Initial City Assessment Report: Semarang City, Indonesia

December 2015

Executive Summary

This report summarizes the key findings of a diagnostic trip to Semarang City, Indonesia in December 15-20, 2015 conducted by the International City/County Management Association (ICMA) CityLinks team, together with climate experts from the Urban Climate Change Research Network (UCCRN). The purpose of the trip was to advance a city-to-city exchange program between Semarang, Indonesia and Gold Coast, Australia on climate adaptation and resilience. Identifying the key challenges of climate change adaptation and a set of key issues in technical exchange between the two cities were the focus of the program.

Semarang is a city located in the north of Central Java Province, Indonesia. More than twenty of its villages lie along the coast and suffer from persistent tidal flood, leading to coastal inundation and exacerbating land subsidence. The tidal flood is induced by interrelated factors, viz., land subsidence, intensifying marine activity, coastal erosion, and climate change.

Despite the numerous ecosystem- and structure-based prevention and mitigation efforts, land subsidence in Semarang prevails. The failure in decreasing the number of loss explicably comes from the ripple effect of unorganized database. The existing dataset is lack of availability and reliability, which leads to more difficulties in depicting and understanding the coastal problems in Semarang accurately.

For this reason, the CityLinks program is concerned with providing available coastal data and examining the appropriate methods for mangrove protection. The program includes several activities, namely:

1. Collecting data sources (from every local governmental agency),
2. Developing model (university and governor),
3. Initiating investigative steps,
4. Collecting experimental knowledge on mangrove (interviews or FGDs), and
5. Determining the appropriate methods for mangrove protection against destructive waves.

CityLinks team will cooperate with the city councils of Semarang and Gold Coast, universities in Indonesia and Australia, and several governmental agencies in Semarang, namely the Marine and Fisheries Office (Dinas Kelautan dan Perikanan), Agricultural Office (Dinas Pertanian), and Public Works Office (Dinas Pekerjaan Umum). The program will be complete in July 2016 and aims to address the coastal problems and climate change challenges in Semarang successfully.

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I. Brief Introduction of Semarang Coastal Area

Semarang is one of coastal cities in the north of Central Java Province, Indonesia. It is located on 6°50'-7°10' N, 109°35'-110°50' E along the strategic economic route of Indonesia. Administratively, it is bordered by Kendal Regency on the west, Semarang Regency on the south, Demak Regency on the east, and Java Sea on the north. Semarang covers an area of 373.7 km^2, divided into 16 sub-districts and 177 villages. Figure 1 shows the administrative location of Semarang.

