



URBAN CLIMATE RISK MANAGEMENT PLAN

CITY OF MAKASSAR



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URBAN CLIMATE RISK MANAGEMENT PLAN (UCRMP)

CITY OF MAKASSAR

AUGUST 2015

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Makasar, Indonesia: Dokumen Strategi dan Rencana Aksi Daerah untuk Adaptasi Perubahan Iklim dan Pengurangan Risiko Bencana (RAD API-PRB).

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ACKNOWLEDGEMENTS

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Figure 1. Rapid development of Makassar requires a balance between development and conservation of the city including the riverbanks area. The programs to create livable and resilient city are needed in Makassar.

CHAPTER 1

INTRODUCTION

Makassar is a coastal city, with hillsides in the periphery that border other municipalities. In term of vulnerability to climate hazards these geographical characteristics mean that the city is exposed to different hazards such coastal abrasion, flooding and also landslides. Urbanization trends also increase vulnerability by adding pressure to the amount of underserviced poor communities that are also dealing with climate change related hazards. The increasing demand for public services, such as health, education, water and energy has become an important issue, and the government should be ready with better long-term planning, that is adaptive and resilient to climate change hazards.

Between 2012 and 2013, the city government of Makassar and United Nations Development Program (UNDP), supported by UN-HABITAT and the United Nations Environmental Program (UNEP), worked together to create the Climate Change Vulnerability

Assessment (CCVA) for the City of Makassar. The CCVA was prepared as a tool that can be utilised by the government and citizens to better understand the impact of climate change on the city, and inform decision-making and planning to build climate change resilience. The CCVA provides a guideline to develop strategies (using analysis and evidence) than can help the city to address its vulnerability to climate hazards. The city can also increase its potential, its capacity to adapt, build human resource capacity, institutional capacity and also its use of ecosystem-based adaptation (EBA) as an integrated and sustainable manner of climate change adaptation. The CCVA can also be used as an advocacy tool both at the local and national level, for example giving inputs to the establishment of the city vision or city planning documents which are pro-poor and resilient to climate change hazard.

ONE OF THE ANALYSIS IN THE CCVA

	Losari Beach, IPAL, Center Point of Indonesia (CPI)	Tallo River Developmen t	Balatonjong Recreational Area/ Lake	Port Area and Industrial Area Reclamation Zone	Monorail Syste m
Increased Rainfall in shorter Asian monsoon	Increased flooding Contamination of city water Storm surges Cut off transportation/ suppliers	Flooding increases vulnerability Boundary erosion Community displacement Crop failure Limited access Loss of infrastructure	Increased likelihood of flooding of surrounding communities Possible transport disruptions	Increased frequency and intensity of storm surges Increased vulnerability for ships/ port Affect the distribution of goods from the port	Difficulty to construct new buildings Difficult of passengers to access the system

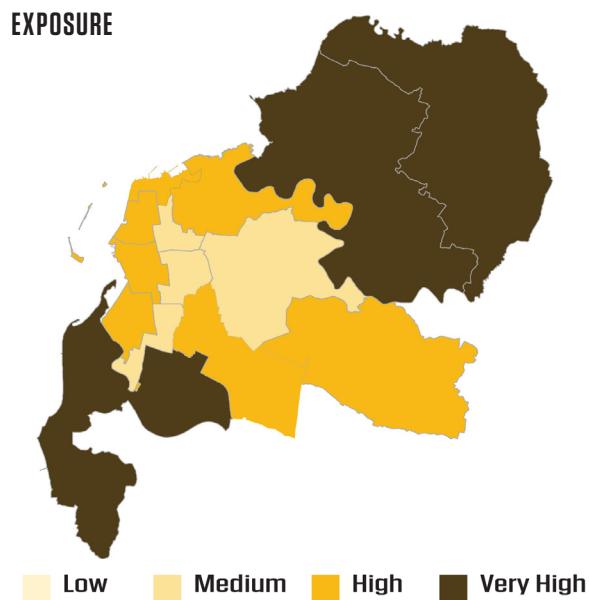
Table 1: The rainfall impact assessment in particular area is one of the issues discussed in CCVA. This document refers to the findings of CCVA and others city document as RPJPD, RPJMD, RTRW as the baseline input for preparation of UCRMP.

The current document, the Urban Climate Risk Management Plan (UCRMP), is a framework for a multi-stakeholder action plan that involves the city government, NGOs, academics and civil society groups. It turns the recommendations and analysis of the CCVA into a strategy and guidelines for policy makers and city stakeholders to better coordinate and communicate interventions, policies and projects to address climate change vulnerability in the city.

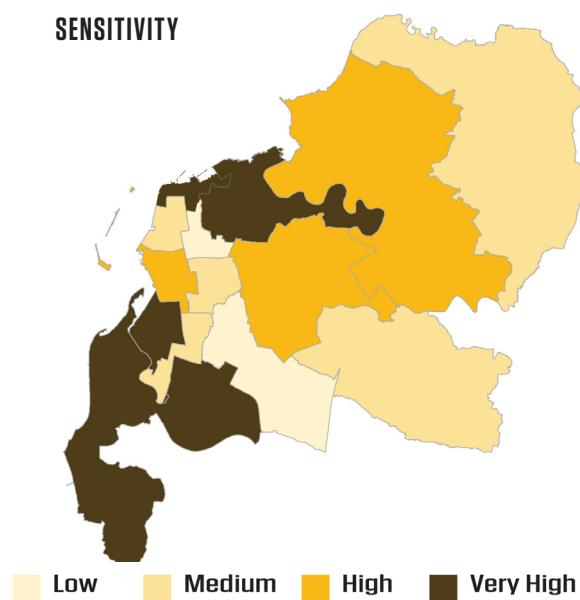
In making the document, the results from CCVA were reviewed to help ground a fundamental understanding about the vulnerability of Makassar. The analysis was also updated with the current conditions of the city. The CCVA and URMP are both interconnected – the information can be updated according to the dynamics of the city, especially in terms of levels of vulnerability that may change over time. Collect data and updating information needed for the CCVA and UCRMP require coordination mechanism to allow collaboration

ANALYSIS IN CCVA - EXPOSURE, SENSITIVITY, ADAPTIVE CAPACITY, VULNERABILITY

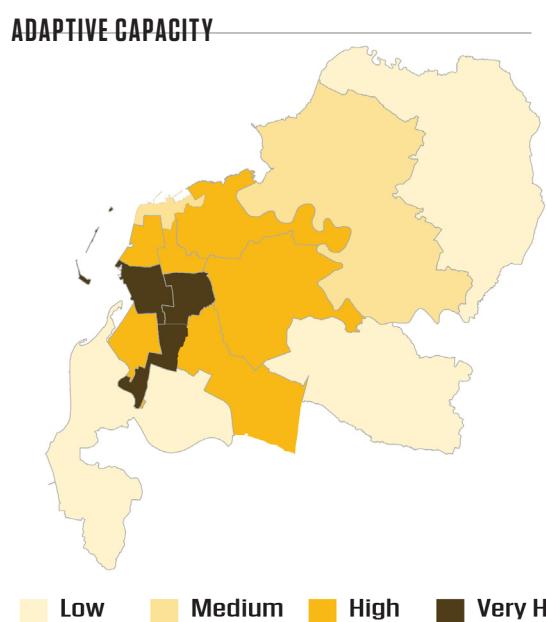
EXPOSURE



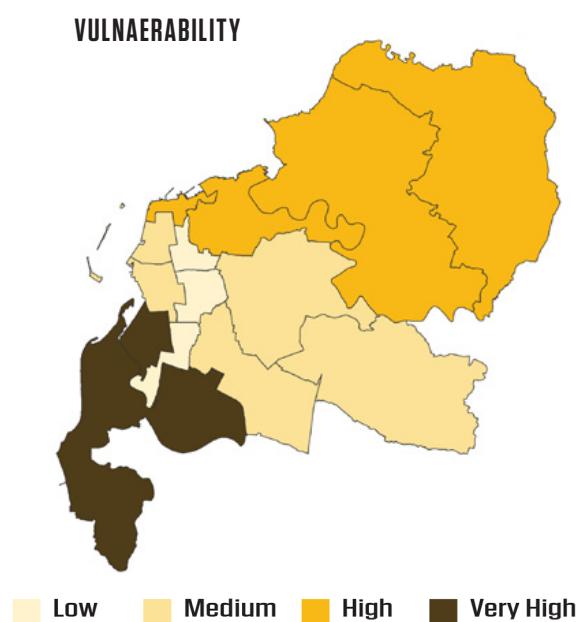
SENSITIVITY



ADAPTIVE CAPACITY



VULNERABILITY



STEPS IN THE FORMULATION OF CCVA AND UCRMP MAKASSAR

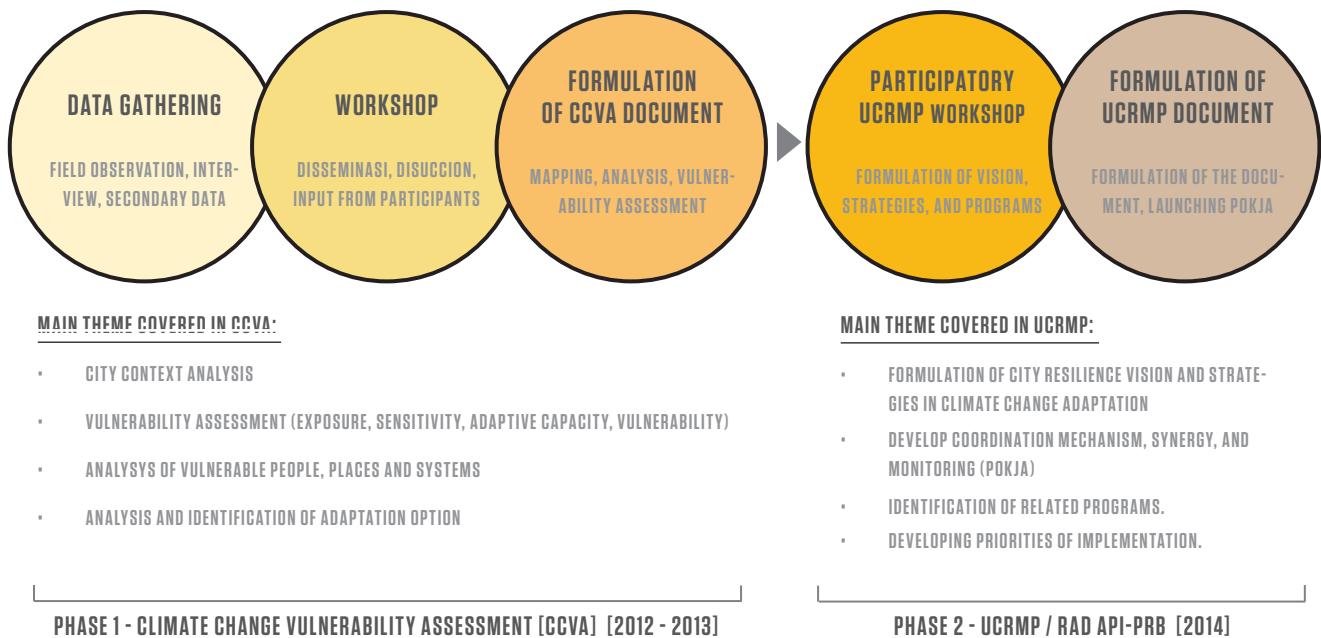


Figure 3: CCVA document was created between 2012 – 2013 and follow up with Urban Climate Risk Management Plan (UCRMP) document as the implementation and action plan framework.

