ce qui peut protéger contre des inondations qui ont des temps de retour peut-être un peu moins grands, mais ça peut quand même limiter le nombre de fois où les les gens sont inondés, c'est-à-dire réfléchir. Mais en parallèle de ça, il y a la réflexion aussi de savoir tiens, mais si, au lieu de mettre des murs, on donnait plutôt davantage de place à la rivière, on végétalise. Avantage les berges pour freiner l'écoulement. Est ce qu'on peut où élargir localement cours d'eau ? Est-ce qu'on peut, à travers ça à la fois améliorer le paysage et réduire le risque d'inondation ? Donc c'est une réflexion. Sont en cours ici aussi. Et oui voilà, c'est sur ce genre de projet que je travaille.

L : Ouais bah écoute c'est trop bien mais c'est ma seule chose que ça arrive de plus en plus également en Belgique mais du coup pour rebondir sur ça. Donc pour tous ces genres d'infrastructures donc qui sont plus Ben voilà, naturels et moins. Mais voilà des infrastructure grises, donc des murs, des canaux, des barrages. Pour vous, c'est quoi en fait les plus grosses barrières d'implémenter ça dans des zones urbaines. Voilà je ne sais pas, c'est avec vos recherches. Y a déjà eu des choses, vous dites là, ça c'est. Quand même plus compliqué, et cetera.

L : Mais en zone urbaine, si là c'est qu'on a déjà un réseau de drainage urbain, donc réseau de collecteurs, les égouts. Qui est en place, qui est fixe, qui est sous le sol avec les pluies qui augmentent ces derniers temps, donc la, l'intensité des précipitations parfois augmente ou leur durée. Donc on a plus d'eau et on a on a en plus tellement imperméabilisé les sols que parfois la capacité des collecteurs ne suffit plus pour ces pluies. Donc on observe de plus en plus souvent des inondations. En milieu urbain. Alors l'idée avance, c'est dire. Ben on augmente la capacité des collecteurs seulement augmenter la capacité des collecteurs, ce n'est pas poss. Puisqu'ils sont sous terre, il faut faire des travaux énormes et ce n'est pas durable comme solution. Du coup, on revient de plus en plus à l'idée de de favoriser l'infiltration, y compris en ville, et donc d'essayer de verdir les villes parce que ça va permettre de de réduire la quantité d'eau qu'on va envoyer dans les collecteurs ou d'avoir des zones même en ville, qui peuvent stocker de l ? Alors ça peut être à travers des exemples très simples, une plaine de jeux qui est légèrement en dépression parce qu'on sait que si il pleut, y a pas d'enfants qui iront jouer et cette zone peut être conçue pour stocker une certaine quantité d'eau comme un une sorte de lac qui va se vider quand la pluie s'arrête et donc c'est toute cette quantité d'eau et ça passe se retrouver immédiatement dans le dans le réseau de collecteurs, on retarde en fait l'arrivée de l'eau dans les collecteurs, donc on diminue le débit qui qui est là et on. On essaie de permettre à l'eau de s'infiltrer. Et de ou de disparaître autrement, mais en faisant ça en même temps, on verdit la ville, donc on aura le nombre d'espaces verts. Ce qui a aussi comme avantage de réduire la température dans les villes parce que c'est un autre, un autre problème et en mettant plus d'arbres plus de végétation. Il n'y a pas que l'infiltration qui va être augmentée. Il y a aussi l'interface. Si on parlait plantes quand il pleut, exemple, on voit, y a toujours toute une série de gouttes

d'eau sur les arbres. Ce sont des gouttes d'eau qui. Ne sont pas tombées par terre qui vont. Après s'évaporer, qui ne vont pas se retrouver forcément dans le dans le réseau de collecteurs. Donc, on retient aussi davantage l'eau avec la végétation et donc il y a tout un jeu à faire là, en en apportant davantage, en laissant de nouveau plus de place à la végétation dans les villes pour réduire l'eau et enfin pour réduire les effets néfastes de. Nous, alors, ça va aussi avec l'idée de redonner de la place à certains cours d'eau dans les villes. Il y a beaucoup de villes dans lesquelles on a enfoui ou caché les cours d'eau sous terre, la Seine, qui est murée à Bruxelles, la même chose avec les nombreux canaux à Anvers. Mais maintenant, on essaye de remettre en tout cas Anvers. Il y a beaucoup de projets pour remettre ces cours d'eau à surface libre pour que la population voie l'eau dans la ville parce que le problème c'est qu'avant, on cachait l'eau et donc l'eau n'arrive. Que quand elle est un problème, quand elle déborde, quand il y a des inondations, alors que si on montre l'eau dans la ville. Ben on apprend davantage à vivre, à vivre avec.

L Ouais Okay

S : Et donc c'est un peu ce genre d'idées qui sont mises en place à d'autres échelles aussi en en Asie du Sud est bon, il y a des villes comme Singapour qui sont très avancées là-dedans et. D'autres, beaucoup moins.

L : Il y a d'autres. Il n'y a rien. Mais qui être et du coup enfin donc là c'était. Mais les points positifs, ça, vous l'avez déjà un peu abordé et aussi c'était une question, c'est parce que voilà dans toutes les infrastructures que je voyais y en a certaines. Je me disais enfin, ce n'est pas possible en ville et donc pour vous, est-ce qu'il y a une limitation du nombre de solutions en ville ou c'est simplement les. Adapter de manière différente. Voilà pour vous.

S : Par exemple, auquel tu pensais, pas possible

L : Mais il y avait enfin, en fait, il y avait des villes ou simplement je me disais, avec la densité de population qu'il y a, ce n'est pas possible de remettre des énormes parcs, de réinstaurer des rivières ou de remettre. Mangrove. Voilà, je me disais enfin, je ne voyais même pas en fait, en regardant les cartes où est-ce que ça pourrait être remis ?

S : Et il y a des initiatives, comme un toit ou mur végétalisée par exemple. Et donc ça, ça permet aussi bah pour autant que le bâtiment soit capable de résister à ce point-là, ça permet de réduire la quantité d'eau qui va se retrouver dans les collecteurs puisque l'eau reste sur les, les toitures et nourrit la végétation et permet alors après l'évaporation, donc là c'est utiliser un espace sur lequel on n'a pas pensé à priori à mettre de la végétation. Ce qui se fait aussi à certains endroits, c'est de réduire la largeur des boulevards. On a parfois fait des. Des avenues très, très. Plus large, on peut les réduire pour redonner plus de place à des espaces verts et réduire la circulation automobile. Ça s'est fait aussi dans certaines villes qui ont voulu redonner plus de place à la mobilité douce, donc ça va de pair avec ça. On installe piste cyclable bordée d'arbres, on réduit la place de la voiture, on a du coup planter des arbres, on permet la mobilité douce et donc tout ça, tout ça va ensemble. Donc il y a moyen. Alors c'est vrai que bon, c'est peut-être. Plus difficile à imaginer dans certaines villes ? Mais il y a y a moyen quand même, et parfois bah par exemple en installant quelques bandes en herbes, en essayant de redonner un peu de place à la végétation. On se rend compte qu'on peut améliorer les choses parce que ça contribue à diminuer la température aussi, et ça d'être bienfaits. Il y a aussi des inconvénients. Il n'y a pas que des

avantages, donc un exemple c'est à Montpellier, ils font beaucoup de travaux dans ce domaine-là aussi donc c'est dans le sud de la France. Montpellier connaît souvent des inondations. Il y a toute une série de quartiers à Montpellier où on a des échelles de graduation. En mesure de niveau d'eau même dans la rue et donc l'eau peut monter assez haut. Tout un plan pour fermer toute une série d'accès à certaines rues quand il y a des alertes de pluies importantes, ils ont rajouté des pas mal de zones de stockage d'eau qu'on ne voit pas toujours forcément. Parfois, c'est une zone qui a l'air d'être un terrain vague, mais qui est en fait une zone de stockage d'eau, donc on ne peut pas bâtir. Mais alors ce qu'ils observent, c'est que maintenant, avec le développement de zones comme ça, il y a de nouveau plus de moustiques. Et. Et donc il y a d'autres problèmes, d'autres difficultés, qui se posent et il faut alors trouver le bon compromis, la bonne manière de gérer tout ça. Certaines personnes se plaignent d'un moustique à cause de cette solution, donc il faut y penser aussi.

L : Vraiment, ça va, c'est, mais c'est un truc qui m'avait marqué quand j'ai demandé du coup aux thaï et indonésien, voilà vous parce que j'aimerais bien leur demander. C'était vous votre ville utopique. Jakarta, si vous devez la dessiner, vous elle serait comment ? Et parce qu'il y en a plusieurs, elles étaient un peu enfin, ils avaient du mal à s'imaginer leur ville autrement. Mais quand la manière. Pourquoi faisons d'ailleurs Ben pourquoi vous l'avez imaginé ? Le typiquement comme ça, ils disaient tous, mais on ne sait pas aller dehors la journée parce que là il fait tellement chaud, y a que des rues tout et des tout est dégueulasse, il y a du plastique partout et là et il y a que quelques petits parcs mais il y a tellement peu de végétation, c'est allé que tout le matin ou tard le soir tout est pas propre, il y a tellement de bruit et il venait de tous tout le temps avec. Le fait de. Pour Bangkok, c'était enlever les routes et remettre les fleuves, réapprendre à vivre avec. Le fleuve et remettre des parcs, mais avec une densité tellement forte de d'arbres en fait qu'il pourrait être là. Il a dit, moi, mon pied, ça serait comme quand j'étais venue l'été, passer en Europe, je peux être à 12h00 dans un parc. Et je peux manger ma salade ? 12h00, dans un parc et à la sortie du boulot remonter et je peux aller en vélo parce que là aller en vélo dans Bangkok, c'est mission suicide et c'était assez et c'est assez interpellant parce que en fait c'est des enfin, c'est des biens basiques et. Et il ne l'avait pas et pour eux, la seule façon dont ils pouvaient s'imaginer l'avoir, c'est aller en Europe. Ah oui, c'est parce que ça, il n'y a personne qui l'imagine comme ça et corruption, machin.

Oui, mais ce qui montrait souvent comme exemple, c'était de fait Singapour, la Malaisie, de plus en plus aussi. Et Ouais, le Japon et la Corée, et c'était à chaque fois ces pays-là qui revenaient.

S : Mais il y a moyen de faire bon. Parfois, des tentatives qui ne marchent pas complètement, mais la ligne de train, ici vers Bruxelles, quand on passe aux alentours de tigny enfin un peu. Avant, il y a. Dans le nouveau travail qu'ils ont fait. Ce sont tous ces espèces de bacs à fleurs sur ces côtés, les talus, au lieu d'avoir juste un mur en béton qui soutient ça, ils ont voulu faire quelque chose de végétalisé. Alors ça ne se passe pas tout à fait comme prévu, mais y aurait peut-être moyen de faire en sorte que ça se passe mieux puisque l'idée était que ce soit tout, des pots de fleurs enfin pas, pot de fleurs, mais des bacs avec la terre dans laquelle la végétation. Installe et puis recouvre le mur. Non, ils ont compté sur uniquement la nature pour que ça se mette en place, donc ça prend un peu plus de temps. C'est un peu n'importe quoi qui pousse et ça ne fait pas forcément une belle couverture mais peut être qu'à un moment on va y arriver et ça donnerait au lieu d'avoir un juste un mur en béton, quelque chose de plus végétal.

L : Okay de faite je n'avais pas pensé à ça et pour vous les clés de succès de l'intégration de ces principes quelles sont-elles ?

S : Bah les clés de succès c'est d'abord que le gouvernement en soit convaincu et la population aussi. Enfin, c'est que tout le monde en soit convaincu parce que ça, ça demande des efforts, ça demande de changer ces habitudes. Et pour ça, il faut tout le monde en soit convaincu. Le gouvernement doit en être convaincu parce qu'évidemment, ce n'est pas quelque chose de rentable à court terme, donc ça va pas rapporter d'argent et c'est ça la grosse difficulté de ce genre de projet, c'est qu'il n'y a pas de rentrée financière immédiate donc ils ne peuvent pas dire si on fait ça, on va gagner, gagner autant. On va améliorer la qualité de vie, mais améliorer la qualité de vie, ce n'est pas quelque chose qui se chiffre facilement de manière monétaire. Et donc c'est plus difficile de convaincre. En plus, ce sont des investissements à long terme. On ne peut pas dire que parce qu'on décide d'installer un parc ou quelque chose de végétal à un endroit, qu'instantanément ça va marcher, la végétation met du temps à pousser, à installer des arbres. Ben ça, ça met, ça met du temps à pousser et donc les effets ne sont pas immédiats. On a des inconvénients pendant la période de travaux et puis des effets qui ne sont pas immédiats et donc il faut vraiment avoir confiance et pouvoir tenir à long terme et ça c'est très difficile. Pour les autorités publiques. La population qui, elle, s'est en difficulté parce qu'elle est inondée, à des vagues de chaleur ou quoi veut des solutions court terme immédiates. Donc il ne voit pas forcément l'intérêt de solutions comme ça et c'est là que c'est. C'est difficile, donc il faut essayer de jouer un petit peu sur les 2 tableaux. Ben on. Je crois que beaucoup par l'éducation, en montrant des exemples de projets de projets réussis là en Malaisie, moi ce qui m'avait frappé, ce qui est. Parce que j'ai eu l'occasion d'aller en Malaisie un peu avant les années. 2000. Et il parlait déjà de leur plan d'opoul d'Opoul donc 20 20 en 2020 mais déjà Céline disant Ben en 2020, la Malaisie sera un pays développé et tout ce plan-là a été mis en place. Alors c'est un pays évidemment, le régime politique ce n'est pas la grande démocratie, mais en même temps ils ont réussi à soutenir donc les progrès qui ont été faits. Allez, y sont assez impressionnants et ils continuent à mettre cette ligne de conduite en en avant en essayant de développer le pays. Je ne dis pas que tout se passe bien, mais ce qui est impressionnant, c'est la volonté et la constance de cette volonté depuis. Depuis plus de 20 ans et ça, c'est une condition qui peut faire en sorte que ça marche, d'avoir une vision à plus long terme et de s'y tenir. Et puis, pour que cette vision à plus long terme fonctionne, Eh bien, il faut informer, éduquer la population. Pour que les gens soient conscients que c'est un mieux qui va pouvoir venir de là, reprendre peut-être aussi et chance des exemples d'anciens, on voit de temps en temps des petits reportages comme ça où les gens disaient Ben avant, on avait beaucoup de poissons là-bas, maintenant plus et il y a des exemples de réussite. Dans un autre registre, le rein dans les années 80, il y avait à peu près plus aucun poisson dedans. C'est un fleuve mort et il y a eu beaucoup d'initiatives pour revitaliser le rein, des coopérations entre la France et l'Allemagne pour. Redonner au rein caractère plus naturel. Ben, ça marche. Y a de nouveau des poissons, il y a, il y a de nouveau beaucoup plus de vie, ça prend du temps mais ça fonctionne et donc utiliser des exemples de de réussite. Qui peuvent être partagés avec la population, montrer qu'on peut créer alors des plages au lieu d'avoir des berges bétonnées et des fleuves, on peut recréer des plages à certains. Le droit qui permet aux gens de se baigner. On pouvait plus se baigner dans leur âme, hein ? Y a des. Zones de baignade, utiliser des exemples pour réussir à convaincre la population.

L : Mais ça, c'est trop bien, vous le mettez en avant parce que c'est un des énormes points, c'est l'utilisation de l'intelligence collective afin de sensibiliser, informer et intégrer aussi tout le monde dans le Loop et donc vis-à-vis de ça c'est aussi pour ça qu'enfin c'est enfin, voilà c'est on sait bien évidemment. Ensuite je vais vous demander comment utiliser les données géospatiales dans ce genre de contexte ?

S : C'est bien simple, en fait d'avoir d'abord. Dans les données, je ne sais pas, c'est vrai qu'il y a de plus en plus de données disponibles et une donnée qui est essentielle, c'est, ce sont les modèles numériques de terrain, modèle numérique de terrain. C'est en fait Ben une vue aérienne ou en a une vue aérienne du terrain. Bon on a une série de pixels pour chaque pixel, chaque petit carré de l'image, on peut attribuer l'altitude du terrain. On connaît l'altitude et donc avec ça, on peut reconstituer ce genre de données qui permettent de faire des vues 3D dans Google par exemple qu'on connaît l'altitude des différents points. Mais ces données-là sont existantes sur la terre entière, maintenant fournies par la NASA, mais avec une résolution qui n'est pas toujours très fine. Là, la Maïeutique, c'est 30 M sur 30 M. Ça permet de faire une série de choses, mais pas d'avoir les détails. En Belgique, on a toute une couverture de la Belgique avec une maille de 1 M sur 1 M, donc tous les mètres partout on connaît. L'altitude du sol et ça, c'est très précieux parce que ça permet de savoir quand une pluie tombe. Quelles sont les chemins par rouleau vert ruisselé ? Et il va arriver et ça, ça nous aide par exemple dans une des études qu'on a dû faire pour les inondations du côté de marche, il y a un site, la ferme de la Commanderie qui a été, qui a été inondée et les gens se demandent pourquoi et comment, parce que cette ferme, elle est là depuis presque l'ancien âge, jamais eu de problème et pourquoi elle a été. Mais grâce au modèle numérique de terrain de la zone, on a pu analyser exactement la topographie et se rendre compte que cette ferme, elle est installée dans une cuvette, qu'elle est en plein dans le chemin de ruissellement principaux des eaux, puisque si on a toutes les pentes, toutes les latitudes, Ben on peut en fait virtuellement avec l'ordinateur, faire couler de l'eau dessus et voir par où l'eau coule et l'eau. Elle va toujours couler dans le sens de la plus grande pente et les eaux se concentrent ça qui ? Donne les rivières, donc on voit quelles sont les chemins par lesquels l'eau s'écoule. Et on voit qu'un 2^e chemin d'écoulement passe justement par la ferme. Il y a une route à côté qui fait comme une digue et donc en temps normal, au cours des pluies normales, il y a de l'eau qui arrive vers la ferme, mais qui peut s'évacuer. Mais quand il y a eu trop d'eau qui est arrivée et qu'en plus la One qui est à côté déborde, bah ça fait trop d'eau et le fait de pouvoir analyser ces données et de regarder sur une carte toutes les altitudes de pouvoir grâce à ces données tracées, les chemins d'eau nous permettent d'expliquer ce qui se passe et ça permet de Comprendre que si on met une digue à cette à tel endroit, ça va, ça va aider à guider l'eau autrement et ça va protéger une zone. Ça nous a permis aussi de voir par exemple, c'est un autre endroit, là c'est à fourrière, c'est sur la, sur la Lomme, il y a un petit pâté de maison qui est complètement inondé, qui a été complètement inondé. Qui est derrière une rue principale. Et sous cette rue, il y avait un Pertuis qui passe et qui permet de que l'eau rejoigne là l'homme de l'autre côté. L'idée des gens, c'est de dire Bah, il faut qu'on réactive ça comme ça, toute l'eau qui vient se stocker. Chez nous, elle part et rejoint la lame. Ben non parce qu'en analysant le terrain et les niveaux d'eau, on s'est rendu compte que toute façon il y avait autant d'eau de l'autre côté. Donc, même si on fait une connexion, il n'y a rien qui va s'évacuer et avoir ce genre de données permet de répondre à ces questions. Les gens peuvent avoir l'impression de Ah bah il suffit de faire un trou là et l'eau va s'en aller. Mais non, parce qu'on peut leur montrer avec des cartes en connaissant les niveaux. Non, ça ne fonctionne pas comme ça. On peut aussi à

partir de là donc si on complète les données, là on a parlé uniquement de données d'altitude, on a des données sur la couverture du sol, savoir si on a plutôt des bah, des arbres, des prairies et tout ça, ça va affecter le coefficient de ruissellement donc la capacité à faire couler l'eau ou à la laisser s'infiltrer et donc ça permet de calibrer des modèles hydrologiques qui à partir d'une pluie transforment ça en. En débit un peu plus bas si, il y a une si le sol a une grande capacité d'infiltration, on va avoir moins d'eau à l'arrivée que si on a si on a une capacité d'infiltration quasi nulle parce qu'alors tout va, tout va ruisseler. Mais ces cartes de couverture du sol, elles existent aussi dans beaucoup de pays. En tout cas, elles existent en Belgique, elles existent dans beaucoup de pays, donc elles permettent de de de de prédire plus ou moins ce qu'on va avoir comme. Écoulement toujours dans ce genre de dé. Mais on a la composition du sol qui permet de déterminer la capacité d'infiltration et y a des tas de données comme ça, on a les. Les réseaux de collecteurs urbains, les réseaux de d'égouts qui sont répertoriés aussi. Donc si on. Combine les chemins d'eau, de ruissellement et la connaissance des collecteurs. On sait aussi prédire ce qui va arriver comme mot en fait, il y a des tas de choses qu'on peut faire grâce à ces données.

