This Technical Brief looks at the key sanitation issues affecting populations in rural flood settings, including excreta disposal, vector control, waste management (including clean-ups), drainage and the disposal of dead bodies.

It is important to plan the response with an understanding of the type of flood and its impact on the affected population. Floods may last from a few days up to many months. Refer to Mwaniki (2009) for a comprehensive list of the different types of floods.

The type of intervention will not be the same for all flood situations, and it may be necessary to work in a phased approach. The phases are:

- **Immediate action after the flood (1st Phase options)**, typified by instability and rapidly changing situation (0 – 2 months).
- **Short to medium-term actions (2nd Phase options)**, typified by a stabilisation of the situation (from 2 – 6 months).
- **Medium to long-term actions**, typified by the recovery & resettlement of the affected communities (6 – 12 months or longer). Medium to long-term options are not considered in this paper.

Sufficient water, sanitation and hygiene (WASH) facilities on their own will not guarantee an optimal impact on people’s health. To achieve maximum benefit, it is imperative to ensure that those affected by floods have the tools, knowledge and understanding to prevent WASH related disease by involving them in the design and maintenance of the facilities.

In situations of displacement, women and adolescent girls may be vulnerable to sexual violence or exploitation. To minimise such risks, and to ensure a quality response, the participation of men, women and children in the planning, decision-making and management process is critical.

**The importance of hygiene behaviour**

Sanitation, water supply, and health are directly affected by hygiene behaviour. It is important to bear this in mind when considering technical options, so that sanitation facilities provided in emergencies are acceptable to the users and can be used and maintained hygienically. It is essential to read this briefing in conjunction with the ‘Hygiene Promotion in Flood Settings’ briefing (Sow, 2009).

### 1. Excreta Disposal in a Rural Flood Setting

The priority of any immediate options is the speed of response, and it is essential that technologies to contain excreta can be installed quickly. Traditional excreta disposal technologies, such as pit latrines, pour-flush toilets and raised urine-diversion (UD) toilets, may be difficult to implement quickly in a sudden onset flood but are often used in 2nd phase responses.

#### 1st Phase Excreta Disposal

In the 1st phase of the emergency, the immediate excreta disposal options include:

- **Excreta clean up campaigns**
- Chemical “Portaloo” toilets
- Packet latrines (with or without enzymes)
- Bucket latrines with close fitting lids
- Storage tank latrines
- Overhang Latrines
- Simple pit latrines (local materials)
- Latrine kits/hardware

The choice of the option will depend on the situation, in particular whether the flood has displaced communities or whether they have decided to stay in or near their homes. In some situations, lack of space may be a problem; examples include Bihar (India) and Khulna (Bangladesh), where families were forced to shelter on cramped embankments.

Criteria for Selection

In an emergency setting, a number of factors must be fully considered before introducing the chosen solution. The choice of technology should be based on a solid assessment of the situation. Refer to Harvey (2007). Consultation with the affected community is an essential part of the assessment, and a number of parameters should be considered, including:

- The physical constraints (rocky ground, high water table, flood plain, etc.) existing in the target community.
- The community’s preferences regarding excreta disposal practices and facilities. Are there any strongly held beliefs or taboos about urine or faeces?
- Existing local knowledge and local organisations involved in promoting sanitation.
- The different requirements of men, women, children and those with special needs.
- The logistics of supplying latrine materials and the availability of hardware and moulds also needs careful consideration.

Setting Minimum Standards

Some minimum standards for sanitation are:

1. Sanitation should be part of an integrated WASH approach, implemented in line with SPHERE and other environmental protection guidelines.
2. Culturally appropriate designs, with separate latrines for men and women. Provision should be made for supplying appropriate anal cleansing material.
3. Latrines, particularly those used by women and children, should be lockable from the inside.
4. In the 2nd phase, excreta disposal facilities should be affordable, cost effective, create appeal to users and discourage vectors.
5. Provision for safe disposal of children’s and infants’ excreta, including child friendly latrines and culturally appropriate nappies.
7. Provision of hand washing facilities and soap at all latrines and facilities must be maintained on a regular basis.
9. In hurricane and cyclone affected areas, roof materials (such as corrugated galvanized iron) must be secured by clamps or hooks.