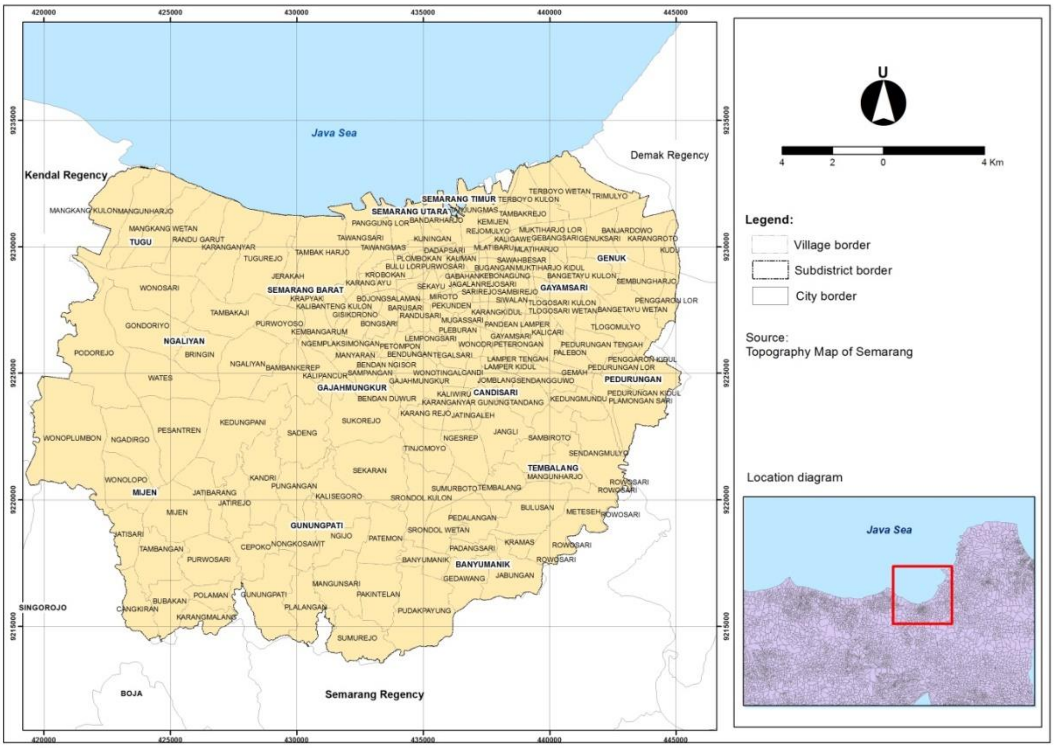

Figure 1. The Administrative Map of Semarang, Central Java Province, Indonesia

Legally, Semarang City was formed in 1950 under the Constitution No. 16/1950. Historically, it began to grow in the fifteenth century, i.e., when Ki Pandan Arang of Demak merged the small, scattered settlements in Gisikdrana, Semarang Selatan, Gajahmungkur, Borgota, Pleburan, and the surroundings into one governed area named Semarang (Maskur, 2008) with a central government in Bubukan, close to the Port of Semarang. Furthermore, Tome Pires in his book "Suma Oriental" described that in 1513 the inhabitants of Semarang consisted of Arabian, Chinese, Persian, Gujarati, Malay ethnics, etc (Tourism Office of Semarang City, 2006). Meanwhile, during the colonization era, in 1753, this city was developed northward. Hence, since the nineteenth century, the development of Semarang has centered in the north.

Semarang City in Figure shows that the population of Semarang was 1,572,105 in 2013; most of which stayed in the center of the development –i.e. coastal area, with a population density of 4,206 people/km^2. According to the statistics in 2005-2013, the population in Semarang increased by 1.4% per year. Natality and migration dominantly influence the population growth. Developing in industry, Semarang attracts more and more people to migrate and work in the city. Most of them work in industrial sector: 53,610 entrepreneurs, 176,635 industrial workers, and 86,766 traders in 2013 (BPS, 2015), while the rest of them work in agricultural sector as farmers and anglers.

The sun shines all the year in Semarang. This tropical climate is characterized by monsoonal rain that consists of one peak for each rainy and dry season, as influenced by the monsoonal wind that blows from Himalaya in Asia to the north coast of Australia. Based on the 30-year dataset of Ahmad Yani Meteorological Station, organized by the Bureau of Meteorology, Climatology, and Geophysics (BMKG) Semarang, the average annual rainfall is 1,684 mm. The peak of rainy and dry season is from December to February and from June to August, respectively. The driest observed rainfall is 1 mm at the lowest temperature, 24^0C. Hence, according to Koeppen's Climate Classification, the climate in Semarang is wet dry tropical (Aw).

Topographically, Semarang has different variation of elevation: from 0.4 to 348 masl with a distance of 27.5 km between the lowland (coastal area) and highland (hilly area) (Figure 2). The slope of the coastal area varies from 0^0 to 2^0 with a flat-to-gently-undulating morphology (e.g. in Semarang Utara, Tugu, and Genuk Sub-Districts), while the slope of the hilly area varies from 150 to 400 with a hilly-to-very-hilly morphology (e.g. in Mijen, Candisari, Banyumanik, and Gunungpati Sub-Districts).

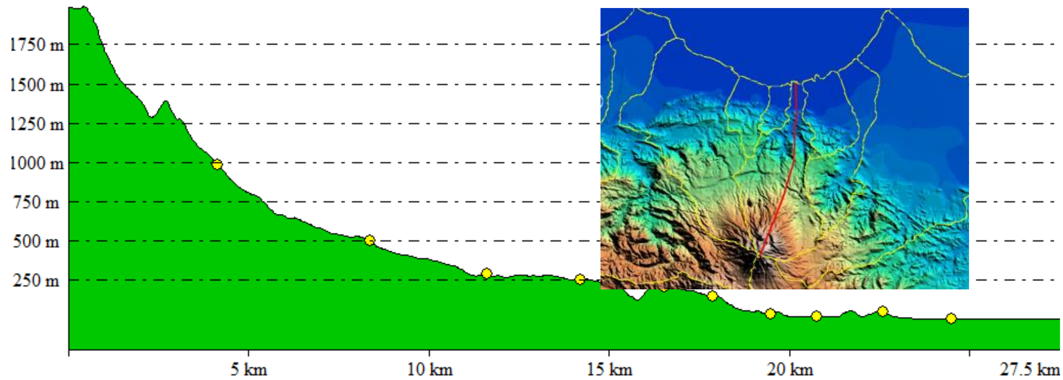

Figure 2. The Morphological Cross-Section of Semarang (Source: Helmi, 2014)

