PENANG GREEN AGENDA 2030

Title: Disaster Risk Reduction and Management

Prepared by : Disaster Risk Reduction and Management Working Group
Division : Think Tank & Policy
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Level 46, KOMTAR,
10503 Penang,
Malaysia

t : +604-250 3321 / 3322
f : +604-250 3323

e : info@pgc.com.my
w : www.pgc.com.my

EXECUTIVE SUMMARY

Penang is susceptible to disasters, ranging from the annual occurrence of floods and severe air pollution to occasional landslides. Although the disaster fatality rates are relatively low, economic losses and social upheaval experienced by victims and the public cannot be underestimated. As the pace of development continues and the impact of climate change becomes more apparent, the frequency and severity of these disasters will increase. Instead of reacting to events as and when they happen, it is pertinent that the Penang State Government takes more proactive steps to identify, assess and monitor risks and the vulnerability of Penang. A thorough risk and vulnerability assessment is an essential start to effective disaster risk reduction and management in Penang.

The current governance structure set out in MKN 20 is top-down, confined to government actors and dealing mainly with operational matters during a disaster. Within the current structure, District Officers play an important role in initiating and coordinating efforts at a local level. At the state level, a small team under the State Secretary (or Setiausaha Kerajaan Negeri) is in charge of not only disasters but also safety and security. Resources are being stretched and the various Government departments are just about able to deal with situations when they arise; no agency is in charge of making sure Penang is resilient against future new threats. Furthermore, despite the important role of Non-Government Entities (NGEs) in providing the much needed emergency aid and after-care programmes, the Penang State Government currently does not have a strategy to work with these actors effectively.

In this current system, the role of the public in recognising and preparing for risks is also neglected. Lack of awareness and knowledge about how to deal with risks increases their vulnerability and cause unnecessary fatality and damage. Lack of proactiveness from the community could also complicate rescue missions. Penang's first responders and rescue teams are already doing an important job in protecting lives and property but more can be achieved by enhancing the role of the community.

The Working Group on Disaster Risk Reduction and Management proposes the following **four recommendations** to improve disaster management in Penang, after taking into account their impact and ease of implementation:

1. Programme to increase public awareness and education (2020)

There needs to be programmes to raise awareness and educate the public about disaster risks in Penang and, more importantly, what to do during a disaster. This can be done through the formal education system (schools etc) as well as capacity-building courses or training with vulnerable groups. If the public is more aware of the disaster risks and is well prepared, it will have a huge impact on reducing the vulnerability of Penang to disaster. This will also make the work of emergency services more effective. This is a low hanging fruit that can be implemented quite quickly.

2. Better early warning system (2020)

This is about increasing the capacity of the State to improve the disaster early warning system either by integrating data systems, adopting more effective dissemination technology (WhatsApp etc), or placing more equipment (e.g. sensors) in the right locations. Improving the early warning system will have a positive impact on the resilience of Penang in facing future disaster risks. This, like a low hanging fruit, can be implemented relatively quickly.

3. Setting up a dedicated disaster management unit at the State level (2021)

The establishment of a dedicated disaster management unit will improve the capacity of the State to deal with disasters. For example, the development of a proper and proactive disaster management framework with clear strategies to reduce the number of victims and economic losses caused by disasters can build Penang's resilience. In this way, the State can also access international disaster management funding and ensure disaster aids and resources are used efficiently. Having a dedicated unit will also promote accountability and improve coordination efforts among all Governmental and Non-Governmental stakeholders. Having a dedicated unit with separate funding and resources will have a considerable impact on disaster management in Penang. This is not a low hanging fruit due to various reasons (cost, availability of candidates, political will etc) but the first step is already being initiated.

4. Land use resilience planning (2025)

Penang can increase its resilience towards disasters through comprehensive and forward-looking land-use planning. This will include incorporating measures to increase climate resilience and reducing long-term risks to people and property, such as robust infrastructure planning and scenario modelling into Local and Structure Plans. This is also about tackling "man-made" disasters at the source i.e. uncontrolled or irrational development. This has been identified as having the highest impact on increasing resilience and reducing the vulnerability of Penang in relation to disasters. It will take a while to change the current standard operating procedures, mindset, assumptions and planning tools to incorporate resilience into land-use planning. However, elements can be introduced gradually and an overhaul of the Structure and Local Plans can take place in 5-7 years' time.

