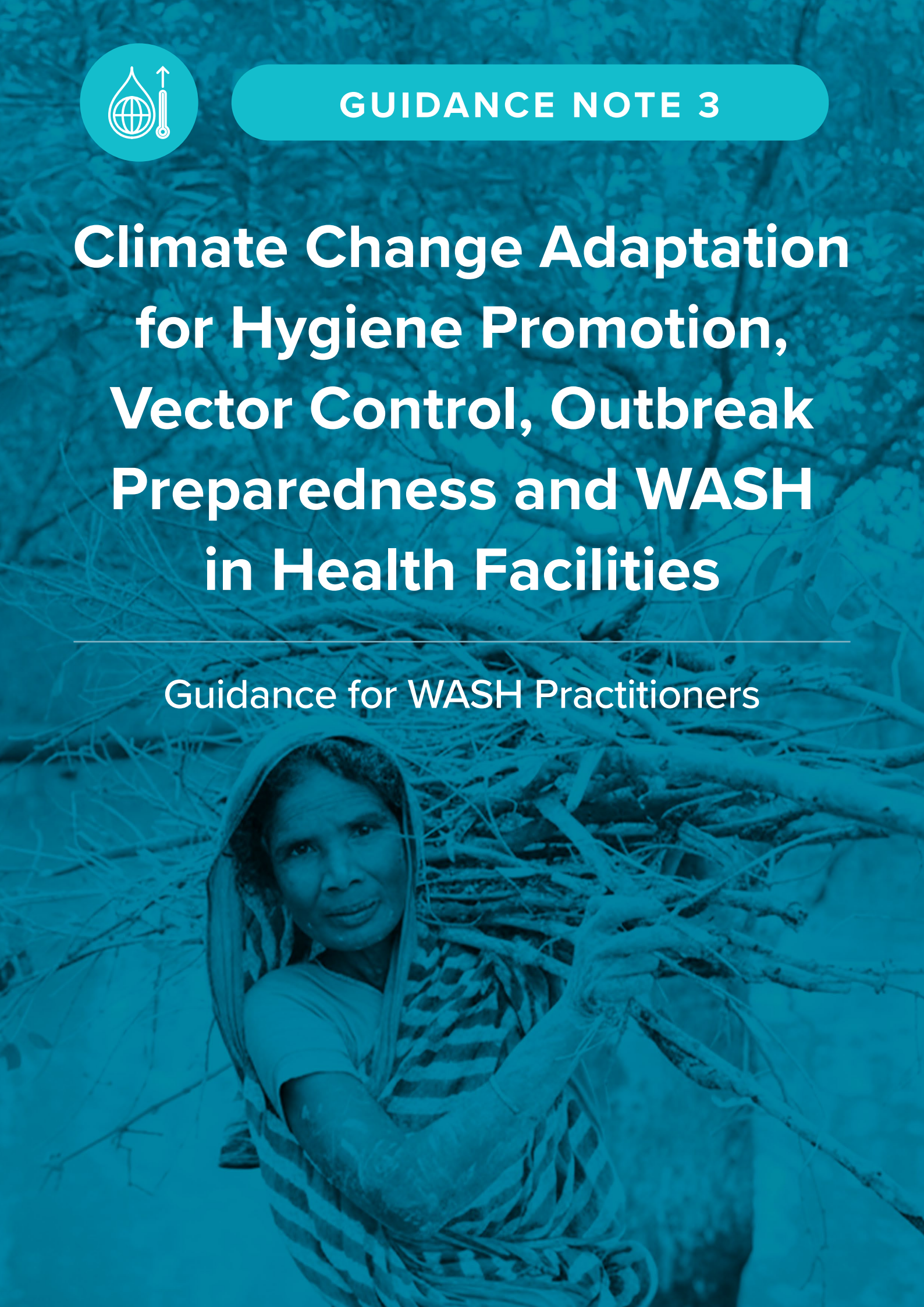
GUIDANCE NOTE 3

Climate Change Adaptation for Hygiene Promotion, Vector Control, Outbreak Preparedness and WASH in Health Facilities

Guidance for WASH Practitioners



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Abbreviations

CBO	Community-Based Organisation
CBV	Community-Based Volunteer
CEBS	Community Event Based Surveillance
CDC	Center for Disease Control
CHIKV	Chikungunya Virus
CHW	Community Health Worker
DDT	Dichlorodiphenyltrichloroethane
DENV	Dengue Virus
DFID / FCDO	Department for International Development, now Foreign and Commonwealth Development Office
GN	Guidance Note
DRR	Disaster Risk Reduction
EWS	Early Warning System
GFFO	German Federal Funding Office
HAI	Hospital-Acquired Infection
HMIS	Health Management Information System
IFRC	International Federation of the Red Cross and Red Crescent Societies
IPC	Infection Prevention and Control
IRS	Indoor Residual Spraying
ITPS	Insecticide Treated Plastic Sheeting
LLIN	Long Lasting Insecticide Treated Net
MERS	Middle East Respiratory Syndrome

M&E	Monitoring and evaluation
MHH	Menstrual Health and Hygiene
MoH	Ministry of Health
NFI	Non-Food Item
NGO	Non-Government Organisation
ORS	Oral Rehydration Salts/Solution
PLA	Participatory Learning Assessment
PHRA	Public Health Risk Assessment
PWD	Persons with Disabilities
RCCE	Risk Communication and Community Engagement
SARS	Sudden Acute Respiratory Syndrome
SOP	Standard Operating Procedure
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development
VA	Verbal Autopsy
VBD	Vector-Borne Disease
WASH	Water Sanitation and Hygiene
WASH FIT	Water and Sanitation for Health Facility Improvement Tool
WHO	World Health Organisation
WSP	Water Safety Plan
YFV	Yellow Fever Virus

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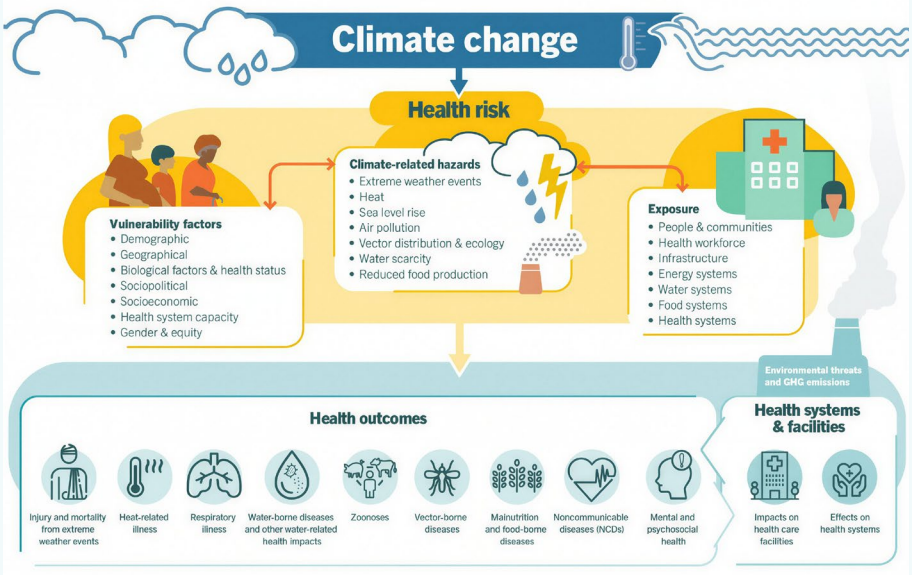
1 Introduction

Climate change is the greatest risk to human health in recorded history. Over the next 20 years, climate change is expected to cause an additional 250,000 deaths per year, and countries with weaker health and water, sanitation and hygiene systems will be disproportionately affected (WHO, 2023a).

3.6 billion people live in areas highly susceptible to climate change; risks to their health are strongly influenced by environmental, social and public health determinants (see below). A major determinant of their risk is access to climate-resilient water, sanitation and hygiene (WASH) facilities and services, and their ability to adapt behaviour to mediate an emerging catalogue of risks to their health.

This Guidance Note (GN) follows a **four-step structure** for implementing climate-adaptive actions. It focuses on the **hygiene promotion, vector control and outbreak preparedness and response components of WASH programming**. It should be read in close conjunction with *Guidance Note 1: Climate Change Adaptations for WASH*, which details adaptations to WASH infrastructure that support stronger climate resilience. These adaptations are needed to support changes in behaviour that can reduce public health risks associated with climate-related events.

Figure 1: Climate Change Impacts on Health



Source: WHO, 2023a. Upscaled with Magnific.

1.1 What do we mean by Hygiene Promotion?

Hygiene promotion is a planned, systematic approach that enables people to take action and encourages behaviours or conditions that prevent or mitigate WASH-related diseases. Hygiene promotion is entwined with community engagement and is fundamental to a successful WASH response (Gensch, R., 2022). Hygiene promotion is not a one-way delivery of messages; instead, it should be based on an understanding of context, people's life experiences and understandings, changes in behaviour and coping mechanisms, and a two-way dialogue to build on people's own knowledge and understanding of risk and disease prevention. Hygiene promotion supports effective use of water and sanitation infrastructure by working with communities to determine their preferences, examine barriers, and motivate individuals and wider communities to promote positive behaviours for their health.

Climate-related hazards can alter the contexts, conditions, behaviours and understanding of health-related risks in communities over both the short and long term. This Guidance focuses on measures that can be adopted by WASH practitioners to support changes in hygiene and health-seeking behaviour that can support affected communities to become more resilient over time (see Step 2 below for more information on the impact of climate change in relation to hygiene promotion).

1.2 What do we mean by vector control?

A vector is a disease-carrying agent, including insects such as mosquitoes, flies and lice, and rodents such as rats. Vector-borne diseases (VBDs) are human illnesses caused by parasites, viruses and bacteria that are transmitted by the bite or feeding patterns of vectors. Common vector-borne diseases in humanitarian settings include malaria, dengue, yellow fever, Japanese encephalitis and onchocerciasis. When referring to vector control in humanitarian settings, we mean prevention of these illnesses through actions that interrupt the life cycles and ecologies of disease vectors. These actions can often be complex and require long-term, specialist investment in a range of complementary control methods, and so this Guidance focuses on simpler measures that can be adopted by WASH programmes and practitioners to minimise vector-related disease burdens in humanitarian contexts. Further information on the impact of climate change in relation to vector-related diseases can be found in Step 2 below.

1.3 What do we mean by disease outbreaks and healthcare settings?

A disease outbreak is a sudden increase in occurrences of a disease, when cases exceed the normal expectancy for the location or season. Disease outbreaks are common in humanitarian emergencies, when people's regular health and hygiene habits and access to health systems are disrupted or compromised. WASH-related diseases are especially common in humanitarian contexts, where lack of access to safe water for drinking and hygiene purposes, proper excreta management and hygiene facilities and items can increase the incidence of faeco-oral transmitted diseases[1]. Climate change and related hazards can compound the incidence of WASH-related disease outbreaks by contaminating water sources with excreta following flooding, encouraging the use of unsafe water sources during periods of drought and extreme heat, and driving ecosystem changes that expose affected populations to different disease patterns.

Reference to health care settings in this Guidance is concerned only with the WASH-related aspects of these facilities, including the maintenance of proper infection prevention and control (IPC). IPC is itself important for disease prevention for patients, health care workers and wider communities, and to maintain correct IPC often requires close collaboration with WASH practitioners. Climate change and its related hazards can impact IPC practices in health facilities similarly to impacts on health and hygiene behaviours in communities. More details on the impact of climate change in relation to disease outbreaks and healthcare facilities can be found in Step 2 below.

1.4 Who is this guide for?

This guide targets the practitioners of national and international organisations in WASH, Disaster Risk Reduction (DRR), environment and public health, policy makers, community-based organisations, and relevant government departments. The Guidance is intended to support them in understanding the WASH-related public health risks associated with climate change hazards, identifying existing best practices, and designing activities for hygiene promotion, vector control, disease outbreak and WASH in healthcare settings to adapt to and mitigate the effects of climate change on human health. It provides guidance on integrating hygiene promotion, disease prevention, and epidemic preparedness activities into broader WASH and climate change adaptation strategies. It is relevant across various contexts, including emergency response, early recovery settings and longer-term development or fragile context settings.

1.5 How to use this guide

This guide presents a four-step process to support practitioners in assessing, understanding, selecting and monitoring climate-adaptive activities for hygiene promotion, vector control, disease outbreaks and healthcare settings.

Step 1: guides users through a process to identify and prioritise climate-related risks in their working context. This step is common across the GFFO Guidance Notes, and further details on this step are elaborated in *GN 1: Climate Change Adaptations in WASH*.

Step 2: highlights the key impacts on hygiene promotion, vector control, disease outbreaks and WASH in healthcare settings attributed to climate-related hazards. Since many impacts are similar across different types of climate-related hazards, the Guidance groups these into four key areas: flooding, drought, excess heat and ecosystem changes.

Step 3: provides a menu of approaches and activities that can be used to adapt hygiene promotion, vector control, disease outbreaks and WASH in healthcare settings to different climate-related hazards. Many of these activities will be familiar to WASH practitioners as good practice; therefore, this Guidance highlights key aspects related to climate adaptation, rather than providing full descriptions of each. Further resources and links are provided in each section for those who would like more information on activities and approaches identified as good practice.

Step 4: summarises key considerations for monitoring and evaluation related to climate-adaptive activities for hygiene promotion, vector control, disease outbreaks and WASH in healthcare settings. These should be used to continually assess the success of climate adaptation activities and adjust them where necessary to ensure they have a positive impact on affected communities.

1.6 Guiding principles

1. **Community Engagement is key:** communities are uniquely positioned to identify their specific challenges and to implement tailored solutions that enhance their resilience and sustainability. As such, any climate adaptation activities need to be implemented in a way that is sensitive to communities' preferred communication channels, language, context, and cultural sensitivities to provide accurate, timely and context-specific information about climate risks, health impacts, and proposed strategies. Engaging community members in climate action empowers them to take charge of their environment and fosters a collective sense of responsibility.

See *GN 6: Risk Communication and Community Engagement Strategies for Climate Change Adaptation in WASH Programming* for further details.

Activities throughout this guide should be implemented with strong participation and decision making from affected communities.

2. **Draw on indigenous knowledge:** as with hygiene promotion, a standardised approach to climate resilience that relies only on teaching messages and scientific information as the motivation for change is unlikely to be effective. WASH practitioners should prioritise listening to community explanations of how changes in climate over time have affected their lives, livelihoods and behaviours, and their coping mechanisms for these changes. By harnessing local knowledge, skills, and resources, WASH practitioners can develop innovative strategies that address climate change impacts while improving the quality of life for affected populations.

3. **Behaviour change requires as much investment as infrastructure:** making WASH services resilient to the effects of climate change is about much more than technology: changing behaviours (particularly in environments that are stressed by human activity, such as water over-extraction or inadequate solid waste management) can be a much more powerful investment, particularly when supported through local or national leadership. Behaviour change is a science and requires investment for both short and long-term change. For WASH services to be truly climate resilient, communities must be supported and motivated to adopt the skills and knowledge to maintain them (Water Aid, 2021).