Based on the Geological Map of Magelang and Semarang (Thaden, et al., 1996), Semarang is composed of alluvium (Qa), Gajahmungkur volcanic stone (Qhg), Kaligesikvolcanic stone (Qpk), JongkongFm (Qpj), DamarFm (Qtd), KaligetasFm (Qpkg), KalibengFm (Tmkl), and KerekFm (Tmk). The lowland is composed of sedimented alluvium material, consisting of sand-silt-clay layers and some volcanic sand and gravel. Meanwhile, the highland is mostly composed of igneous rock. In addition, the geological structures consist of several types of faults that are mostly found in Kerek, Kalibeng, and DamarFm: a West-East normal fault with a Northwest-Southeast convex and North-South and Northwest-Southeast transverse faults. Another transverse fault is located along Kali

Garang, bordered by Bukit Gombel, lying northward from Ondorante to Bendan Duwur. The Geomorphological Map of Semarang, presented in Figure 3, shows the lineaments of the geological structures as well as the landforms of Semarang. The landforms of the northern part are different from those of the southern part. The northern part varies from sedimentation on the river mouth, coastal alluvial plain, floodplain, to alluvial plain, while the southern part varies from structural-denudational hill, volcanic slope, to volcanic foot slope.

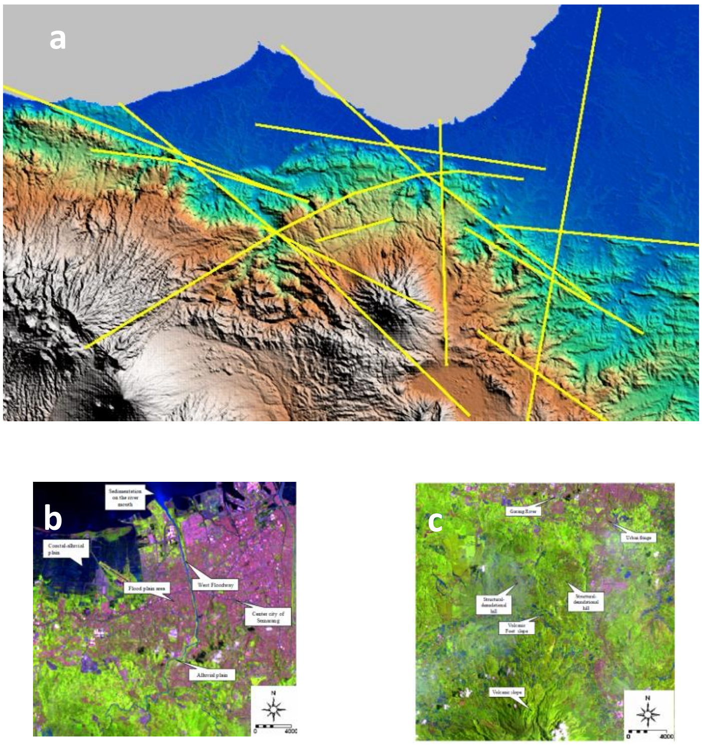

Figure 3. The Geomorphological Map of Semarang: (a) lineaments of faults and folds in yellow lines, (b) the landforms in the northern part, and (c) the landforms in the southern part (Source: Helmi (2014) and Marfai (2003))

There are more than 15 rivers flowing through Semarang. Some of them are Babon, Banger, Semarang, Baru, Kreo, Kripik, Garang, Silandak, Mangkang, and Sringin. Garang River, flowing from Ungaran Volcano to the Java Sea, has the highest discharge, which is around 53% of the total discharge flow in Semarang (Pemerintah Kota Semarang, 2015). Therefore, it becomes the most influencing river in Semarang, i.e., it controls the water supply and even the river flood hazard in the city.

The northern part of Semarang, especially along the alluvial plain, has a higher groundwater potential than the southern part. The hilly area on the southern part has limited groundwater discharge (Marfai, 20013). Unconfined groundwater (3-18 meters deep) has less discharge potential than confined groundwater (50-90 meters deep) (Pemerintah Kota Semarang, 2015). Recently, people use confined groundwater for water supply due to the scarcity of unconfined groundwater.

II. Coastal Problems in Semarang City

Climate change has been affecting almost every coastal city in the world, including Semarang. Semarang, the capital of Central Java Province, has been experiencing serious issues due to climate change impacts, for instance, coastal erosion, land subsidence, and flooding. According to Marfai et al. (2008), Semarang is classified as the fifth largest city in Indonesia due to the increasing population (1.5 million) and population density as well as flourishing economic activities in industry and fishery. This city is located along the northern coast of Java, which is mainly composed of young alluvial swampy deposits with clay and fine sand. This type of materials is originated from marine and river sedimentation (Said and Sukrisno, 1982).

