GETTING FLOOD-READY IN TRINIDAD & TOBAGO

AN ISLANDS LIKE US BOOK

Technical consultant: Keeshan Ramkissoon
Design: The Invisible Creative
Edited by: Anu Lakhan & Austin Fido

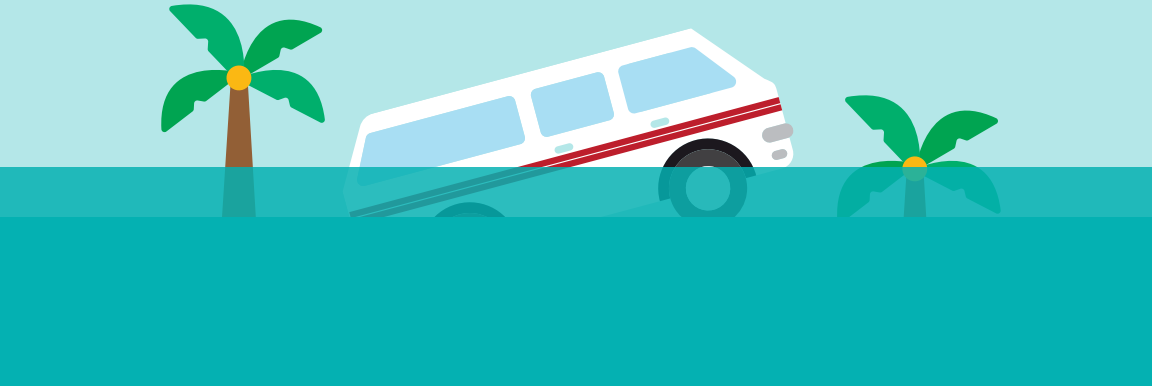
CONTENTS

GLOSSARY OF TERMS

We aren't always precise in our use of language and words in our everyday activities and conversations, but for the purposes of this conversation - about flooding - it would be useful to stick to some specific definitions of certain words.

In our day-to-day vocabularies the words "hazard" and "disaster" can almost be taken as different versions of the same thing: they're each a type of dangerous thing, essentially. So too might we regard the words "resistance" and "resilience" as near synonyms.

But in these pages we ask you to consider these terms as having specific and distinct meanings:



HAZARD & DISASTER

HAZARD

Hazard can be defined as any agent or event that has the potential to cause harm to people, property, or the environment. We can therefore distinguish a "hazard" – something that could cause harm – from "risk", which is the probability that exposure to a hazard will cause harm.

DISASTER

The International Federation of Red Cross and Red Crescent Societies, define a disaster as: "A...sudden calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources."

RESISTANCE & RESILIENCE

RESISTANCE

Resistance in the context of risk management and disaster recovery can be defined as the degree to which a society or community is affected by a particular event. This can be applied to individuals and property too. For example, an "earthquake-resistant" building is one designed to be less prone to collapse in the event of an earthquake. So, a society with a high level of resistance to flooding would presumably suffer little damage from a flood.

RESILIENCE

This can be defined as the extent to which a society or community can recover from a significant event. A society with a high degree of resilience might suffer great damage from flooding but recover quickly from the negative impacts of the event.

NO NATURAL DISASTERS. ONLY NATURAL HAZARDS

You don't believe that, do you? How can we say there are no natural disasters when every rainy season there are desperate families who have lost all their belongings or entire homes? Rivers overflow their banks and flood highways, damaging vehicles and trapping drivers for hours. One heavy downpour and fallen trees take down electrical and telephone wires. No disasters, indeed!

We're not making light of the very real consequences of weather-related incidents, but we are saying these situations don't have to happen at all if we plan for the rains that we know will come.

A disaster occurs when we don't prepare for a hazard or potentially dangerous event. We can't stop the rain, but we carry umbrellas, don't we? It's the same principle. What we need to do is build our resistance and resilience. That's how we stop natural incidents from becoming tragedies.

So, let's start looking at what we can plan for, how we can plan, and what kind of help we need.