L : Ouais, à peu près au final, c'est super superposition de données qui font qu'on a une vision vraiment globale.

S : Oui, c'est la combinaison de toutes ces données

L : Ok c'est vrai que du coup par rapport à ça enfin il y avait un peu par rapport donc enfin j'ai regardé du coup certains mémoires ou des projets de gens qui faisaient des visualisations géospatiales d'écoulement de l'eau, et cetera en Asie. Et chaque fois ça me paraissait tellement compliqué. Et donc je me demandais ce que vous pensez qu'en fait toute cette partie avant de d'analyser les données, qui peut être enfin maintenant du fait que c'est devenu beaucoup plus accessible ? J'avais fait joujou avec. Le site de la NASA et je n'ai pas compris grand. Chose hein, mais c'était. Assez, c'était assez cool en fait. Un pouvoir revoir tout. C'est comme ça. Est-ce que vous pensez qu'au final ça peut être un frein même à certaines décisions de dire qu'en amont il y a tellement il y a autant de recherches où vous pensez qu'au final, comparé à des recherches que pour faire un barrage, c'est moins voire exactement ? La même chose ?

S : C'est du même ordre, ce sont des études hydrologiques du. Du même ordre. Et en fait, grâce à toutes ces données qui existent maintenant, on peut beaucoup plus facilement faire ce genre d'études et les faire de manière beaucoup plus précise que ce qu'on faisait avant. On avait des cartes avec quelques courbes de niveau et on était limité dans les données. Puis rien n'était digitalisé, donc c'était beaucoup plus compliqué. Maintenant, avec toutes les données qu'on a, on peut faire beaucoup de choses. Et alors ? Ce qui est intéressant, c'est que même dans des pays où il y a peu de données, Ben il y. A au moins ces. Données de la NASA s'il n'y a pas de pluviomètre et qu'on ne connaît pas les mesures de pluie, Ben on a au moins. Mais donner des satellites de pluie qui permettent de se faire une idée de ce qui tombe sur chaque pays et donc ça, ça permet aussi de faire des études dans des pays dans lesquels ce n'était à peu près pas possible avant parce qu'il y avait pas de données, donc toutes les bases de données qui sont accessibles en plus de manière publique, s'enrichissent et permettent alors aux personnes et aux chercheurs de pays moins favorisés aussi d'avoir. Accès à ces outils et à ces à ces méthodes. Mais c'est ce qu'on fait dans les collaborations qu'on a. Haïti, par exemple, on essaie vraiment de développer toute une méthodologie à partir d'outils open source gratuits libres, pour pouvoir quand même aller le plus loin possible grâce à toutes les connaissances qui existent.

L : C'est ça, c'est Bon à savoir, parce que c'est vrai que en voyant tout ça, je me disais c'est peut-être potentiellement un frein. Mais donc c'est bien de savoir quoi non ?

S : Et moi qui vont être dépendantes maintenant en. Vain qui font des études. Population, c'est le flux-là qui utilise des données géospatiales qui font des données, mais qui font des. Des simulations d'inondation, c'est de reproduire ce qui s'est passé à Pépin sep là, les inondations à isoprène.

L : Parfait merci. Je ne sais pas si vous avez entendu qu'Une ancienne professeure de l'UCL, mais au niveau de la santé publique, qui a qui a reçu le prix de la terre bleue ? Qui a créé la base d'open source pour. Voilà, j'ai oublié le nom. J'essaie de me rappeler, mais du coup je me demandais enfin, voilà la fin, j'avais écouté toute son interview de la première et expliquait que voilà le fait d'utiliser des données géospatiales, c'est le futur pour les inondations, que c'est quelque chose qui commence de plus en plus à. Voilà, et donc je me demandais, voilà pour vous là, maintenant, est-ce que ça assez utilisé ce serait quoi potentiellement les futures technologies prometteuses et qui auraient.

S : Plus de cette base de données qu'eux maintiennent enfin, c'est. C'est vraiment extraordinaire, c'est super utile. Moi, je l'utilise dans des cours aussi pour montrer que le nombre d'inondations augmente et tout donc toutes les données collectées. C'est, c'est super. Et toutes ces bases de données qui existent permettent de. Bah de conforter toutes les preuves qu'on a, qu'il se passe quelque chose et on a besoin d'évidences scientifiques. On a besoin de preuves pour pouvoir aussi convaincre la population et les autorités. Donc, ces énormes bases de données sont très utiles et le fait de les rendre publics ça permet à tout le monde d'y accéder donc soit pas juste à un petit groupe de personnes privilégiées qui peuvent y accéder. Tout le monde y a accès donc ça permet de diffuser plus largement l'information. Alors dans le futur, Ben il y a des trucs comme je ne sais pas. Google essaie de développer un peu son flood up pour. Pouvoir cartographier le risque d'inondation un peu partout en fonction des prévisions climatiques, c'est vraiment encore très embryonnaire. Ce n'est pas super, c'est encore très vraiment de l'ordre du gadget, mais ça préfigure ce que ce qu'on peut faire avec les moyens de calcul actuels. Maintenant, les moyens de calcul nécessaires pour pouvoir faire une carte d'inondation. Ils sont quand même assez conséquents mais. On arrive à faire de plus en plus de choses, donc moi je crois quand même beaucoup dans le fait de rendre accessible et public toute une série d'outils, parce qu'alors ça permet de de montrer aux gens ce qui se passe et de de sensibiliser en fait les gens aux problématiques potentiels.

L : Ok. Et pour faire des études comme ça, de des zones potentielles des inondations au niveau du temps et du coup en général, c'est aux alentours de combien ?

S : C'est difficile à chiffrer, ça dépend vraiment de de la zone, du terrain, donc il y a une première étape qui est de récolter toutes les données, soit elles sont faciles, on a le modem. Numérique de terrain facilement, ne soit pas une fois qu'on a récolté toutes les données topographiques et de nature du sol, il faut créer un maillage pour le calcul, donc choisir une taille qui fait que les simulations ne seront pas trop longues, mais quand même assez précises. Et puis enfin, analyser les, les résultats et les présenter de manière convenable. Tout ça s'automatise de plus en de plus en plus. Donc dans certains cas, quand on a vraiment les données facilement, par exemple, on a déjà établi un modèle, faire un. Un scénario en p. En quelques

minutes ou quelques heures, ça peut être fait. L'établissement de tout le modèle au départ, lui, il prend un peu plus de temps, suivant l'ampleur de la zone.

L : Ouais et donc ouais, c'est vrai donc en fait le plus gros du travail c'est vraiment faire en premier le enfin le premier modèle et puis après normal. Ça va et donc pour une ville à l'aide de la taille de Paris, ça pourrait prendre en fait au final des mois quoi.

S : Ah oui, là c'est colossal parce qu'en fait Paris ce n'est pas une zone naturelle, donc simuler une inondation dans Paris, il faut réfléchir à ce qu'on veut simuler. Est-ce que c'est reproduire ce qu'ils font tout le temps ? La crue de 1910, qui est de référence à Paris, là, c'est la scène qui a débordé et qui envahit tout, donc par rapport à ça ajouter l'effet de la pluie qui tombe est négligeable quand on est au bord de la Seine parce qu'ils sont inondés par la scène qui déborde. Maintenant, si on veut, dans certains quartiers, représenter l'effet d'un. Seulement important parce qu'il y a une grosse pluie, mais que la scène n'a pas encore débordé, c'est autre chose. Ça va être une étude plus locale sur un quartier, mais là alors il faut décrire la topographie et la couverture du sol de manière plus précise, et il faut tenir compte du réseau d'égout parce que lui, il peut prendre une partie et ce qui déborde, c'est ce qui n'a pas été pris dans le réseau d'égouts, mais modélisé en détail. Le réseau d'égout n'a pas de sens si on veut faire juste le débordement de la Seine, on peut se contenter d'avoir les quartiers représentés de manière plus grossière, donc c'est difficile à dire. Ça dépend de ce qu'on veut faire en fait. Tout ça se prépare donc en fait, les personnes en charge de ses études, elles ont étudié à l'avance ou une série de scénarios. C'est ce qui se passe maintenant en Belgique. Enfin, dans les études qu'on fait pour marche, Nassogne et Rochefort, mais on va dire maintenant OK, si y a une pluie d'un temps de retour de 25 ans qui se produit, vous aurez vous risquez d'avoir un débit de. Autant si c'est un temps de retour de 50 ans, voilà le débit auquel il faut s'attendre. Et voilà les zones potentiellement inondées. Donc maintenant on est mieux préparé qu'avant parce que on a fait tout ce travail-là. Donc en fonction des pluies qui qu'on attend, on sait que des pluies de telle intensité se rapprochent de pluies référencées par l'i RM comme étant des pluies avec un temps de retour donné et on peut dire maintenant c'est plus là risque de donner un débit de telle ampleur et on sait que ça peut déborder. Ou pas ? Donc, on a fait tous ces calculs, mais ils sont rarement faits dans le vide. Ils sont souvent faits à la suite d'un événement et du coup on est un peu mieux préparés pour l'événement suivant, mais ce sont toutes des études. Faites alors en en période or cru, mais où on imagine toute une série de.

L : Scénarios OK ça et pour les données géospatiales ? Enfin je ne sais pas du coup si vous avez déjà eu des textes comme ça pour intégrer, voilà des infrastructures plus naturelles. Comment est-ce que vous les étudiez, pour se dire OK, cette CE n'est intéressante que vous prenez des endroits qui sont en général inondés, peu inondés. Est-ce que c'est un peu les endroits de passage ?

S : Ça dépend. C'est vraiment au cas par cas. On analyse le territoire, donc là par exemple, une autre étude avec un autre étudiant sur la commune de. De la commune de 2 l'idée, c'est de dire, on va essayer de laisser un peu plus de place à la hargne qui la traverse. Puis quand on regarde sur une carte la une, bah il n'y a pas de place donc on essaie de voir. Tiens, est-ce qu'il y a un endroit où on pourrait créer une zone d'expansion de de crue dans la ville ? C'est impossible, un peu à l'amont, ça semble possible alors avec des modèles numériques on peut tout faire, on peut abattre un pan de de falaise. Voilà en disant, Ben là on est, on installe une grande zone. Est-ce que c'est utile ou pas par la simulation, on montre que l'effet est limité, mais pour des

petites crues ça peut être utile. Après, évidemment, elle est coupée tout un pan de falaise, ce n'est pas réaliste, donc on essaie de voir sur la trajectoire du cours d'eau un peu plus à l'amont. Est-ce que. Des endroits où on peut créer des zones d'expansion, de crue et donc là, c'est vraiment un travail où on regarde sur la carte, où est-ce qu'il est possible d'installer quelque chose ? Et puis on simule l'effet de ce quelque chose en adaptant le modèle numérique de terrain puisque dans les simulations, on peut faire ce qu'on veut. On peut maintenant avril, on peut dire, là, je veux un bassin, Ben on adapte tout et on. Fait et on regarde les effets. On voit si c'est positif ou pas. Par exemple, ce qu'on peut, ce qu'on étudie pour 2, c'est de dire là y a tous des parkings. Ben est-ce que cette zone, si on dit qu'au lieu d'être de parking, c'est une zone d'expansion de crue ? Est-ce que ça aide, est-ce qu'il faut la creuser un peu plus profondément ou pas, pour stocker un volume d'eau plus important ? Donc c'est tout ça qu'on peut faire à partir des données géospatiales, c'est qu'on a, on a une cartographie détaillée, alors finalement c'est. Google, Google Earth. On regarde et on dit, là on n'a pas de maison, on pourrait se servir de ce terrain-là et on essaie. On teste des scénarios.

L : Ok, trop bien. Ok Bah c'est vrai que là.

S : Je devrais avoir un autre appel dans 5 Min.

L : Trop bien parce que c'est quasiment fini. Juste Ben voilà, vous pourrez juste dire ce que vous en pensez. Donc, est-ce que pour vous donc le fait de travailler avec la population ça donne enfin pour moi, vous l'avez confirmé avec tout ce que vous avez dit, mais est-ce que ça donne des informations importantes que vous ne serez pas à voir vis-à-vis de tous vos modèles ?

S : Ah oui, oui, oui, ça c'est clair. Enfin un bête. Donc là je vais avoir un appel avec 2 chercheurs haïtiens, mais qui sont maintenant en en en Haïti, on étudie les inondations dans une ville, là-bas, la ville de de Cavaillon. Ben c'est important d'y dialoguer avec la population. Là il y a des souvent des crises, il y a eu de grosses crues en 2016 parce qu'il y a un ouragan, Matthew, qui a frappé le. Pays très durement bien, les gens essaient de se mettre à mettre à l'abri où ils peuvent, mais ils ne savent pas où ils doivent, où ils peuvent se mettre à l'abri parce qu'on ne leur dit rien. Donc un des abris qu'ils trouvent. C'est par exemple, ce sont les églises. Mettent alors en quelque sorte, sous la protection divine. Mais si l'Église est à côté de la rivière, ça n'aide pas beaucoup et donc ça, ça a posé des problèmes, donc là c'est important de pouvoir informer la population à l'avance dans les termes que la population comprend. Si on leur dit, il va y avoir un ouragan de telle force, personne qui ne comprend rien, si on leur dit attention, vous risquez d'avoir autant de maîtres d'eau dans les rues ou dans votre habitation. Allez-vous protéger et voilà telle tel endroit qui sont des endroits. Ça, ça les aide et ça, on peut préparer ce travail avec des simulations numériques en disant Quelles sont les zones qui vont être fortement touchées, montrées, que non. L'Église qui est à côté de la rivière, elle ne va pas être protégée, mais que d'autres sites peuvent être plus protégés en leur montrant jusqu'où va aller l'inondation et ça, ça doit se faire en dialogue avec les autorités de la ville. Et puis. La, la population.

L : Ok très bien et du coup ça s'est amène à 2 dernières questions enfin c'est est-ce que vous pensez que du coup-là la confiance et l'implication de la population est un facteur clé pour avoir un impact long terme et aussi des données de meilleure importance ? Oui. Et est-ce que pour vous du coup-là le fait de faire des actions comme ça, plus naturelles ou on ramène de la nature, et cetera ? Ça peut ramener peut-être de la confiance de la population vis-à-vis du gouvernement local, sur la gestion des désastres naturels. Est-ce que pour vous, ça ? Peut-être quelque chose.

S : Oui, mais ça. C'est à plus long terme donc c'est enfin, c'est vraiment une co construction au gouvernement doit expliquer à la population que ça va permettre d'améliorer les choses, montrer des exemples qui ont fonctionné, pour donner confiance, et c'est quelque chose qui s'installe à long terme, mais ce n'est pas immédiat.

L : C'est plus long terme. Ouais OK trop bien Ben voilà, j'ai terminé. Ben merci beaucoup en tout cas pour la. Pour la réponse à toutes les questions et bon appel.

S : Pas de soucis et bon weekend

L : Au revoir bon weekend

INTERVIEW 4 : MARTIN DUVAL

L : Bonjour. Vous allez bien ?

M : Oui très bien et toi ?

L : Très bien. Peux-tu te présenter.

M : Bien sûr. Je m'appelle martin Duval et je suis le créateur de Blue Nove une entreprise française basée à Paris d'intelligence collective.

L : Merci. Je vais un peu t'expliquer le contexte. Donc j'écris mon mémoire sur les infrastructures naturelles qui pourraient être utiliser dans les villes côtières Asie du sud est pour mitiger l'impact des inondations tout en intégrant la population dans le processus.

M : très intéressant. Sur ce que tu viens de me dire j'ai pas mal d'idée je peux me lancer ? N'hésite pas à me dire si je m'égare.

L : Pas de soucis vas y

M : Alors Premièrement, je pense que il faut peut-être dire au fond une ville et puis un projet long terme comme ça, c'est une diversité de parties prenantes, c'est à dire ? Il y a il y a des décideurs, des élus, il y a les citoyens, il y a des entreprises, il y a des associations. Tu vois donc il y a. Il y a finalement on peut prendre cette intelligence collective en disant disant, tiens, je vais faire un peu déjà la liste. De cet écosystème puisque tu as parlé de de de côté, écosystémique, de ces en termes de puisque c'est un mot partie prenante, c'est qui au fond ? Tu vois donc je me dirais après histoire de déjà de les mapper un peu, de les cartographier juste comme ça, en liste simple pour dire voilà, c'est autant, c'est des experts sur ces sujets. Voilà des écoles des tout ça, c'est des typologies de parties prenantes dont on pourra plus tard se poser la question de quand et comment je les implique au fond, je. C'est un peu un premier réflexe que j'aurais de d'approche 2e chose aujourd'hui, c'est de se dire ce projet là, au fond, il a autant vocation à informer, former, sensibiliser, que à récupérer. Enfin, si tu veux, nous, on aime bien parler d'un continuum de l'intelligence collective et peut-être avec 4 étapes principales de ce continuum dans la durée, c'est une première étape. C'est basique hein mais ça pose un peu le truc c'est à dire pour attaquer un problème, il faut d'abord s'aligner collectivement sur la compréhension de ce problème. Donc le problème de de voilà des villes qui vont couler si tu veux problème Ben déjà il faut comprendre un peu qu'on comprend tous la même chose quand on pose le truc comme ça donc t'as une première étape dite de sensibilisation. Alignement

collectif. Donc information sur la compréhension du problème. Donc pour moi, l'intelligence collective y a déjà un effort à faire pour aligner le plus de monde possible sur qu'est ce que ça veut dire ? Qu'est ce que qu'est ce qu'on entend par là tu vois et donc ça c'est un champ d'action en soi. Ensuite, une fois qu'on estime l'avoir fait au maximum de dire Bah on a informé tout le monde, on a éduqué, on a dit voilà le risque. Mais voilà peut-être des opportunités. Qu'est-ce que ça veut dire ? C'est quand et cetera. On comprend tous le problème à peu près de la même façon. Avec le maximum de parties prenantes impliquées, là, on peut dire Bah tiens, une fois qu'on a fait ça 2e phase, on va se mettre à chercher des solutions ensemble. 2e phase de la de ce continuum, c'est trouver, identifier, définir, co-construire des solutions ensemble, donc de l'anglais, c'est un peu idéation quoi tu vois idéation comment on peut utiliser l'intelligence collective non pas pour s'aligner mais pour donner des idées. 3e étape, une fois que j'ai fait ça, c'est comment on utilise l'intelligence collective pour décider ensemble ce qu'on va faire, quelle priorité ce qu'on va abandonner parce que c'est trop dur. Et qu'est-ce que tu vois ? Et voilà donc la codécision. C'est la 3e étape. Et une fois qu'on a fait ça, c'est comment on on fait de l'action collective, c'est-à-dire comment chacun va pouvoir jouer un rôle dans la mise en œuvre des des décisions qu'on a prises. Tu vois donc finalement déjà c'est de poser un peu comme ça. Pour moi, la notion d'intelligence collective c'est de dire, c'est cette diversité de parties prenantes qu'on pré identifie. Et au fond on va pouvoir leur les impliquer dans dans certaines ou tout ou partie de ces phases d'un continuum de l'intelligence collective. Alignement, compréhension, sensibilisation, Idéation, recherche de solutions aux décisions coaction. Tu vois ça, c'est une sorte de tu poses un peu les référentiels, un peu comme ça, me semble-t-il. Après, histoire d'être un peu plus peut être appliquée par concret. Maqué, je dirais, mais on pourrait très bien dire que en tout cas aujourd'hui, il existe des méthodes, des outils. Nous, on a un acteur qui les fournit. De dire c'est pas on pourrait commencer la phase amont, c'est pas déconnant. Après si tu veux t'as plein de manières de le faire, de dire et si on lançait un grand débat citoyen au niveau d'une ville et de son environnement ? Qui pose un peu la question de enfin, il faut faut trouver toujours une manière positive de poser le débat, hein, parce que quand on la menace, c'est ça peut être ne pas couler, ne pas couler en 2050. Tu vois donc ça c'est la version que bon. Bah OK c'est c'est ça le sujet. Ou plutôt tu vois, tu vois améliorer, améliorer la un peu notre. Améliorer notre nos nos développements avec en rapport à l'eau à 2050 bref. Donc y a ça et après de se dire Bah, comment je ? Je réfléchis à impliquer les citoyens parce que c'est la partie prenante qui me semble la plus intéressante. Dès l'amont, dès le plus tôt possible, Adam et donc moi je pourrais imaginer par exemple qu'une démarche d'intelligence collective d'une ville, elle dit Ben nous la feuille de route. De nos actions, on va la co-construire très en amont avec tout le monde et donc on pourrait très bien dire que on pose un. Alors, ces populations, est-ce qu'elles sont connectées à ce qu'elles peuvent contribuer ? Digital mais pas qu'eux. Moi, c'est une sorte d'hybridation d'approche, on peut dire, on va lancer en ligne une grande consultation où on va nous, nous, on fournit ça par exemple, poser des des questions aux poser des questions aux citoyens sur ces sujets, voilà. Bah pour vous, pour vous, le risque de l'eau et de la ville, c'est quoi ? Alors tu vois si je vous dis, voilà, risque d'inondation, vous pensez à quoi ? Quand tu vois commencer à aller chercher les gens sur la la la, la compréhension qu'ils ont de ces risques, comment ils en parlent et donc nous, on a créé une plateforme qui fait la part belle aux questions ouvertes. Tu vois où on va créer ? Même la sémantique des gens quand on leur pose ce genre des questions-là on Ben, on va, on va collecter ça. Et puis d'enclencher par ça. Une une, une captation, une collecte de contributions les plus exprimées possibles hein c'est c'est pas un QCM oui bon bah tu penses que le risque d'être inondé en 2050 il est selon toi très haut, très

moyennement haut, faut le faire aussi mais je pense que nous ce qu'on cherche à faire quand on parle d'intelligence collective c'est vraiment de la contribution libre d'expression on dira OK là on tout le monde a contribué. Quand on met tout ensemble on voit que quand on dit, quand on essaie de par exemple, de de catégoriser les grands types de risques, que ça exprime, hein ? Une inondation d'une ville où les risques à l'eau, bah les gens ils disent je sais pas, ils pensent à leur famille. Les risques à la nature, les risques d'énergie, les risques. J'en sais pas, tu vois et au moins c'est.

