



CLIMATE
RESILIENT
AND INCLUSIVE
CITIES



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URBAN ANALYSIS REPORT 2020

01

PANGKALPINANG

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FOREWORD



Addressing the threat of climate change remains a top priority for the European Union (EU). The European Green Deal is a response to these challenges; it aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy with zero net emissions of greenhouse gases by 2050.

Through the Climate Resilient and Inclusive Cities (CRIC) project, the EU and Indonesia are working together to help cities build a resilient and inclusive future. We do so by building partnerships between governments, businesses, local communities and research institutes in Europe, South Asia and Southeast Asia.

Clearly, there are hurdles along the way, especially in the midst of the COVID-19 pandemic. However, our response to this pandemic needs to be a sustainable one, addressing the challenges of climate change as well as economic recovery.

Just last month, in Sukabumi City of West Java Province, a flash flood cost lives and forced hundreds of citizens to leave their houses. According to the Indonesian National Disaster Management Agency, Indonesia is about to experience more hydrometeorological disasters due to climate change. The CRIC Urban Analysis Report is a timely reminder that cities cannot delay their sustainable transition.

This Urban Analysis Report for ten Indonesian pilot cities under the CRIC project offers a comprehensive overview of city characteristics, policy gaps and climate-related policies in the cities of Pangkalpinang, Pekanbaru, Bandar Lampung, Cirebon, Banjarmasin, Samarinda, Mataram, Kupang, Gorontalo and Ternate.

The report provides empirical evidence to help cities develop policies and tools to strengthen climate change-affected sectors. I am happy to note the consultations among a wide range of stakeholders including government officials, academicians, civil society, professional practitioners, NGOs, and the private sector, ensuring that the proposals are inclusive.

We look forward to seeing how the cities will take up the given recommendations by transforming them into local climate-proof policies and programmes and to further working together to build climate resilient and inclusive cities.

Jakarta, October 2020

Vincent Piket

EU Ambassador to Indonesia and Brunei Darussalam

MAYOR'S FOREWORD



We are pleased to be part of the Climate Resilient and Inclusive Cities (CRIC) Project as one of its ten pilot cities. To put things into action, we have established a Working Group consisting of different stakeholder groups in Pangkalpinang, and allocated budget operation to support the Working Group. This marks our commitment towards climate resilient and inclusive future by ensuring that economic, environment and social sustainable sustainability are taken into account in city planning and development, especially as Pangkalpinang has just celebrated its 263th birthday last September.

We sincerely appreciate the contribution of urban experts in developing and finalising this Pangkalpinang Urban Analysis Report from June to September 2020. We are grateful that our comments and feedbacks have also been taken into account to improve the overall quality, accuracy and usefulness of this publication.

We acknowledge that our city and communities are vulnerable to the impact of climate change, and some strategic sectors will be much more affected than others. We have implemented policies and programmes to respond to climate change, specifically to address climate-change induced disasters, such as floods. We also conducted a GHG Inventory in 2010 that can serve as a baseline to evaluate and monitor GHG emissions reduction target.

This Urban Analysis Report will further help us understand characteristic of this city so we can embed climate change considerations in our decision-making to address the challenges.

We extend our thanks to the urban experts who have provided recommendations and solution to address climate change in Pangkalpinang. As we move forward to the project implementation stage, we commit to ensuring that the recommendations will be integrated in city planning and development.

Thank you

Mayor of Pangkalpinang
H. Maufan Akhri



Climate Change is an issue of humanity, it is not merely a threat to the environment only. It is one of most visible humanitarian crises of the century. On very many occasions, we have seen how climate-induced disasters disrupted local economy, food system, basic services and left vulnerable groups more powerless. As an association connecting more than 10,000 cities and local governments in the Asia-Pacific region, UCLG ASPAC is responsible for supporting cities to be climate-resilient, something that we take seriously.

The cost of inaction now is huge. It is therefore urgent for cities to act and find solutions that should be based on data and scientific rigour enabling evidence-based decisions that subsequently reduce the impact of climate change. I emphasise, continual and periodic assessment of risks and change in attributes of cities are critical in enhancing resilience. In light of this, I commend the Climate Resilient and Inclusive Cities (CRIC) team and our urban experts for their hard work to publish this Urban Analysis Report. Great thanks to all the pilot cities of CRIC for their support in producing this Report. It presents a comprehensive outlook on climate risks, programmes and policies at a city level and provides recommendations and solutions to tackle climate change.

This report also underlines the importance of coordination that transcends administrative boundary as climate has no border! It is something that UCLG ASPAC can contribute through the CRIC Programme, by connecting the dots between cities in Asia and the Pacific and beyond within the framework of sub-national and national governments for vertical integration. We intend to bring cities on the center stage of “Blue Ocean” and “Blue Sky” agenda through action-based proposals and approaches on circular economy, air pollutions and cross-cutting issues. And we are committed to ensuring that climate change best practices can be up-scaled and replicated for greater multiplier impact.

I look forward to seeing how the plans are put into actions to create climate resilient and inclusive cities. Our future will depend on how cities act today. Every concrete step on climate action we make now will bring closer our dream for inclusive, prosperous and sustainable cities and communities.

Dr. Bernadia Irawati Tjandradewi

Secretary General of UCLG ASPAC



As President of Pilot4Dev, I have had the honor to be directly involved in the Climate Resilient and Inclusive Cities Project from its very inception. It was with great pleasure that I attended the CRIC Kick-off event back in January 2020 which allowed us to meet up with our Indonesian partners in order to prepare and launch the project. A great added value from this event was the possibility to meet up with the mayors of the cities piloting the implementation of the project. Today, there is a myriad of cities in need of support in terms of urban environment and climate change resilience.

Pooling the expertise and knowledge of EU partners including ACR+, Pilot4DEV, University Gustave Eiffel, ECOLISE and Asian partners UCL ASPAG and AILLSG, this very ambitious five years project aims to establish a long lasting and unique cooperation. It is carried out through a triangular cooperation between cities and research centres in Europe, South Asia (India, Nepal, Bangladesh), and Southeast Asia (Indonesia, Malaysia, Philippines, Thailand). It aims to contribute to sustainable integrated urban development, good governance, and climate adaptation/mitigation through long lasting partnerships, and tools such as sustainable local action plans, early warning tools, air quality and waste management in consultation with experts' panels. The final beneficiaries include the local community of the cities/provinces, including women, marginalised sector, civil society and private sectors.

Now entering the 10th month of its implementation, this project has already proven to be a fruitful endeavor now implemented in 10 different cities in Indonesia. Among the chief results obtained so far, 10 urban analysis reports have been written and edited, and assess the current capacities of the different target cities. The project in itself has required the direct involvement of local authorities' officials, generating a real eagerness to make the cities more resilient and inclusive at the local level. The next steps of this project will involve the release of the Urban Analysis Reports along with policy briefs and recommendations adapted to the different pilot cities which have been involved in the project so far. This release will be completed by the creation of tools put together by the International Partners of the CRIC project, in order to equip local authorities and possibly tackle the urban and environmental challenges they face.

Due to high urban growth rates in countries such as Indonesia, Vietnam and the Philippines it is predicted that a significant share of the population of those countries will be living in cities in the next ten years. Cities in the South Asian and South East Asian regions are already impacted by climate change, and they could substantially benefit from long lasting solutions in terms of climate resilience and inclusiveness. The CRIC Project aims to inform and facilitate the equipment of local governments, cities, urban stakeholders working on climate resilience, mitigation and adaptation of those cities by pooling the best resources available and transferring and adapting as much knowledge as possible. Since urban areas host most of the vulnerable populations, as well as vital and social infrastructure, and local governments get increased pressure to develop services, infrastructure and employment, it is therefore of utmost urgency to make sure that we are all up for the challenge presented by climate change.

Isabelle Milbert, President of Pilot4Dev

A handwritten signature in black ink, appearing to read 'Isabelle Milbert', written over a horizontal line.



The CRIC project represents for the Association of Cities and Regions for sustainable resource management (ACR+) - a network of local and regional authorities mainly based in the EU and the Mediterranean Area - a unique opportunity to cooperate and strengthen the role of cities to deliver on resiliency and inclusiveness.

ACR+'s core mission is to develop sustainable resource management initiatives involving local and regional authorities; in particular regarding waste management, one of the priorities raised by the urban analysis report. As such and for more than 25 years, we have been designing and implementing initiatives on circular economy, waste prevention, and waste management, building through this an extensive knowledge basis. Several ACR+ members have been already cooperating in the South-East region, whose experiences could be capitalized on and further developed through CRIC.

Conversely, this project provides a great learning opportunity for ACR+ members, to understand how local initiatives make a difference at global level. The present report contributes to effectively comprehend the local context, shedding the light on the key challenges and priorities. It shows that the exchange of methodologies to support decision-making processes rather than transfer solutions is crucial to successfully deliver sustainable projects.

However, more than a mere exchange of experiences, CRIC is a timely reminder that cooperation is key, at all levels and between countries. The EU cannot deliver alone the ambition of the European Green Deal for a climate-neutral, resource-efficient and circular economy. Activities like the ones developed within the CRIC project (trainings, stakeholder engagement, tools development, local action plans) can provide solid evidence to support bilateral and regional policy dialogue actions aimed at implementing the Green Deal and 2030 Agenda's objectives beyond the EU. Unfortunately, we cannot and should not forget the wider context in which the project is unfolding: the COVID-19 outbreak has been posing tremendous challenges at local level. With the hindsight we have so far, we see that local agenda based on resilient models contribute to better adapt and mitigate the negative impacts of the pandemic. Having this in mind, ACR+ has been supporting its members in overcoming the situation and is determined to also follow this path in CRIC.

Françoise Bonnet

ACR+ Secretary General

A handwritten signature in blue ink, appearing to read 'F. Bonnet', written in a cursive style.