amongst city stakeholder. Thus, the UCRMP also puts forward the critical importance of establishing a climate resilience working group (POKJA-Perubahan Iklim) to follow up and push forward the implementation of the strategy and action plan. The UCRMP is not a planning document that can be separated from other planning document, in fact, it provides a narrative that links them together, while focusing on climate resilience specifically. The city vision (RPJMD) and other

document such as RTRW and RKPD are all referred to constantly in this document. They are bundled together and categorized as part of specific strategies that are focused on achieving certain resilience targets. The UCRMP is not limited to only the government's agenda or programs, it also includes those of other stakeholder agenda from NGO and university.



Figure 4: Fishermen and coastal communities are some of vulnerable groups in Makassar. These fishermen have to be able to survive in the midst of rapid development in coastal area and the threat of climate hazard.

CHAPTER 2

VISION AND STRATEGIES

CITY VISION:

“MAKASSAR CITY: A LIVABLE CITY, REDUCING VULNERABILITY AND ADAPTING TO CLIMATE CHANGE”

For the first time in the city, the UCRMP workshop was conducted involving different city stakeholders. The workshop discussed and prepared a vision that describes how the city will adapt and become resilient to climate change. The UCRMP workshop was implemented twice, on the 25th– 26th November 2014, and on the 21st April 2015. The process of developing the action plan during this workshop stressed choosing a vision and a set of strategies, identifying the projects and actions of each strategy, and describing each of the components that come together to build climate change resilience.

A vision is a goal or ideal condition that the city wants to achieve in certain time frame. A strategy is the ways in which this goal will be achieved. Therefore the strategies are more focused upon different components that contribute to the full realization of the vision. Each strategy can be described by the projects that characterize it, and each project is connected to different departments within the government agency system.

The City Resiliency Vision that defined through this process helps to contribute to the city's overall development vision as stated in RPJMD 2014-2019, it complements this vision. The UCRMP vision is “The Livable City Makassar through Reducing Vulnerability and Adaptation to Climate Change”, there are two main components of this vision: *Livability* and *Resilience*.

- The **LIVABLE CITY**, refers to the relationship between the city space and the community, which guarantee the security, comfort, and inclusive, and egalitarian relationship amongst the city's stakeholders (RPJMD 2014-2019). Through the reduction of vulnerability and increase in adaptive capacity, Makassar desires to achieve the goal of becoming a comfortable, secure and resilient place. A livable state also refers to the ability to cope with threats and climate hazards.
- The city also wants to be **RESILIENT** which covers a wide spectrum of objectives, from the ability to understand the risks and vulnerabilities that climate change poses, to how to prevent and respond to climate threats and hazards, and the ways that they impact city life (livelihood, housing, economy, infrastructure and environment). (www.unisdr.org).

Thus, the two concepts of a LIVABLE and RESILIENT Makassar within the UCRMP serve as guiding inspirations for the city, helping the vision and strategies consider wider issues facing the city. The following strategies were chosen:

2.1 STRATEGY 1:

INCREASING THE AMOUNT OF GREEN SPACE IN THE CITY

The first resilience strategy is to increase the amount of green space in the city – these contribute to reducing vulnerability due to the ecosystem services they provide. Examples of ecosystem services are: absorbing rain to reduce flooding, mangrove restoration to reduce abrasion, and reducing deforestation to reduce the sedimentation of rivers. In Makassar's RTRW one of the major concerns is finding a way to be able to secure up to 30% of the city's area as green space; and creating the incentives and regulations to ensure this target. The city feels that the target is impossible due to the limited amount of space available within city boundaries and the amount that has been built up already. Instead the city wants to focus on meeting a target of 10% green space in the housing sector which can realistically be achieved in 5 years. Currently, the city has 1,098 Hectares of green space including city forests, fields, parks, cemeteries, mangroves

and riverbanks. This is currently only 6.25% of the city area (RPJMD 2014-2019). The city government feels that there must be an effort to increase green space, because public green space like city forest, parks, mangroves and riverbanks play significant roles in reducing vulnerability to climate change.

The city government is also actively promoting the improvement of existing green spaces through a variety of integrated projects. *LONGGAR* or Lorong Garden is a project to improve small paths in dense neighborhoods so they can function as comfortable green public spaces for the community. This project has been integrated with a program to beautify neighborhoods with plants, public amenities, trash collection, and potted garden. This program aims at also reducing carbon emissions..

The city government is also increasing the number of public spaces in the Losari Beach area. In the future, the government will continue to prioritize development in Losari and expand public spaces there. A larger budget allocation has been given to protecting the city's existing conservation area and new green spaces.



Figure 5: Giving education and raising the awareness made through various programs aimed to create clean and healthy neighborhood environment. Some of integrated programs already create such as Lorong Garden (alley garden) program as collaboration between several related government officials.

AVAILABILITY OF GREEN SPACE IN MAKASSAR

No	Kecamatan	Luas (Ha)	Ketersediaan RTH						Jumlah RTH Eksisting (Ha)	% thdp luas kota (%)	
			Hutan Kota	Jalur Hijau	Lapangan	Taman	Pemakanan	Bakau			
1	Biringkanaya	4.822	62,93	8,64	69,16	52,30	14,38	10,09	0,00	217,50	1,24%
2	Bontoala	210	0,00	0,45	0,00	4,69	1,16	0,00	0,00	6,30	0,04%
3	Makassar	252	0,00	2,63	0,29	3,87	1,87	0,00	0,00	8,66	0,05%
4	Mamajang	225	0,00	0,14	0,25	1,73	4,44	0,00	0,00	6,56	0,04%
5	Manggala	2.414	0,00	0,00	11,79	2,06	37,05	0,00	4,70	55,60	0,32%
6	Mariso	182	0,54	1,92	5,02	2,03	0,00	0,00	0,00	9,51	0,05%
7	Panakkukang	1.705	17,94	8,91	13,75	9,54	13,34	0,00	0,00	63,48	0,36%
8	Rappocini	923	0,00	9,31	3,82	3,09	1,25	0,00	0,00	17,47	0,10%
9	Tallo	583	0,00	4,39	3,92	7,11	13,10	364,06	0,00	392,58	2,23%
10	Tamalanrea	3.184	44,51	16,17	9,83	7,39	5,31	20,99	74,53	178,73	1,02%
11	Tamalate	2.021	0,75	6,42	11,29	2,33	6,40	0,00	161,82	189,01	1,08%
12	Ujung Pandang	263	0,00	2,98	8,46	4,44	0,00	0,00	0,00	15,88	0,09%
13	Ujung Tanah	594	0,00	4,24	3,15	1,55	0,31	0,00	0,00	9,25	0,05%
14	Wajo	199	0,00	1,16	0,02	0,72	0,03	0,00	0,00	1,93	0,01%
TOTAL		17.577	126,67	67,36	140,75	102,85	98,64	395,14	241,05	1.172,46	6,67%
%			10,80%	5,75%	12,00%	8,77%	8,41%	33,70%	20,56%		100,00%

Source: RPJMD Kota Makassar

STRATEGY FOR INCREASING THE AMOUNT OF GREEN SPACE IN THE CITY

ISSUE	RELATED PROGRAM	VULNERABILITY REDUCTION
Narrowing of public space in the city due to urbanization	Program LONGGAR – Lorong Garden	<ul style="list-style-type: none"> Improving quality of life of urban vulnerable group, including the poor, women-headed household, children, elderly, and people with disabilities. Improving the environment quality of slum area. Improving the quality of infrastructure and urban system (road, drainage system and open space).
Decreasing of green area in the city (park, mangrove and urban forest)	Mangrove plantation in coastal area	<ul style="list-style-type: none"> Improving the quality of environment through plantation of mangrove. Increasing the economic resilience of fisher through mangrove fisheries. Protecting coastal area from abrasion and sea level rise.
	Reforestation in drought area	<ul style="list-style-type: none"> Increasing the coolness and the conveniences of city through reforestation. Increasing the green area and recreation (park). Decreasing the vulnerability of drought and high temperatures in Tamanlarea, Panakkukang and Ujung Pandang. Improving the environment quality generally.

2.2 STRATEGY 2:

INCREASING THE QUALITY OF INFRASTRUCTURE AND PUBLIC SERVICES

Increasing the quality of infrastructure and the extension of public services is another strategy to bolster urban resilience. The Makassar CCVA reveals the trend of rapid urbanization occurring in the urban periphery. These areas are fast becoming new residential settlements because land is more affordable compared to areas close to the city center. The outer sub-districts of Makassar are growing at a rate of up to 3%, whereas some central areas are actually declining (-0,2%). This trend is having an impact upon the conversion of agricultural land into housing and as areas for the establishment of industry and business. Another public infrastructure and public services issue in the developing area is the lack of established services, such as water, roads, health care, and trash collection.

