CLIMATE RESILIENT AND INCLUSIVE CITIES

URBAN ANALYSIS REPORT *2020*

01

BANJARMASIN

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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

Foreword

Banjarmasin City Government is pleased to present this Urban Analysis Report, representing collaboration between the Climate Resilient and Inclusive Cities (CRIC) Project and Banjarmasin. This report provides insights on city characteristics, existing climate-change policy and programme and policy gaps, and also recommendations to tackle upcoming urban challenges.

The Urban Analysis Report is a relevant publication in the midst of our efforts to evaluate the significance of existing policies and programmes to sustainable development and community empowerment. We are also currently evaluating our Spatial Plans.

We are committed to creating sustainable urban development that takes into account economic, social and environmental aspects. From environment point of view, we would like to explore possible policies and programmes to tackle floods, manage waste, upgrade settlement and reduce GHG emissions. We want to ensure community participation in all these programmes.

Banjarmasin City Government will initiate actions based on the recommendations in this report to ensure a climate-resilient and inclusive city.

Thank you.

H. Hermansyah

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 AIILSG, 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

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

ABOUT THE AUTHORS

Mulya Amri is a Research Director at Katadata Insight Center, based in Jakarta, Indonesia. He is a senior public policy and urban development specialist who has co-written 19 books and book chapters, and numerous peer-reviewed journal articles on subnational economic development, regional competitiveness, and urban governance. Mulya has 20 years of experience working with government officials, businesses, and civil society groups through policy analysis, regional economic development, and city planning projects in Indonesia, Singapore, Brunei, the Philippines, China, and the U.S. Mulya has a Ph. D in public policy from the National University of Singapore, a Master's in urban planning from the University of California, Los Angeles, and a bachelor's degree from Institut Teknologi Bandung, Indonesia.

Jamalianuri is a researcher at Katadata Insight Center. She has been actively involved in various research projects mainly from a multidisciplinary perspective and worked collaboratively with academic institutions, government bodies, parliament, private sectors, and international institutions. Jamalianuri holds an M.Sc in Urban Management and Development from IHS Erasmus University Rotterdam and a bachelor's degree in Political Science from Universitas Indonesia. She is highly enthusiast to learn and grow in the field of public policy, urban land governance, and sustainable development.
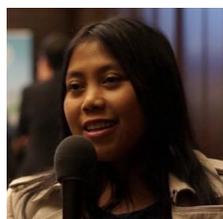
Risanti Delphia is a researcher at Katadata Insight Center, based in Jakarta, Indonesia. She has experience working in research area on various study objectives, exploring insights from various points of view. She has developed her passion in sustainability-related issues since she was actively involved in community on climate action projects. Risanti holds a bachelor's degree in Chemical Engineering from Institut Teknologi Sepuluh Nopember, Indonesia.

ACKNOWLEDGMENTS

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GLOSSARY

APBD	Anggaran Pendapatan dan Belanja Daerah (Local Government Revenue and Expenditure)
APBN	Anggaran Pendapatan dan Belanja Negara (National Revenue and Expenditure)
API	Adaptasi Perubahan Iklim (Climate Change Adaptation)
AQI	Air Quality Index
BAB	Buang Air Besar (Defecate)
BAK	Buang Air Kecil (Urinate)
BAPPEDA	Badan Perencanaan Pembangunan Daerah (Local Development Planning Board)
BAPPENAS	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency/Ministry)
BAU	Business as Usual
BIG	Badan Informasi Geospasial (Geospatial information Agency)
BMKG	Badan Meteorologi, Klimatologi, dan Geofisika (Agency for Meteorological, Climatological, and Geophysics)
BOD	Biochemical Oxygen Demand
BPBD	Badan Pengendalian Bencana Daerah (Local Disaster Management Authority)
BPK	Barisan Pemadam Kebakaran (Rows of Fire
BPS	Badan Pusat Statistik (Central Bureau of Statistics)
BRT	Bus Rapid Transportation
BTS	Buy the Service
BUMD (ROEs)	Badan Usaha Milik Daerah (Regional Owned Enterprise)
BUMN (SOEs)	Badan Usaha Milik Negara (State Owned Enterprises)
COD	Chemical Oxygen Demand
CTPS	Cuci Tangan Pakai Sabun (Washing Hands with Soaps)
DAS	Daerah Aliran Sungai (Watershed)
DDDT-LH	Daya Dukung dan Daya Tampung Lingkungan Hidup (Supporting Capacity and Environmental Capacity)
DLH	Local Environment Agency
DO	Dissolved Oxygen
DPUPR	Dinas Pekerjaan Umum dan Penataan Ruang (Public Works and Spatial Planning Agency)
GDP	Gross Domestic Product
GDRP	Gross Domestic Regional Product
GRK (GHG)	Gas Rumah Kaca (Greenhouse Gas)
GIS	Geographic Information System
IE	Inventory of Emission

IKLH	Indeks Kualitas Lingkungan Hidup (Environment Quality Index)
IMB	Izin Mendirikan Bangunan (Building Permits)
IPAL	Instalasi Pengolahan Air Limbah (Wastewater Treatment Plant)
IPCC	Intergovernmental Panel on Climate Change
IPLT	Instalasi Pengolahan Lumpur Tinja (Fecal Sludge Treatment Plant)
IPM (HDI)	Indeks Pembangunan Manusia (Human Development Index)
ISPU	Indeks Standar Pencemar Udara (Air Pollutant Standard Index)
KEMENDAGRI	Kementerian Dalam Negeri (Ministry of Internal Affairs)
KEMENHUB	Kementerian Perhubungan (Ministry of Transportation)
KEMENPUPR	Kementerian Pekerja Umum dan Perumahan Rakyat (Ministry of Public Works and Public Housing)
KEMENPERIN	Kementerian Perindustrian (Ministry of Industry)
KEPPRES	Keputusan Presiden (Presidential Decree)
KK	Kartu Keluarga (Household)
KLHK	Kementerian Lingkungan Hidup dan Kehutanan (Ministry of Environment and Forestry)
LAPAN	Lembaga Penerbangan Antariksa Nasional (National institute of Aeronautics and Space)
LIPI	Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Sciences)
LLTT	Layanan Lumpur Tinja Terjadwal (Scheduled Fecal Sludge Service)
OPD	Organisasi Perangkat Daerah (Organisasi Perangkat Daerah)
PD	Perusahaan Daerah (Local Company)
PDAM	Perusahaan Daerah Air Minum (Local Drinking Water Company)
PD PAL	Perusahaan Daerah Pengolah Air Limbah (Local Wastewater Management Company)
PERDA	Peraturan Daerah (Local Regulation)
PERMEN	Peraturan Menteri (Ministry Decree)
PERMENPERA	Peraturan Menteri Perumahan Rakyat (Minister of Public Housing Decree)
PERPRES	Peraturan Presiden (Presidential Regulation)
PERWALI	Peraturan Walikota (Mayor Decree)
PERUMDA	Local Public Company
PHBS	Perilaku Hidup Bersih dan Sehat (Clean and Healthy Lifestyle)
PLN	Perusahaan Listrik Negara (State Electricity Company)
PLTU	Pembangkit Listrik Tenaga Uap (Steam-fueled Power Plant)
PLTA	Pembangkit Listrik Tenaga Air (Hydroelectric Power Plant)
PLTD	Pembangkit Listrik Tenaga Diesel (Diesel Power Plant)
PLTG	Pembangkit Listrik Tenaga Gas (Gas Power Plant)
PLTMH	Pembangkit Listrik Tenaga Mikrohidro (Micro Hydro Power Plant)
PLTS/LTSHE	Pembangkit Listrik Tenaga Surya/Lampu Tenaga Surya Hemat Energi (Solar Power Plant/Energy Saving Solar Lights)
POSYANDU	Pos Pelayanan Terpadu (Community Level Health Center)
PP	Peraturan Pemerintah (Government Regulation)
PPP	Public Private Partnership

RAD	Rencana Aksi Daerah (Local Action Plan)
RAN	Rencana Aksi Nasional (National Action Plan)
REDD	Reducing Emissions from Deforestation and Forest Degradation
RENSTRA	Rencana Strategis (Strategic Plan)
RKAB	Rencana Kerja dan Anggaran Biaya (Work Plan and Budgeting)
RKPD	Rencana Kerja Pemerintah Daerah (Local Government Work Plan)
RPJMD	Rencana Pembangunan Jangka Menengah Daerah (Local Medium Term Development Plan)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium Term Development Plan)
RPJP	Rencana Pembangunan Jangka Panjang (Long Term Development Plan)
RTH	Ruang Terbuka Hijau (Open Green Space)
RTRW	Rencana Tata Ruang dan Wilayah (Spatial Plan)
RUPTL	Rencana Umum Penyediaan Tenaga Listrik (Electricity Supply Business Plan)
RUSUNAWA	Rumah Susun Sederhana Sewa (Low cost rental apartment)
SDGs	Sustainable Development Goals
SIDIK	Sistem Informasi Data Indeks Kerentanan (Vulnerability Index Data and Information System)
SOP	Standard Operational Procedure
SPALD S	Pengembangan Sistem Pengelolaan Air Limbah Domestik Setempat (Development of a Local Domestic Wastewater Management System)
SPALD T	Pengembangan Sistem Pengelolaan Air Limbah Domestik Terpusat (Development of a Centralized Domestic Wastewater Management System)
SSK	Strategi Sanitasi Kota (Urban Sanitation Strategy)
TPA	Tempat Penampungan Akhir (Final Landfill)
TPS	Tempat Penampungan Sementara (Temporary Waste Collection Points)
TPST	Tempat Pembuangan Sementara Terintegrasi (Integrated Temporary Landfills)
UNFCCC	United Nations Framework Convention on Climate Change
UPTD	Unit Pelaksana Teknis Daerah (Local Technical Implementation Unit)
WIUP	Wilayah Izin Usaha Tambang (Mining Business License Area)

CHAPTER 1.
Overview of Banjarmasin

This chapter provides an overview of the city of Banjarmasin in South Kalimantan, Indonesia, from a primarily environmental and social angle. It provides an initial basis for assessing the extent to which the principles of a climate-resilient and inclusive city could be achieved in Banjarmasin, given its current conditions.

1.1 General Description

Banjarmasin is the capital of the Province of South Kalimantan, with an area of 98.46 square kilometers and a population of 708,606 people in 2019. It sits along the Barito River, about 25 kilometers before the river empties into the Java Sea. Banjarmasin is situated at the core of the Banjarbakula or Banjarmasin metropolitan area, which hosts a population of around 1.9 million, or equivalent to 52% of the province's population. Banjarbakula is one of the metropolitan areas outside of Java Island identified for further development by the Indonesian central government in its 2014-2019 National Medium-Term Development Plan.

Figure 1. Images of Banjarmasin and the Barito River

Source: Personal Documentation/MA

Source: Tripadvisor

Banjarmasin and four other cities and regencies in the metro[1], namely Banjarbaru City, Banjar Regency, Barito Kuala Regency, and Tanah Laut Regency are among the 12 cities and regencies that make up South Kalimantan. Banjarmasin City shares borders with Barito Kuala Regency towards its north and west sides, and with Banjar Regency towards its south and east sides (see Figure 2).

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[1] "City" refers to the Indonesian administrative unit "Kota", while "Regency refers to "Kabupaten". These are third-level government units below the national government and the provincial government. However, the Indonesian political system is decentralized; cities and regencies have a substantial amount of autonomy from the provincial and national government.

Figure 2. Map of South Kalimantan by Cities and Regencies

Note: Arrow points to Banjarmasin
Source: https://kalsel.bpk.go.id/peta-administrasi/

1.2 Topography and Climatology

Area of Banjarmasin is located 16 centimeters below sea level and is relatively flat with an average slope of 13%. Nicknamed "city of a thousand rivers," Banjarmasin City is located in a downstream area and is crossed by many rivers. Based on official data from the Banjarmasin City Water Resources and Drainage Service, there are 209 rivers with a total length of 193 kilometers running through the city. The two largest rivers are the Martapura River which is 25 kilometers long and 211 meters wide, and the Barito River with a length of 11 kilometers and a width of 725 meters.

The Barito River crosses two provinces in Kalimantan, namely South Kalimantan and Central Kalimantan. This river also passes through 10 regencies, namely Tabalong, Balangan, Hulu Sungai Utara, Hulu Sungai Tengah, Hulu Sungai Selatan, Tapin, Banjar, Kota Banjarbaru, Kota Banjarmasin, and Barito Kuala. The Barito and Martapura rivers separate Banjarmasin mainland in two.

Figure 3. Banjarmasin Map

Source: Google Maps

Based on the GIS-based river database in 2019 (see Table 1), there are a total of 209 rivers in Banjarmasin, where half of them require cleaning, shallow, or even completely lost. Some rivers that used to divide parts of the city have turned into residential areas, and people have built houses above the rivers or on the riverbanks. The rivers that are still flowing are also in poor condition because of waste problems, and some rivers no longer function properly for transportation.

Table 1. River Condition in Banjarmasin

No	River Condition	Total
1	Can still be used for river transportation	54
2	Still flowing but deadlocked/requires cleaning	54
3	Still flowing	44
4	Shallow, many houses jutting into the river so that it narrows	25
5	Starts to be shallow and requires cleaning	21
6	Dead river	6
7	Cannot be seen anymore because the existence of houses	5
	Total	209

Source: Banjarmasin City Environmental Office, 2020.

Banjarmasin's geographical location is at 3°16'46'' to 3°22'54'' south latitude and 114°31'40'' to 114°39'55'' east longitude. This position is close to the equator, with a tropical climate. Like most cities in Indonesia, there are two seasons in Banjarmasin, namely the rainy and the dry season. The monsoon wind blows from the north, namely the Asian Continent, causing the rainy season. While the dry season is caused by wind blowing from the south, namely the Australian Continent. The tropical climate makes the average temperature quite high, ranging between 25°C - 38°C. While rainfall fluctuates in the range of 1,600-3,500 mm with the number of rainy days in a year of approximately 150 days.

1.3 Demographic Characteristics

In 2019, the city of Banjarmasin was inhabited by 708,606 people with a density of 7,196 people per km[2] based on data from the Central Statistics Agency (BPS). The population is spread over 5 districts[2], where Central Banjarmasin is the most populous with 13,953 people per km[2], while the least populous is South Banjarmasin with 4,284 people per km[2]. Central Banjarmasin is also the densest district, followed by West Banjarmasin (see Table 2 and Figure 4).

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[2] "District" refers to the Indonesian administrative unit of "Kecamatan", a sub-city or sub-regency unit that has no political autonomy.