1. Background

1.1 Penang Green Agenda 2030 and Disaster Management

Disaster Risk Reduction and Management (DRRM) is one of the ten key focus areas identified as urgent issues in Penang. A series of serious floods and landslides have in recent years hit Penang that has caused the loss of human lives and property damage. While the Penang State Government currently focuses on carrying out major flood mitigation projects, it should also look at other non-structural measures that will help solve or ameliorate the problems at the source. This is particularly important as Penang will have to brace for the new reality of sea-level rise, serious flooding, drought, loss of species and damage to our ecosystem as an inevitable result of climate change.

The focus of the DRRM Working Group is to look for ways to increase Penang's resilience against disasters through integrated planning and reducing vulnerability. After General Election 14 (GE14), the Penang State Government should reassess its DRRM plans in order to maximize the help and support it can secure from the Federal Government to safeguard the integrity of its people, economy and environment for the coming decades. Most importantly, the Penang State Government should look into creating a more integrated and comprehensive DRRM system. In addition, the Penang State Government should take future threats from climate change seriously and make sure that existing, as well as planned infrastructure projects, are appropriately prepared for the impact. The Penang State Government should also introduce policies to govern the different phases of disasters, including pre- and post-disaster management that are currently overlooked.

1.2 Current Situation

When it comes to dealing with disasters, the Penang State Government has to follow Directive 20 issued by the National Security Council (MKN) of Malaysia in 1997.[1] The Directive, widely known as MKN20, outlines a policy and mechanisms that govern the role and responsibility of the respective Government agencies before, during and after a disaster. It adopts a very top-down approach in relation to disaster management. The scope of MKN20 covers all types of land-based disasters, including natural and man-made disasters such as industrial accidents, floods and landslides and major transport-related accidents.

MKN20 sets out the governance structure for dealing with disasters within the Government. Generally, there are three levels of administration for disasters management. At the district level, the District Officer will chair operations for localised events that do not cross districts. If a disaster affects more than one district, the State Secretary (Setiausaha Kerajaan Negeri or SUK) will coordinate and oversee the operation at the state level. In the event of a major incident that crosses the state boundary, the operation will be chaired by the Deputy Prime Minister's Office. These three levels of administration are clearly defined and guide the coordination of various government agencies in disaster management. The Royal Malaysia Police is in charge of rescue and recovery operations at the scene of a disaster.

[1] Majlis Keselamatan Negara, Arahan No. 20: Dasar Dan Mekanisme Pengurusan Bencana Negara. <http://www.ump.edu.my/doc/arahan-mkn-no.20-semakan-semula-09_02_2013.pdf>

At the SUK level, a small team under the Service Management Unit is in charge of the overall safety and security issue in Penang, including disaster management. As a result, the team currently only has the capacity to respond to disaster events as and when they happen. It does not have the capacity to take proactive steps such as carrying out a risk and vulnerability assessment or establishing a comprehensive disaster management strategy. There is currently also a lack of effective communication and outreach targeting the public and communities.

As the chair of the operation at the district level, the District Officer (DO) has the discretion and a range of powers to manage a disaster and can allocate resources as he or she sees fit. The DO will coordinate activities on the ground and will contact local administrative units ("Majlis Pengurusan Komuniti Kampung" (MPKK)) and provide the necessary information to take immediate action. At the SUK level, apart from coordinating efforts for cross-district disasters such as floods, it also provides monetary aid to victims of disaster through the Disaster Fund (Tabung Yayasan TYT) to compensate for property damage.

Other important agencies involved in disaster management are the Society Welfare Department (Jabatan Kebajikan Masyarakat or JKM), Meteorology Department (Jabatan Metereologi Malaysia or JMM), Department of Irrigation and Drainage (Jabatan Pengairan dan Saliran or JPS), the Fire and Rescue Department (Jabatan Bomba dan Penyelamat) and the Civil Defence Department (Angkatan Pertahanan Awam Malaysia or APM). JKM is in charge of setting up evacuation and relief centres, and coordinates the provision of necessities to victims such as food and clothing. In addition, it provides counselling services. JKM also has its own Immediate Relief Fund (Tabung Bantuan Segera or TBSN) that provides one-off monetary aid to those in need. JMM monitors and issues weather and natural disaster-related warning systems such as those for storms, typhoons and earthquakes. JPS is in charge of monitoring river water level and rainfall status to provide early warning for flood incidents. It also manages the drainage system that could ease or exacerbate Penang's vulnerability to flood. Together with the police, the Fire and Rescue Department or Bomba and APM are the first responders in a disaster.

