Vulnerability Assessment System as a Monitoring Tools for City Resilience

Indonesia case study

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3rd Asia-Pacific Climate Change Adaptation Forum 2013

19 March 2013

City Resilience?

WHO WILL SURVIVE

It is not the strongest of the cities that will survive, but rather the ones most responsive to changes (Charles Darwin) and able to design planning recognizing spatial heterogeneity in both ecological and social functioning of urban areas (Pickett et al, 2003) and trend of future changes (local, regional and global)

Resilience is the capability of a system faced with shocks or stresses to maintain or quickly restore its function.

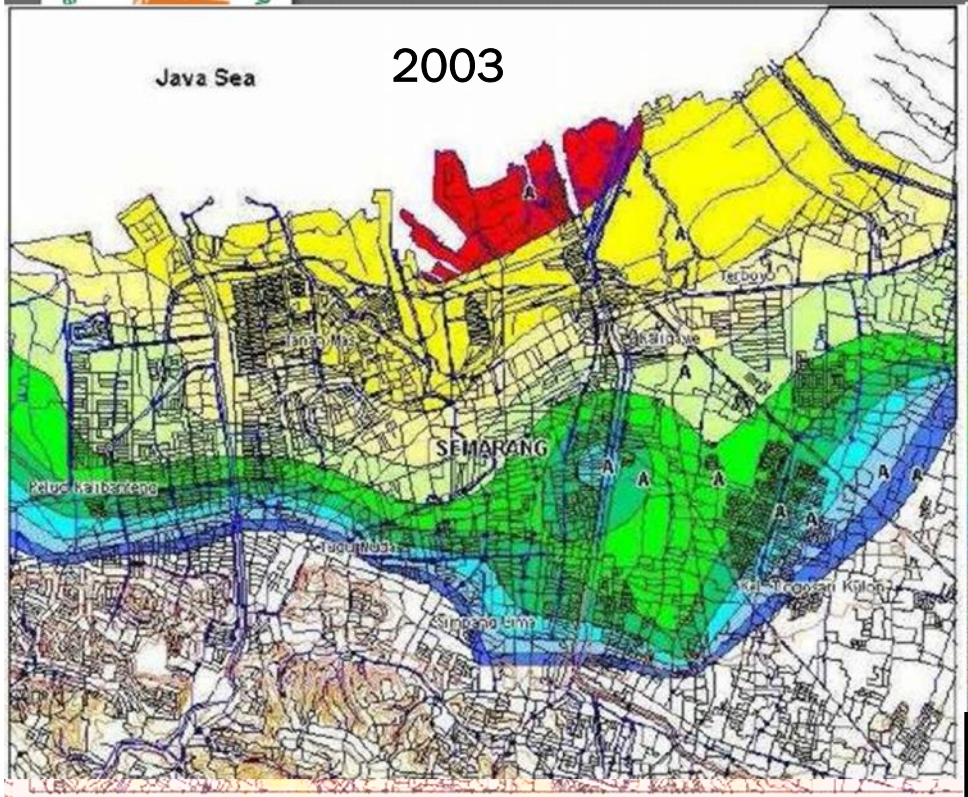
Structuring and Development Resilient City