Table 2. Total Population of Banjarmasin in 2019

Area	Number and %of Population	Density per km²
Banjarmasin City	708.606	7.196
Sub-district		
South Banjarmasin	25%	4.284
East Banjarmasin	18%	7.290
West Banjarmasin	21%	10.646
Central Banjarmasin	14%	13.953
North Banjarmasin	22%	6.400

Source: BPS of Banjarmasin City, 2020.

The number of male citizens is slightly higher than that of women: 355,412 men (50.1%), and 353,194 women (49.9%) in 2019. The majority (95.2%) of Banjarmasin citizens follow Islam. Islam has been deeply interconnected with the main culture of Banjarmasin since the spread of Islam in this area hundreds of years ago. Other religions followed are Protestantism, Catholicism, Hinduism, and Buddhism.

The majority of the population comes from the Banjar ethnic group, which is a native of the Banjarmasin area. While the population originating from outside Kalimantan is mostly Javanese and Madurese. In addition to these ethnic groups, there are also Chinese, Dayak, Bugis, Sundanese, and Batak.

Figure 4. Population Density of Banjarmasin, by District
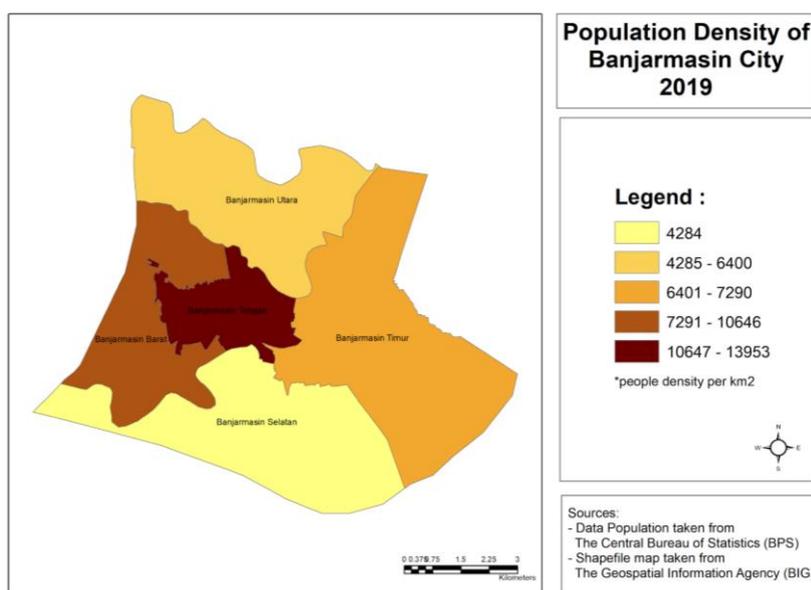
Source: Katadata Insight Center, 2020, based on BPS Banjarmasin data

1.4 Economic Structure

In 2011-2019, Banjarmasin recorded an annual average of 6% economic growth, as seen in Figure 5. The Gross Domestic Regional Product (GDRP) of Banjarmasin is typically higher than that of South Kalimantan Province and Indonesia.

Figure 5. GRDP Growth Rate of Banjarmasin, South Kalimantan, Indonesia, 2011-2019

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Banjarmasin	5.15%	6.18%	6.93%	6.11%	5.79%	6.28%	6.40%	6.38%	6.13%
South Kalimantan	6.12%	5.73%	5.33%	4.85%	3.82%	4.40%	5.28%	5.13%	4.08%
Indonesia	6.17%	6.03%	5.56%	5.01%	4.88%	5.03%	5.07%	5.17%	5.02%
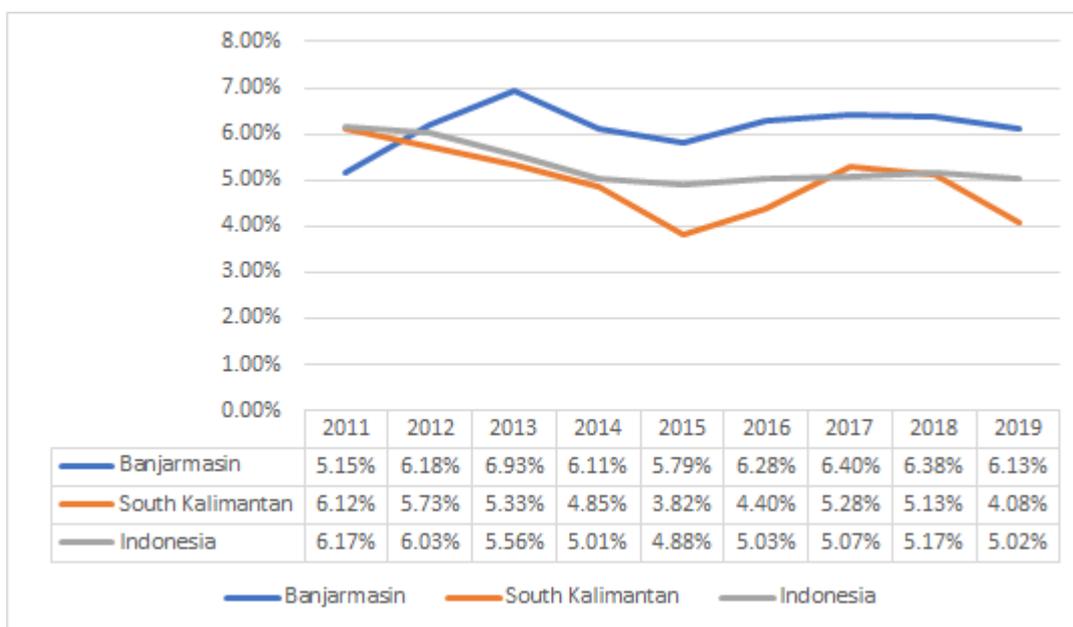
Source: BPS, 2020.

The manufacturing sector contributes the largest share of the city's economy in 2019, which is 18% (see Table 3). This is driven largely by food and beverages (F&B) sub-industry, which contributes to 58% of the total manufacturing industry. The leading commodities are bread and soy sauce which are dominated by large and medium industries, while the leading commodities of micro/small/medium industries are wet cakes, cookies, and crackers.

Banjarmasin has a strategic geographical location in the province and is supported by the presence of a logistics port that enables the flow of trade in this region. The trade sector has the second-largest share of Banjarmasin's GDRP at 12.4% in 2019.

Table 3. Banjarmasin Gross Domestic Regional Product 2015-2019

Sector	GDRP Based on Constant Prices by Business Field in 2010 (Billion Rupiah)					%
	2015	2016	2017	2018	2019	2019
A. Agriculture, Forestry, and Fisheries	436.87	459.69	486.11	507.28	533.70	2.4%
B. Mining and Quarrying	0	0	0	0	0.00	0.0%
C. Processing Industry	3237.28	3381.29	3590.43	3796.07	4016.25	18.0%

D. Procurement of Electricity, Gas	60.24	63.22	66.39	71.26	74.49	0.3%
E. Water Procurement	200.28	216.07	232.09	250.14	269.73	1.2%
F. Construction	1729.49	1810.76	1936.39	2098.01	2274.53	10.2%
G. Wholesale and retail trade, and repair of cars and motorbikes	2123.48	2272.07	2428.07	2593.94	2772.61	12.4%
H. Transportation and Warehousing	1782.45	1899.86	2017.02	2164.02	2309.99	10.3%
I. Provision of Accommodation and Food & Beverage	570.95	606.78	651.37	699.19	754.47	3.4%
J. Information and Communication	1178.03	1277.35	1369.39	1468.30	1569.45	7.0%
K. Financial Services	2221.43	2403.67	2540.86	2635.20	2640.76	11.8%
L. Real Estate	648.55	689.89	736.44	786.96	838.72	3.8%
M,N. Company Services	427.76	462.71	501.88	545.15	592.99	2.7%
O. Government Administration, Defense, and Mandatory Social Security	923.52	942.59	967.49	1004.64	1084.71	4.9%
P. Educational Services	824.71	880.93	949.54	1024.98	1106.89	5.0%
Q. Health Services and Social Activities	768.74	837.38	895.16	954.64	1015.26	4.5%
R,S,T,U. Other services	377.84	407.06	432.95	465.70	502.08	2.2%
GDRP	17511.61	18611.32	19801.58	21065.48	22356.63	100.0%

Source: Statistics (BPS) of Banjarmasin City, 2020.

1.5 Environmental Condition

1.5.1 Air Quality

Air quality in Banjarmasin scores 17 on the Air Quality Index (AQI), which is relatively good.[3] Results of air quality monitoring (ISPU) in Semester I of 2019 (Table 4) show that air quality is at a good level, according to parameters stated in Government Regulation No. 41 of 1999 on National Ambient Air Quality Standards.

However, air pollution remains a concern. The Banjarmasin City Transportation Office stated that 75% of air pollution is caused by motorized vehicles on land. Most Banjarmasin people use private vehicles in their daily activities, while public

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[3] An AQI index score of 0-50 is considered good or healthy, while a score of 301 and higher is considered hazardous.

transportation is not well developed. Another source of air pollution in the city is industrial activities. These include activities of factory machines that use fossil fuels.

Table 4. Air Quality Monitoring Results at Several Sampling Locations in Banjarmasin in Semester I 2019

No.	Sample Code	24 Hours PM10 ug/m3	1 Hour SO_2 ug/m3	1 Hour CO_2 mg/m3	1 Hour O_3 ug/m3	1 Hour NO_2 ug/m3
1	U-1	44	6.81	10.53	1.38	5.7
2	U-2	45	6.81	14.08	1.29	4.5
3	U-3	13	6.81	1.14	1.63	0.1
4	U-4	201	6.81	4.85	2.21	3.9
5	U-5	30	6.81	1.14	1.21	1.4
Average		66.60	6.81	6.35	1.54	3.12
Quality Standards		150	900	20,000	100	200

Source: Banjarmasin City Environmental Office, 2020.

1.5.2 Greenhouse Gas Emissions

The growing size or number of industries, infrastructure, and vehicles are increasing greenhouse gas (GHG) emissions in Banjarmasin. Various development activities also release pollutants such as CO_2, N_2O, and CH_4. The city of Banjarmasin published an inventory of GHG emissions and removals in 2019. This was carried out according to the GHG Inventory Guidelines established by the Intergovernmental Panel on Climate Change (IPCC). The inventory covers four sectors, namely energy, agriculture, land cover, and waste management. This document is also used as a reference for climate change mitigation activities in Banjarmasin.

GHG from Energy

In the energy sector, fuel combustion is a category that generates significant emissions. Based on the energy sub-sectors, as shown in Figure 6, the largest energy contributor is electricity, followed by transportation.

Figure 6. GHG Emissions from Energy Uses / Activities in Banjarmasin 2016-2017

	2016	2017
▇ Industry	135,282	142,254
▇ Transportation	264,315	273,982
▇ Household	46,434	48,889
▇ Electricity	846,628	861,690
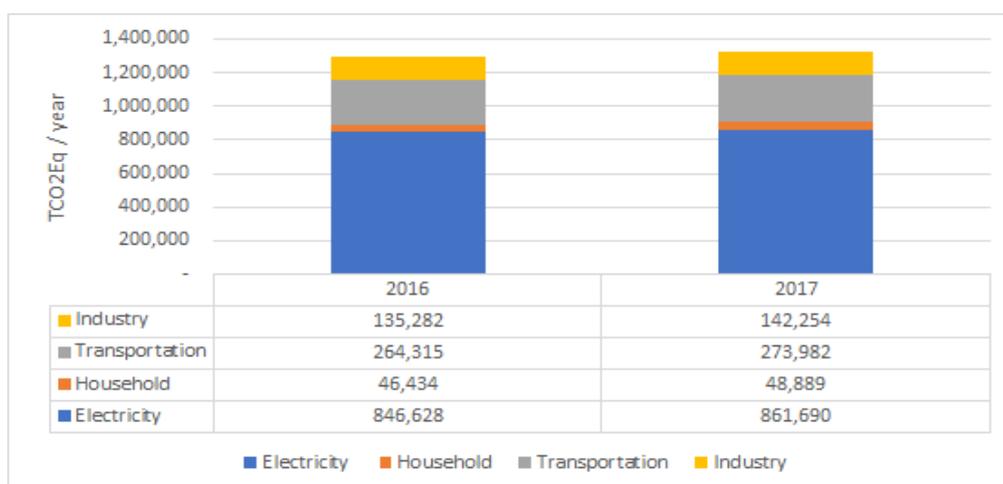
Source: Banjarmasin City Greenhouse Gas Inventory, 2019

In 2017, most (82.5%) of the energy in South Kalimantan was generated from crude oil. Meanwhile, coal made up 9.8% and new and renewable energy (NRE) made up 6.3%. Towards the future, the energy mix will tilt towards coal and NRE, where they are projected to rise to 43.1% and 19.6%, respectively in 2025 (see Table 5).

Table 5. Projected Energy Mix of Power Plants in South Kalimantan (%)

No.	Energy Types	South Kalimantan			Indonesia	
		2017	2025	2050	2025	2050
1	Crude Oil	82.5%	34.7%	21.0%	25%	20%
2	Natural gas	1.3%	2.6%	2.7%	22%	24%
3	Coal	9.8%	43.1%	51.5%	30%	25%
4	New and Renewable Energy	6.3%	19.6%	24.7%	23%	31%

Source: Department of Energy and Mineral Resources South Kalimantan

The electricity system of South Kalimantan Province is mostly supplied from the Barito system, which consists of several types of power plants including coal (PLTU), hydro (PLTA), diesel (PLTD), and gas (PLTD). The proportion of coal plants is dominant, considering the high source of coal in the province. Based on data from the Provincial ESDM office, new and renewable energies that have been developed in South Kalimantan are hydro, Micro Hydro Plant (PLTMH), biogas from cow manure and human dung, and Solar Plant/Energy Saving Solar Light (PLTS/LTSHE).

Transportation Sector

The transportation sector uses largely gasoline and diesel fuels. The total GHG emissions from gasoline are greater than those from diesel (see Figure 7), but this is due to the high rate of gasoline use, relative to diesel fuel. The types of transportation in Banjarmasin include civil aviation, road transportation, railways, water transport, and others. But there is no breakdown of GHG emissions based on transportation type.