The CityLinks' discussion on November 18-20, 2015 listed several problems faced by Semarang. The problems are as follows:

a. Coastline recession due to coastal erosion

The coastline in Semarang has been receding, as proven by the distance between the present and the former coastline (Figure 4), due to coastal erosion. Large materials on the coastline are eroded, causing excessive land loss in Semarang. Consequently, anglers, as the most affected livelihood in the coastal area, have been losing their fish ponds to land recession.

Figure4. Coastline Recession in Semarang
(Source: Helmi, 2014)

Together with the government, the local people built wave breakers and sea wall as a structural protection against high tides and longshore currents. However, the rate and the extent of coastal erosion in Semarang are still high. Therefore, they apply different methods, which are mangrove tree planting and sediment trapping using hybrid technology. These methods are expected to provide a long-lasting coastline protection as well as coastal area restoration.

b. The construction of Tanjung Mas Harbor

The Tanjung Mas Harbor was constructed extending the main land as a groin or cape (Figure 5). Unfortunately, the structure of the harbor acts as a barrier, i.e., it prevents longshore current from transporting sediments to the east side of the harbor and, therefore, deposits the sediments on the west side. A prolonged process potentially leads to silting on the west side and extensive erosion on the east side. However, the future condition depends on the movements of the longshore current. Therefore, further research on predicting the foreseeable movements become necessary.

Figure 5. Tanjung Mas Harbor (red line)

c. Mangroves destruction due to high tides

Natural mitigation to prevent coastal erosion includes restoring the mangrove ecosystem in the coastal area. Mangrove trees provide a number of advantages, namely absorbing the energy of wind and tide as well as purify polluted water. The local government of Semarang, together with the local people and NGOs, had planted mangrove trees along the coastline before they were damaged by strong wind and high tides during the west monsoon. Regarding the urgency of mangrove protection, the Ministry of Marine Affairs and Fisheries has been developing a hybrid-engineering model whose functions are not only as wave breaker but also as sediment trap. This model is designed to trap sediment from offshore and store it into the hybrid-engineering system. When the amount of the trapped sediment is accumulated enough, the sediment is used for mangrove tress planting.

The local people also built wave breakers made of mud-filled car tires (Figure 6). These wave breakers are placed in front of the mangrove trees in order to reduce the energy of wave and high tide. However, the unstable structure makes them damaged easily. Therefore, these wave breakers need to be reconstructed every 5 years.

Figure 6. Mud-filled car tires for wave breakers and mangrove protection

The government also built wave breakers as a structural protection against coastal erosion (Figure 7) and intensive energy from waves and longshore currents. However, the structure is damaged because of inadequate construction plans.

Figure 7. Wave breaker in Trimulyo

d. Land subsidence

Land subsidence in Semarang is naturally triggered by tectonic process and soil consolidation. At the same time, this coastal city experiences a rapid population growth and economic development in industrial sector. The development of industrial sector in the area potentially exacerbate the existing land subsidence due to increasing structural loads and groundwater over-extraction for industrial activities. The movements of the Earth's material causes land to subside gradually (Marfai et al., 2007). Consequently, several houses subside over time (Figure 8 and 9).

Figure 8. Land subsidence in Tambak Rejo

Figure 9. Land subsidence in Tambak Lorok

The rate of land subsidence in Semarang is up to 5.8 cm/year (Helmi, 2014). This rate of subsidence occurs due to compression between aquifer layers and unconsolidated materials, consisting of clay or silt materials (easily collapsed), rock dissolution, and oxidation of organic soils. Nevertheless, it mostly occurs because of groundwater withdrawal. Identifying the main problem that causes land subsidence becomes important in determining the best solution. The rate of land subsidence in Semarang is shown in Table 1.

