

CLIMATE RESILIENCE WORKING PAPER SERIES:  
WORKING PAPER 2

# INTEGRATING CLIMATE RESILIENCE STRATEGY INTO CITY PLANNING IN SEMARANG, INDONESIA

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The *Climate Resilience Working Paper Series* is coordinated by  
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## ABOUT THIS SERIES

Climate change specialists are increasingly highlighting the need for *adaptive organizations*, which are flexible, responsive, and most importantly capable of *learning* by altering practices based on their experiences.

The **Climate Resilience Working Paper Series** fosters critical reflection, exchange, and learning among practitioners and researchers engaging with the challenge of building climate change resilience in urban centers. The series is coordinated by the Institute for Social and Environmental Transition (ISET).



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# INTRODUCTION

UNFPA's 2007 State of the World Population<sup>1</sup> report affirmed that for the first time in history, more than half of humanity is urban-based. This is expected to grow to 70% by 2050, represented by 6.4 billion people. The greatest amount of growth is expected to occur in secondary cities of developing countries, those with current populations below 500,000.

Migration to cities will continue because of economic, political and social factors, especially among low-income countries<sup>2</sup>. Vulnerable, usually poor populations are like to settle in marginal and hazardous areas. To illustrate, the number of people living in floodplains of urban areas may rise, by 2060, from:

- East Asia - 18 million 45–67 million
- South-Central Asia - 35–59 million
- South East Asia - 7 million in 2000 to 30–49 million
- Africa - 26–36.

World Bank recognizes that the most adverse impacts of climate change are likely to be in urban areas where people, resources, and infrastructure are concentrated<sup>3</sup>. These will be especially pronounced in coastal zones. There is a high incidence of hydro-

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<sup>1</sup> United Nations Population Fund, *The state of the world population report, 2007*, United Nations Population Fund: New York

<sup>2</sup> Government Office For Science and Foresight, *Foresight: Migration and global environmental change*, 2011: London.

<sup>3</sup> World Bank, *Climate Resilient Cities: A primer on reducing vulnerabilities to climate change impacts and strengthening disaster risk management in East Asian cities*, 2008: Washington D.C.

meteorological events including flooding and landslides exacerbating other hazards affecting urban areas. Impacts are particularly acute in regions hosting vulnerable communities. The already present a challenge to communities and their local government representatives in being prepared and proactive in risk reduction and resilience building, and increasingly so in the face of more frequent and extreme climate change related events. The combination of increasing urban population size, particularly in expanding slum areas, with increased severity and frequency of natural disasters as a result of climate change, will likely add to pressures that will overwhelm some urban centres. The poor, especially those in areas vulnerable to disaster, will have least resilience. They will increasingly be exposed to vulnerability arising from flooding; clean water supply crises; inappropriate solid waste and sanitation management; increasing disease; increasing unemployment and loss of economic opportunity; land insecurity; energy access; exacerbated malnutrition and food insecurity.

These issues highlight the need for integration of climate adaptation into urban planning, yet by and large most cities fail to consider climate change as a priority. From experience reasons include<sup>4</sup>:

- Climate impacts will accrue over time and become increasingly acute over the next 20 – 50 years. City planning, budget and election cycles (where present) rarely plan beyond 10 – 20 years.
- Few, if any staffs in city planning departments have awareness of climate risk. When knowledge is present, awareness of how to take action and ability to implement is limited at best.
- Short-term exigencies are given priority over longer-term issues.
- Climate change adaptation measures are considered a drain on budget, rather than an investment protecting lives and assets.

Investment in climate change adaptation measures as an outcome of urban planning processes is needed. Funds and efforts spent should be considered as contributing to protection of lives and assets. They are a path to sustainable development, protection of infrastructure, economies and society.

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<sup>4</sup> Sarah Opitz-Stapleton, Greg Guibert, Karen MacClune and Stephen Tyler, *Only death is certain, yet you still get out of bed in the morning. Communicating Climate Information in adaptation and resilience practice*, 2011, ISET ([http://i-s-e-t.org/images/pdfs/03\\_ISET\\_CatalyzingUrbanResilience.pdf](http://i-s-e-t.org/images/pdfs/03_ISET_CatalyzingUrbanResilience.pdf))

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Planning around climate change will help municipal governments and citizens take a longer term approach to planning, and consideration of the broader landscapes cities sit within, and interactions with upstream and downstream geographies. Measures taken to adapt to climate change develop focus on long-term strategies to strengthen vulnerable groups, even when they are not currently vulnerable. They also help avoid making decisions now that create vulnerability in the future, such as developing infrastructure on the edge of floodplains or in coastal areas. The tools to understand and plan around climate change and its impact on city vulnerability are available. Now is the time to foster their adoption and replication

