

# Options to Progressively Upgrade Sanitation Infrastructure from Emergency Response to Stabilisation

## Context

Including sanitation in emergency preparedness and contingency plan efforts is key to avoid harmful practices such as open, uncontrolled defecation. However, in cases of sudden onset emergencies or when there are not enough resources to immediately build robust infrastructure, a phased approach can help minimizing the risks associated with poor sanitation. Services can be progressively upgraded from controlled open defecation to shallow trench latrines or deep trench latrines, before the resources and capacities at hand allow to implement communal, shared or household level toilets. If capacities allow, all steps do not need to be done – or implementation of different systems can happen in parallel. The main goal is to shift as fast as possible away from (controlled) open defecation and provide more dignified solutions for forcibly displaced people. Consultation with users or community representatives is key to adjust the siting and design of the sanitation facilities, with community participation being strongly encouraged to ensure cultural acceptance.

This short guidance summarises the main design features of controlled open defecation fields, shallow trench latrines, deep trench latrines and shallow family toilets. Dealing with acceptance, hygiene measures and decommissioning are presented as cross-cutting topics. This document is mainly based on work from WEDC and the *Engineering in Emergencies* guidebook (cf. references at the end of this document).

It is important to note that all the options presented in this document are temporary options which need to move to more dignified facilities as soon as resources allow.

## Controlled open defecation fields

The sanitation priority is to separate excreta from the living environment and to control indiscriminate defecation.

Indiscriminate defecation poses a high health risk to individuals, water sources and food supplies. It may happen because of cultural habits, or because the sanitation coverage is not sufficient (for more info, check the box “*Dealing with acceptance*” below). When this happens, faeces can be covered with lime and should be removed to a safe disposal site such as a pit.

In many cases, the only immediate solution to excreta containment is to open “controlled open defecation” fields. These fields localize contamination and make it easier to manage the safe disposal of excreta. They are only a short-term measure until alternative solutions are developed; in case of cholera outbreak, it is not a recommended option.

## Design & construction

There are two types of defecation fields: open and trenched (for the latter, see next section on “shallow trench latrines”). Figure 1 presents the main design features of a controlled open defecation field. Digging trenches should be done as soon as resources allow.

Key points in the design include:

- Defecation fields should be as large as it is possible to manage safely. Consider about 0.5 m<sup>2</sup>/person/day to dimension the field.
- Fields should be at least 30 m from shelter, stores and water sources, but well distributed around the camp to allow easy access. For example, for a group of 500 people, you should plan for at least 2,000 m<sup>2</sup>/week (equivalent to an area of 50m x 40m).
- The sites should not be uphill from settlements, and surface runoff should be managed safely.
- Designate distinct fields for male and female and internal partitioning to allow privacy.
- [Handwashing station](#) at the exit, including a soak pit.