DON' T PANIC! (PLAN FOR IT!)

First, let's take a moment to be clear on how bad panicking is. Panic, while being an almost instinctive reaction to most threats, is the absolute worst thing we can do. A state of panic takes away our ability to think clearly about what we need to do. If we can't focus on the best way to get out of a difficult situation we are likely to:

FORGET REALLY IMPORTANT THINGS (OR PEOPLE).

LOSE TRACK OF OUR BEST OPTIONS.

GET CONFUSED ABOUT PRIORITIES.

So, once more:

DON' T PANIC

We know we cannot stop the rain from falling. And we know that many communities in Trinidad and Tobago are at high risk of flooding in times of heavy rain. That means that flooding is a predictable hazard in our country.

The 2018 floods in Trinidad were the result of consistent (and later intermittent) rainfall over a three-day period. It wasn't even a storm or a hurricane. It was a lot of rain falling on land that couldn't absorb all of it; into rivers that overflowed their banks; and gushing out of drains that were not prepared for what was coming down.

Still, a hazard need not be a disaster. We need to work out ways to increase our resistance — taking the early steps to stay as safe as possible. This builds our resilience and helps us reduce damage and loss in at-risk areas. With sound planning, we can recover faster and better.

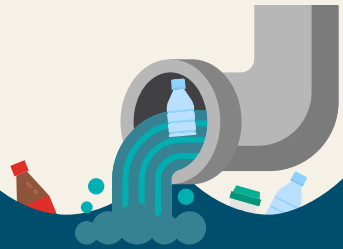
Most of all, if we know what we're doing to prepare ourselves in the best ways possible, we can have a little more peace of mind.

TYPES OF FLOODS

All floods are not equal, nor do they come about in the same way. In global conversations, increased flooding is often equated with climate change events such as melting ice caps, rising sea levels and more intense storms and hurricanes. (Have a look at *Islands Like Us: Trinidad and Tobago*). Trinidad and Tobago is not immune to these threats but we face others as well – others over which we have some measure of control.

FLASH FLOODING - URBAN

Let's start with the ugliest one. Flash flooding (also known as pluvial or surface flooding) in urban areas tends to be caused by poor or inadequate drainage infrastructure. In cities like Port of Spain, drains are often clogged by litter and debris. This is a huge problem: it's every tiny piece of paper we throw out of a car window; fast food boxes dropped at the side of the road; the dumping of household garbage, appliances, and even car wrecks into rivers. The rains come and the drains can't work the way they were designed to because there's simply nowhere for the water to run.



FLASH FLOODING - RURAL

If the picture looks bad in town, let's consider how much more crippling the effects are in farming areas. Flash flooding in the countryside can happen because the earth cannot absorb enough water, fast enough. Poor agricultural practices and bush fires can degrade the soil. The result is that the water from heavy or sustained rains very quickly saturates the ground and everything else sits on top. Crops are destroyed and livestock can be lost. The compromised land is slower to recover, landslides become a threat and the whole cycle repeats itself a little more viciously every year.

RIVERINE FLOODING

Riverine or fluvial flooding happens when rivers break their banks.

- Overbank flooding occurs when the water level in a river or stream rises to the point that it overflows the edges of the waterway.
- Flash flooding of a riverine nature happens when an intense torrent of water forms in a river channel within hours, if not minutes, of excessive rainfall. The water volume is large, moving fast and there's no forewarning. Add the hidden debris floating in it and we have a particularly dangerous flood.

COASTAL FLOODING

Coastal flooding occurs when normally dry land is flooded by seawater. This is often the result of storm surge or extreme tidal activity.

GROUNDWATER FLOODING

This happens when the water table rises above ground level because underground drainage cannot drain water away quickly enough to prevent water from rising. Though very rare in Trinidad and Tobago, incidents of groundwater were reported in Cental Trinidad in 2018.

