44. Emergency water supply

This is an overview of the principles of providing water in emergency situations. It outlines the planning procedures necessary for ensuring adequate supply, rather than focusing on design.

As well as food, shelter, and medical aid, providing clean water is usually one of the highest priorities in the event of an emergency. It should be considered alongside immediate sanitation measures, however, which are just as important in controlling many of the most common diseases found in disaster situations (see pages 21-24).

Responding to an emergency

An appropriate response to an emergency depends on whether the emergency affects people where they live, such as in the case of an earthquake or flood, or whether the population is displaced as a result of other pressures such as famine or war. Although the measures may differ, planning considerations for water supply are similar in both situations.

Planning what to do

There are several planning considerations:

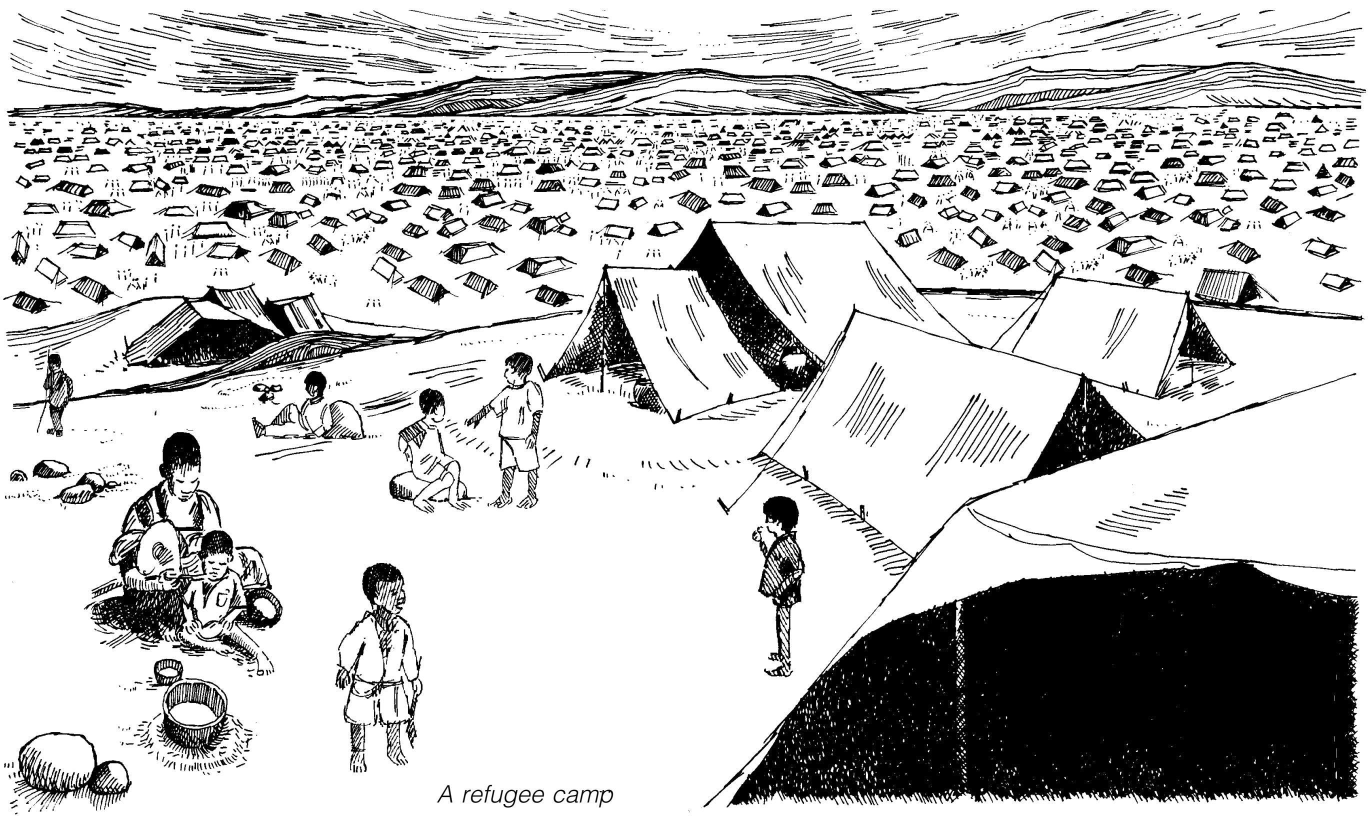
- **Demand assessment**
  How much water is needed?
- **Location and protection of water sources**
  Where are the nearest/most convenient sources of water? How can they be protected?
- **Water treatment**
  What is the level of water treatment required for use/consumption? What methods are available for treatment?
- **Water distribution**
  Where will people collect water from?
- **Collection and storage**
  How will the water be collected? How will it be stored for domestic use?

