Technical Guidance:
PRIMARY AND SECONDARY EFFECTS OF NATURAL AND TECHNOLOGICAL HAZARDS AND THE COMPOUNDING IMPACT OF COVID-19

IFRC

TARGET AUDIENCE AND PURPOSE OF THE DOCUMENT:

This document is developed for Geneva Secretariat, regional, country cluster and National Society colleagues who are engaged in response, recovery and risk management activities related to a variety of natural and technological hazards and are now being confronted with the compounding nature of the COVID-19 crisis.

It highlights how the COVID-19 pandemic may undermine the resilience of communities and individuals affected by the primary and secondary effects of a hazard, as well as how a particular hazard may seriously worsen the conditions of people affected by COVID-19. It therefore calls for a fully integrated approach whereby these '*compounding effects'* are being addressed.

It also shows that certain interventions may be able to address both issues related to natural hazards and the COVID-19 pandemic, thus having a '*compounding benefit'*. These interventions could include *Public Awareness/Public Education messaging, prepositioning of goods such as non-food items, medical supplies, dry food, increasing water reserves and WASH related measures.*

This document will guide planners, practitioners, and facilitators at various levels in developing more comprehensive contingency, preparedness or risk reduction plans which effectively factor in the COVID-19 pandemic.

The effects and interventions mentioned across the various hazards in this guidance document are not exhaustive and we welcome additional suggestions identified by colleagues. If you have any additions or corrections, please contact IFRC's Resilience Coordinator Chang Choe at ch.choe@ifrc.org .

***Source**: UNDP/DHA, Introduction to Hazards, Disaster Management Training Program, 3rd edition; Bruno Haghebaert, Perspectives on pro-active management of natural hazards. An enquiry into technocratic, behaviouristic, structural, and neo-populist approaches, Ph.D., 2002; additional input by Colin Fernandes, American Red Cross.*

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HAZARD TYPE: DROUGHT 	**PRIMARY EFFECTS:**	***WASH:*** ▪ Water supply shortage ▪ Lack of/limited clean water supply for domestic use. ***Livelihoods:*** ▪ Losses in production of crops, dairy and livestock, timber, and fisheries. ▪ Income loss for farmers and others directly affected. ▪ Decline in food production and increase in food prices. ▪ Unemployment increases as drought affected production declines. ***Environment:*** ▪ Effects on water (increased salination) and air quality (dust, pollutants) ▪ Damage to animal and fish species, ecosystems, and habitats. ***Public Health:*** ▪ Increase in malnutrition due to food shortages. ▪ Loss of human life from food shortages or drought related conditions. ▪ Health problems due to decreased water availability. ***Social:*** ▪ Increased poverty due to reduced income having a negative impact on quality of life. ▪ Population migration for employment or relief.
	SECONDARY/INDIRECT EFFECTS:	▪ Drought can contribute to poor soil quality through erosion leading to decrease in agricultural productivity. ▪ Increase in food prices and reduced income could result in increasing social unrest, civil strife, tensions, and conflicts ▪ Forest fires/wildfires could cause habitat loss, threatening human settlements.
	COVID-19 RELATED EFFECTS:	***WASH:*** ▪ Lack of/limited clean water supply may no longer allow for proper handwashing. ***Livelihoods:*** ▪ Decreasing incomes will hinder access to medical treatment of patients with COVID-19 (where medical care is being paid for). ***Food Security:*** ▪ Already low levels of food security due to lockdown will be seriously aggravated as a result of damage to local crops, livestock and fishery. ***Mental Health:*** ▪ Drought and COVID-19 could increase stress and exacerbate mental health issues of the population.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Securing/increasing of water reserves in the community/household ▪ Messaging on water conservation practices ▪ Cash Voucher Assistance ▪ Risk Communication and Community Engagement activities ▪ Psychosocial care

