

Responding to floods and flooding

Inundation by floodwater or inundation of seawater as in the case of a tsunami,

This Technical Brief identifies typical flood responses undertaken in various contexts and also discusses the OXFAM kits, which can be used for these processes.

Flooding Situations

Firstly, it is important to identify the type of flooding situation affecting the local population. In order to do this, it is necessary to undertake a rapid needs assessment. Questions to be answered include:

1. Is it a rapid on-set (flash-flood), a slow (river overflowing) onset flood or has there been a tidal surge (Tsunami)?
2. What caused the flood? Excessive local rain or rain in neighbouring catchments combined with poor drainage and/or high tides?
3. Is it an area that is affected by flooding on a regular basis or have people been caught unawares?
4. What is the magnitude of the flood and what are the affects the people lives and the economy?
5. How long will floodwaters persist?

Typical information sources include; local newspaper, radio & TV bulletins; observation, partner organisations, interviews with women and community representatives. Local authorities, responsible ministries. Hospitals, clinics and health outposts. Local and International NGOs and agencies.

Undertaking a rapid needs assessment

Typically, a number of questions need to be answered about the flooding and the affect of the floods on the local population. The rapid needs assessment is best undertaken by staff with experience in emergency response; however staff with development experience or staff from local partner organisations can be quickly trained to participate in such rapid needs assessments, especially if an experienced emergency person leads the team. Ideally, a rapid assessment team should consist of: a team leader; a public health engineer, a public health promoter and a food security and livelihoods specialist. Depending on the magnitude of the flooding, such teams may be supported by logisticians, administrative staff, finance staff, gender specialists or any other necessary support staff. In the event of flooding over a very wide area, several multi-disciplinary assessments teams may be deployed at the same time, as is the case in the Mozambique floods in May 2002. In this case, the deployment of several teams will require centralised coordination and support

to ensure there is access to transport, finance and the necessary equipment to complete the assessment successfully. Security considerations and the well being of the assessment team must be taken into consideration at all times, especially in conflict zones or in locations where there are high levels of delinquency.

Typical Assessment Questions to be Answered.

As Oxfam typically intervenes in public health, questions should be focussed on the health status of the affected population, the affects on water, sanitation and health infrastructure, and the affects on people's food security and livelihoods. However, to provide a better understanding of context, general questions, along with questions on cultural issues and gender specific issues need to be asked. For more information on socio-cultural issues, see Oxfam TB2: "Vulnerability and socio-cultural considerations for PHE in emergencies".

Appropriate questions for a rapid needs assessment are given in Annex I. Further information on conducting needs assessments and suitable needs assessment questions are given in Oxfam Emergency Response Manual.

Effects of floods and typical Oxfam responses

1. Urban Water Supplies Contaminated

Due to leaks in distribution main, polluted water may leak into the water supply system, especially if there has been a loss of pressure in the distribution lines during the flood. Alternatively, sewage systems may be washed out resulting in contamination of water sources and water supply systems. Water treatment plants may also be flooded, resulting in water treatment processes being hampered. Industrial drainage systems may also over flow, causing chemical contamination of water sources and supply systems.

Oxfam's normal response is to assess; obtaining information from the relevant government departments i.e. waterworks, sewage, municipal, etc. regarding water problems-their capacity, resources available and any plan of action they may have. Visits or surveys of water plants and/or sewage works may be undertaken, as well as visits to the affected community in order to understand the problems. What are the current water sources, quality and quantity? Current and possible health risks that may affect people's health need to be analysed, as do risks to livelihoods and vulnerable groups, etc. Understanding people's coping mechanisms in the current context is also an important factor, including accessibility and

responsibility at family level. Coordination with other agencies and the government/local authorities is essential in preparing a logical response. Following the initial rapid assessment, further surveys may need to be conducted.

Typical Responses

- Support waterworks needs as appropriate: i.e. providing tanks to perform sedimentation, chlorination, storage and distribution for the interim periods and possible support to rehab damage system or assistance to resume water supply.
- Install Oxfam or local tanks in different strategic location for treatment and distribution operating by trained local or govt. staffs or Oxfam's operators.
- Assist water trucking from the unaffected source by providing storage, pumping and distribution facilities.
- Train volunteers/technicians to conduct necessary centralized or household treatment followed up by surveillance (monitoring residual chlorine).
- Provide the means for water collection and storage, and if necessary for household treatment. i.e. bucket, cup, chlorine solution, dropper/syringe, etc.