Si récupération larges des citoyens quand on leur dit risque d'inondation de la ville, à quoi ils pensent, tu vois et. Là, Ben ça vient offrir une première structure de compréhension de ce Risque. Et ça c'est intéressant parce que ça montre qu'on rentre dans une démarche de coconstruction, de dire OK, donc, et là, si tu veux, c'est une démarche où rien qu'avec un débat en ligne, que tu pourrais doubler par des tas d'ateliers citoyens, avec des gens qui vont aller dans les locale, faire un petit atelier. Et de dire, Bah voilà, on en 01h00 ou 2, on on anime des 15 personnes, on prend un compte-rendu, puis on le remonte sur Joy. Sur ça, on a collecté une masse d'informations avec un questionnaire en ligne. Et puis tous ces ateliers qui ont eu lieu peut-être pendant plusieurs mois. Et là on dit Ben étape un quand on a essayé d'aborder cette notion de risque, voilà ce que pensent les Gens en fait. Voilà comment ils associent ce risque dans leur quotidien, dans leur et ça, une fois que tu fais Ça, bah tu le, tu l'analyses Et tu le repartages avec tout le monde, c'est-à-dire ? Tiens, on vous a. On s'est posé collectivement la question de ces risques. Voilà un peu ce qu'on s'en dit nous. Quand on, collectivement, nous les citoyens de la ville. Voilà et là, Bah t'as commencé à engager tout le monde. Tu vois dès la phase un, je dois dire tu dis Bah OK donc là c'est ce que je disais tout à l'heure, on s'est aligné collectivement sur la lecture qu'on a de ce risque là au fond et ça c'est une étape un et donc après tout à préparer une met le terrain pour aller rechercher les gens.

Okay Si ces risques là, c'est ceux là ? Bah qu'est ce qu'on fait ensemble pour trouver des solutions. Mais tu vois et donc là tu rentres dans peut-être la phase 2 du continuum de d'imaginer ce que c'est par des appels à projets d'idées de start-up d'entreprise de. Tu vois des des appels à idée. Est-ce que c'est des ateliers, un peu outillés en locale, où tu vas dire Ben voilà, faites des brainstormings en local pour trouver des idées, remonter nous, tout ça.

Et puis là t'as une phase 2 où tu vas peut être dire bah ça y est maintenant j'ai collecté plein d'idées, je voilà, t'as peut être 50 ou 100 Projets ou idées qui Ont émergé de cette phase là (2).

Et là tu dis bah lesquels On fait ensemble et là tu peux presque basculer dans la phase 3 de dire comment on va décider de faire les premières 10 à 15 actions sur lesquelles on va sous investir et donc ça donne aux élus de la ville, aux maires ou à la Mairesse de la ville et à ses équipes. La capacité d'expliquer le plan d'action de décision qui font prendre à la lumière des contributions des des citoyens et donc là a vraiment créé les conditions D'une implication. Tiens, moi, moi je suis citoyen. On m'a demandé ce que c'était ma compréhension du problème et du risque. On m'a demandé, j'ai participé ou pas ? On a demandé à plein d'autres parties prenantes de me proposer des solutions et là, bah la ville, elle communique sur sa priorisation de ses actions. En disant pourquoi c'est celle-là qu'on choisit, pourquoi celle-là, on les dépriorise ? Et pourquoi celles-là Elles sont peut-être intéressantes, mais on va continuer de les creuser parce que c'était peut-être des bonnes idées, mais il faut quand Même encore travailler dessus, tu vois ? Donc là t'as créé en intelligence collective, tu vois ce ce moment de l'homme là où tu ? Ah ouais, là c'est une ville qui s'est pris en main collectivement et et après je dirais pour le

passage à l'action. Là il y a plein de choses à inventer. C'est c'est une phase qui tu peux pas appeler à l'air très sympas, on va tous mais y a plein de choses à innover dans la manière dont tu maintiens le collectif. On a, on peut imaginer que Ben dans les quartiers Et bah il y a des squads d'action pour le combat anti inondation qui vont se créer. Ça peut être une sorte, tu vois de de référentiel un peu d'architecture ou tu peux mettre dans ton mémoire ? Voilà. Je, je je. Je réfléchis hein ? Mais voilà, comment une ville ambitieuse, qui est très désireux de d'associer toutes les parties prenantes, principalement les citoyens, dans une démarche de construire ensemble sa feuille de route 2030. Pour éviter le problème De qu'est ce qu'on fait à d'ici 2030 pour éviter et peut-être créer des opportunités pour être une ville résiliente ? Finalement, par rapport à voilà par rapport à ces sujets. Et Ben t'as Aussi une ville Qui, qui a révélé finalement sa résilience par sa capacité à mobiliser l'intelligence collective, tu vois ? Et ça, ça rend la, ça rendrait la vie aussi plus sereine sur sa capacité à aller avoir conscientisé Tout le monde. À avoir priorisé les natures de risque, à attaquer, à avoir trouvé certaines actions concrètes pour les adresser et avoir lancé un plan d'action. Pour y arriver. Tu vois l'intelligence collective exprimée comme ça ? Elle est un peu aussi sur voilà le le fait de créer ce sérénité, c'est un trop grand mot parce que on sait tous que on va peut être pas y arriver, hein. Mais en tout cas Un niveau d'engagement des parties prenantes sur ça pour moi, un peu, si j'avais un un, m'arrêter là. Après il y a. Voilà des méthodes, des outils pour le faire mais en très gros Je parlerai d'intelligence collective comme ça, dans le contexte que t'as dit tu vois.

L : Okay ça va.

M : Je sais pas si c'est ça que tu attendais

L : Si si j'ai juste une question sur ce que tu disais il y a des ateliers, donc l'atelier, les ateliers seraient pour les personnes qui sont plus isolées et tout ça et qui auraient pas d'accès.

M : Fond, tu sais ou tu sais aussi Lucile, des parfois dans ces régions, parce que on dirait tu vois, on va mettre en ligne un questionnaire pour que des gens donnent des idées et tout. Il y a des gens, ils ils maîtrisent pas le la langue. Sont peut-être pas aussi facilement connectés, même si tout le monde a un téléphone Smart de type smartphone ou un accès aujourd'hui, quoique et puis ils vont peut être pas oser dire les choses, tu vois ? En termes d'inhibition ou de confiance en eux, pour voir dire des choses. Donc je pense que ça, c'est une partie pour des gens, pour une certaine catégorie de personnes qui vont plutôt être capables d'avoir envie de contribuer en ligne à un questionnaire. Mais les autres faut aller les chercher. Côté inclusion, accessibilité De la démarche au plus grand nombre.

L : okay ça se fait par les atelier

M : Oui, les ateliers servent aussi à ça, c'est géo, accessibilité géographique, accessibilité numérique, accessibilité de de langue, l'accessibilité de d'éducation. Oui, les ateliers servent aussi à ça, c'est géo, accessibilité géographique, accessibilité numérique, accessibilité de de langue, l'accessibilité de d'éducation. Tu vois pour exprimer une idée, tu vois une contribution ou un point de vue sur un risque. Donc oui, je pense qu'on n'a pas d'autre choix que d'imaginer que t'as une sorte de plan d'action avec un réseau de d'animateur associatif ou tu vois je ne sais quoi ou ou de kit en tout cas qui dit on va organiser un maximum d'ateliers citoyens. ces sujets là qui sont complémentaires peut-être de ce que t'auras mis un questionnaire en Ligne. Un Peu comme en France, il y avait eu le grand débat national, le grand débat national. Il y a quelques

temps, avec l'histoire des gilets jaunes. En fait, souvent t'es obligé de construire les 2 piliers un peu. Ils collectent en ligne pour des gens connectés tout ça et puis d'aller organiser des, des rencontres. Voilà de type Atelier citoyen, ça peut des entretiens, ça peut être et et en fait après tu remontes tes données. Les origines finalement et ton analyse, tu la cumules et tu fais une analyse globale de de choses qui sont montées par le questionnaire en ligne qui sont remontées par les comptes-rendus des ateliers citoyens par exemple. Donc tu vois d'un point de vue méthodologique tu dis, on remonte ça pendant quelques mois, on aura par exemple hein. On va, on récupère toutes les données, on digitalise ça, on aujourd'hui y a des algorithmes qui permettent en fournit de faire une analyse sémantique de de toute sa donnée. Aujourd'hui tu peux dire l'intelligence collective, elle est un peu massive de ce type-là, elle est un peu plus possible grâce à une nouvelle technologie à la fois les nouvelles technologies qui vont mettre le questionnaire en ligne, mais aussi les nouvelles technologies qui permettent une analyse de ces de cet énorme base de données où tu peux rapidement faire une super analyse. Donc il y a il y a un message aussi, cette intelligence collective. Nous on parle d'intelligence collective massive. Elle est aussi possible aujourd'hui grâce aux nouvelles technologies. Parce que sinon toi tu pourrais dire Bah écoutez à avant on aurait pu se dire c'est sympa mais on va faire des ateliers parce qu'on a, on pouvait pas mettre en ligne un questionnaire digital moment donc il fallait un an pour faire des ateliers puisque aller partout, rencontrer un maximum et vous allez croire tellement récupérer de choses des comptes rendus sur papier et tout. Il nous faut peut-être 2 ans pour les analyser. Bon. Ben tu vois, c'est temps-là ils sont hyper réduits aujourd'hui. Parce que un truc en ligne, tu fais quelques ateliers. Après t'as la récupération. Le traitement des données, l'analyse en 2 mois tu fais une analyse massive de données tu Vois donc il y a un côté.

L : Donc ça prend combien de temps un projet comme ça ?

M : Vas peut-être dire, regarde tu pourrais si tu rentres un peu dans le design du projet, tu dis peut-être pendant un mois, on va faire un cadrage pour dire quelle question on va poser ok donc tu prépares ça puis tu peaufines. La méthode des ateliers du tout le kit des ateliers d'animation du questionnaire en ligne tu mets en ligne un questionnaire pendant 2 mois. Dans tu fais des ateliers en parallèle pendant 2 mois, tu donnes un mois pour remonter, retraiter la donnée parce que tu as des comptes rendus papier, il faut les digitaliser, et cetera. Donc tu digitalise toute la récupération pendant un mois et après tu peux analyser pendant un mois. Tu vois c'est quand même de l'ordre du rapide ça prendre entre 4 et 6 mois. Donc en un semestre on peut vraiment dire Wow La ville, enfin, elle a mobilisé le plus grand nombre et elle a identifié les risques. Les premières idées sont remontées. Et tu peux montrer comme ça que t'as impliqué tout le monde tu vois ?

L : Oui clairement ça va super vite.

M : Aujourd'hui, c'est quand on parle d'intelligence collective, alors l'intelligence collective c'est plein d'autres choses, l'intelligence collective, ça peut être dire la ville en plus. Elle a organisé. Un gros événement où elle a mobilisé tous les chercheurs du monde entier sur le sujet, les a fait venir, elle les a fait travailler eux-mêmes. Ils ont contribué sur des recommandations, un peu comme Le GIEC, parce que c'est Des experts de tous ces domaines. Tu vois, c'est une autre forme d'intelligence collective, d'experts. Moi ce que je en là, je suis parti un peu avec mon peut-être à moi, c'est l'intelligence collective des citoyens qu'il faut appliquer, mais il y.

L : Oui mais c'est ça le but c'est les citoyens.

M : Mais Et là, les villes, par exemple une forme d'intelligence collective, ça aurait pu être d'un consortium de ville qui se Mette ensemble pour elle. Lancer une communauté d'experts pour dire Bah faites nous les recommandations de comment on devrait faire une ville résiliente à l'inondation ? Ben tu vois, c'est une autre forme d'intelligence d'initiative, d'intelligence collective. Sauf que là, les prenantes que tisser d'animer, c'est d'une part est ce que mettre des villes ensemble. Ça vaut la peine pour animer ça. Et après t'as dès l'intelligence collective entre experts et chercheurs. Donc tu vois c'est une autre formes complémentaires

L : Ouais non clairement, mais c'est vrai que ouais non en fait, il y a plein de trucs. Mais c'est vrai que là dans le premier abord, enfin pour moi ce qui serait plus intéressant, c'est la population. C'est vrai qu'à long terme, entre les villes, ça, ça peut être vraiment intéressant parce que en fait le, le but c'est de donner vraiment un projet qui a une vue en fait vu que ça, j'ai gardé une vue systémique où j'ai étudié Jakarta, Bangkok et au HCMC. Et j'ai failli faire aussi manilla mais après un moment je me suis dit, bon, c'est un mémoire pas un doctorat. C'est d'avoir ouais, c'est de garder une vie systémique sur l'Asie du Sud-Est pour que et en fait on se rend compte que c'est souvent le même Pattern assez récurrent qui se passe dans chaque ville pour en fait avoir quelque chose qui puisse être utilisé dans les grandes lignes par tout le monde. Et puis, bien sûr t'adaptes en fonction de de ta situation, mais c'est de de garder quelque chose qui peut être enfin, voilà un outil qui peut pas être utilisé que par Bangkok, mais qui pourrait être utilisé par tous dans la région Asie SE.

M : C'est vrai que avec l'Asie du sud-est tu peux eux avoir un discours autour ? Ben aujourd'hui, les technologies, elles permettent de rapidement analyser de la donnée collectée, soit. On sur de manière un peu de format présentiel ou en ligne, il y a aussi les technologies. Elles peuvent, elles peuvent sans doute enfin se mettre aussi au service des langues. Voilà, c'est de dire aujourd'hui, on parle des IA et cetera. La capacité d'utiliser les technologies pour des traductions ou même du Tu sais de du speech to text à dire je viens je t'interview tu parles dans ta langue et puis tu vois les technologies, elles permettent très vite de de faire transformer ça en texte analysable avec la bonne langue, la bonne articulation, donc on est dans une ère où je pense qu'on peut se réapproprier positivement des technologies. Pour lever certains freins et contraintes en disant Ouais en Asie, voilà quel est le niveau d'éducation, quelle est la la capacité de la la, le multilinguisme. Tu vois donc comment des gens ils vont bien exprimer des choses qu'on peut bien analyser. Tu vois ce que je veux dire ? C'est mais en fait on peut tenir un discours aujourd'hui. Bah voilà c'est c'est plus facile qu'avant. Grâce grâce aux technologies je trouve tu vois ?

L : Déjà une question, en fait, c'était pour la 3e étape, tu as dit que c'était le moment où il y a ou alors la deuxième je sais plus avec la création d'idées. Mais en fait, je me disais enfin moi du coup. Mais les les idées. Enfin, le but, c'est vraiment de d'amener la population à accepter en fait les infrastructures dites naturel et donc en fait, j'imagine la façon dont on amène les entretiens. Enfin, les les ateliers, le questionnaire peut faire en sorte un peu de pousser, j'imagine, vers ma direction ?

M : Bien sûr. S'il focus le, c'est-à-dire si le sous sujet de ça, on n'est pas obligé de partir sur la globalité de la vision. Si l'idée du projet d'abord c'est comprendre et réapproprier les avantage de la nature dans le contexte de la résilience. Tu vas utiliser la phase 1 pour informer pour

éduquer c'est vraiment sensibiliser vers cette direction là. quand on dit s'aligner collectivement, c'est le, c'est le moment où tu vas former. Donc c'est là que tu vas, tu vas mettre, tu vas la ville, elle va communiquer beaucoup sur ce qu'il faut donc tu as toute une phase importante de formation et éducation avant d'aller chercher les gens pour qu'ils éventuellement donnent des idées. Mais après la phase 2 c'est comment trouver des solutions alternatives ensembles car si ils faisaient ça c'est qu'il y'avait un besoin tu vois. Donc faut trouver une solution qui répondent à leurs besoins pour pas faire comme avant pour qu'ils se sentent vraiment impliqués dans tout le processus. Ah oui, et toi et toi après tu vas aider à la prioriser, plutôt des solutions qui sont venues d'eux et pas des solutions qui leur sont imposées ou à la fois ça ça même pas que ça donne du mal et en plus on me demande de faire comme ça. Moi, je me débrouille très bien et de comment ? Je faisais avant hein ? Enfin tu vois donc c'est un processus qui est un.

L : Oui non clairement faut que le citoyen se sente écouter et pas d'avoir pris le temps pour rien. Mais mais c'est vrai que enfin, il y avait une idée derrière tout ça. C'était aussi du coup y a plein de d'infrastructures naturelles possibles. Et il y a des quartiers en fait, quand on fait l'analyse de quel type d'infrastructure faut mettre y a beaucoup d'analyses de données géospatiales pour voir la ville, pour voir l'écoulement à quel point c'est proche des routes et cetera, et donc en fait il y a des quartiers qui sont automatiquement en fait un peu pointés du doigt comme là ça pourrait être un hotspot hyper intéressant donc c'est vrai.

M : Je veux dire, avec un potentiel de faire des choses. Justement, ce quartier, c'est ça où ? D'accord ?

L : Oui c'est ça. Cartier d'expérimentation, un quartier pilote quand tu veux. Car bon y'a des quartiers où automatiquement, c'est pas très intéressant d'y aller parce que voilà, c'est l'élévation, et cetera n'a pas de sens et d'autres par contre où là c'est on va dire un peu le le scénario parfait pour les intégrer. Et donc c'est vrai que là on y pensant tout ce qui est Atelier mais en. Fait les ateliers. Moi je les mettrai dans ces Quartiers là, parce que c'est c'est.

M : Bien sûr, bien sûr, bien sûr, Ben Là tu viens, tu viens de rajouter, si tu veux un autre point, qui est important. Ce qu'on fait à la maille de la ville, qu'est ce qu'on fait à la maille des quartier ? Oui bah qu'est ce qu'on fait à la maille après ? Mais une maille d'un immeuble ou d'une entité, c'est à dire sans doute en effet que c'est des marges d'intelligence collective. Il faut les les adapter. Tu peux très bien dire. La phase de sensibilisation le grand questionnaire en ligne, la COM, il faut que tout le monde soit sensibilisé. Pour autant, tu peux rentrer dans une phase progressive. Pas d'expérimentation mais en tout cas de d'avoir des quartiers pilotes à la fois. Parce que c'est là que c'est le plus impactant, et 2 parce que tu vas concentrer ton effort. En effet, d'animation dans ces quartiers là tu vois donc oui et après tu peux, tu peux utiliser ces quartiers comme un peu des des quartiers ambassadeurs qui montrent la voie à d'autres qui vont pouvoir s'appuyer sur des des actions qui sont ressorties de ce quartier, même si pour eux Bah il y a moins d'enjeux mais au moins ils auront. Ils arrivent après le fait qu'il y a des choses qui ont été plus concrètes, plus validées. Dans ces premiers quartiers, tu vois ?