2 Implementing climate-adaptive hygiene promotion, vector control and outbreak preparedness activities

This Guidance offers a four-step process to support practitioners in implementing climate-adaptive activities. The four steps are:

Step 1: Analysing and prioritising climate-related risks

Step 2: Understanding the impacts on hygiene promotion, vector control and outbreak response

Step 3: Selecting climate-adaptive activities

Step 4: Monitoring the climate-adaptive activities

2.1 Step 1: Analyse and Prioritise Climate-Related Risks

The risk analysis stage involves identifying hazards linked to climate change and prioritising the hazards that impact hygiene promotion, vector control, disease outbreaks and WASH in healthcare facilities and services. From here, we can identify WASH-related vulnerabilities and describe the possible impacts on people's needs.

During this step, it can be useful to think about the following aspects:

Hazard Identification	Identify hazards that could impact WASH systems, such as floods, droughts, heatwaves, and changes in ecosystems (i.e. if large numbers of people are displaced on a longer-term basis, this will change the ecosystem of the location they have been displaced to).
Geographic Extent	Use the official administrative divisions of the country (e.g., national, regional, district, and municipal levels) to describe the area(s) affected by the hazard.
Frequency and Trends	Analyse climate projections and historical data to assess how frequently the hazard occurs and whether its frequency is decreasing, stable, or increasing over time. *GN 7: Climate Data for WASH Programming* can support the analysis of trends over time. Since this Guidance is also concerned with health and hygiene-related impacts, trends in epidemiological data should also be considered. Epidemiological data can be regularly collected from the Ministry of Health (MoH), health facilities, health-based organisations, and through community health volunteers (CHVs). This data over time can support the assessment of changes in disease prevalence and the likelihood and potential severity of outbreaks[2].
Duration and Seasonality	Determine the typical duration of the hazard (e.g., days, weeks, months, or years) and identify the time of year it usually occurs (e.g., winter, summer, rainy season, dry season, or year-round).

Scale & Intensity	Evaluate the severity of the hazard (e.g., low, moderate, or high) and assign a severity score based on its frequency, duration, and impact.
Impacts on WASH	Identify which components of WASH, hygiene promotion, vector control and health systems are vulnerable. For targeted locations, conduct a comprehensive analysis of WASH services and facilities. Data on these issues can be extracted from WASH assessments and baseline surveys and may include access to and quality of water supply, adequacy of sanitation facilities, hygiene behaviours, and accessibility of health services.
Impacts on people	After analysing various climate-related hazard impacts on WASH, determine what this means for people living in targeted areas. What would be the impacts for them in terms of managing their health and hygiene, their vulnerability to disease outbreaks and contact with disease-carrying vectors, and what impacts would this mean for people accessing healthcare facilities? Consultations should take place to understand community vulnerabilities, WASH infrastructure preferences, existing hygiene behaviours, and coping mechanisms regarding climate-induced health risks. Engage local leaders, community-based organisations, different age groups, gender, Persons with Disabilities (PWDs) and marginalised community representatives to ensure inclusivity.

A risk assessment template and four-step process to identify climate change-related risks, hazards, and impacts on the WASH sector can be found in *GN 1: Climate Change Adaptations for WASH*.

2.1.1 Other considerations for assessing climate-related risks

The analysis can also consider the following elements to develop a comprehensive picture of the potential impacts of climate-related hazards and a coordinated, effective and meaningful intervention in collaboration with communities and stakeholders:

Collaborative and coordinated assessment	Risk assessments can be conducted by a single agency, but are more effective when carried out as a multi-agency and multi-stakeholder activity involving affected communities, WASH actors, DRR teams, environmental agencies, and relevant government authorities. Where possible, risk assessments should be conducted in alignment with the development of national adaptation plans. A **stakeholder analysis** at this stage can support the identification of key community structures, organisations, relevant authorities, climate-related departments, NGOs/INGOs, Community-Based Organisations (CBOs), community-level mechanisms, and health service providers to engage in the process. One option to encourage wider engagement is to conduct a climate hazard assessment workshop with key stakeholders. This can support the prioritisation of risks and development of an initial roadmap for integrating climate adaptation into WASH and public health response.
Context Analysis	An analysis of context should be conducted throughout the project to understand the demographics, power dynamics and social institutions, such as health infrastructures, access to healthcare and health-seeking behaviours, socioeconomic factors, hygiene behaviours and social norms, that might affect the adoption of climate-adaptive approaches.
Risk Communication and Community Engagement	The assessment stage should also be used to understand communities' preferred communication channels, language, context and cultural sensitivities in order to design accurate, timely and context specific information about climate risks, health impacts, and proposed strategies. See *GN 6: Risk Communication and Community Engagement Strategies for Climate Change Adaptation in WASH Programming* for further details.
Assessment as an iterative process	Regularly review priority hazards and actions with communities and stakeholders, as these can change over time. Ensure that any plans or activities are adjusted in line with emerging priority risks, and advocate or influence externally for issues that cannot be directly addressed by your organisation alone.

2.1.2 Simplifying climate-related hazards for hygiene promotion, vector control, disease outbreaks and WASH in healthcare facilities

As the impacts and activities required to adapt to different hazards are similar across different hazard types, the range of climate-related hazards has been grouped into four broad categories. The groupings draw on the perspective that these types of climate-related hazards increase population movement, population density and population contact with animals and plants.

Within this Guidance Note, this encompasses:

Flooding

- Flash flooding
- Riverine flooding
- Coastal and estuarine flooding
- Storm surge
- Glacial lake outburst floods
- Flooding and standing water generated by cyclones/ tropical storms (Saffir-Simpson level 3-5)
- Sea level rise

Water Scarcity and Drought

- Drought
- Hydrological drought
- Agricultural drought
- Decreased surface water
- Decreased groundwater
- Salination and saltwater intrusion
- Desertification
- Siltation

Heat

- Heatwaves
- Increased heat (long term)
- Dust storms

Ecosystem Changes

- Riverine/coastal erosion
- Subsidence
- Ecosystem changes
- Wildfires
- Landslides/mudslides

2.2 Step 2: Understand the impacts on hygiene promotion, vector control and outbreak response

This stage involves assessing the potential impacts on hygiene behaviour, vector control, disease outbreaks and WASH in healthcare facilities for the four broad categories of climate-related hazards detailed in Step 1.

The impacts have been simplified and summarised in the Table below. Use the hyperlinks to navigate to further information on each impact below the Table:

Table 1: Impacts across the four types of hazard

Type of Climate Related Hazard	Impacts on Hygiene Behaviours	Impacts on Vector Control	Impacts on disease outbreaks and WASH in Health Facilities
Flooding	2.2.1 Loss of facilitating factors for positive hygiene behaviour	2.2.4 Facilitation of vector breeding	2.2.6 Increased risk of water-borne diseases 2.2.7 Increased risk of vector-borne diseases 2.2.11 Loss of facilitating factors for IPC and positive hygiene behaviours
Water Scarcity and Drought	2.2.2 Reduced water availability for hygiene practices	2.2.4 Facilitation of vector breeding	2.2.8 Increased risk of water-washed and drought-related diseases 2.2.7 Increased risk of vector-borne diseases 2.2.12 Reduced water availability for IPC and patient care
Heat	2.2.3 Increased risk of food contamination	2.2.5 Increased habitat range of disease-carrying vectors with long-term changes in heat	2.2.9 Increased risk of morbidity, mortality and health-system overwhelm

Ecosystem Changes	2.2.1 Loss of facilitating factors for positive hygiene behaviour	2.2.4 Facilitation of vector breeding	2.2.10 Increased risk of zoonotic disease transmission 2.2.7 Increased risk of water-borne diseases from unprotected water sources

The infographic below can also be helpful in summarising some of the key impacts of climate-related hazards on human health and hygiene:

Figure 2: Impact of Climate Change on Human Health

Source: Adapted from Freifeld, A. G., et al. 2023. © Ibex Ideas 2025

2.2.1 Loss of facilitating factors for positive hygiene behaviour and its impact

Facilitating factors for positive hygiene behaviour, also referred to as preconditions and enabling factors for hygiene, are the resources, processes, services and infrastructural prerequisites that enable good hygiene outcomes within affected populations (Gensch, R., 2022). These include the provision of adequate water and sanitation infrastructure, access to hygiene items and consumables, and the functionality of WASH services, such as hygiene promotion and outbreak response. When these are disrupted, damaged or destroyed by climate-related hazards, positive hygiene behaviours are also interrupted, and people may resort to negative coping mechanisms, leading to a decrease in community hygiene and the potential for an increase in WASH-related disease outbreaks.

During climate-related hazards, the loss of facilitating factors and their impact may include:

Damage, destruction or disruption of WASH infrastructure operations: flood water and extreme weather can significantly affect WASH infrastructure which is supporting positive hygiene behaviours and the reduction of WASH-related disease outbreaks. Impacts include:

- **Access to safe water:** water abstraction facilities, such as boreholes, wells and intake pipes, may be flooded with contaminated surface water; water distribution facilities may be damaged by high winds, damage from flood water surges or erosion of topsoil. If access to clean, safe supplies of water is interrupted, people may resort to using flood water or other unsafe sources for drinking and hygiene practices, increasing the incidence of diarrhoeal diseases. During periods of drought and high heat, surface water sources may also be contaminated with amoeba and algal blooms as water bodies heat up. Amoeba such as *Naegleria fowleri,* which can cause fatal infections to the nervous system, proliferates in surface water under warm conditions. Cyanobacteria blooms can cause lung irritation (CDC, 2024).
- **Access to sanitation:** sanitation facilities, such as latrines, may be flooded and contaminate surrounding areas, including water abstraction points, with faecal matter, increasing the risk of faeco-oral transmitted diseases. Faecal sludge treatment facilities may likewise be overwhelmed and contribute to faecal contamination of water bodies and the wider environment. Solid waste management systems may be interrupted or overwhelmed during clean-up operations for flood or extreme weather-related debris, resulting in an accumulation of waste that can provide breeding grounds for disease vectors and increase the likelihood of vector-borne diseases. During times of drought where open defecation is practised, vegetation die-off may mean that women and girls are forced to travel further to defecate privately, exposing them to higher levels of protection risks.

- Access to facilities for hygiene: facilities such as bathing spaces, laundry facilities and handwashing stations may be damaged by high winds and flood water caused by extreme weather, limiting affected populations' ability to practise hygiene behaviours that prevent diarrhoeal and water-washed diseases.

This loss of facilitating factors affecting water quantity, quality and access to sanitation **impacts the ability of individuals and communities to practise positive hygiene behaviours**. Unless WASH infrastructure is adapted to be resilient to climate-related hazards, the financial costs of rebuilding or repairing facilities can be high, and the health and hygiene impacts significant and wide ranging:

- Communities affected by WASH-related diseases and poor hygiene behaviours typically have less resilience to cope with future climate-related challenges. Continued access to WASH infrastructure supports communities' ability to cope with slower-onset events by preventing disease (WHO, 2022a).
- Increased incidences of diarrhoeal disease, coupled with nutritional insecurity from losses in livelihoods and crops (that may also occur during flooding and extreme weather), exacerbate malnutrition. Climate-related hazards and subsequent loss of WASH facilities and services, causing regular increases in the incidence of diarrhoeal disease, can contribute to chronic malnutrition. This is particularly problematic for children, leading to stunting and impaired cognitive development (Guerrant, R.L., 2013).
- Lack of facilities for adequate menstrual hygiene management can make it more difficult for those who menstruate to maintain personal hygiene. Lack of access to clean and safe toilets means people who menstruate face higher risks of infections, harassment, and missed school/work. Damaged or inaccessible sanitation systems during disasters can also worsen these challenges, impacting health and dignity.
- Persons with disabilities (PWDs) face numerous challenges in maintaining hygiene during floods. Damage to WASH infrastructure and water-logged or muddy paths often render water points inaccessible. Many PWDs must resort to bathing and laundering in contaminated floodwaters, exposing themselves to skin infections, rashes, and other health issues. Access to clean water and private spaces leaves people with incontinence unable to maintain proper hygiene. They are often forced to use contaminated water for washing materials, heightening the risk of infection. Privacy concerns in temporary shelters exacerbate these difficulties, and the absence of proper disposal systems leads to unsafe practices and environmental contamination (Nawaz, S., et al., 2024).

Loss and/or disruption in access to hygiene items: floods often damage roads, block supply routes, and limit market access, preventing the timely delivery of hygiene supplies. In addition, widespread displacement due to climate-related hazards increases the number of people relying on limited resources, placing

significant strain on local markets and distribution systems. This surge in demand, combined with restricted supply chains, leads to shortages and inflated prices, making basic hygiene items unaffordable for many people. Key impacts include:

- **Lack of access to soap:** washing hands with soap can reduce the risk of diarrhoeal diseases by 42-47% compared to washing with water alone (Curtis, V., 2003). Reducing diarrhoeal disease both immediately after an emergency and over the longer term has significant impacts on a population's ability to recover and develop longer-term resilience to climate-related hazards in the future.
- **Lack of access to safe water containers:** interventions that reduce microbial contamination of water at the point of use, including provision of clean, safe water containers that reduce the risk of recontamination at the household level, are seen as effective methods to reduce the incidence of diarrhoeal disease (Clasen, T., 2015).
- **Lack of access to materials for managing menstruation and incontinence:** disruption in access to markets and hygiene materials may make it more difficult for people who menstruate and those with incontinence to access items that support dignified management. Increased rainfall can make drying reusable materials more difficult; using unclean or damp products can increase the risk of skin, urinary tract and reproductive tract infections, as well as causing irritation and discomfort. Lack of proper disposal sites may also mean that period and incontinence products are disposed of incorrectly, potentially damaging facilities or contaminating the environment.

2.2.2 Reduced water availability for hygiene practices

Climate-related water scarcity can reduce the ability of people to maintain good hygiene and increase the likelihood of outbreaks. If people are forced to use unsafe sources for drinking water, it increases the spread of infectious diseases such as diarrhoea, cholera and dysentery. At the household level, studies show that, in times of water insecurity in areas with reduced water availability, changing water consumption and skipping hygiene practices are the most common coping mechanisms (Venkataramanan, V., 2020). In addition, a reduction in water availability makes hygiene practices more challenging; behavioural change campaigns might not be effective in areas where access to water is increasingly constrained by the changing climate (UNICEF, 2022). Adequate water and sanitation are fundamental for menstrual hygiene and incontinence management. To manage both effectively, safe, clean water is essential for bathing, handwashing, and cleaning reusable products; these can be compromised in areas of climate-induced water scarcity.

In many societies, women and children are primarily responsible for collecting water. Climate change-related drought can increase the distance required to travel to collect water, which negatively impacts women's and children's time, safety, health, and economic opportunities. Likewise, increases in the cost of water due to scarcity can have negative impacts on household economics.

2.2.3 Increased risk of food contamination

Climate-related hazards can increase the risk of food contamination in several ways. Irrigation of crops with poor quality water (flood water, recycled water or surface run-off that occurs when rain cannot penetrate dry and compacted soil in drought conditions) can lead to contamination of crops if the crops are not cleaned and prepared properly before consumption. *E. coli* and *Salmonella* especially proliferate in circumstances such as these (CDC, 2024). Some studies have shown that Salmonella infections increase twofold during heatwave events, with the intensity of heatwave events having a significant effect on an increase in cases (Milazzo, A., 2016). This may be because Salmonella and other disease-causing bacteria proliferate faster at higher temperatures. Secondly, food contamination can be increased during heat and drought events if personal (handwashing) and food preparation hygiene are neglected due to insufficient water. Children under 5 years old bear 30% of foodborne disease fatalities (WHO, 2023a).