Could put in some pictures of tanks, etc. set up in water works compounds. Then after, have a text box about the use of PUR or some other magic powder. Alternatively, do a batch treatment with Alum, including the jar test. Useful to have a diagram to show decantation process.

Useful equipment and materials

- Oxfam Tanks T11, TR10, TRT6, etc. or suitable local PVC tanks 1 to 10m³
- Distribution accessories such as pumps, tapstands, flexible hose, etc.
- LDR Rapid response kits includes lightweight petrol pump, lay-flat hose, taps and accessories.
- Calcium hypochlorite (HTH) or bleaching powder
- Aluminium sulphate (crystal Alum)
- Suitable water container, i.e. Oxfam buckets.

Here we can expand out these sections with more information of the relevant kits. Need to check what new specs are.

Human resources

- Partnership with Govt. water department, municipal, Oxfam's local partner or Oxfam expatriates & local staff.

This needs to include technical and materials support to enable the relevant authority to restart operations as quickly as possible.

Could put a case study in here?

2. Rural Water Sources Polluted

In the event of flooding in rural areas, shallow (protected or unprotected wells) may be inundated or contaminated by surface run-off. Shallow tube-wells fitted with handpumps may also be affected in a similar way.

Ponds and other surface water sources will undoubtedly be contaminated by flood water and it should be remembered, many people may be stranded on roofs and trees, and don't have access to safe water.

Invariably, if simple pit latrines are used in such areas, these will have overflowed and contaminated the environment and water sources. If open defecation is a common practice, faecal matter will be washed into water sources.

Typical Responses

- Quick survey to identify priority water sources that can provide fairly coverage to the affected people.
- Rapid cleaning and disinfecting programme for affected water sources like well and handpumps using community volunteers by phase.
- Dewatering water from community ponds or essential water bodies that use for washing and cleaning utensils.
- Distribution of household water treatment materials and instruction.
- Distribute safe water among the stranded community and means to store and use.
- Dissemination of messages of what is safe water and where and how to obtained it.
- Distribute household water filters in low-density population settings

Useful equipment and materials

- Dewatering pumps, cleaning tools, disinfecting agents for the wells.
- Tools & spare parts for tube-well and hand pump to repair and clean
- Follow-up team, to check water quality and palatability of the clean well.
- Provide "Watermaker", "PUR", chlorine tablets, alum and water container as and where appropriate.
- Provide household filter units with the relevant training inputs.
- Plastic bags, mobile tanks with local carrier such as boat, 3 wheeler van, bullock-carts, donkey/camel, tractors, etc. as appropriate to carry water.

Human resources

- Need trained volunteers or paid worker to conduct quick survey.

- Partnership with Government or municipal, health departments, Oxfam's local partner organisations or Oxfam expatriates & local staff.

[Include a case study about water filters from the Dominican Republic.](#)

3. Excreta Disposal in Flood Situations

Flooding can cause displacement of the local population into improvised shelters such as schools, community buildings, sports halls, stadiums and other such large buildings. Generally, such buildings are ill prepared for the influx of a large number of people. A lack of organisation, within the displaced and amongst the authorities, is likely to be one of the main characteristics. Access to potable water, appropriate sanitation facilities, health care and NFI's will be problematic.

In such shelters, excreta disposal is very often problematic due to over-crowding and the lack of latrines/toilet facilities in the building. Existing latrines/toilets are fill quickly and rapidly overflow. Open defecation becomes commonplace and poor drainage at the site may compound the problems, with excreta drifting around in drainage water. Women may have to wait for dark, suffering forced constipation during day, as there is nowhere "private" to go. If "security" is poor, this may result in gender based violence and sexual assaults on women when they access facilities.

Typical Responses

- Support municipal or camp authority to empty existing septic tanks and dig additional pits/tanks to accommodate additional excreta.
- Provide additional temporary latrine structures if floodwater is receding and feasible.
- Provide excreta containment when the ground floors are flooded, so excreta does not drift around.
- "Portaloo" type solutions may be applicable, but success is dependant on being backed up by a reliable emptying and cleaning service.
- Provide adequate privacy for women with plastic sheet or local materials such as mat, shacks, etc so.
- Maintain latrines by paid worker if community unable to keep it clean and useable.
- Provide adequate lighting if toilets/latrines are dark, so they can also be used at night

Useful equipment and materials

- Self-supporting latrine slabs, prefabricated latrine structures and digging tools, etc. [List Oxfam kits](#)
- Locally available latrine slabs, toilet pans, or other locally manufactured toilet pedestal.

