FLOODING

A flood is an accumulation or an overflow of an expanse of water that covers or inundates dry land.

TYPES OF FLOODS

1 RIVERINE

This usually occurs when a river overflows its banks. It is usually due to the volume of water within a body of water, such as a river or lake, exceeding its capacity and overflowing its banks. It can also occur in rivers, when the velocity of the river is so high it flows right out of the river channel, usually at bends or meanders.

2 COASTAL

Floods from the sea cause overflow or overtopping of flood defences, such as sea walls. A flood from the sea can be caused by a heavy storm (storm surge), a high tide, a tsunami, a cold front, or a combination thereof.

3 FLASH FLOODING

This is a flood that rises and falls rapidly with little or no advance warning. Flash floods usually result from intense rainfall over a relatively small area.

4 URBAN FLOODING

This occurs as a result of land development. Permeable soil layers are being replaced by impermeable paved surfaces, through which water cannot infiltrate. This leads to greater runoff being generated, which can make rivers out of road-ways and ponds out of car parks.

5 STORM SURGE

Storm surge is an abnormal rise in the water level in coastal areas, over and above the regular astronomical tide, caused by forces generated from a severe storm's wind, waves, and low atmospheric pressure. Storm surge is extremely dangerous, because it is capable of flooding large coastal areas. Extreme flooding can occur in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 20 feet or more in some cases.

6 GROUNDWATER FLOODING

A groundwater flood is the emergence of groundwater at the ground surface away from perennial river channels or the rising of groundwater into man-made ground, under conditions where the 'normal' ranges of groundwater level and groundwater flow are exceeded.

WHAT CAUSES FLOODING?

NATURAL

As we mentioned above, there are plenty of different causes of flooding. While different flood types typically have different causes, most floods are caused by one of the following activities.

1 INTENSE/ HEAVY RAINFALL

When rain falls heavily, the raindrops hit the ground with force. This can cause the rain drops to bounce off the soil instead of infiltrating into the soil. The water from the rain is then forced to flow over the surface instead, thus increasing the surface runoff.

2 PROLONGED RAINFALL

When rain falls for a prolonged period of time, the soil can become saturated. When the water is unable to infiltrate into the saturated soil, it is forced to flow over the soil, thus increasing surface runoff. Rivers that are unable to accommodate excess rain water overflow their banks onto neighbouring flood plains.

3 RELIEF

Relief refers to the difference in height between the highest point and the lowest point on land. When rain falls, the surface runoff can move very quickly from mountainous or hilly areas to low lying areas making these low lying areas more prone to flooding.

4 STORM SURGE AND TSUNAMIS ALSO CAUSE FLOODING

Storm surges from hurricanes and other tropical systems can cause sea levels to rise and cover normally dry coastal areas in several feet of water. Tsunamis on the other hand are giant waves caused by earthquakes, underwater volcanic eruptions or large impacts to the water's surface. As these waves move inland, they build height and can push a lot of water inland in coastal areas.

HUMAN INDUCED

1 DEFORESTATION

The lack of vegetation encourages water to flow over the surface rather than infiltrate into the soil thus increasing surface runoff.

2 POOR LAND USE PRACTICES

Slash and burn agriculture, over-cultivation and overgrazing eventually cause the soil to become infertile and unable to sustain vegetative growth. Consequently, the lack of green cover encourages water to flow over the surface rather than infiltrate the soil thus increasing surface run off.

3 URBANISATION

Urbanisation leads to the replacement of permeable soil with that of an impervious layer of pitch and concrete, through which water cannot infiltrate. This results in increased surface runoff, which leads to flash flooding.

4 IMPROPER WASTE DISPOSAL

Oftentimes, garbage that is not properly disposed of enters into the drainage system and clogs drains. This obstructs the free flow of water that enters these drains causing water to back up during rainfall flooding the surrounding area. A buildup of garbage can also obstruct the natural flow of water in rivers and streams.

5 QUARRYING

This is the clearing of land for the removal of aggregates (mainly sand gravel) which is to be utilised in the construction industry. The action of quarrying leaves land bare and devoid of any trees and shrubs thus increasing surface runoff.

6 OLDER INFRASTRUCTURES CAN FAIL

Older infrastructures can fail when heavy rains come and water levels rise. When dams break, they unleash torrents of water on unsuspecting households. This is part of what happened when Hurricane Katrina hit New Orleans in 2005.

These aren't all the reasons that flooding can happen, but they are some of the most common factors.

EFFECTS OF FLOODING

1 CASUALTIES

People may die as a result of drowning.

2 HEALTH ISSUES

Stagnant flood waters become a breeding ground for mosquitoes and can therefore lead to epidemics and diseases. Vector borne diseases, such as dengue, and water borne diseases, such as cholera and leptospirosis, may be spread through contaminated flood waters.

3 LOSS OF LIVESTOCK AND AGRICULTURAL CROPS

Livestock, such as cows, goats and chickens, may drown in flood water. Agricultural crops, which usually have shallow roots, are easily swept away by fast moving water, or may be lost when agricultural land becomes inundated by flood water. This can incur huge financial losses to the farmers.

4 DAMAGE TO PROPERTY AND INFRASTRUCTURE

Structures, such as roads, power plants, water pumping stations and bridges, may be negatively affected.