Currently, the District Office keeps a record of all the priority buildings such as kindergartens, schools, hospitals, and low-lying buildings with a high number of vulnerable people, which is essential information during a disaster. In the event of a pending flood, low-lying houses are given immediate information so they can start preparing for it.

Despite the best efforts of all parties, management of disasters, particularly floods and landslides, still needs improvement in Penang. Various problems still occur on the ground during a disaster, including overcapacity of relief centres, lack of sanitary and cooking facilities, and delay in accessing basic necessities. These, coupled with the trauma caused by disasters, take a toll on the emotional and physical wellbeing of people affected by disasters especially the vulnerable, elderly and people with disabilities. Even when help arrives, it is not guaranteed to be distributed equally among the community, which causes resentment and dissatisfaction. The political leaning of individuals can also obstruct cooperation between community and the State, and among community members themselves.

2. Long-Term Goal

The DRRM Working Group recommends that the State Government integrate Sendai Framework for Disaster Risk Reduction into the Government's plan on disaster management by 2030. Sendai Framework expects countries to take action to "prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, thus strengthen resilience".[2] Sendai Framework has targets covering seven areas, such as mortality, people affected, economic loss, critical infrastructure and services, disaster risk reduction strategies, international cooperation, and early warning and risk information.

The DRRM Working Group also recommends the State Government pay particular attention to a few major types of disasters that Penang suffers or will suffer from, including flood, landslide, food and water security, and sea-level rise. It also suggests that the State Government adopts indicators to measure progress on disaster management, such as direct economic losses caused by disaster and the amount the Government spends on disaster prevention and relief. However, before it can meaningfully measure any progress, Penang State Government needs to make provisions to ensure that the right data is collected and verified as currently data availability and quality is a major problem in Penang.

3. Main Challenges and Gaps

3.1 Institutional Challenges

3.1.1 There is a **lack of coordination and proper communication between Government and Non-Government Entities (NGEs)**. While MKN20 establishes the governance structure or hierarchy within the Government in dealing with disasters, it does not extend beyond Government bodies. Without established protocols or guidelines in coordinating the roles of the different parties, the valuable resources and time contributed by NGEs (including Non-Governmental Organisations, trade association and local communities) are not being used optimally. For example, due to the lack of information on the "3 Ws" (who, where what), help from NGEs has either not reached the communities that need them, or help was concentrated in a few communities leaving the others feeling left out. NGEs in Penang provide valuable assistance to disaster victims ranging from food aid, clothing and shelter to psychological therapy. The Penang State Government needs to make sure that it optimally harnesses the goodwill and help of NGEs.

3.1.2 There is **no dedicated unit at the State level for disaster management**. The Service Management Unit of the SUK that is in charge of the coordination effort at the state level is overstretched. With only a small team of people, the Unit is not equipped to carry out better coordination of the different stakeholders (including NGEs), adopt a consistent and effective communication strategy, or to take proactive steps to plan and prepare for impending

[2] Sustainable Development Goals Knowledge Platform, Sendai Framework for Disaster Risk Reduction 2015–2030. <https://sustainabledevelopment.un.org/frameworks/sendaiframework>

threats rather than just reacting to events.

3.1.3 Penang needs good and reliable data to have a clear understanding of the current and future threats it faces as well as its vulnerability. During a disaster, decision-makers need to have access to these data in a timely fashion. Although some **information** is currently available at the District Officer level (such as the number of households, the location of priority buildings etc), it is **far from adequate for Penang to take a proactive stance in dealing with future threats**, especially in the pre- and post-disaster (long-term recovery) phases. Currently Penang does not track the number of people affected and also the economic losses caused by disasters every year. It also **does not have a centralised database** containing information about all Non-Government stakeholders involved in disaster rescue and relief, nor their respective capacity. At the local level, there is a lack of data on the composition of local residents regarding their vulnerability.