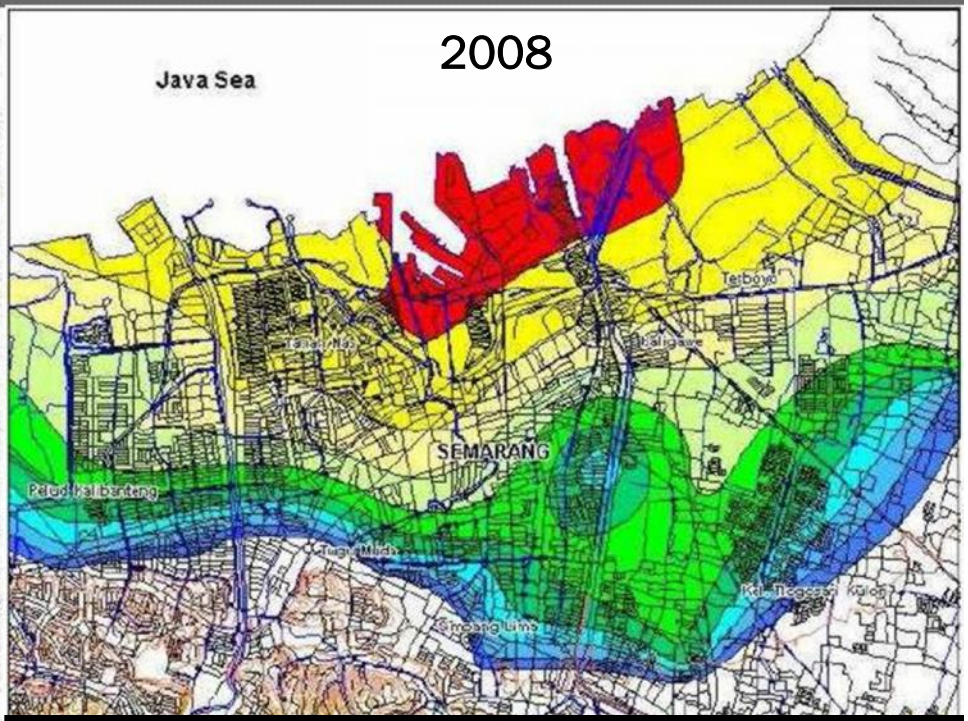
1. To treat the city as the planning and arrangement of experiments in which all the ecological and social changes resulting from implementation can be **measured, evaluated and documented well**,
2. To **Utilize the potential of dialogue** between professionals, people of the city, surrounding communities and institutions both government and private sector to support research and structuring of the city, as well as Utilize resources available

(Boer modification from Pickett et al, 2003)

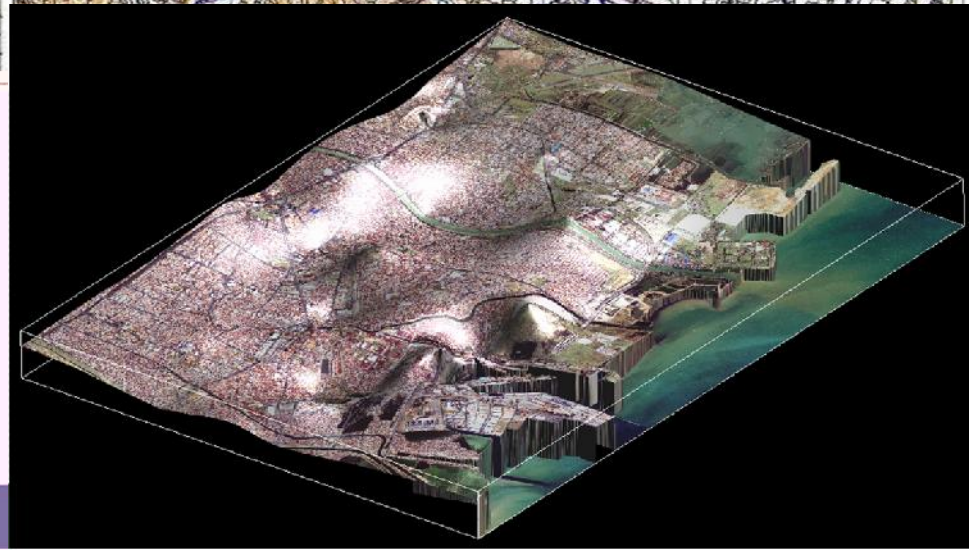
Case Study of SEMARANG CITY

ELEVATION COMPARISON 2003 - 2008





< 0 m below sea level
0 - 0.5 m
0.5 - 1.0 m
1.0 - 1.5 m
1.5 - 2.0 m
2.0 - 2.5 m
2.5 - 3.0 m
3.0 - 3.5 m
3.5 - 4.0 m

