

Multiple causes of flooding

THE recent floods in Penang are, in my professional opinion, due to a variety of causes.

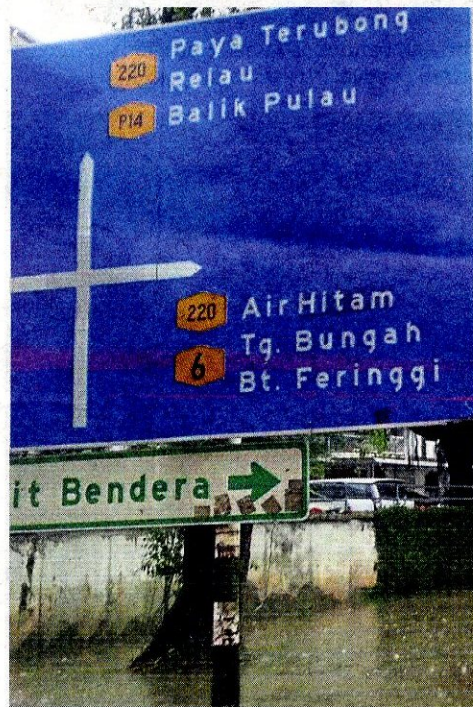
Climate change is affecting the whole world. Penang is no exception. Global climate change has increased rainfall in Penang as the recent floods were partly due to heavy and continuous rain. When rain falls incessantly for weeks, the soils are saturated and the rivers' capacity to drain away the water is overtaxed.

But we cannot solely blame heavy rainfall because the forested areas in Penang did not get flooded. Only the low-lying urban areas were flooded. This is because the porous nature of the forest floor allows rainwater to penetrate into the ground. In contrast, the impermeable surface of concrete jungles do not allow rainwater to penetrate to the ground, thus causing huge volumes of water to enter drains and rivers very quickly. This leads to flash floods, which happen very quickly but do not last long.

Due to urbanisation and the change from natural land use such as forest (natural jungle) to towns and cities (concrete jungle), it is not surprising that urban areas suffer higher frequencies and magnitudes of flash floods. Hence, it is unwise to dismiss development and hillslope cutting as not the cause of flash floods.

Converting green areas into concrete jungles reduces the amount of permeable surfaces. Cutting hillslopes weakens the soil, exposing it to erosion. Sediments from soil erosion are swept into rivers, reducing their capacity for drainage. These two are certainly part of the reasons for the recent flooding in Penang.

Flash floods have been occurring frequently in Penang since 1985 when I first came here. The problem has not been addressed by the authorities mainly because development was always given more priority over flood prevention and forest conservation by both the previous and current state governments.



River encroachment is another reason behind the flooding. Development is very close to rivers, leaving no room to manoeuvre. Floodplains are also densely developed. Housing areas lack green spaces and permeable surfaces, resulting in very high rates of surface runoff.

Urban drainage is not well planned and there is over-reliance on open monsoon drains even though the Drainage and Irrigation Department (DID) has a new environment-friendly urban drainage manual called Manual Saliran Mesra Alam (MSMA). However, contractors do not follow the manual because it is complicated and expensive.

People are also still throwing garbage into drains and rivers. There is too much emphasis on structural measures such as river dredging whereas non-structural measures such as awareness and education campaigns and fines on littering are not enforced.

Penang needs a sustainable and ecologically sound urban drainage

system. The Universiti Sains Malaysia engineering campus is built on such a drainage system. Rainwater is allowed to seep into the ground and flow slowly to the river. This allows the river plenty of time to drain away excess rainwater. The rainwater is also filtered, giving stormwater better quality.

Another reason for the frequent flooding in Penang is the fact that it is affected by high tides twice a month. When the tide is at its highest, and it coincides with heavy rains, flooding would be inevitable.

I would like to suggest that the authorities consider the following to address the problem of flash floods in Penang:

- (i) Plan developments according to climate change scenarios;
- (ii) Control developments on hillslopes and forested areas even if these areas are private land;
- (iii) Implement and enforce the MSMA;
- (iv) Keep river banks and floodplains free from encroachment.

Denmark, for example, has bought land adjacent to rivers back from landowners and dismantled buildings on them to allow rivers to flow freely. Seoul has revived the Cheonggyecheon River that runs through the city by dismantling three layers of highways that once buried it;

(v) Raise awareness and conduct education programmes on littering and its effects on rivers and flooding;

(vi) Impose heavy fines for littering;

(vii) Gazette the remaining forests;

(viii) Implement a reafforestation programme;

(ix) Encourage flood-proofing of properties; and

(x) Set up a river education centre along the banks of Sungai Pinang which can be used for education, recreation and tourism.

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Trees need to be trimmed but not destroyed

I FIND it admirable that the authorities in Penang are involved in tree conservation.

During the heavy spells of rain recently, branches were broken and trees uprooted, causing a lot of inconvenience to the public.

So it would be wise now to inspect trees, remove the dead ones and prune those with branches that overhang electrical

and telephone cables or hinder traffic.

A team of tree pruners armed with chainsaw and cranes was at work recently, cutting down the trees and branches they deemed unnecessary.

Unfortunately, they also indiscriminately cut off the lush branches of tall trees, leaving the boles bare. This will surely dam-

age the trees which have taken years to grow.

Not only were the lush branches of these trees home to birds, bats, squirrels and other small animals but they also provided shade to cyclists, pedestrians, street food traders, gardeners, road sweepers, rubbish disposal workers, and even the tree pruners themselves.

The damage is done now but perhaps in future, the authorities will pay more attention and send trained supervisors to restrain their chainsaw demolition army.

"Plant more trees" is our current mantra but let us also look after the ones we already have.

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