3.1.4 Disaster management as outlined in MKN20 is a very **top-down process**. The lowest level of governance (e.g. MPKK) and local communities have limited opportunities to provide active feedback. As a result, local coordination and immediate help during a disaster can be compromised or become sub-optimal. New organisational reform to be carried out at the local level (i.e. MPKK) in 2019 will set out clear roles and profiles for each member of the local administration unit. This can potentially create capacity for a more bottom-up process provided there is sufficient funding and resources. However, there is currently no clear plan to encourage more active participation from local communities, which rely heavily on the Government to provide information and assistance.

3.1.5 In Penang, the Government's efforts and resource focus overwhelmingly on attending to events when disasters happen, and **less on pre-disaster (e.g. strategy, capacity building, outreach, education etc) and post-disaster** (e.g. long-term efforts to rebuild communities, improve resilience or relocation, provide emotional support etc).

3.2 Non-Institutional Challenges

3.2.1 Very often **disaster management does not address the root causes of disasters**. In many cases, the main cause of excessive flooding and landslides in Penang is irrational land development that paves over natural ground or cuts through slopes without addressing how excess water can be safely channelled away. In addition, existing drainage systems are unable to cater for the high volume of rainfall and construction of proper drainage systems is not always possible especially in rural areas.

3.2.2 **Public awareness and education on disaster risks and preparedness is not strong**. Currently, the lack of preparedness at a community level increases vulnerability and impedes efficient handling of crises.

3.2.3 Mitigation projects, such as flood barriers and barrage, usually involve structural engineering solutions, which can **cost hundreds of millions of ringgit**. Funding sources are usually hard to come by and disaster risk financing is still a relatively unknown concept.

3.2.4 **Political disagreements are hindering efforts on the ground**. Community members are often separated by different political views and are unwilling to work closely and proactively

in preparing for disaster. It is also impeding active involvement of men and young adults at the local administrative level (MPKK).

3.2.5 **Weather forecasts and warning capacity** of the Meteorology Department or JMM need to be enhanced. More specific and timely forecast of local weather conditions will allow more time for preparation.

4. Important Issues / Solutions

4.1. Governance

4.1.1 The Government should set up a **dedicated disaster management team** within the State Government to be equipped with sufficient resources and political clout.

4.1.2 Disaster planning and strategy should take a **long-term approach** that takes into account the future impact of climate change and disaster risk.

4.1.3 Penang State Government should establish a **network that consists of Government agencies and Non-Governmental Entities** and enable an effective communication system for disaster. The network must utilise the strength of each member and conduct exercises to prepare for disaster.

4.1.4 Current monitoring and review framework should be accompanied by **strict enforcement**. At the moment monitoring and review of disaster management are not entirely effective due to resource constraints and lack of proper feedback processes, and findings are not always available and transparent to all parties.

4.1.5 To better prepare for and recover quickly from a disaster, the Penang State Government needs to create a data centre that contains all relevant information such as land use, physical characteristics of a locality, vulnerability and disaster forecast. In the near future, the SUK will introduce a Penang alert system that connects databases from various agencies e.g. MBPP, MPSP etc., which can form the basis of a **state-wide database**.

4.1.6 The State Government should improve the current standard operating procedure (SOP) to **expand the role of the lowest level of administration** e.g. MPKK as well as the local community.

- Utilize the role of MPKK by imposing performance index on them as well as providing the necessary guidance and training such as first aid training.
- Each local coordination unit or local emergency response team should be equipped with basic instruments and provisions to deal with a disaster. Currently, the lack of individual profile at the local administrative level means it is unclear who will be in charge of the equipment, capacity building etc.
- MPKK, especially those that face a high risk of disaster, should have direct access to the most up-to-date information and early warnings.

4.1.7 Both the State and Local Governments should explore how **Penang's Smart City Initiative** can enhance disaster preparedness and management systems. Currently, the Smart City Initiative is already working with the SUK to connect data for the use of disaster alert and

management.

4.1.8 The State Government should explore **alternative funding** opportunities (e.g. disaster risk financing) for disaster preparedness and mitigation instead of relying solely on the State and Federal budgets. In general, prevention and mitigation are usually cheaper than correction.

4.1.9 The State Government should adopt a **State Disaster Risk Reduction Strategy**. Although it is relatively straightforward to draft a Strategy, implementation will be challenging especially in the absence of a dedicated unit for disaster management, as there are many agencies to manage and monitor.

