**Principles to Address Water-related Disaster Risk Reduction (DRR) under the COVID-19 Pandemic**

Leaders, decision makers, and citizens should be aware that water-related disasters[1] continue to be imminent in countries and cities under the COVID-19 pandemic. Disaster Risk Reduction (DRR) strategies and actions specially designed for the current pandemic situation will protect disaster-affected areas from becoming epicenters of pandemic explosion and assist with swift recoveries from disasters. The following Principles offer practical advice to political leaders managers of DRR and COVID-19 responses, and for all stakeholders to formulate strategies and actions. These initiatives can address water-related disasters that may occur anytime in the future, even under the pandemic. While the Principles address water-related disasters, they are applicable to the other types of disasters as well.

In the current COVID-19 environment, immediate attention has been placed on mitigating COVID-19 infections and treating those who become ill. However, the threats of water-related disasters remain as imminent now as before COVID-19. Competition and complications among DRR emergency responses and COVID-19 health care responses could magnify negative impacts in some countries and cities.

Implementation of DRR strategies and pre-emptive actions that factor in the current pandemic are needed to protect areas impacted by water-related disasters from also becoming new epicenters or clusters of the pandemic. The following Principles offer practical advice to political leaders, managers of DRR and COVID-19, and all stakeholders on how to prepare and respond to avoid magnified impacts due to co-occurring disasters. While these Principles are identified to address water-related disasters, they are equally applicable to other disaster types.

       Principle 1: Enhance leaders' awareness on disaster risk reduction (DRR) in the pandemic

       Principle 2: Integrate actions on risk management of disasters and pandemics

       Principle 3: Provide clean water, sanitation, and hygiene sustainably during and after disasters

       Principle 4: Protect disaster risk management stakeholders from threat of COVID-19

       Principle 5: Protect scarce medical resources from disaster impact

       Principle 6: Protect disaster evacuees from threat of COVID-19

       Principle 7: Protect COVID-19 patients from threat of disasters

       Principle 8: Develop Specialized Evacuation Guidance for Cities and Areas under COVID-19 Lock-Down

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[1] Water-related disasters in this document mean all sorts of disasters of which impact is given by water. They include heavy rain, storms, floods, droughts, land slide, debris flow, tsunami, high tides, liquefaction, glacier lake outburst flood (GLOF), and water pollution accidents. Water related disasters comprise over 95% of all disasters in terms of number of affected people. Over 90% of the past 1,000 major disasters are water related.

Principle 9: Finance DRR actions under COVID-19 effectively to avoid economic catastrophe

Principle 10: Strengthen global solidarity and international cooperation to cope with these co-occurring challenges towards building our world back better

*Given that, Disaster Response and Recovery from a flood or drought disaster are complicated by mitigation of COVID-19, and vice-versa.*

**PRINCIPLE 1: ENHANCE LEADERS' AWARENESS ON DISASTER RISK REDUCTION (DRR) IN THE PANDEMIC**

- Be aware that water-related disasters are imminent in countries and cities while they are under COVID-19 pandemic. Although situations in areas affected by both disasters and pandemics can be complicated and confusing, step by step decision making and actions will help. Although tasks may look too immense and complicated, avoid giving up. Making DRR decisions with the pandemic situation in mind, and vice versa, will help avoid later confusion.

- Ensure integrating disaster and pandemic risk management strategies and actions. Bring together joint teams of DRR and COVID-19 experts to provide advice based on their ongoing dialogue and integrated advice. Make critical decisions by consulting them.

- If a water-related disaster happens, maintain or recover as quickly as possible basic services such as power, transport, water and hygiene to prevent spread of disease and cumulative effects of co-occurring disasters, including protecting essential medical and DRR personnel. For this, ask DRR managers to take ex-ante measures such as planning emergency protection of critical infrastructure and arranging contingency supply of recovery material/equipment. Ask DRR managers to establish a system to swiftly mobilize personnel and equipment for DRR at emergency since they may not be readily available as officials are on work shifts and public works are suspended under COVID-19.