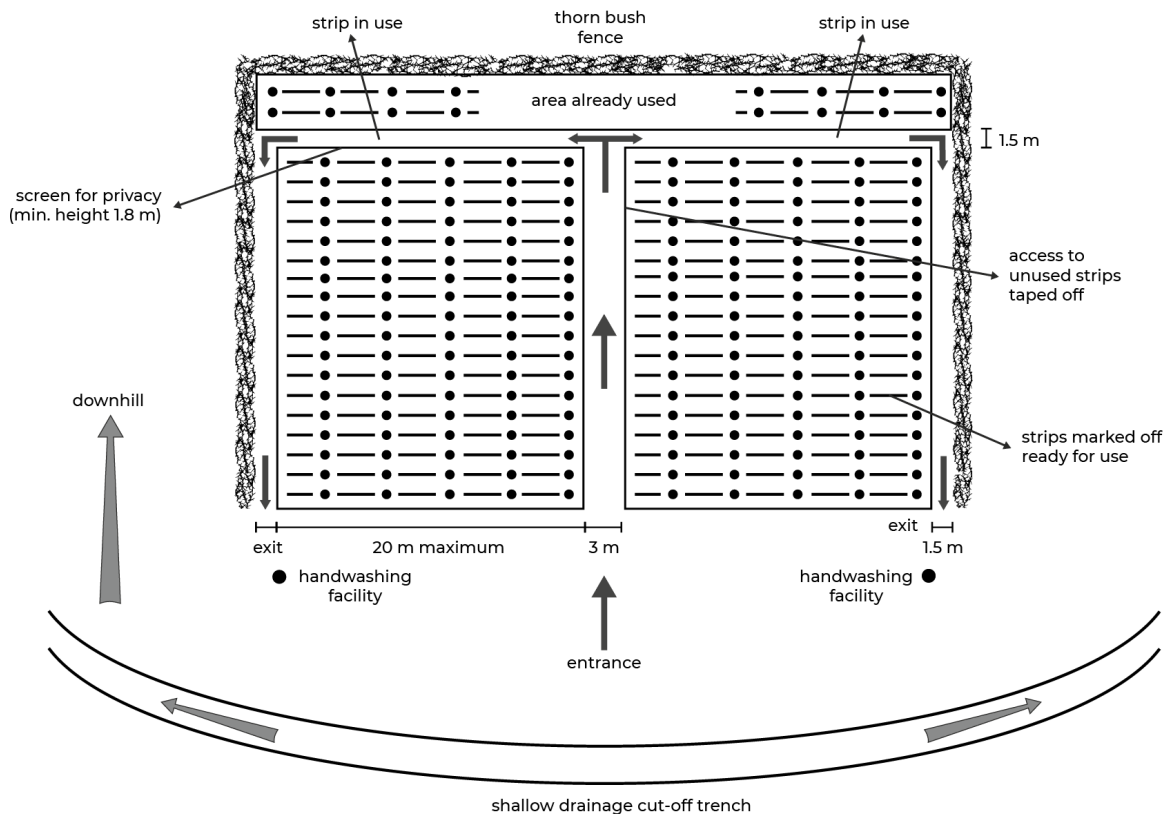


Figure 1: Design of controlled open defecation fields  
(adapted from Harvey et al., 2002, based on R. Reed's initial drawing)

### Operation & maintenance

- The furthest part of a field is used first. Strips can be marked out by stones, screens of plastic sheeting or marker poles and tapes. To encourage the full usage of a defecation zone, the supervisors can relocate a screen that provides some additional privacy along the row as it fills up with excreta.
- Access to strips not in use should be prevented by temporary fencing or tape.
- Anal cleansing material may have to be supplied or, if water is used, it should be provided at the entrance.
- Provide water and soap for handwashing at the exits (see also box "Hygiene measures" below). Mandatory disinfection points can be considered as faster way to provide handwashing. Someone should be assigned to the supervision of the handwashing station – proper use, water & soap/disinfectant refill.
- If possible, excreta should be covered with a little bit of earth or lime as a vector control measure.
- Defecation fields must be well managed and constantly supervised. Community cooperation is essential. Children should be accompanied by a parent.

### Decommissioning

- Cover the excreta with lime. Once full, a defecation field can be scraped off, and the residues be buried in a trench.

**Advantages:** Rapid to implement; minimal resources required; minimises indiscriminate open defecation.

**Constraints:** Lack of privacy for users; considerable space required; difficult to manage; potential for cross-contamination of users; better suited to hot dry climate

## Shallow trench latrines

Wherever possible, avoid open defecation fields and dig trenches. Digging trenches is a significant improvement as excreta can easily be covered with soil and pathways kept clear. It improves the overall hygiene and convenience.