L : Oui oui clairement.

M : Donc oui c'est une clé dans le déroulement du projet

L : Oui y'a un vrai but long terme. Tu vois y'a eu un vrai projet à échelle énormé en Chine. Enfin, ils ont essayé ça à grande échelle. Il y a enfin, j'ai rencontré des gens qui ont fait les

recherches à Wan, donc ça j'ai trop hâte. Ils ont remarqué qu'en fait y a les quartiers où il y avait eu ces solutions. Là, il y avait un réel impact sur le bonheur, en fait des personnes qui vivent parce qu'il y a plus d'espaces verts. Il fait moins chaud, il y a moins de problèmes de sécheresse et aussi d'inondations parce que ça, c'est comme des éponges naturelles. En fait, au final, donc c'est bête, mais des mamies qui disaient que leurs plantes, pour une fois on était Ben elle est pas morte en fait et et que c'était beaucoup plus agréable d'y être et qu'ils préféreraient leurs quartiers. Ça, ça peut être incroyable car tu peux montrer à quel point ce quartier de fait est devenu tellement plus agréable alors que bon bah c'était le même bête quartier que celui d'à côté avant.

M : Oui, mais ce que tu dis important dans le sens où souvent on vit un peu que avec des problèmes, entre guillemets, de l'éco anxiété. Bon, on va tu vois ? C'est, c'est très scopique notre époque, c'est à dire, on nous dit que. On va, on va mourir sous l'eau, on va brûler avec le climat, on va se faire tuer par les robots et l'intelligence artificielle, donc c'est important quand même d'aller sans doute faire ce genre de démarche en ayant les 2. C'est il y a des risques mais y a aussi des opportunités quoi, c'est-à-dire on et au-delà de l'opportunité de juste pas mourir sous. L'eau, c'est autre chose. C'est, on va vivre mieux notre vie. Aujourd'hui, on va, on va climatiser nos quartiers grâce aux arbres. On va enfin tu vois. Et donc ça c'est important aussi de l'avoir. Ou plutôt pour montrer, pour embarquer dans la démarche. Et que sur un côté, éviter les risques, aller chercher des des solutions de bien-être, tu vois ?

L : Oui donc un peu du positif et du négatif quoi.

M : Ouais Ouais, ça c'est c'est un moteur pour pour attirer le plus grand nombre de personnes. Parce que voilà, on l'a tous un peu sur du profit mais y a des gens que ça va faire chier. Car y'a des gens tu vois ils sont en mode moi je préfère pas savoir qu'il y a une guerre en Ukraine. Je préfère pas savoir parce que dans mon quotidien, moi je j'arrive pas à c'est trop, c'est trop, c'est trop stressant, c'est trop négatif et donc si on a dès le début du projet, quand on veut embarquer les 2 mon capitaine, c'est à dire bien sûr il y a des risques, on va aussi, on va travailler l'intelligence collective pour réduire les risques mais y a aussi des supers opportunités.

L : Ouais, c'est comme dans un de mes cours. C'était comment redonner des feedbacks à des personnes ? Et c'était toujours 2 positif pour un négatif et de de contrebalancer pour que en fait le négatif passe plus facilement parce que Ben y a du ouais, c'est vrai positif

M : Clairement c'est ça. Dans ce qu'on disait tout à l'heure, c'est-à-dire si on si on se lance dans une démarche d'intelligence collective long terme, on a bien vu le continuum, il dit, on va d'abord sensibiliser, informer, on va aller chercher des idées, on va décider. Puis après on veut maintenir le maximum de gens engagés pour qu'ils passent à l'action et que, à titre individuel et collectif, Ben ils coupent moins d'arbres et tout, c'est un temps long, ça. Maintenant, on la réduit ce temps par des phases d'accord et donc, mais les facteurs clés de succès de ce temps long, c'est ce. Qu'on vient de dire, ça fait partie des facteurs clés de succès, ça veut Comment dirais-je une sorte de Manipulation de com que de mettre un peu de positif pour qu'on voit moins les risques. Je pense que fondamentalement tu l'as très bien expliqué le. Le positif, il y est oui c'est Parce que trop bête de pas mettre le positif parce qu'on a bien vu ces quartiers pilotes, que les gens ils ont découvert des choses tellement positives qu'on n'aurait pas anticipé. Donc, vraiment ils sont là quoi donc ce serait vraiment trop bête de pas les mettre. Tu vois, c'est plutôt ça. e côté de montrer que ce genre de démarches, elles sont pas que Anxiogènes pour éviter le risque

mais elles sont aussi positives pour ce créer. En gros, le mot qu'il faut dire, Je pense Lucie, c'est créer un futur désirable. Voilà, tu vois, c'est ça ? C'est-à-dire éviter l'inondation, c'est pas très désirable, on suit donc il se trouve que dans la nature de ton projet, il y a plein d'éléments à exploiter pour créer un futur désirable. Bon bah utilisons les donc ça on vient d'en parler donc comme comme dans le futur désirable, c'est, on va se prouver collectivement qu'on peut être tellement résilient quoi, c'est à dire quand on enclenche ce genre de démarche. Finalement, l'intelligence collective en elle même. Elle est aussi une preuve de résilience de la vie. Une ville qui s'est prouvée à elle-même, cassait se mobiliser collectivement massivement pour résoudre un problème. Ça augmente la résilience de facto parce que ça augmente le degré de confiance Collective

L : Oui, oui, oui, c'est ça. Ouais, non clairement, mais écoute dans tout ce qui est facteur clé de réussite est-ce qu'il y'en a d'autres ?

M : Tu vois, on va faire face à des enjeux, donc le facteur clé de succès on l'a un peu évoqué, c'est le moi je dirais un phasage dans le dans, le, dans la, dans la durée de l'implication, de l'intelligence collective, de plein de manières différentes donc c'est comprendre ça, le facteur décisif, c'est que l'intelligence collective elle n'est pas que pour trouver des idées à à des problèmes, à les clés pour comprendre les problèmes. Elle est clés pour décider ensemble bien les bonnes décisions et les clés pour passer à l'action. Donc c'est un perpétuel succès que de que de bien dédier l'intelligence collective à plein de choses différentes. Ensuite de montrer en facteur clé de succès, je pense, bride ation aujourd'hui. Alors j'ai parlé des nouvelles technologies, Ben les démarches d'intelligence collective qui fonctionnent bien, c'est celle qui hybride, où il y a du présentiel, Il y a des ateliers, y a des entretiens, il y a de la rencontre vraiment ? Synchrones... Voilà donc l'hybridation du digital du syndrome de la synchrone, des petits nombres d'ateliers. Des trucs d'une grande conférence à 300, tout ça, c'est le facteur clé de succès d'une réussite, d'une démarche. Mais ceci qu'une facture clé de succès, c'est parce que on est dans le ton long, il faut reboucler souvent avec les, avec, les les participants. C'est-à-dire ? On vous a sollicité sur des questionnaires, des ateliers, on va pas attendre un an pour vous dire ce qu'on a Ce qu'il en est ressorti ? Donc aujourd'hui c'est des boucles fréquentes de retour, pour dire vous souvenez, on a fait un Questionnaire, il y A 2 mois, voilà les résultats. Tu vois donc ça, ça maintient l'engagement, c'est un Autre facteur qui le succès ?

L : Okay

M : Ensuite, je pourrais dire. Ouais bon après c'est un peu comme toujours franchir des franchir des étapes et puis je finirai par ce que toi même t'as dit c'est à dire un savoir trouver les bonnes mailles d'actions à l'échelle de la ville et à l'échelle du local. Ou plutôt, c'est à dire tiens, le côté expérimentation, avec des quartiers pilotes, c'est un facteur critique parce que à la fois On tu vois, ça peut plus vite livrer des résultats, ça peut illustrer et mobiliser d'autres et d'autres quartiers. Y a un un petit peu comme ça, d'embarquement et de boule de neige, un peu de motivation qui se crée et et donc ça c'est un facteur clé de succès que d'avoir un un peu aussi la bonne approche de la notion d'expérimentation.

L : Ok trop bien. Et pour les les barrières typiques que tu rends comptes quand t'as des projets, je sais pas ce qui se passe le plus souvent ?

M : Je pense qu'on peut trouver des élus, des décideurs qui sont convaincus que ça vaut la peine de de faire avec les Citoyens plus qu'on en a l'habitude de le faire, de les impliquer et pas que de les forcer à et que en fait voilà, c'est pas que de la communication et de l'interdiction, c'est à dire de dire Bah arrêtez, on va mettre une grande interdiction avec des amendes si tu coupes des arbres, et cetera. Mais j'ai pas répondu exactement à la question des risques. Elle crée de plus les conditions d'utiliser la carotte que le bâton. Tu vois ce que je veux dire parce que sinon on voit bien que si on fait pas ça, on va se retrouver d'un point de vue décideur à plutôt avoir à utiliser le bâton, les amendes. Voilà et ils mettent la loi, la loi là-dedans, alors que par une démarche d'intelligence collective on peut se donner la capacité à inventer ensemble un peu les motivations. Tu vois de de faire les choses bon donc le risque il peut y avoir. J'en ai un peu parlé Bah de d'avoir. Tout simplement. Quelqu'un qui est pas convaincu de ça, c'est à dire un décideur qui dit bah non, tu sais quoi moi ? Je les connais mes citoyens, un ils ont pas d'idées, ils sont plutôt bêtes. Il y a pas d'intelligence chez eux, je sais ce qu'ils vont dire. Ils vont me dire ça, mais faut pas prendre des supers idées hein, donc ils vont pas ces décideurs qui vont pas être convaincus de l'intérêt de les mobiliser, ne serait-ce que par la dimension Créative. Ou ils vont avoir presque l'impression de perdre du temps, des moyens et de en gros ils vont pas comprendre que ce qui peut paraître comme une perte de temps. Au début tu réduis le temps dans la durée de cycle complet quoi, c'est à dire ? Moi, j'explique souvent ça, c'est à dire le temps que. T'as l'impression de perdre, de faire tout ça. Tu le regagnes tellement sur la, sur le fait d'avoir tout le monde impliqué pour passer À l'action après. Donc, en fait, c'est de faire comprendre que peut être le plan en tête qu'ils ont d'espérer que les gens vont comprendre qu'il faut intégrer plus la nature, ça va prendre 10 Ans. Étrangement, il faut pouvoir leur expliquer que si on fait ça comme Ça, on va gagner 3 ans. Sur les ou 4 ans parce qu'on a impliqué tout le Monde au début. Tu vois et donc ça c'est c'est il y a des gens qui veulent pas entendre ça qui dit bah non, je préfère prendre ma décision en chambre avec mon comité de de directeur et puis on va faire un plan de communication, on va y arriver. Tu vois ? Un premier risque de pas de pas convaincre en fait des décideurs de l'intérêt de ces démarches. Tout bêtement, hein ? 2e risque de quand même les convaincre qu'il faut y. Aller donc, il y a toujours un risque de participation. On croit naïvement que tout ça, si on va chercher les citoyens, ils vont jouer le jeu. Ils vont vouloir, Ben c'est toujours une forme de risque. On peut être déçu par le fait que les gens participent pas, contribuent pas, viennent pas aux ateliers, répondent aux questionnaires moins qu'on croit, tu vois alors. Parce que peut-être eux, le participant ? Il se dit Ben On me, on m'avait demandé mon avis une fois, écoute, ça a servi à rien. J'avais donné mon avis, on m'a demandé, on m'a interviewé, j'ai pas su ce que c'était devenu. On m'avait pas partagé les résultats, on m'a jamais expliqué que les décisions qui avaient été prises. Le risque, c'est, c'est ne pas Les théologiquement, évitez les conseils de dire aux citoyens attendez, c'est pas parce que vous allez proposer des choses qu'on Va les mettre En œuvre un Attention, nous on veut vous impliquer, mais après on va co-décider ensemble. Il se peut qu'il y a des choses que vous allez proposer, qu'on va décider de ne pas faire, mais on vous expliquera pourquoi. Il y a une sorte de réussite d'un contrat de confiance entre le mandataire qui organise ça et le participant. Je me suis et donc ça, c'est un facteur clé de succès, c'est-à-dire ? Ok moi le mandataire je prends sur moi d'organiser toutes les ressources, les méthodes, les outils pour vous solliciter. Je m'engage à part à à partager les résultat et À être dans une logique de questionnement très ouvert, je vais pas vous imposer de bon, je vais vous impliquer, hein. Pour le sujet on on a 3 solutions, tapez un, tapez 2, tapez 3 bon Ben là, c'était pas vraiment de l'intelligence collective. Tu me suis, tu peux me dire que tu m'as aidé à choisir, mais tu peux un peu moins me dire que tu m'as demandé

de donner mon avis ? Donc il y a une notion relative de je t'ai, je t'ai expliqué, je t'ai sollicité, j'étais associé, tu vois ? Dans non, moi, je me, Je je, je m'engage, moi mandataire, à faire plutôt la part belle au questionnement, ouvert à vous laisser exprimer quand même les sujets, les idées, les problèmes et cetera. Je m'engage aussi à rapidement partager les résultats, à vous dire vraiment ce qu'a dit le collectif en toute transparence, même si après on va décider plus tard. Et je m'engage de pas trop tarder à décider. Parce que ça aussi, c'est des, c'est décevant, c'est-à-dire de on partage les résultats. Un an après, on a toujours rien décidé, donc je m'engage. Le participant, Ben je m'engage à participer à donner des idées, mais je m'engage aussi à comprendre. Que peut-être les idées que je vais mettre vont pas être, vont pas être mises en œuvre, ça fait plus d'huile en termes de maturité collective, de l'intelligence. Tu vois ce que je veux dire parce que nous on pense par exemple.

L : Oui Oui clairement.

M : On A eu un cas qui s'appelait la Convention Citoyenne pour le climat Qui était une sorte de méthode de Dire, on va Prendre, je crois que c'était 100 citoyen, au hasard T'aurais pu être tiré au sort. Tu viens, on fait venir des experts méthodologiquement qui te forment ces sujets et après vous mettez on, on sait, et après vous vous pouvez donner des propositions. En fait, ça a été un cumul d'erreurs méthodologiques. En fait, pour illustrer, c'est à dire un, on a vu que les gens qui avaient été sélectionnés, ils avaient déjà plein de biais très Écolo machin, tu vois un peu un peu, un peu. Voilà je sais pas, on va pas parler politique mais un peu des biais de tu vois, faut on va créer des des jardins sur les toits des immeubles et ça va on va manger des carottes et Des fraises et Ça va résoudre le climat. On a sous-estimer Les experts qui les formait Ben en fait, ça enlevait pas ces biais là tu vois ce que je veux dire ça, les ça les reformatais pas bien au fait de la science au fait de la science donc c'est pas évident hein, tu vois même sur le Sujet de l'inondation ? Tu vas aujourd'hui un rapport de méfiance par rapport À la science on l'a bien vu avec le COVID, donc en fait, qui détient la vérité ? Du risque de l'inondation, tu vois ce que je veux dire, même si tu mettais un rapport d'expert qui dit Bah on on A réuni les 100 scientifiques les plus pointus du monde qui vont dire que le risque, c'est celui-là que la probabilité que ça arrive, c'est celle-là et que et que si on fait rien, on va se retrouver dans cette galère là. Toi, il y a toujours un pan aujourd'hui des sociétés, les réseaux sociaux, les complotistes qui vont, qui vont pas, qui voilà qui ont trouvé des raisons, que c'est pas vrai de t'expliquer que c'est pas vrai. Donc le ça pose aussi le rapport à la science, à la à qui détient la vérité d'un constat et. Cetera donc y a c'est l'autre nature de risque. C'est à dire que quand on va Poser le problème avec bien Peut-on peut comprendre que c'est vraiment la vérité. On le voit bien avec les ados sceptique et des choses comme ça quand même hein. Donc enfin le bon, la vérité, elle vient plus et hélas du fait du pied du mur ou Ben non oui les forêts elles ont brûlé l'année dernière et l'inondation la il y a 2 ans. Donc on voit bien que un an et là on est dans une phase où il y a on est moins dans la prédiction que dans le constat que ça commence à arriver. Et donc je pense que voilà, moi je, je pense qu'y a un côté du participant. Voilà, j'étais sur la méthode. Y a eu plein d'erreurs, les le côté formation, alignement grâce aux experts, il allait pas fonctionner comme ça et je finis là-dessus les participants. Ils ont pensé qu'à un moment donné, les 100 recommandations qu'ils allaient faire, elles allaient vraiment mises en œuvre par les politiques. Et quand le politique a dit mais attendez parmi là Dessus, nous, on va se donner le on, on va se donner le Pas de lesquels on va mettre en œuvre lesquels on va pas mettre en œuvre, lesquels on va continuer de réfléchir, ça a créé une Énorme déception parce qu'on pas Dit les règles du jeu au début. Tu me suis donc il y a un sujet Enclencher l'intelligence collective oui,

on y Voit plein d'avantages, on embarque, on va gagner du temps, on n'est pas à L'abri d'avoir des idées, on va Permettre la capacité à les mettre localement. Le plus localement possible des actions parce qu'on a embarqué tout le Monde dès le début, maintenant, on Peut aussi, si on a mal expliqué les règles du jeu, la manière dont on va le dérouler et cetera, décevoir Voir empirer tu vois, c'est-à-dire de gens qui disent façon, voilà, ça sert à rien. Tu vois bien. On m'a demandé mon avis, on m'a pas partagé les résultats. On n'a pas décidé et en plus voilà. Et donc ça, ça, c'est aussi contribuer à une maturité collective de de cette, de cette manière de mobiliser cette intelligence quoi tu vois ? Parmi les les risques ?

L : Voilà enfin, ouais, non, c'est c'est intéressant et en fait c'est la population genre comme le truc que t'avais dit là ou la population était pas du tout Motivée dès le départ. Comment ça va se passer, comment est-ce que c'est possible de la motiver un peu plus enfin ? J'imagine là à ce moment-là, c'est même plus toi qui a les rênes en main, c'est la communication. Je sais pas.

M : Alors ça c'est un bon sujet. Alors ça, c'est un bon sujet. Attends, je regarde un truc, c'est un bon sujet sur. La motivation ? Mais là, c'est là qu'il faut être un petit peu. Tu vois, c'est pas prendre la COM pour la COM par exemple. Je me dis Que sur des choses qui ont été faites par des associations Par des gens qui le font vraiment et qui le disent et on donc on savait pas, c'est beaucoup plus puissant que si c'est le maire de la ville qui le dit. Donc par exemple, t'as vraiment des Comment dirais-je ? Des voilà des cas de choses qui sont bien faites, comme tu expliquais la ville, les gens l'ont fait. En plus elle bah Ça, on a plus de force sans doute quand c'est eux qui Le disent-ils disons Premièrement. Un des facteurs clés de succède de motivation. Ça peut être de mettre en avant des témoignages de gens qui l'ont vraiment fait, qui expliquent même pourquoi, en quoi leurs convictions et et en quoi ça améliorerait la situation. Tu vois ? C'est juste un exemple hein, hein ? Un 2e, c'est c'est ce que ta liste à lire, un d'aller d'abord travailler un peu le la Plutôt que de faire, voilà une communication un peu globale comme ça sur sur des grandes affiches ou sur des ou sur internet, et cetera. Et mais d'essayer de sensibiliser comme ça, il y a peut-être aussi Tu vois et D'être un peu par les écoles auprès des jeunes. Il faut penser que les enfants, ils vont rentrer à la maison, ils vont expirer. Papa, maman, vous saviez que quand même, quand on arrachait l'arbre, là. Quand hein, tu tu peux avoir plein d'idées, il n'y a pas une seule et même manière sur trouver les meilleurs leviers motivationnels Des cultures locales. Moi, j'ai envie de dire aujourd'hui, ces achats seraient sensibles. Si c'est dit comment et par qui et à quel moment tu vois, j'irai poser la question comme ça, Lucile, moi je je serais humble d'un point de vue culturel, j'ai pas envie de traduire Mes référentiels un peu occidentaux, français ou belges, de comment moi ça me comment, moi ça m'a impacterait. Si on me le disait, Si on communiquait peut-être j'allais réfléchir en disant c'est quoi les leviers de communication les plus impactants ? Là-bas, j'essaierai de me renseigner un peu. Tu vois ce que c'est quand c'est plutôt, tu vois des gens ? Voilà, j'ai si j'ai donné juste des idées, c'est peut être pas des bonnes, mais j'essaierai de me dire en fait ça peut être quoi ? Les 45 leviers d'action dont on peut penser qu'ils sont les plus impactants ? Tu vois je et là j'ai j'essaie de comprendre un peu localement ce qui marche et ce Qui marche pas ? Et je construirai mon plan de de formation, sensibilisation, communication sur ces Peut-être que c'est des gens quand le gouvernement communique sur eux, ils ils ils sont dans le déni, ils y croient pas du tout, voire ils prennent ça comme de la propagande. Ceux qui sont très sensibles peut Quand tu as une petite association locale qui dit quelque chose, tu vois je sais pas ou ou la maîtresse de l'école ou le maître de l'école qui dit quelque chose, tu vois ?