Semarang, Indonesia, became a part of the *Asian Cities Climate Change Resilience Network* (ACCCRN)<sup>5</sup> programme, funded by Rockefeller Foundation, in 2009. The city's government has worked to develop a Climate Resilience Strategy (CRS). This defines prioritised actions reducing vulnerability to climate change. A city working group (CWG) comprising government officials, local NGOs and academics, leads ACCCRN involvement. The Local Development Planning Board (BAPPEDA) oversees CWG management and responsibilities in planning, and use of public development funds. The CWG structure enables integration of ACCCRN activities into city planning processes and budget cycles.

We discuss implementation of this integrated process and how it succeeded in incorporating climate change into city planning in Semarang. The key processes of resilience planning discussed here are similar to sister programs in another eight ACCCRN cities among three other countries. Yet there are a number of approaches that were key to facilitating the process in Indonesia, given local context:

- **Active engagement with local government and NGOs from program inception:** This engagement was significant in building government support and developing a platform for civil society engagement, which then eased integration of the CRS into city planning.
- **Making sectoral studies relevant to city planning:** This contributed significantly to legitimizing selection of local issues to be addressed.
- **Regular Shared Learning Dialogues (SLDs):** Cities held a large number of iterative SLDs, which facilitated identification of city needs that ACCCRN could address, and dissemination of related progress.

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<sup>5</sup> [www.acccrn.org](http://www.acccrn.org)

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Identifying key government officials able to remain in their positions long enough to lead a sustainable resilience planning process was a major challenge, among others.

ACCCRN's overall achievement has led the program to be recognized by local and national governments, and formed a platform for self-funded replication elsewhere by municipal governments. In Semarang, the CWG has since become responsible for climate projects outside ACCCRN. In recognition of this, Indonesia's Ministry of Environment is considering designating Semarang a national pilot Resilient City.

# CASE STUDY

## BACKGROUND

Semarang is a medium sized city with a population >1,550,000 covering 373.70 km<sup>2</sup>. It is characterised by coastal and hilly areas, making it vulnerable to disaster risks including flood, storm surge and landslide. It is also vulnerable to periodic drought. Climate change is worsening the impact of these hazards and adds the further hazard of rising sea level in the long term.

An ACCCRN-sponsored vulnerability assessment predicted more intense rainfall in shorter periods than experienced historically, causing perceptible and significant impact by 2020. It indicated increased variability in seasonal rainfall patterns, so that without effective management and development planning, as occurrence of flood and drought increases, impacts would worsen over coming decades<sup>6</sup>.

As with other Indonesian cities, a Mayor leads Semarang, supported by a city manager and four city assistants responsible for implementing the city's planning/program and reporting directly to the city manager (Figure 1). The assistants are in charge of:

- Government Administration (overseeing governance departments).
- Economy, Development and Welfare.
- Information and Networking.
- General Administration (operations).

Development planning is coordinated by the government spatial planning agency, BAPPEDA, which sits in the Economy, Development and Welfare department. In Semarang, BAPPEDA recognises it needs to seriously consider the challenge climate change poses to the sustainability of urban development. It strives to ensure Semarang becomes more resilient to climate change and able to cope with climate-related hazards. This is exceptional within Indonesia, as elsewhere. It is forward thinking government "champions" that drive this type of motivation; it was a platform that ACCCRN could build upon.

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<sup>6</sup> Mercy Corps. *Semarang Vulnerability and Capacity Assessment*. 2010. Jakarta, Indonesia

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The governance framework that has engendered this initiative is relatively recent<sup>7</sup>. Indonesia's governance was strongly centralized until 1999; most regulation and policy was made at the national level and applied across all cities. Due to this arrangement, the majority of highly skilled and trained professional civil servants were employed by national government and rarely found in cities outside of the capital, Jakarta. After President Suharto resigned in 1999, the country transformed its government system through rapid and broad decentralization to district levels<sup>8</sup>. This was intended to provide greater autonomy to local government, particularly regencies and cities, creating policy supporting development and budgetary decision-making at local levels. These changes brought new opportunity as well as challenges to the country.