### Design & construction

- Communal trench latrines can be quickly prepared to provide a short- to medium-term solution. Their lifespan will depend on the number of users and the area size. A shallow trench latrine may last 2-4 weeks, while a deep trench (see next section) may last 1-3 months.
- Trenches need only be 20-30 cm wide and 15-60 cm deep.
- The dimensioning of the area can be done by counting approximately 0.25 m<sup>2</sup>/person/day. For example, for a group of 500 people, you should plan for at least 900 m<sup>2</sup>/week (equivalent to a square of 30m x 30m). Another rule of thumb is to allow about 3.5 m trench length per 100 users.
- Include screening for privacy (> 2 m height, i.e. higher than a standing person) and should be gender segregated.
- Divide the field into strips 1.5 m wide with access paths.
- Special latrines with facilities such as a seat and handrails should be built for physically impaired people, as trench latrines cannot be used by some of them (incapable to squat). Potties are an alternative for children.
- **Handwashing station** at the exit(s), including a soak pit.

### Dealing with acceptance

*Acceptance of communal emergency sanitation options may be an issue, both for the host communities and for the refugees themselves. To overcome such challenge, communities need to be involved in the siting and design. Awareness about the risks of not containing human excreta should be raised. The following aspects should be taken into account:*

- *Reluctance to use controlled defecation trenches: in order to increase acceptance, the trenches should be as short and multiple as possible, in order to allow a maximum of privacy. Smaller areas are preferred by users, nonetheless they may be challenging to implement. There is a trade-off to find with the availability of space and materials and management capacities.*
- *Plastic sheets and poles are in high demand at the onset of an emergency, and there is a risk that such materials are unavailable or get stolen.*
- *Providing tools at block level can enable refugees to dig shallow trenches/pit themselves, and to organise as groups of families.*
- *The host population/land owners may oppose defecation fields on their land: it can be argued that uncontrolled open defecation cannot be avoided, with more severe consequences, incl. public health risks for the host communities. It is also important to raise awareness about the fate of excreta in the soil, which will decompose and turn into organic matter. In all case, the potential stigma associated with land that has been used for defecation and the impact on future use should not be eluded.*
- *Proper management is key for the smooth operation, maintenance and overall hygiene, and can encourage refugees to use the facilities. Hygiene workers should be hired for demarcation, implementation, organization, monitoring and supply management (esp. regarding hand washing /disinfection)*

### Operation & maintenance

- Use strips furthest from the entrance first.
- Only short lengths of trench should be opened for use at any one time to encourage the full utilization of the trench in a short time.
- Each user should cover the excreta with earth from the backfill mound. Shovels or cans may be provided.
- Anal cleansing material may have to be supplied or, if water is used, it should be provided at the entrance.
- Provide water and soap for handwashing at the exits (see also box “Hygiene measures” below). Mandatory disinfection points can be considered as faster way to provide handwashing. Someone should be assigned to the supervision of the handwashing station – proper use, water & soap/disinfectant refill.

### Decommissioning

- Once a trench is full, cover with lime and close with the rest of excavated soil. Mark the site with tape in order to avoid people walking on it. See also the dedicated text box on decommissioning below.