- Empty drums, cement blocks, bricks etc to line pits or make containment structures.
- Locally produced matting, wattle and daub, plastic sheeting, clothe sacks etc to make superstructures and provide privacy.
- Provision of desludging pump and containment tanks, if appropriate and feasible.
- Ashes, lime powder, disinfectants, diesel spraying etc. for latrines to prevent flies and to reduce odour
- "Portaloo" toilets and the accompanying maintenance services, if appropriate.
- Hire of sludge gulping lorries

[Case study from Dominican Republic.](#)

[Case study from Indonesia on tank emptying](#)

4. Waste Management and Drainage in Flood Situations.

Waste management and poor drainage may quickly create problems and health hazards in collective centres. Rubbish, produced by relief packaging, food leftovers, and other activities may quickly accumulate, creating ideal breeding sites for rodents, flies and other insects. Such animals/insects can become vectors for spreading diseases such as dengue, malaria, typhus, and leptospirosis amongst others, especially when displaced centres are overcrowded and no waste disposal facilities exist.

Pools of stagnant water remains after floodwater recedes and mosquito and other vector population increased.

Decaying corpses and carcasses can create an unpleasant dangerous environment.

Typical Responses

- Technical support to the local authority, municipal, etc and integrate Oxfam works with govt efforts if there are any.
- Provide rubbish container or garbage hole to the displaced centres and ensure people using them properly.
- If the floodwater remains, provide rubbish containment mad of local or readymade materials.
- Provision of hiring rubbish truck, or fuel for municipal truck to collect and dispose solid waste in a designated dumping area.
- Provide tools to the community to clean-up surroundings and to drain out stagnant water, fill-up ditches, etc.
- Organise community and provide tools to conduct a mass cleansing campaign. Use cash-for-work or food-for-work (or incentives), if necessary.
- Special programme to dispose corpses and carcasses.

Useful equipment and materials

- Tools (shovels, picks, rakes, hoes, wheelbarrows, etc.)

- Protective clothing (Wellington boots, overalls, gloves and helmets)
- Rubbish bins, heavy-duty plastic bag or local baskets.
- Cash-for-work for refuse collection/clean-up campaign.
- Protective cloths and necessary materials to dispose of human and/or animal bodies.
- Food, cash, NFI, as appropriate.

Human resources

- Need trained volunteers or paid workers.
- Community mobilisers or health promoters.
- Partnership with Government or municipal environmental health departments, Oxfam's local partner organisations or Oxfam expatriates & local staff.

Possible case study from Mozambique or other.

5. Emergency Shelters.

Existing public buildings/schools don't have windows or doors and the roof is damaged and leaking, so offers little protection from the rain or cold. People could be sleeping on cold, wet floors so increased possibility acute respiratory infections such as coughs and colds, this may be particularly pronounced among children. Alternatively, people may be asked to vacant buildings such as schools without alternative options being made available.

In rural settings, people may be displaced and living under an open sky. Men, women and children could be vulnerable to sickness from weather and insects bites, such as mosquitoes.

Typical Responses

- Support local authority or school to repair and fix worn doors, windows, walls and roofs.
- Distribute plastic sheets, shelter materials and if necessary poles and ropes so people can build their own temporary hut.
- Provide damp-proof flooring materials (plastic sheet) and if necessary blankets to vulnerable families those who needed.
- Provide bed-nets to affected families if malaria is a problem.

Useful equipment and materials

- Local materials, door and window panels, roofing materials (plastic sheet, CGI or asbestos sheet, tiles, etc.).
- Shelter materials-local or imported plastic sheet for cover and floor.
- Blankets and mosquito nets as appropriate.

Human resources

- Need trained volunteers or paid worker to conduct quick survey.

- Partnership with Government or municipal health departments, Oxfam's local partner organisations or Oxfam expatriates & local staff.
- Carpenters and other skilled craftsmen.

6. Medical and Health Awareness Issues for People in Emergency Shelters.

Displaced people may not have access to clinics and healthcare. Existing MoH clinics could be short of medicine, doctors and nurses. It may be impossible to deliver medical supplies due to the area being cut off.

Health awareness for flood affected people

People don't have knowledge and means to prevent and first line treatment for diarrhoea. Lack of knowledge on how to prepare home made ORS, how long boil water to make it safe, etc.

Water purification tablets and materials distributed without proper instruction so people using them ineffectively.

