



Collection of Advisories on Health Impacts of Floods



National Programme
on Climate Change
and Human Health

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Scope of the document: This document contains collection of advisories on various health impacts of floods. Each page from 1-10 can be used as a standalone advisory page/IEC material.

Public Health Advisory: Floods

Climate Change & Floods

- India is highly vulnerable to floods.
 - With increasing anthropogenic global warming, increased frequency of localized, intense rainfall and flooding with a reduction in overall monsoon rainfall are being observed in the country.¹
 - Flood risk is projected to increase over the major river basins of India, especially in Indus-Ganges-Brahmaputra River basins.

Flood-prone area	Mechanism of flooding
River basins	Flooding of major river basins due to heavy rainfall events, and melting of glaciers and snow especially in Himalayan region due to global warming
Hilly area	
Urban area	Cities situated on river banks, near downstream/ upstream of dams, inland or in hilly areas, and on coastal regions are prone to river or flash flooding after heavy rainfall events, cyclonic storms or tsunamis and sea-level rise because of anthropogenic geographical alterations, inadequate drainage and stormwater management systems
Coastal area	

- Major flood-prone regions include Uttar Pradesh, Bihar, Punjab, Rajasthan, Assam, West Bengal, Haryana, Orissa, Andhra Pradesh, Gujarat.

Floods can be dangerous

Be Smart, Be Prepared!

What to Do Before a Flood? (During Flood Watch/Alert)

- **Stay updated:** Listen to your local radio or television station for updates. Follow Central Water Commission (CWC) at <https://ffs.india-water.gov.in/> for latest update.
- Know about **evacuation routes and high grounds** if in low-lying area
- **Keep mobile phone charged**, for emergency communications use SMS
- **Gather emergency supplies**, including your prescription medicines, non-perishable food and water. A disaster can easily disrupt the food and water supply at any time.
 - Store at least **5 liters of water per day** for each person and each pet. Store at least a 3-day supply.
 - Store at least **3-day supply of food**. Keep in mind utilities and water supply might be disrupted.
 - Keep foods that have a long storage life and require little or no cooking, water, or refrigeration
 - Meet the needs of babies or other family members who are on specific dietary requirements
 - Avoid very salty or spicy food items, as they increase the need for drinking water
- **Collect important documents** including Ration card, Voter ID card, Aadhar Card, Health/Vaccination records etc and store them in a waterproof bag/container
- **Prepare an emergency kit which should include following in a waterproof bag:**²

Battery-operated torch, Extra batteries	Knife
Battery operated radio	Chlorine tablets or powdered water
First aid box and essential medicines	Important documents
Emergency food (dry items)	Thick ropes and cords
Drinking water (packed and sealed)	Proper/Waterproof footwear
Candles and matches in a waterproof container	
- If in a low-lying area, gather sandbags, ladders, and ropes to prevent and avoid from flood waters
- Bring outdoor items inside or tie them down securely
- Untie cattle for their safety

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What to do During Flood warning/During Floods?







- Turn off all utilities at the main power switch and close the main gas valve to avoid fire, electrocution, or explosions.
- Elevate furniture and other goods
- Do not touch electrical equipment if you are wet or standing in water
- Block drain holes and toilets bowls with sandbags to prevent sewage backflow

If flood warnings are issued, take action, and follow evacuation orders!

If evacuation orders are issued, make sure to

- Secure your home and turn off all utilities at the main power switch and close the main gas valve.
- Do not touch electrical equipment if you are wet or standing in water.
- Take emergency kit and collected documents and go to higher grounds or identified shelters
- Avoid areas that tend to be flooded such as low-lying grounds, flood plains, canyons, washes, etc.

What to Do After Flooding?

