

Executive Summary - Team AdverCity

Problem: Over the next few decades, the entire world will experience sea level rise. This will intensify storms, weaken coastal cities, harm fisheries, and cause numerous other problems. However, Jakarta, Indonesia will experience more severe sea-level rise than most of the world because of its unique under-sea geography and gulf-stream water pressure that gets trapped by the cluster of land masses. Jakarta is also sinking due to the erosion of the coastlines and the depletion of the underground aquifer.

Primary Hypothesis: Building natural and innovative sea-walls will fortify the city, its inhabitants, and its thriving economy.

Secondary Hypothesis: Improving access to climate-related data will reduce the impact of natural disasters on local populations by allowing them to better understand and adapt to climate trends.

Solution - Seawalls: Our plan is to create a mix between artificial walls using porous concrete that can absorb and withstand salt water in key areas, and genetically-modified mangroves to provide a natural, sustainable barrier elsewhere on the coastline.

Solution - Drainage: In the event of a storm, water gets collected until it gushes out into the urban areas of the city. There's also waste accumulation that's caused by broken drainage systems and the lack of sanitation among inhabitants within the society. To address this issue, we proposed to redesign drainage systems by using polymer concrete and one-way valve pumps. Also, we plan to convert waste materials into compost for plantation fields. Organic waste is segregated and shredded through the process of composting. After processing, they become organic fertilizers for plants.

Solution - Education: Our solution approaches education from two angles, the first being public awareness and the second climate data dissemination. We will build upon a successful, small scale Disaster Risk Reduction project implemented in a rural section Indonesia by the United Nations Development Program. Combining public awareness modules with current community development meetings, we can concur that critical information would reach a broader, adult audience unaware of the gravity of the situation.

As part of our short-term education solution, we will restructure climate data input and coordination, and identifying training strategies such as technical training, field schools and community learning centers. This data will be incorporated into the machine-learning model that can predict floods to further improve the accuracy from 83%.

As part of the long term solution, a machine learning model was developed using sea level data in combination with floods that occurred in Indonesia and will be improved using precipitation data. The model will keep learning based on floods that occur in the future, further increasing the accuracy from 83%.