The City of Makassar has some vital infrastructure projects in the works, such as the ring road, the expansion of the

airport, a monorail system, the installation of new water pipes, and the development along the waterfront. Together with this new development, the need for new infrastructure is urgent. However, this development also has an impact on those people who are vulnerable to climate change, for example, by displacing fishing communities and the impact that development will have upon local livelihoods (CCVA, 2012).

Clean water has also become a critical issue in Makassar. The local municipal provider (PDAM) wants to increase the quality as well as the quantity of water that it distributes, however, there have been challenges due to the lack of water sources available. This is due to the decreasing amount of water supply, and low quality of water, from the Bili-Bili Dam above the city. With major growth in the periphery, PDAM has to expand their services to be able to keep up with demand in these areas.

Despite Makassar being surrounded by water several times a year the city struggles to manage the availability of its water supply due to increasing demand. During the dry season

POPULATION GROWTH AND WATER SUPPLY NETWORK

□ PDAM Network
■ River

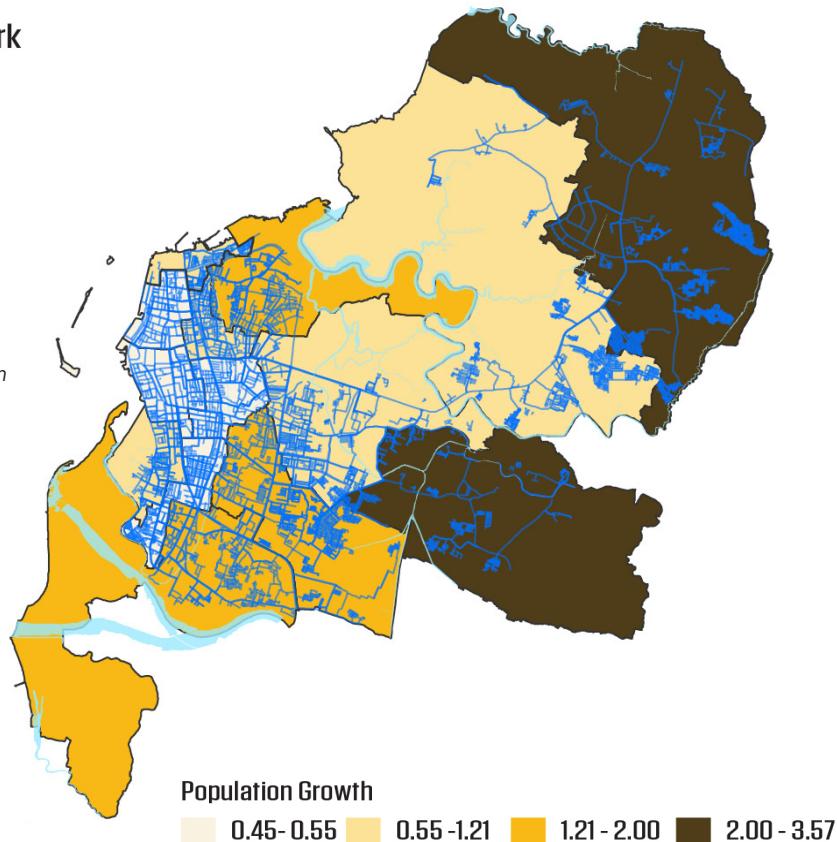


Figure 6: Rapid growth of the city occurs in the periphery which is lack of clean water services.

The clean water service to periphery area is required in order to decrease the vulnerability of community in this area.



Figure 7: Public service and infrastructure are the main aspect in building resilient. Provision of the main infrastructures such as affordable housing, health facilities, electrical and water supply can help to build city resiliency.

there is insufficient water, but during rainy season there is sometimes too much.

The government has proven that it has focused its attention on improvements to water services by committing a significant budget allocation to improving water management and the distribution of clean water to residents. The RPJMD indicates that the allocation for management and distribution of water has increased up to 85%, compared to the previous RPJMD. The budgets for water-related projects have also increased from 8 billion Rupiah, to 33 billion Rupiah.

The City Vision of a livable city should also be understood as Makassar desiring to become a clean and beautiful city. "Makassar tak Tidak Rantasak" which means 'Makassar is not ugly and dirty' is a government program to improve the urban environmental quality through better trash management. The city wants to improve this sector of its public services and to encourage community participation in achieving this goal. Through a massive public awareness campaign called LISA (lihat sampah ambil); See the Garbage, Collect it!), the government wants to initiate a movement to promote the importance of hygiene and environmental health.

To achieve resilience the city also has to focus upon improving health services. Climate Change also has an impact upon increasing the intensity and likelihood of climate related diseases such as respiratory problem (ISPA), itchiness, dengue, and others. Improving and extending health services, even to the remote area of the city, cannot be neglected.

There are some important aspects to be considered in improving public service delivery, i.e. developing design that consider various types of condition and the needs of the citizen with different ages, gender, or physical condition. For instance, in the provision of clean water to the communities and waste management, it is important to involve and accommodate the needs and inputs from the communities, male and female. As well as in the provision of health services, it needs to consider the different scheme that works for different groups like old people, women, children, and people with disabilities. Some of those are more vulnerable when facing climate-related disease like respiratory problem (ISPA) or dengue. Thus, in the formulation of development plan or strategies, it is important to make sure that the most vulnerable groups are given the access to public service delivery.

VULNERABLE URBAN SYSTEM IN MAKASSAR CITY

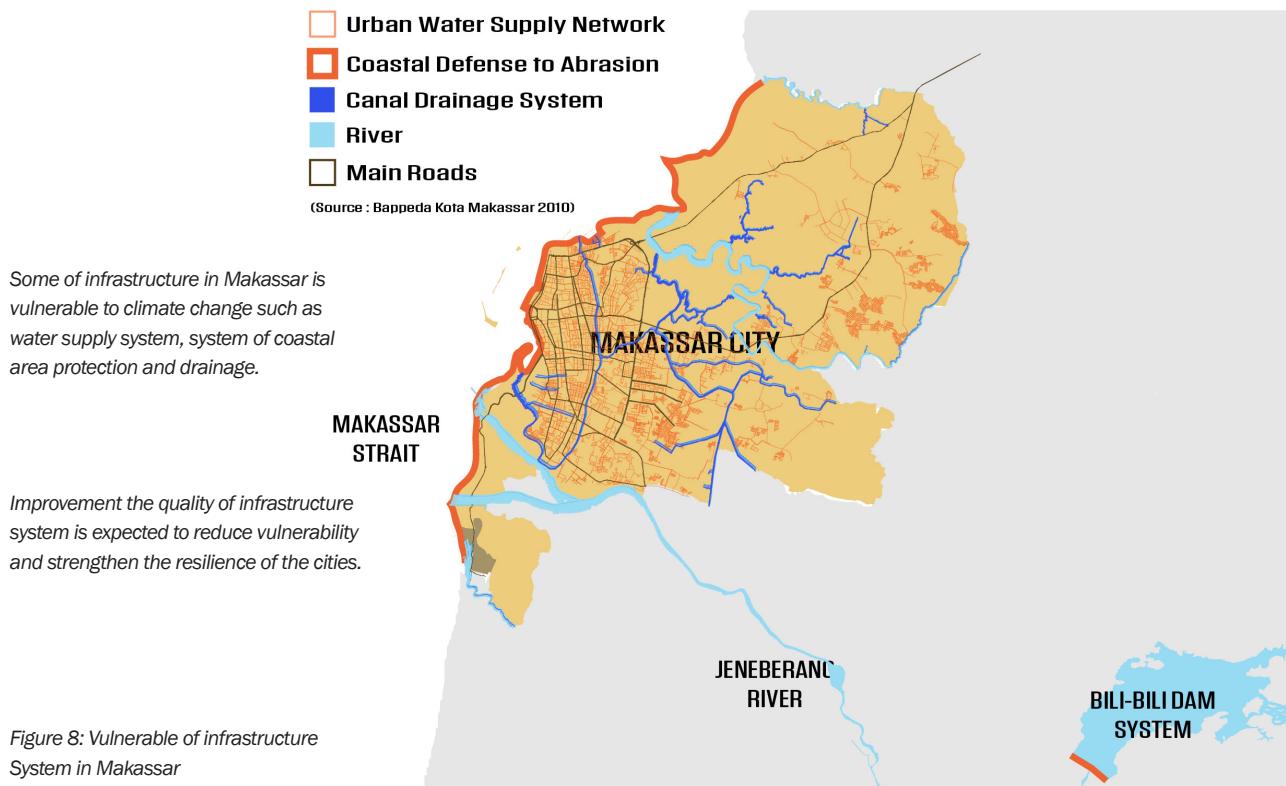


Figure 8: Vulnerable of infrastructure System in Makassar

STRATEGIES FOR INCREASING PUBLIC INFRASTRUCTURES AND SERVICES

MAIN ISSUES	RELATED PROGRAM	VULNERABILITY REDUCTION
Lack of infrastructure and public services in periphery and vulnerable area	Emergency Center	<ul style="list-style-type: none"> • Disaster preparedness • Helping the disaster victim through emergency assistance
The vulnerability of some of the main infrastructures in the city	Development of infrastructure and facilities in the border area and vulnerable places	<ul style="list-style-type: none"> • Reducing the vulnerability of vulnerable area due to lack of access to infrastructure, through water and electricity provision, and development of new roads to increase the resiliency.
	Development of shoreline protection in Barang Caddi Island (physical mitigation)	<ul style="list-style-type: none"> • Protecting Barang Caddi island from abrasion • Protecting the damaging of fisher boat
	Normalization and development of drainage system	<ul style="list-style-type: none"> • Improving the environmental quality of settlement area and city in general
	Improving the area of surrounding canal	<ul style="list-style-type: none"> • Improving the quality of drainage system in Makassar • Reduce the risk of flooding in the settlement area along the canal • Improving the resilience of marginal group to vulnerability of climate change in the city
	Facilitation of public infrastructure improvement (rehabilitation), environment and settlement area in post-disaster.	<ul style="list-style-type: none"> • Improvement the quality of environment in settlement area and city in general • Improvement the infrastructure and community social institution
Vulnerability of water supply infrastructure of PDAM from environmental degradation	Clean water supply for the Eastern and southern area of the city; Rehabilitation of PDAM pipeline utilities in Jl. Perintis Kemerdekaan km 4	<ul style="list-style-type: none"> • Reducing the lack of clean water during the dry season. • Improving clean water service in the eastern area of Makassar.