ABOUT THE AUTHORS



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Herdianti Thamrin



Asih Budiati



Maria Serenade



Putra Dwitama

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Dr. Pascaline Gaborit



Emmanuel Rivéra



Paolo Marengo



Danko Aleksic

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TABLE OF CONTENTS

FOREWORD	I
ABOUT THE AUTHORS	VI
ACKNOWLEDGMENTS	VIII
TABLE OF CONTENTS	IX
LIST OF TABLES	XI
LIST OF FIGURES	XI
GLOSSARY	XII
INTRODUCTION	XIV
Background	XIV
Objectives	XV
Methodology	XV
CHAPTER 1 Overview of Pangkalpinang	1
1.1 General description	1
1.2 Topography and Climatology	1
1.3 Demographic Characteristic	2
1.4 Social Structure	3
1.5 Economic Structure and Industry	5
1.6 Environmental Data	6
1.6.1 Air Quality	6
1.6.2 GHG Emissions	7
1.7 Waste Management	10
1.8 Flood	11
1.9 Fires	13
1.10 Soil and Water Quality	14
1.11 Spatial and Infrastructure Condition	15
1.12 Social Infrastructure and Services	16
CHAPTER 2 Policies and Strategies for Climate Resilient and Inclusive City	18
2.1 Nation-wide Policies, Strategies and Target	18
2.2 City-wide Policies, Strategies and Target	18
2.3 Description of the Policy of City's Government Structure	20

2.4 Stakeholders Involvement in Policy Making	20
CHAPTER 3 Key Problems, Challenges & Opportunities in Priority Sectors	21
3.1 Climate Change Adaptation and Mitigation	21
3.2 Energy and Transport.....	21
3.3 Water and Sanitation	22
3.4 Solid Waste Management	22
CHAPTER 4 Policy Direction, Recommendations and Enabling Strategies for Priority Sectors	24
4.1 Current and/or Expected Policies Related to Priority Sectors	24
4.2 Challenges and Opportunities for Mainstreaming Sustainable Development.....	25
4.2.1 Policy Instruments	25
4.2.2 Tools, Early Warnings, GIS.....	25
4.3 Financing Instruments	26
4.4 Partnership and Capacity Building.....	26
CHAPTER 5 Conclusions and Recommendations	28
REFERENCES.....	29

LIST OF TABLES

Table 1 - Average AQI of the City of Pangkalpinang in 2019	7
Table 2 - Number of Registered Motor Vehicles in Pangkalpinang City , 2017-2019	8

LIST OF FIGURES

Figure 1 - Location of Pangkalpinang	1
Figure 2 - Rivers and Lowland Area in Pangkalpinang	2
Figure 3 - Population Densities per District in Pangkalpinang	3
Figure 4 - The Percentage of Poor People in Pangkalpinang	4
Figure 5 - Number of Poor People (thousand) in Bangka Belitung Islands Province in 2017-2019	4
Figure 6- Open Unemployment Rate by Regency and Municipality in the Province of Bangka Belitung Islands	5
Figure 7 - Gross Domestic Regional Product in Pangkalpinang in 2019	6
Figure 8 - Carbon dioxide emissions by sector	8
Figure 9 - Land Use and Carbon Stock in Pangkalpinang	9
Figure 10 - Detail of CO ₂ emissions sources from forestry, energy and waste, respectively	10
Figure 11 - Solid waste landfill in Pangkalpinang, 2020	11
Figure 12 - Distributions and Amount of Flood Events per District in the City of Pangkalpinang in 2019	12
Figure 13 - Flood Risk Index per District in Pangkalpinang 2019	13
Figure 14 - Fire Spots in Pangkalpinang in 2019	14
Figure 15 - Damaged land near the Rangkui River caused by the illegal tin mining operations, observed in June 2020.	15
Figure 16 - Illegal mining operation in Rangkui River, observed in June 2020	15
Figure 17 - Fisherman houses near the Rangkui River, observed in June 2020	16

GLOSSARY

AMDAL	Analisis Mengenai Dampak Lingkungan (Environmental Impact Analysis)
AQI	Air Quality Index
BABEL	Province of Bangka Belitung
BAPPEDA	Badan Perencanaan Pembangunan Daerah (Local Development Planning Agency)
BBM	Bahan Bakar Minyak (Fuel Oil)
BNPB	Badan Nasional Penanggulangan Bencana (National Disaster Management Authority)
BPBD	Badan Penanggulangan Bencana Daerah (Regional Disaster Management Agency)
BPS	Badan Pusat Statistik (Central Bureau of Statistics)
BUMN	Badan Usaha Milik Negara (State-Owned Enterprises)
CCA	Climate Change Adaptation (Adaptasi Perubahan Iklim)
CRIC	The Climate Resilient and Inclusive Cities
CSR	Corporate Social Responsibility
DAS	Daerah Aliran Sungai (Watershed)
DPRD	Dewan Perwakilan Rakyat Daerah (Regional People's Representative Assembly)
E-FGD	Electronic Focus Group Discussion
EIA	Environmental Impact Assessments
EU	European Union
FGD	Focus group discussion
GDRB	Gross Domestic Regional Bruto
GDRP	Gross Domestic Regional Product
GHG	Green House Gas
GIS	Geographic Information System
IPA	Instalasi Pengolah Air (Water Management Installation)
IPP	Independent Power Producer
ISWRM	Integrated Solid Waste Management and Sustainable Resources
IUPR	Izin Usaha Pertambangan Rakyat (Public Mining Business License)
KLHS	Kajian Lingkungan Hidup Strategis (Strategic Environmental Assessment)
LAP	Local Action Plan
MASL	Meters Above Sea Level
NGOs	Non-Governmental Organizations
OPD	Organisasi Perangkat Daerah (Local Government Offices)
PCM	Public Consultation Meetings
PDAM	Perusahaan Daerah Air Minum (Local water company)
PKL	Pedagang Kaki Lima (Street Vendors)
PLN	Perusahaan Listrik Negara (State Electricity Company)
PLTG	Pembangkit Listrik Tenaga Gas (Gas Power Plant)
PLTS	the Waste Electric Power Plant

PLTU	Pembangkit Listrik Tenaga Uap (Steam Power Plant)
PPP	Policies, Plans and Programs
RDTR	Rencana Detail Tata Ruang (Detailed Spatial Planning)
RENSTRA	Rencana Strategis (The Strategic Planning)
RPJMD	Rencana Pembangunan Jangka Menengah Daerah (Regional Medium-Term Development Plan)
RPJP	Rencana Pembangunan Jangka Panjang (Long-Term Development Planning)
RPJPD	Rencana Pembangunan Jangka Panjang Daerah (Long-Term Local Development Plan)
RPJPN	Rencana Pembangunan Jangka Panjang Nasional (National Long-Term Development Plan)
RTH	Ruang Terbuka Hijau (Green Open Space)
RTNH	Ruang Terbuka Non Hijau (Non-green open space)
RTR	Rencana Tata Ruang (Spatial Planning)
RTRW	Rencana Tata Ruang Wilayah (City Spatial Planning)
RTRWN	Rencana Tata Ruang Wilayah Nasional (National Spatial Planning)
RTRWP	Rencana Tata Ruang Wilayah Provinsi (Provincial Spatial Planning)
RUTR	Rencana Umum Tata Ruang (General Spatial Planning)
SD	Sustainable Development
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
TM	Taman Merdeka (Pangkal Pinang City Park)
TPA	Tempat Pembuangan Akhir (Final Landfill)
TPS	Tempat Penampungan Sementara (Temporary Landfill)
UCLG ASPAC	The United Cities and Local Governments Asia Pacific
UN	United Nations
UPTD	Unit Pelaksana Teknis Dinas Daerah (Regional Technical Implementation Unit)

INTRODUCTION

Background

Climate change is one of many types of shocks and stresses that cities face (Leichenko, 2011; Rockefeller Foundation, 2019). The impacts of climate change such as rising sea level, flooding, storms, extreme weather, wildfires, landslide as well as air and water pollution holds high possibilities in becoming the hazard that terminates a civilization (Hoegh-Guldberg et al., 2018). With over 55% of the world's population now living in cities (Rockefeller Foundation, 2019), urban areas consequently host most of the vulnerable populations with vital and social infrastructure also at stake (UN Habitat, 2019). It means that **deteriorating** environmental conditions as a result of climate change poses more threats to cities.

Many international agreements and institutions such as the 2015 Paris Agreements, the Climate Change Trust Fund, the United Nations Framework Convention on Climate Change, and Sustainable Development Goals (SDGs) 2030 have been set up to tackle climate change. As stated in the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, states must recognize "that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests" (sustainabledevelopment.un.org). Thus, the economic development should remain together on the same line with urban planning and climate resilience strategies.

The relationship between climate change and city growth is inevitable and interdependent. For instance, the growth of population in cities is usually followed by enhancement of industrial activities to sustain the economy that comes with it (Satterhwaite, 2009; Blodgett and Parker, 2010). Therefore, municipal governments need to have profound policies, infrastructures, systems, tools, and capable human resources to bring about a climate-resilient city (Tyler and Moench, 2012). In other words, efforts to foster climate change resilience must be bundled with efforts to promote urban development and sustainability (Leichenko, 2011).

In the sense of Climate Change Adaptation (CCA), resilience is the capacity or ability of a community or society to perform necessary measures and adapt to hazard to the point of withstanding shocks and rebuilding itself when necessary (Neeraj et al., 2009). It is also the capability to absorb and cope with impacts of climate shocks and extremes in the short-term, and to learn, reorganize, and redevelop, preferably to an improved state, in the longer-term (Engle et al., 2013). Climate change resilience is understood as "the capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level" (Bell, 2012). Thus, urban resilience refers to the ability of a city or urban system to withstand a wide array of shocks and stresses (Leichenko, 2011). Hence, it is necessary to understand climate challenges and their impacts in order to elaborate specific ways to adapt to them and appropriate measures of climate resilience and vulnerability (Neeraj et al., 2009; Tyler and Moench, 2012).

Indonesia is the world's fourth largest country by population, with 274,045,229 people as of September 2, 2020, where 56.4% of the population is located in urban areas (Worldometer.info). Within the next five years, Indonesia's share of urban residence is expected to grow to 68% of the population by 2025 (Worldbank.org). This could lead to

several issues such as informal settlements, flooding due to overcrowded areas, high rate of unemployment, exhaustion of natural resources, and degradation of environmental conditions in the cities (activesustainability.com). However, present climate change intervention mainly focuses on mitigation and adaptation at a national level of policy settings while sustainable adaptation policy to climate change at city level is still a nascent policy domain for cities' leaders and urban stakeholders (Lassa and Nugraha, 2014). Socially and economically differentiated urban areas need to be reckoned in the urban analysis for resilience so that social justice, equity and specific contexts of cities receive attention in urban climate resilience strategies and practices (Friend and Moench, 2013; Lassa and Nugraha, 2014). This is why it is important to identify and analyse the adoption of urban climate resilience strategies in municipal urban planning in Indonesia where each city has its own characteristics and potentials of economic, social and environmental vulnerabilities.

Objectives

This report explores challenges faced by local government and urban stakeholders in adopting socially inclusive climate resilience strategies into urban planning and analyses further support from stakeholders, national and international communities. It includes policy recommendations for urban climate resilience strategies and practices that are relevant to the city of Pangkalpinang to address climate change.

1. **Identify and analyze** the current status, gaps and the potential adoption of urban climate resilience strategies in urban planning of Pangkalpinang city.
2. **Provide knowledge and urban analysis** on urban planning, climate and resilience policy, and social inclusive policy of Pangkalpinang through precise data, pictures and maps of the city.

Methodology

This study was granted a research permit by the Mayor of Pangkalpinang through the Local Development and Planning Agency in the city. Before starting the research activities, the research team of this report joined the local government meeting arranged by United Cities and Local Governments Asia Pacific (UCLG-ASPAC) together with Pilot4DEV, ACR+ and other European partners, explaining the research activities and purposes. **Five different approaches** were employed for data collection, namely, **desk research**, **Focus Group Discussion (FGD)** with 12 local government officers from 12 different local government offices, **interviews** with 12 expert informants, **surveys through questionnaires** to expert stakeholders with 28 respondents, and **field observation**. By understanding the local perspective and multi-stakeholders, this report contributes to developing effective interventions and to improve climate change adaptation and disaster risk mitigation.