Figure 7. GHG Emissions from the Transportation Sector in Banjarmasin 2017-2018

	2017	2018
Diesel fuel	1.510	3.131
Gasoline Fuel	272.472	172.437
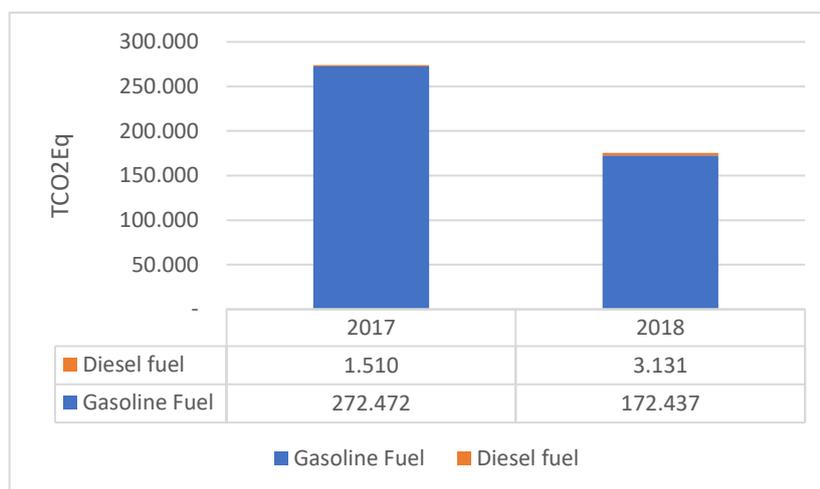
Source: Banjarmasin City Greenhouse Gas Inventory, 2019

Waste Management Sector

Emissions from waste processing are mainly generated from solid waste and liquid waste. The results of the GHG inventory show that the largest GHG emissions were generated from the final landfill (TPA), producing 346,8 million tons of CO_2 in 2017 (see Figure 8).

Figure 8. GHG Emissions from Waste Management Activities in Banjarmasin 2014-2017

	2014	2015	2016	2017
Final Landfill	328,774,108	320,335,092	259,020,819	346,747,853
Open Incineration	12,149	20,815	16,960	22,471
Composting	871	983	884	1,023
Liquid Waste	35,011	35,495	35,954	36,407
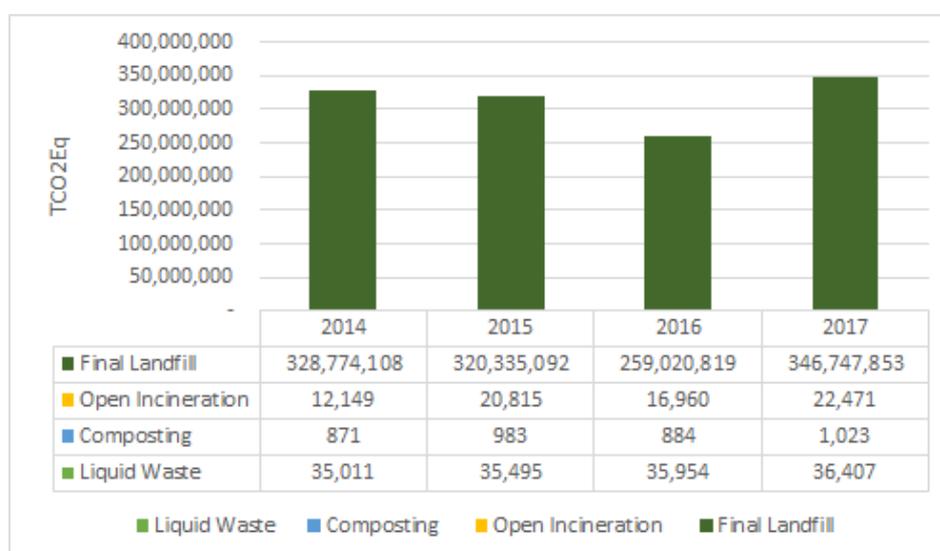
Source: Banjarmasin City Greenhouse Gas Inventory, 2019

The government of Banjarmasin previously conducted a study on the inventory of emission (IE) in 2013. There are three groups of emission sources, namely point sources, area sources, and mobile sources. The highest point source emission comes from industry (97.5%), generated from the power plant during the production process. (see Table 6). More details showing emissions from area sources and mobile sources are presented in Annex 1.

Table 6. Total Emission from Point Sources in Banjarmasin

No.	Sources	Emission (ton/year)					
		NO x	CO	CO_2	HC	SO_2	PM10
1	Hospital	20.61	2.65	1,180.25	1.00	0.06	0.80
2	Hotel	15.48	2.07	2,359.75	0.77	0.09	1,721.10
3	Restaurant	4.80	12.24	2,319.32	1.71	0.01	2.25
4	Industry	1,135.99	7,437.88	422,893.52	538.88	70.61	716.99
5	Mall	14.65	1.88	1.98	0.71	0.04	0.57
6	Street vendors	1.35	43.77	1,992.55	6.54	0.00	8.28
	Total	1,192.89	7,536.50	430,747.39	544.62	70.80	2,449.99

Source: Emission Inventory and Calculation of Pollution Air Emission Load in Banjarmasin City

1.5.3 Water Quality

Banjarmasin's Local Drinking Water Company (PDAM) supplies clean water to around 172,000 customers and reaches 99% of Banjarmasin residents. The water supply comes from various sources, the largest being reservoirs, and rivers. However, this city faces a problem of declining water quality, especially river water, due to its location in the downstream area and is impacted by pollution in the upstream areas, aside from local pollution.

The Mayor of Banjarmasin issued the Mayor Decree No. 158 of 2011 concerning the Designation of Rivers as Public Facilities and City Government Assets. The document states that the river conditions in Banjarmasin have experienced much silting and damage due to household and business activities. To restore the river's condition to its function, the river in the city of Banjarmasin needs to be designated as a public facility and an asset of the city government.

The Environmental Agency of Banjarmasin calculates the water quality using a drinking water quality standard storage system. From the calculation results, it is found that the condition of the river water quality is moderate to heavily polluted with the main parameters including Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and E-coli.

Table 7 shows a tendency for pollution level to increase at almost all sample points in the third and fourth quarters of 2019, when Banjarmasin entered the rainy season, and pollutants were carried into the rivers. The test was carried out at the UPTD Health Laboratory of the Banjarmasin City Health and the Environmental Office UPTD Laboratory.

Table 7. Calculation Value of River Water Pollution Index in Banjarmasin 2019

No.	River Samples	Q I	Q II	Q III	Q IV
1	Pekapuran Hulu (S-1)	6.20	3.80	12.23	12.79
2	Pekapuran Hilir (S-2)	7.88	3.54	11.57	7.54
3	Pemurus Hulu (S-3)	8.92	3.14	11.31	9.84
4	Pemurus Hilir (S-4)	12.40	2.95	7.73	11.05
5	Andai Hulu (S-5)	5.76	3.17	6.91	7.52
6	Andai Hilir (S-6)	6.44	3.20	6.91	12.77
7	Antasan Kecil Hulu (S-7)	5.31	3.42	9.07	8.72
8	Antasan Kecil Hilir (S-8)	6.19	3.07	6.92	9.80
9	Martapura Hulu (S-9)	5.54	2.97	6.44	8.72
10	Martapura Tengah (S-10)	6.80	3.12	8.01	8.67
11	Barito Pertamina (S-11)	6.81	3.04	8.65	9.06
12	Barito Alalak (S-12)	6.52	-	8.00	8.67
13	Kuin Pasar Terapung (S-13)	6.45	3.02	6.22	8.26
14	Surgi Mufti (S-14)	5.76	2.99	6.90	5.86
15	Baru Pekapuran (S-15)	5.76	3.15	7.73	7.32
16	Kelayan (S-16)	5.86	3.09	9.06	9.79

Source: Report and Data Analysis of River Water and Ambient Air Quality in Banjarmasin, 2019

Water quality in Banjarmasin is also affected by pollution from coal mining activities in the upstream areas outside of Banjarmasin but still connected to the city through rivers. In 2014, Greenpeace released a report on the impacts of large-scale coal mining on water quality in South Kalimantan (see Figure 9). Samples from ponds and effluents associated with mining activities across the province were taken and found to have unacceptably high acidity, containing an elevated concentration of heavy metals. This research also indicates that almost 45% of South Kalimantan's rivers are located downstream of coal mining areas and hence potentially at risk of toxic pollution.

Figure 9. South Kalimantan Sampling of Mining Sites
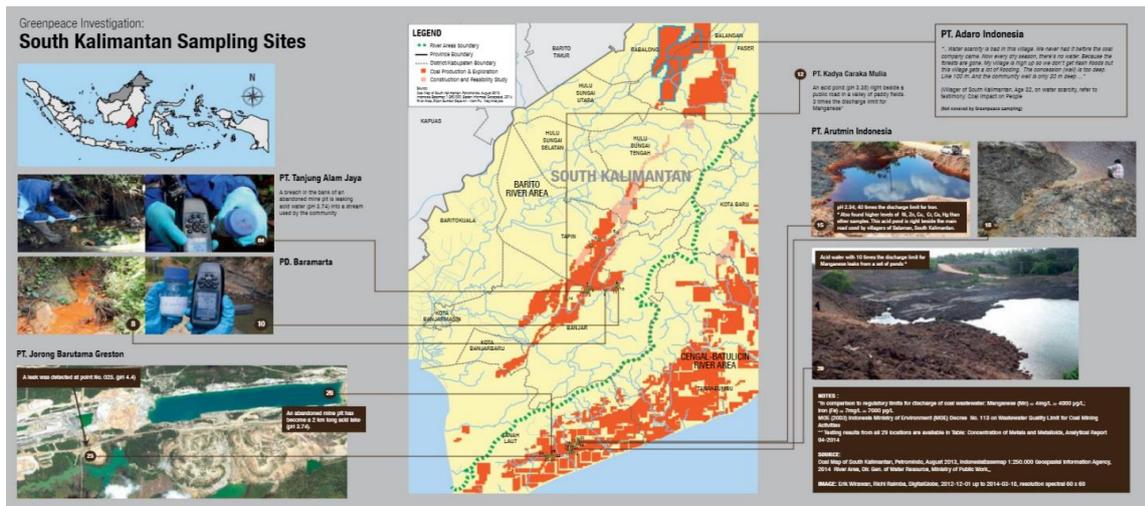
Source: Greenpeace Report: Coal Mines Polluting South Kalimantan's River, 2014

1.5.4 Solid Waste Management

The city of Banjarmasin produces 490-558 tons of solid waste per day or the equivalent of 0.7 kg/person per day in 2018. The waste composition is dominated by organic waste (see Figure 10).

Figure 10. Waste Composition of Banjarmasin in 2018
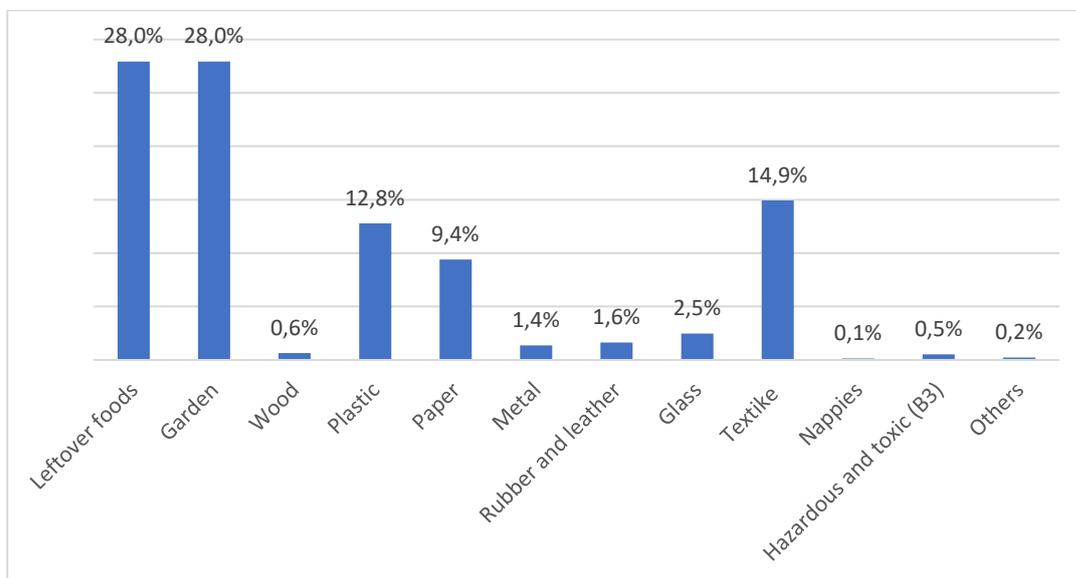
Source: Banjarmasin City Environmental Office, 2020.

Throughout the city, there are 113 temporary waste collection points (TPS) that operate with a total capacity of 1,000 m3 (see Table 8), no further detail is available. Three of these are Integrated collection points (TPST). However, the combined capacity of these facilities could not manage all the waste. On average, 70% of the total waste was transported to the final landfill per year (see Table 9), but a staggering 8.5 tons of solid

waste (equivalent to 1.7%) per day was just being dumped in rivers, and 17 tons (3.4%) per day was dumped on vacant land. It is no wonder that water pollution is a grave concern.

Table 8. Number of Banjarmasin TPS in 2019

No.	Sub-District	Number of TPS	Capacity (m³)
1.	South Banjarmasin	14	122
2.	East Banjarmasin	14	329
3.	West Banjarmasin	37	214
4.	Central Banjarmasin	33	161
5.	North Banjarmasin	37	214
Total		113	1,000

Source: Banjarmasin City Environmental Office, 2020.

Table 9. Waste Treatment in Banjarmasin

Year	Transported to landfills (%)	Composted (%)	Dumped into the river/ditch (%)	Dumped on vacant land (%)	Recycled (%)
2019	72.7	0.03	1.7	3.4	21.0
2018	69.0	0.04	3.4	6.8	20.0
2017	68.0	0.04	4.4	8.8	17.0

Source: Banjarmasin City Environmental Office, 2020.

1.6 Climate Change and Disaster Risks Reduction

The National Disaster Management Agency (BNPB) measures the vulnerability of cities in Indonesia in the form of a disaster risk index. The overall index for Banjarmasin in 2018 was 96.4 (see Table 10), which is considered as a "medium" category. This score is the lowest among the 13 cities/regencies in South Kalimantan, indicating that other cities/regencies in the province are even more disaster-prone. Throughout 2019, fires were the most intense disaster that occurred in Banjarmasin (see Table 11).

The National Disaster Management Agency provides a portal to assess disaster vulnerability at the village level, called the Vulnerability Index Data Information System (SIDIK) and risk assessment portal (InaRISK). Due to the high level of detail presented in these systems, they are explained further in Annex 1.

Table 10. Banjarmasin Disaster Risk Index in 2018

No.	Disaster	Score	Category
1.	Flood	21.6	High
2.	Forest and land fire	21.6	High
3.	Drought	14.4	High
4.	Extreme Weather	13.6	High
5.	Earthquake	10.8	Medium
6.	Tsunami	7.2	Medium
7.	Landslide	7.2	Medium
	Overall Index	96.4	Medium

Source: National Disaster Management Agency, 2019.