2.3 STRATEGY 3: IMPROVING SOCIAL AND ECONOMIC WELFARE

Another resilience strategy is to improve social and economic welfare of residents. A “livable city” means that residents should be able to fulfill their basic needs, enabling them to enjoy a comfortable and safe standard of living, both socially and economically. The number of poor households in Makassar in 2011 was 71,700 families, or 6.24% of total households in the city, this decreased to 69,200 families in 2012. The decrease in the poverty rate of 3.61 % from 2011-2012 is a positive trend, but efforts to eradicate poverty must continue. Poverty continues to change and evolve, and so efforts to reduce poverty must too.

The unemployment rate of Makassar in 2013 was 8.69%, this is higher than the national average of 6.21% (BPS 2013). This means that labor absorption in the job market is not high enough, and 45% of job seekers were not accommodated in the job market (RPJMD 2014-2019).

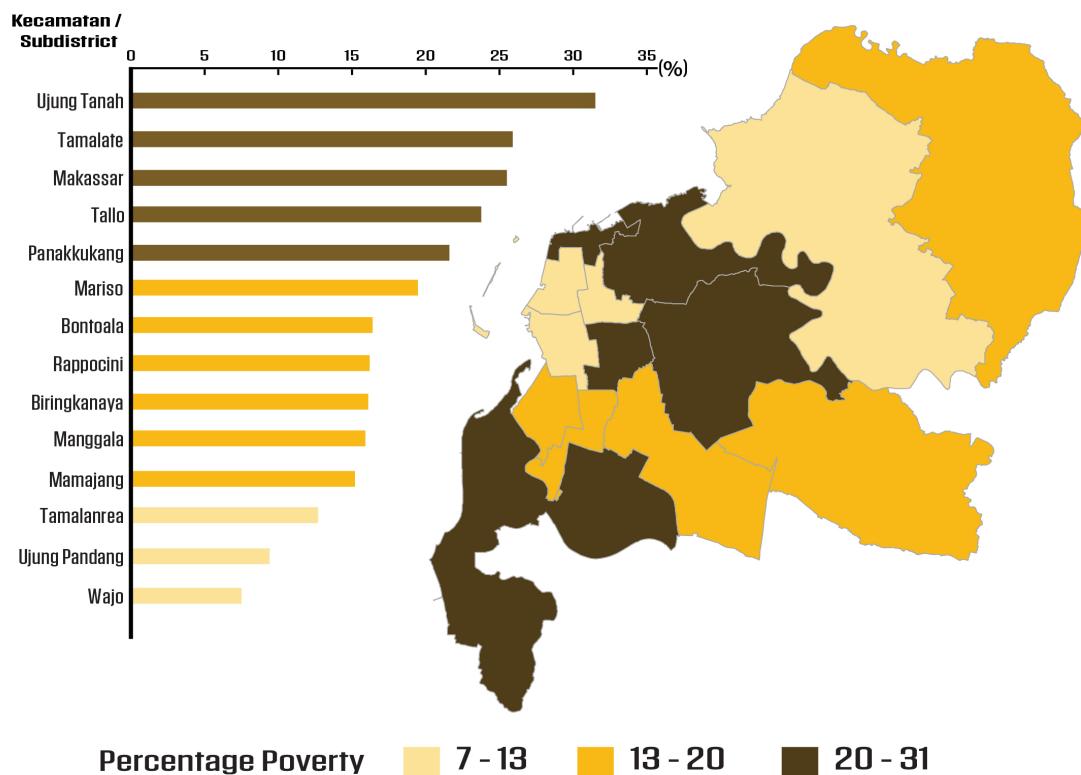
The number of households living in the slum areas is still not certain, however, according to data released by the

Department of the Environment (BLHD), approximately 58,268 households occupy areas that are considered as slums. From that number around 55,268 (95%) live in tidal flooding areas, along the coastline and riverbanks. Therefore we can say that poverty and climate change hazards are closely related.

The government has to work hard to provide welfare to the people since the city continues to grow, and many migrants will be attracted seeking jobs. The city has already created many programs to reduce unemployment, and has also launched a family-based social insurance program, vocational trainings, micro-credit programs, health insurance, free education; these are all dedicated to raising the standard living of citizens. Increasing living standards can also reduce the vulnerability of groups such as poor communities in coastal areas, children, farmers, women and those living along riverbanks.

The efforts to improve the economic and social welfare is also need to be targeted to the vulnerable groups and develop the strategies which meet the conditions and needs of those groups of people. For instance, economic development program should have effective strategies that accommodate specific needs and conditions of female-headed household. They have different needs compare to male-headed household.

POVERTY MAP (%) PER DISTRICT 2012



Lesson learned from some economic empowerment programs, like *Simpan Pinjam untuk Perempuan* (SPP), the program by PNPM, found that women have a significant role and capacity in managing capital in groups. Other vulnerable group, like people with disabilities, also have specific need that so the government should also think

about their specific needs like how to give them social security program, or economic empowerment program through training which also should consider their capabilities.

STRATEGIES FOR ECONOMIC WELFARE AND SOCIAL IMPROVEMENT

MAIN ISSUES	RELATED PROGRAMS	VULNERABILITY REDUCTION
Most vulnerability of climate change in the poor areas	Recovery of productive economy in Post-Disaster	<ul style="list-style-type: none"> Building the resilience of vulnerable community Livelihood guarantee of community
	Social rehabilitation and reconstruction of the victims	<ul style="list-style-type: none"> Rehabilitation of infrastructure and community social institution
Unemployment among young people	Youth disaster preparedness program	<ul style="list-style-type: none"> Strengthening the institution/ community institutional in disaster management and preparedness
The vulnerable groups of climate change are poor people such like fisheries and informal workers/ small traders	Training of applicable technology for fisher and Program optimization of Management and marketing for fishery product	<ul style="list-style-type: none"> Improving capacity of vulnerable group Strengthening economic access of community/ vulnerable group/ fisher
	Improving the welfare of fisher	<ul style="list-style-type: none"> Improving the resilience and adaptation capacity of vulnerable group (farmer)
	Development of fishery cultivation and fishery education	<ul style="list-style-type: none"> Improving the resilience and adaptation capacity of vulnerable group (fishermen)
	Financial support for the group Bantuan modal kelompok	<ul style="list-style-type: none"> Strengthening the resilience of vulnerable group in economic aspect



Figure 10: Community economic improvement programs like group funding support, training for applicable technology are needed to strengthen economic capacity of community in order to building resilience community from climate change.

2.4 STRATEGY 4: INCREASING PUBLIC PARTICIPATION

A fourth resilience strategy is increasing public participation in decision-making. The participation of citizens in a city's development is necessary for the city to develop and progress. Goodurban governance requires the involvement of various interest groups to encourage the improvement of the life in the city. Weak participation is often also associated with low access to information that weakens the capacity of citizens to participate in the city development process. Marginal

community groupsoften lack knowledge about planning and regulations, especially informationrelated to climate change. A lack of public knowledge about environmental management is a challenge because it makes it more difficult to raise public awareness and encouraging participation related to engaging in climate change resilience activities. Therefore, programs are necessary that can raise public awareness about climate change, and encourage community participation in environmental management, and building resilience to climate change.

STRATEGI PENINGKATAN PARTISIPASI PUBLIK

MAIN ISSUES	RELATED PROGRAM	VULNERABILITY REDUCTION
Lack of community participation in adaptation and disaster mitigation programs	Training management and preparedness of disaster	<ul style="list-style-type: none">• Increase the capacity of community for dealing with disaster
	Integrated waste Management training	<ul style="list-style-type: none">• Increase capacity of community regarding to the important of cleanliness and waste management• Increase the environmental quality of the city in general
Lack information of climate change in community level	Increasing the awareness and law enforcement in marine resource management	<ul style="list-style-type: none">• Protection of the marine resources from damaging which impact to vulnerability
	Socialization of climate change adaptation	<ul style="list-style-type: none">• Capacity building of community to face the disaster



Figure 11: Socialization of climate change issue can be conducted through direct socialization, training as well as media news regarding to adaptation activity to face climate change.

2.5 STRATEGY 5:

INCREASING INSTITUTIONAL CAPACITY OF GOVERNMENT, NGOS AND COMMUNITY

The institutional capacity assessment of the city government indicated weaknesses that should be improved upon. Firstly the institutional authority of the government remains limited. One of the weaknesses created by regional autonomy is the increasingly challenging process of coordination between regions that limits the authority of local institutions to deal with sector-based and inter-territorial issues. Secondly, institutional capacity to anticipate rapid urbanization still needs improvement. Rapid urban growth should also be accompanied by an increased capacity of the government apparatus to provide services to the community. This includes the improvement of the quality of public services, infrastructure improvements, enforcement of environmental regulations, the ability to reduce leakages, and the fight against corruption.

Thirdly, the complexity of climate change problems requires the coordination of all departments. Climate change relates to a diverse range of urban issues, such as

urban governance, infrastructure, and social and cultural trends. Another crucial issue is the low technical capacity of the government to anticipate disaster and climate change hazards. This requires capacity building efforts for the technical agency, for example BPBD, to improve their capacity to respond to emergencies and increase their skills during a future reconstruction phase.

At the community level, there are also some weaknesses: the lack of information and lack of technical preparation to prevent and mitigate climate change related disasters. What are needed are programs to disseminate information about climate change and more education to citizens about prevention. A campaign that promotes strengthening the capacity of community groups to anticipate catastrophic climate change is also needed.

Increasing capacity should also consider about the diversity of people, and the spatial distribution of the people. Thus, the capacity improvement program should include the vulnerable groups like women and people with disabilities. We should also involve the youth, elderly and children, with considering their characteristic and abilities.