4.2. General Capacity Building

4.2.1 Penang State Government should work with the Federal Government and third parties to **improve the capacity of the Meteorological Department** to provide timely weather forecasting and conditions. To start with, it is essential to have a clear understanding of what Penang requires from the Meteorological Department to create a robust disaster management regime.

4.2.2 Penang State Government should conduct "**resilience auditing**" to identify current and future "shocks and stresses" Penang faces so that it can produce a meaningful resilience strategy to help Penang prepare for future threats.

4.2.3 The State Government can upgrade its **early warning system** through improving data connectivity next year. However, to make it sustainable, the State needs to make sure that it carries out regular upgrade and maintenance of sensors etc, which inevitably would require cost and manpower.

4.3 Increasing Resilience (Land Use and Infrastructure Planning)

4.3.1 Penang's land use should incorporate **"nature-sensible" or "disaster-mindful" planning** that takes into account Penang's physical characteristics as well as natural and built elements (e.g. rainfall, water flow etc) so that the risks each land use development faces are known beforehand and are properly mitigated. For example, factories producing hazardous waste should not be near residential areas or essential water or food sources.

4.3.2 When assessing the social and environmental impact of projects, especially in high-risk areas, the **cumulative impact of development** in the locality needs to be taken into account instead of just focusing on the impact of that particular development. Individually, land development may not have a huge impact on its surrounding but if taken collectively, they can increase disaster risk (e.g. flood, landslide etc) substantially to the locality.

4.3.3 The State Government should take a proactive stance in dealing with disaster risks especially flood and landslide. It should draw up a **multi-faceted map** of Penang that highlights the vulnerability and disaster risks of different localities. It also needs to improve the study of its rivers, streams, catchment areas, and slope conditions. Macro-level planning must show **disaster-prone areas and disaster "hotspots".** Once the medium to high risk areas are identified, the State Government must monitor these areas (e.g. low lying areas, slope land) consistently and the risks they face.

4.3.4 **Infrastructure planning and construction** in Penang has to take a long-term approach and be subjected to **vigorous disaster risk-testing**. Planners need to make sure that Penang's crucial infrastructure is adapted to future climate change risks (e.g. right infrastructure built at the right place) and properly safeguarded against disasters.

4.3.5 To increase the resilience of Penang to disasters and the impact of future climate change, the State Government needs to make sure Penang's **food and water sources are safeguarded** and local biodiversity is protected. This will improve the chances of a recovery after disaster.

4.3.6 Land use planning in Penang should carry out **scenario modelling** in order to identify the development pathway or pattern least risky to local communities, economy and infrastructure.

4.4 Reducing Social Vulnerability

4.4.1 The Government needs to carry out a **public awareness and education campaign** on disaster management. Awareness by the public on the causes and impact of disasters, as well as the course of actions to be taken during and after a disaster is very important in helping Penang to deal with disasters effectively.

- The Government can improve the preparedness of and trust building with the public through education and capacity-building workshops. To raise awareness of disaster risks and how to prepare for them is a shared responsibility among Government, Non-Government Entities and local community.
- Communities should be empowered to deal with an emergency through better early warning systems and the availability of local emergency response teams.
- Create opportunities for young people to assist during disasters. The availability of such programmes has so far reduced local complaints due to higher awareness and the local community valuing a direct involvement in disaster management.