Table 11. History of Disasters in Banjarmasin in 2019

No.	Event	Number	People Impacted	House and Infrastructure Damaged	Estimated Loss (in rupiah)
1	Tidal Floods	25	9	2	-
2	Fires	96	1956	474	49,751,719,000
3	Tornado	3	23	2	82,500,000
	Total	124	1988	478	49,834,219,000

Source: National Disaster Management Agency, 2019.

Compared to another city in Kalimantan, which is Samarinda in East Kalimantan, Banjarmasin generally faces lesser disaster hazard for floods, forest and land fire, tsunami, and landslide. However, Banjarmasin faces higher hazards for droughts, extreme weather, and earthquake (see Figure 11).

Figure 11. Disaster Hazard in Banjarmasin Compared to Samarinda
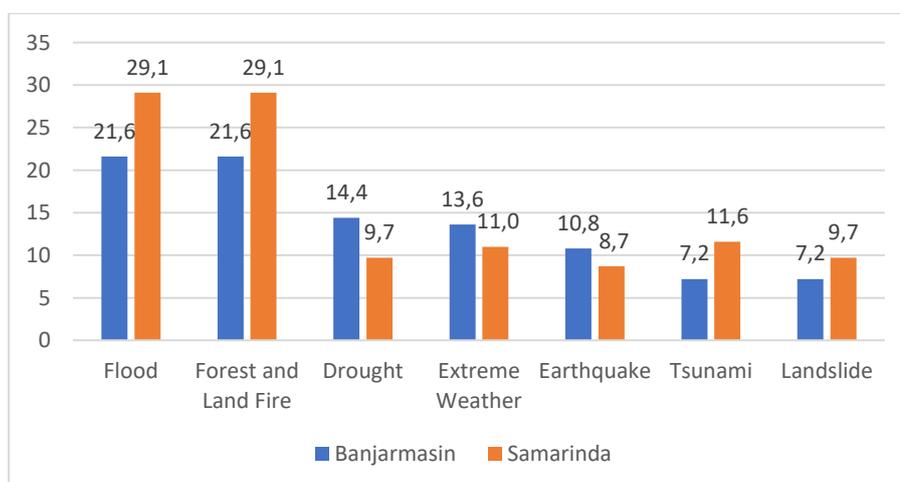
Source: National Disaster Management Agency, 2019.

1.6.1 Flood

Fires and floods are the highest-risk disasters in Banjarmasin. Potential flooding in the city is caused by several factors. First, some parts of the city are located 16 centimeters below sea level, which makes the area vulnerable to tidal flooding. Historically, high tides in this region occurred in June-July. When the tide occurs, one-third of Banjarmasin land is flooded. The highest tide ever recorded was as high as 2.4 meters.

Second, the position of the city is in the downstream area, where Banjarmasin receives water from the upstream area. When rainfall is high, rivers in Banjarmasin will overflow into land in the city area. Third, the behavior of the people who still have the habit of littering makes the river water flow and the drainage system clogged. As a result, when water discharge is high, river water and culverts will overflow.

The most severe impact of climate change on the City of Banjarmasin is the rise in the surface of the Java Sea in the southern part of South Kalimantan Province. The rising seawater will cause the Barito River to overflow to the Banjarmasin mainland.

The main step that has been taken by the local government is to build a better drainage system. In 2018, the total length of Banjarmasin roads was 756 km, but only 145.9 km has proper drainage and only consists of one network (see Table 12). In addition to drainage, the government is also building sheet piles on the riverbank to reduce river overflows to the road.

Table 12. Length of Roads with Drainage and Concrete Embankment in Banjarmasin, 2014-2017

No.	Description	2014	2015	2016	2017
1.	Road with drainage (km)	126.6	129.9	138.8	145.9
2.	Concrete river embankment (km)	38	38	44.7	45.6

Source: Banjarmasin City Public Works and Spatial Planning Office, 2020.

1.6.2 Fire

Another high-risk disaster is fire. There are two types of fires, namely residential fires and forest/bush fires. Residential fires have a higher risk and impact compared to forest/bush fires because the forest area in Banjarmasin is not too extensive. In 2019, there were 68 residential fire incidents in Banjarmasin (see Figure 12). Along with urbanization, unorganized densely populated settlements are growing. The settlements are mostly temporary buildings made of wood that are prone to fire, resulting in the quick spread of fire. The causes of residential fires in Banjarmasin are typically short circuit due to bad wiring and unattended stove, compounded by building construction materials made of wood, limited fire-fighting facilities from the city government, and inadequate accessibility of firefighters due to dense and unorganized residential areas.

Figure 12. Number of Residential Fires in Banjarmasin in 2019
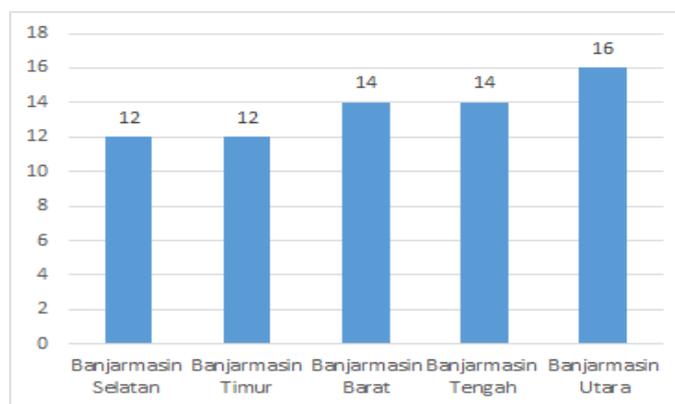
Source: Banjarmasin City Regional Disaster Management Agency, 2020.

The Banjarmasin Local Disaster Management Agency (BPBD) mentioned there are 279 firefighting units with a total of 6,839 personnel. These are mostly allocated to districts with a higher number of fires such as Central Banjarmasin, East Banjarmasin, and South Banjarmasin (see Table 13).

Table 13. Number of Fire Fighting Units, Personnel, and Pumping Units in Banjarmasin in 2019

No.	District	Number of Fire Fighting Units	Number of Personnel	Number of Pump Machines	
				F. Pump	Alcon
1.	South Banjarmasin	45	1.147	41	39
2.	East Banjarmasin	61	1.460	52	41
3.	West Banjarmasin	39	825	40	59
4.	Central Banjarmasin	106	2.673	95	61
5.	North Banjarmasin	28	734	36	42
	Banjarmasin	279	6.839	264	242

Source: Banjarmasin City Local Disaster Management Agency, 2020.

1.7 Social Infrastructure and Service

1.7.1 Education

The city of Banjarmasin has adequate educational facilities with schools from early childhood to university levels. The teacher to student ratio at elementary to high school ranges from 10-19 students for each teacher. The ratio of teachers to students at elementary to high school level is slightly higher than the national average of 1:16 (see Table 14). Meanwhile, private junior high schools in Banjarmasin have the best ratio with one teacher teaching ten students.

Table 14. Number of Schools and Student-Teacher Ratios in Banjarmasin in 2019

No.	Educational Stage	Number of Schools in Banjarmasin	Ratio of Students to Teacher		
			Banjarmasin	South Kalimantan	Indonesia
1.	Elementary School	255	18	14	17
2.	Junior High School	64	16	13	16
3.	Senior High School	51	16	15	16
4	Vocational High School		17	15	17

Source: Banjarmasin City Education Office, 2020.

1.7.2 Health

In Banjarmasin, 135 health facilities can be utilized by the community in 2019 (see Table 15). The ratio of doctors in Banjarmasin is 1 to 1,013 residents (Table 16). This is better than the national ratio of 1: 2,500.

Table 15. Number of Banjarmasin Health Facilities in 2019

No.	Health Facility	Total
1.	Hospital	7
2.	Maternity Hospital	1
3.	Polyclinics	32
4.	Public Health Center	26
5.	Additional Public Health Center	25
6.	Pharmacy	44
	Total	135

Source: Banjarmasin City Health Office, 2020.

Table 16. Number of Health Facilities and Health Workers in 2019

Health Workers	Number of Health Workers	Ratio of Population to Health Worker
Doctors	699	1,013
Other Workers	3,704	191
Total	4,403	160

Source: Banjarmasin City Health Office, 2020.

1.7.3 Sanitation

The quality of public health is influenced by access to drinking water and hygienic behavior. Community participation in the Clean and Healthy Lifestyle program (PHBS) in Banjarmasin is still low. (see Table 17). Many household septic tanks do not meet requirements. Instead of individual household septic tanks, the sewage system should be organized collectively at the neighborhood or district level.

Table 17. Progress in Implementation of the Sanitation Strategy in Banjarmasin

| No.	Indicator	Current Status
1	Households practicing open defecation (BAB)	7.85%
2	Households with improper septic tank	42.54%
3	The practice of draining private septic tanks periodically	32.6%
4	Households with wastewater treatment facility (IPAL/IPLT)	8.08%
5	Public awareness rate of washing hands with soap (CTPS)	11.11%
6	Community awareness and participation of waste sorting	10.2%
7	Public awareness of littering behavior	13.36%
8	Community awareness and participation in drainage management	40%

Source: Urban Sanitation Strategy of Banjarmasin 2020-2024

1.8 Urban Governance (City Government Structure)

Government institutions in the city of Banjarmasin are divided into three parts, namely the executive, legislative, and vertical agencies. The executive body consists of the city government, consisting of the mayor and the vice mayor who are elected for a five-year term and can be re-elected once, as well as 38 city departments (work units and offices). In policymaking, the executive body coordinates with the legislative to get approval and ratification of the rules.

The legislative body in the city of Banjarmasin consists of a Local House of Representatives (DPRD) totaling 45 people who are elected in the 2019 general election. In addition to the executive and legislative branches, there are vertical institutions (derived from central government ministries or agencies operating in certain areas) such as district courts, prosecutors, Antinarcotics Agency, etc.

Figure 13. Banjarmasin City Government Structure
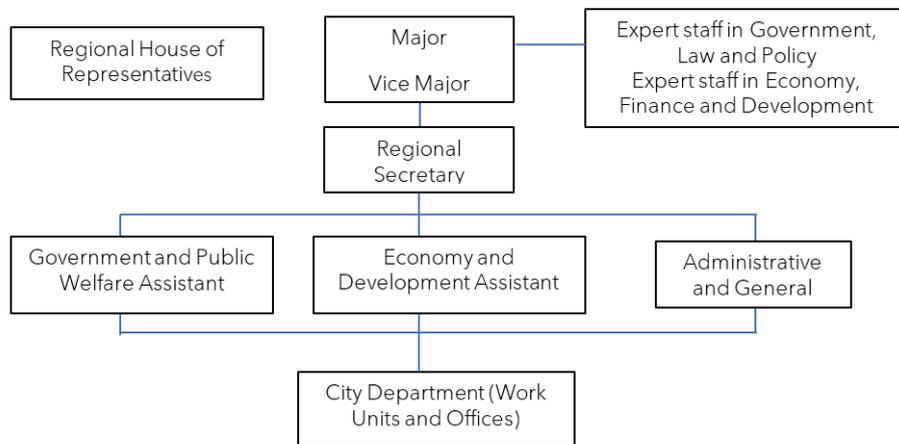
Source: Authors

One interesting note is the participation of the civil society movement in Banjarmasin in dealing with the high risk for residential fires in Banjarmasin. The community established a volunteer firefighters' group, called Rows of Firefighter (BPK). Data from BPS Banjarmasin stated that there were 329 firefighting organizations spread across five sub-districts in Banjarmasin. The community as BPK volunteers participate in providing personal firefighting equipment, handling fire directly, assisting the victims, disseminating information to the public, and establishing a public kitchen.

CHAPTER 2
Policies and Strategies for Climate Resilient and Inclusive City

Achieving climate-resilient and inclusive cities throughout Indonesia, including in Banjarmasin, require the presence of good, supporting policies at the national and local level. This chapter reviews the relevant government policies and strategies to ensure Banjarmasin can achieve that goal.

2.1 Nation-Wide Policies and Strategies

The Indonesian government issued a report entitled Low Carbon Development Indonesia, suggesting that if key sustainability policies are implemented, Indonesia can increase economic growth to 6% (higher than the current growth) while reducing GHG emissions by 43%.
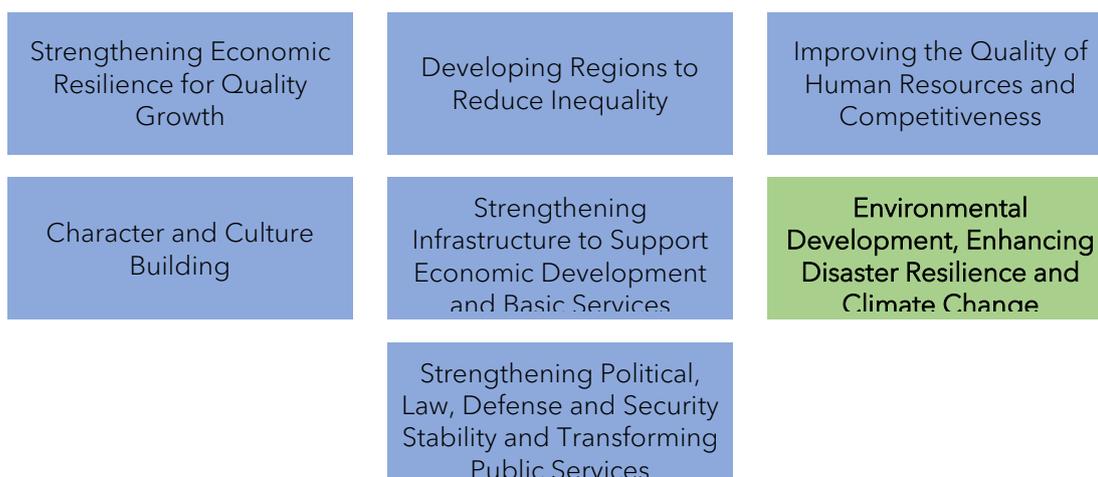
Low carbon development is part of Indonesia's current Mid-term Development Plan (RPJMN 2020-2024). This is a development approach that advances the balance between economic growth, people welfare, and environmental protection, by (1) shifting from fossil fuels to renewable energy such as solar, wind, and geothermal, for electrification and vehicle fuel, (2) planting trees in an area of more than one million hectares by 2024, (3) being efficient in energy usage, (4) conserving water, fisheries, and biodiversity, (5) stopping the issuance of business licenses in the

forests and peatland area, (6) investing to implement low carbon development, (7) improving land productivity by 4% a year, meaning that smallholders can produce more food and more people with fewer resources and land.

2.1.1 Sustainable Development

The Government of Indonesia in the early 2000s compiled the 2006-2026 National Long-Term Development Plan (RPJPN) as a guide in achieving development targets. In 2020, the RPJPN has entered the final stages formulated in the 2020-2024 National Medium-Term Development Plan (RPJMN). There are seven development agendas in this RPJMN that are in line with Sustainable Development Goals (SDGs), as seen in Figure 14.