2.2.4 Facilitation of vector breeding

Flooding, drought, heat, and ecosystem changes can all facilitate increased disease-carrying vector breeding, most notably mosquitoes. Mosquitoes are the most common disease-transmitting biological vector; mosquito-borne diseases are already a major global health threat, with nearly 80% of the world's population at risk of infection. The pathogens that cause malaria, dengue, yellow fever, chikungunya, Zika, lymphatic filariasis and West Nile virus are all transmitted by mosquitoes.

Climate-related hazards generate conditions in which mosquito breeding can proliferate:

- **Through increased presence of standing water**: flooding increases the likelihood of standing water, which in turn increases the breeding sites for mosquitoes that carry malaria (Anopheles mosquitoes) and dengue (Aedes mosquitoes). Whilst the relationship between flooding and increased mosquito-transmitted disease is not linear, environmental conditions such as those found in many humanitarian contexts – poor quality housing and poor health infrastructure – exacerbate the risk of epidemics following heavy rainfall and flooding (Seltenrich, N., 2021).
- **Through poor water storage and spillage**: in drought conditions, common coping mechanisms include increased water storage and water trucking. However, both may also provide opportunities for increased mosquito breeding. Poor water storage, which allows access to mosquitoes, creates additional breeding grounds. Spillage from water trucking and pumping, likewise, can provide enough water for Aedes mosquitoes to breed. Aedes mosquitoes carry dengue, Zika, chikungunya and yellow fever.
- **In dense urban areas**: socio-economic factors also increase the risk of mosquito-borne diseases. Climate change is driving population movement and increased urbanisation. Poor housing, inadequate water supply (and therefore the need for water storage), and

inadequate treatment of wastewater can increase the breeding opportunities for Aedes and Culex mosquitoes. Studies have noted that the risk of dengue is higher in urban locations following periods of drought (Lowe, R., 2021).

2.2.5 Increased habitat range of disease-carrying vectors with long-term changes in heat

Increased heat is implicated in shifts in the habitat of disease-carrying vectors such as mosquitoes, ticks and sandflies. Changes in the habitat range of these vectors have already been observed at elevated latitudes and altitudes as these vectors seek locations where the temperature range is preferable for their reproductive cycles (Semenza, J.C., 2018). Climate also influences the reproduction rate of parasites and viral particles inside vectors and human hosts, meaning that upsurges in temperature can reduce the incubation period of these pathogens and hasten the spread of diseases like Zika virus, malaria, dengue and chikungunya quicker than at lower temperatures (ibid). Long-term changes in seasons can also affect vector and host animals, human activity and land use, which could further affect the distribution and prevalence of vector-borne diseases (Lindgren, E., 2012). Scientists estimate that climate change is implicated in changes to dengue distribution in particular, estimating that by 2085, approximately 5-6 billion people (50-60% of the projected global population) would be at risk of dengue transmission, compared with 3.5 billion people (35% of the population) if climate change did not happen (Hales, S., 2002). Similarly, studies also indicate that global temperature increases over the next 50 years may lengthen annual transmission periods by more than a month for malaria and more than four months for dengue (Colón-González, F.J., 2021).

2.2.6 Increased risk of water-borne diseases

Water-borne diseases, such as diarrhoea, cholera, typhoid, dysentery and other gastrointestinal infections, can be exacerbated by climate-related hazards. As discussed above, flood damage to WASH infrastructure and contact with contaminated water can be a major source of these diseases. Moreover, high temperatures can increase pathogen survival, replication and virulence levels, and drought can concentrate pathogens in limited water supplies. Whilst diarrheal morbidity and mortality are declining globally, climate change may slow this downward trajectory (Levy, K., 2018). Studies show that where communities experience cycles of drought followed by heavy rainfall, the risk of diarrhoeal disease is magnified (ibid). Diarrhoeal diseases are already the second leading cause of death in children worldwide, and the second greatest source of death and disability in low-income countries (ibid); if rates of acute diarrhoeal diseases increase due to climate-related hazards, this in turn increases child and overall morbidity and mortality rates. Increased diarrhoeal disease over the long term also has serious consequences for children's physical and cognitive development and on both individual household and overall economic development.

2.2.7 Increased risk of vector-borne diseases

As described above, the facilitation of vector breeding and changes in the habitats and transmission periods of vector-borne diseases due to climate-related hazards result in increased risks of vector-born disease (Opoku, et al. 2021). The impact on public health of the most common vector-borne diseases is:

Malaria

Malaria is a widespread mosquito-borne disease produced by Plasmodium parasites and transmitted by Anopheline mosquitoes. It causes an estimated 249 million cases globally and results in more than 608,000 deaths every year. Approximately 86% of malaria deaths globally are among children under five years old. An estimated 10,000 pregnant women and 200,000 newborn babies die annually due to malaria during pregnancy. Over 80% of malaria cases and 90% of malaria deaths occur in tropical sub-Saharan Africa and are in countries that are either affected by conflict or are hosting displaced populations in camps or in low-income urban areas with limited piped and regular water supplies and sanitation services.

Zika Virus

The Zika virus is spread by both Aedes and Culex mosquitoes. Whilst Zika infections are usually mild and self-limiting, they can be associated with neurological problems like Guillain-Barré syndrome and serious birth defects like microcephaly.

Chikungunya (CHIKV)

Chikungunya is an alphavirus carried by Aedes mosquitoes. CHIKV causes fever and severe joint pain, which has a major negative influence on the quality of life of those who are infected.

Dengue

Dengue is the most prevalent viral infection transmitted by Aedes mosquitoes. The causative agent of this disease is the dengue virus (DENV), including four different serotypes. Dengue virus causes dengue fever: high temperature, muscle aches, vomiting and joint pains for 2-7 days. Multiple infections increase the risk of Severe Dengue (previously Dengue Haemorrhagic Fever), which can lead to life-threatening complications. More than 3.9 billion people in over 132 countries are at risk of contracting dengue, with an estimated 96 million symptomatic cases and an estimated 40,000 deaths every year.

Yellow Fever

Yellow fever is produced by the yellow fever virus (YFV) and carried by Aedes and Haemagogus mosquitoes. Infection causes fever and muscle pain. It is self-limiting in most cases, but some patients enter a second ‘toxic’ phase which causes severe damage to the liver and kidneys, bleeding from orifices and abdominal pain. The possibility of death for people who develop toxic yellow fever is estimated to be 47% within 7-10 days of infection. Vaccination for yellow fever is available.

Other diseases such as leishmaniasis (spread by sandflies that proliferate in poorly disposed solid waste) and lymphatic filariasis (spread by mosquitoes) cause chronic suffering, life-long morbidity, disability and stigmatisation.

2.2.8 Increased risk of water-washed diseases

Water-washed diseases, including scabies, typhus, trachoma and conjunctivitis (pink/red eye), are typically controlled by access to sufficient quantity and quality of water for hygiene activities such as body washing and laundry of clothes and bedding (see reduced water availability for hygiene practices above). When water resources are scarce, households and communities tend to prioritise water use for livelihoods, such as feeding livestock and watering crops, reducing water availability for hygiene uses and allowing the proliferation of these diseases.

2.2.9 Increased risk of morbidity, mortality and health-system overwhelm

Currently, climate change already causes an estimated 150,000 deaths annually; a conservative projection by WHO estimates that between 2030 and 2050 approximately 250,000 additional deaths will occur each year due to diarrhoeal disease, malaria, dengue and undernutrition (WHO, 2023a). Climate change is expected to continue increasing both non-communicable and infectious diseases.

Heatwave events also increase mortality and morbidity incidence; a review of studies across both high- and low-income settings noted an overall increase in mortality rate of up to 28% during heatwave events, whereas increases in morbidity rates ranged from 14 – 83% depending on context and population group (Arsad, F.H., 2022). Specific groups are more vulnerable to the impact of heatwave events or prolonged increased heat. These include the elderly, young children, pregnant women, the malnourished, those with pre-existing medical conditions (especially cardiovascular and respiratory diseases) and those living in informal settlements with reduced access to water and cooling technologies (IFRC, 2021). Understanding which groups are at higher risk and engaging with them on potential adaptations ahead of heatwaves is vital for minimising the impact on their health during these events.

Where increases in mortality and morbidity intersect with poorly resourced healthcare systems – often found in humanitarian, conflict and low-resource settings – the impact is likely to be of overwhelmed healthcare facilities and resources.

See also: *GN 12: Programmatic Response to Extreme Heat*.

2.2.10 Increased risk of zoonotic disease transmission

Zoonotic, sometimes called 'spillover' infections, are those that occur naturally in animals but, due to population movements of both humans and animals (often due to climate-related hazards), have 'jumped' and become capable of causing human infections (Freifeld, A.G., 2023). The 21st century has seen an increase in such diseases, including Middle East respiratory syndrome (MERS), severe acute respiratory syndrome (SARS), the 2009 pandemic influenza H1N1, and the COVID-19 pandemic. Climate change-associated movements in animal, insect and human populations and subsequent changes in ecosystems provide opportunities for zoonotic infections. These movements often overlap - as animal and insect vectors seek cooler, temperate areas at higher altitudes that support their lifecycles, humans seek these same locations to avoid sea level rise and cycles of heat, drought and flood (ibid.) Subsequent ecosystem changes caused by human habitation – deforestation to clear land for agricultural use, increased waste products and population density – further force fauna into contact with humans, increasing the likelihood of spillover events and the emergence of novel infections in human populations.

2.2.11 Loss of facilitating factors for IPC and positive hygiene behaviours

Water, sanitation, health care waste management, hygiene, and environmental cleaning are critical for enabling infection prevention and control (IPC) practices, such as hand hygiene and surface disinfection, and must be prioritised together to ensure safe and high-quality health care (WHO & UNICEF, 2024). Evidence highlights the fact that millions of deaths could be prevented through improved WASH services in health care facilities. An estimated eight million people die each year in 137 low and middle-income countries due to poor-quality care (WHO & UNICEF, 2024). A significant contributing factor is the lack of basic WASH services: one-third of health care facilities do not have the necessary hand hygiene resources where care is provided; one in four lack basic water services; and one in ten have no sanitation services. Approximately 1.8 billion people rely on health facilities without basic water services, and 800 million people access facilities that do not have toilets. The situation is even more severe in the world's 47 least developed countries, where half of all health care facilities lack basic water services. The true extent of the problem remains unknown in many areas due to major gaps in data collection, particularly concerning environmental cleaning practices (WHO, 2022c).

Damage to or destruction of WASH facilities in healthcare facilities increases the risk of nosocomial or hospital-acquired infections (HAIs). It includes damage to water supplies, sanitation, healthcare waste management and infection prevention and control (IPC) equipment (such as handwashing stations, laundering facilities, and the supply of disinfection and cleaning materials). This is similar to the loss of facilitating factors for positive hygiene behaviour described above, but is potentially even more pressing in healthcare facilities because:

- Patients with already compromised immune systems, from infections or injuries presented earlier at the healthcare facility, are more susceptible to secondary infections.
- HAIs add an extra burden to healthcare resources, which may already be strained due to the impacts of climate-related hazards disrupting regular function or supply, or to an increased patient load from injuries and illnesses caused by climate-related hazards.

This creates a vicious cycle of healthcare facility overwhelm.

2.2.12 Reduced water availability for IPC and patient care

Climate-related hazards can cause healthcare delivery breakdown through both infrastructure damage and reduced availability of water. To meet minimum humanitarian standards, healthcare facilities should have access to a minimum of 5L per outpatient per day, 40-60L per inpatient, 100L per surgical intervention, plus an additional amount for IPC (Sphere, 2018). Healthcare facilities should also have safe water storage to supply the facility for 48 hours. Reduced water availability means less water for practising infection prevention and control measures, such as handwashing for staff, disinfection and cleaning for wards and treatment areas, and proper laundering of materials that can become contaminated and transfer diseases (these materials are also known as fomites). Respiratory illnesses, cholera and haemorrhagic fevers can all be transmitted via fomites. Reduced water supply and the resulting poor IPC increase the risk of HAIs, further adding to the health care burden, morbidity and mortality in resource-depleted contexts.

2.3 Step 3: Select climate-adaptive activities for hygiene promotion, vector control and outbreak response for the four key climate hazards

Box 1: Climate-adaptive Activity Summary

Many of the suggested climate-adaptive activities for hygiene promotion, vector control and outbreak response (such as monitoring epidemiological data, coordination, and engaging with communities) are the same for all four of the key climate hazards of flooding, water scarcity and drought, heat and ecosystem changes. However, their focus and targeting may change (for example the provision of hygiene items may focus on replacing losses during floods or on introducing new items to manage extreme heat). Other activities are specific to certain hazards (such as water-conserving designs in droughts or reducing the risk of extreme heat).

Step 3 details the activities in three sections (hygiene promotion, vector control and outbreak response). Each approach describes activities that are common to all hazards or are hazard specific.

Hygiene promotion activities include monitoring epidemiological data and trends, promoting the use of climate-adapted water and sanitation infrastructure, discussing water-borne and water-washed diseases, food hygiene and the use of water-conserving designs. Climate-adaptive activities also address longer-term community strategies, provide access to hygiene-related materials and collaborate with formal and informal health system representatives.

Vector control activities include monitoring epidemiological data, community engagement and discussion of specific vector-borne disease information, engagement with site planning for proper environmental control, and mobilisation on vector control at settlement and household levels.

Outbreak response monitors epidemiological data and trends, engages with communities and focuses on the adaptation of health facilities for better climate-related hazard resilience and stronger infection prevention and control.

Many of the suggested activities are the same across different climate hazards; this is because activities for hygiene promotion, vector control, disease outbreak and WASH in health facilities largely remain the same across different types of hazards; it is the focus and targeting of activities that may change. To reflect this, we have grouped the adaptation activities together below, and provided links to helpful resources, guidance and case studies that can support climate adaptation planning for hygiene promotion, vector and outbreak control, and healthcare facilities.