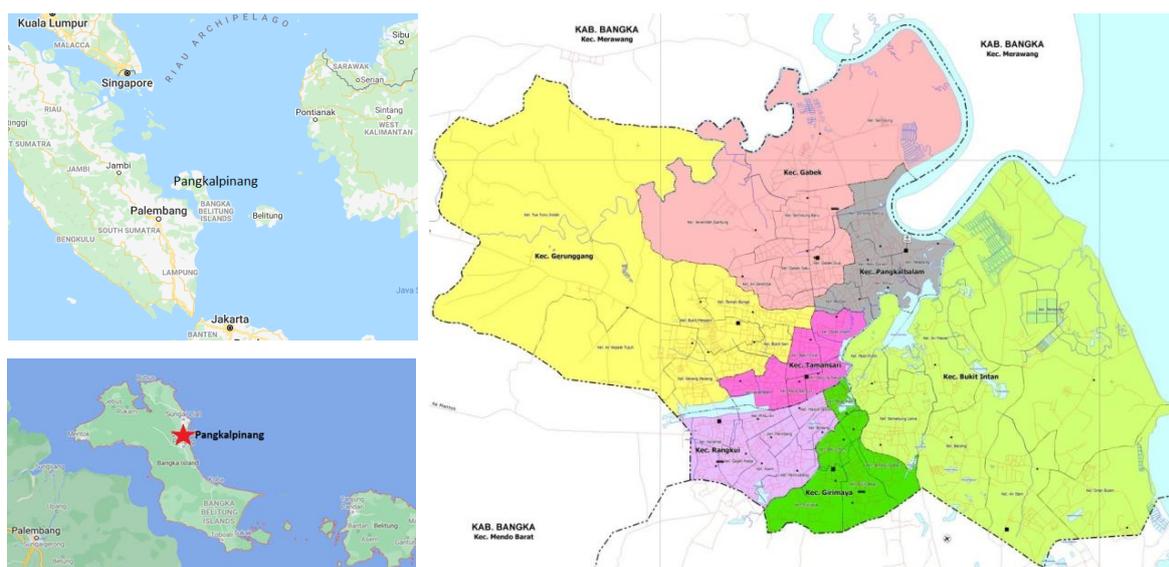
CHAPTER 1

Overview of Pangkalpinang

1.1 General description

Pangkalpinang is the capital city of Bangka Belitung Islands Province in Indonesia, geographically located between 2°4'-2°10' South Latitude and 106°4'-106°7' East Longitude. The city has a total area of 118,41 km² which is administratively divided into seven districts, namely, Rangkui, Bukit Intan, Girimaya, Pangkalbalam, Gabek, Tamansari, and Gerunggung with a total population of 212,727 inhabitants. The creation of the city was instituted in Law of the Republic of Indonesia Number 27 Year 2000, concerning the establishment of Bangka Belitung Islands Province with administrative area of one city and two regencies, namely, the city of Pangkalpinang, and Regencies of Bangka and Belitung. The city is sandwiched between Bangka and Central Bangka regencies to the North and South, respectively. In addition, it is bordered to the East, by the Karimata Strait (Central Bureau of Statistics/BPS of Pangkalpinang, 2020).

Figure 1 - Location of Pangkalpinang

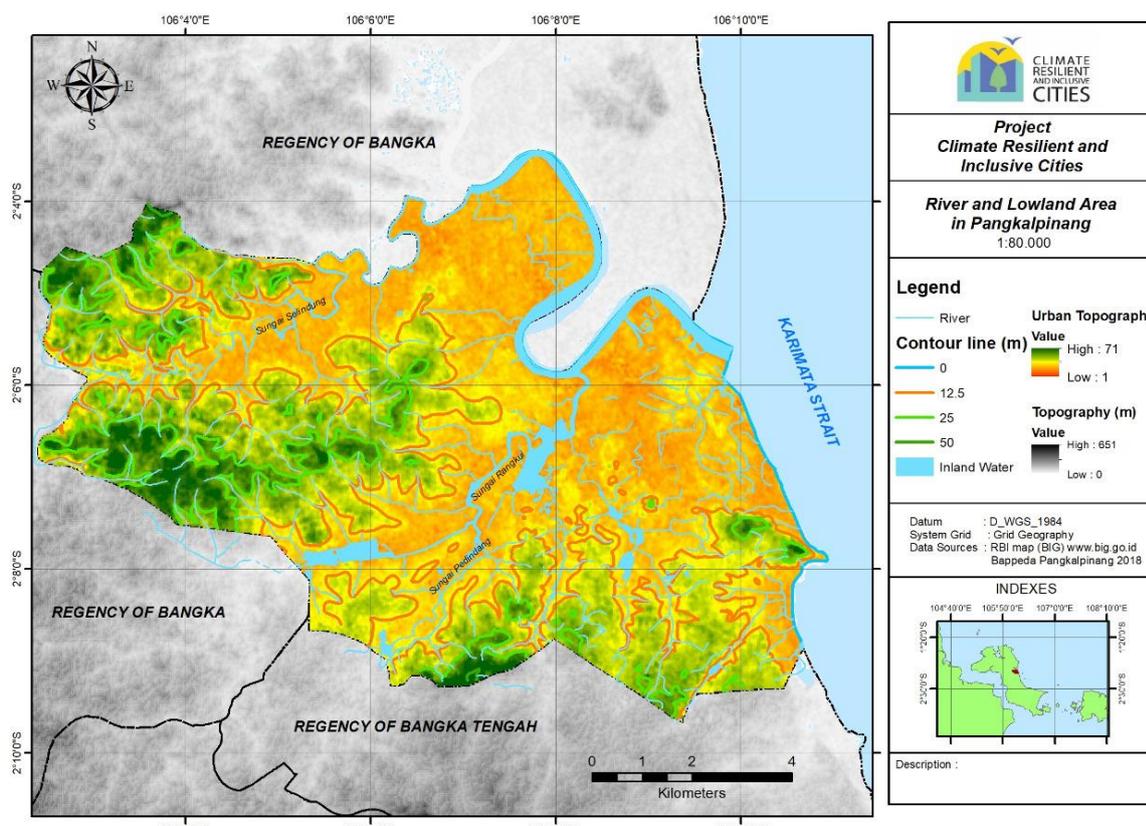


Sources: Maphill.com (image on the left) and RTRW Kota Pangkalpinang (image on the right)

1.2 Topography and Climatology

Pangkalpinang has three rivers flowing to the ocean on the East part of the city which are Selindung, Rangkui and Pedindang rivers. The topographic condition of the city is generally bumpy and hilly with an altitude of 20-50 meters above sea level (asl) and a slope of 0-25% and the maximum height is 71m asl. The structure of land in the city forms a concave shape with the downtown area located in lowland, making the city prone to flooding, especially in the rainy season due to tides through the Rangkui River.

Figure 2 - Rivers and Lowland Area in Pangkalpinang

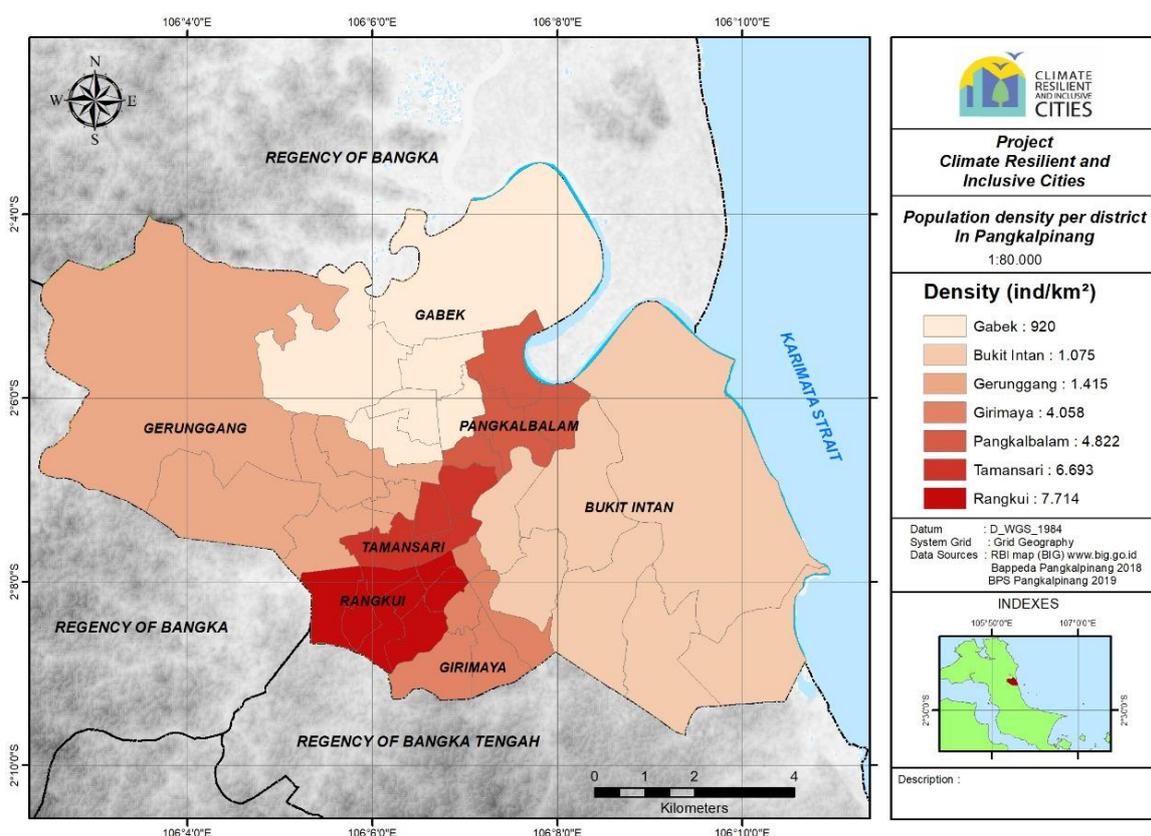


Climate in Pangkalpinang is classified as type-A tropical wet with an average precipitation rate of 2.073,3 mm in a year and 16 rainy days in a month. August is the driest month. The average temperature is 27.3°C recorded at range from 22.0°C to 34.9°C in 2019. The city's lowest humidity is at 32.0% and the highest is at 99.0%. While wind velocity ranges from 0.0 m/s to 11.4 m/s at an average of 2.8 m/s. The wind moves with an atmospheric pressure between 1004,7 mb to 1015,3 mb, at an average of 1010,1 mb (source: Central Bureau of Statistics/BPS of Pangkalpinang, 2020).

1.3 Demographic Characteristic

Pangkalpinang is populated by 109,198 male and 103,529 female inhabitants, a 1.98% total increase compared with the 208,520 in 2018 (BPS of Pangkalpinang, 2020). Gerunggang is the most populated subdistrict with 43.768 inhabitants while the least populated is Girimaya with 19.237 inhabitants. The 2018-2019 annual population growth rate was of 0.85% with the highest growth found in Gerunggang district (4.81%), and the lowest rate found in Tamansari (-2.43%). The city population continues to grow drastically due to urbanization of rural areas from regencies to the city.

