

Report on Climate Change Impacts in Penang

Executive Summary

- Like all countries around the world, Penang is already feeling the impacts of climate change, and experts caution that they will get worse if no drastic actions are taken. The United Nation's Intergovernmental Panel on Climate Change (IPCC) has reported that the critical threshold for extreme weather events lies between 1.5°C to 2°C of warming. Currently, evidence shows that the world is moving towards a 2-3°C increase in temperature by the end of the century making the issue of climate change critical
- Penang has already seen an increase in **rainfall intensity** with the annual rainfall per hour increasing sixfold from the 1990s, from an average of 31mm to 180mm today. More intense rainfall will lead to more floods, which is compounded by the loss of permeable surface areas and disturbance to natural water flows caused by poorly planned development. Increased rainfall will also cause more instances of landslides and soil erosion.
- Penang will experience more **drought** events as the periods of dry spell are prolonged. This will threaten Penang's water security as the supply of treated water relies mainly on one source – Sungai Muda. Increased drought events will also impact food and crop production. Overall, these effects will bring inconveniences to people's livelihood and threaten the local economy as the need for water rationing increases due to inadequate water supply. In 2016 alone, Penang spent close to half of million Ringgit on cloud-seeding.
- With long coastlines, Penang is particularly susceptible to **rising sea levels**. The National Hydraulic Research Institute of Malaysia (NAHRIM) has projected a sea level rise of 0.68m by 2100 in Penang, which will permanently inundate large areas of coastlines, including paddy fields, on the Mainland and parts of Balik Pulau on the Island. Saltwater intrusions will also negatively affect water supply.
- Another potentially serious concern is the increased occurrence of **heatwaves**. By 2050, it is predicted that the northern part of the Peninsular, including Penang, will face more than 240 days per year where temperature reaches beyond 35°C. Heatwaves can cause numerous fatalities and may make certain places uninhabitable.
- Extreme weather events and permanent change of local weather will threaten **food production**. Production of staples like rice and vegetables will be affected by disasters (such as floods and drought) and loss of land due to sea level rise. In addition, pest attack on crops is also expected to increase, further compounding the issue. Climate change has also warmed up and increased the acidity of the ocean. Increased sea surface temperature will destroy marine ecosystems such as coral reefs and drive away species of fish from Penang's sea. Staple fish stocks, like the

Indian mackerel (*ikan kembung*), are expected to disappear as early as 2050 if sea surface temperature continues to rise.

- Climate change threatens Penang's **biodiversity**. Sea level rise might decimate its mangrove forests, which act as good coastal defences against floods as well as nursery for fish and other marine organisms. Increased heat will also drive away, or worse cause the extinction of, certain terrestrial as well as marine species.
- Penang will face **public health** crises as a result of climate change, such as the spread of infectious diseases. Outbreaks of certain vector-borne diseases, like dengue, are predicted to increase in Malaysia as weather changes. Frequent flooding and disruption to water treatment facilities from disasters will also increase the instances of water-borne diseases such as cholera.
- The **socio-economic implications** arising from climate change cannot be ignored. The high financial costs of disasters, inflation and recession (for example, food shortage will push up prices), unemployment, declining labour productivity, crimes and conflicts, and climate migration and displacement, are just some examples of the devastating impacts to society as a whole. Climate change will create a domino effect on the natural as well as social ecosystems that will threaten the prosperity and growth of Penang.
- Climate change will amplify the vulnerabilities of Penang, as well as create new challenges. Penang needs to quicken its transition to a **low carbon economy** to help mitigate the risk of a runaway climate. At the same time, it needs to take **climate adaptation** seriously, which entails the State Government taking proactive steps to make its people, infrastructure, and institutions more resilient and better prepared to deal with the impacts of climate change.