Typical Responses

- Support MOH or local health authority in terms of human resource and medical supply with logistics to reach affected community. MOH health staff may available from outside of flood affected area.
- Setting up mobile satellite clinics in remote affected area.
- Trained volunteers to disseminate and demonstrates how prepare ORS (sachet and home made), how to treat and handle water at household levels with priority health messages.
- Provision of ORS

Useful equipment and materials

- Stationary for trainings and workshop.
- Teaching aids (projectors, whiteboards, etc.).
- ICD Materials (posters, leaflets, etc.).
- Manuals and books (PHAST, etc.)
- Hygiene kits and NFI's
- Soap
- Buckets, mops and cleaning materials
- ORS sachets
- Puppets and other interactive techniques

Human resources

- Health volunteers to conduct quick survey.
- Partnership with MoH or environmental health departments, Oxfam's local partner organisations or Oxfam expatriates & local staff.

Further information

Davies, D, and Lambert, R (2002) Engineering in Emergencies, A practical guide for relief workers, 2nd Edition

Reed, R, and Harvey, P (2007) Excreta Disposal in Emergencies Manual

OXFAM Humanitarian Department (2004) Equipment catalogue, Sept 2004 (Eighth edition)

OXFAM Solid Waste Management Guidelines (2002)

Oxfam Emergency Response Manual, 2nd Edition, January 2004

PAHO & WHO (2004) Management of dead bodies in disaster situations, Disaster Manuals and Guidelines Series, No 5

Sutton, S (2004) Low Cost Water Source Improvements, Practical guidelines for fieldworkers

Annex I – Rapid Needs Assessment Questions

General

1. How many people are affected by flood? Who are they? e.g. IDP settlement, local community, farmers, urban, etc. How? Homeless, lose of property and assets, human lives & livestock, standing crops, damage to public health facilities, etc.
2. Where are they now? On the high land, public buildings, roads/embankments or stranded on roof and trees. If displaced, what belongings and essential stuffs have they salvaged. Cash, animals, some foods/grains, cloths, utensils, etc.
3. What are the priority needs? e.g. 1. Shelter, 2. Food, 3. Cloths/blanket, 4. Drinking water, 5. Sanitation in displaced centre.
4. What are the current health problems or risks?
5. What are conditions of local markets? Are they operating or collapse?
6. Communication systems; rail & road disconnected? Sea/river route risky? How to access? Time & cost.
7. Who is doing what & where; UN, other INGO and local NGO, local and central government and at what strength.

Water Supplies

8. What were the normal water sources? Pipe water supply, well, deep or shallow tube-wells, dug-wells.
9. What happen to water source or supply system? Still under water, water receded but polluted, people starts using wells, leakage in distribution main and contaminated.
10. What are the current water sources? How is the quality? Is the water source contaminated or at risk of further contamination? Are there any safe sources that remain unpolluted?
11. Is treatment necessary? What level? Waterworks, storage tank, disinfecting wells and shallow tube-wells, bucket chlorination, chlorine tablet or alum at household level.
12. What are the key hygiene issues related to water supply?

General Sanitation

13. Sanitation has public health significance in flood situation in displaced centres, camps and urban areas but not a high priority if people remain at home in the village.
14. Do people have the means to clean their home/shelters and environments?

Excreta disposal

15. What is the normal tradition of people? Do they use latrine?
16. Are there any existing facilities? If so are they used, are they sufficient and are they operating successfully? Can they be extended or adapted? Do all groups have equitable access to these facilities?
17. Are the current defecation practices a threat to health? If so, how?
18. Are people prepared to use latrines, defecation fields, trenches etc? Do women need privacy and protection in any form?
19. How do women deal with menstruation? Are there materials or facilities they need for this?

Vector-borne disease

20. What are the vector borne disease risks and how serious are they? (i.e. Any obvious problem of flies, mosquitoes, rodents, cockroaches, fleas, lice or bedbugs?)
21. If vector borne risks high do people have access to individual protection?
22. Is the affected population used to dealing with these risks? Which vectors in particular?
23. Which groups of the population are most affected-children/men/women/new arrivals/old residents
24. Is there evidence of overcrowding? - Do people have previous experience of communal living?
25. Do people have any livestock – where are they/ types/ where do the livestock defecate etc?
26. Is there a National Public Health/Vector Control Programme?

Waste management

27. Is solid waste a problem?
28. How do people dispose of their waste?
29. What type and quantity of solid waste is produced?
30. Can solid waste be disposed of on site, or does it need to be collected and disposed of off site?
31. Are there medical facilities and activities producing waste? How is this being disposed of? Who is responsible?

Drainage

32. Is there a drainage problem? Especially when flood water receding?