How to use

1. Decide which element to focus on: Hygiene Promotion; Vector Control; or Outbreak Response and WASH in healthcare facilities, and navigate to that Table
2. Choose the type of climate-related hazard to respond to
3. Read horizontally across the Table to find potential activities for that hazard that can support climate adaptation and greater resilience
4. Use the document hyperlinks to navigate to further guidance, resources, examples and case studies to help choose and implement the activities

2.3.1 Climate-Adaptive Hygiene Promotion Activities

Table 2: Climate-Adaptive Hygiene Promotion Activities

Type of Climate-Related Hazard	Impacts on Hygiene and Health	Potential Hygiene Promotion Activities
Flooding	Loss of facilitating factors for positive hygiene behaviour Increased risk of water-borne diseases	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of climate-related hygiene information, coping mechanisms, and barriers and enablers to positive practices Promote the use of climate-adapted water and sanitation infrastructure (see *Guidance Note 1*) Providing access to hygiene-related materials, products and materials to replace losses

		Discussion of water-borne disease-specific information during preparedness and response phases, key actions to take and the barriers and enablers to these Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Discussion of food hygiene-specific information and barriers and enablers to safe food preparation and storage practices Engagement with communities and other stakeholders on reducing risks with longer-term strategies
Water Scarcity and Drought	Reduced water availability for hygiene practices Increased risk of water-washed diseases	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Use of water-conserving designs for handwashing, body hygiene, and laundry Promotion of water recycling and increased water storage Discussion of water-washed disease-specific information, during both preparedness and response phases, key actions to take and the barriers and enablers to these Discussion of food hygiene-specific information and barriers and enablers to safe food preparation and storage practices Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Discussion of climate-related hygiene information, coping mechanisms, and barriers and enablers to positive practices Engagement with communities on reducing risks with longer term strategies

Heat	Increased risk of food contamination Increased risk of morbidity and mortality for specific groups	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of food hygiene-specific information and barriers and enablers to safe food preparation and storage practices Discussion with high-risk groups on signs and symptoms of extreme heat stress, coping mechanisms and health-seeking behaviour, and the barriers and enablers for these actions Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Provision of items to facilitate household and personal cooling Discussion of climate-related hygiene information, coping mechanisms, and barriers and enablers to positive practices Engagement with communities and other stakeholders on reducing risks with longer-term strategies
Ecosystem Changes	Loss of facilitating factors for positive hygiene behaviours	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of pre and post-disaster/ movement practices and the barriers and enablers to regaining positive hygiene behaviours Provision of hygiene-related materials Engagement with communities and other stakeholders on reducing risks with longer-term strategies

Across all Hazards

Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources

This activity is integral to all elements of hygiene promotion, vector control and outbreak response and preparedness, as climate-related hazards like floods, droughts and increased heat can shift disease transmission patterns, alter the severity and durations of outbreaks, and expand their geographical range. Climate-related hazards can also bring new public health risks to areas that have not previously experienced them, such as new or re-emerging outbreaks of cholera or new locations of dengue transmission.

Despite climate change driving increases in public health risks, investments in health systems and humanitarian public health responses do not always meet current or future requirements. Therefore monitoring, analysis and careful resource allocation will be required to target preparedness, response and system building activities in the most impactful way.

Monitoring Data

Health data and trends require monitoring in the short term to determine peaks in epidemic diseases, and over the long term to determine patterns and changes in public health and climate-related risks.

Health data should be collated from numerous sources on a systematic basis:

1. **At community level:**
   - **Community Event Based Surveillance (CEBS):** is a simple and low-cost initiative designed by IFRC to mobilise communities to monitor potential health risks. Trained community members monitor for 'unusual or inexplicable' events or monitor an existing outbreak. This approach works on the basis that communities are first to know when something is wrong, and that community members will not always utilise bio-medical health providers in the first instance of showing signs and symptoms of disease. The data from CEBS should be combined with existing national surveillance systems, where these are operational. More information on CEBS can be found here.
   - **Use of verbal autopsies** (VA): VAs are a method used to determine the cause of death through interviews with close relatives and caregivers. VAs can be particularly useful for monitoring potential outbreaks or changes in public health risks in places where communities do not trust or are required to routinely inform health facilities of community-based deaths. WHO has a standardised

Verbal autopsy tool using closed questions; however, versions with more open questions may be helpful in establishing stronger trust between Community Health Workers (CHWs), Community-Based Volunteers (CBVs), and community members, particularly in areas where trust in professional medical health practice is low.

2 At a local health system level:

- **Surveillance:** in contrast to CEBS described above, public health surveillance is usually conducted by trained health professionals using commonly agreed indicators of diseases of interest. These can be used for outbreak detection, allowing rapid communication of potential outbreaks to responding actors, and for systematic data collection on morbidities and mortalities at local health centres. Where these systems work well, the data compiled over time can give a clear indication of public health and outbreak concerns, allowing for stronger seasonal planning of hygiene promotion, outbreak preparedness and vector control activities. It also allows for more strategic planning of refresher trainings for CHWs and CBVs. WASH actors should collaborate closely with local health actors to access such data.

3 At a national level:

- **Health Management Information Systems (HMIS):** these systems combine data across different areas of health to generate information that enables decision makers to identify problems and needs, and allocate resources (Global Health Data, 2025). Typically managed by the Ministry of Health in a country, the data provided can be invaluable for pinpointing hotspots for different diseases or seeing trends over time. This data should be used to inform hygiene promotion, vector control and outbreak preparedness and response activities where it is openly available.
- **Integrated Surveillance and Climate-Informed Health Early Warning Systems (EWS)**: WHO has recently developed guidance for using climate-informed warning systems to 'increase the effectiveness of disease control by intervening before or at the beginning of the epidemic curve' (WHO, 2021). These systems monitor environmental conditions and forecast high-risk conditions to trigger active surveillance and initiate discussion of risks with potentially affected populations.

Analysing Data

WASH actors should make operational sense of data from these various sources using a *Person-Place-Time* analysis:

Person

An analysis of who is most affected by climate-related disease and stronger targeting of preparedness and response activities, by identifying whether disease incidence or prevalence differs across population groups based on their age, sex,

ethnic group, occupation or other factors. This is particularly important for targeting the use of resources to those most vulnerable and to minimise those most likely to require additional or complex health care support, if affected. Whilst communication and engagement with communities should seek to inform as wide a range of population groups as possible, where resources are limited, targeting activities to high-risk groups can help reduce the overall burden on health centres during peaks of climate-related disease transmission.

Engage communities to discuss climate change hazards, their impacts on public health risks, and whether people have any existing coping mechanisms or ways to prevent or mitigate these, particularly focusing on the high-risk groups.

Place

Climate change is changing the distribution of disease transmission geographically; this means that WASH practitioners will need to adapt preparedness, response and control activities in areas where they were previously not required. WASH practitioners should engage with health data to determine 'hotspots' – areas where transmission is highest – and prioritise interventions in those areas. Data should also be used to review changes in trends over time in the geographical distribution of different diseases.

At the community level, analysis can focus on transmission pathways (such as identifying handwashing practices and practices relating to safe water consumption and excreta management) to determine priority areas for intervention of hygiene promotion and WASH activities.

Time

To best respond to climate-related public health risks, it is important to monitor disease transmission across two time frames:

1. Seasonal occurrences: monitoring the peaks and low periods of transmission of various diseases over the seasons in a year. For example, are there particular points in the year where transmission is typically high, and is this generally predictable? This can be assessed through:
    a. Reviewing previous years' epidemiological data from national HMIS, public or private health facilities.
    b. Discussing disease trends with affected communities, including using participatory activities such as seasonal calendars (see below).
2. Changes over the longer term: This means analysing epidemiological trends over 10–20-year periods to find any shifts in the geography, length or severity of outbreaks that can support planning for future risks, or identifying diseases that may have epidemic potential in the future.

This analysis can support **stronger seasonal planning** of hygiene promotion, vector control and outbreak preparedness and response activities, for example:

- Ensuring information and activities on relevant signs, symptoms and positive health-seeking behaviour are timed appropriately for best impact (i.e. before peaks of diseases are expected).
- Working with community structures, such as traditional midwives and healers, pharmacies and health centres, ahead of expected peaks to reinforce helpful information.
- Supporting communities to take actions to minimise public health risks ahead of predicted peaks.
- Working with Health Centres to prepare for increased patient numbers, ensuring WASH facilities, services and staff training are sufficient.

Discussion of climate-related hygiene information, coping mechanisms, and barriers and enablers to positive practices

Communities that have experienced flooding and other extreme weather events recently, or on a cyclical basis, will already understand the impacts on their health and hygiene. They are likely to have developed coping mechanisms, positive or negative, to deal with the aftermath. Identifying, promoting and supporting positive coping mechanisms and enablers of positive hygiene practices are key adaptations to hygiene promotion programming to strengthen community resilience and adaptation to climate-related hazards. It is important that behaviours, barriers and motivating factors are discussed across different groups in communities, particularly marginalised groups who may not be able to adopt recommended behaviours without support.

Key activities include:

Discussing the impacts on health and hygiene with flood-affected communities

Work with different groups within communities to understand their usual health and hygiene practices during periods of climate stability, and how these change following climate-related hazards. This can help the identification of negative behaviours that need support through hygiene promotion and WASH services, and positive behaviours that need to be encouraged. Tools that support the understanding of behaviours and coping mechanisms across different groups include:

- **Barrier and Motivator analyses:** Oxfam's Community Engagement in WASH guide (Niederberger, E., 2018, p. 14) provides a simplified approach to these analyses that can be

easily adapted to climate-related hazards. Further examples of approaches to analysing behaviours and promoting change can be found in Section B of the Compendium of Hygiene Promotion in Emergencies (Gensch, R., 2022).

- **Surveys, discussion groups and household discussions:** these are regular aspects of hygiene promotion programming but can be easily adapted to climate-related hazards to focus discussion on changes in behaviour in the short and long term for different groups. The IFRC's Enhanced Vulnerability and Capacity Assessment (IFRC, 2018) has good example questions around climate hazards, coping mechanisms and community behaviours that can be adapted for these tools (see also IFRC's Additional questions for FGD and Interview).
- **Participatory tools such as mapping, ranking and photovoice:** Participatory Learning and Action (PLA) tools, such as mapping, ranking, voting, etc., are commonly used; they are successful tools for working with community groups to analyse different issues (IIED, 2013). They can be adapted for discussing and analysing climate hazards:

  - **Mapping** can be adapted to look at climate-related hazards and areas of the community that are particularly vulnerable, facilitating the targeting of the most impacted households with hygiene promotion support.
  - **Trend analysis** can be adapted to review how climate-related hazards, reactions, and coping mechanisms have changed over time. It can be an especially useful approach for introducing the concept of climate change to communities.
  - **Ranking** can be used to compare and prioritise the most critical local climate hazards. Trying to tackle all climate-related hazards in one locality can feel overwhelming; ranking helps communities to identify hazards and events that may be caused by climate change and prioritise them for action. Ways of adapting these tools to focus on climate change can be found in the Livelihoods and Forestry Programme Toolkit (Raj, B., 2010). Remember, however, to keep the focus of the discussion on changes in health and hygiene behaviour.
  - **Seasonal Calendars** should become a routine part of exploring climate-related changes with communities.

A seasonal calendar can be used to track changes throughout the year, increasing impact through better timing and targeting of hygiene promotion, outbreak preparedness and vector control activities. Instructions for how to conduct seasonal calendar discussions can be found in the Compendium of Hygiene Promotion in Emergencies. Expanded over multiple years, or adapted to include climate information, seasonal calendars can also be used to track changes over time in both the climate and its related risks. The Red Cross/Red Crescent Climate Centre provides a good example of a seasonal calendar used to track and indicate activities related to vector control to minimise Zika transmission.

- **Photovoice** allows different groups to explore issues through photography and video. Participants take photos or videos of hygiene and health-related issues in their communities and use group discussion to reflect on the reasons, emotions and experiences that led them to photograph or film their choices. Photovoice can be used for comparisons before and after climate-related hazards to determine how things change, but also for how people's feelings and experiences change over time. Guidance on Photovoice can be found in section T30 of the Compendium of Hygiene Promotion in Emergencies.

Identifying coping mechanisms and supporting positive behaviours

Participatory discussions, using the tools above, can be used to understand the coping mechanisms different groups in the community use when their normal routines are interrupted by climate-related hazards. It is important to remember that different groups will have access to and utilise different coping mechanisms depending on their age, gender, ability, economic situation and societal status (marginalised communities may have much more difficulty utilising positive coping mechanisms, for example). Hygiene promotion activities should:

- **Explore alternatives to negative coping mechanisms:** for example, use of unsafe drinking water sources during flooding, minimising or stopping water for hygiene practices during periods of water scarcity, or delaying seeking support from healthcare facilities during outbreaks. It is important that the reasons for employing negative coping mechanisms are explored with different groups, and the reasoning understood,

to avoid providing messages or information that cannot be acted upon. For example, delayed health facility visits may be due to perceptions that treatment is expensive, or to misconceptions around the cause of different diseases.

- **Support and facilitate positive coping mechanisms:** where examples of positive coping mechanisms exist using available resources, highlight and promote these to others. For example, there are many local, natural alternatives to Oral Rehydration Salts (ORS), such as rice water, sugar salt solution and fruit juices, that may be more accessible and acceptable to some communities. Highlighting options that people already have within their means can foster community resilience.

Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision

Collaboration with formal and informal stakeholders is crucial for the success of outbreak control activities and responses to extreme heat. Close collaboration with Ministries of Health, district health offices, public health departments, HMIS and national/international health-based organisations is required to prepare for and respond to climate-related disease outbreaks and extreme heat events. WASH actors should encourage the MoH or Health Cluster to set up specific coordination groups to tackle epidemic disease burdens and coordinated actions in response to heat waves and periods of extreme heat. These groups should support multiple stakeholders to work towards the same aim, share data and collaboratively plan interventions with affected communities to minimise duplication and ensure harmonised approaches for affected populations.

Of equal importance is collaboration with community stakeholders, such as traditional healers, CHVs, CHWs, and religious leaders, to implement integrated risk communication and community engagement strategies. These strategies should ensure that information is provided on: early health-seeking behaviour, groups at high risk of infection or the effects of high temperatures, signs and symptoms of concern, and possible treatment methodologies, and ensure that this information is consistent between actors, accurate, context-specific, and widely disseminated.

Collaborative planning with such stakeholders helps align information and messages with national and local public health strategies, outbreak and response preparedness plans, and existing disease control programmes. Maintaining harmonised information across all communication channels will minimise misinformation, foster community trust, and ensure that rapid, coordinated responses are in place during outbreaks, extreme heat events or other climate-related hazard events.

For more information on developing RCCE strategies, see *GN 6: Risk Communication and Community Engagement Strategies for Climate Change Adaptation in WASH Programming*.

Engagement with communities and other stakeholders on reducing risks with longer-term strategies

As part of climate-resilient hygiene promotion, WASH actors should engage with affected populations to understand their lived experiences with climate impacts and existing coping mechanisms. This can be done through discussion forums, surveys and working with trusted leaders and representatives to highlight indigenous knowledge about environmental changes.

Risk-reduction strategies for hygiene and disease outbreaks should build on indigenous knowledge. Strategies should be co-created with communities and relevant stakeholders, such as health practitioners and public health departments, schools and educational institutions, faith-based institutions and local planning, development or disaster preparedness bodies.

WASH staff should capitalise on strong community relationships developed through hygiene promotion and disease prevention activities, and networks of community-based volunteers, to link relevant stakeholders and facilitate exercises that contribute to long-term strategy development between these different actors.

Useful actions can include:

- Risk-mapping exercises to determine areas of high concern linked to climate-related hazards.
- Scenario planning to explore potential situations, such as recurrent flooding, sea level rise, extended periods of heat, or increased epidemic burdens, and the creation of short and long-term response protocols to these.
- Resource mapping and budget allocation for necessary improvements to reduce risks.
- Joint monitoring systems to enable both affected communities and responsible stakeholders to identify improvements over time.
- CARE's Climate Vulnerability and Capacity Analysis Handbook, whilst not focused on public health, outlines participatory ways to explore climate vulnerability with communities and develop activities to strengthen resilience that could easily be adapted to public health (CARE 2019).