In the case that WASH facilities have to be shared, minimum objectives, inspired by SPHERE guidelines, should be established.

<table>
<thead>
<tr>
<th></th>
<th>1st Phase</th>
<th>2nd Phase</th>
<th>Longer-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>Technically basic &amp; barely culturally acceptable</td>
<td>Generally, technically &amp; culturally appropriate</td>
<td>Technically &amp; culturally appropriate</td>
</tr>
<tr>
<td>Quantity</td>
<td>1/100 people 70m distance</td>
<td>1/50 people 50m distance</td>
<td>1/20 people 25m distance</td>
</tr>
<tr>
<td>Usage</td>
<td>50% using correctly &amp; regularly</td>
<td>75% using correctly &amp; regularly</td>
<td>95% using correctly &amp; regularly</td>
</tr>
</tbody>
</table>

Table 1: Minimum Objectives for Safe Excreta Disposal (Harvey et al, 2002)
<table>
<thead>
<tr>
<th>Description</th>
<th>Advantages/Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excreta clean up</td>
<td><strong>Advantages</strong>&lt;br&gt;- Low cost&lt;br&gt;- May be appropriate in the short term but only in areas where latrines are not used&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- Labour intensive&lt;br&gt;- Not sustainable</td>
</tr>
<tr>
<td>Chemical &quot;Portaloo&quot; Toilets</td>
<td><strong>Advantages</strong>&lt;br&gt;- Hygienic and odour is minimised&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- High cost, difficult to transport and require regular emptying</td>
</tr>
<tr>
<td>Packet latrine</td>
<td><strong>Advantages</strong>&lt;br&gt;- Packets are lightweight and easy to transport&lt;br&gt;- Appropriate for flooded areas or where space is limited&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- May be unacceptable to affected population&lt;br&gt;- Final disposal site must be clearly marked, accessible and used</td>
</tr>
<tr>
<td>Bucket latrine</td>
<td><strong>Advantages</strong>&lt;br&gt;- Defecation containers can be procured easily and transported&lt;br&gt;- Once containers are provided only final disposal system needs to be established&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- May be culturally inappropriate&lt;br&gt;- Large number of containers and disinfectant required</td>
</tr>
<tr>
<td>Storage tank latrine</td>
<td><strong>Advantages</strong>&lt;br&gt;- Large storage tanks are often available in relief shipments&lt;br&gt;- Rapid to set up/construct and can be used in flooded or rocky areas&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- Regular emptying required&lt;br&gt;- Large number of tanks may be needed which could be used for other purposes such as water supply</td>
</tr>
<tr>
<td>Over-hung latrines</td>
<td><strong>Advantages</strong>&lt;br&gt;- May be the only option in areas with high water tables and lack of space&lt;br&gt;- Risk of contamination where water is used for recreation, bathing, etc.&lt;br&gt;- Must be solidly constructed and safe for users&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- Unsuitable in high water table areas or where ground is unstable or rocky. Often associated with bad odours.&lt;br&gt;- Must be solidly constructed and safe for users</td>
</tr>
<tr>
<td>Simple pit latrines</td>
<td><strong>Advantages</strong>&lt;br&gt;- Cheap, quick to construct, easily understood and operate without water&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- Unsuitable in high water table areas or where ground is unstable or rocky. Often associated with bad odours.&lt;br&gt;- Must be solidly constructed and safe for users</td>
</tr>
<tr>
<td>Kit latrines</td>
<td><strong>Advantages</strong>&lt;br&gt;- Rapid to implement on site&lt;br&gt;- Quality hardware designed for easy transport&lt;br&gt;<strong>Disadvantages</strong>&lt;br&gt;- May require pits being dug&lt;br&gt;- Expensive and there may be delays in procuring &amp; transporting to site&lt;br&gt;- May be culturally inappropriate</td>
</tr>
</tbody>
</table>

Table 2: Advantages and Disadvantages of 1st Phase Excreta Disposal Options (adapted from Emergency Sanitation, 2002)
2nd Phase Excreta Disposal Options
Following the stabilisation of the flood situation, short-to medium term options and the use of semi-permanent facilities, need to be considered.