	Do	Don't
	<ul style="list-style-type: none"> • Prevent and reduce exposure to floodwater • If needed, while entering flood waters, wear waterproof footwear, use a long stick to check the depth of the water, and avoid sewage lines and drains. 	<ul style="list-style-type: none"> • Do not enter, walk or drive into the flooded area with flowing or stagnant water until absolutely necessary. • Do not go near flooded electric poles or if electrical cables are fallen.
	<ul style="list-style-type: none"> • Floodwaters are dangerous and can lead to injuries and illnesses. • Learn more about Floodwater: Health & Safety (advisory on page 5) and Protecting & Preventing Flood Related Injuries and Illnesses (advisory on page 7) 	
	<ul style="list-style-type: none"> • Follow drinking water advisory • Use properly boiled or chlorinated water for drinking and cooking, • Throw away any food that has come in contact with floodwater. 	<ul style="list-style-type: none"> • Do not drink flood water, or use it to wash dishes, brush teeth, or wash or prepare food.
	<ul style="list-style-type: none"> • Learn more about Safe Drinking Water, (advisory on page 8) 	
	<ul style="list-style-type: none"> • Return to your home only after local authorities have declared it safe to do so. • Be aware of health hazards and practice safe cleaning, if your home is flooded. • Learn more about Returning Home After Flood Event: General Health & Safety Tips (advisory on page 3) and Cleaning Tips, (advisory on page 4) • Homeowners may want to temporarily store items outside the home until insurance claims can be filed. 	<ul style="list-style-type: none"> • Remove and throw out material contaminated with floodwater or sewage.
	<ul style="list-style-type: none"> • Ensure fly and mosquito prevention and control measures. • Learn more about Preventing Food-Borne and Vector-Borne Diseases (advisory on page 9) • Inform about dead animals or birds to the Municipalities and Local Bodies for removal by deep burial and spraying of the bleaching power. 	
	<ul style="list-style-type: none"> • Provide emergency wound care in case of small, non-penetrating injuries. • Learn more about Emergency Wound Care (advisory on page 6) • Seek immediate medical care, if you or someone you know develops fever or diarrhea. • Seek professional help if experiencing anxiety or mental stress. National Psycho-Social Helpline: 080 46110007. Learn more about Post Disaster Stress Management & Prevention of Mental Illnesses (advisory on page 11) 	
	<ul style="list-style-type: none"> • Keep a family member informed. • If stranded, contact national helpline: 011-1078 or local helplines: _____ 	

Avoid walking or driving through flooded areas

Flood water, fast-moving or standing, both can be dangerous.
Only 6 inches of water can cause you to lose control of your vehicle.

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Returning Home After a Flood Event: General Health & Safety Tips



Sanitation & Hygiene

- If routine clean/drinking water supply is affected,
For **drinking**, use water that is rolling boiled for 1 minute and then cooled or disinfected (*See [Safe Drinking Water, advisory on page 8](#)*)
For **personal hygiene**, use disinfected water
- If you have any open cuts or sores that were exposed to floodwater, wash them with soap and water and apply an antibiotic ointment to prevent an infection.
- Seek immediate medical attention if you become injured or sick.
- During a water advisory, use only bottled, boiled, or treated water for drinking, cooking, etc.
- Throw away any food and bottled water that comes/may have come into contact with floodwater.
- Do not use flood water to wash dishes, brush teeth or wash and prepare food.
- Always wash your hands with soap and water if you have been in contact with floodwater

When in doubt, throw it out!



Prevent mold/fungal growth.

- Clean everything with mold on it. Clean up mold with a mix of bleach and water
- Clean up and dry your home quickly after the storm or flood ends- within 24 to 48 hours if possible.
- Fix any leaks in roofs, walls, or plumbing as soon as you can.
- Increase ventilation in your house by opening doors and windows. Use fans to dry wet areas. Position fans to blow air out doors or windows.
- Thoroughly clean all wet items and surfaces with hot water and laundry or dish detergent. For example, you'll want to clean any flooring, concrete, molding, wood and metal furniture, countertops, appliances, sinks, and other plumbing fixtures.
- To control mold on hard surfaces (floors, stove, sinks, plates, tools), make cleaning solution by mixing 1 cup of household bleach with 4-5 liters of water.
- Never use bleach in a closed space. Open windows and doors first.

Flood water can make the air in your home unhealthy.

When things remain wet for more than two days, they usually get mold.

Prevent heat stress

- In hot weather, try to stay cool, take breaks in shaded areas or in cool rooms, drink water and nonalcoholic fluids often, and wearing light and loose-fitting clothing.
- Do outdoor activities during cooler hours.