The large-scale decentralization of planning and budget authority was not accompanied by thorough preparation for decentralised management and budget authority. Before decentralisation, local government had little voice in setting governance and budget targets. After decentralisation, this authority was allocated, but skills and experience were rarely adequate to articulate a coordinated governance vision. This usually led to unresolved disputes between sectoral agencies over planning authority and budget allocation. Yet city governments, the *Kota* – along with the *Kabupaten*, or regencies, in non-urban areas – readily accepted the new system with its authorities and responsibilities, to frame and implement local development planning. Yet due to limited capacity and experience, delivery of key public services was, and largely remains, poor.

Today, gaps in local government management still need to be filled. ACCCRN sees climate change as an opportunity to bring new perspectives and improvements to urban development planning. By making climate change relevant to development planning, government is enabled to think further about current and future risks threatening sustainability of city development and economic growth strategy. It also enables climate-related hazards and conditions to be considered explicitly for the first time.

## SEMARANG CITY SELECTION AND ENGAGEMENT

Climate change adaptation is a new issue to Indonesian cities; few understand the importance of considering climate change into city planning. During the ACCCRN city

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<sup>7</sup> Based on Law No.22 Year 1999 and Law No.25 year 1999

<sup>8</sup> Below the level of province, Indonesia is divided into 398 rural regencies (*Kabupaten*) led by a regent, and 98 urban cities (*Kota*) led by a major 1 administrative *Kabupaten* for an island group; 5 administrative *Kota* representing the capital, Jakarta. 550 smaller towns do not have city status and fall under *Kabupaten* governance. The various *Kota* are mayoralities, and usually incorporate some peri-urban areas. Semarang is one such *Kota*.

selection, finalists were selected on various criteria with a particular emphasis on a high commitment to implementing the program, support from effective city leadership, recognised vulnerability, and a desire to own programming related to climate change. Local government “champions” with the authority to drive ACCCRN programming forward were essential. Semarang city government has fulfilled all requirements. A major driver was the internal realisation by local officials that climate change issues were already affecting city development, with worse disaster anticipated.

Once the city was selected the local ‘champion’ or key person started mapping the presence of stakeholders in the city. This was the head of BAPPEDA, who then needed to influence wider stakeholders within the city; only a locally respected champion would be able to foster trust among ‘internal circles’ of influence. The challenge was then to maintain engagement and broaden support to mitigate the risk of government staff rotation, which happens on a regular basis. The ACCCRN program was delayed for reasons including mayoral elections and subsequent staff rotation. The risks here was always that rotations could lead to the termination of ACCCRN program in Semarang. This risk was managed through effective and necessary engagement with high levels of government including the new Mayor and city manager.

## CITY PLANNING PROCESS

Semarang, as elsewhere in Indonesia, has several planning systems relating to various sectors and ACCCRN focuses on one of these, development and spatial planning. This concludes with documentation used by the city to direct its budget and activities. It results from three cycles of activity:

- Long term development planning (RPJPD) with a 20 year strategic time horizon
- Mid-term development planning (RPJMD), reviewed every 2-years and revised every 5-years and encompassing the Mayor’s vision and mission
- Annual planning, which provides the yearly implementation direction for the RPJMD.

Spatial planning is a major part of the 5-year RPJMD and encompasses the Mayor’s vision and mandate. It legitimizes land use planning decisions. It also forms the basis of infrastructure planning, implemented by Public Works and other relevant agencies.

In principle the city RPJMD development process (Figure 2) takes around six months to be completed. Its procedure is meant to incorporate a highly inclusive review and revision process conducted among different levels of government, from sub-district to the regional House of Representatives (DPRD). This process is also used to prioritise

actions that need to be implemented in the city to support its overall development plan.

The process starts with the identification of the RPJMD team, which includes representatives from different government institutions. The team consists of:

- *Head of team*: Head of BAPPEDA.
- *Vice head of team*: Finance director.
- *Responsible party*: City Manager.
- *Secretary*: Secretary of BAPPEDA.
- *Working group / team member*: Heads of local agencies, as needed.

The team then compiles information needed for RPJMD development (Figure 2). This usually consists of related law and policy, provincial and city long-term development planning (RPJDP), provincial and city spatial planning, evaluation of previous RPJMDs, and statistical data for the city for the last five years. The RPJMD is then drafted, outlining mid-term and prioritised program activities for the city during the next five years. Once the team finalises its second draft, a *musrenbang* is conducted to prioritise short-term action. *Musrenbang* is the annual process of public participation conducted at the sub-district level, led by the head of each sub-district and attended by representatives of the community residing within that particular area. The purpose is to ensure that emerging issues are discussed with the public and to decide upon main short-term priority actions. Results from the *musrenbang* serve as inputs for the final draft of RPJMD, which is completed by the RPJMD team along with BAPPEDA, responsible for overall RPJMD coordination.