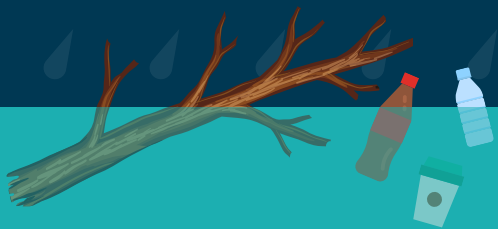
Adapted from TT Weather Center

CAUSES OF FLOODS

No, it's not just rain that causes flooding – though it is certainly often a factor, and heavy rain is perhaps the most common cause.

Globally, causes of flooding include rain, melting snow and ice, coastal flooding caused by storm surge or tsunami, to broken dams and deforestation.

Broadly, we can divide the causes of flooding into two basic categories; natural and manmade. Note, however, that often the cause of a specific flood might be a combination of these factors: heavy rain in an area with drains blocked by illegal dumping waste, for example.



According to the Trinidad and Tobago Weather Centre, there are

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COMMON CAUSES OF FLOODING IN OUR COUNTRY

THE FIRST THREE CAUSES CAN BE CLASSIFIED AS "NATURAL":

1. Intense rain: during a particularly heavy shower, raindrops are essentially too large and falling too fast to be absorbed when they hit the ground. Instead, the raindrops can "bounce", essentially splashing and forming surface-level runoff that quickly finds its way to watercourses, raising the water level to that of a flood.

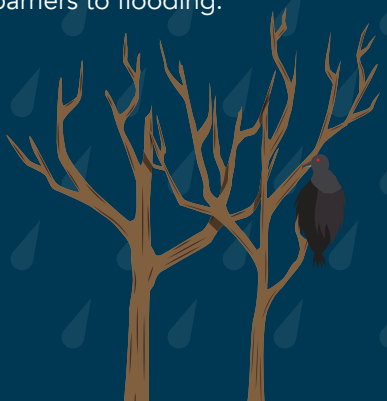
2. Prolonged rain: during a long period of rainfall, soil becomes saturated; eventually, the ground can take no more water and the rain starts to form surface level runoff, leading to flooding in much the same way as during an intense rainstorm.

3. Topography: the shape of the land can facilitate flooding — simply put, water likes to run downhill. Rain falling on steep hillsides will naturally flow in the direction of lower-lying areas at the base of our hills and mountains.

THE REMAINING SIX CAUSES CAN BE CLASSIFIED AS "MAN-MADE":

4. Deforestation: trees, and more importantly the soil that they grow on, will absorb and retain water; when forested land is cleared – especially when it is stripped of soil and replaced with an impervious material, for example, concrete - it removes some of the natural barriers to flooding.

5. Poor land use: sometimes this is simply a factor in deforestation, but there are some practices – like over-grazing or over-cultivation on agricultural lands – that can reduce the quality and quantity of soil and vegetation. This increases the risk of flooding for much the same reason as more obvious modes of deforestation.



6 Urbanization: often, when land is cleared of vegetation it is to further the development of the roads and buildings required by a growing population and economy. Unfortunately, a consequence of that urbanization can be increased risk of flooding, as layers of largely impermeable asphalt and concrete cover the soil that once absorbed rainfall.

7 Improper or illegal waste disposal: dumping trash or old appliances in the wrong places isn't just unsightly and unhygienic, it can also block drains and waterways and increase the risk of flooding.

8 Quarrying: the act of quarrying – digging rock and minerals out of the ground – contributes both to deforestation and potential topographic changes that can significantly increase flood risk.

9 Drainage: some existing drains are not adequate. For example, drains that were built decades ago in Port of Spain cannot always handle the volume of runoff now. Increased rainfall and urbanization are part of the problem. Some drains were inadequate when they were first built, especially in low-lying areas.

Adapted from TT Weather Center

WHAT HAVE WE GOT TO LOSE?