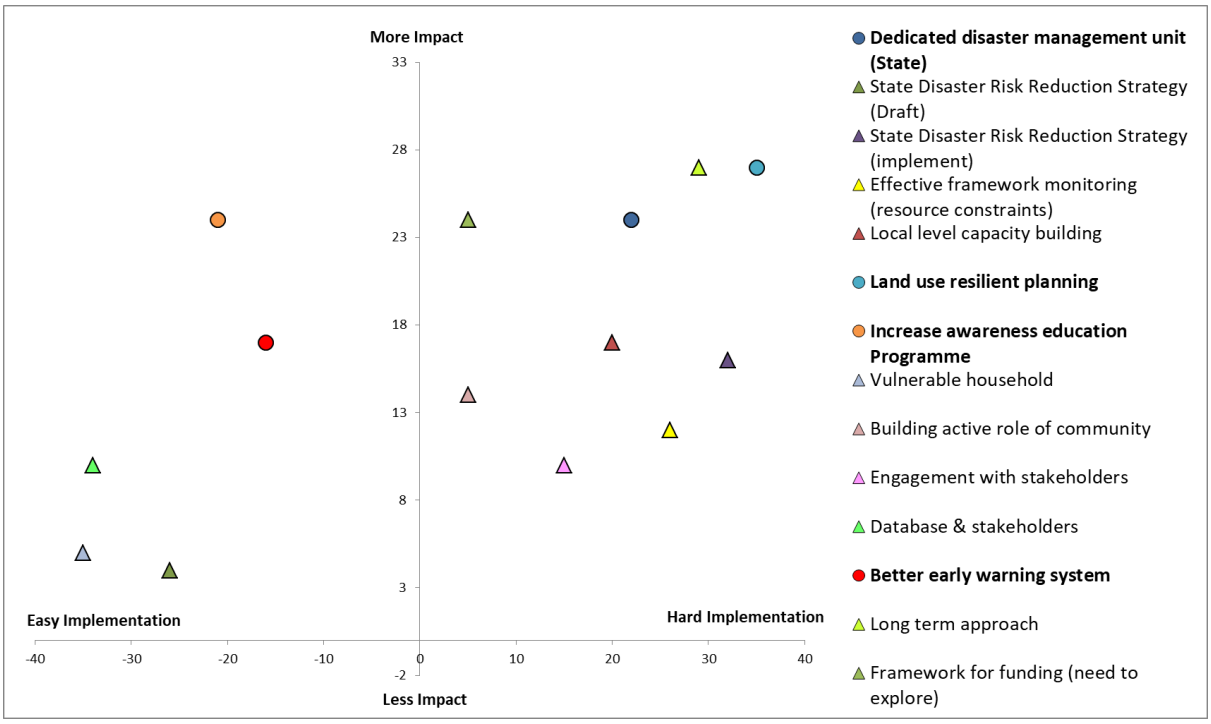
4.4.2 The Government should also work with Non-Government Organisations (NGOs) to build **capacity building programmes for NGOS and NGEs** on how to improve coordination between stakeholders for pre-, during and post-disaster stages. In addition, better communication of the Government's disaster management SOP with NGOs and NGEs will lead to closer working relationships with Government.

4.4.3 The Government should work with local communities to **identify vulnerable households and individuals** and all first responders should have access to such information. Assistance for these households or individuals may need to be prioritised because of their specific conditions (which can include bedridden patients, people with mobility issues and those unable to communicate or operate mobile phones).

4.4.4 The Government should utilise **local knowledge** in relation to preparing for and dealing with disaster. It should also introduce policy to build a **bottom-up approach** to allow local communities to take on a more active role in managing disasters. Local communities have a better understanding of local vulnerabilities as well as resources that they can use during a disaster. The Government should also invest in community training to increase the capacity of local actors.

4.4.5 The Government should work hand-in-hand with local communities to **overcome political divide and create common trust** and understanding between community members and between community and the Government. This can be done through more direct outreach, community training and programmes, and utilising the power of youth.

5. Major Policy Recommendations and Milestones



1. Programme to Increase Public Awareness and Education (2020)

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3. Setting Up A Dedicated Disaster Management Unit At The State Level (2021)

The establishment of a dedicated disaster management unit will improve the capacity of the State to deal with disasters. For example, it can develop a proper and proactive disaster management framework with clear strategies to reduce the number of victims and economic losses caused by disasters. The State can also access international disaster management funding and ensure disaster aid and resources are used efficiently. Having a dedicated unit will also promote accountability and improve coordination efforts among all Governmental and Non-Governmental stakeholders. Having a dedicated unit with separate funding and resources will have a considerable impact on disaster management in Penang. This is not a low hanging fruit due to various reasons (cost, availability of candidates, political will etc) but the first step is already being initiated.

4. Land Use Resilience Planning (2025)

This is about increasing Penang's resilience to disasters through comprehensive and forward-looking land use planning. It includes incorporating measures to increase climate resilience and reducing long-term risks to people and property (e.g. robust infrastructure planning, scenario modelling etc) into Local and Structure Plans. This is also about tackling "man-made" disasters at the source i.e. uncontrolled or irrational development. This has been identified as having the highest impact on increasing the resilience and reducing the vulnerability of Penang in relation to disasters. It will take a while to change the current standard operating procedures, mindset, assumptions and planning tools to incorporate resilience into land use planning. However, elements can be introduced gradually and an overhaul of the Structure and Local Plans can take place in 5-7 years' time.