These questions must be considered as soon as an emergency occurs. It is also important to prioritize action. A phased action plan comprises:

- Immediate measures (to sustain life);
- intermediate measures (from about 2 to 6 weeks after the disaster, or the arrival of refugees in a camp); and
- long-term solutions (from about 6 weeks).

The actual duration of these phases is usually determined by three factors:

- Accessibility of the disaster area or refugee camp for local, national, and international assistance;
- the nature of the disaster; and
- the availability of water, materials, and skilled labour.



A refugee camp

Emergency water supply

Demand assessment

Demand estimates will clearly depend on local conditions. Table 1 shows guideline figures only. It is important to note that water quantity alone is not sufficient to ensure the health of refugees. Good sanitation and hygiene education and behaviour are also essential.

Table 1. A guide for assessing the demand for water in a disaster situation

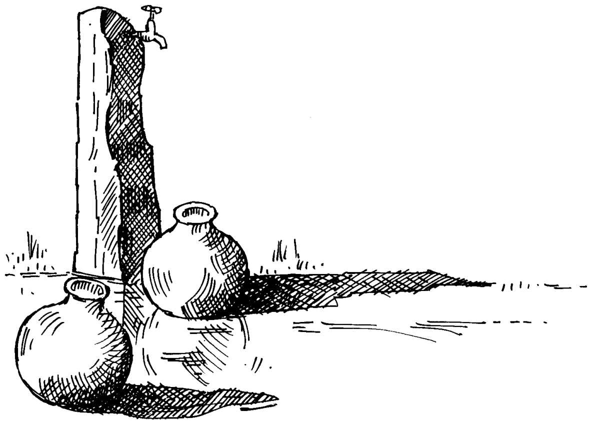
Individuals	Minimum for survival	3 – 5 l/p/d
	Desirable emergency supply	15 – 20 l/p/d
Health centres	Out-patients only	5 l/patient/d
	In-patients (excluding cholera hospitals) (not including laundry)	40 – 60 l/patient/d
Feeding centres		20 – 30 l/p/d
Toilet flushing water	Pour flush latrines	2 – 8 l/p/d
	Cistern flush	40 – 50 l/p/d
Animals (approx.)	Cattle	20 – 30 l/h/d
	Horses, mules, donkeys	15 – 25 l/h/d
	Sheep, goats,	10 – 20 l/h/d
	Camels	2 l/h/d
Irrigation	Very variable, but typically	3 – 6 l/m²/d

Allow at least 40% extra for unforeseen circumstances and waste.

Location of water sources

There are three types of water source:

- **Existing sources**
  When disasters occur where people live, it may be possible to revive some or all of the existing water supplies.



Existing water sources may be revived

- **Local sources**
  Local sources of water in areas where existing supplies are inaccessible due to the nature of the disaster, or where refugees gather away from existing communities; may include wells, boreholes, springs, streams, ponds or rainwater.
- **Distant sources**
  Water will usually be available from existing communities — which may be some distance away from the disaster area or refugee camp. The impact on these communities of an increase in the volume taken from a water source must always be considered.

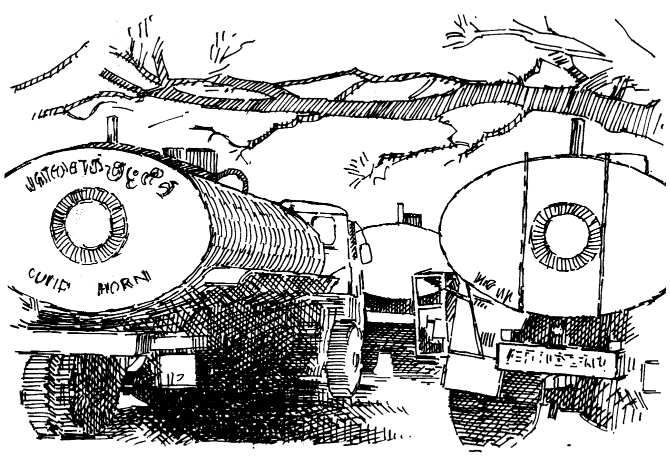
A note about water quality

Normal practice is to supply all water of a quality suitable for drinking.