In the 2nd phase of the emergency, the key options include:

- Simple pit/trench latrines
- Pour-flush toilets (with off set pits)
- Aqua privies
- Raised pour-flush units with septic tank
- Raised urine diversion (UD) toilets
- Simple composting toilets

The ideal solution is to provide every family with their own latrine, but this may not be possible in the first instance. Communal or shared latrines will have to be used until enough family latrines can be built.

When a pit is dug, digging below the water table increases the available pit volume. There is evidence that wet pits take longer to fill. The main risk is pit collapse, hence pits should be lined with appropriate, locally available materials such as fired clay bricks, block work, wicker baskets, large stones/rocks or pre-cast concrete rings. A 200 litre oil drum, with perforated walls, can also be used as a liner, though it will make a low volume pit. Pit linings can be extended above ground level to provide the required pit volume, as shown below.

Excreta Disposal in High Water Tables
If the water table is within 1.5m of the bottom of a pit latrine it is almost certainly contaminated. The following measures should be taken:

- Ensure people do not use water from wells in the vicinity of excreta disposal facilities.
- Carefully assess the risk of pollution through sub-surface movement of pathogens. Generally, a minimum distance of 10 metres from a latrine to a water source is adequate to prevent linear contamination but this will depend on soil/ground conditions. If in doubt, a sanitary survey should be undertaken.
- Consider developing alternative water sources – this may be more cost-effective than providing alternative excreta disposal facilities.

Figure 1: Example of an aqua privy (WEDC)

In the majority of cases, traditional excreta disposal technology (pit latrines, pour-flush toilets, etc.) will have to be adapted for use in high water table areas.

Figure 2: Techniques for pits in high water tables (WEDC)

Excavated material can be used to build a mound or embankment around the latrine. This mound can be used for liquid infiltration from the pit if it is:

- Formed with permeable soil
b. Well compacted with a stable side slope of 1:1.5
c. Thick enough to ensure that filtrate does not seep out of the sides of the mound

The slab should be constructed at least half a metre above the highest water level.

**Raised Urine-Diversion (UD) Toilets**

Normally, urine-diversion (UD) toilets are used to separate faeces and urine for re-use (ecological sanitation). In a flood environment, re-use of the by-products may not be the main priority.

UD toilets are suited to rocky ground or areas with high water tables, and more resistant to cyclic flooding. They can also be used for many years, making them an attractive and sustainable option. The impermeable bottom of the chamber prevents contamination of both the soil and ground water. Normally, one chamber is in use whilst the other chamber is used to break down faeces. The seat or squat slab is connected to a hose or piping to separate the urine, which can be either collected in a container or drained to a soak away.

**Figure 3: Twin vault UD latrine, Sri Lanka**

Raised latrines may not be socially acceptable if people feel 'exposed' going in and out of the unit. They may also restrict access for disabled people, the elderly, pregnant women and others. Choosing hardware to meet the needs and cultural preferences of users (i.e. seated, squatting, wet or dry anal cleansing) is critical to acceptance.

**Figure 4: Urinal and container**

The adoption of urinals for men, who prefer to stand when urinating, is one way of improving the performance and effectiveness of UD toilets and this will reduce the number of cubicles required.

**Simple composting latrines**

Space permitting, a household may choose to dig a shallow, unlined pit latrine above the water table that will have a short life. The simplest and best-known composting toilet is the “Arborloo”. This toilet uses an unlined shallow pit (1 – 1.5m deep), fitted with a ring beam, slab and portable superstructure. When the pit is nearly full, a new pit is dug close by, and the ring beam, slab and superstructure are moved to the new site. The old pit is covered with soil, allowing contents to compost down. When fully composted, a tree can be planted. A pit decomposition period of at least 6 months is recommended.