Once approved by the Mayor, the final RPJMD draft is sent to the provincial House of Representatives (DPRD). The DPRD and Mayor discuss the content of city plans and each program within the RPJMPD. This leads to the development of a regional policy and regulations pertinent to the RPJMD. By the end of the process, the DPRD submits the city RPJMD to the national government. Once approved, funding is allocated from central government on the basis of an annual implementation plan.

In reality, RPJMD planning usually takes a longer time than mandated. The main impediment is the difficulty in reaching an agreement between local communities and government, each of which often has differing priorities. It is also very difficult to select a set of priorities likely to be approved by all representatives within the government itself. Department priorities differ between departments, leading to protracted discussion and negotiation.

## SPATIAL PLANNING PROCESS

Spatial plans in Indonesia (Figure 3) cover a 20-year period (Figure 4). Yet plans are “living documents” that are re-evaluated every two years and revised every five years<sup>9</sup>. In accordance with Law no. 17/PRT/M/2009 city planning must be in line with national spatial planning. This requires provincial government to wait for the national spatial plan to be approved before it can start to develop complementary provincial plans. This cascades down to district governments; they wait for the approval of their province’s spatial plan prior to developing their own. This causes large delays in developing city spatial plans, as even national spatial plans are rarely prepared in a timely manner.

The spatial planning process in Indonesia has several purposes including development of long and mid-term economic development plans (RPJPD and RPJMD); land-use allocation; attempting harmonize priorities and demands from different sectors represented in city development; and deciding location of investment areas for the government and private sector.

The development of spatial planning is the responsibility of city Spatial Planning Agency, which is then reviewed and approved by the BAPPEDA as the key institution planning city economic development on behalf of the city mayor. Once approved by the Mayor, then funding will be provided through city annual funding (APBD). In the case of cross-regional spatial planning disputes, for example between a city and neighbouring district, all relevant spatial plans are sent to the provincial governor for resolution and subsequent approval. Oversight of planning falls is the responsibility of the city Spatial Planning Agency and BAPPEDA.

### INTEGRATING CLIMATE CHANGE INTO RPJMD

The RPJMD planning process provides an opportunity to integrate key climate change priorities into city planning, budgeting, investment and activity, through the initial design of the RPJMD or through the *musrenbang*. Mercy Corps, through the ACCCRN program was able to facilitate this process through city partners. A critical success factor was a detailed understanding of how the planning process functioned in both theory and practice.

Intensive engagement and networking are crucial to the success of integrating any priority issue into development planning. It is important to select local government program partners who have an influence in the process; in this case emphasis was

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<sup>9</sup> Kementerian Pekerjaan Umum. *Peraturan Menteri Pekerjaan Umum no. 17 Tahun 2009*. Jakarta, Indonesia

focused on the important role of the RPJMD team, particularly during the public consultation process the *musrenbang* represents. Mercy Corps sought out a local program partner within the BAPPEDA given the agency role and responsibility managing city development planning. This was a key step ensuring climate change adaptation issues were integrated into the overall city government agenda. In addition to choosing an appropriate government partner, Mercy Corps organized a series of meetings and workshops to provide information and training on climate change issues for government staff, especially those at decision-making level, to raise their understanding of the importance of climate change adaptation.

In addition to BAPPEDA engagement, Mercy Corps also chose to work with institutions and representatives outside the government that could contribute additional capacities and credibility to the process of integrating climate change into planning. These included academics from local universities, and local NGOs with good relationships with city government actors including the Mayor and with experience of how to successfully target advice and technical inputs that would influence planning. This collaboration among three different types of institutions proved very effective for mainstreaming climate change adaptation into the government agenda. The government still acted as the ultimate decision maker, and took a lead in coordinating these institutions. NGOs and academics took recognised responsibility for climate-related and vulnerability analyses, providing data and information for the purpose of incorporating climate adaptation measures into the RPJMD.

Mercy Corps also engaged the city Mayor to establish a legal agreement between the city and Mercy Corps. In a Memorandum of Understanding the Mayor agreed to delegate several of his staff to support ACCCRN resilience planning activities. These included the city manager, and staff from BAPPEDA, environmental agency and public works departments. This was an important step, as the government staff cannot work on a non-governmental program without a formal letter of endorsement from the Mayor.