Figure 3 - Population Densities per District in Pangkalpinang

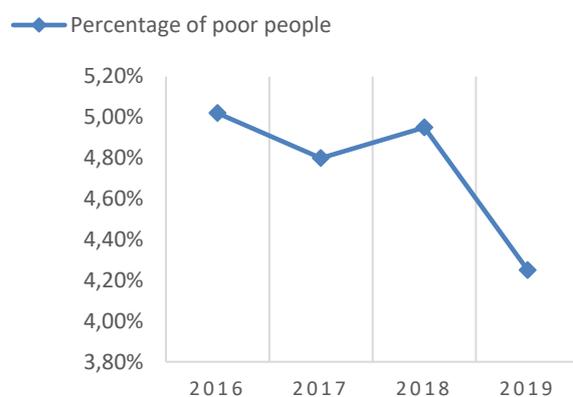


The city's population density in 2019 was 1.819 inhabitants per km², with the highest and lowest values in Rangkui district (7.714 inhabitants per km²) and Gabek district (920 inhabitants per km²), respectively.

1.4 Social Structure

Generally, collectivistic cultures can be found in Indonesia where religious cultures and values are seen as important, and as an integral element of community life. In fact, Indonesia has a constitution that maintains belief in God with five formally recognized religions; Islam, Catholicism, Protestantism, Hinduism, and Buddhism. In Pangkalpinang, Islam is the majority religion with the Muslim population taking up to 84.5% while the remaining 15.5% are classified into Buddhist (5.8%), Protestant (3.9%), Catholic (3.9%), and Hindu (0.03%) populations (BPS Pangkalpinang, 2020).

Figure 4 - The Percentage of Poor People in Pangkalpinang



Source: (Central Bureau of Statistics/BPS of Pangkalpinang, 2020)

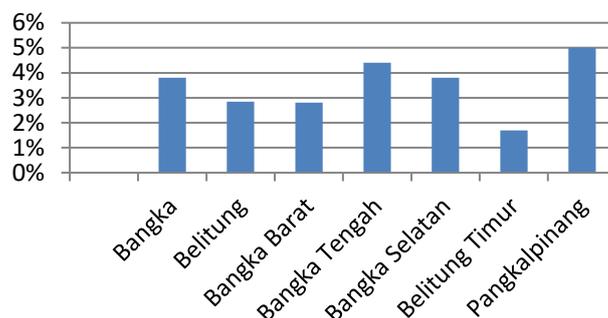
In 2018, the percentage of poor people in the city was represented 4.25% of the population. Although the percentage of poor people in the city of Pangkalpinang tends to decrease as shown in graph 1 above, the city was at the fourth place in terms of the number of poor people compared to other cities in the Province of Bangka Belitung Islands. There are a total of 9,041 people in the city with monthly income below 50.76 USD per month (BPS Pangkalpinang, 2020) as shown in below:

Figure 5 - Number of Poor People (thousand) in Bangka Belitung Islands Province in 2017-2019

Regency/City	2017	2018	2019
Bangka	16,50	18,02	16,52
Belitung	14,10	14,00	11,88
Bangka Tengah	11,40	11,12	9,80
Pangkal Pinang	9,80	10,27	9,00
Belitung Timur	8,40	8,93	8,51
Bangka Selatan	7,90	7,58	7,02
Bangka Barat	6,10	6,35	5,65
Total	74,10	76,3	68,38

Source: (Central Bureau of Statistics/BPS of Pangkalpinang, 2020)

Figure 6- Open Unemployment Rate by Regency and Municipality in the Province of Bangka Belitung Islands



Source: (Central Bureau of Statistics/BPS of Pangkalpinang, 2020)

However, the city has the highest open unemployment rate in the province (see Figure 6, above).

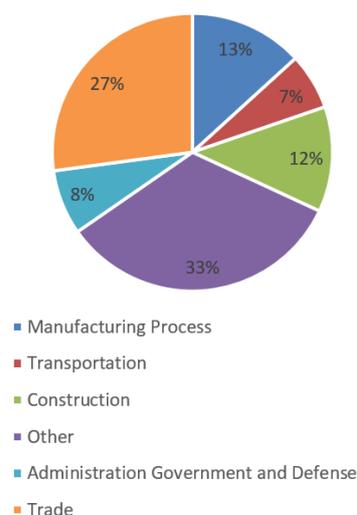
1.5 Economic Structure and Industry

The city of Pangkalpinang is a trading city in the Province. The local governmental policy on mining businesses has had an impact on the economy along with the rubber and palm oil plantations in the islands. A total of 1,562ha area is used to cultivate food crops, smallholder plantations, fisheries and forests. While 1,163ha is temporarily not cultivated, 4,130ha are used for settlement, and the remaining areas of 2,085ha are swamps and state forests (Source: <https://www.pangkalpinangkota.go.id/geografis/>).

Furthermore, the trade and service sectors in Pangkalpinang play an important role in moving the economy of the city. Based on the value of the city's Gross Domestic Regional Product (GDRP) and the percentage of its distribution, the economic structure of the city is more directed to the tertiary sector, including trade, transportation, communication, financial and service sectors. For the industrial area, it occupies approximately 1,440ha of area located near the Pangkal Balam Port.

The large retail industries also significantly shape the city's economy. It is among the business fields that most Gross Domestic Regional Bruto (GDRB) has been generated in the last decade. Additionally, goods are exported through the Pangkalbalam seaport, with a total volume of 69.818 tons shipping activities in 2018. The highest export volume was recorded in May 2018 with 9.941 tons, while the lowest was in November with only 1.516 tons of goods. Meanwhile, the import volume of the city in 2018 was 28.466 tons of goods with the highest and lowest volumes obtained in August (6.254 tons) and March (210 tons), respectively.

Figure 7 - Gross Domestic Regional Product in Pangkalpinang in 2019



Source: BPS Pangkalpinang

Manufacturing process is the second highest contributor to the GDRB of Pangkalpinang; however, the number of its contribution has continued to decrease since 2014 at 20.89% to 13.17% in 2019. Nevertheless, the role of process manufacturing in creating jobs remains high with 22 medium and large sized enterprises. Bukit Intan district has contributed the most with the highest number of employees (1.749 people) because the majority of companies are located in this district, while others are located in Pangkalbalam and Rangkui.

Agriculture, forestry, and fisheries only provide 4.94% of the total GDRB with cassava as the biggest commodity. In 2018, 7ha of land was used to cultivate cassava, which produced a total of 98 tons. However, this number represents a drastic decrease from the 278 tons production obtained in the previous year.

Pangkalpinang is one of the centers of the sea fish production in the province of Bangka Belitung Islands. As a coastal city, Pangkalpinang has potentials to develop the fisheries industry through various derivative food products. Fisheries have the most production value (14.87%) out of the three combined components of the GDRB (BPS Pangkalpinang, 2020).

For tourism industry, the city aims to become a strong tourist destination in the islands based on culture and natural types of tourism. The city has some nature-based areas and landscapes which have a potential to attract tourism such as the Pasir Padi Beach, which is located around 10km from the city center. Based on the government regulation, land use for tourism is allowed in the 500ha Tourism Zone Site which includes Pasir Padi Beach, Tanjung Bunga Beach, Girimaya Golf Course and Lapangan Merdeka Park. However, there is a need for further development of tourism facilities and services.

1.6 Environmental Data

1.6.1 Air Quality

Air quality in Pangkalpinang is at the Air Quality Index (AQI) level ranging from 21 to 26. It is greater than the maximum limit established for one year by the World Health

Organisation (WHO), reflecting a health risk in the long term. Nevertheless, this level of air pollution is generally lower than the pollution level of other Indonesian cities such as the ones on Sumatera and Java island, namely Bandar Lampung (AQI 84), Pekanbaru (37 AQI) or Cirebon (45 AQI) (air-quality.com). The dry season correlates with the increase of forest and land fires incidence with 88 incidents recorded in Pangkalpinang throughout the year 2019. The air quality is worsening partly as a result of haze emitted by these fires which originate from surrounding regencies on the island. Apart from forest and land fires, the AQI of the City of Pangkalpinang is also influenced by the transportation and industrial sectors where the average NO₂ emission in the transportation sector is higher than other sectors. Furthermore, the average SO₂ emissions in the transportation and industrial sectors in Pangkalpinang are higher than the ones emitted by the residential and office buildings. The BMKG stated that Indonesia is experiencing a wet dry season in 2020 where the rainfall is high during the yearly dry season which is predicted to contribute to better air quality. Data monitoring in the early October 2020 shows that the AQI of Pangkalpinang is at the green level (0-50).

Table 1 - Average AQI of the City of Pangkalpinang in 2019

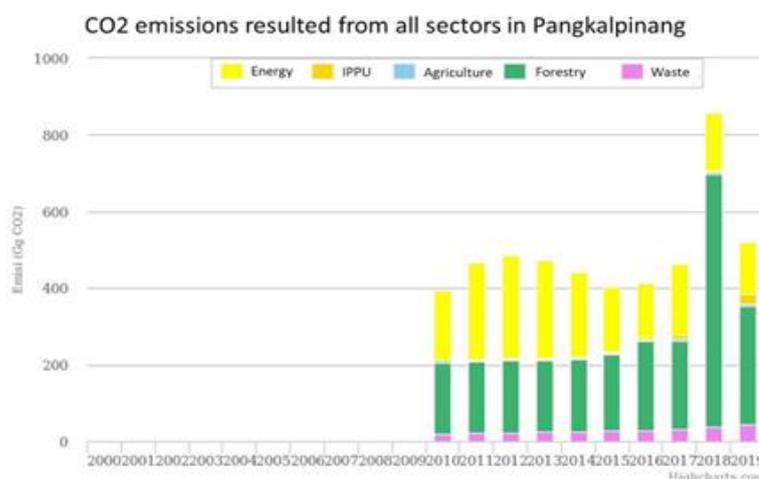
No.	Function	Average NO ₂ / function	Average SO ₂ / function	Average NO ₂	Average SO ₂	Index NO ₂	Index SO ₂	Ieu	AQI
		µg/m ³	µg/m ³	µg/m ³	µg/m ³				
1	Transportation	10,95	9,61	6,01	7,32	0,15	0,37	0,26	91,22
2	Industrial areas	4,50	11,12						
3	Settlements	4,18	4,82						
4	Offices	4,43	3,72						

Source: Environmental Department of the City of Pangkalpinang (2019)

1.6.2 GHG Emissions

Greenhouse Gas Emissions (GHG) emissions in Pangkalpinang are mostly generated from three sectors: the forestry, energy and waste sectors. The total GHG emissions in 2019 was 521 gigagrams of CO₂. The forestry sector contributed to the highest value with 311Gg CO₂, followed by emissions from the energy sector with a value of 150Gg CO₂ and, last, the contribution of the the waste sector amounting to 43Gg CO₂. Industrial Processes and Product Use (IPPU) and agriculture sectors contribute with less CO₂ emissions.

Figure 8 - Carbon dioxide emissions by sector



Source: <http://signsmart.menlhk.go.id>

In general, the GHG emissions in Pangkalpinang have not changed much since 2010. It fluctuates in the range of 400Gg CO₂ to 500Gg CO₂. There was a significant increase in emissions in 2018 to reach 857Gg of CO₂, but decreased again in 2019. Emissions from the forestry sector increase every year. This indicates that there have been no significant efforts to reduce GHG emissions from the forestry and energy sectors.