STRATEGY FOR INCREASING INSTITUTIONAL CAPACITY OF GOVERNMENT, NGOS AND COMMUNITY

MAIN ISSUES	RELATED PROGRAM	VULNERABILITY REDUCTION
Constrain on regional problem and lack of coordination between intra-regional area	Regional coordination of MAMINASATA metropolitan area	<ul style="list-style-type: none">Preventing high environmental damage in the buffer zone of the city.
Lack of technical capacity regarding to disaster and climate change (government and community)	Training disaster risk reduction and preparedness for the community	<ul style="list-style-type: none">Capacity building to the community, especially for the vulnerable groups, about disaster preparedness.
	Integrated Waste Management Training	<ul style="list-style-type: none">Increase capacity of community regarding to the importance of cleanliness and waste management.Increase the environmental quality of the city in general.
	Creating Proklam (Climate-friendly Kampong)	<ul style="list-style-type: none">Capacity building of community related to climate change issue.Increase the community participation by providing numbers of ways to participate.
	Strengthening and training of TAGANA, youth disaster preparedness group	<ul style="list-style-type: none">Capacity building to the young generation about disaster preparedness mainly in vulnerable areas.

2.6. STRATEGY 6: ENVIRONMENTAL CONSERVATION

Between 1991 and 2010, there was an increase in the proportion of built to un-built areas in the Jenebarang watershed and its surroundings of up to 279%. The city is growing very rapidly and is moving eastwards along the Maros and Jeneberang Rivers, as well as along the coast. This is evidenced by the massive coastal developments in Losari and Tallo. This development also contributes to environmental degradation and the dwindling of water infiltration and water catchment in the Jeneberang watershed. It also accelerates the flow of water into the sea, and the likelihood of flooding since faster flowing water causes flooding.

Areas of vegetation area (or green areas) in the buffer zone have also declined by 73%, mainly in the Jeneberang watershed, specifically in the area of the Bili Bili dam. Lack of vegetation causes rainwater run-off to flow into

rivers more quickly and contributes to increased flooding and vulnerability in the city. In addition increasing water turbidity of the Jeneberang River also reduces the quality of drinking water for residents of the city of Makassar.

Historical records over the past fourteen years demonstrate that floods and high winds are climate phenomenon that occur frequently and cause damage in the city. Between 1999-2013 there have been 26 recorded cases of flooding, in which a total of 324 houses have been damaged and 6,476 people have been affected. The most recent flooding event occurred in January 2013 resulting in 5,763 victims. This was the most severe flooding event in the recorded history of the city. Flooding impacts the life of people living along rivers and canals, as well as low-lying areas, especially those with poor channels. New housing is increasingly being built in the periphery of the city, where agricultural land is being converted for new sub-divisions, these are thought to be a major contributor to the flooding in January 2013.

The degradation and decline of mangrove forests along the coastline are also a serious issue that increases

AREA EXPOSED AND VULNERABLE TO FLOOD

Here is a map of flood affected area and vulnerable area of flooding. Reforestation and environmental conservation are needed to improvement the quality of environmental and expected to reduce flood risk.

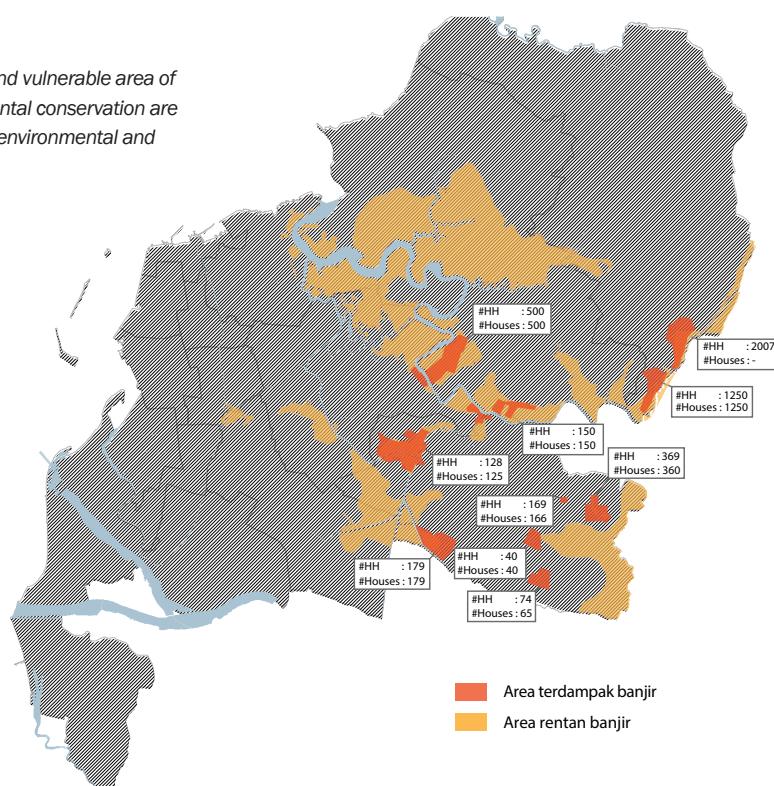


Figure 12: Environmental conservation aims to reduce disaster risk mainly in vulnerable area of climate hazard.

vulnerability in the city. Many coastal communities now do not have mangrove forests due to deforestation and as a result have become very sensitive to strong winds and abrasion. Between 2003-2012 there have been 21 reported cases of strong winds that have cost 180 lives, and destroyed 384 homes.

Thus, the environmental conservation effort should be focusing on some key aspects:

- (1) Preserve the watershed area.
- (2) Improve the quality of the coastal area and small islands through mangroves;
- (3) Preserve conservation area.

In the conservation process, it is important to involve different stakeholders in the process to do collaborative action, not only from government, but also from NGOs and civil organizations.

STRATEGY OF ENVIRONMENTAL CONSERVATION

MAIN ISSUES	RELATED PROGRAM	VULNERABILITY REDUCTION
The damage of green/vegetation area in the buffer zone	Monitoring of conservation and protection of watershed area in Tallo and Jeneberang	<ul style="list-style-type: none"> • Protecting the environmental quality in watershed area. • Disaster risk reduction due to environmental degradation.
	Land use controlling in watershed area	<ul style="list-style-type: none"> • Reduce the potential damage of watershed area due to physical development in this area. • Disaster risk reduction due to environmental degradation.
The damage of coastal ecosystem, mangrove and islands	Monitoring of environmental quality in coastal area and small islands	<ul style="list-style-type: none"> • Improve the quality of coastal area. • Disaster risk reduction resulting from the trash in coastal area.
	Mangrove plantation in coastal area	<ul style="list-style-type: none"> • Restore the mangrove to reduce vulnerability in coastal area because of abrasion.



Figure 13: Mangrove cultivation is one of the strategies to increase the open space and environment conservation where its role to protecting coastal area from abrasion and sea level rise.

2.7. STRATEGY 7:

PENGUATAN DAN PENEGAKAN REGULASI DAN HUKUM

Currently regulatory aspects are considered weak due to a general lack of enforcement. Some of the issues relate to a lack of firm sanctions and disincentives for offenses, or a lack of incentives for those who obey and follow the

rules correctly and consistently. Another challenge is that many people lack information regarding planning and regulations, this result in there being urban development violations. There is therefore a need to launch a public awareness campaign to disseminate and raise awareness about regulations; this will support better compliance with existing laws and regulations.

STRATEGI PENGUATAN DAN PENEGAKAN REGULASI DAN HUKUM

MAIN ISSUES	RELATED PROGRAM	VULNERABILITY REDUCTION
Lack of low enforcement regarding to regulation of environmental conservation	Open space availability as requirement to construction permit	<ul style="list-style-type: none">Reduction vulnerability of environmental in the city
Lack of knowledge and public awareness of the regulation and law enforcement	Improve the awareness and law enforcement of the empowerment of marine resources	<ul style="list-style-type: none">Protecting the marine resources from damaging caused by vulnerability
Legal framework to ensure the resilience of the city	Develop Mayor regulation related to green building	<ul style="list-style-type: none">Legal certainty to ensure sustainability and city resilience