Discussion of food hygiene-specific information and barriers and enablers to safe food preparation and storage practices

A fundamental challenge is that climate change undermines all aspects of food safety simultaneously; it can degrade water quality, raise temperatures and disrupt infrastructure while reducing the resources available to address these problems at the same time. Currently, there is no specific guidance on the relationship between climate change and food hygiene. However, the following key adaptations build upon WHO's Five Keys to Safer Food (WHO, 2006):

Adapting food preparation and storage

As pathogens proliferate faster on food items at higher temperatures, reducing the amount of food cooked to what will be consumed immediately and cooking more regularly (rather than cooking in bulk and storing) can minimise food-related diseases during extreme heat events. Where food must be stored, households and businesses should ensure that cooked food is not stored at room temperature for more than 2 hours, is refrigerated promptly (where these facilities exist) or is kept at a temperature above 60 degrees centigrade before serving.

Use traditional methods of food preservation

For example, solar drying, smoking, fermenting or salting, adapted to the local conditions.

Encourage the use of safe water sources for food preparation and hand hygiene

Adaptations in infrastructure may be required to ensure access to safe water is continuous throughout different climate-related hazards (see *GN 1: Climate Change Adaptations for WASH*). The use of these adaptations should be encouraged, particularly for food-related businesses.

Increase collaborative work with food-related businesses

To install back-up supplies for clean water supplies and hygiene facilities for when main systems are compromised, to increase understanding and change practices during periods of extreme heat and to recognise high-risk behaviours that contribute to food-borne diseases.

Floods

See also the hygiene promotion activities relevant Across All Hazards.

Promote the use of climate-adapted water and sanitation infrastructure

Effective hygiene promotion relies on access to and use of appropriate water, sanitation and hygiene infrastructure, including water supply points, toilets, bathing spaces and laundry facilities. *Guidance Notes 1 (Climate Change Adaptations for WASH)*, *5 (Improving the Resilience of Groundwater Infrastructure to Climate Change)* and *11 (Climate-Resilient Faecal Sludge Management)* detail adaptations to infrastructure in response to climate-related hazards, and so they are not discussed here. However, the following considerations can be helpful for hygiene promotion teams in the promotion of the use of climate-adapted WASH facilities:

- **Consult users on the best designs for both their needs and the needs of the changing climate**: adaptations to facilities, such as elevating latrines and water points, may mean that some WASH facilities become more difficult to use by some members of affected communities, including older people, those with disabilities and pregnant women. Develop a shared understanding through consultation about changes to infrastructure design and adaptations that can be made to ensure they are comfortable and dignified for all users.
- **Listen to user feedback on what works and what doesn't**: indigenous knowledge about climate change and its effects, and local experience about previously attempted adaptations can be invaluable, as can learning about modifications or 'tweaks' to climate-resilient infrastructure that can improve its use. Modify designs in response to user feedback to promote continued relevance and use. Oxfam's WASH Tweaks approach outlines an iterative approach to user feedback that supports ongoing modifications to ensure WASH facilities adapt to the changing needs of their users (Oxfam, 2025b).

Providing access to hygiene-related materials, products and materials to replace losses

Including water treatment supplies, safe water storage containers and ORS (if applicable), period and incontinence products, and accompanying information on safe use.

Guidance on consultation, selection and distribution of minimum hygiene items, including period products and assistive products and devices for incontinence, can be found in existing literature and so will not be dealt with in detail here, other than to emphasise

that **consultation with users is key to finding products that work for their specific contexts and circumstances** (Sphere, 2018, Columbia University and International Rescue Committee, 2017 and House, S. and Chatterton, C. 2022). However, when planning access to hygiene-related materials in the context of climate change, the following considerations can support the long-term availability of items:

- **Support climate-related hazard preparation with local markets:** climate-related crises and sudden disasters, such as floods, can disrupt the supply chain for hygiene items. Strengthen local markets by supporting the production and distribution of local, quality products (where these exist), mapping of alternative supply routes, and flood-resistant storage or warehousing for contingency items. Conduct market assessments to evaluate the availability, quantity, and quality of hygiene products at different times of the year, and work with local vendors on cash and voucher-based delivery systems. These systems can be particularly effective when used as part of anticipatory action mechanisms to provide communities with the required items before a disaster hits.

See also: *GN 8: Anticipatory Action in the WASH sector.*

- **Invest in social marketing for supportive products:** positive coping mechanisms, such as household water treatment following climate events, can reduce public health risks and outbreaks. Social marketing has been used to good effect to promote the use of household water treatment in areas with high incidences of water-borne diseases. This approach requires significant investment and long-term partnership building between the private sector, governments and communities, but can be an effective way of motivating large-scale behaviour change. Process Solutions Inc., the Center for Disease Control (CDC) and USAID have documented their approaches and recommendations for such approaches (POUZN Project, 2007).
- **Climate resilient distribution mechanisms:** map places of safety used during floods or other climate events, such as evacuation centres or areas of high ground, and pre-position items in those areas where appropriate. Distribution by boat has been effective in ensuring essential items reach communities cut off by floodwater.
- **Provide access to products that support positive coping mechanisms:** water containers with lids to minimise recontamination, washing basins that minimise water use for laundry, and household water treatment options can all support positive hygiene behaviours following disruption caused by flooding or other climate-related events.

Some considerations apply to period and incontinence products:

- **Consider whether reusable or disposable products are preferred by users and are most appropriate.** Sustainable, reusable and washable products may be more suitable for areas where supply chains are frequently disrupted by climate-related events, but can be difficult to dry in places with prolonged rainy seasons. In these cases, it may be prudent to ensure access to both washable and disposable products to be used in conjunction with each other.
- For disposable items, consider whether **solid waste management systems** are still functional during periods of climate-related events. Washable items may be preferable until waste management systems are re-established.

✔ For washable items, consider **products that require reduced amounts of clean water to launder**. Menstrual cups require only small amounts of clean water to maintain; however, they are not suitable for some users or some cultural contexts. For all hygiene items, **consider that the relevance of different items may change in response to changes in climate over time**. Regular discussions should take place with different groups within affected communities to determine changes in needs or preferences for different items in response to climate change (for example, reusable period or incontinence products may be preferred when they can be washed and dried easily during hotter periods of the year, but less preferred during rainy seasons when drying is more difficult). Work with local businesses and suppliers to ensure hygiene products meeting various needs are stocked throughout the year and updated to reflect emerging needs and preferences.

Discussion of water-borne disease-specific information during preparedness and response phases, key actions to take and the barriers and enablers to these

Climate-related hazards like floods increase the incidence of water-borne diseases by contaminating safe water sources and displacing communities to areas with unsafe water sources. An abundance of contaminated water also makes the maintenance of hygiene practices, such as handwashing and latrine use, more difficult, leading to an increase in faeco-oral disease transmission.

Preparedness efforts should focus on ensuring that areas of safety, such as evacuation centres and higher ground, are well provisioned with flood-resistant water supply and sanitation facilities (see *GN 1: Climate Change Adaptations for WASH*), and pre-positioned hygiene items, such as handwashing devices, soap, laundry soap and water treatment chemicals, if required. Preparedness efforts should also focus on health facilities, ensuring these too have flood-resistant WASH facilities and a continuous supply of clean water. Community health workers and volunteers should be trained in common water-borne disease signs and symptoms ahead of flooding events. This supports referrals and the provision of accurate information about the diseases and positive, health-seeking

behaviours to affected populations. As discussed above, a focus on groups at higher risk of infection from various water-borne diseases may help in focusing resources and activities:

Table 3: High Risk Groups for Water-borne Diseases

Pathogenic Agent	Water-Borne Disease	High Risk Groups
Bacteria	**Cholera**	• Children • Older people • Women (as having the main burden for caring and water collection)
Bacteria	**Typhoid**	• Children • Older people • People who have limited access to safe water and sanitation
Virus	**Hepatitis A**	• Children • Older people • People with liver disease
Virus	**Hepatitis E**	• Children • Older people • People with compromised immune systems • Pregnant Women
Virus	**Polio**	• Children under 5 • Anyone who is unvaccinated against Polio
Bacteria	**Leptospirosis**	People: • who come into contact with contaminated water and soil (especially after flooding) • who have close contact with animals • with compromised immune systems

Virus	**Rotavirus**	• Children under 5 • Older people • People with compromised immune systems • People living in overcrowded conditions
Salmonella Bacteria	**Salmonellosis**	• Children under 5 • Older people • People with compromised immune systems • Pregnant Women • People with chronic illness
Shigella Bacteria	**Shigellosis/ Bacterial Dysentery**	• Children under 5 • Older people • People with Malnutrition • People with compromised immune systems

Cholera outbreaks are becoming larger and longer because of climate change and are occurring in new locations. **Hygiene promotion and outbreak response may need to shift from response and preparedness-only actions to surveillance, awareness raising, and the provision of supportive materials on a continuous basis.**

Key adaptations may include the following:

Targeting hotspot areas where cholera and water-borne diseases are endemic

Since cholera and many faeco-oral diseases are highly transmissible, focusing responses on areas with high caseloads can make best use of limited resources. WASH practitioners should coordinate with national Ministries of Health and local-level health authorities to determine hotspot areas for priority interventions.

Stronger collaboration between WASH and Health actors, particularly in Priority Areas for Multisectoral Interventions

In hotspot areas, coordinated approaches between WASH and Health actors are vital. Preparedness and response activities should consider the role of the Oral Cholera Vaccine and WASH improvements simultaneously.

Using climate-based prediction and early warning systems

WHO, FCDO and the UK Met Office have been undertaking work to strengthen early warning systems for outbreaks by using climate-related data (WHO, 2021). These tools can be used to inform preparedness activities, trigger active surveillance and allow early actions to minimise the scale of outbreaks linked to climate-related events. Mobile messaging systems, such as WASHmobile, have been tailored to climate change by using forecast data to send messages ahead of heavy rainfall to remind affected communities of key hygiene behaviours for minimising the risk of water-borne diseases following floods (WASHmobile Research Team 2025).

Creating water safety plans (WSPs) and long-term water monitoring

WSPs are a proactive approach to managing risks to ensure safe drinking water from catchment to consumption. WSPs can be particularly useful to map how risks change during periods of flooding and to pinpoint actions at the community and household levels that can reduce the risk of consuming contaminated water. WSPs should be coupled with long-term water quality monitoring at different points in the water chain to evaluate their success, and make adaptations to reduce risk where necessary (WHO, 2023b).

Ongoing awareness raising of signs and symptoms

In areas where cholera outbreaks have become deeply rooted, hygiene promotion actors should plan for broad and sustained information and education campaigns. These may require more detailed communication, influencer and stakeholder mapping than ordinarily undertaken in humanitarian contexts. Further details on these tools can be found in the Compendium of Hygiene Promotion in Emergencies (Gensch, R., 2022).

Advocacy and action

Advocacy and action can emphasise water, sanitation and hygiene's integral role in reducing cholera outbreaks, promoting inclusion in national plans and strategies, as well as at the local level. Working with households to understand barriers in building or utilising flood-resilient infrastructure can add insight to where financial or in-kind support would be best directed.

Working with health facilities and informal providers to ensure IPC is rigorously adhered to

Health centres and non-biomedical health practitioners (such as traditional healers or birth attendants) can become a source of infection for water-borne diseases if IPC is not strongly adhered to. WHO and UNICEF's WASH FIT tool provides a framework for identifying WASH-related risks in health facilities and implementing climate-resilient actions to improve IPC and health outcomes. Informal healthcare providers, such as traditional healers and midwives, should be integrated into outbreak response efforts, receiving the same training as CHWs and CBVs and, if required, materials to support IPC such as gloves, hand sanitiser and soap. Case studies from the 2014 West Africa Ebola epidemic highlight the benefits of integrating indigenous healers (Elhra, 2015).

Water Scarcity and Drought

See also the hygiene promotion activities relevant Across All Hazards.

Use of water-conserving designs for handwashing, body hygiene, and laundry

In drought-prone and water-scarce environments, hygiene promotion must focus on ensuring limited water is managed at the household and community level to ensure essential hygiene practices are not deprioritised. The following adaptations and products may support continued hygiene practices in water-scarce environments:

Handwashing

Water-conserving handwashing stations

Examples include the Oxfam Handwashing Stand, which has self-closing taps and a low water flow to conserve water (Oxfam 2025a), and the Gravit'eau, a handwashing system that recycles grey water for use again (Gravit'eau 2025). Simple two-bottle systems – where one drinking water bottle is filled with soapy water, and one with clean water (the caps have small holes) – can also be used as a simple approach to promote handwashing whilst conserving water. Although clean water use is preferred, handwashing can reuse water from cooking vegetables and rice, and from laundry (WHO, 2020 and White, S., 2020).

Use of Antibacterial Hand Rub (AHBR)	AHBR, or hand sanitiser, can be used in water-scarce contexts. A minimum of 60% alcohol content and 3-5 ml for each handwashing event is recommended (WHO, 2025).
Antimicrobial Towels	The Super Towel is a microbial-bonded towel that, when wet with water, provides effective handwashing without soap or running water. The towel can be wet, wrung and used for 3-5 hours for handwashing, meaning very little water is used (Real Relief, 2025).

Personal Hygiene

Water-conserving showers	Based on camping showers, products like the Pocket Bottle Shower can provide water for personal hygiene using a small amount of water (WaSH Innovation, 2025).
Waterless body wash	Whilst not specifically designed for humanitarian contexts, waterless body washes may have use in water-scarce environments, or for populations on the move where access to sanitation facilities is limited.
Menstrual cups	For washable items in contexts of drought or water scarcity, consider **products that require reduced amounts of water to launder**. Menstrual cups require only small amounts of clean water to maintain; however, they are not suitable for some users or in some cultures. Other innovations, such as washing bags for period underwear, can minimise the amount of water required to clean these products (Reemi 2025).

Laundry

Hand-cranked washing machines	The Divya Washing Machine is designed to save up to 50% of water compared to handwashing practices and operates without the need for electricity or plumbed water supply (The Washing Machine Project, 2025).

It is important to note that many of the products listed above have been piloted at a small scale and, therefore, further testing in drought and water-scarce areas is recommended to support their use at scale.

Promotion of water recycling and increased water storage

In areas of water scarcity or drought, increased engagement about sufficient storage and recycling, or reuse of water will be required. Increased water storage may be proposed at the community level, through communal ponds or berkads (see *GN 1: Climate Change Adaptations for WASH* for more information), or at the household level through household water tanks (constructed or supplied) or barrels. Where water storage is increased, it is important to continue to work with households to monitor for signs of mosquito breeding in and around storage, and to ensure regular cleaning of large water storage tanks takes place on a regular basis, depending on the type of water collected and the use of the water.

Water reuse or recycling should be encouraged in areas where water scarcity persists. Opportunities to do this at the household or community level may be determined through Integrated Water Resource Management planning (see *GNs 2 (Integrated Water Resource Management)* and *10 (Climate Change and Community-Based Water Resources Management)*) or through conducting household water use surveys to determine approximate quantities used for different tasks. Where water reuse is new or not commonplace, hygiene promotion can be used to determine any perceived barriers, highlight potential benefits, and encourage and monitor uptake at a household or community level. Successful examples of water reuse include more technical, community-wide solutions, such as the Barkha Camp in Iraq (Octopus, 2021), to more localised solutions, such as keyhole gardens in Tanzania (Dreschsel, P., 2024).