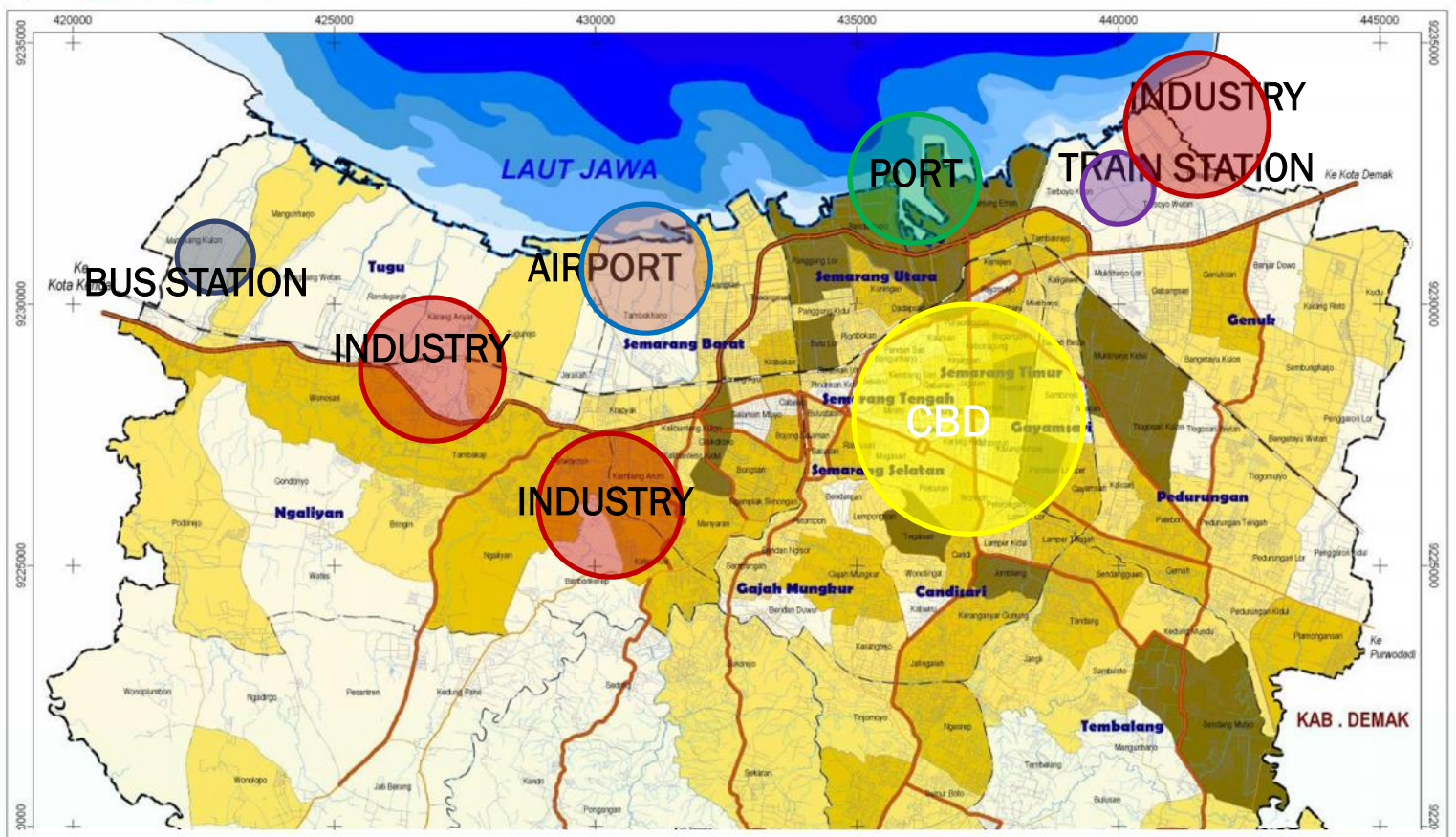


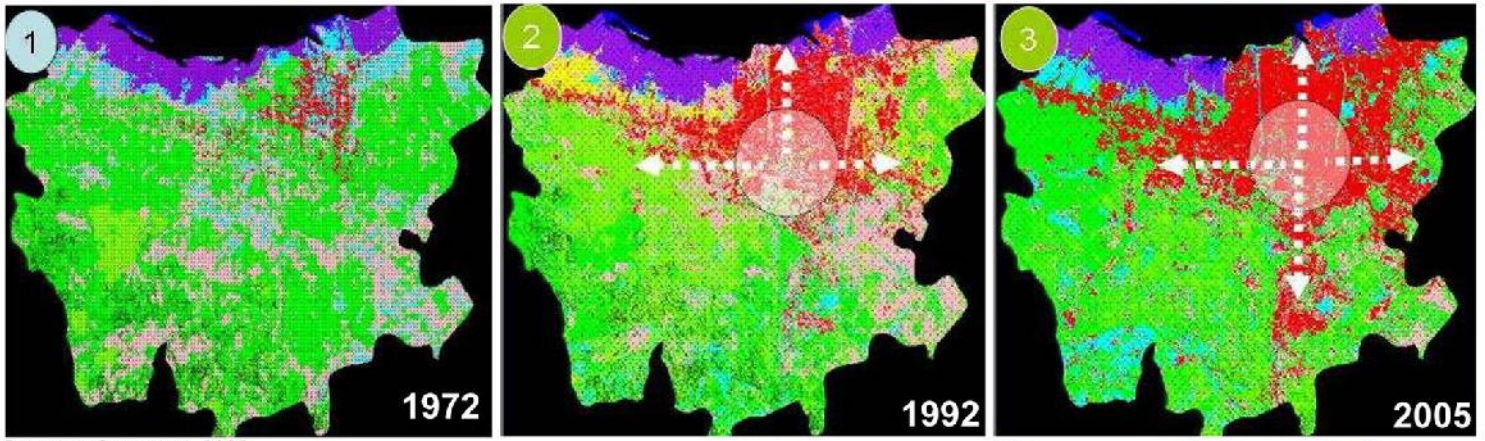
SEA LEVEL RISE TREND & PROJECTION

Covered Area of Flooding and tidal Inundation :
± 86 km^2 (23%),
The number of household in flood prone area is 60.000

	2000	2025	2050	2100
SRESA2 (cm)	2	10	21	60
Range (cm)	0 – 4	4 – 20	9 – 41	15 – 112
SRESB1 (cm)	2	10	21	48
Range (cm)	0 – 4	4 – 22	9 – 42	18 – 86

Population And Activities Distribution



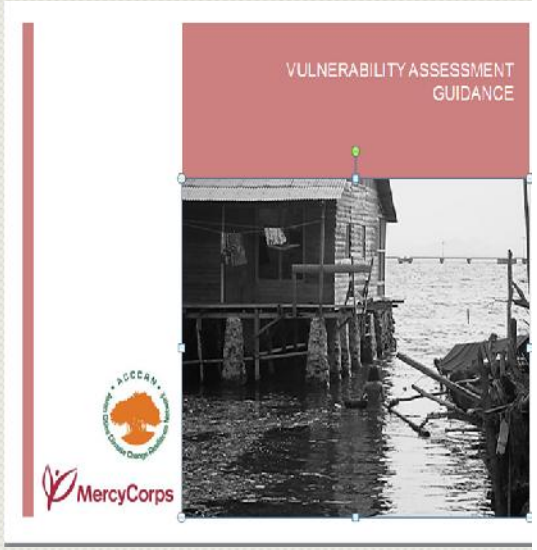


population density

- Low density
- Medium density
- High density
- Very high density

VA System As Tools For Resilience Planning

- Provide tool to **evaluate** the impacts of development programs in **changing the level of vulnerabilities**.
- Develop the needed new indicators to **measure the effectiveness of development programs** in building climate-resilience system.
- **Better assist (**national, province), cities and regencies stake holders **in decision making process** to identify and to prioritize climate change adaptation program/activity
- Better assist the stake holders to ensure **the synergy** and conformity **of cross-level climate resilience strategy** and/or action plan...