Prevent cold-related risks

If you are working in water that is cooler than 24°C, wear insulated clothes and insulated rubber boots, take frequent breaks out of the water, and change into dry clothing when possible.

Prevent carbon monoxide (CO) poisoning.

If using generators, keep them at least 20 feet from any doors, windows, or vents.

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Returning Home After a Flood Event: Cleaning Tips



General Safety Tips for cleaning a flooded home:

Put on **personal protective equipment** to protect your eyes, nose, mouth, and skin.

Hard hats

Goggles

N95 masks

Heavy work gloves

Waterproof boots

Earplugs/protective headphones (if working with noisy equipments)

Fire extinguisher

If sewage is involved, make sure to wear waterproof/rubber boots, rubber gloves, and goggles during cleaning.

Cleaning up your home can be a big job.

Work together and be sure to take care of yourself.

- Use teams of at least two people to work together to move heavy/bulky objects
- Avoid lifting any item that is heavier than 23-25kg by one person. Lifting heavier items than this could hurt you
- Seek professional help e.g., electrician instead of doing risky jobs yourself.
- Pace yourself, rest when you need to.
- Decide which cleanup tasks are most important, and focus on those first.
- Avoid contact with power lines, and take extra care in cutting trees or branches that are bent or caught under something else.
- Wash all clothes worn during the cleanup in hot water and detergent. These clothes should be washed separately from uncontaminated clothes and linens.
- Remove and throw out material contaminated with floodwater or sewage.
- Throw out items that cannot be washed and cleaned with a bleach solution: mattresses, pillows, carpets, and stuffed toys.
- Clean walls, hard-surfaced floors, and other household surfaces with soap and water and disinfect with a solution of one cup of bleach to 18 liters of water.
- Always wash your hands with soap and water if you have been in contact with floodwater

Anything that had contact with floodwater could carry germs.

Disinfect toys

- Make sure toys are clean. Prepare a cleaning fluid by mixing 1 cup of bleach in about 23 liters water.
- Wash off toys carefully with your cleaner and let the toys air dry.
- Stuffed animals and some baby toys may not be cleaned completely.
- Throw out toys you can't clean thoroughly.

Cleaning of Sumps/Overhead Tanks/Wells/Borewells

- After flooding, submerged bore-wells, sumps, open wells should be used for collecting drinking water only after a thorough cleaning.
- Water logged in the sumps/overhead tanks should be drained out completely
- Scrub and wash the sump/overhead tank with bleaching powder.
- After a thorough scrubbing, the sump/overhead tank can be filled with water
- The water should be chlorinated (see [Safe Drinking Water, advisory on page 8](#))
- Allow the water to flow for at least five minutes in all taps to flush out the impurities.

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Floodwater: Health & Safety



Drowning is a real risk for everyone during floods regardless of their ability to swim. Fast-moving shallow water can be deadly, and even shallow standing water can be dangerous for small children.

Stay out of moving or stagnant floodwater, it can be dangerous.

Floodwaters contain many things that may harm you.

Injuries	
▫ Physical, sharp objects such as lumber, vehicles, and debris	Drowning, injuries, hypothermia, sprains or strains, lacerations, wound infections, skin infections, eye infection
▫ Fallen power lines	Electrocution
▫ Wild or stray animals such as rodents and snakes	Animal bites including snake bites or stings Rodent-borne infections
▫ Household/medical/industrial chemical or radiological exposure ▫ Coal, ash waste (contain carcinogenic compounds such as arsenic, chromium, mercury)	Poisoning, Chemical injuries Radiation injuries
Infectious diseases	
▫ Human and livestock waste	Water-borne & Food-borne diseases linked to poor water, sanitation, and food safety • Cholera, Typhoid, Leptospirosis, • Viral Hepatitis A and E
▫ Household, medical, and industrial hazardous biological waste	
▫ Lack of enough, clean drinking and utility water	
▫ Increased mosquito breeding	Vector-borne diseases • Dengue, Malaria, Zika, Chikungunya, Kalaazar, West Nile Virus ³

If anyone develops fever or diarrhoea, they should seek medical care

Flood events may lead to Non-infectious diseases	
▫ Lack of continuation of health care/medicines	Mortality from heart attack/stroke
▫ Stress, depression, post-traumatic stress disorder	Mental Health issues
▫ Impact on food availability and quality (long-term)	Malnutrition

The best way to protect yourself is to stay away from floodwater.