Representatives from these institutions formed a city team, responsible for implementing all ACCCRN activities conducted in the city, including the development of a Climate Resilience Strategy (CRS), which was finalized prior to the most recent RPJMD in 2010. The integration between CRS and RPJMD was possible due to the government engagement established at the outset of ACCCRN in Semarang. The CRS itself consisted of issues that had a foundation in a least some issue raised by the government within their current RPJMD. The subject matter in the CRS and RPJMD is strongly cohesive since a consultancy with the local officials was conducted intensively during its development and because the city team itself consists of government staff who are part of the RPJMD team.

## CITY RESILIENCE STRATEGY

The City Resilience Strategy (CRS) is a fundamental framework a city develops for anticipating and addressing potential climate change impacts. It forms the basis for developing resiliency. Its most important functions<sup>10</sup> are to provide:

- A document containing broad guidance, prepared by local stakeholders and government.
- Context, evidence and analysis justifying adaptation interventions.
- Priorities for resilience actions.
- Consistency with existing planning documents and processes, that can easily be used by local government agencies.
- Guidance for the private sector and civil society groups to design and implement their own adaptation actions.
- Linkage and coordination with complementary activities for donor and other funding.

The CRS's three critical content components are:

1. *Climate impacts and vulnerability*: Explaining city vulnerability with a focus on vulnerable communities and the areas they live within, climate-related hazards in the context of downscaled climate change projections.
2. *Proposed resilience actions*: These will include:
  - a. Activities building climate resilience.
  - b. Contributions activities make to overall resilience.
  - c. Benefits to vulnerable groups.
  - d. Roles of government and other stakeholders.
  - e. Links to other plans or projects.
3. Prioritised resilience actions.

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<sup>10</sup> ISET. *Introduction to Resilience Planning Presentation*. 2010. Bangkok, Thailand

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Assessing existing city plans in the context of hazards and projected impact of climate change starts the CRS development process. Recommended actions are prioritised to fill gaps in plans that might otherwise exacerbate vulnerability.

The Semarang CRS was harmonised with the RPJMD with the aspiration to inspire city government departments to see how they could contribute to reducing climate change impact. The result of the CRS was the integration of climate change resilience measures into the next RPJMD. This was conducted through meetings, workshops and public consultation. Differences between the RPJMD before and after integrations can be summarised thus:

<b>RPJMD without considering risk assessment of climate change</b>	<b>RPJMD with considering risk assessment of climate change</b>
<p>Section VIII. Indication of prioritised program plan and funding needs</p> <ul style="list-style-type: none"> <li>• Development of village self-sufficient food.</li> <li>• Acceleration of irrigation and clean water provision.</li> <li>• Acceleration of Electricity provision.</li> </ul>	<p>Section VII (change in title because of changes). Strategy, policy direction, and indication of prioritize local development program plan</p> <ul style="list-style-type: none"> <li>• Development of village self-sufficient food by considering climate change issues.</li> <li>• Acceleration of irrigation and clean water provision based on hydro-climatology projections.</li> <li>• Acceleration of electricity provision based on renewable resources.</li> <li>• Risk reduction and geologic, hydrometeorology, and coastal disaster management.</li> </ul>

Identifying the timing for CRS completion and RPJMD development was crucial for success. The city team was aware of the opportunity 5-year RMD revisions presented for input, and thus finalized the CRS before the RPJMD revision began. Once the CRS was prepared, the content could be utilised by the government as data, information and input to improve their next period mid-term development plan. Furthermore, the CRS was

designed for integration into the RPJMD and the local spatial planning document. This is critical because of the importance of land-use planning for climate resilience. The next spatial planning will occur in 2015.

Although the CRS is an important tool for city partners to analyse climate vulnerabilities, enhance their capacities, and propose actions to address climate change, the document itself is not of great value unless integrated into the RPJMD so that the government will have to dedicate attention and resources to its calls for action. The RPJMD is translated into an annual workplan, where it can be allocated budget for citywide implementation. This way, the CRS and climate change topics will be actualized as part of city development. This will need to be monitored over a period of several years to ensure implementation is effective.

Since designing the CRS and working to integrate it into RPJMD, the members of the Semarang city team have a better understanding of effective longer term planning; they see the importance of understanding their current and future vulnerability; and they have much higher technical capacity. They are adding to their agenda to establish an expert climate change team that will be responsible to provide inputs for the city's development and spatial planning. This expert team will be part of a research division in the BAPPEDA and consists of current city team members and other experts.