HAZARD TYPE EARTHQUAKE 	**PRIMARY EFFECTS:**	***Physical Damage:*** ▪ Damage to human settlements, buildings, structures, infrastructure, and lifelines/ services. Essential services such as electricity, water, telecommunications may be disrupted. ***Displacement:*** ▪ Large numbers of people may be displaced and homeless for a substantial period. ***Casualties:*** ▪ The casualty rate is often high, especially when earthquakes occur in areas: a) of high population density, where buildings are not earthquake resistant; or b) where adobe or dry-stone construction is common with heavy upper floors and roofs. ▪ Health services could be affected or overwhelmed by the high numbers of casualties. ***Public Health:*** ▪ The most widespread medical problems are fracture injuries. Other health threats may occur if a) there is secondary flooding; or b) water supplies are disrupted and contaminated water is used. ***Food Security:*** ▪ Food distribution and marketing systems may be disrupted. Roads could be affected/damaged creating barriers to access necessary supplies (food and non-food items). ▪ Irrigation works may be damaged. ▪ Typically, earthquakes do not reduce the local food supply/production.
	SECONDARY/INDIRECT EFFECTS:	▪ Dam failures, and landslides which may block waterways and cause flooding. ▪ Damage may occur to facilities using dangerous materials resulting in chemical spills. ▪ Domestic fires can be caused because of damage to electricity lines/wires. ▪ Breakdown/disruption of communication services. ▪ Education may be disrupted as schools might be used for sheltering the homeless or the building might be damaged and unable to hold classes.
	COVID-19 RELATED EFFECTS:	***Displacement:*** ▪ Homeless infected people may contribute to further spread of COVID-19 virus in overcrowded evacuation centers, as physical distancing may no longer prove feasible. ***Public Health:*** ▪ Damage to health-care facilities, ICUs and diagnostic and treatment equipment and interruption of services such as power cuts can have long-reaching consequences affecting the proper functioning of health facilities. ▪ Health staff may be killed or wounded. ▪ An increase in the number of casualties (due to injuries) may put pressure on prioritization of patients to be treated first. ***WASH:*** ▪ The lack of availability of safe water, sanitation facilities and hygiene conditions can greatly influence the spread and impact of COVID-19. ***Food Security:*** ▪ Already low levels of food security due to lockdown will be aggravated (due to supply chains/transportation being disturbed) as a result of market disruption. ***Psycho-social/mental health:*** ▪ Mental health could further be compounded due to the trauma of the quake as well as the anxiety of contracting the virus or being isolated.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Identification of strong houses/buildings nearby or in neighboring communities that could shelter people and allow for COVID-19 infected people to be isolated, thus reducing the risk of overcrowding. ▪ Initiate or support psychosocial first aid or mental health care system (within the community). ▪ Identification and strengthening of key water resources in the community. ▪ Support handwashing, sanitation, and hygiene activities in key locations such as in schools or public places.

HAZARD TYPE: FLOODS 	**PRIMARY EFFECTS**	***Physical Damage:*** ▪ Structures, infrastructure, and lifelines can be seriously damaged by floods. Flash floods often sweep away everything in their paths. In coastal areas, storm surges are destructive both on their inward travel and again on the outward return to the sea. Mud, oil and other pollutants carried by the water are deposited and ruin crops and building contents. ***Casualties:*** ▪ Strong currents of moving or turbulent water can knock down and drown people and animals in relatively shallow depths. Large numbers of deaths from drowning, particularly among the young, old, sick and weak can happen. Floods generally inflict few serious but non-fatal injuries requiring hospital treatment. ***Public Health:*** ▪ There is little evidence of floods directly causing any large-scale additional health problems apart from diarrhea, malaria, and viral outbreaks. ***WASH:*** ▪ Open wells and other groundwater supplies may be contaminated temporarily by debris carried by flood waters or saltwater brought in by storm surges. Normal sources of water may not be available for several days. ***Food Security:*** ▪ An entire harvest may be lost together with animal fodder resulting in long-term flood shortages. Food stocks may be lost by submersion of crop storage facilities resulting in immediate food shortages. Most agricultural losses result from the inundation of crops. Large numbers of animals, including draught animals, may be lost if they are not timely moved to safety. In coastal areas where fish provide a source of protein, boats and fishing equipment may be lost or damaged. ***Displacement:*** ▪ Floods can contribute to people being displaced and having to be sheltered in evacuation centers which may last several days, until water subsides.
	SECONDARY/INDIRECT EFFECTS:	▪ Loss of livelihoods might increase poverty as well as increase a demand for borrowing from informal moneylending (leading to long term debt). ▪ Schools may be used as evacuation centers which might lead to lack of access to education of children being affected. ▪ Outbreak of water-borne diseases might increase pressure on existing health services and supplies. ▪ In certain rural areas, there also could be an incidence of snake bites.
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Health facilities and ICUs may be damaged and no longer operational. ▪ Health staff in these hospitals may be killed or wounded or unable to report for duties. ▪ COVID-19 patients will have to be moved to other locations to intact health facilities. ▪ Electricity disruption may no longer allow the use of ventilators or other medical equipment. ▪ Pneumonia may be aggravated because of aspirating contaminated water. ***WASH:*** ▪ Lack of/limited clean water supply may no longer allow for proper handwashing and other sanitation measures. ***Displacement:*** ▪ Congestion in temporary shelters could lead to a high risk of COVID-19 transmission.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Developing a contingency plan for the health facility and how business can continue in the advent of a flood or finding alternatives. ▪ Identification of strong houses/buildings within the community or in neighboring communities that could shelter COVID-19 affected people and reduce the risk of overcrowding.