Figure 14. Seven Development Agendas of RPJMN for 2020-2024

Strengthening Economic Resilience for Quality Growth	Developing Regions to Reduce Inequality	Improving the Quality of Human Resources and Competitiveness
Character and Culture Building	Strengthening Infrastructure to Support Economic Development and Basic Services	Environmental Development, Enhancing Disaster Resilience and Climate Change
	Strengthening Political, Law, Defense and Security Stability and Transforming Public Services	

Source: Ministry of National Development Planning/Bappenas, 2020.

Of the seven development agendas, environmental issues, climate change, and disaster resilience (highlighted in the green box) are part of the development focus. These issues become the attention of the government due to the negative impacts that can hamper sustainable economic development. As a follow up to the resolution of these issues, the central government plans the environmental agenda through three main policies, namely: 1) Improving the Quality of the Environment, 2) Increasing Disaster and Climate Resilience, and 3) Low Carbon Development. This is further explained in Table 18, and the narrative that follows.

Table 18. Policy Directions & Strategy for Resolving Environmental, Climate Change and Disaster Problems

No.	Policy Direction	Strategy
1	Improving Environment Quality	Pollution and Damage Prevention of Natural Resources and the Environment.
		Pollution and Damage Management for Natural Resources and the Environment.
		Pollution and Damage Recovery of Natural Resources and the Environment.
		Institutional Strengthening and Law Enforcement in the Field of Natural Resources and the Environment.
2	Enhancing Disaster and Climate Resilience	Disaster management
		Increasing Climate Resilience
3	Low Carbon Development	Sustainable Energy Development
		Sustainable Land Restoration
		Waste Management
		Green industry development
		Restoration of coastal and marine ecosystems

Source: National Mid-Term Development Plan 2020-2024.

Improving the Environment Quality

The quality of the environment in Indonesia in 2015-2017 was relatively stagnant. It can be seen from the National Environmental Quality Index (IKLH), which shows that only air quality has improved, while water quality and absolute land cover quality are declining. The cause of the decline in water quality is less-optimal handling of pollution sources. Domestic waste pollution control, plastics, and industrial waste are still below the target of the RPJMN of the previous leadership period (2014-2019).

Additionally, forest cover is declining because the forest and land rehabilitation has not achieved target due to land rights and status constraints to be rehabilitated. So that Indonesia does not continue to lose the primary forest, the area of primary forest cover must be maintained at a minimum area of 43 million ha. Environmental carrying capacity also deteriorated due to pollution and ecological damage. These parameters include: (a) Primary forest cover; (b) forest cover on peatlands; (c) key species habitat; (d) Settlements in coastal areas affected by climate change; (e) disaster-prone areas; (f) water availability; (g) energy availability; and (h) emission level and greenhouse gas emission intensity. Indonesia targets the environmental quality index (IKLH) reaches 73.25 to 75.25 in 2024.

The government's strategy in dealing with the problem is to monitor water and air quality, prohibit the use of mercury at small-scale gold mining sites and build hazardous waste and medical waste treatment facilities. Gold mining and mercury cause water pollution because of its toxic compounds. Meanwhile, the government is also trying to reduce the rate of deforestation through the strengthening of licensing systems, supervision, and security of natural resource management and the environment.

Increasing Disaster and Climate Resilience

The second policy direction is to increase disaster and climate resilience. Based on the World Risk Report (2016), Indonesia's disaster risk level is high due to the increasing number of disasters in Indonesia. Geographically, Indonesia is a disaster-prone country located on the "ring of fire". Approximately 217 million (77%) of the population is potentially exposed to earthquakes. Around 3.7 million people are potentially exposed to the tsunami.

Natural disasters in Indonesia are divided into two categories: hydrometeorological disasters due to climate change and disasters due to geological activities (see Figure 15). Disasters due to hydrometeorology are far more significant and tend to increase compared to geological hazards. The highest number of disasters due to climate change are floods, landslides, and tornados.

Zones with high levels of disaster hazard need to be prioritized as protected forest areas in spatial planning. Also, there need to be increased adaptation efforts and disaster risk reduction to reduce material losses and fatalities. Indonesia targets to reduce the risk of loss due to disasters and climate hazards to GDP by 0.21% in 2024.

Figure 15. Comparison of the Number of Disasters in Indonesia in 2010-2017
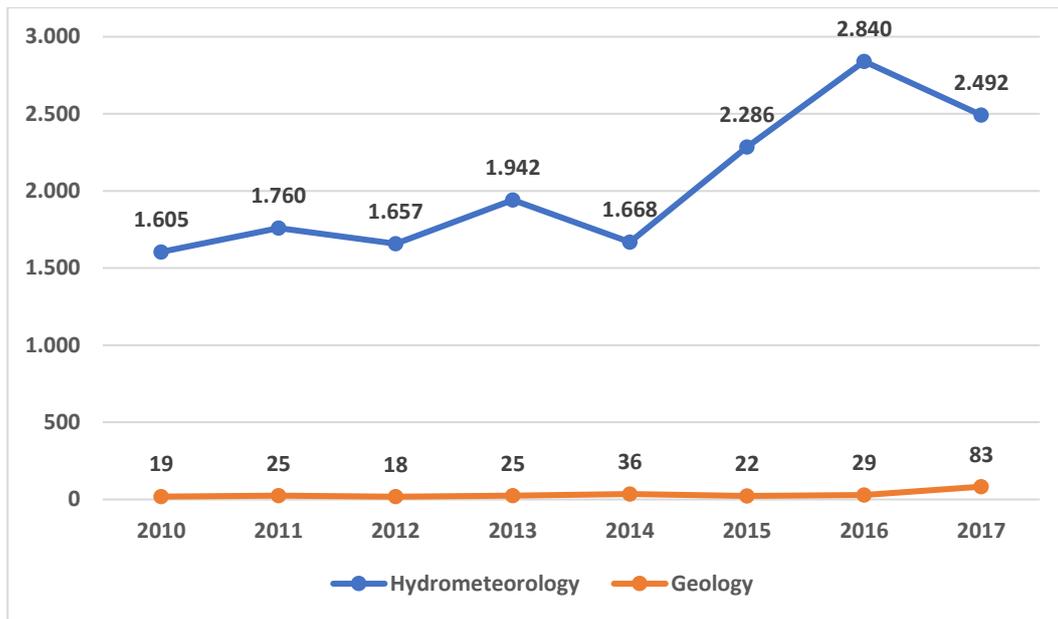
Source: National Disaster Management Authority (BNPB), 2019

The increasing trend in disaster occurrence has made the government adopt disaster risk mitigation planning. The plan must be supported by a strong governance response at the regional level. Several implementing regulations have been issued, such as Government Regulation (PP) No. 2 of 2018 concerning Minimum Service Standards. Then it was enhanced by Minister of Home Affairs Regulation (Permendagri) No. 101 of 2018, which regulates disaster management mechanisms explicitly at the city/regency level.

Low Carbon Development

The third policy direction is closely related to the previous policy, namely, low carbon development. It is because greenhouse gas (GHG) emissions are the main cause of climate change. In 2015, Indonesia became one of the countries that ratified the Paris UNFCCC Agreement as a form of commitment to reducing carbon dioxide emissions, which will begin in 2020.

Indonesia is targeting a reduction in GHG emissions by 27.3% in 2024 and a reduction in the intensity of GHG emissions by 24% in 2024. At the national level, the National Action Plan for Emission Reduction (RAN GRK) document forms the basis for ministries/agencies to carry out activities that will reduce greenhouse gas emissions to reduce the rate of global climate change. In meeting energy needs, the portion of renewable energy must be increased to a minimum of 20% of the national energy mix by 2024.

The main policies to realize this commitment include increasing the use of renewable biogas as a substitute for fossil energy, peatland restoration and reforestation, conservation and auditing of energy use in industry, and conducting inventory and rehabilitation of coastal and marine ecosystems (mangroves, seagrass beds, coral reefs, estuary, and beach forest).2.1.2 National Regulations and Programs The national government has developed various

regulations, policies, and programs related to the environment and climate resilience (see Table 19). These policies form the basis for development planning and program implementation at both the central and local levels.

In line with improving environmental quality, one of the mandates of the Spatial Planning Law No. 26/2007 is the provision of at least 30% of the local jurisdiction's area as green open space (RTH). The 30% figure is the least measure to maintain the balance of the urban ecosystem, which also has an impact on hydrological and air quality. The RTH obligation is divided into 20% for public green open space and 10% for private green open space.

Table 19. National Policies and Programs related to the Environment and Climate Change

No.	Policy and Program	Goal
1	RPJMN – National Medium-term Development Plan of 2020-2014	Five-year planning document that is a reference for cross-sectoral plans, both at national and local levels. The RPJMN is a manifestation of the political promises of the elected president, including the issue of climate resilience.
2	Law No. 32/2009 about Environmental Protection and Management	This law governs environmental management related to principles; scope; planning; utilization; control; maintenance; waste management, duties, and authority of local government; rights, obligations, and prohibitions; community role; and supervision and administrative sanctions.
3	Strategy for Implementation of NDC Act No. 16/2016 on Paris Agreement to the United Nations Framework Convention on Climate Change Ratification	Global commitment to maintain/control the increase in earth's temperature
4	National Action Plan for Adaptation of Climate Change (RAN API) - BAPPENAS	Integration of climate change adaptation with the government, community organizations, donor agencies, and other stakeholders in anticipating the negative impacts of climate change
5	Presidential Regulation - Perpres No. 61/2011 about National Action Plan for Reducing Greenhouse Gas Emissions (RAN GRK)	Work plan to reduce GHG emissions. Activities include agriculture, forestry and peatlands, energy and transportation, industry, land management, and other supporting activities
6	Indonesia Adaptation Strategy - BAPPENAS	Describe the impacts of climate change on the sectors: marine and fisheries, agriculture, health, disaster water resources, and other adaptation strategies.
7	Climate Change Sector Road Map - BAPPENAS	Mainstreaming climate change issues into development planning. Consists of adaptation and mitigation efforts in the water, marine, fisheries, agriculture, health, transportation, forestry, industry, and energy sectors.

8	National Action Plan for Mitigation and Adaptation of Climate Change (RAN-MAPI) – Ministry of Public Works	Reference to the preparation of programs related to public works and spatial planning in anticipating the impacts of climate change and reducing emissions in public works and spatial planning programs.
9	Guidelines for Gender-Responsive Climate Change Adaptation Programs – PPPA Ministry of Women Empowerment and Child Protection	Complementary technical guidelines related to gender mainstreaming in climate change adaptation programs that can be applied in sectoral programs and regional programs
10	Ministerial Regulation - Permen LHK No. P33/2016 on Guidelines for the Preparation of Climate Change Adaptation Action	Guidelines for governments and local governments to develop climate change adaptation actions and integrate them into development plans
11	Ministerial Regulation - Permen LHK No. P7/2018 on Climate Change Vulnerability, Risk, and Impact Assessment Guidelines	Guidelines for: (a) determining the scope of analysis, selecting methods, indicators, indicator data, and data sources in preparing climate change vulnerability, risk, and impact studies, and (b) determining verification criteria for the results of vulnerability, risk, and climate change impacts
12	Presidential Decree - Keppres No. 19/2010 on the Task Force for Preparation for the Establishment of REDD +	Implementation of the Indonesian Government agreement with the Government of Norway (Letter of Intent on Cooperation to Reducing GHG Emissions from Deforestation and Forest Degradation) in the establishment of a REDD + task force
13	REDD+ 2012 National Strategy	Incentive mechanisms for sustainable forest management and compensation for GHG emission reduction
14	Law No. 26/2007 on Spatial Planning	Regulate spatial planning, distribution of authority, rights, obligations, and the role of the community, to criminal sanctions for violations of spatial planning. It also regulates the 30% RTH obligation in each region.
15	National Policy of Handling Slum Settlements 2015-2019 (Bappenas)	Policy to create a supportive environment to improve and prevent the formation of new slums
16	Ministerial Regulation - Permendagri No. 7/2018 on Preparation and Implementation of Strategic Environmental Assessment (KLHS) in the Preparation of RPJMD	Regulate the preparation of KLHS in the preparation of the RPJMD in the framework of sustainable development studies. It sets targets, indicators, and calculation methods of the assessment
17	Presidential Regulation - Perpres No. 97/2017 on National Policies and Strategies for Management of Household Waste and Household-like Waste	The policy direction and strategy to reduce and manage household waste and household-like waste at the national level in an integrated and sustainable manner

18	Ministerial Regulation - Permen ESDM No. 12/2015 on Provision, Utilization and Trading System of Biofuels as Other Fuels (third amendment)	Describes the minimum obligation stage for use of biodiesel (B100) as a fuel mixture
19	Ministerial Regulation - Permen ESDM No. 50/2017 on Utilization of Renewable Energy for Electricity Supply	Guideline for state electricity company (PLN) to purchase power from the power plants that utilize Renewable Energy Sources (EBT)
20	Presidential Regulation - Perpres No. 35/2018 on Acceleration of Waste to Energy based on Environmentally Friendly Technology	Aims to reduce the volume of waste by using waste as a source of energy for power plants
21	Government Regulation No. 63/2002 Concerning Urban Forest	The purpose of managing the urban forest is for sustainability, harmony and balance of urban ecosystems which include environmental, social and cultural elements.

Source: Processed from various sources

2.1.2 Funding and Targets

In addition to supporting the rule of law, funding innovation is an important aspect to be improved. The government plans to establish a pool of funds that will be managed by a management body determined through regulation (see Table 20). Funding does not only depend on the national or local budget (APBN/APBD), but can also come from the community, SOEs, private funds, and international bodies.

Table 20. Disaster Resilience and Climate Change Major Projects and Funding Plan 2020-2024

No.	Major Project	Funding Allocation (5 years)	Funding Source	Executor
1	Strengthening of the Integrated Multi-Disaster Mitigation System	Rp15,79 trillion	State Budget, Local government Budget, Private, State-owned enterprise	BMKG, BNPB, LAPAN, BIG, LIPI, KemenPUPR, KLHK, BPPT, Local Government
2	Construction of Medical Waste, B3 Waste, Domestic Waste, and Plastic Waste Treatment Plants	Rp 13,72 trillion	State Budget, Local government, PPP	KLHK, Kemenkes, KemenPUPR, Kemenperin, Kemendagri, Local Government, Private Sectors

Source: National Medium-Term Development Plan 2020-2024

Through strategies and funding to be carried out, targets are set as an indicator of success, as seen in Table 21 In terms of the number of emissions, GHG emission reduction has reached 23.5% in 2019 and is targeted at a higher decrease to 27.3% in 2024. The targets summarized in RPJMN 2020 to 2024 was the first step of a long-term target of GHG emission reduction by 29% in 2030. From the economic side, it is targeted that potential loss of GDP due to climate change mitigations will be reduced from about 0.13% to about 0.11% of the GDP between 2020 and 2024.