RISKS OF FLOODING

DISEASE

LOSS OR DAMAGE TO PROPERTY

LOSSES TO THE AGRICULTURAL SECTOR

PERSONAL HARM

LOSS OF LIFE BY DROWNING OR INJURY

CONTINUED DEGRADATION OF LAND

ECONOMIC EFFECTS

2018 FLOODING IN TRINIDAD

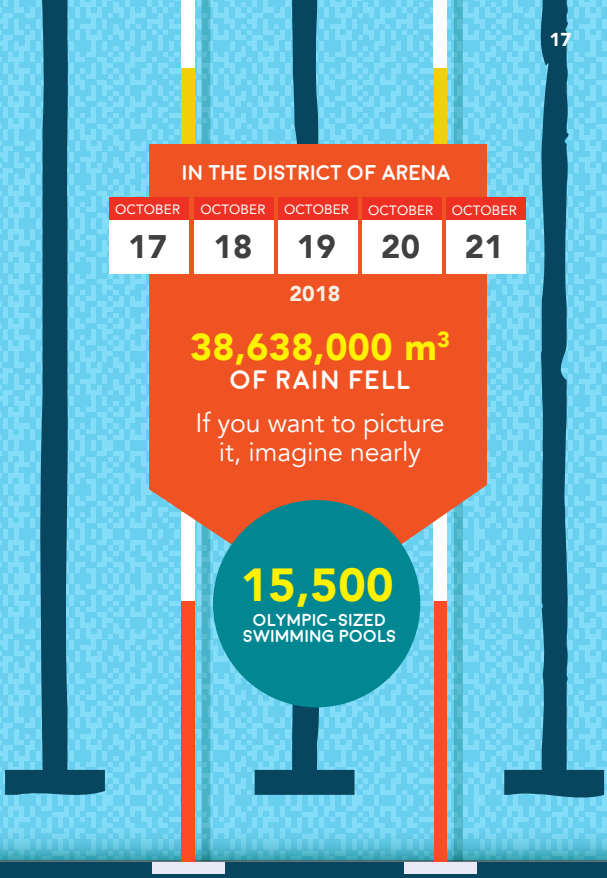
IN THE GREAT RAINS OF OCTOBER 2018. THESE WERE SOME OF THE SEVERELY FLOODED AREAS.

THAT'S HOW MUCH

One of the reasons it was important to do this booklet is to lower our flood fears.

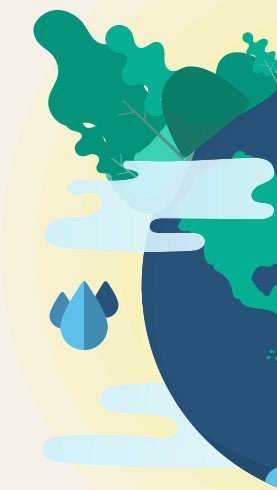
In 2018, we flooded like we'd never flooded before. We didn't know what to do that October when the rains kept coming. And coming. Now, every time it rains, a part of us heads straight to terror. We want you to be calm and prepared, but also aware of what has happened and what can happen.

Let's look at a very specific example:



Adding several areas (not only the district of Arena) that make up north-central Trinidad, we see that there was rainfall that would fill **82,500 Olympic-sized swimming pools.**

THE BIGGEST PLAN: THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030



As we consider the various ways we can prepare and protect ourselves against flooding, perhaps it's best to look at one of the biggest plans of all: the Sendai Framework for Disaster Risk Reduction 2015-2030.

The Sendai Framework is not specifically about flooding, but flooding is one of the many types of hazard which can lead to disaster that the framework seeks to mitigate. At its simplest, the framework is a global agreement on a set of standards and objectives for reducing the risk of any disaster, anywhere in the world.

The Framework was formally endorsed by the UN General Assembly in 2015. Its basic goal is to substantially reduce the impact of disasters around the world by 2030.

To achieve that, the framework outlines four priorities:

- Understanding disaster risk.
- Strengthening disaster risk governance to manage disaster risk.
- Investing in disaster risk reduction for resilience.
- Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

There are a lot of different hazards in the world that can lead to a lot of different types of disaster, so there is nothing simple or easy about the mission laid out by the Sendai Framework.