CHAPTER 3

INSTITUTIONAL FRAMEWORK AND CLIMATE ADAPTATION PLAN

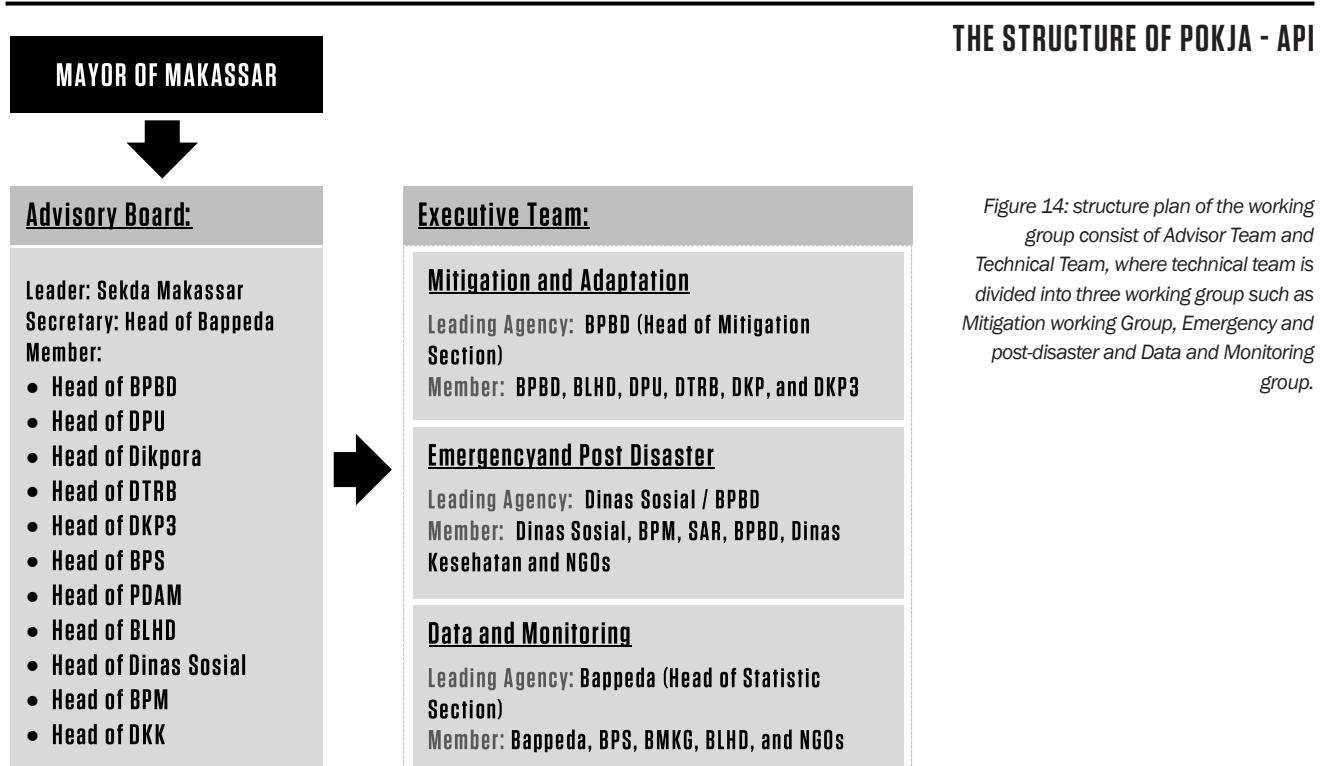
3.1. INSTITUTIONAL FRAMEWORK

Institutional mechanisms are to be established to ensure the compliance of the action plan. The participants of the UCRMP Workshop also agreed upon establishing a multi-stakeholder working group to coordinate actions and monitor and evaluate the local action plan's programs. The working group, also known as the Climate Change Adaptation Working Group (POKJA - API), has the following responsibilities and authority:

- **Coordinating Actions:** The POKJA's role is to facilitate the coordination mechanisms among local government agencies, provincial government agencies (and applicable), universities, community representatives, and non-governmental institutions involved in the working groups.

- **Creating Synergy:** Creating synergy means harmonizing issues and consolidating activities between different agencies. The POKJA is not charged with executing the program, but rather to gather and direct the vulnerability reduction program, or climate change adaptation activities, so that they can create synergies and achieve better results.
- **Monitoring and Evaluation:** The POKJA's monitoring and evaluation roles are to organize and manage measurable data related to outcomes and program impacts.

The POKJA- API structure agreed upon during the UCRMP workshop is illustrated below:



3.2. PROGRAM CLUSTER

To simplify the action and coordination mechanisms between agencies and institutions the POKJA is divided into three main program groups. These are: (1) Mitigation Programs, (2) Post Disaster Emergency Programs, and (3) Data and Monitoring Programs. This grouping is done only to facilitate the inter-institutional working mechanism.

The programs identified in the RAD-API consider three main aspects of climate change vulnerability:

- **Vulnerable People:** They consider whether the program or intervention has an impact upon strengthening the capacity of individuals or groups of people, or to what extent it can reduce the vulnerability of individuals or groups of people to climate change. Vulnerable groups include the poor, fishing communities, women heads of families, children, the unemployed and persons with disabilities.
- **Vulnerable Places:** They consider whether programs are relocated and whether they aim to reduce climate change vulnerability in certain vulnerable locations that are exposed to the threat of climate change. The locations identified as particularly vulnerable include those areas prone to flooding, regions affected by sea-level rise, areas with high levels of poverty, slum areas or dense urban areas.
- **Vulnerable System:** They consider whether the programs have an impact upon increasing the resilience of an urban system or ecosystem to climate change hazards, or whether the program is able to reduce the risk of failure of the system. A simple example is the road system – the program will be judged as to the extent to which it is able to increase the ability of the road system to survive climate change threats and remain operational.

Each departments programs have been prepared within the adaptation framework based on the three aforementioned groups of programs.

3.2.1 Mitigation Programs

Mitigation Strategies prepare and anticipate the impact of climate change, or in a broader sense

coordinate and harmonize the programs of different government agencies. They relate to the anticipation and preparation of people to adapt to, or reduce, vulnerability to climate change hazards. The programs in this strategy include: capacity building, campaigns to raise awareness, environmental regulations, infrastructure improvements, and environmental conservation and protection efforts.

The programs and activities in this strategic group will be coordinated by the Regional Disaster Management Agency (BPBD Makassar), who also manages the programs and activities of other agencies such as BLHD, DPU, DTRB, DKP, and DKP3.

3.2.2 Emergency and Post-Disaster

This group of programs includes those activities related to disaster and post-disaster response. The programs or activities that are included in this strategy include – health care for disaster victims, direct assistance to disaster victims, the reconstruction and improvement of public facilities affected by disasters, post-disaster housing repair or reconstruction, and others.

3.2.3 Data and Monitoring Programs

This program assembles a variety of programs related to data, information and documents that can be useful for reference, and materials for program planning related to climate change vulnerability. An example is the preparation of the vulnerability assessment document and the dissemination of information related to climate vulnerability. In addition, the activities can also include data collection for program planning and impact assessment.

MITIGATION PROGRAMS

No	Project Name	Implementer	Budget	Budget Source	Implementation Period
1	Development of shore line protection in Barang Caddi island (Physical Mitigation)	BPBD		APBD	Annually
2	Development of shore line protection in Kec. Ujung Pandang, Lae-lae Neighborhood	BPBD	Rp 2.000.000.000	APBD	2016
3	Creating disaster resilient neighborhood	BPBD	Rp 212.026.100	APBD	Routine annually (budget for 2 years)
4	Formulation of Mitigation Plan of Coastal and Island	BPBD		APBD 2015	Annually
5	Disaster Risk Reduction Training	BPBD		APBD	Annually
6	Youth Volunteer Basic Training on Disaster Management	BPBD	Rp 275.000.000	APBD	Annually
7	Economic Empowerment of Community in Island and Coastal Area (Group Funding Support)	DKP3		World Bank	2015-2016
8	CCD IFAD/ Capacity Building in neighborhood level	DKP3		APBD	Annually
9	Training of applicable technology for fisher	DKP3		APBD	Annually
10	Improve the welfare of the farmer	DKP3		APBD	Annually
11	Community Empowerment Program in Control of Marine Resources	DKP3		APBD	Annually
12	Increase the awareness and low enforcement in Marine Resources	DKP3		APBD	Annually
13	Program Management and Marketing of Fishery Product	DKP3		APBD	Annually
14	Program Development for Fisheries	DKP3		APBD	Annually

Vulnerable Target Group	Vulnerable Area	Impact to Ecosystem
Community of Barang Caddi island	Coastal area of Barang Caddi island	Decreasing of abrasion impact in Barang Caddi island
Community of Ujung Pandang	Coastal area of Ujung Pandang subdistrict	Decreasing of abrasion impact in coastal area of Ujung Pandang
All of community exposure by disaster	24 neighborhoods affected by disaster, 2 neighborhoods in 2016; Ujung pandang and Lae-lae neighborhood	Preparing responsive and resilience community on disaster (preparedness, EWS)
Community of the island and coastal area (fisher group)	Ecosystem of island and coastal area	Availability of Disaster and Mitigation Plan
Officials and volunteers	The entire of hazard area	The availability of officials and volunteers on disaster reduction
Community as general (250 people)	Makassar City	Preparedness of community-responsive and resilient to disasters
Coastal Community (Fishery Group)	Coastal area and small island	Capacity improvement of urban marine economic, strengthening the capacity of community to manage their environment
Coastal Community (Fishery group)	Coastal area and small island	Capacity improvement of urban marine economic, strengthening the capacity of community to manage their environment
Coastal Community (Fishery group)	Coastal area and small island	Capacity improvement of urban marine economic, strengthening the capacity of community to manage their environment
Farming community	Manggala and Tamalate District	Improve food security in the city
Community especially who have business in marine sector	Coastal area and small island	Increase the understanding of the importance of the role of marine ecosystems and resources.
Community especially who have business in marine sector	Coastal area and small island	Increase the understanding of the importance of ecosystem and marine resource
Coastal community (fisher group)	Coastal area and small island	Capacity improvement of urban marine economy, strengthening the capacity of community to manage their environment
Coastal Community (Fishery group)	Environmentally friendly of fishing gear, reducing vulnerability in coastal area	Capacity improvement of urban marine economy, strengthening the capacity of community to manage the environment

No	Project Name	Implementer	Budget	Budget Source	Implementation Period
15	Increased Marine and Natural Disaster Mitigation and Climate Marine Forecasts	DKP3		APBD	Annually
16	Program Development for Aquaculture	DKP3		APBD	Annually
17	Fisheries counseling	DKP3		APBD	Annually
18	Lorong Garden (Air Lorong PDAM)	PDAM		PDAM	2014 - 2019
19	Public socialization to change mindset on climate change adaptation	PDAM		PDAM	Annually
20	Clean water monitoring (data)	PDAM		PDAM	Annually
21	Water supply in eastern and southern part of Makassar city (pipeline rehabilitation in Jl. Perintis Kemerdekaan along 4 km)	PDAM	Rp 1.000.000.00 0	PDAM	Annually
22	Improve the quality and quantity of open green space	Dinas Pertamanan dan Kebersihan		APBD	Annually
23	Waste recycle	Dinas Pertamanan dan Kebersihan		APBD	Annually
24	trash bank	Dinas Pertamanan dan Kebersihan		APBD	Annually
25	Waste management in landfill	Dinas Pertamanan dan Kebersihan		APBD	Annually
26	Garden alley (park)	Dinas Pertamanan dan Kebersihan		APBD	Annually
27	Maintenance of thematic park	Dinas Pertamanan dan Kebersihan		CSR/APBD	Annually
28	Integrated Waste Management Training	Dinas Pertamanan dan Kebersihan		APBD	Annually
29	Waste Management Socialization	Dinas Pertamanan dan Kebersihan		APBD	Annually