- Effective immediately, request DRR managers to make disaster risk management plans under the pandemic situation to prepare for its eventuality. Priority should be given to the protection for hospitals, medical facilities and their staff members. From the perspectives of DRR and prevention of COVID-19, the DRR plan under COVID-19 should address the specific needs of men, women, young people and children, the elderly, disabled people, migrants, displaced populations such as refugees and internally displaced people, stateless people, day workers, slum dwellers, the homeless, and people susceptible to COVID-19 such as those with chronicle illness. Collect disaggregated data on impacted individuals by COVID-19 and disasters according to gender, age, race, with/without chronicle illness, specific groups as mentioned above so that effective integrated plans to combat both COVID-19 and disasters can be established.

- Ensure that civil defense authorities and emergency medical services have contingency operational plans to simultaneously address a disaster and COVID-19 in order to rapidly balance their competing responsibilities as they have already been responding to the COVID-19.

- Give the highest priority of human and financial resources allocation to sustainable water supply and sanitation during and after disasters since hygiene, particularly hand washing, is a critical element in containing spread of COVID-19.

- Include items in the Principles of this document in the national and community DRR plans. Ask all DRR stakeholders including private sectors to include items in the Principles in their business continuity plans (BCPs).

*Given that the actors in DRR and COVID-19 mitigation need to coordinate for an effective and efficient response.*

**PRINCIPLE 2: INTEGRATE ACTIONS ON RISK MANAGEMENT OF DISASTERS AND PANDEMICS**

- Fully include the health sector into the integrated risk management system. Use basic approaches of Sendai Framework and other international guidelines for DRR to strengthen DRR governance under COVID-19 such as: risk-based approaches; comprehensive emergency management; all-hazards approach; inclusive, people- and community-centered approach; multisectoral and multidisciplinary collaboration; whole-of-health system-based approach; ethical considerations. DRR collaboration and action protocols need to be reviewed and adjusted to enhance resilience to hazards of all kinds including biological hazards.

- Quickly share and learn from the recent cases of heavy rains, floods, hurricanes and tornados that have occurred under COVID-19 situations. Many of these lessons are reflected in these Principles.

- Create situation-specific guidelines and webinars on DRR approaches in COVID-19 situations that reflect your specific, social, cultural, geographical and economic settings. Consider conducting water-related disaster management drills by DRR managers and stakeholders under the COVID-19 situation.

- Provide hazard maps and DRR advice to hospitals and health facilities before disasters strike. Create overlapping maps of disaster/COVID-19 affected areas and facilities. Risks of both infection and disasters can be reduced by avoiding visits to risk-prone areas. The hazard maps should also include the insecurity due to dual impacts of disaster and pandemic, of water insecurity at the household level.

- Review and improve existing early-warning and evacuation systems so that they meet requirement for both safe evacuation and prevention of infection by COVID-19. Develop concise and clear "early warning" communication messages that relate to evacuation and other response items from the natural disaster in the context of pandemic restrictions and guidance.[i]

- Conduct joint risk awareness campaigns of DRR and COVID-19. Enhance awareness on the value of increasing disaster resilience to the risk drivers, including health pandemics, to be better prepared by implementing prevention actions and advancing knowledge on increasing resilience to disasters. Conduct risk assessment and communication of the co-occurring disasters in high risk zones.

- Ensure that Disaster Management teams maintain transparency of the disaster aftermath and responses, and efforts taken to address Covid-19 issues. The public and those affected by the disasters should be able to obtain valid and updated information. The disaster management team should be a facilitator to harness social collaboration by matching the needs (based on data) and the supply of help (from the public) particularly to raise funds to combat the decease. Create a platform of collaboration where help can quickly be matched to the needs.

- Activate existing youth groups for DRR to call for solidarity and collaboration to contain spread of COVID-19 as behavior of young people are decisive element in controlling the decease. Collaborate with youth

groups in disaster management, relief, and recovery activities under the COVID-19 pandemic, making use of their special capability in, e.g., ICT, innovation, and mobilizing their local counterparts.