But as we think about what we can do about flooding in Trinidad and Tobago, it may be helpful to know that this is connected to a global effort to reduce the impact of any and all disasters that we face as a global community.

And those four priorities offer a handy way to think about how to reduce or avoid disaster:

- Understand what you are up against.
- Create systems and institutions to manage the effort.
- Invest in ways to reduce risk of disaster.
- Invest in recovery from disaster in ways that will help reduce risk in future.

ASSESSING FLOOD RISK

AM I AT RISK

Flood-risk assessment simply means figuring out what the chances are of damage to your house and property and how bad that damage might be. Several factors come into play:

- The likelihood of a flood event
- The type of flood
- The consequences of a flood to your home and environment

Remember, not everyone is at equal risk. Some communities are more vulnerable and have fewer resources with which to prepare.

Vulnerability and risk

Our vulnerability is the very fact that we, our belongings, and the space we live in can be harmed by a flood event.

Susceptibility refers to the physical characteristics of our space that make flooding likely.

Resilience capacity is determined by our ability to prepare for the threat, as well as how well we can respond and recover.

Likelihood of a Flood Event

Floods have a multitude of causes and their frequency and intensity vary.

Flood Annual Probability refers to the measure of the chance of flooding occurring in a location over the course of one year. This will change depending on environmental conditions, land use change and changes in flood-weather events.

Depending on the nature of a flood event, we must consider floodwater depth, duration until the waters subside, and onset time from flood source to affected area which all comprise their intensity. Floodwater can also carry contaminants and have variable flow speeds.

The consequences of flood events vary based on a person's location, knowledge of what must be done to increase their capacity to prevent, prepare for, respond to and recover from a flood event, and their ability and willingness to bring to action this knowledge.

FLOOD RISK SELF-ANALYSIS

Have a look at this list and try to answer as many of the questions as possible

- Do you believe you are at risk of flooding?

- Do you possess a general understanding of the causes of flooding?

  There are different types of flooding and flood causes. This is why flood mitigation measures in one area may not work for another. It is important that we understand why flooding occurs, the most likely types of flooding to affect us, and what can be done to reduce our vulnerability.

- Has there been a history of flooding in your area?

  Some key indicators which give us an idea of our vulnerability to flooding are the frequency and magnitude of previous flood events. When buying or building a home, you should enquire whether the area is a flood prone one and build and plan accordingly.

- Has there been major land-use change, including increased paved surfaces and development either uphill or level with your current location?

  Our initial assessment of flood risk is always subject to change due to external factors. Someone living in the same location for over 20 years without an occurrence of a flood event may be at increased risk of flooding if there has been recent development in their area. It is therefore important to re-assess your flood risk on a periodic/annual basis.

- Is your home constructed on a flood plain, near to the coast or a river bank?

  Another indicator of our susceptibility to flooding lies in our location. Settlements in low-lying areas within flood plains or adjacent to river banks or the coast are at higher risk of flooding. Settlements

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in highly urbanized areas with inadequate drainage are also at a higher risk.

- Do you understand and monitor the flood alert system and understand the actions required at each level?

  An important component of raising our capacity is our awareness of the warning and prediction measures in place for flood events. We must be vigilant and pay attention to weather alerts and also understand what actions are required for each alert level.

- Do you have an idea of the key ways you can increase the capacity of you and your family?

  Are you aware of flood mitigation measures which can increase your (and your family's) capacity? Without this knowledge, we will be unable to act effectively or efficiently in addressing our vulnerability to flooding.

- If aware, are you able to do these with your current resources?

  In some instances, we may be aware of what is required, but unable to act on this awareness for whatever reason, be it financial, time or health constraints. We must be able to identify the root causes of why we cannot act, and if these cannot be addressed, reach out to the relevant agencies for support.

- Do you have contact information for emergency services, family members and neighbors in the event of an emergency?

  One of the key components to reducing vulnerability is in having a flood emergency plan. The knowledge of contact information for emergency first responders and for our families can go a long way in ensuring our (and their) safety.