Table 1. Land subsidence rate in Semarang

No.	BM no.	Year	Elevation (m)	Elevation in 1996 (m)	Elevation in May 2000 (m)	Differences (cm)	Subsidence (cm/year)
1	BM 1	Oct 1997	0.593	-	0.415	-17.8	7.1
2	BM 2A	Oct 1997	2.026	-	1.614	-41.2	16.5
3	BM 14	Oct 1997	0.892	-	0.874	-1.8	0.7
4	BM 16	Oct 1997	5.023	-	4.955	-6.8	2.7
5	BM 17A	Oct 1997	2.543	-	2.431	-11.2	4.5
6	BM 19	Oct 1997	2.687	-	2.548	-13.9	5.6
7	BM 20	Oct 1997	3.460	-	3.422	-3.8	1.5
8	BM 21	Oct 1997	4.495	-	4.453	-4.2	1.7
9	BM 22	Oct 1997	7.497	-	7.425	-7.2	2.9
10	BM 23A	Oct 1997	7.017	-	6.982	-3.5	1.4
11	BM 27	Oct 1997	2.387	-	2.248	-13.9	5.6
12	BM 28	Oct 1997	1.549	-	1.370	-17.9	7.1
13	BM 29A	Oct 1997	2.547	-	2.471	-7.6	3.1
14	BM 30	Oct 1997	7.02	-	6.920	-10.8	4.3
15	DTK 000	1991	5.494	5.421	-	-7.3	1.5
16	DTK 008A	1991	20.777	20.743	-	-3.4	0.7
17	DTK 009	1991	7.906	7.860	-	-4.6	0.9
18	DTK 013	1991	5.222	5.117	-	-10.5	2.1
19	DTK 135	1993	3.305	3.232	-	-7.3	2.4
20	DTK 136	1993	1.409	1.288	-	-12.1	4.0
21	DTK 218	1993	1.016	0.915	-	-10.1	3.4
22	DTK 221	1993	1.148	1.002	-	V14.6	4.9
23	DTK 222	1993	1.532	1.358	-	-17.4	5.8
24	DTK 223	1993	2.010	1.834	-	-17.6	5.9
25	DTK 224	1993	2.228	2.085	-	-14.3	4.8
26	JP 1	Oct 1997	0.922	-	0.633	-28.9	11.6
27	JP 2	Oct 1997	1.015	-	0.859	-15.6	6.2
28	JP 3	Oct 1997	0.926	-	0.658	-27.0	10.8
29	JP 4	Oct 1997	0.744	-	0.509	-23.5	9.4
30	JP 5	Oct 1997	2.999	-	2.792	-20.7	8.3
31	JP 6	Oct 1997	0.986	-	0.864	-12.2	4.9
32	JP 8	Oct 1997	2.864	-	2.766	-9.8	3.9
33	JP 10	Oct 1997	7.980	-	7.900	-8.0	3.2
34	TTG-442	Oct 1997	6.338	-	6.283	-5.5	2.2
35	TTG-443	Oct 1997	4.137	-	4.096	-4.1	1.6
36	TTG-446	Oct 1997	4.362	-	4.256	-10.6	4.2
37	TTG-926	1984	1.612	0.640	-	-97.2	8.1
38	TTG-927	Oct 1997	3.234	-	3.039	-19.5	7.8

(Source: PWD, 2000 in Marfai,et al., 2007)

III. Discussion Summary

The main purpose of the Regional Development Planning Agency (Bappeda), as written in the city's master plan, is restoring the coastline and developing the coastal area of Semarang for tourism purposes as well as conservation area. The calibration for the developed model requires several data, such as:

1. Tide information along the Java Sea in order to understand the global current,
2. Data from marine gauge stations for calibrating the results of global current modelling,
3. Bathymetry data of the Java Sea,
4. The topography of the catchment area (extracted from DEM data),
5. A set of data for modelling flood in the catchment area: rainfall, land use, bathymetry of the river, and water level (SPAS) for calibrating the model,
6. A set of data for coastal modelling: tides, waves, and currents,
7. Images of Semarang in order to understand the history of Semarang,
8. Bathymetry of the coast of Semarang,
9. Coastline change (extracted from images of Semarang), and
10. More detailed data on Semarang.

Intensive observation, discussion and experience sharing with related parties lead to the following recommendations:

1. Regular survey for coastline to monitor the changing of coastal morphology,

2. Monitoring from images,
3. For mangrove:physical modelling to decide the right place for planting mangrove,
4. Reviewing the regulation in Gold Coast after the second visit (which regulation is applicable for Semarang),
5. Consolidations with the help of the universities,
6. Building capacity of the society,
7. Conceptual modelling for spatial planning in 2100, and
8. Calculating the budget for Planning.

IV. Project Suggestion

Regarding the overviews on the problems in the coastal area of Semarang City, Gold Coast, as representative, suggested several projects that can solve the problems. The suggested projects are based on the main problem of Semarang City, i.e., the lowest basis level of problems in development: lack of data. Therefore, data should be maintained firstly so that, later, the city is able to run some predictive models to investigate and establish the actual condition in Semarang City. By the end, the results of the investigations can provide a strong basic reason for mitigation and decision-making. Figure 10 shows the framework of these suggested projects.