		▪ Initiate or support psychosocial first aid or mental health care system (within the community) ▪ Identification and protecting of key water resources in the community ▪ Promote and increase education on handwashing and hygiene for COVID-19 ▪ Support handwashing, sanitation, and hygiene activities in key locations such as in schools or public places.

HAZARD TYPE: HEATWAVES 	**PRIMARY EFFECTS**	***Public Health:*** ▪ Dehydration ▪ Possibility of heat exhaustion and heat stroke ▪ Loss of consciousness, headache, and dizziness. ▪ It can also exacerbate pre-existing conditions such as cardiovascular disease and respiratory illnesses.
	SECONDARY/INDIRECT EFFECTS:	***Public Health:*** ▪ Heatwaves will stretch existing health systems by increasing the number of emergency hospital admissions. ***Livelihoods:*** ▪ Heatwaves also impact essential services by reducing the number of hours outdoor workers can be employed safely; reducing productivity in offices without adequate cooling. ▪ In rural areas, farmers might not attend their agricultural lands, contributing to loss of agricultural crops. ***Services:*** ▪ There will be an increase in demand for energy due to an increase for the use of cooling appliances (Air conditioning); ▪ A demand for water will put pressure on water resources and may cause water shortages.
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Health conditions may worsen with the increase of respiratory illness, cardiovascular problems caused by the combination of heatwaves and COVID-19. ▪ Pressure on health systems with increased patient intake affected by the heatwave and COVID-19: need for cooling systems in hospitals. ***WASH:*** ▪ Increase in demand for water in view of rehydration of patients could compromise availability of hand washing facilities
	Interventions specific to COVID-19 effects (but not limited to)	▪ Identification of people having respiratory illness who can be compounded with the pandemic. ▪ Strengthening of the early warning system for heatwaves and linking with the relevant government department for warnings/alerts. ▪ Strengthening and increasing of water resources/supplies for drinking and handwashing/cooling systems. ▪ Develop a contingency plan for the health facility and identify ways how business can continue during heat waves (or identify alternatives)

HAZARD TYPE: LANDSLIDES 	**PRIMARY EFFECTS**	***Physical damage and services:*** ▪ Anything on top of or in the path of a landslide will suffer severe damage or destruction. In addition, rubble may damage lines of communication or block roadways. Waterways may be blocked creating a flood risk. ***Casualties:*** ▪ Fatalities have occurred due to slope failure where population pressure has prompted settlement in areas prone to landslides. ▪ Casualties may result from collapse of buildings or burial by landslide debris. ▪ Casualties may normally not be widespread, except in the case of massive land movements due to major hazards causing landslides, such as earthquakes and volcanoes. ***Displacement:*** ▪ Houses in the path of the landslide will be displaced. The amount of people displaced would depend upon the scale and location of the landslide. ▪ Displaced persons would need to be housed in temporary shelters, until soil is sufficiently stabilised or households are resettled.
	SECONDARY/INDIRECT EFFECTS:	▪ In addition to direct damage from a landslide, many indirect adverse effects occur. These include: ▪ loss of productivity of agricultural or forest lands (if buried). ▪ Adverse effects on water quality in streams and irrigation facilities. ▪ Secondary physical effects such as flooding. ▪ Roads to communities being cut off would result in restricted access of necessary food and medical supplies.
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Health services could face an increase in patient intake with casualties from the landslide and COVID-19 patients, putting a stress on limited medical resources and services ***Displacement:*** ▪ Congestion/overcrowding of temporary shelters could lead to high risk of transmission. ***WASH:*** ▪ Lack of/limited clean water supply may no longer allow for proper handwashing.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Assessing the population in landslide prone zones and identification of necessary relocation sites within or outside the community that can accommodate the displaced keeping in mind physical distancing norms. ▪ Cash voucher assistance for the affected. ▪ Identification of affected people that can be relocated with necessary distancing and hygiene/safety provisions. ▪ Strengthening/protection of water sources.