Emissions from the energy sector are dominated by the transportation (102Gg CO₂). Thus, the use of motorized vehicles, is a significant contributor to GHG emissions in Pangkalpinang. The number of total registered motor vehicles has increased annually from 2,164,496 in 2017 to 2,392,567 motor vehicles in 2019 as depicted in table 3 below:

Table 2 - Number of Registered Motor Vehicles in Pangkalpinang City (units), 2017-2019

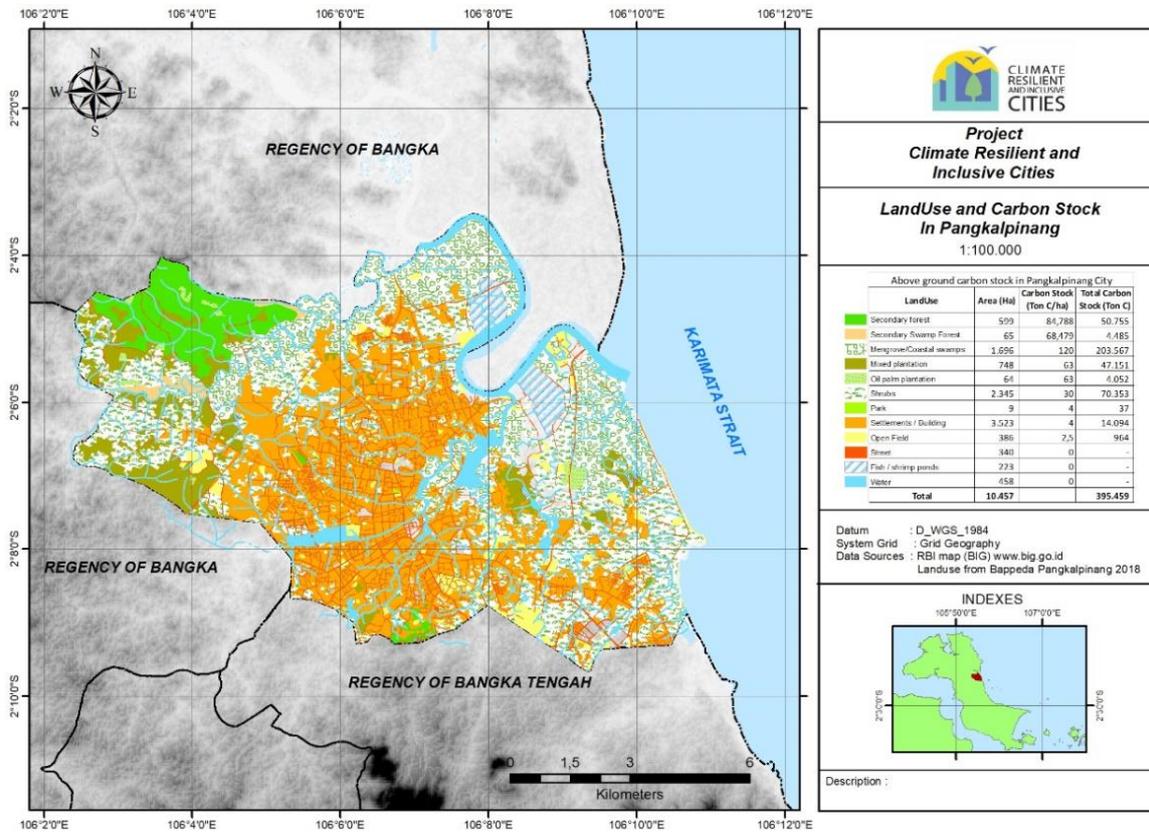
Type of Vehicles	Unit		
	2017	2018	2019
Sedan	16,480	16,633	16,726
Jeep	21,181	22,537	23,774
Minibus	190,604	206,322	222,771
Bus	124	138	144
Microbus	2,661	2,843	2,998
Pick Up	75,161	77,697	81,002
Light Truck	37,896	38,892	39,731
Truck	4,897	5,200	5,291
Motorbike	1,813,473	1,905,126	1,998,022
Special vehicle	2,001	2,062	2,108
Total	2,164,496	2,277,450	2,392,567

Source: Central Bureau of Statistics/BPS of Pangkalpinang (2020)

Public transportation in the city is less effective and more expensive, thereby, making private vehicles a mainstay. Emission tests conducted by the transportation department are ineffective due to the use of old equipment. There is also a lack of facilities in testing electric

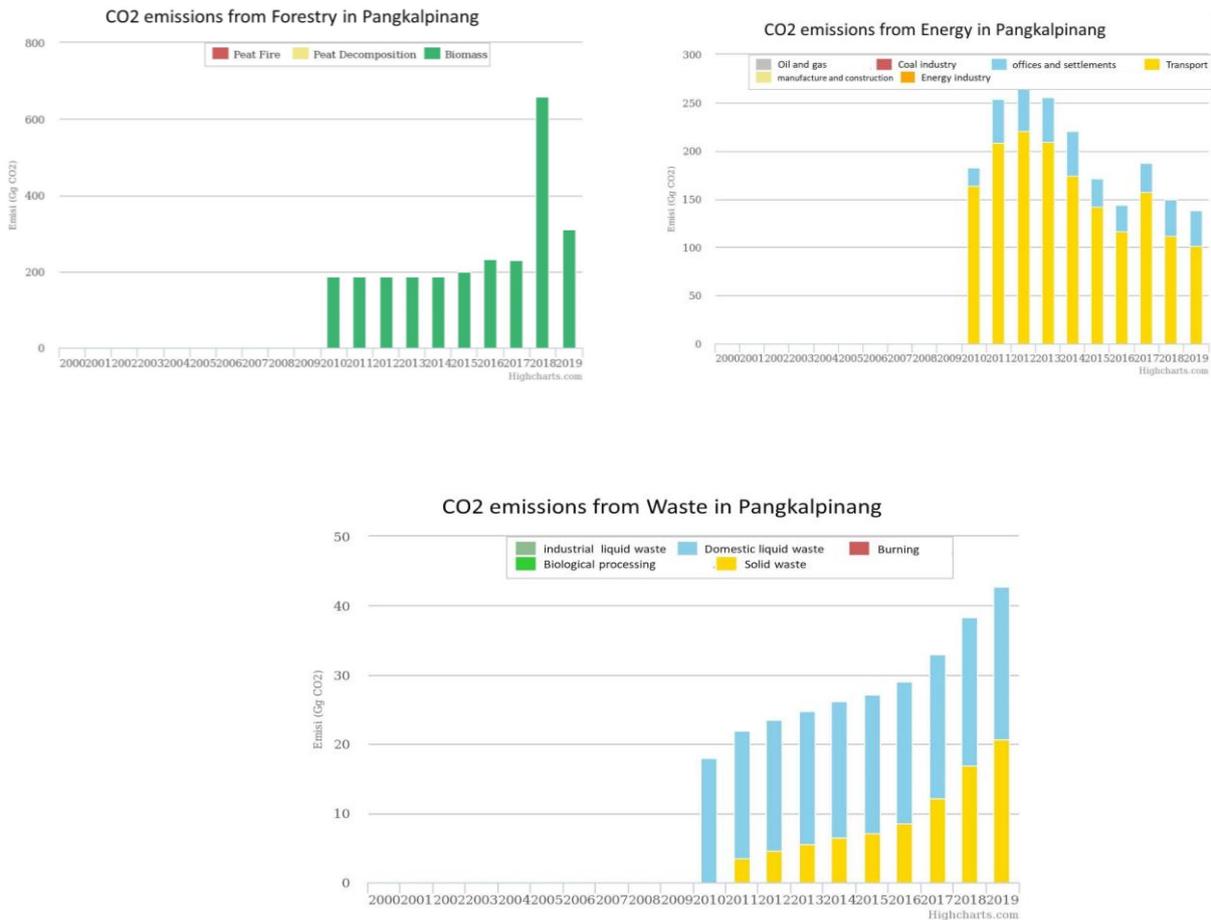
vehicles. Thus, the periodic emission test policy is less effective, due to the numerous constraints associated with tools.

Figure 9 - Land Use and Carbon Stock in Pangkalpinang



As shown above, Pangkalpinang is experiencing rapid urban development. The distribution of built areas and settlements is quite massive. This built-up area takes over almost the same as the green area. However, there is an imbalance between the CO₂ emissions produced and the vegetation in the city. A deeper study of the amount of CO₂ uptake by vegetation is needed to formulate policies in reducing greenhouse gas emissions.

Figure 10 - Detail of CO₂ emissions sources from forestry, energy and waste, respectively



Source: <http://signsmart.menlhk.go.id>

1.7 Waste Management

Waste is one of the major problems in the city of Pangkalpinang. The city government organises waste management practices through several activities: (1) maintenance of cleanliness of garbage on public roads through collecting, transporting, and disposing of waste from public places and to the landfill; (2) maintenance of cleanliness of waste in the market, in the form of collection, transportation, and disposal to the landfill; (3) set up and design of the location of Temporary Landfill /TPS and Final Landfill/TPA; (4) waste transportation from TPS to TPA and (5) disposal or destruction and utilisation of waste.

Figure 11 - Solid waste landfill in Pangkalpinang, 2020



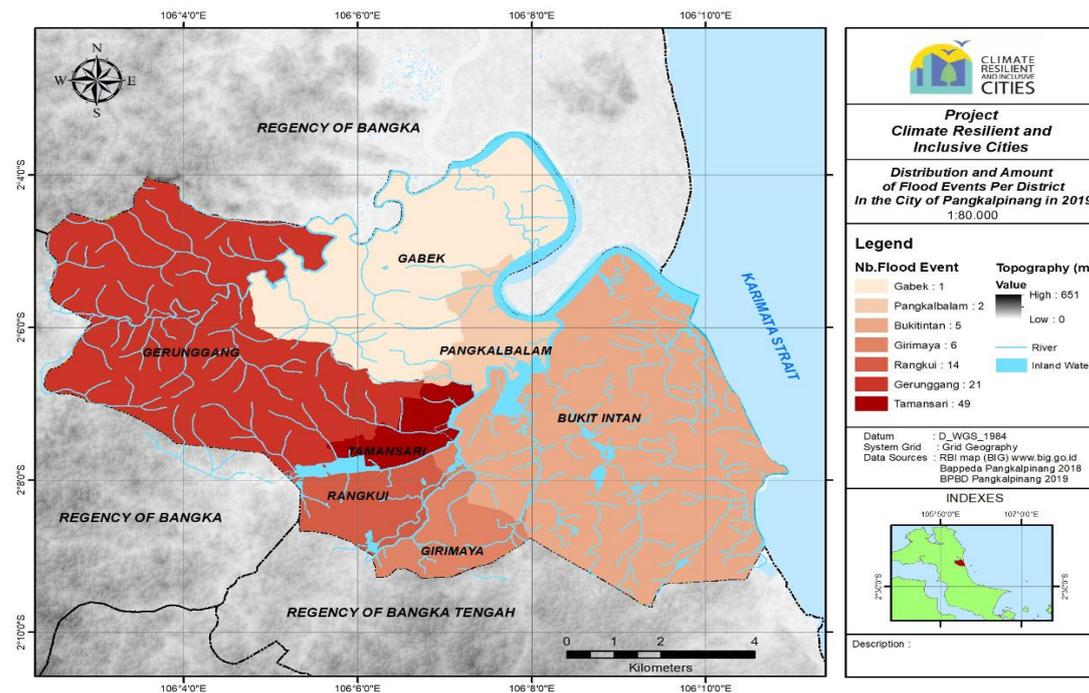
It is estimated that landfills in the city have limited spaces to accommodate waste for another two or three years, considering that quantity of waste will increase. The percentage of landfills per unit of population tends to decrease annually. The provincial government plans to establish regional waste disposal area in Jelutung village near Pangkalpinang. However, it is still in the progress of coordination between the provincial and city governments. A challenge to the development of regional waste disposal area is the resistance from the residents of Jelutung village where they reject the local government's plan. Recently, there has been no incentive for residents to dispose of their trash properly.