# CONCLUSION

Despite success integrating CRS and climate change issue into the RPJMD, several concerns were raised including remaining sectoral gaps. This was largely because city team members lacked sufficient technical capacity to broadly assess vulnerability and to plan resilience strategy. Attempts have been made to address this through intensive trainings yet incorporation of new technical capacity has met with variable success, particularly because of less active team members. Major areas that need focused attention are health and education, particularly to raise awareness of climate threats across city stakeholders. The current CRS thus needs refinement; both by the current city team but also further organizations yet to be engaged.

A monitoring system still needs to be developed by the city team to measure the success of adaptation program to build urban climate resilience for Semarang. This should be developed in partnership with, and for adoption by, city government to ensure sustainability. Normally this would fall under the purview of the government's monitoring department, responsible in part for ensuring development plans are being implemented; it would be logical to assign further responsibility for assessing climate-related interventions that are now part of the RPJMD. Yet the monitoring department has not been engaged by the city team to be involved in ACCCRN program; it is unaware of the program and has no climate-related monitoring and evaluation tools. Unless addressed, there is a risk that the progress of resilience building will be untracked, and that unintended mal-adaptation actions may escape detection..

The biggest concern remains government staff rotation, including key staffer. Unless 'champions' are in place, there is always a possibility of program interventions being cancelled and climate-related policies dropped. The risk is especially acute after 2014, when Rockefeller Foundation funding ends. An exit strategy is therefore in development to ensure ACCCRN sustainability under a city climate program. Government institutions within the city team have agreed to create a pool of experts that will drive climate-related programming for Semarang. The climate expert pool is an initiative of the Central Java provincial government to addressing climate issues that strongly affects the province overall. The Semarang city team has become part of this expert pool, which contributes inputs from the experience of being involved in the urban climate adaptation program.

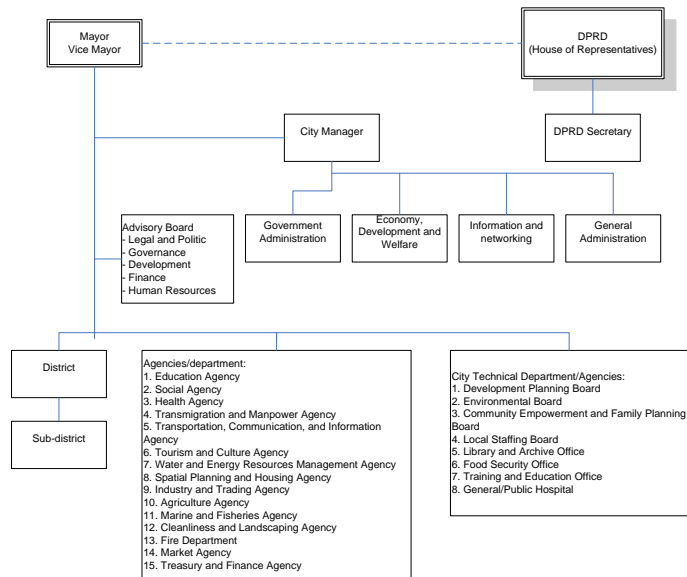
Whereas positive in that the strategy is appropriate for maintaining technical expertise within the city, it still does not secure the sustainability of political will influenced by changes in staffing and funding. Further developing public support for climate

vulnerability to be prioritised represents part of current activity to address this.

A potential opportunity is that in 2010, the Indonesian national government produced a policy stating that all City Spatial Plans (CSP) should address climate change issues. The new Public Works Act no. 26/2007 article 28, stated that every regional and city spatial plan must consider disaster safety procedures and evacuation plans, including evacuation plans for climate-related disaster. City governments have not had the capacity to improve their CSP by addressing climate change issues. The Ministry for Public Works seeks to address this by building capacity within government departments, enabling them to undertake rapid review of the CSP to determine whether or not climate resilience indicators have been addressed and, from there, to develop resilience strategies. This opens the opportunity for Semarang city team to provide methodology and expert advice to integrate climate change issues into CSP in other cities. It is this type of government policy requirement that is essential to national success and sustainability of action in building urgently need Urban Climate Resilience.