**Figure 5: An "Arborloo“ system in use**
2. Vector Control in a Rural Flood Setting

Vectors can carry disease-producing parasites from one host to another. These potential disease carriers are capable of rapidly reproducing and dispersing within favourable environments. Floods often provide conditions for proliferation, with flies and mosquitoes posing the greatest risk. Vectors of significance include mosquitoes, flies, rats and mice, cockroaches, ticks, fleas, lice and mites. The principal vector transmitted diseases include:

<table>
<thead>
<tr>
<th>Vector</th>
<th>Disease/Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquitoes</td>
<td>Dengue, Malaria, Yellow Fever, West Nile Fever, Filarisis, etc.</td>
</tr>
<tr>
<td>Rats</td>
<td>Leptospirosis, Hanta virus, Bubonic plague, Typhus, etc.</td>
</tr>
<tr>
<td>Flies &amp; Cockroaches</td>
<td>Diarrhoeal diseases</td>
</tr>
<tr>
<td>Ticks, Fleas, Lice</td>
<td>Typhus</td>
</tr>
</tbody>
</table>

Table 4: Vector transmitted diseases & conditions (Wisner et al, 2003)

Floods do not cause new diseases or automatically result in outbreaks of vector-borne diseases, but alter the environment, and encourage the proliferation of vectors. Some flood-associated diseases may appear several weeks or months after the event.

Potential Rural Flood Related Problems
- The creation of new breeding sites due to poor drainage
- The creation of poor sanitary conditions in camps and overcrowded areas
- An increase in the number of vector host species present
- Displacements from one location to another and an increase in vector and human contact

In the post-flood period, the first priority is to assess the risk of vector-borne disease transmission, as quickly as possible. If an intervention is required, major vector control activity should take place as soon as possible.

The necessary resources must be mobilised rapidly, and an operational management framework put in place swiftly to allow vector-control activities to be implemented. Refer to Wisner et al, 2003.

Vector control responses
In a post-flood situation, flood-affected people need to have the knowledge and the means to protect themselves from disease and nuisance vectors that are likely to represent a significant risk to health and/or well being. Risks must be kept to an acceptable level and can be controlled by:
- Medical diagnosis and treatment
- Chemical/ biological means
- Environmental sanitation
- Promoting personal protection

Medical diagnosis and treatment: are outside the scope of this paper, and should be undertaken by the competent authorities.

Chemical vector control measures: should be undertaken in a way, which ensures the staff, those affected by floods and the local environment, are all adequately protected. The use of chemicals should be done in a way that avoids creating resistance to that particular substance. The “toxicity grade” of the chemicals being used should be verified prior to use, and the use of DDT should be avoided. All staff involved in spraying must be given adequate personal protection. Refer to Wisner et al, 2003. Possible application methods include:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Application method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dusting</td>
<td>Hand-held dusters manually operated or mechanised.</td>
</tr>
<tr>
<td>Residual Insecticide Spraying</td>
<td>Knapsack sprayers with special nozzles.</td>
</tr>
<tr>
<td>Ultra-low volume spraying</td>
<td>Low-dosage applications to large areas from fixed-wing aircraft or helicopters.</td>
</tr>
<tr>
<td>Space spraying</td>
<td>Interior or exterior applications with pesticide aerosols dispersed under pressure from vaporizers.</td>
</tr>
<tr>
<td>Impregnation</td>
<td>The treatment of materials such as bedding, clothing and mosquito nets with pesticides in emulsion or solution (by dipping and drying, or by spraying with knapsack sprayers).</td>
</tr>
</tbody>
</table>

Table 4: Pesticide application methods and equipment (Wisner et al, 2003)
Where possible, the vector control activities should be coordinated with the local authorities and the relevant public health body.

**Environmental sanitation measures:**
draining standing bodies of water, removing vector breeding sites (such as piles of rubbish, old tyres, water jars, bamboo poles, etc.), protecting water storage containers, setting traps (rats & flies) etc.