L : C'est vrai là semaine prochaine je rencontre 2 Thai donc je leur poserai la question

M : Question ouais, tu vois tu dis Ben chez vous quand y a un sujet un peu comme ça pour changer ? Des habitudes de de mauvaises pratiques de gestion des déchets de voilà bien sûr en fait. Je sais pas qui marche ou qui marcherait le mieux pour venir sensibiliser. Tu vois, ouais ? Et essaye de collecter mon conc. Ça a pas la peine de de faire ça et qu'est ce qu'il faut utiliser parce que c'est aussi intéressant de capter. Ça marche pas.

L : Oui oui c'est ça.

M : Ça ouais ça tu vas faire gagner du temps au projet d'éviter des écueils et de pas investir dans des trucs pour découvrir que ça marche pas, en posant des questions, tu fais 2 colonnes et tu dis quoi tout de suite, selon vous ? Ce qui va pas marcher ? Je suis aussi intéressé par ça que ce qui va marcher.

L : Clairement, c'est trop cool j'ai pleins d'idées de questions à leur poser pour la semaine prochaine.

M : Ouais voilà. Et puis aussi tu peux tester des questions un peu sur tout le continuum, c'est-à-dire que moi tout ce que je t'ai dit sur la motivation d'un participant, d'un citoyen, bah tu dis ici, si on devait vous sensibiliser, vous former, vous montrer que quand même y a des choses, on le fait comme enfant, si demain on vient, vous interviewez pour trouver des solutions pour faire. Autrement bah je voudrais faire comment et et et vous vous sentiriez comment sur la prise de décision ? Un peu qui serait prise sur la base de ces propositions. Oh Ben moi moi, si on fait pas tout ce que j'ai proposé hein, je je serai, voilà j'y croirai pas enfin.

L : Ouais non, clairement, mais en plus je me dis, ça peut même être intéressant de poser les questions. Enfin du coup, mon thème est assez large parce que c'est vraiment avoir une vue très systémique et et en fait le le. But, on croise les doigts, ça fonctionne bien, c'est que ce soit un thème Qui soit donné à À soit quelqu'un qui va faire son doctorat ou son ou son mémoire sa sur sur ça, mais en tant qu'un ingénieur architecte où en fait, moi j'aurais fait plus à partie belle. La gestion du projet et cette personne là mènera plus le côté Ben pratique du projet de de truc et mais donc oui, il y a, il y a des gens que j'ai rencontrés sur tout ce qui est technique, des données géospatiales comme on les les intégrer comme on les comme on les Les comprendre et cetera. Comment est-ce qu'on peut se rend compte que telle zone est plus intéressante que telle zone, la gouvernance De l'eau et. Voilà donc c'est trop drôle parce que même là j'ai des idées en mode des questions à leur poser, avec tout ce que t'as dit de qui pourrait être intéressant de voir aussi eux, qu'est ce qu'ils en pensent de leur côté.

M : Et d'ailleurs, le seul ça me fait penser, peut être un dernier truc, l'air de rien. Tu vois même le questionnaire du début, c'est à dire ? Donc la première. Fois qu'on va aller poser, sensibiliser des questions parce que Un questionnaire, ça a l'air de rien, mais en en soit les Questions, elles m'informent. Moi, si tu m'informes en disant Bah voilà sur le risque de d'arracher un arbre peut être que rien que de me poser la Question, ça m'informe. Je savais pas qu'il y avait des risques d'arracher un arbre. Voilà donc la question, elle a la force de l'information aussi en elle et donc Rien que ça en soi, c'est un travail intéressant de facteur clé de succès risque et avec qui je vais construire Parce que tu peux avoir une version très classique où on va monter une équipe projet avec les élus de 3 experts. Tu vois, tu vas poser des questions, mais ça peut être super intéressant d'impliquer aussi des citoyens C'est à dire, eux, ils vont dire Ah non, mais me pose pas la

question comme ça hein, je la comprends pas ou 2, ça me ferait penser à ça et 3 Ben Moi j'ai aucune idée hein. Donc tu vois donc tu Vois rien que Comment aller les chercher par le questionnement ? Finalement, les citoyens, c'est intéressant. En soi, tu vois ?

L : Ouais ouais ouais non, c'est vrai que ça pourrait être intéressant. C'est à la fin j'ai un questionnaire, j'ai des des idées d'ateliers, de comment intégrer le processus. Petit à petit, c'est vrai que ça peut être intéressant.

M : Oui et puis après tu peux aussi dire à tout est dans tout aussi tu peux dire je vais même expérimenter la méthode Elle-même, c'est-à-dire moi, ce que j'ai envie de faire, c'est d'abord, par exemple, de sur ces sujets là des risques d'inondation et aussi des opportunités de gestion de de ces risques que ça peut donner Bon, j'ai un prototype de questionnaire et j'aimerais faire un atelier prototype avec des citoyens pour voir comment ça marche. Tu vas apprendre plein de choses Comprendre que tes questions elles sont peut-être pas bien formulées que peut être, il y a des questions que t'aurais pu poser et que de suite tu t'avais pas pensé et en plus tu vas jauger l'appétence, l'appétit, l'envie de des citoyens de participer Tu vois et donc je pense que là, à l'échelle de ton projet, tu pourrais un jour avoir l'idée folle de dire Bah moi je vais faire 23 ateliers citoyens et je vais tester ma méthode et tu vas leur dire à eux, ça vous dirait d'être impliqué après pour donner des idées, pour agir, pour que décider et capter un peu ça ? Et. Et tu vois, c'est même à l'échelle d'un projet, ça tu peux le faire finalement.

L : Oui c'est une bonne idée.

M : Tu dis mon projet, il va tester un questionnaire et il va tester un format d'atelier avec avec 10 ou 15 citoyens. Plusieurs ton projet est devenu un peu plus concret parce que là on dit plateforme en ligne et tout. Puis en fait très vite, tu peux dire bah voilà le questionnaire que j'avais imaginé voilà un peu comment, comment ils l'ont perçu. Voilà les réponses qu'ils ont données. Voilà un peu en en 02h00 de temps. Comment j'ai testé l'animation d'un atelier sur ces sujets, tu vois ce que j'en ai un et ça, ça vient donner dans ton projet un peu de. De trucs très concrets, tu vois ou ? Ou ça peut aider à dire un quartier ? Je vois bien comment je vais pouvoir repartir de là, comment tu vois ? Et ton projet ? Il est devenu un peu plus concret. Tu vois en terme de de méthode. Enfin en termes de. De donner envie de poursuivre un peu la démarche d'intelligence collective, tu vois ?

L : Clairement c'est super intéressant.

M : D'ailleurs, je te donne un peu le tuyau mais je sais pas si t'as utilisé chat GPT.

L : Oui hein

M : Tu serais rien que de dire je je veux sensibiliser les, tu fais Un promposition qui Dit, voilà, je je travaille sur un projet de sensibilisation des citoyens au risque d'inondation Ville, j'aimerais les sensibiliser et puis collecter leurs leurs idées. Tu t'as quand même être un peu, par exemple, autour de des risques, arracher les arbres et j'aimerais créer un questionnaire. Et tu dis à quelle question ouverte je devrais leur poser ?

L : C'est vrai bonne idée. Par contre, mais j'ai juste une dernière question là ça, ça me titille. Je me dis en fait, si vous êtes parce que un moment tu as dit que des fois tu te retrouves face à des

des politiciens, en quoi qui sont pas du tout enfin qui voient pas l'intérêt de l'intelligence collective. Et on a déjà énuméré plein de aller de le Levier.

M : Alors alors c'est un c'est intéressant que on parce que nous on travaille autant dans le champ d'un de l'entreprise, même la le côté intelligence collective. Dans les mots qu'on Qui vont être un peu dans La tête des Du champ des du champ politique D'une ville de la Au début, eux ils vont, il faut utiliser d'autres mots, eux par exemple, ils vont dire démocratie participative, démocratie délibérative, concertation citoyenne, consultation citoyenne et donc On peut penser que certaines villes, même si Ben nous, on en tout cas en France, il y en a de plus en plus, on est d'accord, pas d'accord. Ils vont tous avoir leur avis Sur ces sujets en c'est-à-dire de l'intérêt qu'il y a à ou du risque qu'il YAA ou du la de ou de l'impression, que ça réduit leur champ de de décider que de que d'associer des citoyens à dans ce genre de démarche, tu vois en gros, donc on va toujours avoir des cultures différentes, des profils différents, des expériences différentes. En rapport à Y a-t-il plus d'avantages à Voilà, consultez des citoyens. Quand on a une décision à prendre, un plan d'action, à élaborer une loi, à faire à à une loi, à enfin à voter. Et donc oui, on aura toujours un peu d'erreurs, mais vas-y va au bout de ta question, mais tu vois, je voulais, je voulais recréer le le champ sémantique et que peut-être qu'on utiliserait avec eux, c'est à dire on avec eux, on va pas leur dire ouais, enfin tu vas Leur dire intelligence collective. Mais ce qu'il va falloir vendre, c'est, on veut faire une grande consultation citoyenne sur le risque et les opportunités des inondations. Tu vois ? Et là ils vont se dire OK Wh, une grande construction. Là, ça va leur parler, penser. En démocratie participative, tu vois ?

L : 'était plus, mais c'est intéressant d'avoir le. Le champ sémantique, c'est vrai que c'est hyper important de bien choisir ce mot, donc ça, mais c'était en fait. Il voilà, tu te retrouves face à quelqu'un qui est pas intéressé parce que je me dis aussi face aux interviews que je vais avoir peut être que Je vais voir des gens qui vont dire mais on a rien à ***** d'intégrer les citoyens, pourquoi tu veux faire ça ? Comment en fait, moi y a aussi tout ce côté-là, c'est de comment réussir à motiver les gens ou même à voir l'intérêt parce que j'ai l'impression que tout le monde au final, il connaît les intérêts et on a plein, mais c'est comment réussir à donner ce petit déclin de un en fait, ça peut être vraiment important et c'est pas juste avoir leur opinion. Enfin y a.

M : Je pense que je pense que tu tu l'as dit toi-même en partie, c'est-à-dire ? Euh. Enfin y a on l'a évoqué, c'est à dire que probablement il y a d'autres pistes que juste les interdictions et la loi dans de de de qui qui sont là et que je pense que c'est des gens qui sont convaincus que par exemple sur pas boire au volant, mettre sa ceinture de sécurité quand on conduit pas taper sur mon voisin et cetera. Il y a toujours la moi, je mettrai la carotte et le bâton donc Soit sur ces sujets là aussi, au même titre qu'il y a tous les autres sujets de vivre en société. Bon, il y a des actions de type bâton. Mais on est d'accord, Monsieur, Madame, on est d'accord ? Il y a aussi des actions de type carotte, oui enfin, probablement quand même. C'est des gens qui pensent que former des jeunes, éduquer enfin tu vois, on est aussi, on est aussi sur un sujet d'éducation. On est sur un sujet de donc si vous croyez À la carotte et donc à l'éducation dans le long terme, que les gens, il faut leur expliquer, pourquoi il faut faire ces choses là, pourquoi ça a des avantages, et cetera. Il faut les éduquer. Oui, bon Ben nous on pense que une manière de les éduquer c'est de les impliquer, c'est de les impliquer dans les problèmes et et donc c'est ça veut pas dire que vous on va donner l'image que vous élu, vous avez pas les. Enfin, il y a un 2e sujet c'est on est bien d'accord que des problèmes y en a beaucoup. On est bien d'accord que vous vous avez réussi à en résoudre quelques-uns. Oui, on est bien d'accord que vous pensez que

vous êtes pas capable de d'avoir des solutions sur des problèmes nous Puisque c'est des problèmes qui ont émergé récemment et que vous vous donnez pas, vous mettez pas la pression d'avoir réponse à tout problème. À tout vous ? Équipe de la ville, on espère qu'ils vont dire oui, sinon on a en face de nous des gens d'une arrogance et d'un déni tel qu'il pense qu'ils vont couler tout seul, entendre les solutions à tout et donc et donc Vous pensez sans doute tu vois. C'est là que que il y a avantage à essayer d'associer les gens pour trouver ensemble les solutions à ces problèmes là pas tous, mais assez à ce type de problème là, qui sont d'une ampleur et voilà et qui échappe un peu à la à la zone de contrôle qu'on a type type inondation. Oui et donc là voilà, c'est une manière à mon avis de défricher le terrain. Tu vois pour pour essayer d'espérer. Après, il peut y avoir d'autres types de trucs. C'est où là c'est pas ma priorité du moment où vous savez j'ai En ce moment, j'ai Pour l'année qui vient là, je suis tellement d'autres priorités. Peut-être que tu vas avoir en face quelqu'un qui, ou une équipe qui qui va donner un autre argument de pas faire pas permanent, pas faire tout de suite parce que ils ont des sujets de autres, tu veux qui vont estimer en plus important mais mais plus élu, plus budgété, tu peux avoir un premier argument de combien ça va me coûter tout ça ? Lucile, Ah Ben oui, c'est vrai que c'est un investissement que vous avez pas prévu l'année dernière dans le budget de la ville. Ouais, Go, repasser l'année prochaine et on regarde ce qu'on va mettre Dans le budget tu Vois, tu vois donc ça aussi, c'est une sorte de réalisme qu'il faut avoir sur.

L : C'est vrai que niveau budget en général, des opérations comme ça, c'est plus ou moins quoi en terme de budget.

M : Très vite, plusieurs centaines de de milliers d'euros, hein, parce que tu mobilise. Le voilà, un accompagnement des plateformes outils tu tu montes un projet, tu vois ? Dans la durée, tu Vois, tu vois, tu vas vouloir Travailler donc, il dit travailler, tu payes les gens. Enfin tu vois sur le questionnaire la démarche, l'analyse des données, le partage des données, le la conduite des projets pilotes dans les quartiers. Enfin tu vois. Tout ça, C'est c'est, c'est un, c'est un projet. En fait, c'est en fait faut montrer que c'est, c'est un format projet, donc un projet c'est un, c'est un planning, c'est un budget. C'est des people, c'est des, c'est des petits ciels. Enfin c'est des ressources, tu vois ?

L : Non, clairement j'essaie de voir parce que enfin quelque chose qui est critiqué en Asie Sud-Est, c'est que ils réinvestissent tout le temps dans des infrastructures grises, donc c'est toutes les infrastructures type ingénieur. Et ces infrastructures qui coûtent super, super chères qu'ils entretiennent pas bien donc au final elles servent pas grand chose et ça il y a déjà eu pas mal de d'études pour comparer le prix des infrastructures naturelles et infrastructures grises sont nettement moins chères et aussi le le type en fait la manutention à long terme qu'il faut faire est moindre en fait que Ben enfin aller un barrage c'est quand même assez assez lourd comme entretien tandis que les rivières pas L'entretien est nettement moindre et donc c'est vrai que si au final Euh vu qu'on aime vraiment en dessous du prix des infrastructures grises. Ben c'est vrai que le fait de se dire mais attendez avant vous Dépensez ça tous ? Les 2 ans maintenant, on dépenserait que ça et en fait au final, ce projet a atteint même pas encore le prix total de c'est quoi l'entretien ?

M : Oui là tu as clairement un argument. Là-dessus, c'est que, comment dirais-je la nature des budgets que Tu décris là D'infrastructure ils sont d'une autre magnitude que ceux que je t'évoque pour faire un projet d'intelligence collective. Là tu Tiens, un bon argument, c'est à En fait le petit budget parce qu'à l'échelle de la de d'un d'un barrage, c'est rien. Donc le petit budget

d'investissement de faire une démarche régence collective. Il est-il est très probable qu'on le récupère par rapport aux solutions qui vont permettre de faire de pas investir aussi considérablement qu'on aurait fait sans le faire. Et donc c'est un sacré retour sur investissement. Voilà, tu vois donc tu peux tenir un un discours de retour sur investissement pour éviter de d'investir des des 1000000 et des milliards dans des infrastructures dans les mêmes types d'infrastructures qu'on aurait prévues sans cette démarche quoi ?

L : Non, clairement. Et c'est vrai que là j'essaie de voir un peu tous les petits leviers qui pourraient faire que ouais, ça, ça a du sens. C'est tout, mais en vrai moi j'ai plus de questions. J'ai l'impression. Enfin en tout cas-là j'ai plus de questions qui me viennent à L'esprit, je sais pas si toi y a d'autres choses que tu aimerais ajouter que tu aimerais ajouter ou que tu te Dis que c'est intéressant ou quoi ?

M : Non je pense qu'on a fait le tour et tu peux me contacter si une question te revient.

L : Parfait !

M : Oh Lucie, on a oublié de le dire, mais c'est intéressant peut être c'est un autre angle aussi, c'est parce que qui dit inondation, dit urgence crise quand elle On arrive, je pense que l'intelligence collective, on a beaucoup parlé là, de la l'avant, la prévention, c'est à dire comment on on va faire de l'intelligence collective pour que ça n'arrive pas ou que tu arrives moins ou avec moins d'impact. Après, je pense que il y a sans doute aussi à inventer plein de belles choses post-crise, c'est-à-dire que je me dis que quand t'as une ville qui tu vois, tu peux aussi utiliser l'intelligence collective pour gérer une crise qui vient d'avoir lieu. Là je pense y a encore plein de. Inventer sur, par exemple, moi, j'avais discuté avec des pompiers, tu vois pour gérer des cellules de crise beaucoup plus massives en intelligence collective. Tu vois, ça y a eu une inondation, Ben on crée une communauté de de 3000 personnes et là aussi tu actionnes les choses. Tu vois qui viennent aider pendant la pendant la crise, mais tu vois c'est aussi un c'est peut être le mettre un peu plus tôt comme un truc ouvert dans dans mémoire en disant Bah si on arrose Si on a fait tout ça en amont sur la prévention. Il est probable Qu'on trouve aussi de belles idées, de changer les choses dans la manière de gérer la crise avec beaucoup plus d'intelligence collective. Pendant la pendant la crise quoi.

L : Ouais vraiment, la pendant la crise, mais c'est vrai que là ce qu'ils utilisent le plus, c'est pendant et après la crise, c'est des des algorithmes qui analysent Twitter et Facebook mais surtout Twitter. C'est ça qui enfin là-bas fonctionne le plus.

M : Tu vois. Plutôt que d'aller demander aux gens de remonter, tu vas y remonter des choses et tu vas les analyser. Donc au fond, c'est un peu une, tu peux en parler de ça si tu veux tu vois dans chapitre, là c'est une forme, captation de contenu créée par l'intelligence collective et d'analyse.

L : Non clairement c'est important de le dire

M : Juste que c'est juste que Ils vont le, ils vont le dire sur Twitter, ils vont pas le dire sur un questionnaire en ligne Ou dans un atelier ? Tu vois ouais donc non.

L : Mais c'est vrai que c'était, c'était intéressant de voir comment les gens utilisaient Twitter parce que, en général, mettre des photos et donc ça permettait aussi d'analyser les photos et

Enfin, l'ampleur des dégâts et donc à quel point il fallait envoyer, et cetera. Et parce que enfin, on sait dire, après que l'eau est montée à 2 mètre 5. Mais les personnes savent pas trop dire comme ça et donc avec les photos, ça enfin ils montrent un peu comment toute l'intelligence même analysait les photos et c'était super intéressant à quel point ça pouvait aller loin en fait.