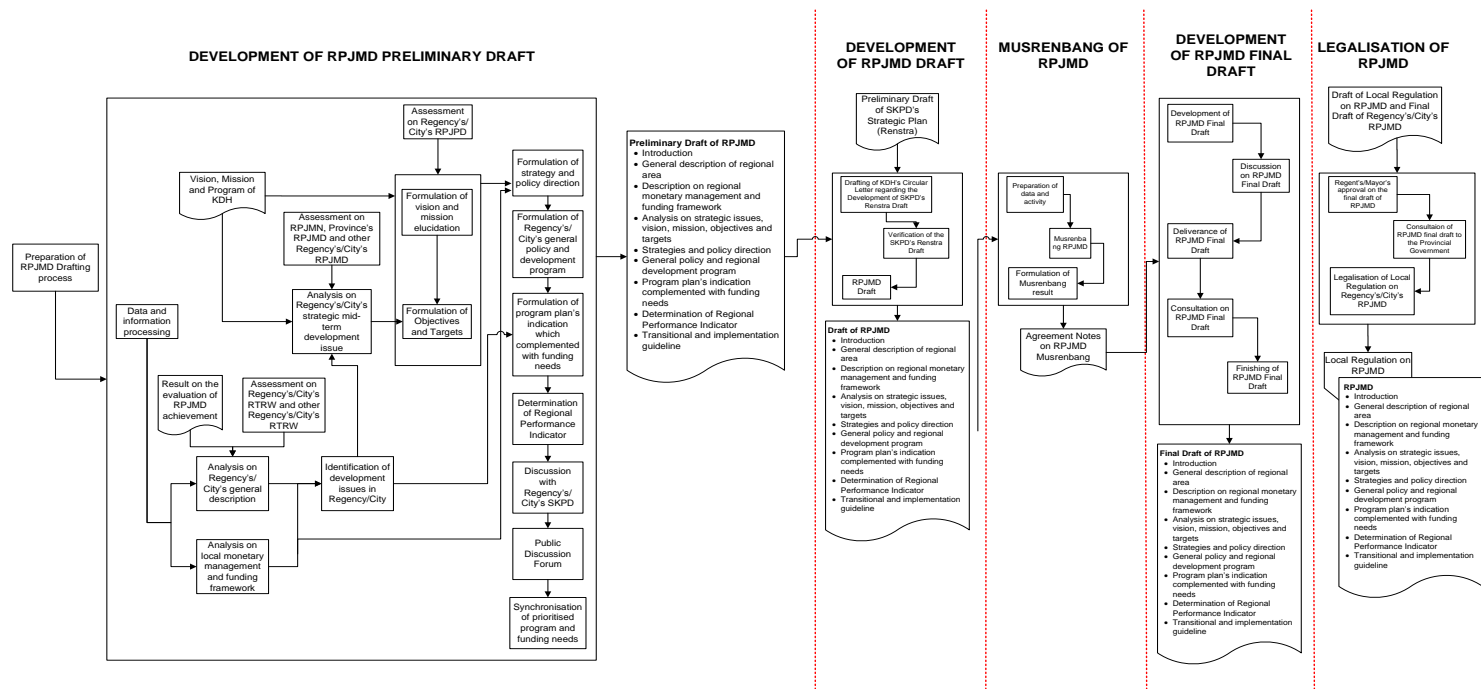
# ANNEX

Figure 1: Semarang's government structure<sup>11</sup>



<sup>11</sup>Kementerian Dalam Negeri. *Peraturan Menteri No.54 Tahun 2010*. 2010. Jakarta, Indonesia

Figure 2: RPJMD process<sup>12</sup>



<sup>12</sup> Kementerian Pekerjaan Umum. *Peraturan Menteri Pekerjaan Umum no. 17 Tahun 2009*. Jakarta, Indonesia