Table 21. Mainstreaming Disaster Vulnerability and Climate Change Targets, 2020-2024

| No.	Objective	Indicator	Target				
			2020	2021	2022	2023	2024
1	Increasing Regional Disaster Resilience Index	Percentage increase in the Regional Disaster Resilience Index	5%	5%	5%	5%	5%
2	Declining potential for loss of GDP in sectors affected by climate change	Declining potential for loss of GDP in sectors affected by climate change	0,13%	0,12%	0,12%	0,11%	0,11%
3	Reducing GHG Emissions	Percentage of GHG emission reduction	26%	26,3%	26,7%	27,0%	27,3%
4	Reduction in GHG Emission Intensity	Percentage of reduction in GHG emission intensity	15,2%	18,8%	21,13%	22,8%	24,0%

Source: National Medium-Term Development Plan 2020-2024

2.2 City-Level Policies, Strategies, and Targets

In addition to the medium and long-term development plans on a national scale, regional governments also prepare development plans for their respective regions. Starting from the provincial level to the city/regency. The City of Banjarmasin has a long-term Development Plan (RPJP) 2005-2025 and the Regional Medium-Term Development Plan (RPJMD) 2016-2021, which also includes policy directions in the fields of environment, disaster resilience, climate change, and inclusiveness.

Based on the identification of disaster risks and climate change, the City of Banjarmasin is most vulnerable to two problems, namely flooding due to high tide and residential fires. The direction of local government policy is focused on these two problems. Then, there are also policies to reduce greenhouse gas emissions to reduce climate change, see Figure 16. These environmental policies are supported by policies related to inclusiveness, especially for vulnerable groups affected by disasters and climate change.

Figure 16. Three Main Issues of Disaster Resilience and Climate Change in Banjarmasin
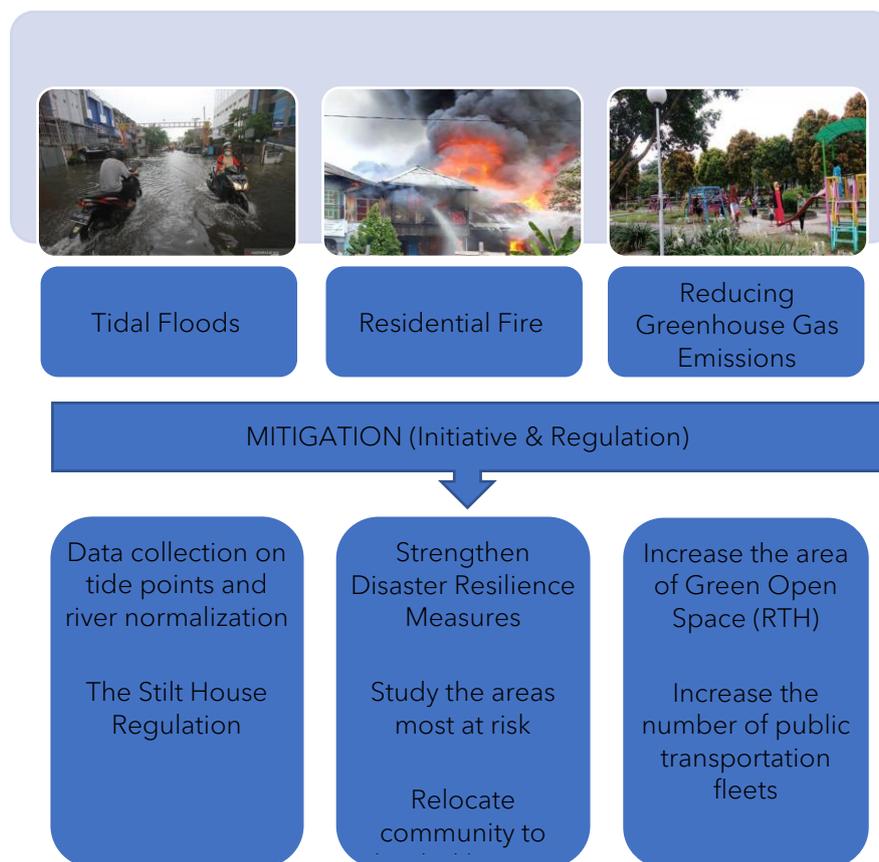
Source: Authors

2.2.1 Response to Tidal Floods

Banjarmasin's topographical condition, which is below sea level and where hundreds of rivers flow, makes it necessary for the city to adapt and mitigate. The adaptation and mitigation process undertaken is formulated in 4 policy focuses. First, normalization (build concrete embankment) along the riverbank area. At present, there are still many people who live on the banks of unregulated rivers and do not have land or building certificates. The initial step taken to resolve this problem is to conduct land/spatial clearance. However, this requires time because it must be done sensitively and must go through an intensive social approach to residents around the river.

Normalization is also carried out by collecting data points that are prone to tidal waves. This data collection is done so that the normalization process runs efficiently by prioritizing the most severe points and so as not to disturb the activities of residents who are not affected by normalization. Forms of normalization carried out are dredging river channels and increasing channel or siring with a total length of approximately three km. Also, concrete pegs will be installed at two points near the river so that people do not build new dwellings at that point.

Table 22. Banjarmasin Regulation on River Management

No.	Regulation	Concern	Program/Activity
1	Perda No. 2/2017	River Management	Large River Normalization and Dredging Activities
2	Perwali No. 158/2011	Stipulation of River as Public Facility and City Government Asset	Small Rivers Normalization Activities
3	Perda No. 15/2016	Efforts to Improve River Management	Small Rivers' Quality Buildings Improvement
4	Perda No 31/2012	Stipulation of River Basin and Former River Basin Utilization Arrangements	Socialization of River Management /Arrangement and Drainage
5	Perwali No.39/2010	River Boundaries, River Benefit Areas, River Controlled Areas and Former Rivers	Making River Border Line Informative Boards
6	Perda No. 14/2009	Stilt Building	Construction and Installation of River Concrete Stakes

Sources: Various sources

The program related to river normalization is handled by the Banjarmasin Public Works and Spatial Planning Office. These programs are carried out in one-year budget cycles and will be renewed annually. In 2020, there are eight priority river normalization programs with a budget of Rp. 22.8 billion (see Table 23). The funds come from the local budget (APBD) and fiscal transfers from the state budget (APBN).

Table 23. Funding Framework for the Banjarmasin River Normalization Program in 2020

No.	National Program	Regional Priority Programs and Outputs	Target	Budget (Rp)	Institution in charge
1.	Expansion of Regional Infrastructure	Implementation of Normalization and Dredging of Large River Channels (volume)	21,000 m^3	5,500,000,000	Office of Public Works and Spatial Planning
2.		Routine Drainage and River Maintenance	80 locations	2,056,690,000	
3.		Implementation of Normalization of Small River Channels	3 kms	5,200,000,000	
4.		Planning for the Arrangement of Large Rivers	4 documents	500,000,000	
5.		Rehabilitation/ Maintenance of the Martapura River	3 kms	4,223,540.000	
6.		Making and Installation of River Concrete Bench	2 locations	500,000.000	
7.		Improvement of Small River Channels/Siring	2.85 kms	4,753,460,000	
8.		Socialization of River Management/Structuring and Drainage in Banjarmasin	5 times	123,000,000	
Total Budget				22,856,690.000	

Source: Banjarmasin City Local Government Work Plan (RKPD), 2020.

Banjarmasin's municipal government also has a policy related to the process of adaptation to tidal conditions as one of the impacts of climate change. The government issued Regional Regulation No. 14 of 2009 concerning Stilt Buildings, aiming to accommodate the culture and natural conditions of Banjarmasin. Through this regulation, every building must adhere to the construction principles of a stilt building. Buildings must also pay attention to environmental aspects by not eliminating the function of water absorption in the area to be built. The oversight function of this rule is carried out by the City Public Works and Spatial Planning Office appointed by the Mayor.

However, the stilt building regulation is not well implemented, and violations are common. Lack of citizen awareness, coupled with the lack of enforcement, constitute the main cause of why the regulation is not effective. The stilt building design is supposed to be a requirement in obtaining the IMB. Nonetheless, there are buildings constructed with land embankments not being prosecuted by the authorities. Related to this, many complaints have come from the public.

2.2.2 Response to Residential Fires

The second policy direction is overcoming residential fires in Banjarmasin. In 2019, there were 279 firefighting units in operation. The existing facilities will be supported by 5 main programs in the field of strengthening disaster resilience. The planned program focuses on the dissemination of prevention measures in various communities. Starting from dissemination to students in 24 schools to disaster dissemination in 10 villages. In 2020 it is also targeted that there will be community training for 2,040 people on the basics of disaster and fire resilience.

In addition to outreach, policy support was also provided in the form of providing a budget for the operation of the disaster and fire alert posts for the full 12 months. In total, all disaster and fire management programs are budgeted at Rp 1.02 billion (USD 0.07 million)[4], see Table 24. The organizers and those responsible for these activities consist of local government agencies, namely: The Regional Disaster Management Agency, the Civil Service Police Unit, and the Fire Department.

Table 24. Funding Framework for the Banjarmasin Disaster and Fire Resilience Program in 2020

No.	National Program	Regional Priority Programs and Outputs	Target	Budget (Rp)	PIC
1.	Strengthening Disaster Resilience	Dissemination of Forest, Land, and Residential Fire Prevention	5 times	72,625,000	Regional Disaster Management Agency, Civil service police Unit, Firefighters
2.		Dissemination of the establishment of disaster safe schools	24 schools	248,200,000	
3.		Dissemination on the Establishment of Disaster Resilient Villages	10 times	94,500,000	
4.		Basic Training and Improvement of Community Resources on Disaster and Fire	2,040 people	270,100,000	
5.		Operational Standby Command Post BPK (Disaster/Fire)	12 months	340,900,000	
Total Budget				1,026,325,000	

Source: Banjarmasin City Local Government Work Plan (RKPD), 2020.

[4] 1 USD= IDR 14,675.76 (per 26/10/2020)

2.2.3 Reduction of Greenhouse Gas Emissions

The main cause of climate change is greenhouse gas emissions. Therefore, it is necessary to make policies that can reduce emissions. The City of Banjarmasin has two priority programs to reduce emissions, namely the expansion of Green Open Space (RTH) and the improvement of public transportation services. Based on data from the Office of the Environment in 2019, green space in Banjarmasin is only around 5-6%. This figure is still far below the local government target of 20% and below the 30% target stipulated in the Law on spatial planning in urban areas.

In 2020, the City Government of Banjarmasin has budgeted Rp 13.8 billion (USD 0.94 million) to increase green open space and maintain existing green open space. The target to be achieved in 2020 is an increase in green open space to 9.5%. However, the realization of the plan encounters various problems. The expansion of green space in community-owned areas was rejected so that only those that belong to the government could be utilized, for now. Also, the initially larger budget must be cut due to the Covid-19 pandemic in 2020.

These problems caused a revision of the target. Banjarmasin City Spatial Planning (RTRW) for 2013-2032 is being revised in 2020. In the RTRW, the target of adding green space is cut to only 1% every year for the next 5 years until 2025. Plans for the development of green space and other spatial plans are the responsibility of two agencies, namely the Banjarmasin City Local Environmental Agency (DLH) and the Public Works and Spatial Planning Agency (DPUPR), as seen in Table 25.

Table 25. Funding Framework for Banjarmasin Green Open Space in 2020

No.	National Program	Programs and Outputs	Target	Budget (Rp)	PIC
1.	Reducing Environmental Damage and Pollution	Increasing the area of public green open space (RTH)	9.5% (revised to 1%)	13,839,517,000 (revised fund allocation still unconfirmed)	Office of the Environment (DLH) Coordinates with the Office of Public Works and Spatial Planning (DPUPR)
2.		Maintenance of city parks	86,690 m2		
3.		Number of green tree seedlings and ornamental plants	16,000 trees		
4.		Development of Parks and Dancing Fountains in Kamboja Green Open Space	2 units of fountain pools and 10,500 m^2 of city park		
5.		City Park Construction	500 m2		
Total Budget				13,839,517,000	

Source: Banjarmasin City Local Government Work Plan (RKPD), 2020.

Land transportation which causes 75% of air pollution is also one of the policy focuses. The solution to reducing pollution is to increase the use of public transportation. Until 2020,

Banjarmasin has nine Bus Rapid Transit (BRT) fleets that pass through 2 corridors. The current number of corridors is smaller than the ideal number of 13 corridors if all villages in Banjarmasin are to be covered. The addition of corridors is constrained by a limited local budget (APBD). In addition to BRT, the Banjarmasin government also provides free bus services of 20 buses, of which 15 are for students and 5 are for disabled groups. This free service gets a budget of Rp 1.2 billion (USD 0.08 million) per year.

There is an opportunity for additional public bus fleets through the 'Buy the Service' scheme (BTS/Skema Pembelian Layanan) launched by the Ministry of Transportation. Through this scheme, the Ministry pays a sum of transportation tariffs to regional transport operators so that the public can use public transportation at lower prices. Banjarmasin proposes to accelerate the BTS program so that it can start in 2021, earlier than the original plan to have that conducted in 2024.

2.2.4 Solid Waste Management, Sanitation, and Slum Settlements

Banjarmasin is implementing the 100-0-100 program, which is a central government directive to ensure the availability of 100 percent drinking water, 0 percent slum areas, and 100 percent sanitation and drainage facilities throughout Indonesia. This program is included in the 2014-2019 National Medium-Term Development Plan (RPJMN) to support the implementation of SDGs in the sanitation program. In Banjarmasin, sanitation management is mainly related to wastewater treatment. Some of the documents that Banjarmasin has regarding this matter are the City Sanitation Strategy Document (SKK) and Local Regulations regarding liquid waste and domestic waste management (see table 26). Examples of programs related to this are Development of a Centralized Domestic Wastewater Management System (SPALD T) and a Local Domestic Wastewater Management System (SPALD S). Banjarmasin also has a Waste Bank and 3R (Reduce, Reuse, Recycle) TPS program to minimize the waste that ends up in landfill.