*Given that water, sanitation, and hygiene are critical element in prevention of COVID-19 and swift recovery from disasters.*

**PRINCIPLE 3: PROVIDE CLEAN WATER, SANITATION, AND HYGIENE SUSTAINABLY BEFORE, DURING AND AFTER DISASTERS**

- Be aware that natural hazards often lead to disruptions in water availability which could affect COVID-19 mitigation efforts. In regions with acute water scarcity, disasters may affect the implementation of hand washing, waste management and other practices meant to prevent human-to-human transmission of the COVID-19 virus. Specific attention must be paid to risks caused by droughts since water scarcity may hinder efforts to contain sanitary crises.

- Protect water infrastructure, particularly at water sources, from contamination. Consider using non-contaminated alternative sources including water harvesting, and the reuse of wastewater to prevent collateral hazards of disaster and pandemic.

- The DRR plans of water service providers should include the effects of not only natural hazards but also pandemics. Pandemics will influence the personnel and thus quality of service provision. Hygiene promotion must be included in all stages of the process through different channels such as medical centers, water/sanitation access points, and emergency personnel.

- Promote research and survey actions to detect COVID-19 traces in wastewater of communities infected with the virus in order to prevent risks, particularly at the time of disasters. New approaches such as, wastewater-based epidemiology (WBE) should be explored. They could be effective and rapid ways to predict potential spreading of COVID-19 from water and sewer system.

- Ask water utilities to enhance the role of digital tools and remote automation/monitoring systems in their business continuity plans. All but essential water and wastewater operational teams, control centers and laboratory staff should be working from a distance if feasible under COVID-19. For workers in the field, teams must be assigned differentiated work shifts that consider quarantine cycles, and must have access to COVID-19 personal protection equipment (PPE).

*Given that there are critical infrastructure and human assets needed during response and recovery to floods and droughts under an ongoing pandemic.*

**PRINCIPLE 4: PROTECT DISASTER MANAGEMENT STAKEHOLDERS FROM THREAT OF COVID-19**

- Educate and build strategically the capacity of DRR stakeholders about COVID-19. Provide accessible, concise and clear guidance on how to avoid infection to disaster management officials and volunteers. For example, use advice leaflets, provision of webinar, and more. Include social distancing instructions in DRR activities in manuals and daily check list.

- Make sure that DRR stakeholders including volunteers are equipped with standard COVID-19 protections

such as masks, when engaged in disaster preparedness/prevention/recovery activities. If possible, stockpile those as well as COVID-19 personal protection equipment (PPE) for use at highly infectious cases. It will be effective to stock PPE for DRR personnel in the period between pandemic waves when there are overflowing supply of PPE for non-medical needs.

- Require daily self-medical checks of disaster management personnel to prevent possible infection in their contact with colleagues and evacuees.
- Balance the need for swift disaster prevention/recovery and for avoiding disease transmission between COVID-19 affected areas and less affected ones through travel of DRR stakeholders, including volunteers.
- Make sure that the quality of monitoring and alerting on disasters is checked and maintained as the quarantine of the officials in charge may affect it.

**PRINCIPLE 5: PROTECT SCARCE MEDICAL RESOURCES FROM DISASTER IMPACT**

- Avoid designating hospitals and medical facilities as places for evacuation. Remove those buildings and facilities from designated evacuation places in hazard maps and DRR plans.
- Prioritize protection of medical staff, facilities, and equipment from disaster impact by:
  - Moving essential power generation equipment to safe areas from water-related disasters (flooding, etc.) and provision of auxiliary power supply equipment to hospitals, health posts and medical facilities,
  - Early dispatching of disaster management personnel to hospitals, health posts and medical facilities to ensure communication of appropriate DRR advice,
  - Moving essential medical equipment and materials to upper floors at early stage
  - Creating evacuation plans for patients and medical staff, taking infectious zones into consideration,
  - Prioritizing provision of water, sanitation and hygiene to hospitals, health posts and medical facilities if water supply and sanitation services are disrupted due to disasters,
  - Identifying safe locations of overflow health facilities needed for the pandemics response to avoid building additional short-term COVID-19 hospitals in disaster prone areas such as flood plains
  - Educating medical staff responsible for emergency management with basic DRR knowledge before a disaster is imminent.