If you must enter floodwater,

- Wear waterproof/rubber boots, rubber gloves, and goggles
- Stay away if power lines are fallen down
- Use a long stick to check the depth of the water, and avoid sewage lines and drains

If you come in contact with floodwater,

- Wash the area with soap and clean water as soon as possible.
- If you don't have soap or water, use alcohol-based wipes or sanitizer.
- Take care of wounds and seek medical attention if necessary
- Wash clothes contaminated with flood or sewage water in hot water and detergent before reusing.



Prevent injuries, avoid going into floodwaters.

If injured, take care of wounds

- Wash your hands thoroughly with soap and clean water, if possible.
- Avoid touching the wound with your fingers while treating it (if possible, use disposable gloves).
- Remove obstructive jewellery and clothing from the injured body part.
- Apply direct pressure to any bleeding wound to control bleeding.

For small wounds:

- Clean the wound after bleeding has stopped.
- Examine wounds for dirt and foreign objects.
- Gently flood the wound with saline solution (preferred), bottled water or clean running water
- Gently clean around the wound with soap and clean water.
- Pat dry and apply an adhesive bandage or dry clean cloth.
- Leave unclean wounds, bites and punctures open.
- Wounds that are not cleaned correctly can trap bacteria and result in infection.
- Provide pain relievers when possible.
- Review the wound every 24 hours.

➤ **Prevent infection of open wounds and rashes**

Open wounds and rashes exposed to floodwater can become infected.

Naturally occurring bacteria in coastal waters like *Vibrio* can cause skin infections through open wounds if present in floodwaters.

- Avoid exposure to floodwater if you have an open wound.
- Cover clean, open wounds with a waterproof bandage to reduce chance of infection.
- Keep open wounds as clean as possible by washing well with soap and clean water.

➤ **Protect yourself from animal and insect bites.**

Floodwater can displace animals, insects, and reptiles. To protect yourself and your family, be alert and avoid contact.



Seek medical attention as soon as possible if:

- There is a large wound, a puncture wound, or a wound contaminated with faeces, soil, or dirty/foreign object. Such wounds might require a booster shot of Tetanus.
- The wound is due to animal bite/snake bite
- A wound shows signs of becoming infected (develops redness, swelling, or oozing, or other signs of active infection such as fever, increasing pain, shortness of breath, fast heart rate, or confusion or disorientation, high heart rate).
- You have signs of sepsis such as confusion or disorientation, shortness of breath, high heart rate, fever or shivering, extreme pain or discomfort or clammy or sweaty.

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Protect and Prevent Flood-Related Injuries and Illnesses

Floodwaters can contain human and animal waste and various industrial waste/chemical contaminants that can lead to illness through contact or consumption.

Eating or drinking anything contaminated by floodwater can cause diarrheal disease.



Protect yourself and your family from diarrheal diseases

Follow sanitation and hygiene measures

- Wash your hands with soap and water (at least for 20 seconds) after contact with floodwater.
- Be sure to always wash children's hands before meals with soap and water often
- If you do not have soap and water use an alcohol-based hand sanitizer that contains at least 60% alcohol.
- Do not allow children to play in flooded areas.
- Do not allow children to play with toys that have been contaminated by floodwater and have not been disinfected.

Ensure safe and clean water for drinking and washing

- Follow local advisory regarding drinking and utility water
- Water that is not safe to drink may be used for bathing, but make sure not to swallow any water or get it in your eyes
- **If you use well or borewell water for drinking/washing**, follow drinking water advisory and guidance on using well water from local health authorities.
- Extensive flooding may contaminate groundwater.
Contact local health department/administration for specific advice on well testing and disinfection.
- Use only clean/ disinfected water to brush your teeth
- **Do not take bath,**
in water that may be contaminated with sewage or toxic chemicals.
in rivers, streams, or lakes that are contaminated by flood water, human sewage, or animal waste.