- Do you know the nearest emergency shelter and the route you need to take to arrive there safely?

  Again, a flood emergency plan is key. This plan will also contain the location of nearby emergency shelters and more than one route

(in the event a route becomes impassable) to them.

- Is your home outfitted with permanent or temporary flood resistance?

  Flood resistance measures are designed to prohibit or slow the entrance of floodwaters. It may be a good idea to invest in these if your home is at high risk for flooding.

- Is your home designed to be flood resilient?

  Flood resilience works hand in hand with flood resistance to greatly increase capacity. It is founded on the principle that flooding is inevitably going to enter your home. This means that your home (and the contents within) should be adapted to incur as little flood damage as possible or be able to recover quickly following a flood event.

- Do you possess an emergency flood kit with food and water rations which will last until the flood is likely to subside?

  An emergency flood kit is an essential tool to have to literally (and figuratively) weather the storm. You can find a list of the critical items needed in this booklet.

- Are you employed/financially stable and debt free?

  Your financial/employment status both dictates your ability to increase capacity before a flood event as well as your ability to recover from any negative impact.

- Can flooding have a direct negative impact on your source of income?

  This point is tied into the previous one on financial stability. You may indeed have a source of income but, if that source is directly or indirectly impacted by a flood event, you may not be able to rely on it as you used to. One such example is in the case of farmers whose crops are destroyed after flood events and who rely on those crops as their primary source of income.

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- Do you have valuable items and documents in an area unlikely to flood or in a flood-proof casing?

  This is tied to flood resilience and emergency flood kit planning. It is wise to keep critical documents and valuables away from areas prone to flooding or at least protect them from the impact of floodwaters.

- Are your home and vehicles insured against flood damage?

  Flood Insurance can be a cost effective way to recover from any major negative impacts of flooding.

- Are there many dependents (children, elderly, sick) in you family household?

  Having a strong family unit can increase capacity as members look out for one another and can financially contribute to resilience/resistance/recovery measures. However, if the family unit contains many dependents who are unable to increase capacity, this can increase vulnerability to all members and therefore special plans should be put in place to address this.

- Are the drainage systems in your area free of debris and blockages?

  Drainage systems are key in rerouting flood waters away from communities. They are the primary flood mitigation measure for highly urbanized areas; however, even if properly designed, drainage systems can become blocked with debris and garbage which severely reduces their capacity to control the flow of water.

After answering the above, do you now believe you are at risk of flooding?

Adapted from Communi-TT

CAN WE AVOID FLOOD DISASTER? BUILDING RESISTANCE AND RESILIENCE

WHAT WE ALWAYS NEED

LONG TERM

IF YOU'RE MOVING OR BUILDING A HOUSE, CONSIDER THE FLOOD POTENTIAL OF THE AREA.

BUILD OR RENOVATE WITH FLOOD-PREPAREDNESS IN MIND.

KEEP YOUR PROPERTY DEBRIS-FREE.

TALK TO YOUR MP ABOUT IMPROVING THE CONDITION OF DRAINS, ROADS, AND OTHER PUBLIC CONSTRUCTS THAT ARE DIRECTLY AFFECTED BY FLOODING.

IF YOU HAVE THE TIME AND MEANS TO PREPARE EARLY

MEDIUM TERM

SET APPLIANCES LIKE REFRIGERATORS, STOVES, WASHING MACHINES AND THE LIKE ON RAISED SURFACES.

SECURE OR MOVE OUTDOOR FURNITURE INSIDE.

MAKE AN EVACUATION PLAN THAT INCLUDES MOVING THE MOST VULNERABLE (THE ELDERLY, INFANTS, PREGNANT WOMEN, THOSE WITH SPECIAL NEEDS) IN OUR HOMES TO POINTS OF EASIEST EVACUATION.

IF THERE'S AN APP FOR FLOOD EMERGENCIES IN YOUR AREA, BE SURE YOU HAVE IT.

PREPARE FOR THE CARE OF PETS AND LIVESTOCK; PLAN FOR THEIR NEEDS AND MOVEMENT TO SAFETY.