**Personnel protection measures:** includes distribution of insect/mosquito repellent, promoting use of long sleeves & trousers, fitting houses/shelters with mosquito/fly netting on windows & doors, distribution of insecticide treated bed nets (ITNs), wearing rubber boots etc.

### 3. Waste Management in a Rural Flood Setting

If large numbers of people have been forced into camp type settings by the floods, it is likely that waste management will become a major issue. The first priority is to analyze the emergency context and the nature of waste being generated. Following this, a system of managing the waste, in a safe and environmentally friendly manner, should be put into place. A decision must be taken as to whether the waste will be dealt with on-site (burial), or whether it is necessary to transfer the waste to a remote disposal site. The keys steps in waste management are:

- Collection, containment & storage
- Waste transfer
- Final waste disposal

For waste disposal on-site (burial in communal pits), then waste transfer will not be necessary (see Figure 7). If disposal is off-site, a means of collection, transportation and a final disposal site must be identified. The municipal and other relevant authorities should be consulted. The agency in charge may have to provide the vehicles and manpower to operate the service.

All personnel working in the collection and handling of waste should be provided with protective clothing and given training. The communities themselves should be consulted about the location of communal waste collection points and how they will be managed.

![Waste pit (WEDC)](image)

**Figure 7: Waste pit (WEDC)**

<table>
<thead>
<tr>
<th>Sphere: Key indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>- People from the affected population are involved in the design and implementation of the solid waste programme</td>
</tr>
<tr>
<td>- Household waste is put in containers daily for regular collection, burnt or buried in a specified refuse pit</td>
</tr>
<tr>
<td>- All households have access to a refuse container and/or are no more than 100 meters from a communal refuse pit</td>
</tr>
<tr>
<td>- At least one 100-litre container is available per 10 families where domestic refuse is not buried on site</td>
</tr>
<tr>
<td>- Refuse is removed from the settlement before it becomes a nuisance or a health risk</td>
</tr>
</tbody>
</table>

**Table 5: Key Waste Management Indicators (SPHERE, 2004)**
4. Clean up Campaigns in a Rural Flood Setting

Floodwaters may be contaminated by sewerage or other by-products. Direct contact with floodwater in itself may not pose a serious health risk, but there may be some risks of disease if floodwater contaminated food items are consumed. People may become infected with diseases such as leptospirosis if cuts, sores or wounds come directly into contact with floodwater, and it may also cause skin diseases. During the emergency period, it is critical to encourage people not to spend too much time in floodwater and to practice basic hygiene. Hand washing with soap and clean water is one of the most effective ways of protecting against disease. Children should be prevented from playing in floodwater and their toys and possessions should be disinfected. Effective hygiene promotion messages will need to be developed. Refer to the ‘Hygiene Promotion in Flood Settings’ briefing (Sow, 2009).

Re-entering a flooded home

Flooded homes may have been contaminated with sewerage or other biological matter, and if the house has been closed for several days, there may be a risk of mould. In both cases, ensure doors and windows are fully open when entering the house for the first time. Open doors and windows at least 30 minutes before starting cleaning activities, and stop floodwater outside the house from re-entering. Good practice includes:

- Wearing rubber boots, gloves & goggles
- Wearing face masks to avoid inhaling fungal spores
- Cleaning all hard surfaces with clean water and a disinfectant
- Washing hands with soap & clean water after the clean up activities.
- Disinfecting cuts and wounds coming into contact with floodwater. Seek medical help if people become ill.
- Washing and disinfecting clothes worn for clean up campaigns. Clothes salvaged from the flooded home should also be washed and disinfected.

