

SEMARANG, INDONESIA + GOLD COAST, AUSTRALIA

COASTAL COMMUNITIES like Semarang are particularly susceptible to the impacts of climate change. Intense storms, beach erosion, and flooding are of particular concern to the city of Semarang. Located on the northern coast of Java, Indonesia, Semarang has a population of 1.6 million. The majority of the city's coastline is owned by private entities, which poses a challenge for the municipality in terms protecting and regulating the coast.

The City of Semarang has undertaken several remediation measures to address coastal erosion, which have achieved limited success. In the western section of the city, where fish ponds are located, the primary defense has consisted of planting of mangroves and building permeable sea walls made of sticks. However, the efforts at ecosystem restoration are often thwarted due to coastal flooding from rainfall that overwhelms the city's sewage system. As a result, water flowing into the mangrove area is polluted, slowing the maturation process of the trees. Moreover, resulting large tidal variations tend to wash out the young trees before they can mature.

PARTNERING ON SHARED CLIMATE CHALLENGES

In an effort to help the city with science based decision support related to this challenge, the CityLinks team paired Semarang with Gold Coast, Australia. Gold Coasts' extensive knowledge of coastal erosion and coastal modeling will assist the city of Semarang with modeling efforts to ensure that resources are going toward coastal restoration techniques that will have the intended impact.

RESULTS

1

A Memorandum of Understanding was developed and signed between Semarang's planning agency (BAPEDA) and Diponegoro University, enabling the City of Semarang to use, develop and run predictive coastal models and to investigate inundation problems in the City of Semarang systematically and scientifically.

2

Over \$80,000 USD worth of coastal modeling software was provided free of charge from the Danish Hydraulic Institute for use by post graduate students at Diponegoro University for the benefit of the city of Semarang.

3

Development of a regional large scale hydrodynamic model of the Java Sea was created and handed over to the City of Semarang.

4

A group of ten postgraduate students and staff from BAPEDA were trained to run coastal models and develop more refined models for the City of Semarang.

SEMARANG, INDONESIA + GOLD COAST, AUSTRALIA

DIAGNOSTIC ASSESSMENT: IDENTIFYING CHALLENGES

- Substantial engineering intervention along the Semarang’s coastline may have potentially caused local erosion and loss of sand that will be exacerbated by sea level rise.
- Mangrove plantation has been used as a major mitigation measure for a number of years, however, the problem of coastal erosion has not been measurably alleviated.
- There is a need for science based decision support tools to address coastal erosion and sea level rise going forward.

TECHNICAL EXCHANGE: SHARING BEST PRACTICES

- Demonstration of hydrodynamic models in Gold Coast, how they accounted for climate change impacts, and how they were utilized to inform coastal planning decisions.
- Engineered and natural mitigation efforts implemented to combat coastal erosion.
- The utilization of green space specifically engineered as a nature park that doubled as a way to combat and treat storm water runoff.

WORK PLANNING:

CREATE ACTIONABLE PROGRESS TOWARD UNDERSTANDING THE SOURCE OF THE SEMARANG’S COASTAL INUNDATION PROBLEM AND DEVELOP TOOLS THAT SUPPORT FINDING A SOLUTION.

OBJECTIVE

To develop a greater understanding of the physical forces at work along the Semarang coast, resulting problems, and potential solutions through a systematic and scientific approach

ACTIVITY 1: PROBLEM IDENTIFICATION & ASSESSMENT

Conduct site visits to learn more about the challenges being faced, identify the potential sources of problem, discuss current coastal management practices in Semarang, and source data for better assessment of situation and supporting future modelling exercise.

ACTIVITY 2: TOOL DEVELOPMENT FOR DATA-DRIVEN DECISION-MAKING

Introduce techniques, training, a base model and tools being used to address coastal management challenges by the City of Gold Coast.

ACTIVITY 3: TRAINING IN COASTAL MODELING SOFTWARE & DATA ANALYSIS

Establish a working partnership with local university, Diponegoro University, and train a team of postgraduate students and planning staff to create predictive coastal models to understand the physical forces at work along the Semarang coast.

CROSS-CUTTING RECOMMENDATIONS AND LESSONS LEARNED

- 1 Forging partnerships between city governments and universities benefit both parties by allowing academics to understand the practical needs of local government managers, while giving local government managers access to the scientific data they need to make informed decisions.
- 2 Coastal modeling can provide an evidence base for planners looking to ensure that city growth and development is done with climate change in mind.
- 3 Working with cities facing similar challenges allows practitioners to brainstorm solutions and generate “out of the box” ideas.