Table 26. Regulation on Water and Sanitation in Banjarmasin

No.	Regulation	Concern
1	Perda No. 7/2010	Permit for disposal and treatment of liquid waste
2	Perda No. 21/2011	Waste/Cleanliness Management and Parks
3	Perda No. 5/2014	Domestic Wastewater Management in Banjarmasin
4	SK Walikota No. 460/2015	Determination of the Slum Settlement's Location

Sources: Various sources

The problem of sanitation in Banjarmasin is inseparable from the existence of slum areas that lack adequate sanitation facilities. Slum settlements in Banjarmasin cover 52 locations in 5 sub-districts with a total area of 549.7 hectares (see table 27), according to Mayor Decree (SK) No. 460/2015. The majority of slum areas are located in South Banjarmasin. Banjarmasin also has several regulations regarding the handling of slum settlements (see table 28).

Table 27. Slum Settlements in Banjarmasin

No.	District	Sub-district	Area (ha)	%
1	Central Banjarmasin	12	40.05	7.3
2	West Banjarmasin	9	56.83	10.3
3	North Banjarmasin	10	137.21	25.0
4	East Banjarmasin	9	95.25	17.3
5	South Banjarmasin	12	220.36	40.1
	Total	52	549.7	100.0

Source: SK Banjarmasin Mayor No. 460/2015

In 2019, the slum area that has been cleared was more than 500 hectares, leaving only 46.21 hectares or equivalent to 8.71%.[5] However, it is necessary to update data related to slum areas, especially those that are currently not recorded in the 2015 decree. The decree is part of the KOTAKU (Kota Tanpa Kumuh/Slum Free City), which is a national collaborative program under the Ministry of Public Works and Public Housing that receives funding from the central government, local governments, and support from Asian Infrastructure Investment Bank and World Bank.

Table 28. Regulation on Slum Settlement in Banjarmasin

No.	Regulation	Concern	Program/Activity
1	Perda No. 3/2019	Prevention and Quality Improvement of Slum Housing and Slum Settlements	Repair of houses unfit for habitation and arrangement of riverbank buildings
2	Surat Keputusan Walikota Banjarmasin No. 460/2015	Determination of Location of Slum Settlements	Improvement of settlement infrastructure
3	Slum Improvement Action Plan (SIAP/ RP2KPKP),	-	Improvement of settlement infrastructure through KOTAKU, NUSP dan P2KKP

Sources: Various sources

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[5] Sukarli. 2020. "Banjarmasin evaluasi data kawasan kumuh untuk lanjutkan program Kotaku". Accessed from https://kalsel.antaranews.com/berita/194318/banjarmasin-evaluasi-data-kawasan-kumuh-untuk-lanjutkan-program-kotaku

CHAPTER 3
Key Challenges and Opportunities

In the previous chapter, relevant central government and local government policies on climate resilience in Banjarmasin were reviewed. This chapter will discuss the key challenges and opportunities in implementing those policies and achieving the intended targets.

3.1 Key Problems and Challenges

Various urban planning and development problems in Banjarmasin and surrounding regencies manifest in the form of flooding, residential fires, and solid waste management issues that contribute to worsening water quality. The flood problem is complicated because it is triggered by both geological issues (i.e., low lying area located close to the sea), as well as human factors (unplanned development of urban and settlement areas). Fire-prone residential areas are also a manifestation of unplanned and informal housing development without due consideration of fire hazards. The issue of GHG emissions is also related to urban planning, in which the city is lacking green open spaces and the sprawling nature of Banjarmasin makes people prefer private vehicles.

3.1.1 Informal Housing on the Riverbanks

Most of the residential areas in Banjarmasin are self-constructed or "swadaya", as seen in the yellow colour in Figure 17. Without adherence to planning and construction guidelines, or in the case where the guidelines are non-existent or of low quality, the quality of these self-constructed houses and residential areas vary widely. Some can be good if they are in a high-income area, but some can be very bad in low-income areas. This is typical of most cities in Indonesia, where the government tends to take a backseat role in managing urban development.

Figure 17. Map of Residential Area in Banjarmasin
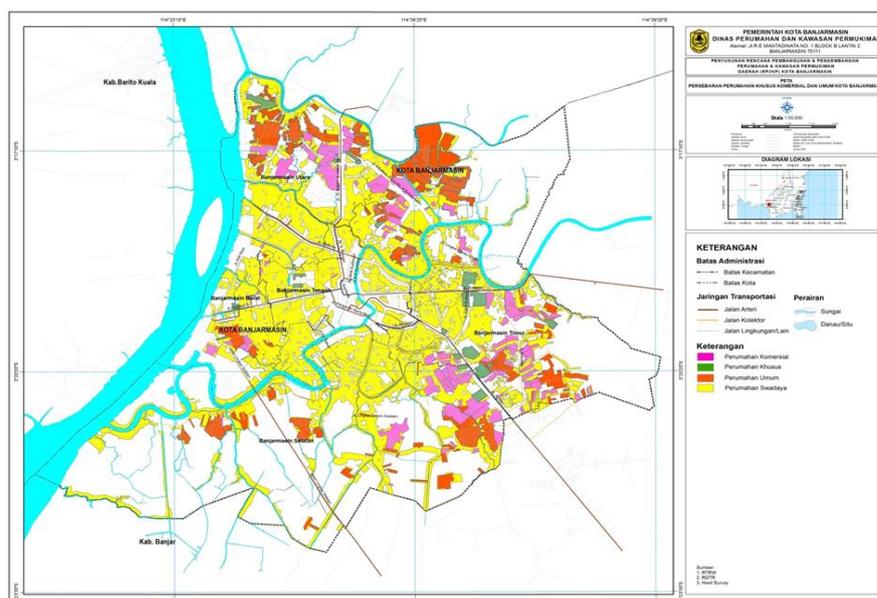
Source: Department of Housing and Settlement of Banjarmasin

In Banjarmasin, the development of a large area of unregulated, "self-constructed" houses bring forth a challenging situation as many parts of the city are located close to rivers. The city is famous for its river culture, and a dependency on the river for physical, social, and economic life. For some people, living above water is almost an identity.

The problem arises along with increasing population, where unregulated and irregular development of houses on the riverbanks and floodplains trigger environmental problems. When Banjarmasin was a much smaller city, such development probably did not impact the environment as much. But as a large city with over 700 thousand population, such conditions pose pollution hazards for the river, and the dense and informal riverbank housing pose fire hazards due to their lack of proper wiring and wood-based building materials. Moreover, the growing settlement in riverbanks also violates the spatial plan.

3.1.2 Solid Waste Management and Sanitation

The provision of raw water in Banjarmasin is constrained by pollution in the Martapura River. The content of E.coli bacteria in the river is high, so it is difficult to process river water to become a source of drinking water. Pollution caused by sanitation issues in residential areas around the river is still very high. Many residents urinate and defecate (BAK and BAB) directly into the river. As we learned in Section 1.5, a substantial amount of solid waste (estimated at 8.5 tons per day) ends up in drainage channels and ultimately the river.

The government has set a regulation to minimize solid waste pollution through Banjarmasin Mayor Regulation No. 18/2016 on the reduction of plastic bags. However, implementation of this policy is evaluated as weak on law enforcement and community socialization. Modern retail stores tend to comply more with the rule, but transactions in traditional markets are still largely done using plastic bags.

Regarding the waste bank and the 3R program at temporary landfills (TPS), implementation is not yet optimal because community participation is still low. Most of the waste is organic, but there is no proper management, especially for communal waste management.

In terms of sanitation, many informal settlements do not meet technical standards due to the low quality of water in swamp and rivers. Several obstacles also arise in implementing Perda No. 5/2014 concerning Domestic Wastewater Management. PD PAL mentioned that revisions needed to be made in response to the Minister of Public Works and Housing Regulation No. 04/PRT/M/ 2017 concerning Implementation of Domestic Wastewater Management Systems. In addition, infrastructure and facilities for wastewater, especially the pipe network for collecting wastewater are still lacking and have not reached all areas of the city.

There has been an institutional change in wastewater management from a Local Company (PD) to a Local Public Company (Perumda), in accordance to Government Regulation (PP) No. 54 th. 2017 concerning BUMD (local government-owned companies). Even though Banjarmasin has a wastewater treatment company, its service capacity is limited. Banjarmasin does not have a regulation on Scheduled Fecal Sludge Service (LLTT) program to support the implementation of Local Domestic Wastewater System (SPALD S). Most people in the city have a septic tank, but they mostly do not meet health requirements. As a result, waste from septic tanks seeps into the ground and

increases the spread of E.coli, exacerbated by the wet character of land.

3.1.3 Greenhouse Gas Emissions

The Banjarmasin City Transportation Office stated that 75% of air pollution is caused by motorized land vehicles. One of the factors that cause pollution is that most Banjarmasin people still use private motor vehicles in their daily activities, while public transportation is not well developed. Water transportation has not been optimally utilized. Existing river transportation is also not connected to the land transportation system. Moreover, currently the existing database is incomplete for GHG emission inventories.

Green Open Spaces (RTH) is critical to reducing GHG emissions. But RTH in Banjarmasin is under-provided. The area of Banjarmasin's RTH in 2020 is only about 5-6% of the city area and is still far below the minimum area of 20% mandated for public RTH in Law No. 26 of 2007. In 2013, the government set a target to achieve 20% of the public RTH area by 2032. However, the implementation faces land acquisition constraints. In the city's Spatial Plan (RTRW), much of the land that was planned to be converted into green space belongs to individuals in the community. As a result, the development plan was rejected by the community. Difficulties in land acquisition have pushed Banjarmasin to revise its RTRW for 2013-2032. Accordingly, the RTRW only targets an

addition of 1% in public RTH annually until 2032.

3.2 Key Challenges

There are plenty of challenges underlying the problems stated above. However, three types of challenges are key: Lack of private sector participation, lack of government-owned land, and inadequate inter-government coordination.

3.2.1 Lack of Government-owned Lands

The Banjarmasin city government has been trying to relocate residents of the informal settlements on the riverbanks to public Rusunawa (low-income rental apartments). This will allow the government to build concrete embankments along the river and better safeguard the quality of river water. However, the relocation process is not easy due to limited land availability in the city center and rejection to move away from the city center, where their livelihoods are located.

Similarly, the issue arises when the government is trying to provide more green open spaces and finds that most of the city's land is already owned by private landowners. Without land at their disposal, the ability of the government to influence development is limited.

However, this should not deter the city government from moving forward with its plans. An incremental 1% increase in RTH annually can be quite substantial if done consistently. But breakthroughs should also be sought where the government can work together with private landowners to build something that benefits the public in general while at the same time benefits the local existing landowners. This will be discussed in the final chapter.

3.2.2 Inadequate Coordination among Local Governments

Mining contributes to the decreasing quality of river water and increases sedimentation that causes standing/stagnant water in Banjarmasin. Although there are no mining activities in Banjarmasin, its location in the downstream area makes it prone to pollution from the upstream areas, such as Tabalong, Balangan, and Banjar Regencies. The Head of WALHI of South Kalimantan (an environmental NGO) argued that 33% of the South Kalimantan area has been allocated with mining permits and 17% for oil palm plantations. Meanwhile, the Head of Energy and Mineral Resources Department of South Kalimantan said that mining activities in the province are taking place in about 76,629 hectares of land.[6] There are also an estimated 50 locations of illegal mining in South Kalimantan.

The shipment of polluted materials adds to environmental problems in

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[6] Susanto, Deni. 2020. "619 Izin Usaha Pertambangan di Kalsel Dicabut". In Media

Indonesia, 18 February, 2020. Accessed from https://mediaindonesia.com/read/detail/290893-619-izin-usaha-pertambangan-di-kalsel-dicabut

Banjarmasin. No systematic coordinating is taking place between the Banjarmasin government with upstream regional governments to solve these problems. As a result of the lack of coordination, the government in the upstream regions still does not take firm action on companies and people's behavior that hurts the environment.

Lack of government coordination is also visible in the case of the greenhouse gas (GHG) information system, which could be better managed. GHG information is very important in tackling climate change. Program monitoring and evaluation related to targeted emission reduction can be carried out only if there is accurate GHG information.

The Office of the Environment (DLH) has the authority and duty to take care of this information. However, there is no coordination with related bodies such as the Meteorology, Climatology, and Geophysics Agency (BMKG) to conduct a GHG inventory. DLH in 2020 plans to start the calculation of GHG emissions. This step is very good for the goal of sustainable development, but still requires supervision in the process.

3.2.3 Lack of Community and Private Sector Role

Sustainable city development requires support from all elements of the community. The government as policy-maker and implementer must work together with other parties such as community groups, entrepreneurs or private companies, and the community in general. However, interviews for this research highlight that the involvement of the community and non-

governmental organizations in urban development is still low. Referring to the ladder of citizen participation, city development should involve the community at the citizen power level where citizens are involved in overall decision making.

The private sector is not only the driver of the economy, but they can also actively participate in protecting the environment. Without the active role of the private sector in reducing emissions and waste, climate resilience is difficult to achieve. However, the awareness of entrepreneurs in Banjarmasin to reduce the negative environmental impacts of their business is still, self-admittedly, minimal. One example is in terms of managing waste. Based on an interview with the Indonesian Employers' Association (APINDO) of South Kalimantan, it is estimated that only 25% of entrepreneurs have controlled their waste according to government standards. These are mostly the larger companies that fall under closer scrutiny.

Another problem is that many mining companies in the upstream area (i.e., around the Meratus mountains) do not carry out land reclamation after their mining activities. There are still many ex-mining holes that were not closed. When it is the rainy season and high rainfall, these conditions can worsen flooding or standing water in the Banjarmasin area. Many companies do not yet have clear Standard Operating Procedures (SOPs) in environmental management so that they are negligent in protecting the environment.

For micro and small enterprises, much work needs to be done to build their awareness and initiative to protect the

urban environment. Also, the city government is seen to have not enforced the rules adequately, for example, in enforcing the plastic bag ban rule. This contributes to entrepreneurs not taking environmental issues seriously.

3.3 Key Opportunities

Three key opportunities are present to catalyze improvement in urban conditions in Banjarmasin towards becoming a more climate-resilient and inclusive city: technological development and partnerships, the Climate Village Program, and the current revision of the city's spatial plan.

3.3.1 Technology and Partnerships

Technology enables the improvement of public services. Related to water management, Banjarmasin's Local Drinking Water Company (PDAM) is exploring cooperation with the Netherlands to build a 35-hectare reservoir. The plan, the Netherlands will also help in terms of providing technology that can convert seawater into a source of drinking water.

The Bus Rapid Transit (BRT) system is currently using the manual ticket method. This makes the manager not have a passenger trip record to predict peak hours or areas with the highest number of passengers. There is an opportunity to use payment technology with electronic cards via tapping in and out at each stop. With this system, the manager can analyze passenger travel habits. This analysis is useful for managers to improve services.

The government can involve private parties and international institutions in providing public services, for example in developing river transportation. In 2018, five teenagers from Banjarmasin developed an application called Go-Klotok that could be used to order transportation boats on the river. However, the application still has some shortcomings, such as not being able to order the service in real-time (at least one needs to order one day before the trip) so it is less practical. But this shows some of the promising ways that technology can help.