Approximately 51.8% of expert stakeholders said that waste management is crucial issue and they demand a better waste management for the city.

1.8 Flood

The city of Pangkalpinang generally takes a concave shape with altitude 0-70m surrounded by high contour areas of 75-150m. Natural disasters are generally caused by the city's topographical concave shape, which makes it vulnerable to floods from the sea water but also from the river. The low topography of Pangkalpinang and the high sedimentation of the river are associated with the frequent floods. Indeed, the riverbed is located higher than some of its flow areas, causing frequent inundations which can be worsened by the malfunctioning drainage network. In addition, floods occur not only in residential areas but also in the central trade/city center area. Floods usually happen in the wet season, from December to May.

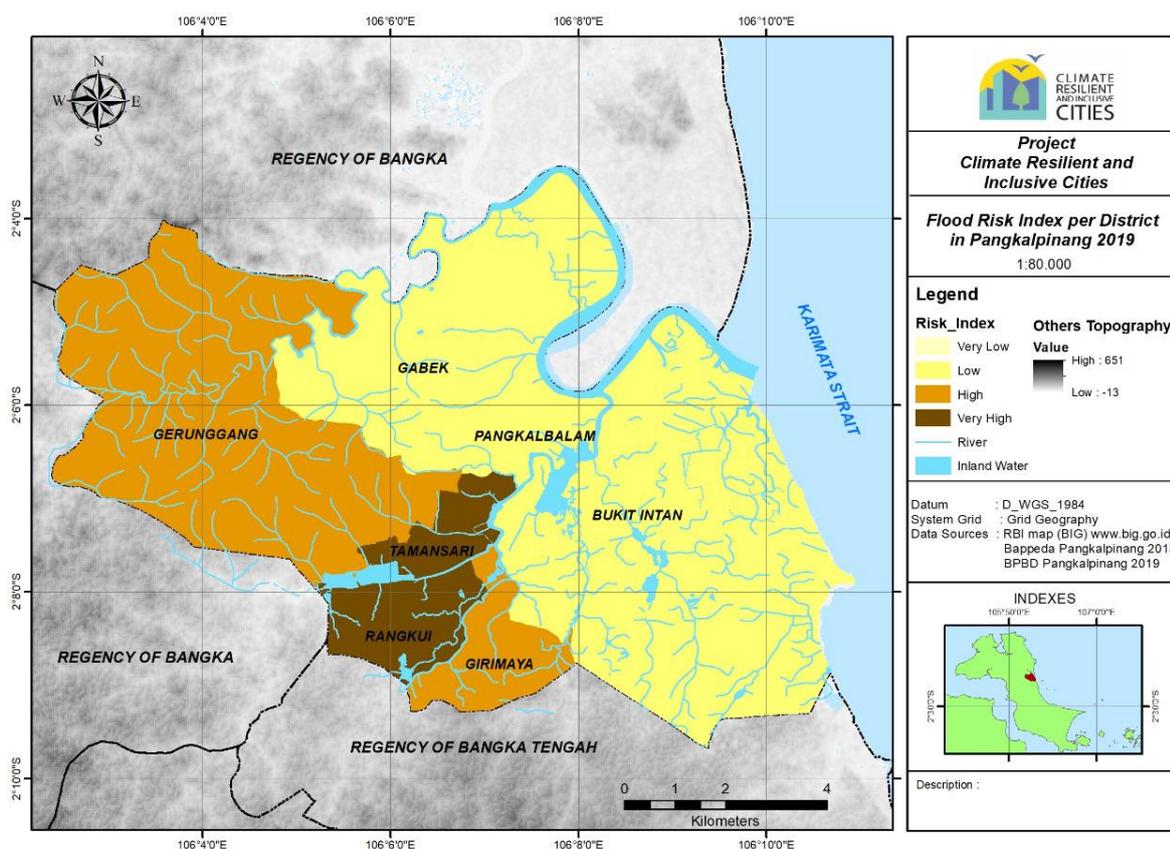
Figure 12 - Distributions and Amount of Flood Events per District in the City of Pangkalpinang in 2019



The highest number of floods occurred in Tamansari district with a total of 49 events during 2019. Flood incidents that were considered high occurred in Tamansari, Gerunggung and Rangkui districts. Specifically, in Gerunggung district, the location of the flood is on the border with Tamansari district. Flood events generally occur in districts that are located on riverbanks. Districts that experienced high flooding events (Tamansari, Gerunggung and Rangkui) were flowed by the Rangkui River and the Pedindang River.

During the rainy season, large volumes of water from upstream eventually cannot be accommodated by river bodies. This is one of the main factors that cause Pangkalpinang to experience frequent flooding. Number of damaged houses due to floods reached 1,497 houses in 2019 with light damage.

Figure 13 - Flood Risk Index per District in Pangkalpinang 2019

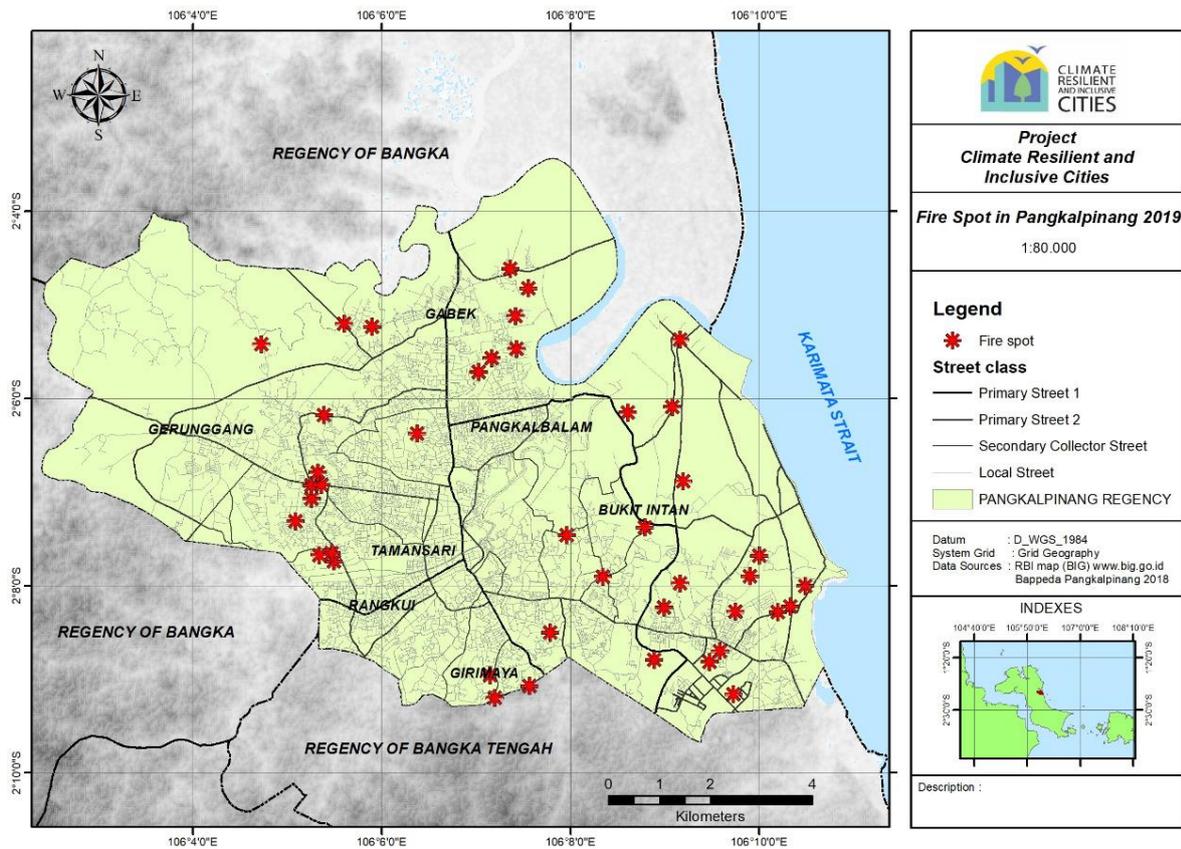


Flood risk index of the city of Pangkalpinang, as described in Figure 17, is based on consideration of flood events and population density levels. Tamansari district and Rangkui district are districts with very high flood risk index.

1.9 Fires

Pangkalpinang is also prone to seasonal fires during the dry period which is usually from the end of July to the beginning of November. Furthermore, Pangkalbalam and Gerunggang sub districts experienced seasonal fires from July to September, with an outbreak in Gabek district from August to November. Girimaya district only experienced seasonal fires in August and September while Tamansari experienced seasonal fires in August.

Figure 14 - Fire Spots in Pangkalpinang in 2019



In 2019, a total of 88 fires outbreaks were counted across the city. These fires occurred in Bukit Intan district throughout the dry season and in Pangkalbalam from July to October.

1.10 Soil and Water Quality

Temperature and rainfall in Pangkalpinang are relatively high, which greatly affects the intensity of chemical and physical reactions of soil. The weathering and washing processes of the soil take place quickly, resulting in many soils undergoing advanced weathering processes, low nutrient levels, and acidic soil reaction. Because of this, land formation is strongly influenced by the amount of water contained in the land.



Figure 15 - Damaged land near the Rangkui River caused by the illegal tin mining operations, observed in June 2020.



Figure 16 Illegal mining operation in Rangkui River, observed in June 2020

The surface water of Pangkalpinang is distributed in the rivers, swamps, and former mine excavation pits. Since the river is affected by swamp conditions, the water is rather brownish in color, containing a fairly high chloride element due to the influx of sea water into the inland areas during high tides. Swamps are quite widespread in the North, center, South and East area of the city. Most of these swamps are affected by tides and the water ranges from clear to brownish in terms of color with a pH below normal, indicating acidity.

The river pollution in Pangkalpinang is mainly caused by the activities upstream. The unconventional tin mining/ traditional mining operations have caused deforestation and river damages in both upstream and downstream areas. However, the upstream areas of the rivers are not part of the Pangkalpinang jurisdiction. Illegal tin mining activities are still conducted in the downstream of Rangkui River. The local government and local police officers have raided off this illegal mining, but the problem law enforcement is still a main concern.



1.11 Spatial and Infrastructure Condition

Currently, the industrial activities in Pangkalpinang are scattered across various villages which are partly located in residential and settlement areas. However, further development will be centered in the Ketapang industrial area in Pangkalbalam district, covering

approximately 825 hectares. Warehouse area is intended to support activities related to the movement and storage of goods. It should be noted that Pangkalpinang is relatively free from slum areas compared with other cities in Indonesia. Pangkalpinang is an example of success story for the *Kota Tanpa Kumuh* (KOTAKU) program. KOTAKU is an urban renewal program funded by the Ministry of Infrastructure and Public Work. The development of the cultivation area is determined by its main function. Assuming that each family occupies one house with an average number of 5 members family, it is projected the need of approximately 60,678 units.