Discussion of water-washed disease-specific information, during both preparedness and response phases, key actions to take and the barriers and enablers to these

Droughts and water scarcity can increase water-related diseases for two reasons: firstly, water for hygiene purposes may be deprioritised below other needs (such as drinking, cooking or watering livestock), allowing the proliferation of skin diseases, mites, lice and faeco-oral diseases. Secondly, reductions in water availability may drive people to use unsafe sources for drinking and personal hygiene uses, increasing the risks of water-borne diseases such as cholera.

An initial step to supporting adaptations is to understand how water is currently prioritised and used, and the real and perceived barriers to prioritising water for hygiene use above others. Water use surveys can be used with households and wider communities to identify the activities for which water is required and how it is prioritised. These surveys can also help households identify any inefficiencies in their water use and potential for water reuse.

Once barriers and perceptions around water use are understood, hygiene promotion and outbreak preparedness can be supported in water-scarce contexts by identifying high-risk groups and supporting adaptations in practice, linked with an understanding of risks:

Identifying high-risk groups for water-borne, faeco-oral and water-washed diseases can support **stronger targeting of preparedness and response** activities by identifying whether disease incidence or prevalence differs across population groups based on their age, sex, ethnic group, occupation or other factors. Whilst communication with communities should seek to inform as wide a range of population groups as possible, if resources are limited, targeting activities at high-risk groups can help to reduce the overall burden on health centres during drought and water scarcity. The Table below has a summary of the most vulnerable groups for a range of different water-washed diseases (a discussion of water-borne and faeco-oral diseases can be found above):

Table 4: High Risk Groups for Water-Washed Disease

Pathogenic Agent	Water Washed Disease	High Risk Groups
Dead skin accumulation	**Dermatitis Neglecta**	• People with physical or mental disability • Children • Older people
Scabies Mite	**Scabies**	• Children • Older people • People with compromised immune systems • People living in overcrowded conditions • People who cannot wash themselves, bedding or clothing frequently
Lice	**Typhus**	• People living in overcrowded conditions • People who have close contact with animals • People who work outside, especially in areas with grass or bushland • People who have limited access to water and soap for washing

Chlamydia trachomatis	**Trachoma**	• Children • People living in overcrowded conditions • People who cannot wash themselves, bedding or clothing frequently
Adenovirus	**Viral Conjunctivitis (pink or red eye)**	• Children • Older people • People with compromised immune systems • People who cannot wash themselves, bedding or clothing frequently
Schistosoma Parasite	**Schistosomiasis**	• Children • Workers who have frequent contact with contaminated water

Supporting adaptations in practice: the following adaptations can reduce the risks and transmission of water-washed diseases:

Promoting the use of water for hygiene practices

Hygiene promotion should focus on the benefits of prioritising water for hygiene, particularly for handwashing, laundry and body washing. Economic analysis exercises, commonly used in Community-Led Total Sanitation called 'calculations of shit and medical expenses' (Kamal and Chambers, 2008), used alongside water use surveys, can help to support households to examine the relative costs of current water prioritisation and make changes that support health.

Working with health providers

Chemical treatments, such as permethrin, are very effective at resolving scabies infections. However, they should be provided under medical supervision and alongside the means for households and communities to sufficiently treat clothing and bedding to remove scabies mites and eggs (see below).

Providing access to fomite treatment during outbreaks

Fomites, such as blankets, towels and clothes, can harbour scabies mites, eggs and lice and prolong outbreaks. To remove them, items should be washed in hot water, but this is unlikely to be a preferred option for households in water-scarce environments. During scabies outbreaks in Yemen, Oxfam organised community-level 'laundry events', providing hot water where households could wash bedding and clothing to remove mites. Where feasible, centralised provision such as this can minimise water use. Alternatively, sealing clothing and bedding in plastic bags for a minimum of three days causes a natural die-off of mites and eggs; therefore, the provision of bags and information on this type of treatment can also be an effective approach.

Provision of technologies that support hygiene with minimum water use

The section on using water-conserving designs for handwashing, body hygiene, and laundry above details different innovations using water-conserving designs to maintain hygiene practices in water-scarce or drought contexts.

Provision of protective clothing

Waders and waterproof clothing can minimise transmission risk for individuals who have frequent contact with contaminated water.

School interventions

Children are most affected by trachoma and are at higher risk of other water-washed infections. The Blue Schools approach is a helpful framework for promoting positive hygiene behaviours alongside environmental education and climate-resilient practices (Swiss Water and Sanitation Consortium 2025).

Stronger seasonal planning of hygiene promotion activities can ensure information and support is provided when needed, for example, when known drought or dry periods are coming.

Heat

See also the hygiene promotion activities relevant Across All Hazards.

Discussion with high-risk groups on signs and symptoms of extreme heat stress, coping mechanisms and health-seeking behaviour, and the barriers and enablers for these actions

Whilst increased heat has effects on all members of a population, certain groups are known to be at higher risk of increased morbidity and mortality during extreme heat events. Potential methods for hygiene promoters and other WASH actors to engage with these groups and increase their access to information about adaptations to reduce their risk are:

Babies and young children	Underdeveloped bodily systems, higher body surface area-to-volume ratio, and lower levels of sweat production all contribute to babies and children being at greater risk of heat stress and increased morbidity and mortality during extreme heat events. Hygiene promotion staff should target locations and activities that typically bring together parents and young children, such as post-natal clinics, infant and young child feeding centres, child-friendly spaces and schools, and parents' groups, to share risk-reducing advice and actions. UNICEF's 'B.E.A.T. the Heat' is a helpful approach centred on awareness, symptom identification and early action to protect children from extreme heat events (UNICEF, 2023).
Older people	Thermoregulatory capacity diminishes with age, and older people are the population group with the highest levels of mortality and morbidity associated with heatwaves. Hygiene promotion teams should work closely with Older People's Associations (OPAs) and specialist agencies to support older people with advice and access to items that can lower their temperature during heat spikes (see below for suggested NFIs). Creating community networks to check in with older people, encouraging them to drink more regularly, and take action to cool their living spaces, are also key adaptations that can support older people during heat-related events.

People with underlying health problems, especially cardiovascular disease	Hot weather causes blood vessels to dilate more, leading to low blood pressure; this can affect people with cardiovascular disease and other health problems. Hygiene promotion teams should work in collaboration with community health workers and with health clinics to provide appropriate information for people with underlying health issues during heatwaves. Information should be provided in easily understandable formats and provide details on seeking early treatment in case of any symptoms of heat stress.
People with mental health issues	High temperatures cause changes that affect multiple physiological systems that regulate mood. Additionally, the effectiveness of some mental health medications can be reduced by these changes, exacerbating mental health conditions. Where individuals with mental health issues are known to community volunteers, offering advice and referrals to health services ahead of heatwaves or periods of extreme heat within the seasonal calendar, can enable individuals to make mental health plans to cope with adverse effects (Teklemariam, D., 2025).
Pregnant women	Excess heat can cause increased risk of high blood pressure, gestational diabetes, heart-related illnesses, early contractions and premature birth. As described above for babies and young children, the UNICEF 'B.E.A.T. the Heat' approach also provides key information for pregnant women and can be used as a framework for hygiene promoters when discussing excess heat with pregnant women in their community.

As described above in Discussion of climate-related hygiene information, coping mechanisms and barriers and enablers to positive practices, working with these high-risk groups to understand the barriers to adopting protective behaviours and the means to overcome them can be done in several ways. The participatory methodologies described in the same section are also suitable for discussions relating to extreme heat, and the items described in the following section, about the provision of items, may help to overcome some of the barriers identified.

Provision of items to facilitate household and personal cooling

Currently, there is no sector-wide guidance on the provision of non-food items that can support personal or household-level cooling. However, the following approaches are low cost and could be used in conjunction with adaptations in shelter design to support passive cooling:

For more information, see *GN 4: Passive Cooling for Public Buildings*.

- **Provision of cloth:** dampened cloths can be used to cool pulse points, placed over necks and heads, and hung in doorways and windows as curtains to minimise heat ingress into shelters.
- **Spray bottles:** can be used to mist skin to provide a cooling layer. Spray bottles can be particularly effective when used in conjunction with fans and can be helpful for keeping young children and babies cool.
- **Handheld and household fans:** rechargeable, solar-powered fans have been shown to be effective in areas that do not have an electricity connection, and new cost-efficient models could be the most suitable for humanitarian contexts (Efficiency for Access, 2025). Fans should not be used if the air temperature exceeds 35 °C, as blowing such hot air at the body heats it up.

See *GN 12: Programmatic Response to Extreme Heat*.

- **Head coverings:** in populations where head coverings are not the norm, hats or fabric used as scarves can minimise the risk of heat stroke and heat stress whilst outside during periods of extreme heat.

Ecosystem

See also the hygiene promotion activities relevant Across All Hazards.

Discussion of pre and post-disaster/movement practices and the barriers and enablers to regaining positive hygiene behaviours

Communities that have experienced population movement to new locations due to climate change may lose access to established water, sanitation and hygiene systems and, as a result, may resort to coping practices that have a negative impact on their health (for example, using unsafe water for drinking or washing, or open defecation in areas underserved with sanitation).

As described in earlier sections, understanding what people already know, where information and service gaps persist, and supporting positive coping mechanisms and enablers of positive hygiene and disease outbreak response behaviours are key WASH

programming adaptations to strengthen community resilience and adaptation to climate-related population movement. It is important that behaviours, barriers and motivating factors are discussed across different groups in communities, particularly marginalised groups who may not be able to adopt recommended behaviours without support.

Key activities for supporting hygiene and outbreak preparedness and response activities during climate-related population movement include:

- Working with urban planners to ensure services are expanded in a sustainable manner to reach new populations. Advocating for the needs of established populations (such as those who may have migrated and created informal settlements) based on their feedback and expressed needs, and bringing their feedback to discussions on future urban planning, will be critical for ensuring areas of relative climate safety are appropriately resourced to maintain population health.

- Where population movement brings communities closer to wild animals, work with health centres and community health workers to increase disease surveillance activities to aid early detection of zoonotic diseases such as Marburg and Ebola.

- Where consumption of bushmeat is common practice, work with communities on making preparation and consumption safer through minimising contact with blood and thoroughly cooking meat before consumption. Where risks of zoonotic disease are known to be high, work with communities to discuss these risks and determine appropriate protection methods (the information outlined for Ebola in this GN can be applied across other zoonotic diseases: WHO, 2025).

- Work with markets, particularly wet markets (markets where dead or live animals are sold alongside other fresh produce) and wildlife markets (markets where non-domesticated wild animals are also sold). The aim is to minimise public health risks by supporting and promoting increased hygiene practices (regular handwashing, disinfection of surfaces and appropriate waste management) and reinforcing bio-security controls, such as minimising contact between different types of animals and between live and dead animals. Work with governments and local authorities to enforce restrictions at wildlife markets that present high risks to public health and zoonotic disease transmission (Lin, B., 2021).

Provision of hygiene-related materials

The hygiene items required for the prevention of diseases associated with ecosystem change are the same as those required for the maintenance of good hygiene under

other circumstances – namely, clean water, functioning sanitation systems, and hygiene products, such as the basic requirements of soap, laundry soap, combs, nail clippers and toothbrushes. Rapid population movements may mean affected communities have lost access to these items, and they should be provided as a matter of urgency, along with promotion of their use to minimise public health risks. Where populations are on the move, hygiene items should be easy to carry and use on the go. Hygiene products, period products for those who menstruate, and items to manage incontinence should be selected in consultation with users and through discussion of the environmental factors that may affect their use (for example, washable products may not be appropriate for water-scarce areas). For further information on different hygiene products, see Providing access to hygiene-related materials, products and materials to replace losses above.

2.3.2 Climate Adaptive Vector Control Activities

A common objective of vector control activities is to reduce or eliminate human contact with disease-carrying vectors by interrupting their life cycles and habitats, thereby preventing the transmission of vector-borne diseases and protecting public health. This objective can only be achieved with: an understanding of environmental factors and how these may change over time in response to a changing climate; the impact of these factors on disease-carrying vectors; and appropriate vector control measures that address the context-specific epidemiological situation and future changes.

Vector control activities can be implemented at both household and community settlement levels. In many contexts, vector control crosscuts WASH, shelter and camp management, NFIs and health. Coordination between different actors is important to ensure effective environmental management, surveillance, and large-scale vector control measures.

Table 5: Potential Vector Control Activities for Different Hazards

Type of Climate-Related Hazard	Impacts on Vector Control	Potential Vector Control Activities
Flooding	Facilitation of vector breeding through presence of standing water	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of vector-borne disease-specific information and barriers and enablers to adopting protective measures Engagement with site planning for proper environmental control
Water Scarcity and Drought	Facilitation of vector breeding through poor water storage and spillage	

Heat	Increased habitat range of disease-carrying vectors with long-term changes in heat	Community engagement and mobilisation on vector control at the settlement level Community engagement and mobilisation on the use of household-level vector deterrents Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Engagement with communities and other stakeholders on reducing risks with longer-term strategies
Ecosystem Changes	Facilitation of vector breeding in dense urban areas Increased contact with vectors due to population density	

Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources

Climate-related hazards like floods, droughts and increased heat can shift vector-borne disease transmission patterns, alter vector breeding seasons, and expand the geographical range of vectors. This can result in longer, more geographically spread outbreaks of vector-borne disease (VBD) in endemic locations, or the arrival of new vector-borne diseases in previously unaffected areas. Vectors – particularly insect vectors - are intrinsically tied to environmental factors: more rainfall can result in more mosquito breeding grounds, longer monsoon seasons can boost VBD disease transmission rates; droughts may drive mosquitoes to congregate in greater densities near available sources of water, including water storage containers near people's homes.

As described above in Climate-Adaptive Hygiene Promotion Activities, public health planning is most effective when using insights from a *Person-Place-Time* analysis of disease trends.

Person

An analysis of who is most affected by VBDs can support **stronger targeting of preparedness and response** activities by identifying whether disease incidence or prevalence differs across population groups based on their age, sex, ethnic group, occupation or other factors. This is particularly important to target the use of resources to those most vulnerable, and to minimise those most likely to require additional or complex health care support if infected with VBDs. The table below shows a summary of the groups most vulnerable to a range of different VBDs. Although communication with communities should inform as wide a range of population groups as possible, if resources are limited, targeting activities to high-risk groups can help reduce the overall burden on health centres during peaks of VDB transmission.

Table 6: High-Risk Groups for Vector-borne Diseases		
Vector	**Vector-Borne Disease**	**High-Risk Groups**
Mosquito	**Malaria**	• Children Under 5 • Pregnant Women • Refugees, Migrants and Displaced people (due to limited health services) • Communities living in remote locations (limited health services) • People who work outdoors (forestry, fishing, mining, agriculture etc.)
	Dengue	• People with underlying health conditions • People with previous dengue infections • Older people
	Chikungunya	• Children under 10 • Older people • People with underlying health conditions • Pregnant women
	Zika	Pregnant women
	West Nile Fever	• Older people • Immuno-compromised people • People with underlying health conditions
Lice	**Typhus**	People: • living in overcrowded conditions • who have close contact with animals • who work outside, especially in areas with grass or bushland • who have limited access to water and soap for washing

Sandflies	**Leishmaniasis**	• Children • Older people • Immunocompromised people • People who are malnourished
River Snails	**Schistosomiasis**	• Children • Pregnant women • People who work in agriculture, fishing, or have regular contact with fresh water
Ticks	**Lyme Disease**	• Children • Older people • People who work outside

Source: Adapted from WHO, 2024c

Engage communities to discuss climate change hazards, their impacts on increasing vector populations, the associated health risks and whether people have any existing coping mechanisms or ways to prevent vector-borne disease, particularly focusing on these high-risk groups.