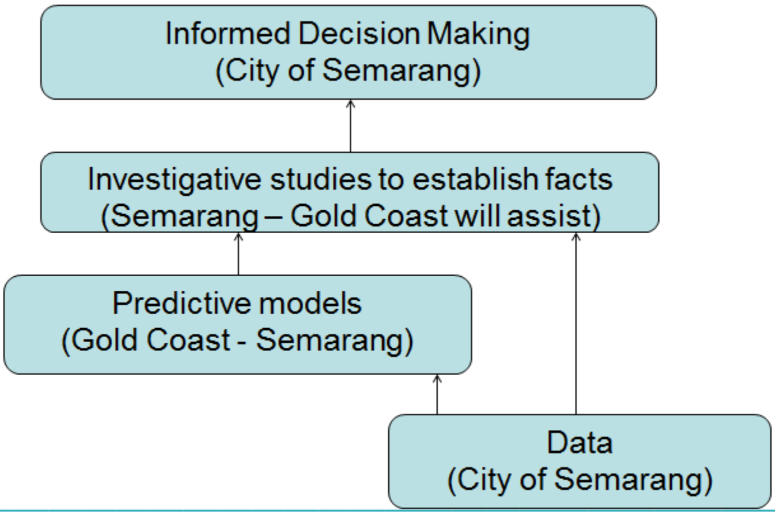

Figure 10. The framework of the projects suggested by the Gold Coast's representative

There are four projects recommended by Gold Coast. Every project is related to each other. Those projects are written in Table 2.

Table 2. Project and Output Recommendation

Suggested Projects	Purposes	Outputs
1 – Base-line study	1. To establish current state of affair. 2. To collate all available data. 3. To list all the challenges and research questions.	1. List of questions. 2. All available data accessible for work programs 2 and 3 3. Stakeholders: all agencies 4. Lead agency: City of Semarang
2 – Modelling	1. To establish the reason for losing inter-tidal lands. 2. To predict effectiveness of various mitigation scenarios.	1. A suite of models of the Java Sea (and possibly of the City of Semarang) to be handed over to the City of Semarang. 2. Capacity building in the City of Semarang. 3. Stakeholders: all agencies 4. Lead agency: City of Gold Coast (this project is subject to availability of required data).
3 – Mangrove	1. To answer research questions that may arise from project 1 about mangroves.	1. Stakeholders: all agencies 2. Lead agency: Semarang
4 – Constraint Mapping	1. To develop relevant policy, constraint maps such flood planning level map, surface water quality control, preloading (land subsidence management) policy, to prepare adaptation plan to enable sustainable development, etc.	1. Relevant constraint maps and policies, and plans. 2. Stakeholders: all agencies 3. Lead agency: Semarang (help from Gold Coast)

V. Problems and Workflows

The above discussion leads to conclusions that the most concerning problem in Semarang is **Coastal Erosion**. Therefore, the main objective is to create **Urban Coastal Protection in Semarang.** The coastal erosion in Semarang involves two sub-problems, which are:

- Sub Problem 1: Lack of understanding of the root causes

  Most of the mitigation efforts in Semarang City failed to prevent further coastline recession. The main reason of this failure is the lack of understanding of the root causes. Several data are not available, such as sea current, sea tide, precipitation, etc. Lack of available data may lead to under- or over-estimating the coastal characteristics of Semarang City. Here are several solutions for this sub-problem:

  1. Collecting data sources (from every local governmental agency),
  2. Developing model (university and governor), and
  3. Initiating investigative steps.

- Sub Problem 2: Need to develop appropriate methods for mangrove protection

  Mangrove ecosystem is the best solution for natural mitigation in the coastal area of Semarang. However, it requires appropriate protection in order to optimize its function as natural wave breaker. Nowadays, the mangrove-protecting structure cannot last for a long time, only 1 to 2 years. At the same time, a mangrove tree needs a minimum time of 5 to 10 years to grow and provide its protective service. Here are several solutions for this sub-problem:

  1. Collecting experimental knowledge on mangrove (interviews or FGDs) and
  2. Determining the appropriate methods for mangrove protection against destructive waves.

These two sub-problems are divided into five (5) workflows, which have to be conducted consecutively.

-**Workflow 1**: Developing mangrove report (Opt: for Mercy Corp and Fishery Agencies)

1. Developing questionnaire
2. Identifying stakeholders
3. Consolidating answers
4. Feeding into the overall report
5. Sharing with Gold Coast

- **Workflow 2**: Understanding the source of the problem

1. Identifying the required data - Hamid
   a. Tide data along the Java Sea, wave, bathymetric and current, and precipitation data (collecting from stakeholders)
   b. Air photos (time series spatial data)
   c. Changes along the coastline
2. Identifying the data organizers - Safrinal and Aris
3. Collecting all relevant data – Safrinal and Aris

-**Workflow 3**: Developing the model

1. Preparing the source students (research assistants? Informants?)
2. Preparing the source of the modelling software
3. Developing and calibrating the model

4. Reporting and feeding into overall report

-**Workflow 4**: Capacity Building of Model (Establishing the capacity building of the model? Disseminating/introducing the model? Building the capacity of the model?)

