Water, Sanitation and Hygiene Technology on Disaster Response: Principles and practices


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Programme approaches in emergency context

Humanitarian response should be based on ASSESSMENT! Emergency response should adopt a phased approach!

**Phase I**
- Disaster
- Preparedness
- Assessment
- Plan for phase 2

**Phase 2**
- Response
- Assessment
- Plan for phase 3

**Phase 3**
- Response
- Assessment

Time
An integrated WASH approach is essential while planning out a humanitarian programme!
Programme approaches in emergency context

WASH has clear link with outcomes of different sectors
Programme approaches in emergency context

• **Integration of DRR measures** in the design, planning and implementation of response. Build back better approach is very important aspect to be considered in the response so as to ensure resilience to disaster.

• Response plan to be based on **vulnerability assessment** to deliver the life saving needs

• **Cross cutting themes** like children, gender, disabled etc that cut across all sectoral responses.

• **Adoption of standards and norms** specific to the needs and the context; social and cultural

• Consideration of **technical appropriateness, environment and long term sustainability** while designing interventions for response

• **Involvement of all stakeholders** of the response, mainly **community participation** in all stages of project/programme right from assessment, design and planning, implementation and monitoring and evaluation.

• **Coordination** of response for ensuring optimum use of resources and timely action
WASH Interventions in emergency context

• Adequate quantity of water

• Ensuring quality of water (drinking and domestic use)

• Safe defecation facilities/excreta disposal and management

• Solid waste management

• Waste water and drainage

• Vector control and personal protection measures from vector borne diseases

• Ensuring hygiene improvement through safe hygienic practices and behavior change communication
Ladder of options for Water supply

Water supply in Emergencies – Ladder of options

1. Piped water supply, Centralized water treatment and water safety plans
   (Long term/Recovery)

2. Development of new sources-Installation of handpumps on tube wells/boreholes,
   Revival of damaged water sources/abstraction points like handpumps, protection of water sources etc
   (Interim/midterm phase)

3. Distribution of household water filters, water purification chemicals etc (aided with hygiene promotion)

4. Chlorination of contaminated sources, ‘ready to install’ emergency water treatment kits, community level emergency water storage kits
   (Immediate phase)

5. Emergency water supply through tankers, distribution of drinking water pouches/bottles etc

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Emergency water supply/treatment kits

**All -in -one treatment kits**

All-in-one treatment system that can directly source raw water and supply treated water. Capacity range from 1000 litres/hour - 4000 litre/hour.

A range of equipment available in the market and they have been used in emergencies.

Examples

Aquaplus P4000

Aqua sure kit
Emergency water supply/treatment kits

Chlorination kit for handpumps
Water treatment equipment

System elements and application

- Strainer (Inlet) with Basket
- Coagulation chamber
- Floculation chamber
- Static mixer
- Pump
- At least 60m of Pipes for Floculation
- By-pass valve
- Water Flow Direction
- Activated Carbon unit
- Chlorination
- Sandfilter
- Pillow Tank
- Tap Stations with Hilfo taps

Source: IFRC
Salinity removal – Reverse osmosis
Membrane filters

Source: IFRC
Membrane Filters
Membrane Filters
Mobile Treatment Units
Emergency water storage kits

Capacity available from 10000 to 95000 litres

Rapid installation

Compact package
Kits for Response

Emergency Response Unit

In 1996, the International Federation set up emergency response units (ERUs), which have responded to the needs of vulnerable in major disasters.

ERUs are part of the International Federation’s disaster response tools. They provide specific support or direct service when local facilities are either destroyed, overwhelmed by needs, or do not exist.

Using a standardized modular system of equipment and pre-trained teams of National Society technical specialists, ERUs can be deployed within 48 hours to 72 hours.

A total of 135 ERU's have been deployed out of which 47 have been water and sanitation ERU's. There are six types of ERUs, each offering a different specialist activity. These are as follows:


For water and sanitation there are three modules available according to water volume required, hygiene related requirements and to beneficiary numbers and locations. Sphere and WHO standards guide the modules' work.

Personal: on average 4 – 8 water engineers / technicians / hygiene promoters are deployed with each module.

The Water and Sanitation ERU is made up of three modules; all three modules can be deployed separately or jointly based on needs.

WatSan Module 15
(for up to 15,000 beneficiaries)

To provide treatment and distribution of water up to 225,000 litres a day for a population of up to 15,000 people, with a storage capacity of a maximum of 200,000 litres a day. This unit can also provide light sanitation. The module is designed for response to scattered populations, with a flexible approach due to a number of smaller treatment units (minimum 5), which can be split and set up as stand-alone units in different locations. Availability of local water sources is required.

Integrated in the Water and Sanitation Module 15 is distribution and trucking capacity, for transport of treated water to dispersed populations with a capacity of up to 75,000 litres a day, with possibility to set up nine different storage and distribution points (preconditions are availability of flatbed trucks, fuel, road access).