- Items such as mattresses, cushions and other such items that cannot be cleaned should be disposed of.
- Ensuring the house is fully dried before resettling

Cleaning up after Floods

Houses that have been filled with flood related debris, such as sediment and silt, may need to be cleaned by organising mass clean up campaigns. The use of a “Cash-for-Work”, approach is an appropriate way of mobilising the affected communities. Tools, such as picks, shovels and wheelbarrows will be essential. It may be necessary to organise trucks and mechanical diggers to evacuate the debris, depending on the volume deposited. Protective clothing such as rubber boots, overalls and gloves should be provided to all those involved in clean up campaigns.

Cleaning and disinfecting with bleach: An unscented proprietary liquid bleach (Sodium Hypochlorite), between 4 – 6 % should be used. The safety instructions on the container must be carefully read and closely followed. Rubber boots, gloves and goggles should be used to handle the solution and it should never be used in a closed space.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Application method</th>
</tr>
</thead>
</table>
| Cleaning water storage containers | - Mix soap and clean water in container  
- Shake to clean inside of container  
- Rinse container  
- Mix 20ml bleach per litre water and pour into container  
- Shake the container so solution touches all surfaces  
- Cover and leave for 30 minutes Rinse with clean water |
| Food contact surfaces | - Wash with soap and clean water  
- Rinse with clean water  
- Mix 5ml bleach per litre water and clean the surface  
- Allow to air dry |
| Hard surfaces and other household items | - Wash with soap and clean water  
- Mix 5ml bleach per litre water and clean the surface  
- Allow to air dry |
Cleaning mould growth
- Mix 50ml bleach per litre water and clean/wash the item/surface with the solution
- Scrub rough surfaces with a brush
- Rinse with clean water
- Dry the item/surface or leave it to air dry

Table 6: Cleaning & sanitising with bleach after an emergency (CDC, 2008)

5. Drainage in a Rural Flood Setting

Surface water in or near emergency settlements may be contaminated with wastewater from septic tanks, toilets and/or latrines. The main health risks are contamination of water supplies; damage to dwellings; vector breeding; and drowning. People should live in an environment where health and other risks are minimised.

To reduce potential health risks, a proper drainage plan may be necessary to deal with storm water drainage. In the event that houses have been filled with floodwater, communities should be mobilised to clear drainage channels and repair small breaches in flood defences using a “Cash-for-Work” approach. Key Cash-for-Work activities include:

- Removing standing water near dwellings by improving drainage to reduce vector breeding sites
- Protecting shelters, paths and water and sanitation facilities from erosion and from flood water
- Providing sufficient appropriate tools for small drainage works and maintenance where necessary
- Protecting existing surface or groundwater sources from erosion or from contamination

Large-scale drainage is generally determined by site selection and the development of detailed drainage plans. It will be necessary to work closely with the competent authorities.

6. Disposal of Dead Bodies in a Rural Flood Setting

Health risks
There is a widespread belief that corpses (both animal and human) pose a risk of communicable diseases after a flood. Such beliefs are frequently mistaken, especially if death has been caused by trauma or drowning. Dead bodies are unlikely to cause outbreaks of diseases such as typhoid fever, cholera or plague, though there may be a risk that water sources become contaminated.

Recovering dead bodies
In the event of human deaths in a flood, the main risk is of mental trauma caused to survivors of the event. In this situation, it is important to organise the collection of corpses to minimise distress, and to allow the communities to grieve and bury/cremate their dead in line with their cultural practices and traditions.

Disposal of dead animal carcasses
Burial is the most common way of disposing of dead animal carcasses, and they should be disposed of quickly and safely to avoid attracting rats. The disposal of dead animal carcasses should be undertaken with the relevant government/local authorities, if possible. Protective clothing, including rubber gloves, rubber boots, & goggles should be worn, and any open wounds should be covered. After disposal of the carcasses, hands should be thoroughly washed with soap. Clothing should be disinfected and washed separately from other clothing items.

Further information
Further information cont.

www.who.int/water_sanitation_health/hygiene/emergencies/deadbodies.pdf


Harvey P, Baghri, S. and Reed (2002). Emergency Sanitation – Assessment and programme design, WEDC, Loughborough University, UK.