1. Preparing the source student from university to maintain the model
2. Establishing a relationship between Semarang and the university
3. Developing an MoU (Memorandum of Understanding) between the university and the City of Semarang
4. Bringing the model from Gold Coast and training the university and the employees of the City of Semarang
5. Hosting a conference to gain an insight from the community regarding the model

-**Workflow 5**: Developing the final report

1. Completing the first draft of the final report
2. Finishing the final report
3. Presenting the final report to the City of Semarang

VI. Related Agencies

Semarang City has many governmental agencies that are responsible of the problems in its coastal area. Some of them have bigger influences on developing the coastal area according to their area of works and functions, which are:

a. Marine and Fisheries Office (Dinas Kelautan dan Perikanan)
b. Agricultural Office (Dinas Pertanian)
c. Public Works Office (Dinas Pekerjaan Umum)

In order to meet every objective of this project, contribution from and coordination/cooperation between these three offices, the Regional Development Planning Agency, and the City Council of Semarang become necessary.

VII. Timetable

Each activity in every workflow is scheduled for the rest of the 9 months. The 10-month project is shown in Table 3. The people in charge are described as follows:

a. Safrinal : as the representative of Semarang City
b. Hamid : as the representative of Gold Coast
c. Aris : as climate expert

*Team: people, organizations, institutions, and agencies contributing in this project

Table 3. Time Table

Workflows	**Person in Charge**	**Month**										**NOTES**
		Nov	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	
Exchange 1		**X**										
Workflow 1: Mangrove report												

1. Developing questionnaire	Safrinal AND Hamid											
2. Identifying stakeholders	Safrinal											
3. Consolidating answers	Safrinal											
4. Feeding into overall report	Safrinal											
5. Sharing with Gold Coast	Safrinal											
6. Gold Coast Responds to Report	Hamid											
Workflow 2: Data Source												
1. Identifying the required data	Hamid											
2. Identifying the data organizers	Safrinal AND Aris											
3. Collecting all relevant data	Safrinal, Aris AND Hamid											
4. Sending data to Gold Coast	Safrinal											
Exchange 2 to Gold Coast												
Workflow 3: Model Development in Gold Coast												
1. Source Student	Hamid											
2. Source Software	Hamid											
3. Developing and calibrating the model	Hamid											
4. Reporting and feeding into the overall Report	Hamid											
Workflow 4: Capacity Building of Model use in Semarang												
1. Source university to maintain model	Safrinal AND Aris											

2. Establishing a relationship between Semarang and the university	Safrinal and Aris											
3. Developing an MOU between the university and the City of Semarang	Safrinal and Aris											
4. Bringing the model and hosting a training to university students and city employees	Hamid, Safrinal AND Aris											Safrinal to provide room for training
5. Hosting a conference to gain an insight from the community regarding the model	Asris AND Safrinal											
Exchange 3 to Semarang												
Workflow 5: Report Development with Recommendations												
1. Completing the first draft	Team											
2. Final draft	Team											
3. Presenting the report to the City of Semarang	Team											

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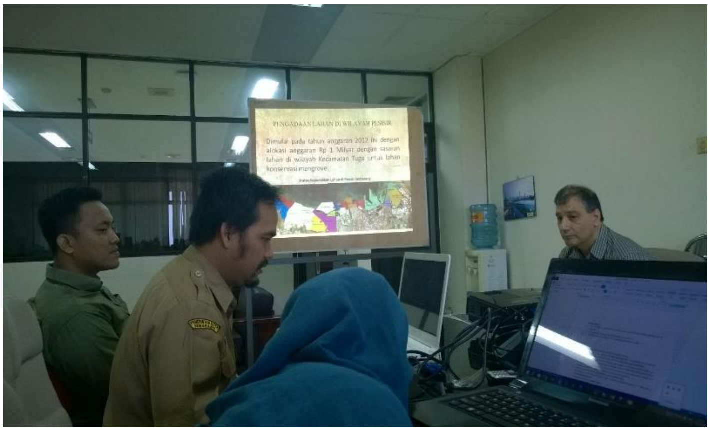
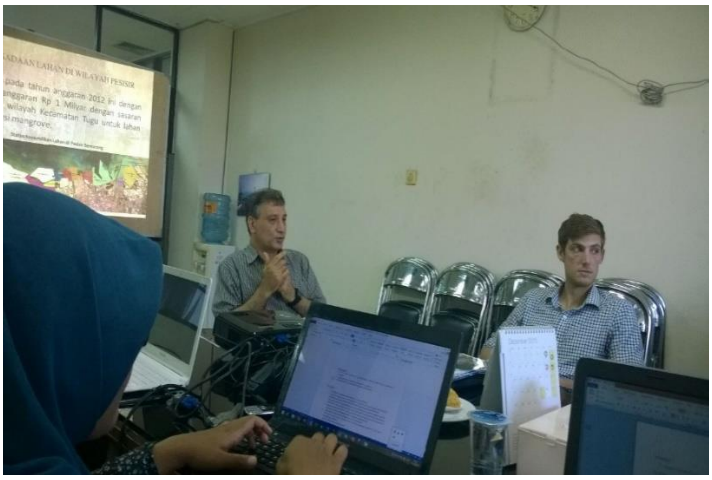
Appendix