KEEP IMPORTANT DOCUMENTS IN SOMETHING WATERPROOF LIKE AN AIRTIGHT BAG OR CONTAINER.

STOCK ESSENTIAL FOOD ITEMS AND DRINKING WATER.

ATTEND TO HOME REPAIRS THAT MIGHT HELP TO KEEP YOU SAFE SUCH AS SECURING LOOSE ROOFING MATERIALS.

FOR IMMEDIATE THREAT

SHORT TERM

STAY INFORMED ABOUT THE STATE OF THE WEATHER, THE CONDITION OF THE ROADS AND WHAT'S BEING DONE IN YOUR AREA.

MAKE SURE YOU'VE GOT YOUR EMERGENCY KITS — INCLUDING PHONE NUMBERS — ON HAND.

FOLLOW BEST PRACTICE GUIDES RE: ELECTRICAL AND PLUMBING RELATED MATTERS (THE STATE OR PUBLIC UTILITIES MAY ISSUE GUIDANCE STATEMENTS).

IF YOU'VE PLANNED FOR THIS EVENTUALITY, REMEMBER: NOW IS THE TIME TO STAY CALM AND PUT THOSE PLANS INTO ACTION.

Adapted from Communi-TT

EMERGENCY KITS

In the worst case, you may need to evacuate to a safer place. Keep a grab-bag of essential supplies ready for that scenario.

The specific items that you need to ensure your own comfort and safety during a flooding event may vary. You may also want to make grab-bags for each member of your family – this will also make the individual bags lighter and less bulky.

Your grab-bag is your emergency kit. The emergency kit should provide you with essential items for a couple of days in a shelter or temporary housing, until the immediate flooding threat has subsided and you are able to return home or make other arrangements.

Ideally, your grab-bag should be watertight, so that the contents are not damaged if you have to wade through floodwaters. If you do not have a watertight shoulder-bag, knapsack or small suitcase, then store individual items in water-proof bags (e.g. resealable bags) and pack those in your grab-bag.

Into this you will put:

1. Critical documents such as passports, emergency contacts, insurance documentation and prescriptions. Also, your wallet and phone.

2. Clean clothes: You'll want a 2 to 3 day supply of clean, dry clothing.

3. Battery-powered or wind-up torch: Pack a torchlight that has its own, reliable power supply. If using a battery-powered torch, don't forget a set of spare, fresh batteries!

4. Drinking water: It may be impractical to carry the amount of liquid you would prefer to drink each day. At minimum, pack two liters of drinking water in a bottle or bottles that can be refilled easily when the opportunity arises.

5. Food: Pack non-perishable items, such as canned food or meals, or items with a long shelf-life, such as nuts and dried fruit. If you are packing tins, don't forget a can opener!

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Prescription or specialty medicines: Ensure you have at least a 3-day supply of any prescription or specialty medications that you need. If possible, also pack your prescriptions so that you can renew your supply if necessary.

Also, don't forget to pack the following items if you can:

First Aid Kit
A small, simple first aid kit with adequate supplies for cleaning and dressing wounds, and providing some pain relief (e.g. aspirin, acetaminophen, or ibuprofen).

Other critical electronics
Portable electronics such as laptops or tablets: in watertight bags with chargers, as well as chargers for phones and other items on your person.

PLANNING DURING COVID-19

Consider the need for PPE for first-responders who are helping to evacuate those at risk or rescue those who are trapped.

Be guided by the information you're getting at the moment, but try to remember your best-practice lessons like proper use of masks and limiting physical contact with others.

Many systems - including supply chains - have been disrupted by the Covid-19 pandemic. We need to act early (rather than waiting for the last minute) to get the supplies we need, to alert emergency services when we are in distress, and to help others if we can.

It may not be possible to maintain physical distancing if at-risk communities need to be sheltered in large groups. Try to keep yourself and others as safe as you can. Can you keep your hands clean and your nose and mouth covered?

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United Nations Office for Disaster Risk Reduction
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