HAZARD TYPE: TECHNOLOGICAL DISASTERS 	**PRIMARY EFFECTS**	***Physical Damage:*** ▪ Damage to critical infrastructure can cause disruption of access and supplies of emergency relief ▪ Explosions may cause destruction of buildings and infrastructure. ***Services:*** ▪ Transportation accidents damage vehicles and other objects on impact, with possible loss of hazardous materials into the environment. Industrial fires may reach very high temperatures and affect large areas. ▪ Blackouts can cause interruption of power supplies to vital infrastructure like hospitals, transport facilities like trains, subways, cooling, and storage facilities, ▪ Disruption of communication channels due to blackouts ***Public Health:*** ▪ Many people may be killed and those injured may require emergency medical treatment. Hazardous substances released into the water or the air may travel long distances and cause contamination of air, water supply, land, crops, and livestock. ▪ Release of hazardous substances may cause health impact and block access to possible contaminated areas. ▪ Wildlife may be killed, and ecological systems disrupted.
	SECONDARY/INDIRECT EFFECTS:	In addition to direct damage from a technological hazard, many indirect adverse effects occur. These include: ▪ loss of income due to closedown of affected industrial facilities. ▪ adverse effects on shelter, agriculture, livestock, and other livelihood activity due to contamination from the spread of hazardous or toxic substances. ▪ potential of Blackouts and loss of power supplies and communication infrastructure. ▪ evacuation or relocation of communities can result in restricted access to relevant public services in that areas.
	COVID-19 RELATED EFFECTS:	***Displacement:*** ▪ Need for evacuation / relocation from potentially contaminated areas might be challenging under COVID -9 restrictions with keeping physical distance and providing sufficient shelter and support to affected people. ***Public Health:*** ▪ Impact due to power cuts of communication blackouts to health-care facilities, ICUs and diagnostic and treatment equipment and interruption of services can have long-reaching consequences affecting the proper functioning of health facilities. ▪ Health staff may be killed or wounded or might have a family member affected who cannot be contacted. ▪ An increase in number of casualties (due to injuries or contamination) may put pressure on prioritization of patients to be treated first. ***Food Security:*** ▪ Already low levels of food security due to lockdown will be aggravated (due to supply chains/transportation being disturbed) as a result of market disruption. ▪ Food supplies from an area potentially contaminated will be further banned from markets which might have a knock-on effect on income of communities. ***Psycho-social/mental health:*** ▪ Mental health could further be compounded due to the trauma of the impact of another unknown and potentially invisible hazard substance as well as the possibility of being stigmatized by coming from a contaminated area.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Provide guidance for “Shelter in place” in case a suitable evacuation / relocation with appropriate shelter locations is not feasible. ▪ Develop and test contingency plan for possibly affected health facilities and how business can continue in the advent of a longer term blackout ▪ Review availability of specialist resources to test on hazardous substances and their means to operate in a CBRN / COVID 19 environment. ▪ Initiate or support psychosocial first aid or mental health care system (within the community). ▪ Possible stockpiling for emergency supplies in case critical infrastructure fails. Further bottlenecks of available PPEs might impact response activities. ▪ Ensure proper decontamination of contaminated areas aligned with activities for COVID-19 response.