M : Mais en fait ça, ce que tu dis Là ça rentre dans le sujet De l'intelligence collective Ça ne peut marcher que s'il y a une intelligence collective à remonter des données.

L : Ouais, c'est vrai que ça peut être même quelque chose qui peut être fait dans la prévention de comment même continuer à apporter. Quand Ben voilà, il y a, il y a un événement de comment le rapporter. Et c'est vrai que ça, c'est pas bête, mais si les gens savent qu'en rapportant par Twitter ce sera analysé.

M : C'est ça, un créer le cercle vertueux, c'est à dire, Vous savez et et là, demain, la ville résiliente, elle peut communiquer qu'elle a mis en place une analyse de ce qui remonte Les moins citoyens Quand je remonte, quand je le sais, Ben je me dis, attends. La qualité des données que je vends, je vais les faire encore mieux Je vais mettre 3 photos de plus ou Quand je prenais ma photo, je ferai encore plus. Tu vois et là tu Tu vas utiliser un usage existant d'intelligence collective, mais tu vas contribuer à l'améliorer.

L : Ouais ouais, c'est vrai que là en plus je peux faire une petite ligne. Du temps parce que enfin, il y a le désastre Management System, donc c'est au début t'as la la fin t'essayes de faire vraiment de la, de la prévention t'as enfin, t'as le moment où il y a le désastre, il y a l'après donc il y a 2 étapes avant, pendant après et donc c'est un peu un petit cercle vertueux que en fait ça s'arrête. Jamais, parce que l'après.

M : Elle a progressé dans les compétences, les techniques, les ressources, les méthodes pour gérer tout ça tout le temps, mieux que mieux qu'elle ne l'aurait fait, sinon mieux que les autres villes et donc il y a un peu l'idée que si elle fait tout. Ce cercle, elle va être popper. Un savoir-faire technique méthodologique tu vois qui va lui donner cette capacité à être à à finalement, à mieux traiter le cercle. Tu vois donc, elle est là le cercle vertueux, à convaincre une ville de basculer aussi, c'est dire. Parce que vous allez chez vous avoir des gens qui savent mieux le gérer parce que vous avez identifié des partenaires techniques ou technologiques pour le faire, et cetera. Vous voyez la le progrès des compétences, le progrès des. Savoir-faire il est-il est-il est au centre du cercle quoi finalement ?

L : Mais c'est trop bien parce que enfin, Bangkok fait partie des sons et c donc c'est 100 villes qui ont été choisies par une fondation pour faire des systèmes pour être plus résilients. Et ils font partie du projet depuis 2016.

M : Super ce que j'avais, moi j'ai pas fait de veille, mais ça peut être intéressant d'aller un peu googlé sur tu vois. Démarches citoyennes ou consultations citoyennes dans les villes asiatiques ? En plus, si tu trouves pas aussi un petit peu de contenu qui dit pas lié nécessairement au sujet inondation climat, mais tiens, il y a des Villes qui ont Fait des des démarches de consultation citoyenne sur plein de sujets différents Pour regarder un peu si on part de Très loin culturellement ou si il y a déjà des Avec des initiatives de ville Qui ont ouvert un débat en ligne, fait un questionnaire en ligne auprès de citoyens. Lancer un appel à aider des appels à projets citoyens ou des tu sais ou des budgets participatifs. Et comme ça tu peux dire Bah Regardez, y a certaines villes déjà, peut-être celles-ci qui ont déjà fait des choses, donc je peux dire le terrain.

Il est plutôt favorable à à aller encore plus loin, d'autant plus sur ces sujets urgents et impactant. Tu vois ?

L : Clairement y'a pleins de choses à faire.

M : bah écoute lucille j'ai été ravie.

L : Moi aussi c'était super merci beaucoup.

M : merci à toi au revoir.

L : Au revoir.

INTERVIEW 5 : FRANÇOIS WAUTIER

L : Voilà, désolé, je ne voulais pas, je voulais ne pas prendre mon téléphone pour pas être distraite pendant que je travaillais au final.

F : Vous avez examens ? Vous avez oublié ce détail important ?

L : Si, mais moi, je, je dois écrire mon mémoire. Enfin, je n'ai pas d'examen. J'ai eu ce stage et mémoire et donc là enfin j'espère que je vais bientôt à la Fin, c'est un truc aussi, donc c'est assez.

F : C'est un programme de combien d'années ?

L : 5 ans Donc là c'est la dernière année et bah normalement août y a le petit papier et le petit diplôme qui est enfin là quoi donc ça Va faire du bien, ouais.

Mais tu n'as pas fait tes études en Belgique. ?

F : Moi, si j'ai fait le même Que ton père.

L : Ah mais oui, c'est vrai, il m'a dit que oui, c'est vrai au CI. OKOK Ben trop bien, mais on peut-on peut commencer si t'es ready OK Ah Ben voilà, si tu pouvais juste commencer par un peu, voilà te présenter et expliquer un peu ton parcours, ce serait top.

F : Oui, bien sûr. Alors voilà, je m'appelle François Wauthier. Et je suis ingénieur civil. Euh après sortie de d'ingénieur civil, en informatique donc j'ai fait Quelques années comme chercheur, je suis Parti au Japon avec une Bourse de gouvernement japonais. Je fais donc un Master là-bas au Japon. Et puis après, j'ai rencontré un thaï qui est devenue ma femme, donc je suis venu vivre en Thaïlande ça va faire 27 ans. Et depuis Ben. J'ai travaillé au début pour des Américains et puis Ben j'ai depuis projeté le directeur informatique en une boîte thaïlandaise et maintenant je travaille pour une boîte internationale qui fait du digital signale voilà.

L : Sympa comme parcours. Mais du coup enfin voilà, moi mon mémoire, ça porte vraiment. Donc enfin je m'intéresse énormément à la gestion des désastres naturels et donc enfin toute cette année-ci pour moi Était autour de. Ça. Au Q1, j'étais en Suède ou j'ai fait mon Erasmus et j'ai suivi que des cours vis-à-vis de ça j'ai Ben voilà, je suis mon devoir par rapport à ça donc. Ça a été un peu tout un, un long processus et donc voilà, je suis vraiment arrivée plus sur l'étude des infrastructures dites naturelles pour tout ce qui est, c'est surtout formation dirais surtout aux côtés des inondations et aussi tout ce qui est sécheresse et cetera. Et donc c'est 111 projets un

peu pour voir comment les intégrer de façon avec une co création avec la population locale et comment ça pourrait fonctionner, comment on peut mettre tout ça en Place, donc voilà tout un processus qui est arrivé à ça Et qui m'a amené En Asie au fur à mesure et du coup, voilà la une des premières questions c'est qu'elle est toi ? Ton expérience vis-à-vis des inondations en habitant à Bangkok donc ?

F : Oui, oui, ça fait 27 ans, j'habite À Bangkok, donc Ça fait quand même, j'en ai vu quelques-unes d'inondation, les plus grosses pour moi, pour la vie, c'était en 2011. J'habite sur l'est de La capitale donc, le test de mon. Coq. Et à cette période ? Là, c'était effectivement toute cette région-là qui. A été le cas. Le plus souffert ? Bon on n'a pas, on a on le dit qu'on a souffert, c'est ce n'est quand même pas catastrophique pour moi parce qu'on a pas eu Lieu dans la. Maison par exemple. Mais par exemple, on ne pouvait pas amener la voiture jusqu'à la maison, quoi, il y avait trop d'eau que pour pouvoir amener La voiture à la Maison, donc ça s'est été un. Chiant. On peut constater pour moi la plus grosse Mais là, le plus gros problème qui a eu à Bangkok, donc tu viens, c'était quand j'étais de l'autre côté. Moi, je travaillais à l'aise à ce moment-là, donc j'avais fait un j'habitais à je travaille à l'Ouest, pardon Pas au nord-ouest et là, c'était en courant. 2015 un truc comme ça 2016 Un truc comme Ça y a eu Une situation absolument terrible. Alors là c'était vraiment gigantesque. J'ai eu des collègues qui Avaient 2 M d'eau dans leur maison. Mais c'était bizarre cette fois-là, d'habitude, c'était toujours vers l'Est, on envoyait La flotte pour dégager la ville de Bangkok et pour une raison qu'on n'a Pas très bien Compris. Cette année-là, c'est parti vers Ouest Et donc nous à la base. Nous, on était un, ils ont construit des barrières partout pour éviter par exemple que le Y a une zone industrielle pour éviter que la zone industrielle ne soit inondée. Bon, il y a l'aéroport qui elle aussi une digue, donc on peut bien. Protégé à l'aéroport. Et pour finir, on n'a pas eu grand-chose quoi Mais par contre, l'autre côté, ça a été une catastrophe. J'ai vu ces 2 ces 2, ces 2 épisodes assez importants de d'inondation Qui ont été chaque fois créés par Un manque de préparation en amont. L'eau arrive des autres états en amont et Quand il y a trop d'eau qui Arrive donc il va relâcher l'eau des barrages ce qui prend quand même 3 semaines à arriver à Bangkok car ça vient du nord.

L : Ok et les conséquences toi sur ta vie à pas eu de conséquence ? Enfin, des pertes ou des conséquences au niveau de ta santé ou quoi que ce soit de La qualité de l'eau.

F : Personne ne m'a non rien du tout ça, voilà comme façon. On ne boit pas l'eau de la ville, on a des bouteilles d'eau et cetera, donc ça ne va pas vraiment une importance en plus On a des filtres Et des pompes.

L : Ouais OKOK trop bien et du coup enfin là comme tu disais. Ben voilà le gouvernement afin qu'en amont ce n'était pas bien géré C'est quoi ta position Face à Leur protection pour des risques naturels quoi donc ? Ça peut être aussi des sécheresses inondation, est-ce que tu as confiance en eux ?

F : Non pas du tout, alors là on a pas du tout du tout, c'est assez corrompu et c'est un peu pareil. Je pense que C'est toujours les militaires qui sont pouvoir et donc tous les projets qui font, c'est, c'est en fait corrompus pour les prennent de L'argent, donc c'est Par là alors peut en payer comparer par exemple à quoi le pauvre où vont créer cette espèce de route, ce terrain qui, quand il y a des grosses inondations, ça peut se transformer très rapidement en quelques minutes, ça peut se transformer en canal pour échapper On évacue les eaux Et quand c'est pas ça, c'est un

une Route qui permet défaire un canal? Bref, alors ça on va pas du tout ce genre de chose ? Ça, c'est pas du tout là, donc on n'est Pas très haut ici on est pas, on est à 2 M au-dessus du niveau de la mer donc.

L : Ouais non clairement. Et enfin, la ville de Bangkok, coule petit à petit donc.

F : Oui il y'a un Très gros problème d'affecements de sol effectivement. Bon, cette maison ici en fait On a déménagé quelques Années, mais on a toujours l'autre maison qui est à ¼ d'heure d'ici, ce n'est pas très loin et puis allez là le sol s'enfonce encore. Les pilotis sont dans le sol et on voit très bien que la terre s'affaisse et il y a des énormes espaces qui se créent entre des maisons. Et ça, c'est vraiment inquiétant.

L : C'est fou de de voir Qu'enfin ça se voit même à l'œil Nu.

F : Alors oui, tout à fait Mais, mais même ici tout près d'ici, donc je vais essayer d'expliquer. Sur une nouvelle route. En fait, on habite maintenant sur un endroit assez nouveau. Ils ont créé cette route il y A 5 ans. Les alentours étaient En train de se développer il y a plein.de magasins qui sont en train De se construire et cetera mais Des trottoirs il y a des endroits où t'as 15cm d'affecement, tu vois. ET ça fait que 5 ans quoi ?

L : Carrément, c'est assez, c'est assez, c'est assez fou mais du coup, pour revenir au gouvernement donc voilà, toi tu ne leur fais pas confiance selon toi ils font pas assez pour protéger la ville face aux inondations et au futur en fait qui ?

F : Non rien, alors on sait très bien que à 30 20 qu'avec la montée des eaux Bangkok il y a de bonnes chances Que ce soit inondé. Mais on n'a Rien, aucune préparation, rien du tout. Pourtant, ce n'est pas qu'il fasse pas de travaux sur les infrastructures, il y a plein de de métros qui sont en train de se construire, des métros souterrains, des métros et élevés il y en 2, pour le moment, c'est souterrain. Donc il y a des constructions Qui se passent mais on ne voit pas L'urgence qui doit y avoir Vis-à-vis de cette problématique de la montée des Eaux à cause du réchauffement climatique.

L : Okay Est-ce que tu penses que c'est un manque de connaissance, vraiment du problème ou ça va juste, on s'en fout enfin pour toi c'est quoi c'est je pense qu'il y a un manque de connaissance globale de la population, un manque de connaissance du gouvernement ou c'est vraiment juste ? Ben tant pis en fait.

F : Il y a une partie qui est à mon Avis dû au bouddhisme ? Il y'a comme une espèce de fatalisme qui existe et par exemple, ils aiment pas du tout parler des mauvais problèmes et Quand y a quelque chose qui ne va pas, on veut pas en parler, on ne veut même pas faire face à ça et donc effectivement, c'est quand ça arrive, c'est con. Il Y a un peu ça n'y a pas Que ça. Parce que point de vue de la connaissance, par exemple, le jeune avocat comme avis sont tout à Fait au courant de cette problématique de monter. Des eaux et cetera. Et pourtant, ils vous rendent bien compte que se passerait, mais ils ont aucun pouvoir. Quand même les dernières élections qui ont lieu il y a il y a un. C'est en fait un parti assez jeune qui a gagné, mais il n'est Toujours pas vraiment au pouvoir. Parce que justement, les militaires bloquent tout et donc, même s'il y Avait eu un parti comme celui-là, qui S'appelle marche en avant ou je sais plus. Peut-être qu'il y aurait des choses qui se passaient, mais La vieille garde avec ses 250 sénateurs nommés par les militaires, Ben évident Il bloque tout.

L : Ouais OK, donc il y a vraiment ouais comme il y a de la corruption à fond quoi. Ok et donc pour toi. Enfin ouais là au niveau de préparation future de l'inondation, de la façon de terrain, et cetera y'a rien ?

F : Ah oui, là, Ah oui, tout à fait. Il y a Tout qui manque, il y a quand même quelques petites choses que tu vois qui sont faites ou tu dis okay, ça, c'est tout de même bien. Par exemple. Oui, par exemple l'aéroport. Ils ont fait ça bien. Il y'a une digue autour de l'aéroport, il y a des. Il y a des canaux dans l'aéroport qui pour évacuer, y a des stations de pompage ou sud-est et au sud-ouest il y a 2 stations De pompage assez Grosses avec des tous, des plans d'eau qui Permettent d'évacuer de l'eau En grande quantité si c'est nécessaire. On le voit bien parce que moi, j'ai, je vais tous les matins faire du vélo là-bas quand je le vois le matin C'est vraiment bien.

L : Tu dis ça, ça devrait un tour de chez moi haha. Et pour la population en général, est-ce Que tu penses qu'elle est au courant de ce qui se passe, des risques futurs ou tu penses que c'est quand même que pour la population qui est plus éduqué et ce que la population moins éduquée au courant ?

F : Ils ont. J'ai l'impression qu'ils ne veulent pas en parler. Parce que j'ai eu, quand on en fait, c'est ici, la maison C'est ma fille qui l'a acheté Et quand on a parlé de la Maison on lui dit. » On devrait acheter ? La maison meilleure ici ? Ça va finir par être inondé et Ça a été directement ou on ne veut pas en parler. Donc, donc il y a un Peu de ça.

L : Ouais OK direct, très fataliste enfin.

F : Ouais déjà regarde déjà, c'est fatigant. Ne pas parler de choses qui peuvent être mauvaises parce que si on parle d'une chose qui Est mauvaise, ça va se passer donc ouais.

L : Okay, okay ça Va, c'est, c'est bon de savoir et est-ce que. Euh enfin voilà vu qu'il y a quand même tout ce souci avec le gouvernement de corruption et cetera. Est-ce qu'il y A quand même un. Enfin est-ce que la population on va dire juste en mode, c'est comme ça ou il y a quand même des personnes qui veulent faire bouger les choses ?

F : Non, non, il Y a des manifestations, il y a des manifestations assez régulièrement. Surtout les jeunes qui veulent faire leurs trucs aussi penser que les jeunes maintenant, leurs parents ont été écrits, massacrés en septembre 1976 quand Il y a eu La un autre coup d'État où les étudiants ont protesté et ça a terminé en massacre. En fait, notre université, c'était donc, il y a eu donc les parents sont aussi au courant, mais ils ont aussi une certaine crainte parce qu'ils ont-ils ont vécu le mauvais côté des choses. La pendant COVID y a eu quelques manifestations qui ont été un peu arrêtées à cause de COVID du COVID justement, ils avaient commenté pas mal de trucs, mais après, avec la, la pandémie ça a été un peu un peu bloqué mais non mais les gens se rendent compte du problème et ils font des choses mais bon ils n'ont pas vraiment le pouvoir donc ils ont du mal À faire à faire Évoluer les choses ?

L : Okay merci. Alors là, on va plus Du coup, rentrer dans le sujet un peu pour tâter le terrain, on va dire pour les solutions naturelles, donc les solutions dites naturelles donc c'est Natural base solution Ou alors les BGI, c'est donc, c'est vraiment en fait, c'est le fait, donc on en général on dit qu'on a les infrastructures grises donc ça va être les canaux, les ponts, les barrages et puis tout ce qui est plus naturel en fait, c'est le fait de ramener des forêts, des rivières, de faire des évaluations spécifiques pour avoir un meilleur écoulement En fait de comment réintégrer la

nature dans un milieu urbain. Bon pour faire en sorte que là la ville devient encore une sorte d'éponge en fait naturelle de et donc c'est assez drôle parce que c'est un concept qui paraît assez basique, mais c'est ça date de 2015 que ça a été Vraiment mis mot à mot que ça ait quelque chose qui a été expliqué. Ça a été quelque chose qui a commencé à être mis en avant et donc c'est encore enfin, en fait, c'est une des solutions qui sont assez connues parce que c'est quelque chose de naturel, mais le fait de comment les réintégrer dans les villes de Comment analyser les villes, de quelle zone choisir ? C'est quand même quelque chose d'assez neuf. Et donc voilà, il y a le fait que ça peut être une des solutions en fait de garder les solutions existantes Donc, vraiment les solutions lourdes Ingénieurs et de mélanger ces solutions là pour faire en sorte que voilà en fait augmenter la résilience des villes. Et donc il y a plein de d'effets positifs qui peut avoir sur la santé, le fait que là, la température dans les quartiers Réduite au. On a une meilleure qualité de l'eau, ça rend aussi les personnes plus heureuses en avoir des zones vertes autour de chez soi, ça crée des emplois donc et ça aide aussi pour les périodes de sécheresse, par en gardant l'eau dans les sols. Donc y a vraiment tout un. Enfin voilà, il y a tout un truc qui commence à se mettre de plus en plus en place pour essayer de promouvoir ça et de faire de plus en plus de projets à grande échelle. Je me demandais donc, toi on maintenant en ayant un peu entendu ce que c'était, est ce que c'est quelque chose que tu pourrais voir dans Bangkok et voir un intérêt d'avoir ? Voilà, c'est des espaces verts, une meilleure qualité de l'eau, moins de chaleur. Est-ce que c'est quelque chose ou tu dis c'est vrai que ça, ça pourrait être cool

F : Il y a quand même un gros problème technique. Déjà, il y a beaucoup d'eau à Bangkok, il y a plein de canaux. On est le venise d'Asie hn. Bon c'est vraiment canon dans toute la ville y'a des canaux rivières qui sont plus ou moins bien entretenues, certains seraient entretenus, d'autres pas si bien entretenus que ça et donc encore. Le terrain en Fait, est déjà relativement saturé de l'eau. Donc utiliser ça comme une éponge, ça Va être difficile Vu qu'il a déjà beaucoup d'eau Et d'ailleurs, c'est une des raisons pour laquelle il Y a un tel niveau d'affaissement du sol, c'est le fait qu'il y a effectivement beaucoup d'eau et que donc dans pas mal d'endroits, c'est la base, c'est de la terre en fait est devenu Un fluide, c'est plus Une terre solide, c'est un fluide. Donc effectivement, je Vois mal ça arriver. Pourtant c'est vrai qu'ils font il Y a il y a des parcs, des Jeux Comme ça, il Y a des. Par exemple, le village, on arrive ici s'est rempli avec des arbres partout, y a des pelouses. Il y a Des choses, quelques trucs Pour les enfants là-bas. Aussi ici les arbres poussent super vite, un arbre de papayes ça pousse de 2 ou 3m en 6 mois. Donc y'a quand même pas mal de verdure. Après c'est vrai qu'en dehors de notre village. En fait notre village est un village privé avec des murs et des gardes à l'entrée y'en a plusieurs dans les environs. Donc c'est vrai que quand je sors du village y'a des zones un peu en friche avec des gros lézards dedans. Donc y a quand même de la nature. Et donc ça, c'est déjà là quoi que je ne voie pas vraiment comment il pourrait faire beaucoup plus. Ah enfin le. Le problème, c'est qu'ils font le contraire. En fait maintenant tous les endroits qui sont Un peu en Friche et qui peuvent être un peu naturels. Ils sont en train de les de les développer pour des habitations et des maisons, et cetera par exemple. Comme je le disais, la, la raison de pourquoi on en est ici, ils ont acheté tous les terrains il y a 20 ans, c'était, c'était des fermes, c'était de l'élevage mais maintenant y' plus tout ça, la ville s'étend et tout se construit. Donc c'est un peu le. Ils vont plutôt dans la direction opposée quoi.