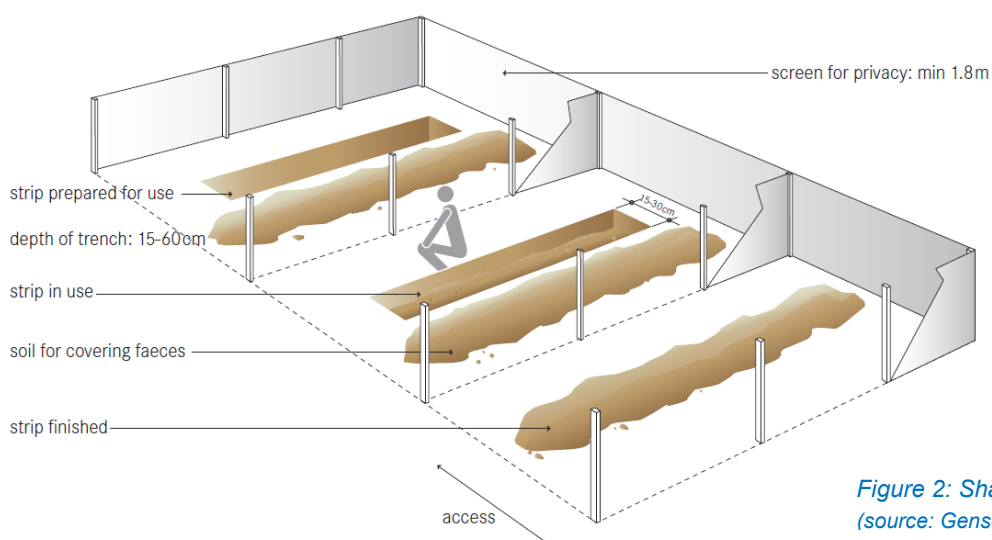


Figure 2: Shallow trench latrines  
(source: Gensch et al., 2018)

**Advantages:** Rapid to implement (one worker can dig on average 50 m. trench / day if no rocky soil); faeces can be covered easily with soil.

**Constraints:** Limited privacy; short lifespan; considerable space required

### Hygiene measures

Two main aspects are of concern:

1. Handwashing/disinfection;
2. Covering the excreta.

*Ideally, a handwashing facility is built next to each emergency sanitation area. If not possible in the acute response phase, hand disinfection solution should be provided, optimally via a hygiene worker posted at the exit of the defecation field/trench area. An introduction to handwashing facilities can be found here (Gensch et al, 2018).*

*With options where the excreta remains close to the user (controlled defecation fields and shallow-trench latrines), each user should cover his/her own excreta, either with backfill soil, or with a bit of lime powder. In both cases, it is recommended to provide a small spade or empty can next to each trench, and that awareness raising is provided at the entrance of the field.*

## Deep trench latrines

Deep trench latrines will be appropriate if there are sufficient tools, materials and human resources available, if soil is not rocky and the highest possible groundwater table deeper than 1.5 m. below surface (in homogeneous soils). Latrines should be sited at least 30 m. from water points, and soil characteristics be assessed in order to exclude any groundwater contamination risk (esp. in fissured soils).

### Design & construction

- Deep trench latrines involve the siting of several cubicles above a single trench which is used to collect the excreta. The recommended maximum length of trench is 6 m, providing six cubicles.
- Trenches should be 0.8-0.9 m wide and at least the top 0.5 m of the pit should be lined. If the soil is instable, the trench should be lined down to the bottom (e.g. with wooden planks or corrugated iron).
- The depth (usually between 1.5 to 3 m) may vary depending on local soil conditions and required speed of implementation.
- After the trench has been dug the quickest option is to put self-supporting plastic slabs straight over the trench. If slabs are not available then wooden planks can be secured across the trench until proper wooden or concrete slabs can be made. The trench should be covered with planks, leaving out every third or fourth plank, which is where people defecate.
- If a high water table, rocky or sandy soil prevents the excavation and use of trenches, elevated platforms may be built. It is also possible to use 200 L drums, (partially) buried in the ground.
- Where possible, covers for the drop holes should be provided, in order to reduce smells and flies.
- Ideally, all designs should be previously discussed with the community and should take into account the safety of women and children and elderly or disabled people.
- Special latrines with facilities such as a seat and handrails should be built for physically impaired people, as trench latrines cannot be used by some of them (incapable to squat). Potties are an alternative for children.
- [Handwashing station](#) at the exit(s), including a soak pit.
- Designs are available at [wash.unhcr.org](http://wash.unhcr.org).