HAZARD TYPE: **TROPICAL STORMS** 	**PRIMARY EFFECTS**	***Physical damage:*** ▪ Structures will be damaged or destroyed by wind force, by flooding, storm surge and landslides. Standing crops may be lost to floods, storm surges, and sea water salinity. Salt from storm surges may also be deposited on agricultural lands. ***Casualties and Public Health***: ▪ There are relatively few fatalities due to the high winds associated with tropical storms but there may be numerous casualties requiring hospital treatment due to injuries caused by flying debris. Storm surges may cause many deaths but usually few injuries among the survivors. Due to flooding and possible contamination of water supplies, malaria and other viruses may be more prevalent several weeks after the flooding. ***WASH:*** ▪ Open wells and other ground water supplies may be temporarily contaminated by flood waters and storm surges. They may be contaminated by pathogenic organisms if bodies of people or animals are lying in the sources or sewage is swept in. Normal water sources may be unavailable for several days. ***Food Security:*** ▪ The combination of high winds and heavy rains, even without flooding, can ruin standing crops and tree plantations. Food stocks may be lost or contaminated if the stores/ structures in which they were held have been destroyed. It is possible that food shortages will occur until the next harvest. Tree and food crops may be blown down or damaged and must be harvested prematurely. ***Displacement:*** ▪ Storm induced floods can cause displacement of communities and sheltering them in evacuation centers which may last several days.
	SECONDARY/INDIRECT EFFECTS:	▪ Loss of livelihoods might increase poverty as well as increase a demand for borrowing from informal moneylending (leading to long term debt).
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Health facilities and ICUs may be damaged and no longer operational. ▪ Health staff in these hospitals may be killed or wounded or unable to report for duties. ▪ COVID-19 patients will have to be moved to other locations with intact health facilities. ▪ Electricity disruption may no longer allow the use of ventilators or other medical equipment. ▪ Pneumonia may be aggravated as a result of aspirating contaminated water. ***WASH:*** ▪ Lack of/limited clean water supply may no longer allow for proper handwashing. ***Displacement:*** ▪ Congestion/overcrowding in temporary shelters could lead to high risk of COVID-19 transmission.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Developing a contingency plan for the health facility and how business can continue in the advent of a flood or finding alternatives. ▪ Establishing or strengthening of a community early warning (connected with the Met department) that would help to pro-actively relocate vulnerable or infected people to safer locations. ▪ Cash Voucher assistance for the affected. ▪ Identification of affected people that can be relocated taking into account the necessary distancing and hygiene/safety provisions. ▪ Strengthening or increasing of water reserves/systems both at the household and community level.

HAZARD TYPE: TSUNAMI 	**PRIMARY EFFECTS**	***Physical Damage:*** ▪ Damage occurs to human settlements, buildings, structures, infrastructure, and lifelines/services along the coastlines. ***Casualties and Public Health***: ▪ Deaths occur principally from drowning as water inundates homes. People may be washed out to sea or crushed by the giant waves. There may be injuries from battering by debris. Some people may develop pneumonia from aspirating polluted water. ***WASH:*** ▪ Sewage pipes may be damaged causing major sewage disposal problems. Open wells/ponds/underground may be contaminated by saltwater intrusion and debris or sewage. Normal water supplies may be inaccessible due to broken water mains. ***Food Security:*** ▪ Flooding and damage by tsunamis may result in infertility of land (saltwater intrusion), damage to food crops, animals may perish, boats and fishing nets are damaged. ***Displacement:*** ▪ Large numbers of people may be displaced and homeless for a substantial period either temporary or permanently (change in landscape).
	SECONDARY/INDIRECT EFFECTS:	▪ Hazardous industries (such chemical factories) located along the coastline could result in environmental risk and damage due to the tsunami. ▪ Solid waste and disaster debris have an impact on the immediate environment, especially if there is no system for waste management
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Health facilities and ICUs located near the coastline may be damaged and no longer operational. Health staff in these hospitals may be killed or wounded. ▪ COVID-19 patients will have to be moved inland to intact health facilities. ▪ Electricity disruption may no longer allow the use of ventilators or other medical equipment. ▪ Pneumonia may be aggravated as a result of aspirating contaminated water. ***WASH:*** ▪ Disruption of water supplies may no longer allow for proper handwashing in coastal areas. ***Food Security:*** ▪ Already low levels of food security due to lockdown will be seriously aggravated as a result of damage to local crops, livestock and fishery. Local produce or supplies could be affected leaving greater dependency on external assistance. ***Displacement:*** ▪ Homelessness and displacement upland of infected people may contribute to further spread of COVID-19 virus, as physical distancing may no longer prove easy.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Assessing the population in tsunami prone zones and identification of necessary relocation sites within or outside the community where the displaced can be accommodated keeping in mind physical distancing norms. ▪ Cash Voucher Assistance to affected households/communities. ▪ Support psychological first aid services for affected individuals. ▪ Promote and intensify risk communication messaging especially in the aftermath of the tsunami.