*Given that the combination of risks from natural hazards and COVID-19 can lead to higher loss of life*

**PRINCIPLE 6: PROTECT DISASTER EVACUEES FROM THREAT OF COVID-19**

- Immediately create or revise evacuation plans that include adapted shelters to assure social distancing, hygiene facilitation, and good sheltering procedures. Ensure proper ventilation of evacuation buildings/ facilities to prevent cluster infection. Identify additional buildings and spaces for shelters that may be needed to meet specific needs for protection of evacuees from COVID-19 such as social distancing and separate spaces for self-quarantine patients. Ideally, specific shelters for COVID-19 patients with medical facilities and separate buildings/facilities/areas of evacuation for self-quarantine patients should be established.
- Promote vertical evacuation as the priority methods of evacuation whenever and wherever possible. This

means evacuating to the second or upper floor of evacuees' own or neighborhood building if safe. This is needed to avoid accidents, to manage encounters with disasters during evacuation, and to make evacuation shelters less dense with people thereby reducing risk of infection by the virus in shelters. In areas where vertical evacuation is not possible, such as flat lowlands, discuss with local community on earlier evacuation to increased number of higher buildings, shelters, and spaces to avoid congestion of evacuees.

- Identify and plan early evacuation and care for the most vulnerable, with social inclusion approach, from the compound hazards, e.g., seniors, handicapped, pregnant women, and patients with chronic deceases.
- Provide ample clean water, soap, sanitary goods, and sanitary pads for evacuees.
- Conduct basic medical checks such as checking evacuee's temperature.
- Prevent any COVID-19 related discrimination to and among evacuees. Keep announcing and distributing accurate information on status and impacts of disasters and COVID-19 in transparent manners as misinformation and fake news tend to spread rapidly and widely under panic situation.
- Advise citizens to include masks, wipes, soaps, towels, and thermometers in evacuation kits prior to disasters.
- Call for cash donation rather than materials which might be contaminated under the pandemic. Promote electronic money transfer in every aspect of payment transaction for DRR to reduce risk of COVID-19 infection through cash.

**PRINCIPLE 7: PROTECT COVID-19 PATIENTS FROM THREAT OF DISASTERS**
- Ensure that DRR and COVID-19 are given integrated top priority: avoid risks that directly endanger human life.
- Understand and take concerted actions for COVID-19 mitigations based on medical control principles of infectious diseases. These medical principles include: 1) Eliminate the source of infection; 2) Cut off the transmission route; 3) Protect the vulnerable groups.
- Create protection plans for COVID-19 patients in self-quarantine or designated facilities that include: means of communication and messages; evacuation plans to disaster-safe quarantine facilities, and medical support after evacuation.

**PRINCIPLE 8: DEVELOP SPECIALIZED EVACUATION GUIDANCE FOR CITIES AND AREAS UNDER COVID-19 LOCK-DOWN**
- Give special early warning to the locked down areas to ensure effective evacuation and safety assurance against disasters and prevent panic actions.
- Create contingency emergency evacuation plans for lock-down situations to prevent panics and enhanced spread of the infection. Disaster response plans based on a time-line format that includes lifting specific restrictions in specific areas need to be considered.
- Ensure coordination with local authorities to designate safe areas and evacuation routes in case of disasters during lock down.