City and Multiple Stake holders

As Beneficieries

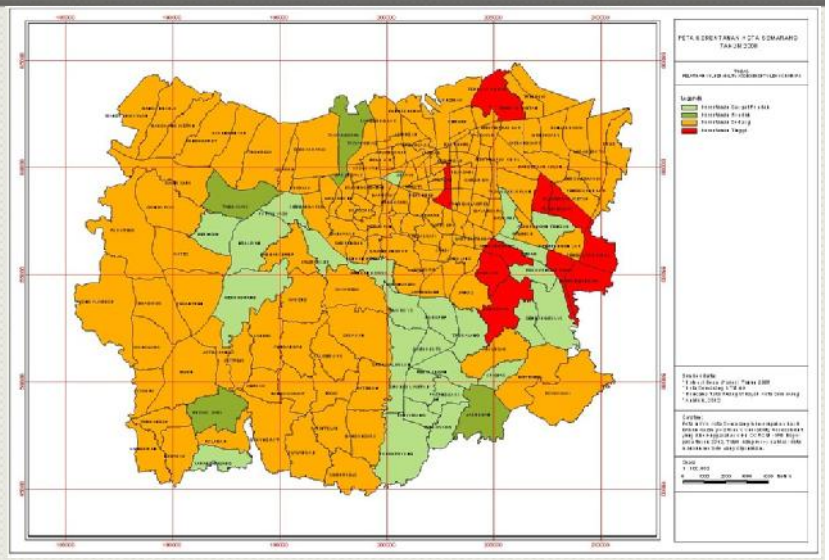
City and Multiple Stake holders

Do Local Climate Action

City and Multiple Stake holders active to Measure Impact

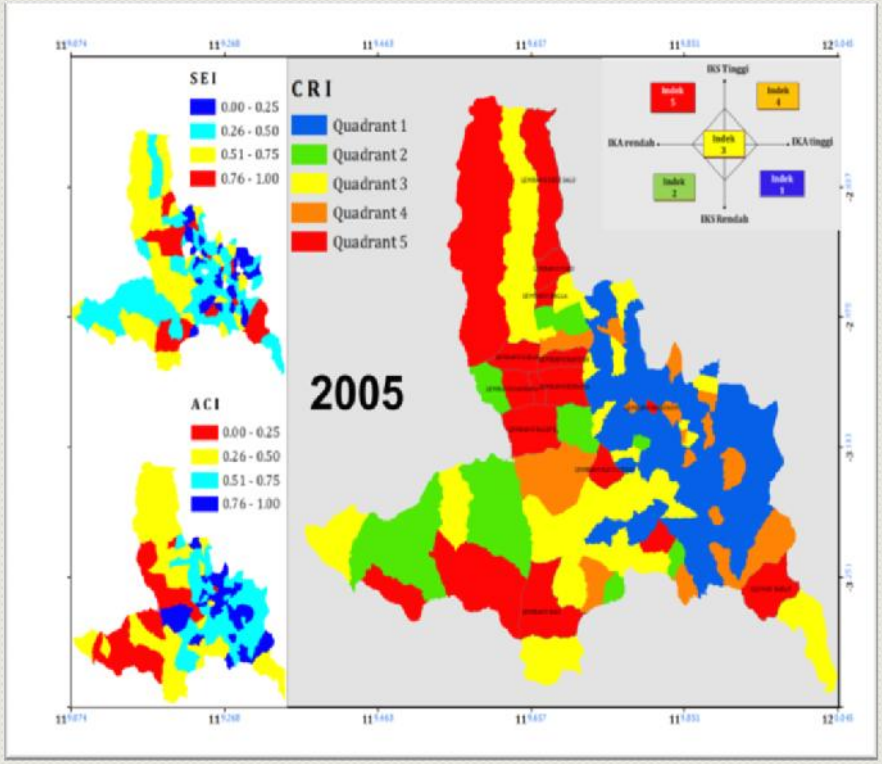
What is The Different?