Startups or investors can be invited by the government to help to develop this application, so it is more practical to use. Aside from the application aspect, investors can also participate in developing their physical services, such as more modern docks, and more massive marketing so that more people can use riverboats.

3.3.2 Climate Village Program

The Climate Village Program, also known as ProKlim, aims to generate more participation from the community in carrying out adaptation and mitigation of climate change through the application of local wisdom. There were 11 locations established with the Decree of the Mayor of Banjarmasin No. 380 of 2018. In 2020, the government proposes 14 locations and 12 among them will receive appreciation for the intermediate category.

The activities conducted include rainwater harvesting/collecting, stilt house design, community wastewater treatment plant, water infiltration points

or bioswales, waste bank activities, plant nursery, hydroponics, and use of organic fertilizers (compost), shown in Figure 18. The climate village program is a good initiative to be continued and to develop measurement indicators so that its impact can comprehensively

increase public awareness of the importance of climate change mitigation. It is important to ensure that the program is on target and effective in empowering the community through training and socialization.

Figure 18. Several Activities of the Climate Village Program

Source: Banjarmasin City Environmental Office, 2020

3.3.3 Revision of the Spatial Plan

The municipal government is currently revising its spatial plan (RTRW). This is an opportunity to redirect the development pattern from currently low-rise and sprawling to become a more compact city that is more dense and vertical in the city center (central business district) while safeguarding water catchment areas, flood plains, and rural areas from becoming concrete and hardscape.

The principles of a compact city are closely related to transit-oriented development. If Banjarmasin were to develop better public transportation options and encourage more people to use public transport, then the integration of land-use and transport systems must be achieved. The current revision of the city's spatial plan should consider the shift from primarily private

vehicle use to public transport, bicycles, and walking.

The provision of green open spaces or RTH is critical to be included in the spatial plan revision. The city would like to increase the area of public RTH in the city, but most of the land is privately owned, and mostly for residential uses.

In conducting spatial planning, the government is expected to be visionary and future-oriented. Even if the land is currently owned by individual community members, no law or regulation forbids the government from allocating it for other alternative uses (i.e., RTH) in the future. Master plans typically involve difficult decisions that need to be taken to change the city for the better. Of course, any change in the land use, especially if it impacts community-owned property, should be consulted with community members. This typically requires an intensive process of communication, and often

also co-design between the government and the community.

To enable this to happen, the government needs to consider incentives and concrete benefits for the original landowners to convert their residence (landed houses) to other uses (perhaps vertical buildings with large green open spaces). This can be done through "vertical land consolidation" with community members as key actors, supported by the government, and possibly in partnership with private developers. This and other urban development schemes are explored further in the next chapter.

CHAPTER 4
Policy Direction, Recommendations, and Enabling Strategies

Sustainable development aims to produce high quality global human resources and improve the global economy while maintaining environmental sustainability. Indonesia faces challenges in adapting to climate change. Banjarmasin is prone to climate change with floods, fires, and GHG gas emissions, having effects on quality of life in urban areas.

Upon review of Banjarmasin's key characteristics (Chapter 1), the current national and local-level policies (Chapter 2), and the key challenges and opportunities (Chapter 3), this chapter concludes by offering key policy directions and recommendations for Banjarmasin to embark in becoming a more climate-resilient and inclusive city.

4.1 Suggested Policy Directions

The following policy directions are suggested to be adopted as high-level principles that need to be taken to support the implementation of climate change mitigation measures in the city of Banjarmasin. They include a systematic effort to tackle floods, the establishment of a local action plan for GHG reduction and engaging in more inter-local government collaboration.

4.1.1 Disaster Risk Reduction- Tackling Floods Systemically

The problem of climate change in the form of high tides and rising sea levels have contributed to flooding events and pushed the city to adopt a policy that requires housing construction in the form of houses on stilts, mimicking the structure of traditional houses in the area. The stilt house design is suitable for flood-prone areas and is considered adaptive to climate change. However, this regulation transfers the responsibility of dealing with flood risk to individual households, rather than the government.

As a design principle, stilt houses make sense, but it should not allow the government to be released from their responsibility of reducing flood risks and flood occurrence in the city. To prevent fires, stilt houses can be made with concrete instead of wood. But this does not necessarily solve the issue of overly dense and irregular development patterns. It also does not deal with the planning problems of providing an adequate evacuation zone for the instance a fire does occur. The impact of such fire can be fatal for groups with disabilities, even in concrete stilt houses.

Tackling of deep-seated flooding problems in Banjarmasin should be more comprehensive than regulating housing design. It requires an overhaul of the city's long-term spatial plan (RTRW), and currently, an opportunity to revise the RTRW is present. Banjarmasin's spatial plan should incorporate some of the city's existing programs to improve drainage channels, construct concrete embankments, improve the housing situation in the city, identify relocation sites in strategic places in the city center, and also identify sites to be converted to public open spaces.

These initiatives may seem as expensive, but they do not need to solely rely on a limited government budget. There are plenty of opportunities for win-win collaboration between land-owning community members, the government, and private sector developers to redevelop the city according to a shared common vision. These will be explained below under enabling strategies.

4.1.2 Local Action Plan for GHG Reduction

At the national level, the government issued Presidential Regulation No. 61/2011 on the National Action Plan for Reducing Greenhouse Gas Emissions (RAN GRK). This regulation aims to reduce GHG emissions in key areas, including agriculture, forestry and peatlands, energy and transportation, industry, waste management, and other supporting activities. The Province of South Kalimantan has made an implementing regulation through South Kalimantan Governor Decree No.

14 of 2013 on Regional Action Plans to Reduce Greenhouse Gas Emissions. This regulation states that regional development, including that at the regency/city level, supports and complies with the national GHG emission reduction target.

Regulations at the provincial level must be further operationalized for implementation at the regency/city level. However, Banjarmasin has not yet issued a city level regulation or a master plan for reducing GHG emissions at the city level. The city government should have its legal product or policy document specifically regulating emission reduction targets. This is useful for communicating the city's emission reduction policies to various parties. Also, a legal document or master plan allows the city government to have clearer and more measurable targets, thus facilitating the supervision process.

This local action plan should also create a reward program for sectors that are able to increase environmentally friendly and energy efficiency or reduce the use of fossil fuels. It also needs a specific policy regulating low emission/green transportation as an effort to reduce GHG emission.

4.1.3 Regional collaboration with nearby regencies/cities

The Banjarbakula metropolitan area is made up of Banjarmasin as the core, along with Banjar Baru City, Banjar Regency, Barito Kuala Regency, and Tanah Laut Regency as the peripheries. Inter-regency coordination is the authority of the provincial government.

But with Banjarbakula being identified as one of the metropolitan areas outside Java that is mentioned in the Medium-term Development Plan of 2020-24, support for the metro is expected to come also from the central government, not only the provincial government.

The Banjarbakula metro regional cooperation, however, does not include other regencies that are far from Banjarmasin (and therefore not part of the metro area), but still connected to the city through watersheds and rivers. These include Tabalong and Balangan regencies, where mining, forestry, and plantation activities possibly impact Banjarmasin through water (rivers) and air. Another form of inter-local government cooperation, aside from Banjarbakula, is perhaps needed based on these watersheds. This could be initiated and managed by the central government if deemed nationally-strategic enough, but it could also be initiated and coordinated by the provincial government of South Kalimantan since it involves multiple cities and regencies.

This coordination scheme should assess the enforcement of South Kalimantan Provincial Regulation No. 2 of 2019 concerning Watershed Management which focuses on coordination, integration, synchronization, and synergy between various parties in managing natural resources to increase watershed support capacity). It can be considered to establish a specific institution dealing with rivers, i.e., through the "One River One Management" principle, by empowering more local wisdom, i.e. through the involvement of river-based

communities and tribes. This approach can be done in the context of disaster risk reduction especially flood management, waste management, and reduction of greenhouse gas emissions.

4.2 Enabling strategies

This section offers several enabling strategies to achieve the suggested policy directions above, taking into account the relevant and opportunistic policy instruments.

4.2.1 Conduct a Comprehensive Environmental Assessment

Banjarmasin should conduct a comprehensive environmental assessment of the conditions throughout the city. This is particularly related to mitigation to improve water quality and reduce greenhouse gas emissions, supported by integrated data from each local government organization. With the water pollution problem, the city of Banjarmasin needs to develop innovations in domestic waste management and coordination for law enforcement for upstream waste.

The river problem as part of what some call an 'environmental crisis' is partly caused by natural factors but mostly depends on the behavior of local people and companies. It is also a cultural problem, and it is necessary to create solutions that include spatial planning, law enforcement, creation of life in harmony with the environment, and citizen participation. It is important

to see local wisdom and philosophy to conserve nature interpreted in regulation.

4.2.2 Conduct Large-Scale Climate Awareness Campaign

Parts of Banjarmasin are located below sea level and prone to flooding. In the future, with the issue of sea-level rise and most people living close to water, awareness of climate change is very important. Dissemination of the dangers of climate change and the importance of environmentally oriented education must become the agenda of the city government. The campaign needs an educational model on climate change and its mitigation, specific on GHG emission reduction targets.

To achieve sustainable urban development, it is important to develop a sustainable community culture. In managing environmental problems and disasters in urban areas, generally, it is only from a technical approach. For example, in flood management efforts by making reservoir areas, drainage, and so on.

In the principles of good governance, community involvement, and participation in the development process is also needed. This approach emphasizes the capacity and independence of the community, resulting in a resilient city. In the concept of collaborative development governance, the community plays an active role in forming an environmentally friendly city.

4.2.3 Involve the Community in City Planning and Development

City spatial planning is a future-oriented exercise that should be done inclusively with citizens and community groups. To facilitate this process, the government needs to involve the community as much as possible. This requires capacity building, facilitation, and organization of local community groups through methods that are already familiar among NGOs and civil society groups, such as Participatory Rural Appraisal (*Survei Kampung Sendiri*), etc.

Many of the efforts to implement the spatial plan would require land acquisition, i.e. for public parks, water catchment areas, widening of drainage channels, etc. Currently, much of the land is owned by private individuals. Thus, it is quite normal and expected that individual landowners would reject plans to acquire their land for public purposes if they do not get any benefits from it.

This is a common problem that has taken place in many cities around the world. But it does not mean that the government should back down from its plan to acquire land and redevelop it in the public interest. One of the strategies that can be considered is a win-win proposal between the government and individual land-owners through "vertical land consolidation".

This is a method where land-owners consolidate their land and then redevelop it (or offer it to the private sector or government to be

redeveloped) as a vertical structure, thus leaving room for green open spaces. But the vertical structure needs to be a mixed-use building/district with commercial value, not purely residential. For example, apartment units on the upper floors (where the residents could live), and shopping establishments or offices on the lower floors. The land freed by going vertical could be allocated for green open spaces.

The project can be seen as a business endeavor, where residents now become shareholders of the new mixed-use building/district. Whereas before they did not make any money from the land that they own, now they receive shares from the income of the commercial property.

4.2.4 Explore Alternative Financing Sources

Innovative climate change program funding needs to be explored. With complex environmental situations and problems to be tackled, relying only on the local budget is not enough. Due to limited funding, including private participation to collaborate in financing green development may become an alternative option.

Participation of the private sector, state-owned and regional government-owned enterprises and the public should be mobilized. Public-Private Partnerships (PPP) can take place in many forms. More urban development-specific approaches such as Land Value Capture (LVC) and development exactions could be a potential source of financing.

LVC is a mechanism where the private landowners or developers contribute to the funding of infrastructure and public service development in the city, with the understanding that once built, the infrastructure and public service will benefit the landowner through an increase in land value. This mechanism has been utilized in many places throughout the world, where the private sector contributes to the construction of public transit (or other) infrastructure that passes by or is located near their property. Development exaction is a social obligation imposed on large private real estate projects to contribute to public services and infrastructure in the city, and it has been implemented in Jakarta.

Creative and climate resilient alternative financing by not only depending on state funding sources, especially for infrastructure development, will encourage sustainable development. There needs to be a mapping related to the potential of environmentally sustainable and innovative financing for private and public participation, especially green financing programs. This financing scheme may become an opportunity to build green infrastructure to reduce flood risk, drainage improvement, improving green corridors, and providing social housing for slum dwellers.

4.2.5 Strengthening Regional Plan

To achieve a climate resilient and inclusive city, the existence of policy support is crucial. Currently, several policies are deemed not climate-proof and "polluters pay" principles should be

strengthened. Some sectors that need strong policy are:

➤ Energy and transportation: Public transport, less emission private vehicles (operational age)

The government gives priority to public transportation so that it has more advantages over private. The residents pay the emission through a carbon *offsetting program that* shifts behavior to take public transportation.

➤ Waste management: enforcement of Perda No. 21 of 2011 concerning Waste/Cleanliness Management and Parks, specific regulation such as composting and waste banks. A clear roadmap to increase economic value with technology utilization on landfill is also needed.

➤ Water and sanitation: (1) Wastewater piping system and communal wastewater treatment plant system; (2) the drafting of a regional regulation on changes to the wastewater management institution from PD to Perumda; (3) the drafting of a regional regulation regarding the Scheduled Fecal Sludge Service (LLTT) program and regulations for calculating LLTT service rates; (4) revised Perda No. 5 of 2014 Regarding Domestic Wastewater Management in Banjarmasin, Mayor Decree as a derivative regulation of the Perda. No. 5 of 2014; (5) replacement of septic tanks that do not comply with technical standards into technical standards gradually and continuously and (6) regulations that require the use of septic tanks according to technical standards in building permits (IMB).

➤ Settlements and housing: (1) Rehabilitation of slum settlements,

equipped with infrastructure and utilities facilities (adequate amenities), (2) Documents/Decree Determination of the location of the remaining settlement on riverbanks (updated version).

4.2.6 Human Resources and Institutional Capacity Building

The improvement of institutional capacity is vital for each program planning and implementation. Some upgrading need to be delivered in prioritized sectors:

Water and Sanitation: (1) Optimization of technical guidance and training to improve the capabilities and competencies of human resources regards the development of the Fecal Sludge Treatment Plant (IPLT) and drainage system; (2) Marketing, Planning, Operations and Maintenance as well as managerial skills for PD PAL staffs; (3) increase the capacity of the licensing apparatus/technical service related to the use of septic tanks in accordance with technical standards; (4) capacity building for the community regarding PHBS and proper and safe sanitation; (6) simple household scale compost

Solid waste treatment: Technical guidance and training to improve the capabilities and competencies of human resources regarding the landfill control system and equipment operations.

Green House gas emission reduction: Socialization of guidance and training to government officials on using environmentally friendly energy, energy efficiency, and pollution control.

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