Figure 17 - Fisherman houses near the Rangkui River, observed in June 2020



Source: Authors

Vulnerable communities living along riverbanks in Pangkalpinang often have limited ability and access to manage or to adapt to climate impacts and the environmental or natural degradation. For instance, fishermen in the city are a particularly vulnerable group living in constructed legal settlements/houses near the rivers.

1.12 Social Infrastructure and Services

Recently, there have been significant developments in providing pedestrian area facilities, especially using safety guide for disabled pedestrians involving the provincial government for some pedestrian paths around provincial main roads. However, not every inhabitant of Pangkalpinang understands the importance of a guide for disabled people. Some people occupy the facilities for street vendors' trading. Street vendors are characteristic of some countries in Southeast Asia such as in Thailand, Vietnam and Indonesia. They generally occupy the roads for their business activities, which can be problematic. In Pangkalpinang, street vendors are booming due to limited access opportunity to formal work.

Findings: 37% of respondents said that the city government has accommodated the interests of women, children, the disabled, minorities and immigrants in designing and developing public facilities;

The majority of respondents (51.8%) claimed that the provision of 30% for green open space has been fulfilled by the government, while opposed this statement, 51.3% respondents are not comfortable with the provision;

The level of willingness to be involved in an inclusive city program is very low due to the fact that 70.4% of the respondents still do not understand what their rights are;

70.4% of the respondents stated that the government has not practiced collaborative work in creating inclusive city programs.

Besides, Pangkalpinang has also made significant improvements in public space development such as city parks. Designing and creating green open spaces is reflected in the local government documents, mentioning that: (1) Green Open Space *Ruang Terbuka Hijau* (RTH) consists of: public RTH and private RTH; (2) public RTH that should be developed in 20,30% of the total city area, consisting of zones that provide protection to their subordinate areas, local protected areas, and other RTH; (3) private RTH will be directed at approximately 10% of the total area of the city, which includes the entire cultivation area.

CHAPTER 2

Policies and Strategies for Climate Resilient and Inclusive City

2.1 Nation-wide Policies, Strategies and Target

The central government of Indonesia has established the National Action Plan for Climate Change Adaptation. Although this regulation is not mandatory for all local governments, it can be a strategic way to enhance city resilience at the local level. At the national level, the Minister of Public Works of the Republic of Indonesia enacted the Regulation No. 17 of 2009 concerning Guidelines for the Drafting of City Spatial Planning as the legal backing for urban spatial planning. The national policy on spatial planning formally coincided with the enactment of Law No. 24 of 1992 concerning Spatial Planning [Law 24/1992], which was later updated by Law No. 26 of 2007 [Law 26/2007]. The objective of the policy is a better quality of national spatial planning. The National Long-Term Development for the Year of 2005-2025 is a continuation of previous developments to achieve the development goals as mandated in the Preamble of the 1945 Constitution of the Republic of Indonesia. Urban spatial planning (RTRW) is a general spatial plan of the city area, which contains the objectives, policies, strategies, urban spatial structure plans, urban spatial planning schemes, appointment of the city's strategic areas, directions and control provisions for the use of urban space.

Moreover, article 14 of Law No. 32 of 2009 concerning the Environmental Protection and Management states that one of the instruments to prevent environmental pollution and/or damage is to conduct a Strategic Environmental Assessment (SEA; in Indonesia commonly known as *Kajian Lingkungan Hidup Strategis*/KLHS). This assessment must be compiled by the local and regional governments to ensure that the principles of sustainable development have become the foundation for development and integrated in the development of an area and/or Policies, Plans, and Programs (PPP).

2.2 City-wide Policies, Strategies and Target

The city government also considers visions of community stakeholders, and the sectoral development stakeholders including trade, tourism, industry, housing and other service business fields. At the city level, strategic and spatial planning should reflect the national and provincial levels of regulations through the *Kajian Lingkungan Hidup Strategis* (KLHS). The KLHS document is a systematic process to evaluate the environmental impact of development, and to ensure the integration of the principles of sustainability in strategic decision-making. In fact, KLHS is a form of strategic action in guiding, directing, and guaranteeing that no negative effects on the environment and sustainability are inherently considered in policies, plans and programs (PPP). KLHS is used to support the substance of the RTRW or can be used as a complementary or supplementary methodological instrument of the elaboration of the RTRW.

The application of the KLHS in spatial planning is also useful for increasing the effectiveness of the implementation of Environmental Impact Analysis (AMDAL) and/or other environmental management instruments; creating better governance arrangements

through the development of strategic and participatory stakeholder involvement; cooperation across administrative boundaries and strengthening the approach of ecosystem unity in regional units.

All of this is summed up in the vision of Pangkalpinang, stated in RPJPD as “improving the people’s welfare through development based on trade and services with the support of leading industries”.

The missions of Pangkalpinang are:

1. **Improving** the people’s welfare through increasing income per capita;
2. **Materializing** welfare that supports the quality improvement of basic public services from education and health;
3. **Reducing** the negative impacts of economic development such as poverty, unemployment, unequal distribution of income between groups and between regions and the problem of environmental pollution;
4. **Realizing** honest, clean, authoritative and quality government apparatus through the support of adequate facilities and the rule of law;
5. **Uphold** law that is undiscriminating and not differentiating the position of the perpetrators in order to suppress criminal acts and illegal actions;
6. **Ensuring** good cooperation between agencies, between regional governments, and between the government, the council and the community in order to achieve a just, prosperous, safe and peaceful society;
7. **Obtaining** the main capital for the development of trade and service sectors through the development of information systems and the availability of quality data, especially in the face of globalization;
8. **Enhancing** the role of entrepreneurs through increasing the spirit of entrepreneurship, women through gender equality and women entrepreneurs in promoting growth and equitable economic development;
9. **Creating** a community with religious lifestyle that has healthy soul and body, and;
10. **Creating** harmony in life through law-abiding people who have high commitment and integrity towards development.

Moreover, the change in function and status of Pangkalpinang is expected to attract a variety of community and economic activities that will result in a demographic increase and economic growth. Increasing the population and economic activities of the community will raise the demand for land both for housing and for economic activities. Increasing the standard of living of the community will improve the quality of life of the community, thereby resulting in an increase in land demand for recreation. With the increasing demand for land for housing, economic activities and recreation, the fulfillment of land needs in Pangkalpinang will have to be adjusted to the physical carrying capacity of urban land.

2.3 Description of the Policy of City's Government Structure

The decision-making process of the city is regulated by the regional regulation No. 3 of 2017 concerning Guideline for Establishment of Regional Law Products. The local government of Pangkalpinang is led by a Mayor and Vice Mayor while the legislative role is carried out by the City Legislative Council. Several regulations exist are:

1. Regulation of the Mayor of Pangkalpinang No. 62 of 2017 concerning Amendments to the regulation of the Mayor of Pangkalpinang; No. 56 of 2016 concerning Position, Organizational Structure, Duties and Functions as well as the Work Procedure of the Technical Implementing Elements of the City of Pangkalpinang.
2. Pangkalpinang Mayor Regulation No. 63 of 2017 Amendments to the regulation of the Mayor of Pangkalpinang; No.57 of 2016 concerning Position, Organizational Structure, Duties and Functions as well as Work Procedures for the Technical Implementing Elements of Pangkalpinang City Regional Apparatus.
3. Pangkalpinang Mayor Regulation No. 60 of 2017 Amendments to the regulation of the Mayor of Pangkalpinang; No.54 of 2016 concerning Position, Organizational Structure, Duties and Functions as well as the Work Procedure of the Regional Secretariat and Secretariat of the DPRD City of Pangkalpinang.

2.4 Stakeholders Involvement in Policy Making

There is certain mistrust from stakeholders to the local government in implementing climate change adaptation through local policies. It also shows indifference towards certain elements of sustainable development where respondents said there is a lack of policies and public participation. The public participation in the decision-making process can be seen as '*grey participation*'.

66.7% of expert respondents stated that the local government needs to improve its capability in Climate Change Adaptation and Disaster Risk Management;

55.6% of expert respondents argue that climate change issues have not been fully integrated into local policies.

From the perspective of multi-level governance, problems of coordination occur in the sense of political contestation, a competition among leaders creating difficulties on the coordination in the inter-regions among the government of cities, the regencies and the province. It thus represents a challenge to tackle the issue of river sedimentation due to traditional mining and land clearing for agriculture in the Bukit Mangkol in Bangka Tengah regency (the upstream of Pedindang and Rangkui rivers). Furthermore, the lack of involvement of nongovernmental actors such as NGOs and socio-religious organisations is reflected in the policy-making process in the city, with a limited involvement in the climate change policy-making process. Therefore, the engagement with different and diverse local actors -including organisations- should spread awareness and understanding of climate resilience as well as strengthen the stakeholders' capacities.

CHAPTER 3

Key Problems, Challenges & Opportunities in Priority Sectors

3.1 Climate Change Adaptation and Mitigation

Pangkalpinang has responsive legal instruments towards climate change adaptation and mitigation which can be seen in the local government of Pangkalpinang regulation number 10 year 2019. However, there are several challenges that must be overcome, for example the limited authority of the municipal government regarding the issue of flooding. The city government cannot stand alone in solving the issue of flooding so this requires strong coordination between the Pangkalpinang city government, the provincial government, and its neighboring regencies.

29.6% respondents said that there is a **lack of coordination between stakeholders** in formulating policies related to climate change adaptation. In addition, 18.5% respondents stated that there is a lack of socialization related to climate change in order to raise public awareness. 74.1% of respondents stated that there is still a **lack of integration of climate change issues into several policies**. Trust to the government capability is very low with 88.8% of stakeholder answering that the local government needs to improve its capability to climate change adaptation.

3.2 Energy and Transport

There is limited electrical supply due to industrial needs. This condition is a problem that hinders both new investment and expansion of existing investments. However, the local government has expanded its policies into future development plan through installing a new power station toward 2030. **Opportunities for the future development can be described as follows:**

1. The plan to meet electrical energy in 2030, amounting to 138,061 kVA
2. Plan for the power plant which consists of:
 - Interconnection of Merawang Diesel Power Plant (PLTD) of 70,083 MW, in Bangka Regency;
 - Air Anyir Steam Power Plant (PLTU) of 2x30 MW, in Bangka Regency;
 - Steam Power Plant (PLTU) IPP Bangka Baru I (FTP2) of 2x30 MW, in Bangka Regency;
 - Gas Power Plant (PLTG) of 2x20 MW, in Bangka Regency;

3.3 Water and Sanitation

The constraints of limited drinking water availability and access to clean water caused by the distribution of the pits within the city are carried out by increasing the function of the pits as water reserves. However, there is a potential way to utilize the water in the former mine excavation pits if it is moderately clear but it is not yet to be utilized as a source of clean water supply for daily use with technological based treatment and management.

Pangkalpinang has 4 Water Management Plants (IPA) with a total capacity of $\pm 103\text{L/sec}$ for $\pm 8,000$ SR services, while the needs of the city are $\pm 27,000$ SR. IPA is spread because there is no centralized and sufficient source of raw water so that the IPA is built following raw water sources. These problems produce high costs, services that are difficult to repair and a high rate of leaks.