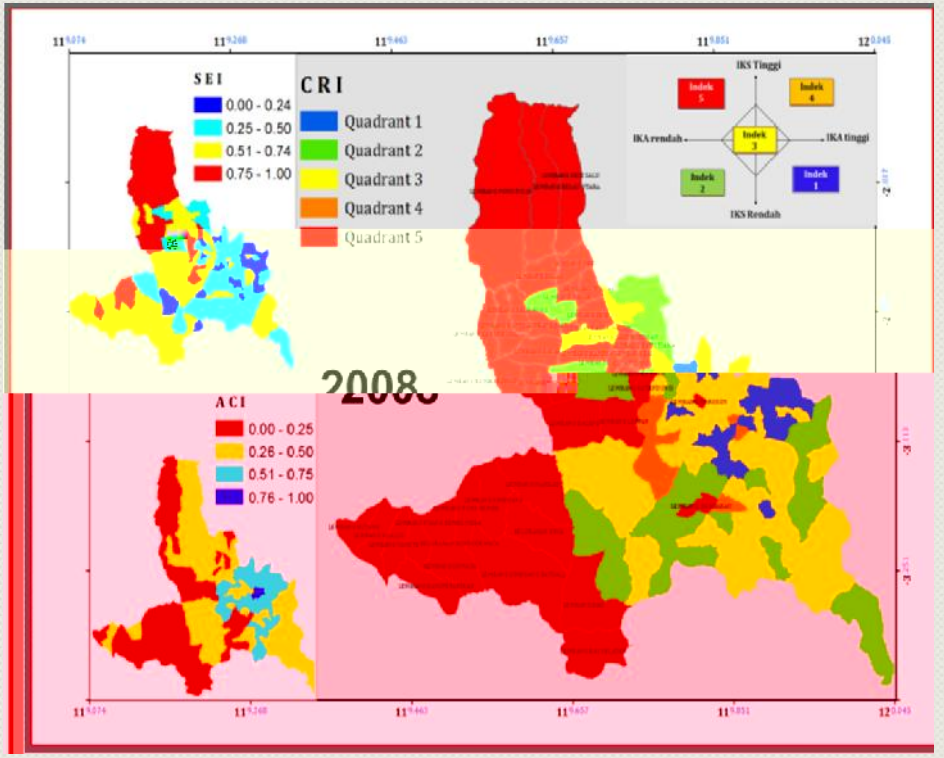
- Led by local government
- Engagement of multiple departments and stakeholders



- Capacity building and shared learning
- Networking activities between cities and other partners, within nationally
- Collaborative workplan development

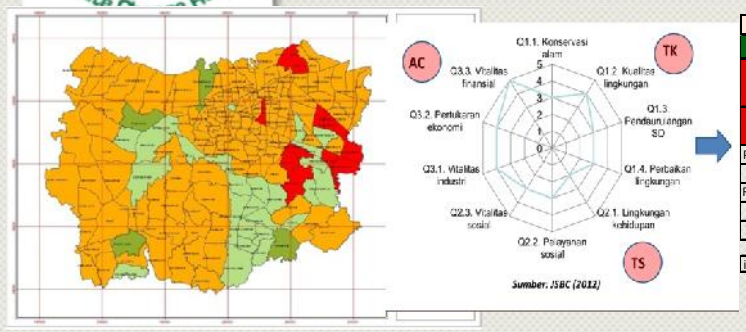
Case Study from Toraja Regency





Source: CCROM

Strength and Weakness of Vulnerability / Urban Resilience Indices

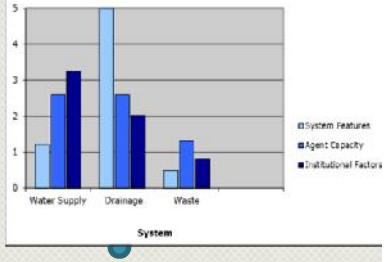


2011

Urban Resilience Indices																	
Water Supply Resilience Index						Drainage Resilience Index						Waste Resilience Index					
System Features		Agent Capacity		Institutional Factors		System Features		Agent Capacity		Institutional Factors		System Features		Agent Capacity		Institutional Factors	
PDAM_services	0	Ratio_inc/expn	3	Tariff_struc	3	Type_drainage	5	Disaster_agency	5	ercent_inundatic	4	Percent_TPS	1	Time_response	4	Tariff_struc	3
PDAM_distrb	5	SOP_disruption	5	Community_inv	5	Percent_drain	5	ercent_complaint	4	Community_drai	5	Percent_TPST	0	Net_income	0	rcent_sub-distr	4
Rasio_prod/cap	4	Provider_ccpro	5	Type_media	4	eaning_TaskFor	5	Community_inv	5	Complaint_call	5	Percent_TPA	3	ercent_employe	0	Community_inv	3
Wtr_leakage	0	Gov_funding	5	Media_info	4	Indicator 4	0	Percent_drain	0	-	0	Safe_TPA	1	Private_sector	1	-	0
Water_quality	5	Plan_prepared	1	-	0	Indicator 5	0	Review_drainage	5	Indicator 5	0	Service_center	5	Sampah-mandir	5	-	0
Use all 15 Indicators						Use all 15 indicators						Use all 15 indicators					
index	1,4		3		3,25		5		2,8038		2,25						1,2