Approximate weight: 22 MT, volume: 160m³ (including technical and teams equipment, vehicles).
Methods for Water Treatment

• Straining
• Disinfection
  – Boiling
  – Solar
  – Chemical
• Sedimentation
  – Three pot
  – Chemical
• Filtration

Source: IFRC
Chlorine products

- Chlorination is the most widely-practised means of treating water at the community level; apart from boiling
- Few mg/l, contact time of about 30 minutes, inactivates more than 99.99% of enteric pathogens - notable exception protazoa
- Quality control on the local market place is a real challenge
Safe storage and handling
Ladder of options for Emergency sanitation

Excreta Control and Management: Sanitation Ladder

- **Clean-up Programme through volunteers**
- **Controlled Open Defecation Fields**
- **Trench Latrines**
- **Pit Latrines**
- **VIP Latrines**
- **Family Latrines**

**Emergency Phase**

**Interim Phase**

**Long term/recovery phase**
Controlled open defecation - Initial response to large scale displacement
Shallow trench latrines

These can be used in climates that are Not dry enough for defecation areas.

Suitable for phase I response

5 latrines in an area 3m by 5.5m. Enough for 250 people.
Shallow trench latrines
Deep trench latrines

Trench width 0.9m
Depth 3m - 4m
Length 4m
Screen height 1.8m

50mm round or square wooden posts driven into the ground.

Plastic sheeting

Trench with privacy screen
Pit Latrines
Pit Latrines
Pit Latrines
Ventilated Improvised Pit (VIP) latrines

- Vent pipe: 110 - 150 mm dia min at least 0.5 m above roof
- Fly-proof screen over top of pipe: check regularly for breakages
- Air flow
- Concrete or wooden floor slab at least 150 mm above ground level
- Superstructure interior must be kept dim
- Soil mound
- Pit lining extends at least 1.0 m below ground level
- Pit — round or square: 2.0 - 3.0 m x 1.0 - 1.5 m
Hygiene promotion in emergencies

The aim of hygiene promotion in emergencies is to:

• reduce high-risk hygiene behaviour; and
• sensitize the target population to the appropriate use and maintenance of facilities.

Hygiene promotion is not simply a matter of providing information. It is more a dialogue with communities about hygiene and related health problems, to encourage improved hygiene practices.
Hygiene promotion in emergencies

WASH interventions critical for child survival


<table>
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<tr>
<th>WASH Intervention</th>
<th>% Reduction in Morbidity</th>
<th>Diarrhoeal Diseases</th>
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<td>Water Supply</td>
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% reduction in morbidity from diarrhoeal diseases
# Hygiene promotion in emergencies

## Communication methods for Hygiene promotion:

<table>
<thead>
<tr>
<th>Individual</th>
<th>Group</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Farm and home visits.</td>
<td>1. Demonstrations.</td>
<td>1. Print Media</td>
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<td>2. Personal interviews.</td>
<td>2. Group discussions.</td>
<td>2. Radio</td>
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<td>3. Letters and phone calls.</td>
<td>3. Exhibitions.</td>
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<td>4. IPC</td>
<td>4. Field trips.</td>
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<td></td>
<td>5. Camps.</td>
<td>5. Documentary</td>
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</table>
Hygiene promotion resources at
http://oneresponse.info/GlobalClusters/Water%20Sanitation%20Hygiene/Pages/HygienePromotion.aspx

All this material is developed by WASH cluster and freely downloadable.
Along with food and shelter, safe water and sanitation are the highest priority interventions in emergency situations. Unless adequate water and sanitation services are quickly provided to emergency-affected children and their families, disease and death will follow. And unless good hygiene is consistently practiced by affected people, the danger of diarrhoea, cholera and other disease outbreaks will persist. This is true in all types of emergencies, from rapid onset natural disasters to long-term crises caused by a range of complex factors.

UNICEF’s first-ever WASH project was an emergency intervention: a well drilling operation in drought-affected northern India in 1966. Since then, UNICEF has responded with water, sanitation and hygiene interventions in hundreds of emergencies in countries around the world.

Today, UNICEF is the lead emergency agency in the WASH sector. Guided by its Core Commitments for Children in Humanitarian Action, UNICEF continues to respond directly to...
WHO Technical Notes for Emergencies

Please click the links below to view pdfs or the web-page versions of the World Health Organization Technical Notes for Emergencies.

1. Cleaning and disinfecting wells PDF | HTML
2. Cleaning and disinfecting boreholes PDF | HTML
3. Cleaning and disinfecting water storage tanks and tankers PDF | HTML
4. Rehabilitating small-scale piped water distribution systems PDF | HTML
5. Emergency treatment of drinking water at the point of use PDF | HTML
6. Rehabilitating water treatment works after an emergency PDF | HTML
7. Solid waste management in emergencies PDF | HTML
8. Disposal of dead bodies PDF | HTML
9. How much water is needed PDF | HTML
10. Hygiene promotion in emergencies PDF | HTML
11. Measuring chlorine levels in water supplies PDF | HTML
12. Delivering safe water by tanker PDF | HTML
13. Planning for excreta disposal in emergencies PDF | HTML
WASH in Emergencies related Publications on WEDC Website

http://wedc.lboro.ac.uk/knowledge/bookshop.html

Tech Report on Safe WiE-NDMA
ENGINEERING IN EMERGENCIES - A Practical Guide for Relief Workers
Jan Davis & Robert Lambert - 2nd Edition 2002

Armed conflict, drought, famine and other serious disasters create emergencies in which large numbers of people require urgent help. Engineering in Emergencies is a practical handbook for all relief workers involved in giving humanitarian assistance at such times. It provides critical information needed to implement an effective response in the aftermath of an emergency.

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