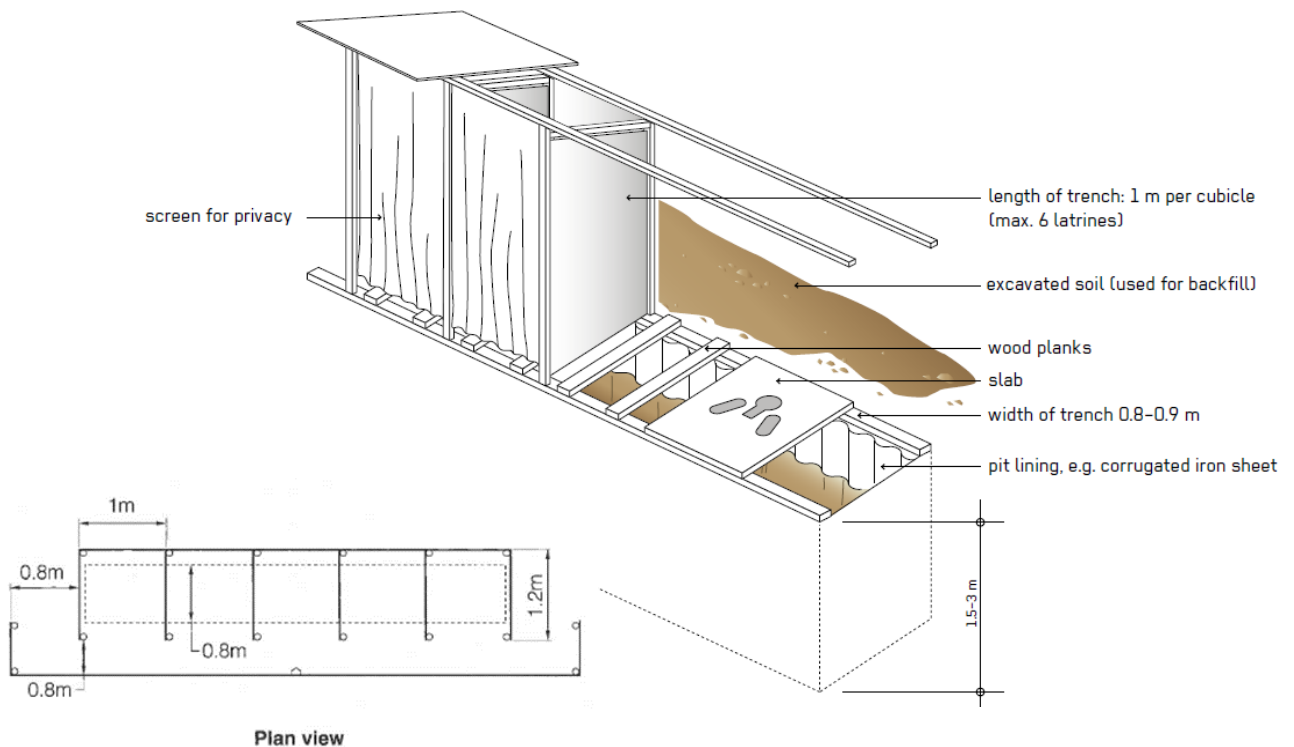


Figure 3: Deep trench latrines (sources: Gensch et al., 2018 and Harvey, 2007)

### Operation & maintenance

- As these latrines are communal and with a high use rate, it is necessary to hire cleaners to ensure cleanliness and overall maintenance.
- Anal cleansing material may have to be supplied or, if water is used, it should be provided at the entrance.
- Provide water and soap for handwashing at the exits. Mandatory disinfection points can be considered as faster way to provide handwashing. Someone should be assigned to the supervision of the handwashing station – proper use, water & soap/disinfectant refill.

### Decommissioning

- Once a trench is nearly full, cover with lime and close with the rest of excavated soil. Mark the site with tape in order to avoid people walking on it. See also the dedicated text box on decommissioning below.

**Advantages:** Cheap; quick to construct; easily understood.

**Constraints:** Unsuitable where water table is high, soil is too unstable to dig or ground is very rocky; often odour problems and vector nuisance; cleaning and maintenance of communal trench latrines need to be ensured, although often complicated.