Place

Climate change is changing the distribution of VBD disease transmission geographically; this means that WASH practitioners will need to adapt and introduce vector control activities in areas where they were previously not required. As with the time analysis below, WASH practitioners need to continuously engage with health information systems and providers to identify any new incidences of VBDs, and to review changes over time in trends relating to the geographical distribution of different disease-carrying vectors. The WHO and many governments assess the risk of increases in VBD related to climate on a regular basis (see, for example, the UK Health Security Report, UK Health Security Agency, 2023). Such documents can be used by WASH practitioners to assess the potential risk of changes to VBD distribution in contexts where they are working. However, the WHO acknowledges that this is an area that still requires greater research and cooperation (WHO, 2024b).

The same is true for monitoring changes in population movement over time; vector control measures may need to be introduced to populations previously unused to them if they are displaced to new locations where VDBs are endemic.

Time

To best respond to climate-related changes in VBD transmission, vector-borne disease transmission must be monitored across two time frames:

1. Seasonal occurrences: this means monitoring the peaks and low periods of transmission of various vector-borne diseases over the seasons in a year. For example, are there particular points in the year when transmission is typically high, and is this generally predictable? This can be assessed through:

    a. Reviewing previous years' epidemiological data from national health management information systems (HMIS), public or private health facilities. The WHO's Malaria control in Humanitarian Emergencies (WHO, 2013) contains simple-to-use monitoring tools that can support local-level surveillance and be adapted for multiple VBDs.

    b. Discussing disease trends with affected communities, including using participatory activities such as seasonal calendars (see above in Climate-Adaptive Hygiene Promotion Activities).

2. Changes over the longer term: involves examining epidemiological trends occurring over 10–20-year periods to find any shifts in the geography, length or severity of outbreaks that support planning for future risks or identifying diseases that may have epidemic potential in the future.

This analysis can support **stronger seasonal planning** of hygiene promotion and vector control activities, for example:

- Ensuring information and activities on vector control, bite deterrence and relevant signs, symptoms and health-seeking behaviour are appropriately timed for maximum impact (i.e. before peaks of VBDs are expected).
- Working with community structures, such as traditional midwives and healers, pharmacies, and health centres, ahead of expected peaks, to reinforce helpful information.
- Supporting communities to act to minimise mosquito breeding, such as clearing drainage channels and solid waste, repairing nets and screens and, if appropriate, supporting spraying activities, ahead of rainy seasons and VBD epidemic peaks.
- Working with Health Centres to prepare for increased patient numbers and ensuring WASH facilities, services and staff training are sufficient, particularly in areas that may not previously have been vulnerable to VBD transmission.

Discussion of vector-borne disease-specific information and barriers and enablers to adopting protective measures

Communities with experience of VBDs may already understand the impacts on their health and will likely have developed coping mechanisms (positive or negative) to deal with cyclical peaks in VBD. However, some communities may not be fully aware of the link between changing climate, changes in the prevalence of VBDs or the transmission routes of VBDs and may not have the resources or means to implement preventative actions. In communities experiencing VBDs as a new phenomenon as a result of climate change, information on causes and prevention may be new and require complex changes in behaviour that will require support to achieve.

As described in the section on flooding above, understanding what people already know, where information gaps persist, and supporting positive coping mechanisms and enablers of positive vector control behaviours are key adaptations to WASH programming to strengthen community resilience and adaptation to climate-related VBD hazards. It is important that behaviours, barriers and motivating factors are discussed across different groups in communities, particularly marginalised groups who may not be able to adopt recommended behaviours without support.

For communities where VBD patterns are changing, or are new, the following approaches may be used to provide information and opportunities for dialogue around VBDs, preventative actions and health-related concerns:

→ Identify communities' preferred channels for receiving information and asking questions using a Risk Communication and Community Engagement (RCCE) approach.

Detailed guidance on how to do this can be found in *GN 6: Risk Communication and Community Engagement Strategies for Climate Change Adaptation in WASH Programming*.

→ Engage communities in discussions about the early signs and symptoms of common VBDs in their area and how these may be changing. Work with communities to identify and address the different behavioural, environmental and economic barriers to employing protective measures. These may include issues such as overcrowded housing, lack of safe waste disposal, poor drainage infrastructure, and the affordability of repellents and nets. Some barriers may delay or prevent treatment, such as limited access to health facilities, affordability, gender norms restricting mobility, reliance on traditional remedies, or mistrust of healthcare providers.

- Discussions should also focus on enablers that encourage communities in VBD prevention, i.e. cultural norms that support VBD prevention, good health practices, and positive experiences with healthcare services, existing community health networks, etc.
- Build on existing knowledge, consider the barriers and positive enablers, raise awareness about the signs and symptoms of different vector-borne diseases, favourable conditions to foster vectors, and preventive measures. Integrating these discussions into routine community engagement activities not only supports VBD control but also builds long-term resilience against climate-sensitive vector-borne diseases.
- Tailor information to reach different age groups, genders, occupations and more marginalised groups by using inclusive communication formats (e.g., audio, visuals, braille, or sign language), and creating safe spaces for women, youth, and vulnerable groups to share their concerns and solutions. Work particularly with groups identified as being high risk in the *Person-Place-Time* analysis.
- Provide training to CHWs, volunteers (e.g., CHVs) and other individuals with strong connections to communities (such as faith leaders, youth groups, local councillors or community leaders) on signs and symptoms of VBD transmission, how it can affect different population groups, and simple preventive measures (see the MENTOR Initiative, 2016, for more information).
- Work with these groups to discuss changing perceptions (questions, beliefs, concerns, practices) and health-seeking behaviour in relation to VBDs, and the barriers and enablers for prevention and early treatment (particularly in areas where there are new/increasing cases of VBD). Oxfam's Community Perception Tracker is a helpful tool for tracking perceptions and was used to great effect during the COVID-19 outbreak, where information was new and rapidly changing. Employing tools like this facilitates the adaptation of information and activities to communities' expressed needs, ensuring information is tailored to their requirements over time (Oxfam, 2022).
- Institutions like health facilities, schools and workplaces may be particularly prone to daytime biting vectors. Collaborate with schools, women's groups, youth clubs, and disability inclusion networks to co-design seasonal action plans for vector prevention. Work with health facilities to ensure they have adequate climate-resilient WASH and IPC measures to control VBDs. Provide awareness sessions to patients and health staff on IPC and provide essential IPC items, including mosquito nets and repellents.
- Promote the use of seasonal calendars to help communities anticipate high-risk periods and take early preventive actions, such as cleaning water containers, using bed nets, and eliminating mosquito breeding sites.

Engagement with site planning for proper environmental control

Where new settlements have to be created for displaced communities, or to expand habitable areas in urban and peri-urban settings, camp or settlement planning must consider the geographical distribution and impact of disease-carrying vectors, and potential future trends. This means organising and futureproofing living spaces in a way that reduces the risk of vector breeding and disease transmission in the short and long term. Where changes in vector breeding patterns are predicted over time, new shelters should be designed with adaptations such as window and door screening, efficient drainage, and appropriate water storage in mind. New sites should consider predicted hazards and plan accordingly to minimise public health risks.

This may include:

- Coordinating with agencies responsible for camp/settlement planning and management and/or relevant authorities to ensure that settlements are not sited on flood-prone areas or marshy ground that may encourage water-based vector breeding.
- Engaging communities and planning experts in creating site layouts that consider climate change hazards (heavy rains, flooding, etc.) and mitigate their impacts through well-planned water supply and drainage, waste management and appropriate distances between shelters to prevent overcrowding. Community feedback should be used to continually improve shelter and WASH infrastructure, ensuring it meets both hygiene and vector control standards.
- Designing water distribution systems to avoid the creation of pools of surface water, or stagnant water in any form (WHO & UNICEF, 2024). Engage communities and coordinate with local authorities to improve drainage systems and ensure regular clearing of blocked drains, dewatering of standing water using pumps or natural soak pits, and levelling uneven ground to reduce mosquito habitats. (WHO, UNICEF, 2024).

For more infrastructural actions, see *GN 1: Climate Change Adaptations for WASH*.

- Ensuring systems for the management of domestic solid waste are in place and functional. In collaboration with communities and local authorities, ensure that household-level waste and any waste accumulating in roads, community buildings, markets, etc., is collected, removed and disposed of safely. Work with communities to encourage the maintenance of clean living spaces and communal areas, creating livelihood opportunities for the management of waste wherever possible. Ideally, domestic waste final dumping/processing sites should be located at least 3 km from residential areas.

Community engagement and mobilisation on vector control at the settlement level

Community mobilisation should be a key adaptation to climate-related vector control. The role of WASH practitioners is to ensure communities are informed, engaged and able to participate in activities **at the community level** to reduce potential breeding sites for multiple vectors, and take action to minimise contact with vectors at the most appropriate time for the greatest health impact. Actions include clear seasonal planning with communities, disseminating information and implementing activities based on sound epidemiological analysis (see above) rather than following standardised messages.

Key adaptations that support vector control at a settlement level include:

Training staff, community health volunteers

Training staff, community health volunteers, community leaders and structures on VBD patterns, symptoms and methods to prevent spread. Regular inspection, cleaning and information events can be organised with these networks, especially in the lead up to known climatic and epidemic peaks (such as rainy seasons). The timing of these events should be evaluated year on year to adapt to climatic changes. These campaigns should focus on draining stagnant water, covering water storage containers, properly managing solid waste, and clearing clogged drains and ditches.

Safe water storage

Communities should be encouraged and supported to cover jerrycans, buckets and barrels tightly with well-fitting lids to prevent mosquito breeding. Having additional stocks of spare lids procured through local markets or in-kind distribution can support safe water storage after periods of wear and tear. Smaller containers should be emptied, cleaned, and scrubbed at least once a week to remove any larvae or eggs; larger tanks should be inspected regularly during periods prior to VBD peaks to check for mosquito larvae. Buckets and containers distributed in hygiene kits should include secure lids and cleaning brushes. Encourage households to regularly treat stored water with chlorine, which will support the eradication of mosquito larvae. Learn about local community remedies for dissuading mosquito egg laying in water containers, or natural methods to kill larvae. Simple, home-made remedies, such as placing a layer of cooking oil, neem or cinnamon oil on water in larger containers, may also control mosquito larvae development (Chatterjee, S., 2023). Larger tanks can use a layer of polystyrene balls (if the water containers empty from the bottom) to dissuade mosquitoes from laying (Soltani, A., 2012).

Eliminating unintentional water collection

Many common household items collect water unintentionally and can become breeding grounds for mosquitoes. They include used tyres, coconut shells, plastic waste and broken containers. WASH teams should work with households to encourage regular household inspections to remove or empty such items after rainfall. Even decorative containers, such as flowerpots or water features, should be drained or checked for standing water following rainfall. If the regular emptying of containers would be challenging, consider building shelters for items that could gather water to keep them dry (e.g., a shelter for tyres or solid waste collection points).

Stagnant and sewage water management

Managing stagnant water and sewage is essential for preventing mosquito breeding. Engage communities and coordinate with local authorities to improve drainage systems and ensure proper siting of water points. In camps and settlements, regular clearing of blocked drains, dewatering of standing water using pumps or natural soak pits, and levelling uneven ground can reduce mosquito habitats. Latrine holes should be covered to prevent flies from breeding, and latrines should be cleaned regularly to maintain hygiene. Where sewage systems are in place, ensure that waste is transported in sealed pipes or covered trucks to avoid leaks and contamination. In areas where mosquitoes are known to breed, solid waste should be managed by using lidded bins, regular waste collection and safe dry composting practices.

Solid waste management

Domestic solid waste needs to be carefully managed as it can provide an ideal breeding ground and habitat for many pathogen-carrying vectors, including mosquitoes and sandflies. In collaboration with communities and local authorities, ensure that household-level waste and any waste accumulating in roads, community buildings, markets, etc., is collected, removed and disposed of regularly and safely. Conduct awareness-raising sessions in communities to encourage cleaning campaigns, managing waste and disposing of it far from settlements.

Larvicides and biological control

Larvicides are biological or chemical insecticides or biological agents that are regularly applied to larval habitats. They target the aquatic stages of vector breeding and are useful for treating large water storage containers that cannot be manually emptied and cleaned every week. Biological control involves introducing a biological agent, such as fish or crustaceans, that feed on the

larval stages of vector breeding. This approach is suitable for larger water bodies. Over the long term, it is important that WASH practitioners take guidance from research and entomological studies to determine changes in vector composition (i.e. the arrival of new species or increases in one species over another, which may require different insecticide use), and vector insecticide resistance, which may require changes in approach.

✓ **Ultralow volume spraying/ fogging/space spraying**

Is a method of spraying pesticides into the atmosphere of built-up urban or camp settings that targets adult insects active during the day. However, it has limited value and is best used only for epidemics at an early stage.

Further details on all these approaches can be found in the MENTOR Initiative Toolkit (MENTOR Initiative, 2016).

Community engagement and mobilisation on the use of household-level vector deterrents

Alongside vector control at the community or settlement level, adaptations need to be made at the household level to minimise vector entry and biting habits.

In locations where vector-borne diseases are new or emerging due to climate change, **significant investment should be made into behaviour change programmes to support new positive and protective habits**, such as sleeping under mosquito nets, particularly emphasising the value of such behaviours in a way that is attractive to the affected community. There are multiple theories and approaches to behaviour change; those in the Compendium of Hygiene Promotion in Emergencies (Section B, p. 126 onwards) can be applied to behaviours concerning vector control.

Materials such as Long-Lasting Insecticide-Treated Nets (LLINs) and repellents should be prepositioned for outbreak response activities. Information gained from seasonal planning should be used to target information provision and public messaging ahead of epidemic peaks, encouraging protective behaviours amongst high-risk populations.

Household-level interventions to minimise VBDs include:

→ **Weekly Household Vector Checks:** communities should be encouraged to adopt routine weekly household checks during periods of high vector activity (i.e. following the trends identified in seasonal calendars for when vectors

breed and when epidemic peaks are expected). Families can inspect their homes for stagnant water, leaking pipes, uncovered containers, and areas with poor drainage. With support from CHVs, households can receive guidance on identifying and eliminating breeding sites. These checks not only promote proactive behaviour but also build community-wide responsibility for preventing outbreaks of vector-borne diseases.