OXFAM TBN 7 (2009) - UD Toilets and Composting Toilets in Emergency Settings
http://www.oxfam.org.uk/resources/learning/humanitarian/tbn_drafts.html#eco

Oxfam TBN 8 – Low cost drainage for emergencies

OXFAM TBN 15 – Domestic and Refugee Camp Waste Management Collection and Disposal


http://www.who.int/water_sanitation_health/hygiene/emergencies/solidwaste.pdf


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This technical briefing has been produced under the Global WASH Cluster Technical Learning Project to support WASH sector learning and improvement. The Technical Learning Project is led by ACF-UK on behalf of the Global WASH Cluster. with the support of the following Steering Group agencies: ACF, Care, CRS, Oxfam, REDR, UNICEF and WEDC. The project team includes ACF, Care, Oxfam and WEDC.

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First trial edition 2009

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The Global WASH Technical Learning Project
### Appendix 1: Technical Excreta Disposal Options in Bangladesh

<table>
<thead>
<tr>
<th>Location Context</th>
<th>Immediate Options</th>
<th>2nd Phase Options</th>
</tr>
</thead>
</table>
| Embankment             | • Trench latrine with fence, lower slope of embankment  
• Temporary raised direct latrine using 5-rings, & mortar seals  
• Bucket latrine  
• Offset pour-flush toilet connected to pit at bottom of embankment by drainpipe.                                                                                                                                                                                            | • Normally, no digging is allowed on embankment                                                                                                                                                                       |
| Roadside               | • Trench latrine with a fence  
• Temporary raised direct latrine using 5-rings, & mortar seals  
• Bucket latrine, large clay pot, etc  
• Containment by using an empty drum                                                                                                                                                                                                                                                  | • Unlikely to continue, but if so, continue the immediate options                                                                                                                                                     |
| Shelters (Communal, schools, public buildings) | • Improvement of existing latrines  
• Trench latrine with fence (away or outside main premises)  
• Temporary raised direct latrine using 5-rings, & mortar seals  
• Bucket latrine (drum, clay-pot, plastic bag and other type of containment)                                                                                                                                                       | • Construct more permanent direct or offset latrines that are raised if necessary                                                                                                                                       |
| Char                   | • Clay pot,  
• Drum  
• Bamboo mat containment with plastic lining                                                                                                                                                                                                                                           | • Direct or offset latrine raised to the level of house plinth  
• Bucket latrine                                                                                                                                                                                                        |
| Raised HH              | • Raised direct or offset latrine with sealed rings, stabilized by bamboo frames.  
• In flood prone levels raise to plinth level  
• Bucket latrine (drum, clay-pot, plastic bag and other type of containment)  
• Bamboo mat containment (plastic lining if necessary) under the raised squatting.                                                                                                                                                                                                  | • Raised direct or offset latrine, in flood prone levels raise to plinth level  
• Bucket latrine                                                                                                                                                                                                        |
| Haor                   | • Clay pot  
• Drum  
• Large containment.  
• Boat latrine                                                                                                                                                                                                                                                                               | • Raised direct or offset latrine using 7-8 rings-steps or pathways.  
• Latrine raised to level of house plinth  
• Bucket latrine                                                                                                                                                                                                                 |
| Hill tracts areas      | • Clay pots  
• Direct or offset pit latrine with plastic pan, one ring and slab.  
• Stilt-offset-direct pipe to covered pit—a traditional tribal practice (avoid water seal-use flap)  
• Bucket latrine                                                                                                                                                                                                                                                                  | • Direct or offset pit latrine with plastic pan, one ring and slab (avoid water seal & use flap)  
• Bucket latrine                                                                                                                                                                                                                 |
| Displaced people’s camp| • Controlled defecation zones  
• Trench latrine with a fence  
• Bucket latrine (drum, clay-pot, plastic bag and other type of containment)                                                                                                                                                                                                                   | • Community off-set latrines with twin pits (avoid water seal & use flap)                                                                                                                                                 |

**Table 8: Excreta Disposal Options for Emergencies in Bangladesh**