*Given that properly handling disasters under COVID-19 will save trillions of dollars globally*

**PRINCIPLE 9: FINANCE DRR ACTIONS UNDER COVID-19 EFFECTIVELY TO AVOID ECONOMIC CATASTROPHE**

- Fully fund the pandemic finance appeal while at the same time having a contingency budget and funds to address disaster and climate-related risks, keeping in mind that compound hazards may cause irreparable economic catastrophe. Arrange contingency finance agreements with banks and/or insurance companies so they can quickly access funds to respond to disasters.

- Ensure flexible funding and disbursement that enable DRR players to plan and respond to rapidly emerging and changing multiple risks under COVID-19 situation.

- Update disaster risk management capabilities to form a global, digital and data-driven plan, with data on prices, suppliers, lead times and specification for procurement of essential goods and services to address disasters and pandemic. Have plans to face challenges of, for example, lack of manufacturing capacity, long and congested supply chains and competing buyers

- Encourage digital payment mechanism in DRR transactions through telephone-based digital currency payment and digital currencies such as one now distributed by Red Cross for disaster victims in East Africa to prevent spread of COVID-19 through contact infection.

*Given that global solidarity rather than isolation is essential to win the battle against co-occurring COVID-19 and disasters.*

**PRINCIPLE 10: STRENGTHEN GLOBAL SOLIDARITY AND INTERNATIONAL COOPERATION TO COPE WITH THESE CO-OCCURRING CHALLENGES TOWARDS BUILDING OUR WORLD BACK BETTER**

- When a mega-disaster occurs, share accurate and timely information on the disaster and its impact with the international community in transparent and accountable manners on a regular basis, to provide global trust to governance and the economy of the affected country.

- Request Weather/Climate Agencies, through involvement of the World Meteorological Organization and UNDRR, around the world to actively coordinate with COVID-19 Taskforces and to provide them forecasts of identifiable climate and weather-related risks to alert them of possible water-related disasters in certain areas

- If necessary, prepare to facilitate international DRR and humanitarian assistance personnel and equipment. During entry restriction situations, international DRR and humanitarian aid personnel and equipment may need established protocols to enter affected countries and areas. Countries should pre-consider and plan facilitation arrangements such as visa issuance, quarantine clearance and customs clearance and protocols for safe assistance during the pandemic. Dispatched teams should be equipped with protection kits. Medical briefings should be given to such international assistance teams before entering COVID-19 affected areas. Use of "Guidelines for the domestic facilitation and regulation of international disaster relief and initial recovery assistance (IDRL Guidelines)" by International Federation of Red Cross and Red Crescent Societies (IFRC) should be promoted.

- Discuss establishing specific regional bodies of pandemic policies and regulations, following examples of those of DRR.  ASEAN countries, for example, have addressed this cross-border issue and regional/ international collaboration for DRR, by establishing a regional center. Such a mechanism is important

when discussing re-opening borders and promoting trades of essential goods and people in resilient manners in rapidly changing situations.

- Special protocol and care from, rather than entry ban because of, COVID-19 for migrating people and refugees due to disasters and other emergencies should be considered.

- Map risks from many perspectives and work in a collaborative, trans-boundary way since hazards do not respect borders or politics. Explore solutions across sectors such as: water, sanitation and hygiene; energy; education; health and nutrition; livelihoods; child and social protection; shelter and housing; and public open spaces.

- Extend international support to low- and middle-income countries that are struggling to cope with the outbreak recognizing that all need to attend first and foremost to the safety and well-being of their own country's citizens. A threat to one of us is a threat to all of us. Be aware that we are only as strong as the weakest in coping with COVID-19 and disasters.

- Take a coordinated approach to understanding and reducing risk across borders and within governments. COVID-19 has demonstrated the need for a whole-of-government approach that leverages the capacities of all relevant Ministries, including National Disaster Risk Management Agencies.

- Start recovery planning now to build our world back better. National and local governments must factor in biological hazards and risks in their national and local disaster risk reduction strategies (Sendai Framework Target (e)). The challenges presented by this disaster will form the basis for new plans and designs to ensure public and private systems are made resilient in the face of future hazards.