The plans on clean water supply system include the increase of clean water capacity, the development of clean water management facilities, and the development of a piping system network for the entire city. However, upper areas need serious attention in terms of reforestation. Forest or land degradation in the city requires reforestation to absorb the rainwater. High sedimentation demonstrates evidence of the disruption of land functions in the upper areas. It is therefore necessary to have integrated regulations as outlined in the Bangka Belitung island provincial regulation, to protect and maintain the upstream area of the river. Activities in the upstream area should comply with environmental management documents and provide reports on the implementation of environmental management periodically and transparently as a form of environmental responsibility. Nevertheless, practices can only be implemented when the Pangkalpinang city government enforces laws.

Efforts to reduce sedimentation can also be made by constructing sediment traps in the river before the water flows to downstream. These sediment traps should be placed in an easily accessible position where the sediment can be discharged regularly. The water quality in the Rangkui River has been negatively affected by externalities of mining activities outside the city area. Thus, multi-level government coordination among provincial government, Bangka and Bangka Tengah regencies is crucially needed for this issue. The problem of illegal tin mining operations in the Rangkui River itself is a problem in the realm of law enforcement due to the fact that it has been banned in the city of Pangkalpinang.

Mostly, inhabitants of Pangkalpinang use ground water and pump up for their clean water supply. Sinking land will be a crucial problem in the future, as the impact of massive ground water exploitation. In fact, the area near the Gedung National is already under sea level. It is not surprising that Gedung National area is one the worst area location during flooding. In tackling this issue, the city of Pangkalpinang has a plan to build water supply reservoir in 2021, namely Waduk Eka Guna. However, the process of land acquisition with the main fund coming from the central government is still in ongoing process.

3.4 Solid Waste Management

Final Landfill/TPA Parit Enam has been projected to be fully occupied after next two or three years. In order to deal with this issue, since 2010, the provincial Government of Bangka Belitung Island and Bangka Tengah and the city of Pangkalpinang have agreed to build new Regional final landfill/ TPA Regional with larger capacity (40 hectares) in the village of Jelutung located in Bangka Tengah, near Pangkalpinang. However, as mentioned earlier, the problem of rejection from people in the Jelutung area affects the

major challenge for this project, causing project postponement due to unfinished land acquisition. Several opportunities can be executed in the future which is relevant to the waste system plans, as follows:

- a) The establishment of container of temporary landfill (TPS) for each village in every district;
- b) Optimizing the utilization of Parit Enam processing site in Bacang Village (Bukit Intan district) through technical improvement of waste processing into a sanitary landfill;
- c) Utilize waste management techniques that are more environmentally friendly based on the 4R concept (recycle, reuse, reduce, recovery); and
- d) Integrated landfill development and management through the concept of partnership with the private sector and cooperation between local governments.

Pangkalpinang has a master plan to build an intermediate treatment facility (ITF) project converting waste to renewable energy. The Memorandum of Understanding (MoU) between the city government and Kaltimex Energy Company is conducted to build this facility. The project will be started in 2021 but the idea of converting waste to energy raises a new issue of the impact of activities of waste burning in the local community. Further study about this waste management practice is needed for assessing the impact of burning waste to environment and climate change.

CHAPTER 4

Policy Direction, Recommendations and Enabling Strategies for Priority Sectors

4.1 Current and/or Expected Policies Related to Priority Sectors

The Strategic Environmental Assessment (SEA) or KLHS is one of the important documents to map environmental conditions, mitigation aspects as well as solution options to minimize the negative environmental impacts. It proceeds as follows:

1. Integrating environmental and sustainability considerations into the drafting of policies, plans, or programs (PPP);
2. Strengthening the decision-making process on the PPP;
3. Help in directing, sharpening the focus, and limiting the scope of the drafting of environmental documents carried out at the level of planning and implementing a business or activity.

Another policy document is the City Spatial Planning/RTRW of Pangkalpinang which is an important document for:

- e) Drafting of Regional Long-Term Development Plan (RPJPD), Regional Medium-Term Development Plan (RPJMD), detail spatial planning, and other sectoral planning;
- f) Spatial use and control of urban space utilization;
- g) Embodiment of cohesiveness, interconnection, and balance between sectors, between regions and between stakeholders; and
- h) Spatial planning of the city's strategic area.

In parallel, it is necessary to have reviews of Pangkalpinang's RTRW. It needs to be carried out in order to obtain strategical direction for space utilization which will be more suitable with the current condition as well as the direction of regional development policy for the next 20 years.

Several existing urban structure and policies in Pangkalpinang are:

1. City structure that has been formed (built area);
2. The main infrastructure network patterns that already exist (especially road networks);
3. Potentials and existing constraints, including limitations on the physical condition of the land;
4. Development trends that have been drafted, such as urban spatial plans (RTRW, RDTR); existing sectoral policies such as plans for developing road networks,

drainage, electricity, as well as the issuance of location permits for industrial, housing, trade and others;

5. Policy to determine protected areas/protected forest and areas that are expected to have protection functions.

In surveys, expert stakeholders demand that the municipal government prioritizes tourism as a strategic economic development for the city of Pangkalpinang.

The types of tourism in Pangkalpinang are categorized as follows: (1) Natural tourism area: Pasir Padi Tanjung Bunga beaches and city forest; (2) Cultural tourism; and (3) Artificial tourism areas, which are developed in Taman Merdeka Square (TMS) located in Tamansari district, the Bangka Botanical Garden (BBG) in Bukit Intan district, Mambo Culinary Market in Rangkui district, the Aquatic Stadium in Gerunggung district and Water Tourism in the Kacang Pedang. Non-green open spaces (RTNH) are urban areas in the form of rivers, spaces underneath bridges, lakes, and special designated inundations areas (retention).

4.2 Challenges and Opportunities for Mainstreaming Sustainable Development

4.2.1 Policy Instruments

There is a need for more concrete efforts in integrating climate change adaptation and disaster risk reduction in urban development programs.

Based on interviews with experts and stakeholders, it was stated that climate change adaptation is not yet a priority program in Pangkalpinang.

The problem of flooding which still disturbs the activities and comfort of city residents requires a more holistic treatment. Illegal mines are still found in some parts of the city, one of them is the Rangkui riverbank. Mining activities have endangered the ecosystem in which they took place, polluting the water and affecting the excavated lands. The environmental situation adds more weaknesses to the city, already affected by its specific contour and coastal location as well as the heavy rainfalls during the wet season.

4.2.2 Tools, Early Warnings, GIS

Issues surrounding vulnerability caused by climate change and natural disasters tend to only be partially tackled. Consequently, most local inhabitants are not prepared for the impacts of climate change that will bear consequences on both individual and urban development. The use of appropriate data and tools is necessary, especially in employing technology and information systems. The social networks through multi-stakeholders' processes beyond administrative boundaries are also crucial. This suggests that environmental issues and climate change adaptation cannot be managed solely by the city of Pangkalpinang.

The data of GHG emissions of the city is derived from the national data. As stated by an expert respondent, regarding disaster early warning system, there is not yet an appropriate tool. It means that there should be a tool to measure the GHG emissions at the city level, followed by an intensive training for the local government staff on how to use the tools and how to analyze data from measurement.

66.7% of respondents stated that they had no experience or ability in disaster risk management using technology. Only 3.7% agreed that they have adequate knowledge on disaster risk management.

4.3 Financing Instruments

Currently, the direct source for financing local climate change adaptation measures is mostly through the local government's own budget although their awareness on various financial instruments and their requirements for sustainable urban infrastructure development and local climate change adaptation are very low. The municipal government considers the need for a deeper understanding of alternative financial instrument on their annual financial budget. A lack of capacity and skills of the city government in preparing and developing financial project proposal for investment are still the main concern. In addition, a long-term collaboration has been made with a third party, P.T Kaltimek, for the construction of the Waste Electric Power Plant (PLTSa) which is expected to process 70 tons of waste per day into 4MW of electric energy is at the MoU stage. This project can be channeled with the assistance of the Central Government.

33% of respondents said that budget from the government is necessary. 29.6% respondents said that there is a lack of coordination among stakeholder in formulating budgets related to climate change adaptation. One of respondents stated that "So far, the budget allocation is quite big to deal with floods. The budget is for construction of drainage and physical infrastructure".

4.4 Partnership and Capacity Building

Most respondents claimed that the city government often works in silos. In other words, there is limited stakeholder engagement such as with community representatives, business leaders, financing partners and academics, especially in the issue of climate change adaptation. However, 78.1% of expert respondents rated the interaction between the local government and city stakeholders is low. However, most respondents claimed that climate change and disaster mitigation issues are mostly led by the city government. The involvement of the private sector or companies and business associations are important for Pangkalpinang. Approximately 100% respondents stated that the city government, legislature and other institutions agree with developing a sustainable program. However, 75.4% of the respondents stated that the government needs to play a more crucial role in climate change adaptation.

An expert stakeholder from the city stated that people in the community are working on the project called Climate Village. Though it illustrates their understanding of the importance of waste management, there are still limited follow-up possibilities for this

program, for instance the mistrust of stakeholders to the local government about the creation of climate and disaster mitigation policies, has discouraged them from getting actively involved in policy-making. In fact, there is also the need for setting up disaster response groups. The expert informants also suggested training and giving a lot of environmental education on waste management.

96.3% of respondents said that the local government was incapable of managing urban spatial planning and the construction of public facilities in relation to climate change and disaster mitigation.

The issue of climate change can not only be tackled with regulations but also with changing behaviors, as stated in the Regulation No. 10 of 2019. The local government rapid assessment of the location of damage, and resources for determining emergency status reflects a responsive regulation, but rules and laws must be followed by behaviour change. The community should understand that handling climate change is not just about legal policies, but how to adapt and change. Thus, the community can also develop their own preparedness and responses. **Government officials need to improve their understanding and skills in more effective climate change adaptation and disaster risk reduction. They are also expected to be able to measure, monitor and analyze greenhouse gas emissions in their region.**

CHAPTER 5

Conclusions and Recommendations

As one of the most vulnerable coastal cities in Indonesia, the city of Pangkalpinang is facing environmental problems such as flooding, extreme weather events, and the quality of water. All this contributes to infrastructure damage, vector-borne disease, and natural resource degradation. Thus, the city holds challenges associated with the implementation of appropriate policies in Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR). The most dominant climate change issue is the impact of high rainfall during the rainy season which leads to flood disasters. The policy documents such as the Regional Long-Term Development Plan (RPJPD), Regional Medium-Term Development Plan (RPJMD), Strategic Environmental Assessment (KLHS) and the City Spatial Planning (RTRW) of Pangkalpinang should fully reflect the target of Climate Change Adaptation and Disaster Risk Reduction. However, the main challenges of the city to implement environmental and urban planning policies are related to multi-stakeholders engagement inside and outside the city. In such complexity, water management especially on the issue of floods and sedimentation, would prove impossible without collaboration between provincial government, the city government and other two neighbouring regencies. Furthermore, there is a need of advocacy support from local members of parliament towards sustainable development agenda in the city of Pangkalpinang which can be aligned with the agenda of climate resilient and inclusive city.

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