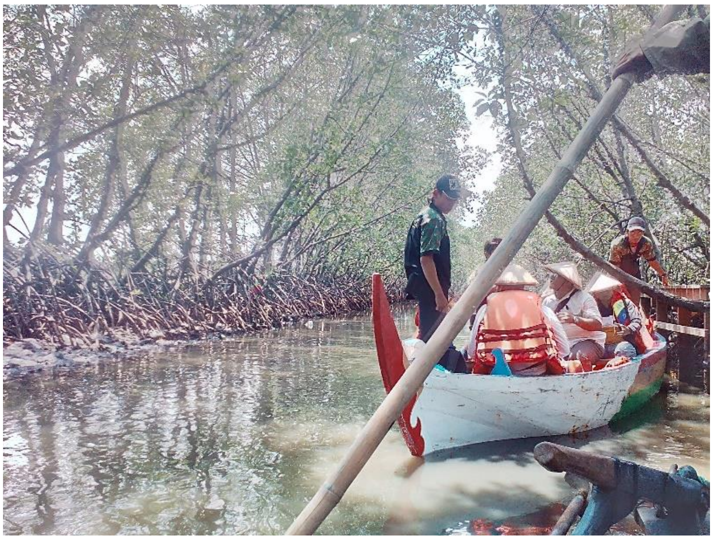
1. Discussion session with Semarang - Climate Change Adaptation Task Force (City Team)
   Date : November 16th, 2015
   Place : Development and Planning Board Office





2. Field Visit at Tapak, Tugurejo.
   Date : November 17th, 2015
   Place : Tapak Village

   Site seeing mangrove forest, mangrove nursery, pond, wave breaker for mangrove protection and shoreline with local community who focused on mangrove consevation in Tapak village. The mangroves are planted in the pond to strengthen the pond's dike made from muddy materials. The mangrove also funtioned for fish breeding/ nursery and absord pollutions in the water.



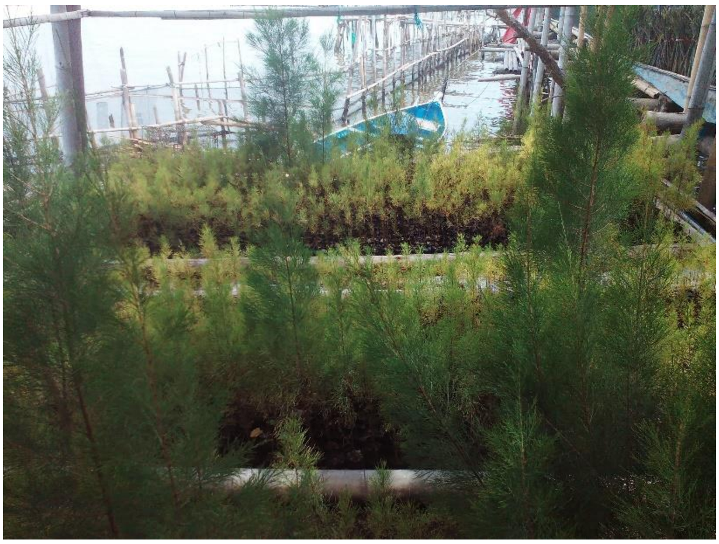
3. Fieldtrip in Tambakrejo

Date : November 17th , 2015

Place : Tambakrejo

Tambakrejo is slum area with several environmental problems such as sanitation, poverty, waste, and health issues. This village has been experiencing land subsidence and tidal flood for several years. The pictures below show adaptation strategies by local people, i.e. (a) raising the ground to a certain elevation; and (b) developing mangrove nursery and casuarina trees for coast.

(a)



(b)

4. Fieldtrip to Trimulyo

Date : November 17th, 2015

Place : Trimulyo

Surveying wave breaker and hybrid engineering developed by Marine Agency

5. Conclusion and Closure
   Date : November 19th,2015
   Place : Development and Planning Board Office

   Discussion and sharing with related institutions.