System, Agent, and Institution Indices 2010

Urban resilience index, developed by ISET



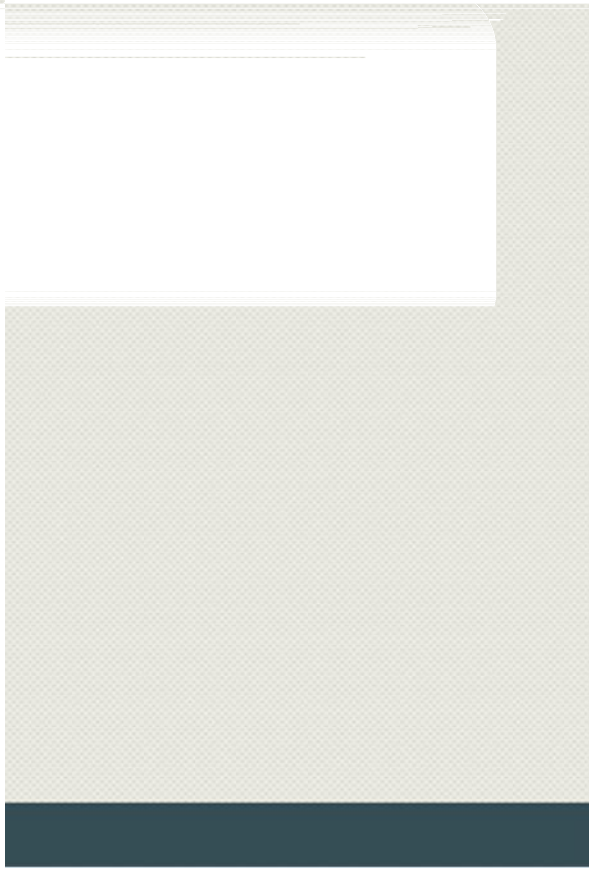
- **Better assist** citiy and stake holders **in decision making process** to identify and to prioritize climate change adaptation program/ activity
- Better assist the stake holders to ensure **the synergy** and conformity **of cross-level climate resilience strategy** and/or action plan

- Lack of data
- Sustainability of data
- lack of human resources

Building awareness of the importance to better collecting and maintaining the data

Example Indicators: Water Supply, Drainage And Waste Management System

Feature	Indicators	Feature	Indicators	Feature	Indicators
System	Public Water Company (PDAM) service area coverage	Systems	Type of drainage system in the city	Systems	Percentage of amount of existing TPS compare to the need based on Waste Master plan
	Spatial distribution of PDAM service area		Percentage of constructed drainage compare to total drainage required (%)		Percentage of integrated temporary dump site (TPST) which available and properly function?
	Ratio of distribution to production capacity		Frequency of routine drainage channels cleaning by Task Force (SATGAS)		Percentage of total solid waste that is collected to final dump site (TPA)
	Percentage of leakage water	Agents	Establishment of Disaster Management Agency and Disaster Mitigation Plan		Construction of a safe and hydrologically isolated land fill site
	Number of days that water quality to meet standards		Percentage of number of complaints which can be handled by Task Force to total complaints (%)		Service center for emergency response for waste collection and transportation
Agents	Ratio of income to expenditure		Community involvement in drainage maintenance (Y/N)	Agents	Time response from Task Force to undertake emergency cleaning for waste collection and transportation?
	Standard operating procedure (SOP) for disruption service		Percentage of budget for drainage construction compare total budget for public works infrastructure (%)		Net income (total operating income or retribution / operating expenses)
	Water (service) provider has considered impacts of climate change projections to the water resources		Review to Drainage Master plan (Y/N)		Percentage of cleanliness employee to its need based on Waste Master plan
	The government has spent funding to increase the water supply		Percentage of total inundation spots in slum districts compare to total inundation spots in the city		Private sectors involvement in supporting waste management
	Plan of the water provider to increase service capacity as preparedness to disaster	Institutions	Community involvement in participatory drainage construction		Independent waste management center at community level
Institutions	Tariff's structure has consider the grouping and minimum water consumption of its customer		Availability of complaint call center	Institutions	Tariff's structure has consider the grouping of different customers
	Community involvement in deciding water tariff				Percentage of sub-districts which not receiving waste service
	Various type of materials for media information to disseminate to public audience				Community involvement in decision making process for tariff structure
	Diverse media of information about water resources				



THANK YOU