Figure 3: Spatial plans in Indonesia

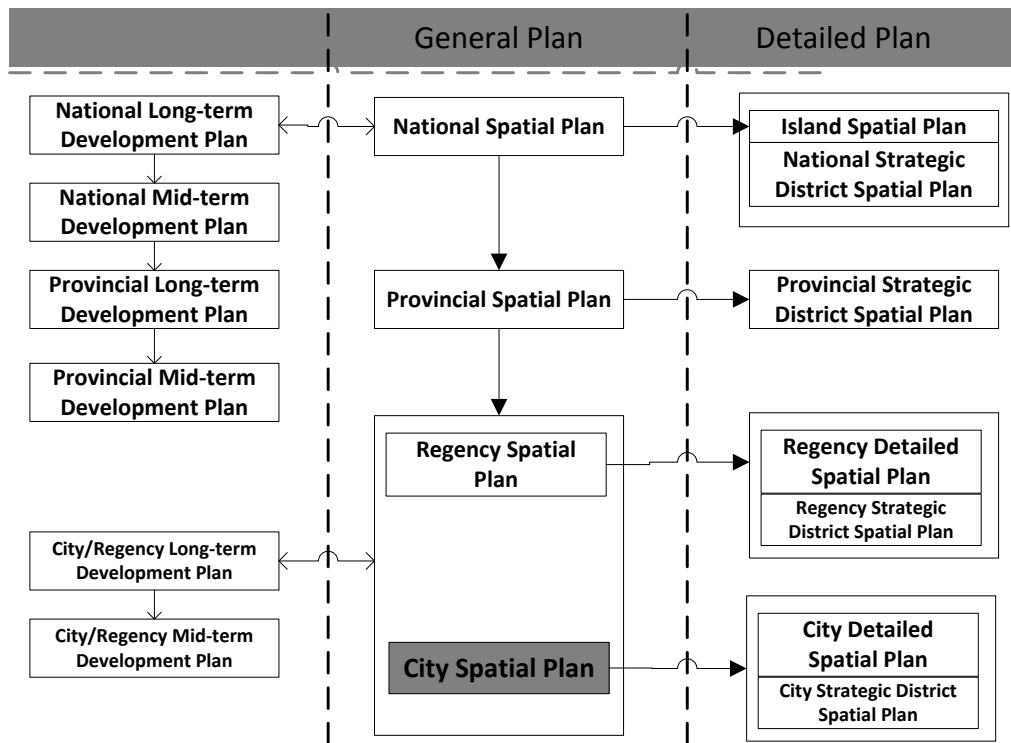
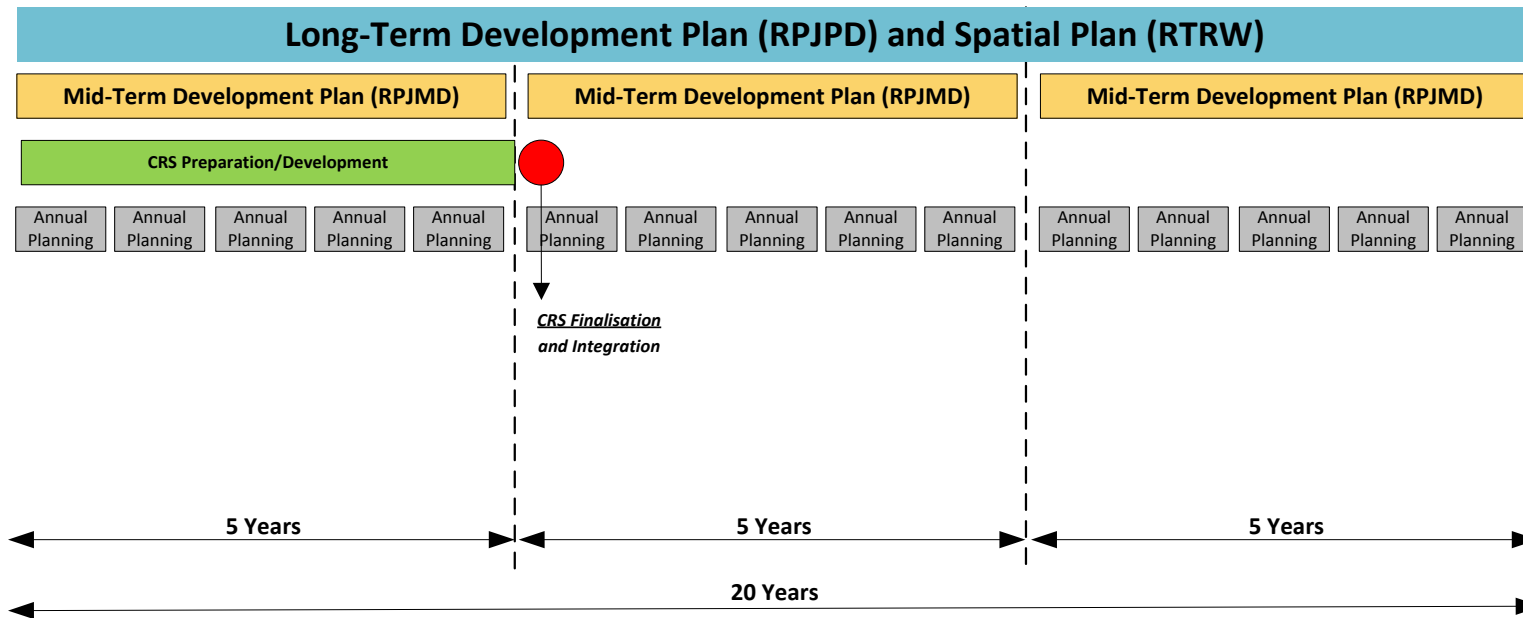


Figure 4: Planning time spans





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Figure 5: Incorporating climate resilience into spatial plans