Protect from chemicals released during floods

Be aware of possible chemicals in floodwater. Floods can dislodge chemical containers and spill their contents

- Do not empty chemical container contents onto the ground, into drains, or into waterways.
- Be alert for leaking containers and reactive household chemicals, such as caustic drain cleaners and chlorine bleach.
- Keep children and pets away from stored, leaking, and spilled chemicals.
- Leave damaged or unlabelled chemical containers undisturbed whenever possible.

If you came in contact with chemical contaminated floodwater,

- Wash skin that may have come into contact with chemicals or floodwater with soap and clean water as soon as possible.
- Remove and dispose of your contaminated clothing, then get away and/ wash yourself to reduce or remove the chemical.



Avoid electrical hazards inside or outside your home

- Avoid contact with electric poles, fallen power cables, overhead power lines during cleaning after floods and other activities.
- Do not drive through standing water if power lines are fallen in the water.
- If you believe someone has been electrocuted, call for emergency medical help

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Safe Drinking Water



Daily Water Requirement

- Minimum drinking water requirement **per person per day is 5 litres.**
- Daily activities like cooking, toilet use, hand washing etc. require a **minimum of 20 litres of water.**

Water sources are likely to get contaminated after floods

Consult with local authorities on whether tap water is safe to use.

When water quality is compromised or insufficient,

- Encourage women to breastfeed their babies
- Prioritize boiled water for formula-fed infants, immunocompromised and other vulnerable patients.
- Ensure that such water is used only for cleaning, laundry and sanitation, in combination with detergent and it is labelled as such.

Ensure safe drinking water by filtering, boiling or disinfecting

Water that has fuel, toxic chemicals, or radioactive materials in it will not be made safe by boiling or disinfection.

1. Boiling

- Bring water to a rolling boil for a complete 1 minute in a kettle/pot/cooker (at elevations above 6,500 feet, boil for 3 minutes)
- Let it cool down itself (without the addition of ice or additional water).
- Keep boiled water safely to avoid contamination during storage.

2. Disinfecting

If safe water is not available and/or if boiling is not possible, chemical disinfection of clear, non-turbid water is effective for killing bacteria and most viruses, but not for germs like Cryptosporidium and Giardia.

- If the water is cloudy, first filter it using a clean piece of cloth or a coffee filter or allow impurities to settle and take out clear water. Then follow the steps below to disinfect
- Bleaching powder/solution or chlorine tablets are commonly provided by local health departments after floods.
- Follow instructions provided based on the household disinfectant supplied to you.

➤ Sodium Hypochlorite (Bleach)

Bleach comes in different concentrations. Check the label of the bleaching solution you are using to find its concentration before you start to disinfect the water.

Use 5%-9% unscented liquid household chlorine bleach.

For clear water, add about 1/8 teaspoon (8 drops or about 0.5 milliliters) per 4-4.5 liters water.

For cloudy/coloured/very cold water, add about 1/4 teaspoon (16 drops or about 1 milliliter) per 4-4.5 liters water.

Mix well, and let it stand for 30 minutes before using.

➤ Chlorine Tablets

Prepare according to package instructions.

Add to clear water or after removal of impurities for best results

- **Store water in clear and covered containers to prevent breeding of mosquitoes.**

Clean and disinfect containers every alternate day.

- **Disinfecting Sumps/Overhead Tanks/Wells/Bore-wells**

a. For 1,000 liters of water 4gms of 33% bleaching powder should be taken in a bucket and made as a paste.

b. Add water up to 3/4th of the bucket slowly and mix thoroughly.

c. Wait for 10 to 15 minutes for the lime and other sediments to settle down.

d. Transfer supernatant chlorine water to another bucket, lower it in the water storage, move it vigorously to mix


e. One hour after the above process of Chlorination the water may be used.



Chlorinated safe water should have 2 PPM chlorine in overhead tanks & 0.5 PPM in the street tap/household tap. If this is not available, a slight smell of chlorine is a crude indicator.