## Children, elderly and people with disabilities

*People with special needs should be identified as soon as possible, and sanitation solutions discussed with them and their families. Children potties can be distributed as soon as available. Different solutions exist for people which cannot squat (such as handrails, hollow seats) and can be found in the Compendium of accessible WASH technologies (Jones and Wilbur, 2014). Ideally, people who cannot access the communal sanitation facilities should benefit from a shallow family toilet.*

## Shallow family toilets

Family level sanitation facilities are always preferred, since the construction, cleaning and maintenance can be carried out by family members, boosting feeling of ownership.

### Design & construction

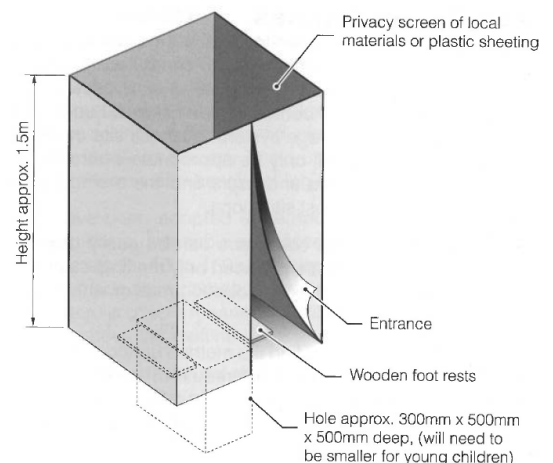
- A shallow pit of approximately 0.3 m x 0.5 m x 1 m depth may be excavated.
- Wooden foot rests or a toilet slab (approximately 0.8 m x 0.6 m) can be placed over this, overlapping by at least 15 cm on each side.
- If available, special seats and handrails should be provided for physically impaired people (incapable to squat). Potties are an alternative for children.

### Operation & maintenance

- Families should be provided with a dedicated container enable them to wash hands and, if relevant, for anal cleansing. Soap should also be provided.

### Decommissioning

- Backfilling should occur when the pit is full to within 0.2 m of the slab. A simple superstructure for privacy can be made from local materials, – which should be preferred over plastic sheets to increase sustainability, unless materials and time are a constraint.



*Figure 4: Shallow family toilet  
(source: Harvey, 2007)*

**Advantages:** Increased privacy; rapid to implement; allow people to actively participate in finding an appropriate solution, contributing with construction and cleaning; enhanced ownership.

**Constraints:** Community must be willing and able to construct family toilets; difficult to manage siting and backfilling of pits; digging tools and materials required.

## Decommissioning of emergency latrines

*Emergency latrines are not designed to stay for long, and usually get quickly full. It is then important to decommission them properly. Here are a few pointers (adapted from Global WASH Cluster, 2021):*

- *If available, pour down lime slurry on top of the excreta before closing the trenches/pits with soil.*
- *Where possible with deep trench latrines, stirring for a period of 20 min is recommended. 1h at pH 11 or 30 min at pH 12 allows to kill pathogens in the sludge in contact with the lime slurry. As a rough estimation, the quantity needed is around 10 L/m<sup>3</sup>.*
- *Cover the pits/slabs with soil at least 0,3 m above the slab. In all case, immediately close any openings to avoid flies.*
- *If a plastic slab is removed, it should be disinfected with 2% chlorine solution and left to dry before placing it back in stock to be reused.*
- *Superstructures that are dismantled should be disinfected (sprayed) with 2% chlorine solution (especially the walls and doors) before safe disposal or reuse.*
- *Planting a tree on top of the pit is an option to accelerate sludge decomposition and to mark the location; in all case, the sites of decommissioned latrines should be clearly marked using whitewashed stones or visible signage. Restrict access to the area for about one year.*
- *Ensure safety of the labourers: engage local labour from the displaced /host community; provide appropriate safety clothing, tools and equipment (shovels, lime, pickaxe, claw hammer, wheelbarrow, plastic sheet, locally available stones/soil, gloves, overall, safety boots, head cover).*

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