Treating water to this standard takes time — even using the simplest of methods. It is often appropriate, therefore, to supply treated water from a distant source as an immediate measure, where possible. At this stage, cost is not usually a problem, as both government and non-governmental organizations are generally willing to mobilize short-term resources promptly.

The most common form of supplying water in this way is by water tanker. Though expensive, tankers can be mobilized quickly and offer flexibility of distribution.

Nevertheless, immediate consideration should be given to alternative sources of water and ways of treating this water once it is located.



Water tankers

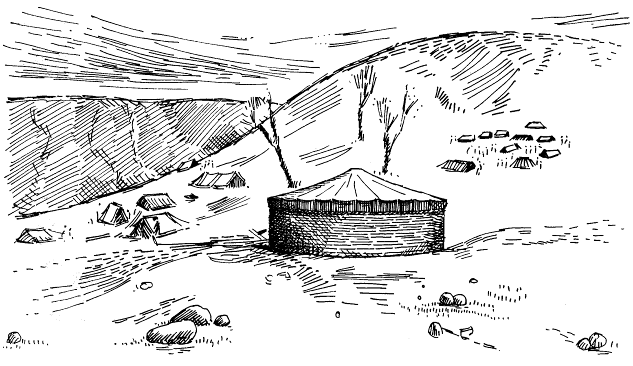
Water treatment (surface sources)

At the outset, it is usually unrealistic to expect the quality of water supplied to satisfy normal water-quality guidelines. Provided that the water is clear to look at, does not smell or have an unpleasant taste, and is disinfected, it is usually acceptable in the short-term, but it should be tested as soon as possible. There are a number of suitable water-treatment options to consider as longer-term solutions. These should aim to provide better-quality water.

- **Infiltration wells**
  The sand and gravel deposited beside and below a river acts as a very effective water filter. So, wells dug a short distance from a river-bank will usually provide better-quality water than the river itself.

Digging an infiltration well

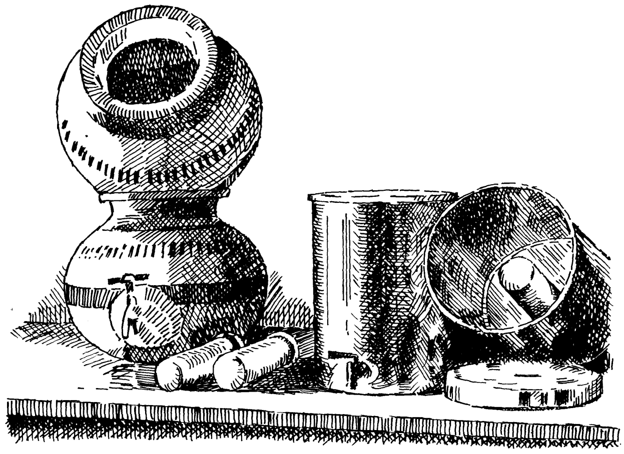
- **Settlement**
  The quality of water from surface-water sources, such as streams and rivers, can be increased significantly by allowing water to stand in calm conditions, preferably under cover. This allows some of the suspended material and associated pollution to sink to the bottom. Some fine particles will not settle, but will remain suspended indefinitely, unless encouraged to settle by the addition of small quantities of certain chemicals, such as aluminium sulphate. This must take place under carefully controlled conditions, as too much chemical additive will poison the water, and too little will not achieve the desired result of purifying the water.



Allowing water to settle in a package storage tank

- **Filtration**
  For large populations, slow-sand filters provide one of the simplest and most reliable forms of water treatment, but they occupy large areas of land, and require careful design and maintenance.

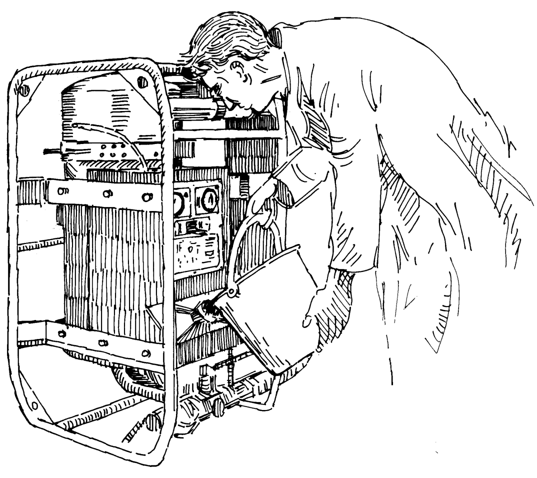
  Small volumes of drinking-water, suitable for individual households, can be obtained from domestic filters that allow water to pass through ceramic filter 'candles'.