Vulnerable Target Group	Vulnerable Area	Impact to Ecosystem
Coastal Community (Fishery group)	Coastal area and small island	Improve disaster resilience of coastal area
Coastal Community (Fishery group)	Coastal area and small island	Improve the ability of urban marine economy
Coastal Community (Fishery group)	Coastal area and small island	Improve the ability of urban marine economy
Vertical gardencommunity)	Makassar City	Improve the environment quality
Community of Makassar city	Makassar City	Increase the community understanding on climate change
Community of Makassar city	Makassar City	Increase the community understanding on climate change
Community in the eastern and shouter Makassar	East : Kecamatan Tamalanrea (BTP, Perum Antara, Perum Hamzih, Perum Asal Mula, Perum Bung), Kec. Baringkanaya (Desa nelayan Salodong, Kel. Pai); South: Kel. Barombang, Kel. Ujung Tanah (Rabatung), Kec. Manggala.	Improve the clean water service for society who needs for clean water crisis (for drinking)
Community as general	Green middle line in the city, the edge of the canal	System sanitation and reduce the pollution in the city
Community as general	Makassar City	The availability of waste recycling unit
Community as general	Makassar City	Improve the environmental quality
Community in general	dump in Makassar city	Improve the environmental quality
Poor community in the city	Manggala subdistrict	Improve the environmental quality
Community in general	Parks in Makassar city	Improve the environmental quality and community livelihood
Community in general	Makassar city	Improve the environmental quality
Community in general	Makassar city	Improve the environmental quality

No	Project Name	Implementer	Budget	Budget Source	Implementation Period
30	Not seedy Makassar	Dinas Pertamanan dan Kebersihan		APBD	Annually
31	Reforestration in drought area	Dinas Pertamanan dan Kebersihan		APBD	Annually
32	Socialization of child behavior for waste management	Dinas Pendidikan		APBD	Annually
33		Dinas Pendidikan		APBD	Annually
34	Development of clean water facilities and infrastructures	DPU		APBD, DAK	Annually
35	Normalization and Drainage System Development	DPU		APBD	Annually
36	Development of wastewater treatment plant communal	DPU		APBD, loan from ADB	Annually
37	Revitalization of Kampung Deret	DTRB / BAPPEDA		APBD	Annually
38	Revitalization of Cannal area	DTRB		APBD	Annually
39	land use planning in watershed	DTRB		APBD	Annually
40	Monitoring of Environmental Quality in Coastal Areas and Small Islands	BLHD	Rp 320.479.200	APBD	Annually
41	Monitoring of Tallo and Jeneberang watershed conservation	BLHD	Rp 162.160.900	APBD	Annually
42	Water resource conservation and water resource damage	BLHD	Rp 53.700.000	APBD	annually (2015-2016)
43	Monitoring of groundwater utilization	BLHD	Rp 1.318.003.800	APBD	annually (2015-2016)
44	Controlling of Climate change impact; monitoring for	BLHD	Rp 83.500.000	APBD	annually (2015-2016)

Vulnerable Target Group	Vulnerable Area	Impact to Ecosystem
urban community	Makassar city	Improve the environmental quality in density area
Community in general	Drought Area Kec. Baringkanaya, Kec. Tamalanrea, Kec. Panakkang, Kec. U. Dandang	Increase the air quality (response to climate)
School age children in Makassar city	Makassar city	Understanding improvement of environmental awareness since early
Youth in Makassar city	Makassar city	Understanding improvement of environmental awareness since early
Low middle income people	Pulau Lumu-lumu, Pulau Barang Caddi, Kel. Pacerakkang, Kel. Sudiang, Kel. Bulu Rokeng, Kel. Pai, Kel. Sudiang Raya, Tallo	Infrastructure: clean water supply
community around the area	the entire city of Makassar	Reduce the impact of floods
community around the area	in several neighborhood such as Kelurahan Lakkang	improve the environment quality
Low middle income people	Kampung Pisang Maccini Sombala	Meningkatkan kualitas hidup permukiman dan masyarakat
Community along riverbank	Main Canal in Makassar: Simsijala Canal, Maccini Sombala Canal	Prevent from shallowing; keep the cleanliness and restore the function of canal
Urban community/ migrant	Around Tallo and Panakkukang area (along Tallo river)	Prevention of environmental damage caused by human activity.
Masyarakat di pesisir dan pulau kecil	20 spots area: 16islands, 1 coral reef, 1 location of seagrass, 1 mangrove	Improvement ecosystem quality of coastal area
Community along Tallo and Jenebarang watershed	Jenebarang and Tallo Watershed	Improvement of environment quality along Jenebarang and Tallo watershed
Community of Makassar city	300 spots of biopore in Makassar city	Improvement of water catchment area and risk reduction of flooding
Community of Makassar city	65 points in Makassar	Monitoring of groundwater utilization
Usaha pengisian Freon / Colostorage	Makassar City	Emission reduction

No	Project Name	Implementer	Budget	Budget Source	Implementation Period
45	Mangrove reforestration in Coastal area	BLHD		APBD	Middle term
46	Create Proklif (Climate neighborhood) of Makassar city	BLHD	Rp 120.001.100	APBD	annually (2015-2016)
47	Training for environmental volunteer	BLHD	Rp 200.000.000	APBD	annually (2015-2016)
48	Monitoring and	BLHD	Rp 254.040.900	APBD	annually (2015-2016)
49	Open green space rehabilitation	BLHD	Rp 250.100.000	APBD	annually (2015-2016)
50	socialization of open space development	BLHD	Rp 156.250.000	APBD	annually (2015-2016)
51	Vertical Garden	BLHD	Rp 193.240.800	APBD	annually (2015-2016)
52	The arrangement of environmental management standart for small and micro bisuness	BLHD	Rp 116.252.200	APBD	annually (2015-2016)
53	Socialization of regulation regarding to environment and law enforcement in environmental aspect	BLHD	Rp 197.794.500	APBD	annually (2015-2016)
54	Environmental law enforcement supervision to the results do not comply with the requirements.	BLHD	Rp 73.962.400	APBD	annually (2015-2016)
55	Capacity Building Mitigation Program for the Officer KLB	Dinas Kesehatan		APBD	Annually
56	Socialization MKKUG for Disaster Management	BMKG		APBN	Annually

Vulnerable Target Group	Vulnerable Area	Impact to Ecosystem
coastal community (fisher group)	Untiaand Baringkanaya neighborhood	Improve quality of coastal and island ecosystem
Lae-lae island community and Barang Lombo	Lae-lae and Barang Lombo island	Improvement of climate change resilience
100 volunteers of environmental in Makassar city	Makassar city	Improvement of climate change resilience
Community of Makassar city	80 spots in Makassar city	Control of green space to improve the quality of the environment.
Community of Makassar city	1 spot in Makassar city.	Improve the quality of green open space
200 targeted participants in Makassar city	Makassar City	Improvement the understanding of the importance of open green space
Community of Makassar city	1 spot in Makassar city.	Improvement the quality of open green space
10 micro business	Makassar City	Improvement the capacity of small-medium economic enterprise to create a friendly environmental business.
100 small medium enterprise in Makassar	Makassar City	Improvement the capacity of small-medium economic enterprise to create a friendly environmental business.
Community in Makassar (enterprise)	Makassar City	Law enforcement for increasing the environmental quality in the city
Puskesmas officials 46 PKM; disaster victim community	Makassar City	Increase the capacity of disaster preparedness
Coastal community (fisher group)	Traditional port (Paotere)	Increase the capacity of disaster preparedness

GROUP OF EMERGENCY AND POST-DISASTER MANAGEMENT

No	Project Name	Implementor	Budget	Budget Resource	Implementation Period
1	Emergency Center	BPBD		APBD	2014 - 2019
2	Preparation and distribution of logistics for disaster victims	BPBD	Rp 1.178.125.100	APBD	Annually
3	Post emergency for disaster	BPBD	Rp 887.890.300	APBD	Annually
4	Identification and verification of the condition after the disaster (public infrastructure, property and housing condition)	BPBD	Rp 199.042.800	APBD	Annually
5	Arrangement Rehabilitation and Reconstruction Plan	BPBD	Rp 143.265.100	APBD	Annually
6	Facilitation the Improvement (Rehabilitation) of Public Infrastructure, Environment and Households in Post Disaster	BPBD	Rp 764.116.100	APBD	Annually
7	Training for Impact Analysis on Losses and needs assessment in Post-Disaster	BPBD	Rp 150.000.000	APBD	Annually
8	Recovery of economic productivity in post-disaster	BPBD	Rp 200.000.000	APBD	Annually
9	The provision of Medical Services and Post-Disaster Psychological services	BPBD	Rp 150.000.000	APBD	Annually
10	Preparation and Distribution of Poor People needs in Post Disaster	BPBD	Rp 200.000.000	APBD	Annually
11	Maintenance of physical building as disaster risk reduction and adaptation to the impacts of climate change	BPBD	Rp 200.000.000	APBD	Annually
12	Monitoring on emergency services	Dinas Kesehatan	Rp 375.650.000	APBD	2015 - 2019
13	Monitoring/ prevention of disease and disaster	Dinas Kesehatan	Rp 182.930.660	APBD	2016 - 2019
14	Fogging Program	Dinas Kesehatan		APBD	Annually
15	Forming Disaster Post Command	Dinas Kesehatan		APBD	2014 - 2019

Vulnerable Target group	Vulnerable Target area	Impact on Ecosystem
community in general	On going process in 1 subdistrict	Increase the capacity of disaster preparedness
Disaster victims	Makassar city	Increase the capacity of disaster preparedness
Disaster victims	Makassar city	Increase the capacity of disaster preparedness
Victims of flood, fire and tornado (100 times)	Location affected by disaster	Contribution on rehabilitation and improvement of environment in post-disaster
Disaster vulnerability group	Location affected by disaster	Improve the capacity of disaster preparedness
Disaster victims	Location affected by disaster	Environmental post-disaster improvement
Disaster victims	Location affected by disaster	Environmental post-disaster improvement
Disaster victims	Location affected by disaster	Socio-economic post-disaster improvement
Disaster victims	Location affected by disaster	Health condition and phsyco logical post-disaster improvement
Disaster victims	Location affected by disaster	Socio-economic post-disaster improvement
Disaster victims	Location affected by disaster	Neighborhood environmental post-disaster improvement
100 people (2 times)	Makassar City (14subdistricts)	Improve the capacity of disaster preparedness
560 people (5 times)	Makassar City	Health condition and phsyco logical post-disaster improvement
Community in general	The area affected by dengue cases - an endemic disease	Improvement of health quality of community
Community in general	Location affected by disaster	Basic needs compliance of victims, improvement of health condition