5 ECONOMIC AND SOCIAL DISRUPTION

The economic impact of flooding can be devastating to a community. This comes from damage and disruption to things like communication towers, power plants, roads, and bridges. This brings business activities in an area to a standstill. Oftentimes, major flooding results in dislocation and dysfunction of normal life long after flood waters recede.

Flooding hinders economic growth and development because of the high cost of relief and recovery associated with floods.

COMMON TERMS ASSOCIATED WITH FLOODING

TERM	DEFINITION
FLOOD PLAIN	An area of usually flat land adjacent to the river that experiences occasional flooding.
RIVER CHANNEL	The wetted perimeter or surface with which a river comes into contact.
RIVER BANK	The sloping land that immediately borders the river channel.
FLOOD FORECASTING	The use of actual precipitation and streamflow data to predict or estimate water levels in a river basin.
FLOOD WATCH	A flood watch is issued when weather conditions favour heavy rainfall and flash flooding.
LEVEES	These are natural or artificial slopes that run parallel to the river course. They are raised above the normal level of the floodplain due to the deposition of river material after a series of floods.

PRECAUTIONARY MEASURES

- Before building, check the area for signs or a history of flooding and find out how many feet above ground level you need to build your house, if building in a flood prone area, purchase flood insurance.
- Locate houses and buildings away from flood prone areas such as river banks and flood plains.
- Do not throw away garbage or large unwanted appliances or other forms of white waste into rivers, ravines or drains. Utilise proper available waste disposal methods.
- Maintain all drainage systems. Clear river channels of debris and overgrown vegetation. This will facilitate an easier flow of water in the river channel. Keep gutters and down-pipes clear of debris and garbage as well.
- Construct flood barriers where necessary to prevent flood water from entering buildings and homes.

BEFORE A FLOOD

- Develop a Family Emergency Plan
- Make sure all family members know what immediate action to take to ensure their personal safety. Preparing a family evacuation plan can assist in this regard.
- Secure all important documents, such as birth certificates, passports and the like in waterproof bags or sealed containers.
- Secure valuables and park vehicles in places that will not become flooded.
- Secure your pets on higher ground. If unable to take pets with you, let pets loose so that they will be able to seek higher ground on their own.
- Always monitor weather conditions
- Build an emergency kit, as well as a grab and go bag for the car, home and workplace, wherever you are.

DURING A FLOOD

- Stay calm. Listen to the radio or television for updated information.
- Move to upper levels of buildings or houses if the lower levels are threatened by flood waters.
- Turn off utilities, such as electricity, gas, water, at the main switches. Do not touch electrical equipment if you are standing in water or are wet.
- Do not drive through flood waters. If flood waters rise around your car, abandon the car and move to higher ground once it is safe to do so.
- Do not seek shelter under culverts or bridges
- Advise children never to play in flood waters
- Store chemicals, important documents and electrical devices on elevated surfaces away from expected water levels.
- Move furniture, electrical appliances and other belongings on higher ground where possible.
- Do not go sightseeing in flooded areas.

AFTER A FLOOD

- Do not walk through flood waters unless it is absolutely necessary. Be careful of hidden objects and broken glass when walking in water. If you have to walk in flood water, walk where the water is not moving and use a stick to check the firmness of the ground in front of you.tay calm. Listen to the radio or television for updated information.
- Exercise extreme caution when entering buildings, as there may be hidden damage, particularly in foundations.
- Gas and fuel pipes may have been damaged. Use flash lights instead of open flames to investigate buildings.
- Report broken utility lines to the public utility company (T&TEC, WASA, TSTT)
- Do not touch live electrical equipment in wet areas.
- If injured, seek medical assistance at the nearest hospital. Health centre or first aid station.
- Do not consume food that has come into contact with flood waters.
- Boil drinking water for at least 10-15 minutes before drinking or treat with sterilisation tablets where available.
- Bury all dead animals as soon as possible.
- Appliances that may have been flooded pose a risk of shock or fire when turned on. Do not use any appliances, heating, pressure, or sewage system until electrical components have been thoroughly cleaned, dried, and inspected by a qualified electrician.

FLOOD PRONE AREAS IN TRINIDAD

Some areas affected by flooding in Trinidad (Water Resources Agency)

CENTRAL

Kelly village, Caroni, Warren, Nejucal, Caparo, Palmiste, Longdenville, Lange park, Montrose, Arena, Ravine Sable, St Helena, La Paille Village

SOUTH

Penal, Barrackpore, Woodland, Papourie, Guaracara, Tarouba, Marabella, Gulf City, Cipero, Gasparillo, Guapo, Cap-de-ville, Siparia, Erin, Palo Seco, Claxton Bay, California, Usine Ste Madeleine, Princess Town, Mayaro, Mafeking Village, San Fernando, South Oropouche, Victoria Village, Ortoire Navet.

NORTH

Moka, Maraval, St Anns, Cascade, Belmont, Port of Spain, Diego Martin, Cocorite, North Coast Road, Barataria

EAST

Sangre Grande, Cuanapo, El Reposo, Fishing Pond, Plum Mitan, Santa Cruz, Saddle Road, Cantaro, Pipiol, Mount Lambert, Lopinot, Arima, Arouca, Oropuna, St Helena Village, Piparo.

A DIVISION OF THE MINISTRY OF NATIONAL SECURITY

In an emergency, being prepared is key, so let's Plan and Prepare in order to safeguard our families, our community and country.

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Everything you need to know about FLOODING