- **Provision of Long-lasting insecticide-treated nets:** LLINs are nets that can be used by individuals or a family. The nets have been treated with insecticide (pyrethroid) during production, either coated or incorporated into the fibres. Sleeping under an untreated mosquito net provides a physical barrier against mosquitoes, but mosquitoes can still bite through any tears or holes, or if any part of the body is touching an untreated net. Nets treated with a pyrethroid insecticide provide a significantly increased level of protection, creating a physical barrier to keep out mosquitoes, and repelling or killing insects that contact the chemicals coated on the net fabric. When planning distributions, LLINs should be provided in sufficient quantity and sizes appropriate to the household members to cover everyone exposed to transmission in the participating communities. Widespread use of LLINs has been shown to provide community benefits as well as household protection. In a study carried out in the southeast of Iran, groups of LLIN users had a significantly lower prevalence of malaria (up to 97%) than groups of LLIN non-users. Malaria morbidity and death have decreased considerably (by about 50%) in sub-Saharan Africa, where more than 427 million insecticide-treated nets were provided between 2012 and 2014. Where net use is new, or where mosquito nets have potential value for other uses (such as fishing nets), planned distributions should also include significant follow-up visits to emphasise the value in their use. Follow-ups should also work with households for the regular inspection of nets, to ensure holes or tears are repaired, or that nets are replaced if too damaged.

- **Insecticide-Treated Plastic Sheeting:** ITPS is a dual-purpose material distributed in communities during emergencies to provide shelter while also offering protection against disease vectors like mosquitoes. The plastic sheets are treated with the long-lasting insecticide pyrethroid that kills or repels insects upon contact. When used to cover shelters or sleeping areas, ITPS creates a protective barrier that reduces human-vector contact. When distributing ITPS, it is important to consider household size, shelter type, and community awareness on proper usage. ITPS should be provided with clear guidance on installation and, ideally, used as roofing or wall coverings to maximise the surface area that repels or kills mosquitoes. The insecticide on the plastic works on contact, reducing mosquito density inside shelters and preventing bites, especially at night. Distribution should prioritise vulnerable groups such as pregnant women, children, and people with disabilities. ITPS can be a helpful contingency item for distribution to allow households to repair their houses or shelter following climate-related hazards.

Mosquito Repellents: mosquito repellents are effective personal protection against mosquito bites. They work by masking human scent or repelling mosquitoes through active ingredients such as DEET, picaridin, or natural oils like citronella. In humanitarian settings, promoting the safe and consistent use of repellents can help reduce disease risk, particularly when used alongside other vector control measures like nets and environmental management. Spatial repellents emit airborne active ingredients, such as Transfluthrin, which impact vectors' behaviour and reduce human-vector contact. They are easy to install and protect people during the day and night in any type of shelter. Other benefits are that they are small and lightweight (easy to transport and distribute), can be stored for long periods, and are inexpensive to manufacture. MENTOR has carried out trials of spatial repellents in various settings such as Syria, Yemen and Nigeria, demonstrating the tools' efficacy on leishmaniasis vectors in Syria, and dengue vectors in Yemen (MENTOR Initiative, 2025).

More information on sprays and other repellents can be found in:

- Malaria Control in Humanitarian Agencies by WHO
- IVM in Humanitarian Agencies. A Toolkit by the Mentor Initiative
- A toolkit for integrated vector management in sub-Saharan Africa by WHO
- Water and sanitation interventions to prevent and control mosquito-borne diseases: focus on emergencies by WHO & UNICEF

Spraying: in settlements where the risk of vector-borne diseases is high, vector control interventions such as sprays (peridomestic space spraying and Indoor Residual Spraying) play a critical role in protecting vulnerable populations. Spraying can be carried out directly by organisations with the necessary technical capacity. Otherwise, they require coordination with technical partners such as the Ministry of Health, WHO, or specialised NGOs with vector control expertise to ensure that spraying activities are safe, effective, and aligned with national guidelines.

There are two key types of spraying:

- **Indoor Residual Sprays (IRS)** are a highly effective intervention that provides protection to entire communities through rapidly impacting vector populations. IRS applies insecticide to surfaces within the house that serve as resting places for mosquitoes. IRS is usually effective for 3–6 months, depending on the insecticide used, the type of surface sprayed, and transmission seasonality. To be effective as a community control measure, IRS requires coverage of at least 80% of dwellings, ensuring that most mosquitoes are exposed to the insecticide. The limitations of IRS include that it requires specific training, it is time-consuming, and some methods can be

very tedious. Spray teams require at least two days of intensive theoretical and practical training before they can start field operations, and these operations must be closely supervised and monitored.

- **Peridomestic space spraying** is commonly applied by national vector control programmes. It is most widely used for rural housing and involves the release of a fine mist of dichloro-diphenyl trichloroethane (DDT), usually throughout homes. This technique is mainly used in emergency situations with high numbers of adult mosquitoes.

2.3.3 Climate Adaptive Outbreak Preparedness and WASH in Health Facility Activities

Many of the activities detailed under hygiene promotion and vector control can be used by WASH actors as part of outbreak preparedness and response; therefore, some guidance in this section will link back to the sections above.

It is important to emphasise the role of strengthened health systems in both outbreak preparedness and response, and in responding more widely to climate-related public health issues. Whilst WASH practitioners traditionally do not engage in health system strengthening, it is becoming critical to ensure that health systems are fit to respond to climate-related emergencies both now and, with increasing intensity, in the future. Engagement and coordination between WASH and Health actors in the provision of climate-resilient WASH infrastructure at health facilities, coordination around the use of health data to better target WASH resources, and strengthening IPC are essential requirements for stronger health systems that are better equipped to manage climate-related health needs.

Table 7: Potential Activities for Outbreak Preparedness and Response and WASH in Health Facilities

Type of Climate-Related Hazard	Impacts on Outbreak Preparedness and Response	Potential Activities for Outbreak Preparedness and Response and WASH in Health Facilities
 **Flooding**	Increased risk of water-borne diseases	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources
	Increased risk of vector-borne diseases	Discussion of water-borne disease-specific information during preparedness and response phases, key actions to take and the barriers and enablers to these

		Discussion of vector-borne disease-specific information and barriers and enablers to adopting protective measures Provision of hygiene-related materials Provision of vector-deterrent materials such as nets and sprays Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Adaptation of health facilities for better climate-related hazard resilience and stronger IPC Engagement with communities and other stakeholders on reducing risks with longer-term strategies
Water Scarcity and Drought	Increased risk of water-washed diseases Increased risk of water-borne diseases Increased risk of vector-borne diseases Increased risk of Hospital-Acquired Infections (HAIs)	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of water-washed disease-specific information, during both preparedness and response phases, key actions to take and the barriers and enablers to these Discussion of water-borne disease-specific information during preparedness and response phases, key actions to take and the barriers and enablers to these Provision of hygiene-related materials Discussion of vector-borne disease-specific information and barriers and enablers to adopting protective measures Provision of vector-deterrent materials such as nets and sprays Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Adaptation of health facilities for better climate-related hazard resilience and stronger IPC Engagement with communities and other stakeholders on reducing risks with longer-term strategies

Heat	Increase risk of health system overwhelm from heat-related health issues	Monitor epidemiological data and trends to determine changes in risk, identify high-risk groups and target preparedness and response resources Discussion of food hygiene-specific information and barriers and enablers to safe food preparation and storage practices Discussion with high-risk groups on signs and symptoms of extreme heat stress, coping mechanisms and health-seeking behaviour, and the barriers and enablers for these actions Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Provision of items to facilitate household and personal cooling Adaptation of health facilities for better climate-related hazard resilience and stronger IPC Engagement with communities and other stakeholders on reducing risks with longer-term strategies
Ecosystem Changes	Increase risk of zoonotic disease transmission Increased risk of water-borne diseases	Monitor epidemiological data and trends to determine novel or unusual cases, changes in risk, identify high risk groups and to target preparedness and response resources Discussion of water-borne disease-specific information during preparedness and response phases, key actions to take and the barriers and enablers to these Provision of hygiene-related materials Collaboration with formal and informal health system representatives to ensure clear, coordinated information provision Adaptation of health facilities for better climate-related hazard resilience and stronger IPC Engagement with communities and other stakeholders on reducing risks with longer-term strategies

Adaptation of health facilities for better climate-related hazard resilience and stronger IPC

Climate change threatens the ability of healthcare facilities to provide quality care and effective infection prevention control (IPC). Additionally, healthcare facilities produce large amounts of environmental waste, which, in the face of climate change hazards such as flooding, is more difficult to collect, store, and dispose of.

According to WHO's WASH FIT document, a climate-resilient health system is one that is 'capable to anticipate, respond to, cope with, recover from and adapt to climate-related shocks and stress, so as to bring sustained improvements in population health, despite an unstable climate' (WHO, 2022c).

WASH adaptations for better resilience and improved IPC include:

Coordination

Following climate-related hazards when there is increased reliance on health systems, WASH actors should join coordination mechanisms with health, local government sectors, NGOs, CBOs, informal healthcare providers and communities, ensuring clear definitions of roles and responsibilities. Collaborations could include the development of guidelines and standard operating procedures on appropriate hygiene practices, waste disposal, provision of safe and sufficient water, adequate sanitation, and vector management at the health facility level to ensure effective health care provision and to minimise the risk of HAIs.

Coordination should also take place:

- **On the use of HMIS and data:** to determine trends and patterns that can support preparedness activities at the health centre level, and to identify likely periods of high health centre use (for example, during epidemic peaks, or following floods, cyclones, etc.). This can facilitate better resource planning and minimise health centre overwhelm.
- **On preparedness and response plans:** community (including informal healthcare providers) and health system stakeholders should be brought together to identify key roles to prevent and respond to outbreaks. Tools such as Community Event Based Surveillance can be used to highlight potential outbreak events early during climate-related emergencies.

- **To link hygiene promotion and health outcomes:** strengthening hygiene behaviours helps break the chain of infection, improves patient outcomes, protects health care staff, and builds trust in the quality and safety of health services. Linking hygiene promotion to health facilities can minimise the spread of disease and mitigate wider outbreaks through, for example, the provision of hygiene kits to cholera-case households upon their admission to treatment centres (Mello-Guyett, L., 2024) or the provision of accurate and timely information to cholera patients and their households through follow-up hygiene messages (George, C.M., 2022).

WASH and IPC Assessments in Healthcare Facilities

Conduct joint assessments and mapping in health care facilities with WASH and health actors to analyse climate change risks to WASH infrastructure, waste management and how IPC could be disrupted by floods, water scarcity, and a rise in temperatures. The WASH FIT tool can be used to support this process and in creating action plans to follow up on assessment findings (WHO, 2022c).

Provision of climate-resilient WASH infrastructure and materials

This includes:

- **Water facilities:** ensure there are sufficient quantities of water in the health facility as per standards, and there are alternative water sources in case of infrastructure damage due to flooding. Water infrastructure should be designed or adapted to withstand potential climate hazards (e.g., heavy rains, wind, floods, etc.);

See *GN 1: Climate Change Adaptations for WASH*.

Water facilities should be regularly inspected for leakages from tanks, pipes and taps to avoid water wastage and creating stagnant water that can contribute to vector breeding. Water storage in health care facilities should be sufficient to meet the needs of the facility in case of an extreme weather event. In areas of water scarcity and drought, water storage capacity should be increased. Water storage tanks should not be located in areas susceptible to flooding to reduce the risk of contamination, and should have appropriate covers to prevent contamination and vectors.

- **Sanitation facilities:** healthcare sanitation facilities should be designed to be more resistant to climate hazards and able to operate under a range of climate conditions, ensuring that failure in one part of the service chain does not cause the entire service to fail.

See *GN 11: Climate-Resilient Faecal Sludge Management*.

- **Hygiene facilities:** where water scarcity and drought are issues, consider the use of water-conserving designs for handwashing, body hygiene, laundry and IPC activities for some examples. Hygiene facilities should have appropriate drainage and should not leak water or cause stagnant pools that encourage vector breeding.
- **Medical waste:** climate change hazards like floods, storms, and extreme heat can damage waste infrastructure, disrupt transport and treatment systems, and increase the risk of exposure to hazardous waste. Medical waste disposal sites should be planned and designed with climate hazards in mind and have appropriate storage facilities in case of interruptions in collection and disposal mechanisms. Where waste pits are used, ensure they are lined, covered, and built to withstand flooding, heavy rains, and other climate hazards. Measures should be implemented to minimise unnecessary Personal Protective Equipment (PPE) use and select reusable or longer-life materials where safe and feasible, reducing overall waste volume.
- **Provision of Personal Protective Equipment:** ensure a sufficient quantity of PPE accounting for potential supply disruptions during floods and cyclones. Ensure sufficient quantities during busy periods associated with climate change events.
- For further information on climate-resilient sanitation, read UNICEF and WHO's progress report on water, sanitation, hygiene, waste and electricity services in healthcare facilities (2023) and WHO's WASH and Climate Adaptation for Health (2022a).

Modifying health facilities for passive cooling

Adaptations that can help health centres be cooler, despite excessive heat, are covered comprehensively in *GN 4: Passive Cooling for Public Buildings*.

2.4 Step 4: Monitoring and Evaluation

Monitoring and evaluation (M&E) are important for understanding which hygiene promotion and public health promotion interventions work, why they succeed, and what needs to be adjusted. When conducted effectively, M&E can demonstrate the effectiveness of projects and programmes and generate new learning. Example indicators for climate-resilient WASH are currently being developed by WHO and UNICEF (UNICEF, 2025).

Effective public health promotion in the context of climate change adaptations requires listening to affected populations, consulting them on their needs, and incorporating their feedback into programme design and adaptation. Use multiple feedback channels to capture diverse perspectives, including the formation of listening groups, community meetings, suggestion boxes, mobile surveys, and dedicated complaints and response mechanisms. Importantly, prioritise closing the feedback loop through returning to communities to inform them of how their concerns, complaints, and suggestions have influenced programme adjustments. This approach strengthens trust, improves accountability, and enhances the relevance and effectiveness of public health and hygiene promotion interventions in climate change-affected areas.

Hygiene promotion, vector control and disease outbreak response interventions should remain flexible, evidence-based, and responsive to evolving climate-related health risks. Adaptive management involves continuous consultations with communities, monitoring, learning, and adjusting interventions based on real-time data, community feedback, and environmental changes.

Good practice includes:

- Public health and hygiene promotion strategies should be regularly updated according to climate forecasts, epidemiological trends, emerging risks and evolving community needs.
- Learning loops should be implemented where interventions are refined in response to feedback from communities, health professionals, and WASH practitioners.
- Perception tracking tools, such as Oxfam's Community Perception Tracker (Oxfam, 2022), can be used to capture perceptions related to climate change and its effects on health. These in turn can help to counter misinformation, promote behaviour change, and refine intervention strategies based on real-time feedback.
- To ensure public health and hygiene promotion programmes are relevant, inclusive, and effective, community engagement is essential. Conduct regular consultations to understand how climate change is affecting community and individual health (e.g., increased diarrhoea, vector-borne diseases, hygiene challenges), what coping mechanisms they are using to adapt to climate stressors (e.g., storing water, alternative hygiene practices) and what barriers they face to safe hygiene and sanitation in climate-affected areas.

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End notes

1. See Sphere, 2018, WASH chapter, Appendix 5 for a list of common WASH-related diseases in emergencies
2. Oxfam's forthcoming publication Public Health Risk Analysis tool (PHRA) can also be used to assess existing public health risks in communities (to be published in 2026 on Oxfam's WASH resource www.oxfamwash.org)
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