HAZARD TYPE: **VOLCANIC ERUPTION** 	**PRIMARY EFFECTS**	***Casualties and Public Health:*** ▪ Deaths can be expected from pyroclastic and mud flows and to a much lesser extent from lava flows and toxic gases. Injuries may occur from impact of falling rock fragments and from being buried in mud. Skin burns and burns to breathing passages and lungs may result from exposure to steam and hot dust clouds. Ash fall and toxic gases may cause respiratory difficulties for people and animals. ***Physical Damage:*** ▪ Complete destruction of everything in the path of pyroclastic, mud or lava flows should be expected, including vegetation, agricultural land, human settlements, and infrastructure. Structures may collapse under the weight of ash particularly if it is wet. Falling ash may be hot enough to cause fires. ▪ Transportation by air, land and the sea may be affected, which can have serious effects on delivery of emergency response. ▪ Communication services can also be disrupted due to damage/destruction of communication lines and towers. ***Food Security:*** ▪ Crops in the path of mud, pyroclastic or lava flows will be destroyed, and ash falls may render agricultural land temporarily unusable. ▪ Livestock may suffer from inhaling toxic gases or ash. Ash containing toxic chemicals may contaminate the grazing and farming lands. ***Displacement:*** ▪ Affected people will be relocated in evacuation centers until the volcanic activity subsides.
	SECONDARY/INDIRECT EFFECTS:	▪ Volcanic eruptions may cause fires, blockage of waterways and long-term environmental pollution issues.
	COVID-19 RELATED EFFECTS:	***Public Health:*** ▪ Respiratory problems will be compounded with the contamination of air and COVID-19. ▪ Health facilities could be damaged/destroyed, or health personnel could be affected/injured/able to access the health facilities. ▪ With transportation channels being cut off, pressure on existing medical aid supplies or the inability to relocate ill patients to a safer place. ***WASH:*** ▪ Lack of/limited clean water supply may no longer allow for proper handwashing. ***Displacement:*** ▪ Congestion in evacuation centers could lead to high risk of transmission.
	Interventions specific to COVID-19 effects (but not limited to)	▪ Assessing the population in volcanic eruption prone zones and identification of necessary relocation sites within or outside the community where the displaced can be accommodated keeping in mind physical distancing norms. ▪ Cash Voucher Assistance to affected households/communities. ▪ Support psychological first aid services for affected individuals. ▪ Establishing or strengthening a community early warning (connected with the government department) that would help to proactively relocate vulnerable or infected people to safer locations.

FURTHER READING:

- Global Heat Health Information Network, *Heat and COVID-19 Information Series*, https://www.ghhin.org/heat-and-covid-19
- EU Lessons Learned Bulletin, *Special Issue: Industrial Disasters and COVID-19*, https://minerva.jrc.ec.europa.eu/en/shorturl/minerva/llb_covidv3pdfAddressing
- UNDRR Africa, *Addressing Disaster Risk Reduction of Multiple Hazards during the COVID19 crisis,* https://www.preventionweb.net/publications/view/71929IFRC
- IFRC Information Bulletin, *Africa: multiple Disasters and Hazards*, https://reliefweb.int/report/world/ifrc-information-bulletin-africa-multiple-disasters-and-hazards
- IFRC News Room, *East Africa: Red Cross raises the alarm over a "triple menace" of floods, COVID-19 and locusts,*
- Zurich Flood Resilience Alliance/Mercy Corps, Building resilience to extreme weather is crucial amid the coronavirus pandemic