L : Ouais donc là pour le moment, tu trouves qu'il y A assez de zones vertes ? mais elles sont en Train de disparaître.

F : Je crois qu'il faut dans un village y Mettre quand même pas mal de verre aussi Mais est-ce que c'est nécessaire partout.

L : Est-ce que c'est juste des arbres partout où il y a aussi quand même des parcs, des zones de détente ?

F : Quelques petits parcs ne sont pas très grands, mais Il y a par Exemple y a des trucs pour enfant là-bas, déjà Avec des jeux pour les enfants bon ce n'est pas incroyable mais c'est déjà ça.

L : Ok.

F : A quelque part, par exemple autour de l'aéroport, où je vais faire du vélo. C'est une réserve naturelle encore Hein, t'as des, t'as des, t'as des lézards, t'as des Serpents, t'as des oiseaux. Toutes sortes de terrain donc parce qu'ils ont pris tout l'aéroport et donc tout autour. C'était en fait une zone plus ou moins attirante.

L : Un endroit qui est sympa, qui est et toi tu n'as pas l'impression que voilà avoir plus de zones vertes ou de parcs ou des zones comme à côté du de l'aéroport ? Améliorer ta qualité de vie de fait de Dire Oh, il Y a ça près de chez moi c'est trop bien.

F : Si, si ça pouvait, ça pourrait mais je ne vois pas très bien quand on pourrait le faire quoi ? Parce que justement, les zones, les zones qui sont, qui sont pour le moment plus ou moins libres, on construit dessus.

L : OK Ouais, non ça, ça c'est sûr. Mais donc ok ça et est-ce que tu trouves qu'en général là la ville est sale, qu'il y a vraiment enfin voilà qu'il y a énormément de déchets que même autour de chez toi ?

F : le sac plastique, c'est une tique dégueulasse. Les gens qui sont dans la crasse ce n'est pas possible. Par contre dans le village c'est très propre dans le village parce que ce sont des propriétés cloisonnées, donc y a des gardes à l'entrée Et donc il y a 300 maisons. Et puis si on vient d'arranger donc ça va. Et puis tous les autres villages autour c'est la même chose hein. C'est une entrée avec des gardes et puis et donc ça c'est donc là ça là c'est des propres parcs, dès que tu vas marcher par exemple le long du canal voilà c'est dégueulasse, alors vraiment dégueulasse c'est dégueulasse. Le long d'une grande route là-bas, il y a aussi plein d'endroits où c'est des détritits sur détritits.

L : Ouais ça ne donne pas Envie d'y aller quoi ?

F : Ouais tout à fait, ouais.

L : Okay, ça va et au sujet de la co-création, si on met la corruption du gouvernement principale de côté, on se focus sur Bangkok tu en penses quoi ? Là, euh. Est-ce que tu penses que les la population locale serait intéressée en fait d'être Pour plus prise en compte dans Des initiatives pour la ville en tant Que telle donc ? Voilà, ça, ça peut être pour des espaces verts, mais ça peut être aussi je ne sais pas moi pour des trucs où est-ce qu'on met la nouvelle école ? Est-ce que tu penses que c'est des choses que qui intéresseraient ?

F : Les jeunes certainement. Ah bah non, peut-être pas pour tous les tous les exemples que tu as donnés, je ne suis pas sûr qu'il serait très intéressé de savoir où sont les écoles et cetera. Il y

a Tellement d'écoles ici en plus. En plus, tout ce qui vous envoyer Dans les écoles privées et internationales Qui qui coûte très cher. Il y en a une juste Ici à côté d'ailleurs. Surtout les jeunes de nouveau. Les vieux sont moins intéressés car le système est tellement hiérarchique tu sais. Et donc vous avez un copain ? Il disait qu'en 2 tailles de rencontres, soit des fructueux, pour savoir lequel est dominant et qui est dominé, et c'est un peu ça quoi n'y a pas beaucoup d'égalité. Bon ça arrive hein ? Des amis qui sont égaux malgré des différences mais y'a toujours un rôle de dominé dominant savoir qui est qui.

L : AH oui d'accord. Et. Et est-ce que c'est déjà arrivé Pour le moment que Le gouvernement ait fait des consultations publiques pour des projets Ou absolument pas ? Et c'était arrivé sur quoi par exemple ?

F : Ben je crois Que l'aéroport de Sapons c'est arrivé, mais ça a pris un temps infini et puis ça change D'avis et puis aussi. Et puis ça Été vachement long comme processus enfin l'aéroport a été acheté dans les années 60 je crois en 60 61 62 entre comme ça et l'aéroport a été ouvert en 2007. Donc pour donner une idée Du lac de temps.

L : Alors, la, la cocréation, enfin Là, la consultation publique, c'était en quelle année ?

F : Je ne sais pas

L : Tu penses que si le on voit là, enfin quand j'ai fait toutes mes recherches, moi j'ai mis des hypothèses, et cetera et donc en fait j'ai j'essaie J'ai essayé de garder une vue très systémique sur l'Asie du Sud-Est. Il y avait, dans les hypothèses qui étaient venues, c'était, est-ce que tu penses que la confiance envers le gouvernement de la part de la population locale pourrait augmenter ? Si voilà le, il y avait de la co création avec le la population mais qu'enfin voilà la co création respecte un certain timing hein ? Pas comme l'aéroport qui a pris quasiment 50. Ou alors par le fait, voilà de commencer à intégrer des solutions pour la mitigation des inondations.

F : Ça va être. Difficile, vu la façon dont juste a fonctionné. C'est quoi ça résulte thème, mon même si on essaie d'essayer, la corruption est inévitable ici de la façon dont ça fonctionne donc je n'y crois pas trop.

L : Ok.

F : Mais les jeunes seraient intéressés d'avoir Plus de de chose à dire mais bon.

L : Ouais, c'est ça, ça reste quand même quelque chose d'assez utopique et du coup ça amène un peu à la question est-ce que. Enfin, pour toi, ce serait quoi ton futur genre, un peu utopique pour la ville de Bangkok. Toi dans ta tête et donc ça peut être simplement au niveau de l'aménagement du territoire également au niveau. Ben voilà de de ce futur qui est quand même assez négatif pour le moment. Ce serait quoi toi t'as vu un peu utopique de comment Bangkok de demain si c'était toi qui étais coréenne, ça ressemblerait plutôt à quoi ?

F : Ouais, très utopique hein.

L : Haha oui.

F : Oui, en fait, je crois C'était à la fin du 10e siècle. Il y a eu un roi. Et il est parti en. Il est parti en Europe, il Est envoyé en Europe et quand il est Revenu, il a décidé qu'il fallait Construire des routes Pour moderniser Bangkok. Alors que, à Bangkok, y avait des cadeaux partout. Alors

ça, c'était une grosse Erreur bon maintenant à l'époque, il ne pouvait pas prévoir. Je ne dis pas Mais ça a Été une cause, on aurait dû garder les canaux. Qui qui était là et qui dit le moyen de de de transport de la ville et on aurait dû garder ça et garder la vie sur les canaux. J'aurais effectivement maintenant, ce serait plus un problème. L'eau montrait, on ça irait car on aurait l'habitude de vivre sur l'eau. Dans l'habitude de le donc pour avoir des maisons qui qui se lèvent et qui descendent avec la marée par exemple, comme au Pays-Bas des choses comme ça, ça pourrait, ça pourrait très bien avoir été fait, mais maintenant ils ont couvert tout ça. Paracerque ici quand il pleut ce n'est pas comme en belgiqu c'est des pluies torrentielles faut les voir pour comprendre donc sans cette adaptation on est dans la merde. Donc avec tout ça je ne vois pas trop bien comment je pourrais avoir une vision utopique de Bangkok.

L : Ouais non mais ça mais ça peut toujours être intéressant parce que voilà y en a ils ont des, ils ont des trucs déjà tout faits dans leur tête en disant Ah moi, si je devais refaire Bruxelles, j'enlevais ça, je mettrai tout ça à la place et cetera. Donc c'est ça, ça peut toujours être intéressant parce que en fait derrière, on peut voir aussi des fois en fait, au final, des besoins des gens. Et dans les. Dans les images utopiques. Enfin, dans les visions utopiques des personnes qu'on voit certains allez patterns qui reviennent souvent en fait. Au final ce sont des besoins. Euh des fois non exprimés, qui peuvent être super intéressant.

F : Il faut quand même, te rendre compte que moi, je suis un étranger, je n'ai pas là, je n'ai pas le droit de voter, je n'ai Pas le droit à rien du tout en fait. Je dois Renouveler mon visa tous les ans moi. Donc je n'ai pas je n'ai pas nécessairement avoir la même vision qu'un thaï qui Habite ici depuis toujours et cetera, ça c'est Ce n'est pas maintenant au point de vue des trafics. Effectivement tu prends un trafic existe. Le trafic, c'est horrible. J'ai envie qu'on revienne au COVID, c'était tellement confortable qu'en direct, COVID n'y avait personne qui qui voyageait, donc on serait arrivé en 20 Min en 20 Min au boulot. J'y arrivais sans problème. Là. Maintenant il faut une fois 2 h.

L : Ah ouais et quand je pense j'ai une dernière question c'est pour Bangkok. J'avais lu énormément sur le fait que voilà mais en fait comme tu l'as dit au début qu'il faisait beaucoup de protection pour le centre de Bangkok et du Coup, il renvoyait vers L'est et qui avait énormément de problèmes aussi avec les populations pauvres qui vivent le long des fleuves et des rivières. Et donc je me demandais un peu ton avis, ce serait des trucs là ? Le fait de rediriger les inondations vers des zones résidentielles ? Et. Et puis voilà de toutes ces populations pauvres.

F : Non, il y a bon. Quand tu regardes la maison traditionnelle thaïe, c'est loti et le Rez-De-chaussée, il n'y a Rien. Ils vivent à l'étage avec tous les trucs importants là. Et donc ils ont l'habitude De vivre avec ces fluctuations de d'eau, c'est, c'est donc la population pauvre à mon avis, y a moins de problèmes à s'adapter que ceux qui habitent dans les maisons qui sont Européanisés et qui Peuvent avoir des gros problèmes quoi quand on a envie un village comme ici si je mettais avoir des grosses inondations, ça très, on serait bien emmerdé. Beaucoup plus que les populations pauvres à mon avis.

L : Et toi ton avis sur le fait qu'enfin du coup les le chemin d'eau le plus direct pour retourner dans le Golfe c'est vraiment c'est par le fait de passer par Bangkok Centre donc vraiment.

F : Oui, tout à fait.

L : Ouais et donc pour toi, c'est quoi ton avis du fait que Ben voilà, il en fait. Ils détournent toute l'eau pour aller dans ces autres quartiers. Mais où en fait il n'y a pas nécessairement de protection en fait pour les quartiers.

F : Et il y a des canaux en fait de nouveau cette, cette histoire d'un système de canaux Qui remonte Et donc normalement c'est canaux, sont là pour effectivement évacuer Les eaux. Donc, par exemple pas loin d'ici Au Cambodge, ils étaient spécialisés d'avoir des systèmes de canaux Et cetera pour Pouvoir gérer les eaux Quand il y avait des inondations, et cetera, ils arrivent à le faire très bien apparemment. Et donc il y avait quelque chose de similaire ici et qui a été endommagé justement avec ces routes, et cetera et même par exemple pendant je me souviens que quand il avait construit le, l'aéroport et donc bouché un canal et juste en se préparant pour les l'inondation, il y a le préfet où qui occupait la raison, qui sont donc du coup, ils ont découvert Que y avait le canal avait été bouché par les gens de l'aéroport. Gros truc, quoi. Mais donc y a des y a des y a quand même des infrastructures quoi. Mais par exemple c'est vrai qu'Il y a une certaine route et derrière ces routes-là y'a rien pour protéger. Ce n'est pas grave et donc ils essaient de protéger jusqu'à un certain point et puis après ça, il y aura, on jette toutes les eaux donc y a des pompes, des trucs d'inondation, ils mettent des ponts partout et avec quelques fois des mecs qui qui qui sont à cause de la pompe 24 h sur 24 ils dorment là pour s'assurer que tout va bien remettre de l'essence quand il faut et tout.

L : OK non mais c'est pas mal un peu à avoir un peu toutes les Tous, tous les points de vue. Ben merci beaucoup en tout cas. Et Ben Ouais.

F : Non, il plaisir oui à une prochaine, peut-être à bientôt hn.

L : Clairement et Ben bonne soirée hein du coup.

F : Ben écoute, toi aussi bonne fin d'après-midi.

L : Salut

F : Bye

INTERVIEW 6 : JIRASAK SAEBAANG

L : Hello How are you ?

J : Good but I can hear myself from your laptop too. I hear myself from your side as well somehow. OK, that's. No, I think now it's OK. Maybe it's just the delay a bit at the beginning.

L : OH yeah, maybe that's it. I don't know.

J : OK, how are you?

L : Ohh well, I'm good here. It's well, it's 10:00 AM and. I'm working a lot for My thesis, so I'm just tired in general. So yeah, it's and it's really warm right now in Brussels. I mean, I guess it's warmer in Bangkok, but for the moment it's 31 degrees. And for us, it's a lot.

J : 21 or 31 ?

L : 31 OK. OK. OK. Yeah, because we're not really used to, I mean, to have such a warm weather now and you can see that everybody is just dying. People are just not used to it, and it's so weird because two weeks before was just raining in like 16 degrees and it just went from that weather to 31 super-hot, super sunny and the air is really moist. So yeah, it's not really pleasant.

J : I see. Yeah, that's sound like where we live actually in Bangkok. Even for ties. That's why we usually we don't. Go out or walk. In the sun and use most of the time we do not walk outside under the sun too, because it's too. Hot, right? So, when we go out to the beach, or we see Western just lie. On the sand with the Super-hot sun is a bit late. We know that you're gonna burn it and you sleep. Similar than me, when Thais go to Europe and this whole temperature with snow, they are just we just go out and enjoy. But if they stay really long, we can feel the deep place as well.

L : Yeah, it's quite funny when some so like we can see people. Not from Europe or like from warmer countries, because when they come here to visit Brussels, they're all wearing like big jackets, because for them it's cold and we're all wearing like dresses and shorts and T-shirt. They were just like, why haha. So well, we can start a bit. So first of all, thank you for your answer. It's really nice and it's going to. Help me quite a lot. So, I'm doing my thesis on natural based solution for disaster management. So, I studied a lot of Southeast Asia because, well, you are the region where you have the most hazard in general. Sorry. So that's why I started to get interested by Southeast Asia and particularly coastal cities because, well, you're a lot living in Bangkok. I mean, it's a huge city and there's a lot of problems. I mean, the city is sinking. You have the sea level rise. And so, there's the whole like question about flooding management. And so that's how I end up here and. So, I'm going to ask you some question about more like your personal experience living in in Bangkok, so nothing too technical, more like your life in Bangkok and how you feel about all of this. So, I mean, first of all, you can maybe introduce yourself and talk. Bit about yourself.

J : OK, OK. And as you can call me A

L : OK.

J : Yeah, actually I. My hometown is in South of Thailand in Soka. Like when I crack, and they come to work in Bangkok on. Since year 2000s. Then I'm stuck here. I cannot move anywhere. Yeah, so now I have a house living in here working, or we're working in Bangkok. My family live in Bangkok as well. I have one boy. Going to a school nearby, actually just five minutes. But I work in town, so I have to drive, or I just go by BTS, which is the public train. Like go to town around one hours and we only we work from home for three days or two day a week. Depend on the week overall and I work on screen with the Screen Cloud company actually same company as François.

L : Yeah. OK. Perfect. So, for you, what's your personal experience with floods?

J : Ohh a lot. OK. I am born from South, actually. In my experience in South. In the past we have quite often fast for like a few years, but maybe every 2-3 years we will have some flood right and maybe I take every decade also big flood in South. But in South when it's. But actually, it mostly comes from really super heavily rain and the water management is not good. So, you can quickly flood, but also it will be dry really fast. In like a few days like 2 days or three days,

but really go really long. But when I moved to Bangkok, actually we I have experienced 1 deep flood. It also come from the water management received fail from to know when it happened, really have heavy rain and the land coming down they they're not able to put many of the water to go out from time to time nicely. So, it breaks through at one point and big flood, but that big flood is surprise me, because from South actually it will go within like 2 days. But in Bangkok, because it's so flat and it's so wide and very shallow, right it stays there for a month or most. So, we have to relocate and work, move to the north of Thailand. Work from the other side instead and come back later when the water is coming down. And my experience from time to time in Bangkok, I think we it always works. And can quickly drain as well, but I think it's easier to be frank now it doesn't seem like. Then right, if it starts to rain now, we know that we're going to be flood somewhere for sure. Yeah, and it might. It I think traffic away bad, but it's getting even worse with that anyway. And we also know about the issue that that is sinking. A lot in the past, it's thinking a lot from the you said of the underground water, water. But right now, they did many that better, but it will it already sink and so they'll think more from a lot of reading etcetera, etcetera. And also, now we have global warming. We see we will start to lift up more if we look in the map. Many areas in Bangkok actually are under sea level. And that actually also quite effect a lot on us to thinking about long-term living in Bangkok, I think or even me. I was always thinking about it like do I want to invest or put. Are living in Bangkok, with no plan. No really clear plan that come from government to make sure that we will be there. But from what we see as we government. Topics how many invest so much money in steel? Invest in Bangkok like they've lost their new business area? Extend public transport, extend the Skytrain everywhere. Every direction of Bangkok to Dubai. Which? Without plan for water management at all.

L : OK. So, it's constant threats actually like you have always this floating thing. You know that if it's raining too much, it's going to you're going to have floods somewhere and you know that there's no plan.

J : Yeah, yeah. I didn't want all lost time. You know when it's. Raining really hard. It will be flooded for sure because water management still not good. But we I think luckily the recent. Mayor of Bangkok that we got really good. Actually, he had come up by many plans, right. Try to improve the water flow system and try to look into more prevention hopefully. We will have better plan coming up soon then they have big project too or create big tunnel to underground to give push the water out quickly. Quick gear and I think that's still not enough. That enough that good for drain out the brain. Early front, which can stay there for a few years, but in long term for sea level thing that that's totally different.

L : OK. And how do you feel about the fact that the government is not doing enough and this? This thing that you might not be living in Bangkok in 20 years because the situation gets out of control. How do you feel about?

J : It's like campaigning. To be honest. We what I see, I see the improvement, and everything is still happening around that like they see the future of Bangkok still there like they not stop and see like no, no nothing slowed down at all in terms of building new. Being improvements but on the other hand. Without that proper planning, it's quite really sound quite risky for us to see, so I feel I think I feel not fully safe to stay or to really, really spend really long long-time investment. Or anything in in Bangkok. Yet apart from the other case study like Netherlands or

some country that they have very good water management, that there are still many possible cases that can be done. But if you take the case but it's not going to be done within that term.

L : Yeah, totally. And do you trust the government for, like, the mitigation of flooding on the long term? Do you think they can do it, or do you think there are, I mean, you said that for the moment, I'm not doing enough. They're like talking. About it, do you? Do you trust them to do something?

J : In private government, I do not trust at all. Right, but now we just got a new one. Everyone covers on them on in many directions, right. So, I think we kind of have starting to have a New Hope to see the future. But depends on the win or not, we still waiting for a 60 day after elections. Then there will be another internal election for new Prime Minister if he will win, then we probably know.