No	Project Name	Implementor	Budget	Budget Resource	Implementation Period
16	Social service for post-disaster victims	Dinas Sosial	Rp 1.324.843.300	APBD	2014 - 2019
17	Rehabilitation and Social Reconstruction of victims	Dinas Sosial	Rp 86.816.400	APBD	2014 - 2019
18	Providing facilities and infrastructure of the victims	Dinas Sosial	Rp 266.550.000	APBD	2014 - 2019
19	Strengthening and Training for Youth Volunteers in Disaster	Dinas Sosial	Rp 634.936.750	APBD	2014 - 2019
20	Social stabilization in social hazard area	Dinas Sosial	Rp 529.988.800	APBD	2014 - 2019
21	improvement of Human Resource of human resources official agencies	Badan Pemberdayaan Masyarakat	Rp 300.000.000	APBD	2014 - 2019
22	Management training for Sanitation and water supply officials (BPS-PAM), BPS CARE, SLBM, KSM SANIMAS, KPP	Badan Pemberdayaan Masyarakat	Rp 300.000.000	APBD	2015 - 2019
23	Training and capacity building of neighborhood officials (RT/RW) in Makassar City	Badan Pemberdayaan Masyarakat	Rp 300.000.000	APBD	2016 - 2019
24	Operational of TP-PKK Makassar City	Badan Pemberdayaan Masyarakat	Rp 2.250.000.000	APBD	2017 - 2019
25	Rehabilitation of Facilities and Infrastructure in post-disaster	DPU		APBD	Annually
26	Social Support for the community	PDAM		APBD	Annually
27	Provision of water supply	PDAM		APBD	Annually

Vulnerable Target group	Vulnerable Target area	Impact on Ecosystem
Victims of flood and fire	Location affected by disaster	post-disaster economic and social Improvement
Victims of flood and fire	Location affected by disaster	post-disaster economic and social Improvement
Victims of flood and fire	Location affected by disaster	Improvement of post-disaster environment facilities
Victims of flood and fire	Location affected by disaster	Strenghtening the phsyco logical of community in post-disaster
Victims of flood and fire	Location affected by disaster	Improvement the social, economic and physcogital of community
LPM (300 people) as cadres in neighborhood level	All of the RT and RW in Makassar	Improvement the capacity of institutions that can empower broadly.
Community in general	103 sanitation services in Makassar	Improvement the capacity of institutions that can empower broadly.
RT dan RW di seluruh kota Makassar sebagai kader potensial di level lokal	All of the RT and RW in Makassar	Improvement the capacity of institutions that can empower broadly.
PKK di seluruh Kota Makassar	all of neighborhoods of Makassar	Improvement the capacity of institutions that can empower broadly.
Disaster victims	Location affected by disaster	Improvement environment capacity of housing in post-disaster
Disaster victims	Location affected by disaster	Improvement of post-disaster socio-economic condition
Disaster victims	Location affected by disaster	Improvement the basic needs of community as the disaster victim

Data and Monitoring Program Group

No	Program/Activity Name	Implementor	Amount of Budget	Budget Resource	Implementation Period
1	Preparation of Regional Budget for Food and Nutrition	BAPPEDA		APBD	Annnually
2	Coordination of Poverty Reduction Program	BAPPEDA		APBD	Annnually
3	Coordination of Coordination of the National Health Insurance (BPJS) Implementation	BAPPEDA		APBD	Annnually
4	Planning and Strategy for Poverty Reduction	BAPPEDA		APBD	Annnually
5	Regional Spatial Planning Coordination Agency (BKPRD)	BAPPEDA		APBD	Annnually
6	RTRW Revision	BAPPEDA		APBD	Annnually
7	National Data Collection Social Economic Survey Makassar	BPS		APBN	Annnually
8	Data Collection of Sakernas	BPS		APBN	Annnually
9	Dissemination and Data Services	BPS		APBN	Annnually
10	Data Collection of Village and Neighborhood Potential Data	BPS		APBN	Annnually
11	Procurement of rain intensity measurement foce each sub-district	BMKG		APBN	Annnually
12	Socialization of Climate change adaptation	BMKG		APBN	Annnually
13	Desimination of Extreme Rain forcecasting for each region	BMKG		APBN	Annnually
14	Direct services of Birthday Certificate	Dispendukcapil		APBN	Annnually
15	Mobile KTP	Dispendukcapil		APBN	Annnually
16	Climate Change Impact Management: Monitoring and Logging for User Materials Ozone (BPO) and producer of greenhouse gases (GHG)	BLHD	Rp 83.500.000	APBD	Annualy (2015 -2016
17	Data Collection of open space	BLHD		APBD	Annnually

Vulnerable Target Group	Vulnerable Target Location	Impact on Ecosystem
Malnutrition Community	Makassar city	Decreasing number of malnutrition community
The poor community	Makassar city	Urban poverty alleviation
The poor community	Makassar city	Availability of health insurance for the public
The poor community	Makassar city	poverty alleviation
The poor community	Makassar city	Good landuse allocation
The poor community	Makassar city	Good landuse allocation
Community in general	Sample in Makassar City	Supporting infrastructure (availability of data as a basis for decision making).
Community in general	Sample in Makassar City	Supporting availability of data for decision making process.
Community in general	Makassar city	Supporting availability of data for decision making process.
Community in general	Makassar city	Supporting availability of data for decision making process.
Community in general	Makassar city	Increase the understanding of community in climate change
Community in general	Makassar city and surrounding area	More preparing the emergency response to extreme rainfall that is expected to potential flood.
Community in general	Makassar city	Supporting the availability data for decision making process
Community who ID compulsory	Makassar city	Supporting the availability data for decision making process
Stakeholder who production of GRK/BPO	Makassar city	Emission reduction
Community in general	Makassar city	Taerget achieving of open green space

No	Program/Activity Name	Implementor	Amount of Budget	Budget Resource	Implementation Period
18	Management Implementation of Watershed	BLHD	Rp 162.160.900	APBD	Annnually
19	Inventory of Company producing B3 Waste	BLHD	Rp 102.928.300	APBD	Annnually
20	Testing Emission of Motor Vehicle	BLHD	Rp 132.685.000	APBD	Annnually
21	Policy Formulation for Control Pollution and Environmental Destruction (Regulation of Groundwater and Environmental Management)	BLHD	Rp 400.001.900	APBD	Annnually
22	Arrangement of Mayor Regulation on Green Building	BLHD		APBD	Annnually
23	Monitoring of Seagrass and Mangrove	BLHD		APBD	Annnually
24	Development of Environmental Data and Information	BLHD	Rp 242.280.000	APBD	Annnually
25	Set the availability of open green space as requirement for Building permits	DTRB		APBD	Annnually
26	Updating information on Animal Husbandry	DKP3		APBD	Annnually
27	Mapping special region of PHM	DKP3		APBD	Annnually
28	Data Collection for Fishery Production	DKP3		APBD	Annnually
29	Aquaculture Statistics	DKP3		APBD	Annnually
30	Strenghtening of Fisheries Data Statistic	DKP3		APBD	Annnually
31	Mapping the area of disaster hazar; Mangala, Panakkukang, Tamalanrea, Biringkanaya, Rappocini and Talo subdistrict.	BPBD	Rp 127.965.200	APBD 2015	Annnually
32	Preparation of Flash Flood Contingency Plan	BPBD		APBD	Annnually
33	Preparation of Disaster Makassar Profile	BPBD	Rp 153.775.000	APBD	Annnually
34	Regional Data Update on Hazards Area	BPBD	Rp 120.000.000	APBD	Annnually

Vulnerable Target Group	Vulnerable Target Location	Impact on Ecosystem
Tallo	Sungai Tallo watershed	Availability data on water quality
Businessmen	Makassar city	River, watershed, socio-culture data
Community in general	Makassar city	Emission reduction
Community and businessmen	Makassar city	Intrusion of sea water, subsidence of ground water
Community in general	Makassar city	Law enforcement for increase environmental quality
Barang Caddi Island	Barang Caddi Island	Monitoring the ecosystem condition
Community in general	Makassar city	the Availability of open green space
Stockbreeder	Makassar city	Law enforcement for increase environmental quality
Stockbreeder	Makassar city	Reduce the deployment of PHR
Farmer	Makassar city	Monitoring sector that can support community economic
Coatal community	Makassar city	Monitoring sector that can support community economic
Fisher	Makassar city	Monitoring sector that can support community economic
All of the exposure community	Kecamatan Manggala, Panakkukkang, Tamanrea, Biringkanaya, Rappocini, dan Tallo	Information for the community about the hazard location in their area
Community along the riverbank of Jenebarang and Tallo river	Wilayah dampak luapan aliran Sungai Jeneberang dan Tallo	Improve the disaster preparedness, community and government
Community along the riverbank of Jenebarang and Tallo river	Wilayah dampak luapan aliran Sungai Jeneberang dan Tallo	Improve the disaster preparedness, community and government
Community in general	Makassar city	improve the disaster preparedness, community and government
Community in general	Makassar city	Improve the disaster preparedness,



Figure 15: Community who live in coastal area is likely more vulnerable from climate change. The program focusing on community to improve the adaptive capacity and risk disaster reduction is needed.

CHAPTER 4

CONCLUSIONS AND RECOMENDATIONS

The RAD-API puts forward ways to improve coordination and synergizeactions between stakeholders; this is a dynamic process. Climate change data require regular updates in order to obtain a picture of the latest conditions. RAD-API and Climate Change Vulnerability Assessment (CCVA) is a unity, where updated results of the vulnerability assessment will provide the necessary information to develop a vision, strategy, program priorities and intervention of the city. In addition, RAD-API requires support and synchronization with various other development planning documents in order to be fully integrated into the system and mechanisms of urban development. The framework programs of each department in the RPJMD and its derivative documents, such as the RKPD, are an important part offormulating priorities and programmingof this action plan. The RAD-API should be updated regularly each budget year in order to allow for adjustments and the addition of new programs or activities contemplated in the government's annual program plans.

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URBAN CLIMATE RISK MANAGEMENT PLAN (UCRMP) - CITY OF MAKASSAR