Domestic water filters

- **Disinfection**
  As a final precaution to ensure that water is bacteriologically safe, it should be disinfected. This reduces the number of bacteria present in the water to a safe level. Disinfection is most effective in clear water. Chlorination is the most widely used technique, as it is available in various forms and as some of the chlorine compound should remain in the water, increasing the likelihood that the water will remain safe to drink during distribution and storage.

- **Package water-treatment plants**
  Package water-treatment plants are highly mechanized, self-contained units which, though small, compact, and quick to install, are expensive, and require routine maintenance by a skilled operative. They have been used successfully in Turkey and Zaire, however, as one of several water-treatment options.



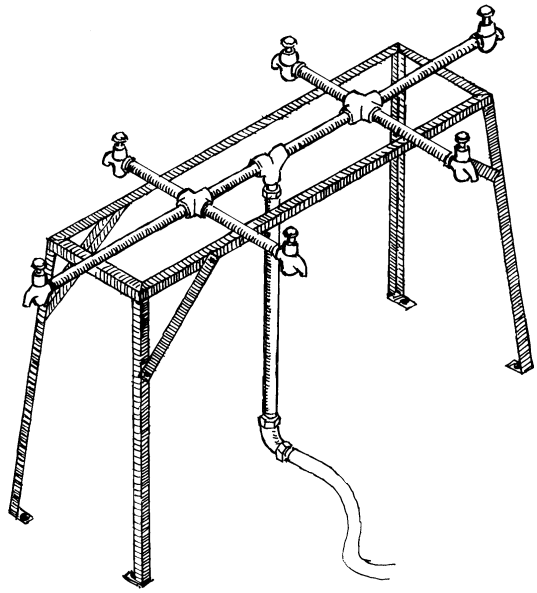
A package water-treatment plant

Emergency water supply

Water distribution

As noted above, water tankers are usually only suitable as a short-term measure. Water may be distributed more efficiently using a simple pipe network. Where possible, the distribution network should be connected to a water-storage tank. The tank may be filled slowly over a 24-hour period — allowing people to draw water when they need it most. The pipes should be designed to carry the maximum expected flow (see *The Worth of Water,* pages 117-120).

The water-collection point usually comprises a series of taps attached to the end of the pipe network (see right). Tap stands should be evenly distributed throughout the camp, and must be strong enough to withstand heavy, sometimes continuous, use.



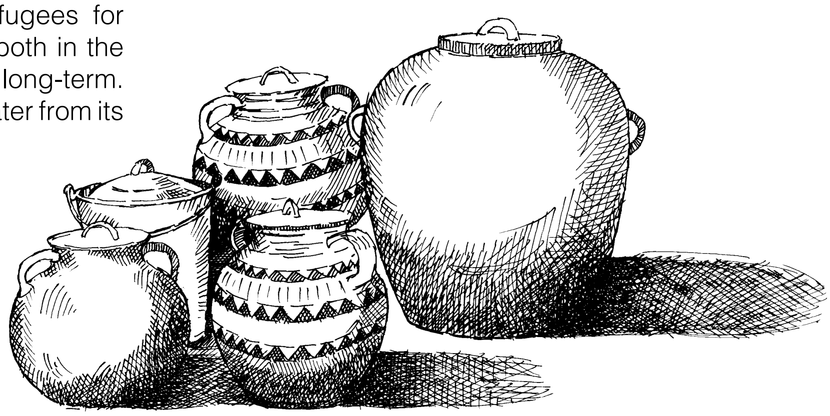
Oxfam water-collection point

Collection and storage

The collection and storage of water by refugees for domestic use is an important consideration both in the immediate aftermath of a disaster, and in the long-term. Refugees may have no means of collecting water from its source, so containers must be provided.

Contamination of water often takes place *after* the water has been collected from the supply. It is necessary, therefore, to provide water-collection and storage vessels that are easy to use and keep clean.

Hygiene education has an important role to play in ensuring that water is not contaminated.



Covered water containers

Further reading

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