L : OK. Well, I will follow the election.

J : Yeah, we had a cop 8 years ago by the military and he said he gonna stay only a few years but actually he stays. Longer and put new plan the policy operation in to make sure he wins in the next round or even this round. It's quite hard to win, right? But in in, in the dictionary, the word for our new party is very clear. But to be a Prime Minister different. What new rule that need to be working on? Yeah.

L : OK. And since you talked about the Netherlands, so I don't know. So, the Netherlands I think is kind of like the best case to show. I mean, Japan is also quite good. Is So what they did in the Netherlands is that there's a mix of. So, what we call grey infrastructures, so it's canals, dikes, flooding systems, but more like hard engineering system, something that's men built. And then we have all the natural based solution, so it's how you can. Adapt nature to shift your city to some to like a sponge city, so it's kind of like a synergy because if you just have one of them, it's probably not enough. But the two of them together can work quite well. And so of course I mean. In Europe, in the Netherlands, it's not raining as much. Well, we're not the Venice of Asia, but like, do you feel like natural based solution mixed With the infrastructure you have already, so like what you said about the road that would go down in the tunnel, you feel all those things are something you wish for you think could be good for your city in terms even attractiveness for your better well-being everything how? Do you feel about those?

J : OK, I think any plan that you have that there are some moving into that direction would be nice, right, plan. But two things together. I think it's some more, some more long-term solving the issue right. I think in the natural part so. Good to do on that bit because it not just blocks and protect us from that water level, but also increase greener and do the other good stuff that we can get from it. Maintenance maybe also better compared to the other big infrastructure that it. Since we do not know much since actually, I haven't known much in terms of this spec and how good of that design and architecture. I also find questions on net length people because all of them have to live in the ground that actually under sea level and everything still move around him them right, and those very other things that they built, how strong it is, it looked like and think and look actually. Take it have to handle in quite big power, a lot of absorption in terms of the force that is. You from the sea, usually nature, or we have very, very high and sometimes the magnitude can be multiplied when something bad happened, like in Japan for example. Yeah. And yeah, if I live there also. Maybe. Maybe he went in with good plan. If it's not good

enough people published, your questions. Oh man, I heard about Singapore and also now start to do this good planning to protect their city for many possibilities. Way like itinerary. Do the sponge idea as well to create the absorption before the. I mean we see surrounding country also start to think about it and now hopefully Bangkok. We have some.

L : So, for you basically anything that would happen would already be a good sign.

J : Yes

L :

I guess. OK. OK. And do you feel like? The government, but also the population has enough knowledge about flooding, not just like flooding happening, but everything that it means. Do you think they have enough knowledge or not at all?

J : I think we have enough good people that good understanding people, many people that capable to do good thing and good knowledge. But they haven't been up yet since government does not focus on that yet. And if they come back to focus on that.

L : OK.

J : I think they can bring good people up to hill, take care and make sure thing happen. Usually, as more is for those corruption because you're going to be big project, you're going to be huge money, less like if there are not many things where it's not gonna be lost and the quality is not gonna be good and you're gonna take really long time before it works.

L : Yeah. Are you stressed about the? Yeah, the fact, I mean, I guess yes, because it takes time. But OK, so back to the natural based solution when you see like those other cities doing it, when you think about those solution. What do you think it could bring to you personally in your daily life?

J : Yeah. I think for us as. People, little one. What we can do, we just do the best on trying to help saving this video of the anything that can affect global warming. Like participate in this we're having like the topics that why this this thing I think you will be very efficient or anything that I can emphasise that we should try to do more on protection and making better. Project positive that we should try to be the voice for it. Yes. Yeah, thank you.

L : OK. And do you think that? Do when you so this is kind of like. A hard question. I mean hard and fun question because I always think it's interesting to see what people are going. To say so for you, what would your desirable city look like? So, if you think about Bangkok and how you would like it, how would it be? Do you have more bikes? More parks more. I don't know, like health institution. It's good to know because so most of the time when you talk about your desirable city, you can point out some needs. And so, if you could just like. Explain a bit how your desirable sit in your head would be. You're just like, oh, if Bangkok was like, that would be so great. And there I would, for example invests in gets.

J : Yeah. OK. I think the most pain point for Bangkok people is the transportation. First of all, for sure, if public transport can be a lot, lot better, can be easier to like, help to lease and reduce the amount of. Need to use car and have you already give a lot of better life quality in the fact that every day you go out clearly. Lose at least one hour one way, two way arrive. It will be two hours, something every day. This is a lot of time and not increase trade and money that you have to pay for transportation by car or buy anything. Multiple hops like another one for public space I think everyone need to have better public area. We have many. But I'll say for four

times I think publicly will be quite different from Europeans. We will see many good public areas in Sweden or in those Swedish countries or we are right, but better is not to be hanging out even under the sun. But I think for Thai. We have big topic area. It's gonna be used not. Like Park or something, it needs to be quite dense in terms of. Tree in order to keep the shade or always can be early or something that not super-hot and you can spend more time with people and families, cause not just on early morning or in the evening that. Would be nice.

L : OK, it's fun that you talk about Sweden because the whole first semester I was there for my Erasmus, so I was in Sweden for the whole first semester. It was amazing, loved it. It's true that they have a really good balance between life and work, and the public transport there is amazing and it's. It's right. Like for them in their law, it's actually written that everybody has the right to go to the nature. So that's why you have so many places where you can rent a tent for free. All your hiking gears for free, and you have those public. Accommodation into nature where you can sleep with. Free and it's your own contract. Like it's just pure trust that you're going to take care of it and put it back, like how it should be. So, I think that's it's so, so cool. And most of the time it was great. So yeah, everything is done for you to enjoy outside, so that's so great. So, I was wondering so part of like my project is also about Co creation so it's how to Co create something with like the governments and the population so it can go from. You have a few representatives or the neighbourhood that's talking with the government, or you can have huge public intelligence. So, it's like for two months you have a survey online and some workshop in some specific neighbourhoods to get like, more like a collective idea of what's happening and what people want. And so, you can like Co create a solution that everybody agrees on. I mean, of course I'm not going to take all the ideas, but it's more like a bad corporation to be sure that everybody is on the same path. And do you think this is something in Thailand that would work, and that people would be up to? And do you think that those kind of also operation would increase the trust towards the government?

J : And really into this equation actually. If we had government probably not work at all, they're not. He does not listen to anything that government. Right. But the Coleman maybe have more chance, right. But the topic that we want to call and get this like feedback back and also why? I don't know if we talk about this water level thing and the prevention of thinking, I think we've got a lot of feedback and we've probably got a lot of requests. But in terms of core work and make things happen, what we can do to help this thing to? Happen again. It will probably need some idea and something from expertise to say that maybe we need your help on this to put this thing on this thing. Create more tree on this location or at some point to make it happen fast. If someone can go there, bring something or something like that. That might be easier to select and get the help, but for feedback I think something this this topic might be. Over the power of the small. The normal people can do to make things really, really happen to protect and. Solve the issue.

L : Yeah. And so, you don't feel like the local government of Bangkok would do it efficiently?

J : Not sure

L : Yeah, yeah, of core creation. So like Co creation usually what you. Do first is that. You target the neighbourhoods or like the area you think could be interesting. Then you ask about their needs and what they actually need. And then depending on the needs you create a solution and then you implement the solution, and you keep the people in the loop all the time, so they

know what's happening. But part of the goal of this it's also to be quick. It's not supposed to take 30 years. Years, but it's so it's something where people are really like in the loop, but after you basically helped in the beginning you got informed and you got your feedback after it's more like you get newsletter to know where it's going and maybe if they're open to it they still are open for feedback.

J : I see. I see. I see. I see. I say actually. I think this idea will work for sure. People love to do good, better thing that also saying that they lead to them more if their voice actually has been. Taking into considering and take actions, actually we got a lot of liquors in many, many things. That we want for. Us not just needed to remain and stuff. We want more power. We want some more green earlier, public earlier that we can take people to do, or you want even we want clearly in time many. Many, many of my friends actually they like craft beer and I know many people they put together like a small group that they want to build be at local. But actually, we have really strong public law for drinking. So those guys they produce outside of Thailand and send it then to Thailand so the beer is super expensive like 10\$ and it would probably be 1\$ if it was done in Thailand. So, they're grouping together and try to push this and our government to help like to provide them the way that they can do so we can. Do something like this but not just the. I think this kind of stuff that people think it will be beneficial for, like local production if they listen surely, they will participate for sure.

L : That's nice. I love that. It's about beer. I mean, I guess you know that Belgium is the country of beer, so.

J : Really like half beer? And I'm so sad that when we when tie clap they actually have to get it from outside country and import it back. So once more. Battle it calls out a few 100 bucks, probably. Fine \$10 or.

L : Oh yeah, that's super expensive.

J : I like that. Yeah, but yeah, it can be just one dollar.

L : Yeah, yeah, and that's great. Yeah. OK. OK, that's nice. And did it ever happen already to have public consultation from your local government in Bangkok for something?

J : Is it already happening? I think I haven't been following much. But the current new mayor in Bangkok is quiet, really good. He goes everywhere and try to help. And I think he started to do many good projects already. From what I heard and see, but I haven't followed much, the last one that I see that he tried to go to the abandoned area that owned by big Company, and they try to turn that into the public area by to link it in the term by government by. Hancock and turn it into power and people can go there and use that space like it and leave it blank and nobody use it right and he goes and find that many as many places as possible to turn that into. I think that's a good. Project the other project also has. Idea for your network you're training by going into. Because Bangkok we have so many cannons, so many different. Means and most of the time it doesn't have good, good maintenance and good management. So, he plans to do like ask people and set up the team to have all of that to help when the next winning season, which is now, I mean we will find out.

L : OK. That's good to know that this thing happening. So, if it happens, it's not totally new and.

J : Yeah, actually another one that I quite like recently, he just goes to visit London to visit, I think university and. See and the tile designer projects where they try to keep making turn their own tile into more interesting area for people to go and spend life and it look into how to. Would do that same in Bangkok as well. The calendar year is good.

L : Yeah, that's nice. Because I mean it's super important, especially when you're getting a bit like getting bigger and bigger as a city to make the city nice and attractive because a whole part of like natural based solution is that it creates a lot of attractiveness. Because the more the city is, the greener the city is, the more attractive it become because it becomes more pleasant and nicer to get around this less hot and everything. And last question is what kind of communication channels are like the most used in Thailand's? I mean I don't know if it's Facebook or you know like you probably have something different than what we use. So that would be nice to know.

J : Right. We mainly use YouTube I mean I use YouTube the most. Actually, the mayor does a lot of live and in YouTube and we also have many, many channels he that he goes to interview and he also by. How to say complete with some very good loans and now in terms of improvement and getting the ideas like the idea that I told you, that he goes to visit that London actually he, he also takes a famous YouTuber on the channel deadly lead on the business. Then etcetera, etcetera and go there.

L : OK. Right. Yes. Are you using other platforms ?

J : I would say Facebook.

L : OK, that's good to know. Well, it's nice as well. The OK, well, I mean, I've I asked everything I needed to ask. I don't know if there's anything you want to add.

J : No, not really. I maybe only one thing. What is the outcome of your thesis?

L : Ohh yeah, so my thesis is the plan is actually to give back my thesis to other students next year. Who would do? Some part I cannot do some industrial engineer, so I'm not an architectural engineer, so I'm super interested in natural based solution, but I cannot like to learn how to implement it myself. Self. So, it's the goal is to kind of create like a project that could work for Asian, Southeast Asian coastal cities. They kind of have like a guideline book on how to implement natural based solution in a holistic way. So, by integrating the population and kind of like create something that would work on the long term to mitigate all their risk and maybe push the city, I mean at one at one point the sea level will be so high that. Even if we do whatever we want, the city will be gone. But it's to make the shift also easier. And longer. Because I mean, if in if in 30 years, Bangkok is totally flawed, it's going to be a huge disaster, because if everybody from Bangkok has to move out, it's crazy. So, if you make the shift easier by making the life better and kind of like making plans so the whole thing takes longer. I don't know. You get like 50 or 60 more years. That's already a huge win. And then on the long term, I mean that's not part of my master thesis, but that's something I will talk about is that it has to be. But in the plan that at one point you have to move people out of the city because. It's going to be too hard, but it's something to make the city more attractive, more pleasant, more resilient and how to implement it in a way that's actually working on the long term. And also, to increase the trust in general and also to help government doing it, because a lot of people look at the Netherlands like, oh my God, it's amazing what they did, but they did all of it in 20 years, so I mean. It's

possible, but I think it's such a hard. Job and it looks huge. Huge. I mean, even me, when I look at all the geospatial data and how to integrate all those things, it's super complicated. So, it's kind of like the goal, I mean it probably will never be used because it's, I mean it's a school project, but I mean maybe it will be used one day. Who knows, but. It's kind of like to give a book to make the whole shift easier and to give all the guidelines. So yeah, it's really fun because I learned a lot. I'm interested by disaster management, especially in the case of water. So, it's nice to learn how over. Yeah, over people walks. And I mean it's so different from Europe and even in Europe if you go from the Netherlands and Italy, I mean it's like the moon and the sun. I mean it's.

J : And the way water moves also shake.

L : Yeah. Yeah, but also, yeah, we don't have the same rain. We don't have the same thing. So that was a big walk for me to not think as a European when I was reading the whole thing and think, OK, they have different kind of plan, different weather they have the monsoon. The rains are. Like crazy, the soil is different and so there's all those things that you have to take into account. And that's also a lot of problem. Most of the studies done are done in Europe, and then they're just like, oh, we can implement that there. But it's not enough, I mean. The sponge city that you create for Southeast Asia way bigger, way like more important, more follow through than for the Netherlands way. I mean you get rain but me. We get less rain in two months than sometimes you in one day.

J : And clearly with this effect from global warming, sometimes we have just one day range equal to or more to four-year reign as well, usually very bad and we call that the 100 years rain which usually happen only 100 years at a time. But now it's happening more. Yeah, what we see. Have you been in Bangkok?

L : No, but I'm going next year, so I'm it's my last. Year of study. And after that I'm actually planning a huge trip around Southeast Asia for a year. So, there's Thailand, Laos, Vietnam, the Philippines. I don't know why but I. Really want to go to the Philippines. For so long. Has been in. My life forever. And so yeah, it's so for a whole year, just backpacking. So yeah, this summer I'm going to work. A lot to put a lot of money on the. Side and then just enjoy and I think it's going to be really fun to see, I mean to see Bangkok, to see all the city that I've worked on, to sit in real life. To see all the, I mean, it's not the electric lines that you have.

J : In Bangkok, yeah, yeah. You will love it and the rest of Southeast Asia as well.

L : Well, OK. Well, thank you for everything was really, really nice and it. Helped a lot.

J : You're welcome. I hope that that, yes. OK.

L : Yeah. Yeah, it was. It was super good. You really helped a lot with a lot of information. Thank you. Well, thank you very much for everything and well bye and have a good end of the day then.

J : Nice to meet you. Bye.

L : Bye.

INTERVIEW 7 : AMANDA WIDYAPUTRI

L : Hello, How are you ?

A : I'm fine and you ?

L : Really good. I think we can start with a short introduction of yourself ?

A : So I'm freshly graduate from the Institut Teknologi Bandung (ITB) in Indonesia and I would like to become a profitability and sustainability analyst. I have a test period at Pinhome for the moment hehe. And I have lived in Jakarta all my life and I am 24 years old.

L : Thanks for the short introduction. As I told you by message, I will ask about your personal experience with floods in your city.

A : Yes yes it's fine

L : Okay have you experience any floods while you were living in Jakarta and can you explain the situation ?

A : So I have seen multiple flood. It was raining really hard in Jakarta, it was fine at first but after a while it started flooding and the water entered my house. I lost my pet turtle and had to sacrifice a few wooden furniture because of this unfortunate event. My experience was actually still ok cause i know that there's some part in Jakarta that is worse, even their house is submerged and people needs to be rescued from their homes so I know I was lucky but this was the flood event that touched me the most personally.

L : Can you explain how the government's response to the flooding went?

A : Not sure what they do but i see that there's some rescuing effort done by the government

L : Do you think the government has done enough to protect you from this event ?

A : They did help with evacuation but other than that I have not seen much happening to be honest.

L : SO do you trust your local government to manage and mitigate disasters?

A : Not at all, they just try to do something after the disaster happen nothing before really. I mean as I said mostly evacuation and there is infrastructure in the city but it doesn't seem like it working to be honest.

L : And for your what could they do to be mitigate floods ?

A : Well we already have wall, dikes, canals, etc but it's not working so I would say building parks or green spaces in the city. We saw that during my Erasmus in Sweden and they do that in Singapore and it seems that it works and its pretty at the same time.

L : Okay thanks for that input. And do you think that the public should be involved in the decision making of flood prevention measures ?

A : Yes totally cause if you want to decide something you must make sure that the decision will solve the problem, and to solve the problem you need to really understand the problem that is faced by the public

L : Exactly. So I guess as you said before you would push for natural based solution ?

A : Yes because Jakarta is densely covered by buildings and roads and i don't think there's enough "nature" left in this city. And as I said before the current infrastructure are not working so it's not enough.

L: Okay good and do you feel that the population in Jakarta has enough knowledge about flooding ?

A: Well the population yes but not the government or they would have done things differently I mean we are sinking and they just want to move the city...you see not the best.

L: I see. It is true that moving an entire city is kind of crazy especially to move it again to a coastal position!

A: Right so weird so you see I don't think they have enough knowledge and if the population could say things we wouldn't do that. Everybody lives in Jakarta

L: So how do you feel about the current water management system ?

A: Okay I mean it's not perfect but it's okay just not optimised for heavy rain...

L: How do you feel about the urban planning of your city ?

A: I hate it because the government kept giving permission for property developers to build concrete buildings like office, malls, etc. and sacrificing spaces that ideally could have been a city park or nature reserve. And the neighbourhood would me so much better with more green spaces. I love going to the park and relax next to a big tree. I mean the city is already so so busy and those kind of place help me relax.

L: So you feel that the environment affects your health?

A: Yes, my job is already stressful so at least i expect that when i get out of office, i could be a bit stress-free. But that just don't happen here cause the city is too crowded. I get stuck in traffic quite a lot and it's getting traumatizing. The air quality is not good as well cause of pollution. After visiting and living in Sweden for 6 months I am less okay with this life i got used to spaces and quiet. Here it's crazy all the time it never stops.

L : So how would you create a nice environment around your neighbourhood for you to enjoy ?

A : I would build more parks, bike lanes cause i love biking and i learned to bike in Sweden and it was so much fun you feel free here biking is a death sentence, then also decent sidewalks. I mean you know building a city for human and not for cars.

L : I totally get it !

A : As I told you I really don't have much time...

L :Yeah Yeah don't worry I got the information I needed. Thank you again and go day at work !

A : Thanks and it was nice seeing you again ! Bye Lucille good luck for your thesis.

L : Thanks Bye.

Abstract :

Disaster management has become a pressing global concern as natural disasters continue to increase in frequency and intensity, impacting both developing and developed countries. Among these disasters, flooding stands out as one of the most common and impactful worldwide, particularly in Southeast Asia. The region's rapid and unplanned urbanization, localization, growing economy, and high population density contribute to heightened vulnerability, especially in poorly designed coastal cities. Moreover, the lack of disaster preparedness culture in South Asia and global warming further amplifies the risks faced by the population.

This research aims to understand the complex relationship between governments and local populations in disaster mitigation. It specifically investigates three major cities—Bangkok - Thailand, Ho Chi Minh City - Vietnam, and Jakarta - Indonesia—to gain insight into systemic issues in flooding events. The study delves into concrete solutions to target those systemic problems, with a focus on the potential of Blue and Green Infrastructure (BGI) as a natural sponge to mitigate flooding events.

Using qualitative research, the author conducted interviews to validate the desirability of the implementation of BGI and the use of a collaborative framework for disaster mitigation. The findings revealed a strong desire from the local population to be actively involved in the mitigation process. However, a significant challenge lies in persuading the government to adopt a more modern and collaborative approach. Massive Collective Intelligence emerged as a promising framework to harness collective wisdom and create a general sense of involvement.

In conclusion, a comprehensive and collaborative framework for disaster mitigation is possible and is highly desirable among the local population. However, certain obstacles, particularly governmental resistance, need to be addressed. Further research on the feasibility and viability of this collaborative approach should be conducted to fully convince decision-makers of its potential and foster successful disaster mitigation in Southeast Asian coastal cities.