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Prevent Food-Borne and Vector-Borne Diseases

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- Flooding can contribute to increased vector-and rodent-borne diseases.
 - With increase in global warming, increases in heavy rain and temperature will increase the risk of diarrheal diseases, dengue fever and malaria in Asia.

Prevent water, food and vector-borne diseases after floods

- Use boiled or chlorinated water for drinking and food preparation.
- Drink and use clean, safe water. (See [Safe Drinking Water, advisory on page 8](#))
- Throw away any food that has come in contact with floodwater.
- If your food has touched any floodwater, it is not safe to eat and increases your risk of water-borne diseases.
- Keep hands, food preparation areas and utensils clean.
- Separate raw and cooked food. Separate produce affected by flood waters
- Cook food thoroughly
- Keep food at safe temperatures.
- Store food and water in containers of metal, glass or thick plastic with a tight-fitting lid
- Wash anything used for eating and cooking before and after use
- Throw out trash as soon as you can, keep it in a covered rubbish bin
- Ensure removal of garbage and decaying material as early as possible to avoid the growth of flies
- Disinfect these areas with bleaching powder and lime
- Don't eat or drink food/water that could have come in contact with rodents

When in doubt, throw it out!

Rodent Control Activities

- Trap any existing rodents. While cleaning up, wear rubber/plastic gloves, seal the dead rodent in two plastic bags and dispose appropriately.
- Cover/close all holes in your home

Fly Control Activities

- Ensure removal of garbage and decaying material as early as possible to avoid the growth of flies
- Disinfect these areas with bleaching powder and lime

Mosquito Control

- Stagnant water in tyres, broken earthen pots, coconut shells, waste plastic containers, open household water storage and construction sites etc are the potential breeding sites for mosquitoes
- Remove unused containers and broken items that can accumulate water

Protect from mosquito bites

- If your home is in an area with stagnant or standing water, use mosquito repellent, following the instructions on the label, and apply it to clothes or skin. Also wear trousers and long-sleeved shirts, and sleep under mosquito nets.



Supporting flood victims

- Give the victims time to heal. Allow the victims to mourn over the losses they have experienced. Try to be patient with changes in their emotional Makeup.
- Provide support by patting on the shoulders or by holding victims' hands as they cry. Be sensitive to community norms-about the code of conduct vis-à-vis opposite gender, weaker sections and elderly
- Ask for support from people who care about the victims and who will listen and empathize with their situation
- Find out local support groups (NGOs, help groups, and community-based organizations that are often available for those who have suffered physically or mentally from natural disasters
- Make the victims interact with groups led by appropriately trained and experienced professionals
Group discussion can help people realize that they are not alone and that other individuals in the same circumstances often have similar reaction and emotions

✚ Mental health in the paediatric age group

- Provide a playful atmosphere to help relieve tension. Younger children in particular may find it easier to share their ideas and feelings about the events through non-verbal activities such as drawing, painting, acting and dancing
- Encourage older children to speak with younger children and share each other's thoughts and feelings
- Don't move a child if care can be arranged locally
- Try to keep the child with his/her own community members. Do not try to rename the child.

Look out for these common signs of distress:

- Feelings of fear, anger, sadness, worry, numbness, or frustration
- Changes in appetite, energy, and activity levels
- Difficulty concentrating and making decisions
- Difficulty sleeping or nightmares
- Physical reactions, such as headaches, body pains, stomach problems, and skin rashes
- Worsening of chronic health problems
- Increased use of alcohol, tobacco, or other drugs

If you experience these feelings or behaviours for several days in a row and are unable to carry out normal responsibilities because of them, seek professional help

✚ Managing stress

- Establish/re-establish routines such as meals at regular intervals and follow an exercise regimen
- Take time off from demands of daily life by pursuing hobbies or other creative activities.
- Take care of your body: eat healthy diet, get plenty of sleep
- Connect with others and share your concerns
- Stay informed, avoid too much exposure to news and be aware that there may be rumors during disaster, check your sources.
- Seek professional help if distress impacts your daily life for several days/weeks
- If you feel stressed or anxious, call National Psycho-Social Helpline: 080 46110007

References

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