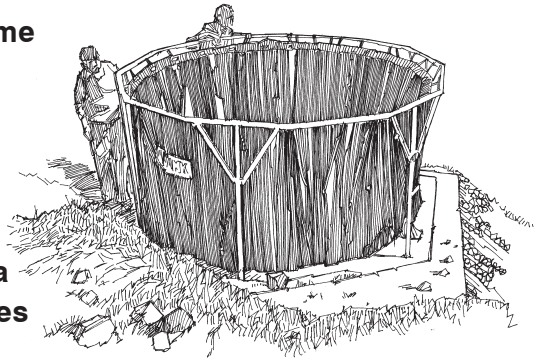
How much water is needed in emergencies

Water is essential for life, health and human dignity. In extreme emergency situations, there may not be sufficient water available to meet basic needs and in these cases, supplying a minimum level of safe drinking-water for survival is of critical importance. Insufficient water and the consumption of contaminated water are usually the first and main causes of ill health to affect displaced populations during and after a disaster. This technical note considers the minimum quantities of water that are required for survival in emergencies.



Factors affecting water requirements

The amount of water required to support life and health in an emergency varies with climate, the general state of health of the people affected and their level of physical fitness. Of equal importance in deciding how much water is needed are the expectations people have. A poor rural community may have far lower expectations concerning the quantity of water that is essential for life than people used to living in a wealthy urban environment. As a result, the poorer community is likely to consume less.

The Sphere Standards

Attempts have been made in the past to define minimum water quantities required in emergencies. In 2004, a cluster of relief agencies developed the document entitled *Sphere Humanitarian Charter and Minimum Standards in Disaster Response* which set standards for the minimum level of services people affected by an emergency should receive. For water supply, it states that all people should "have safe and equitable access to sufficient quantity of water for drinking, cooking and personal and domestic hygiene" and that public water points should be "sufficiently close to households to enable use of the minimum water requirement".

Most major relief agencies and their donors have accepted the Sphere Standards as the foundation for acceptable relief services. Sphere also describes *indicators* which relate to the delivery of the standards, including water quantity standards. Indicators are not binding like the standards; rather, they are suggestions of what might be a *reasonable interpretation* of the standards.

This technical note uses the Sphere indicators for guidance.

Carefully consider your local situation to be sure that they are appropriate for the conditions you are dealing with.

How much water does an individual use?

People use water for a wide variety of activities. Some of these are more important than others. Having a few litres of water to drink each day, for example, is more important than having water for personal hygiene or laundry, but people will still want and need to wash for the prevention of skin diseases and meeting other physiological needs. Other uses of water have health and other benefits but decrease in urgency as Figure 9.1 demonstrates.

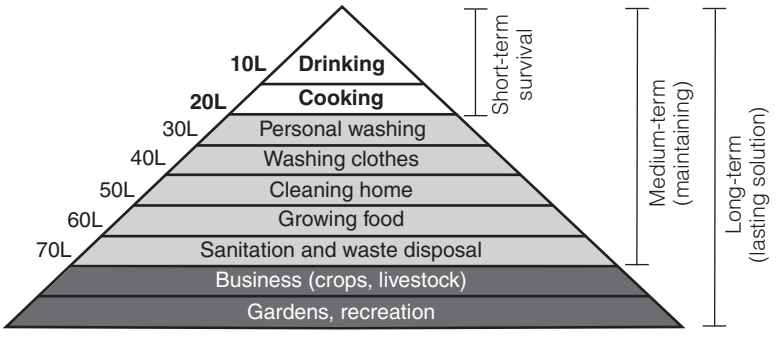


Figure 9.1. Hierarchy of water requirements (after Maslow's hierarchy of needs)

Priorities for water

People do not always have predictable needs. In some cultures, the need to wash sanitary towels or to wash hands and feet before prayer may be perceived to be more important than other water uses. Talk to people to understand their priorities. People may also have quite specific needs concerning the use of water for anal cleansing.

Women and men may have different priorities. Women may be concerned about basic household water requirements and water to wash during menstruation, whilst men may have concerns about livestock. In the assessment, waste spillage and leaks also need to be taken into consideration.

The Sphere Standards suggest a basic survival-level water requirement to use as a starting point for calculating demand (see Table 9.1). However, research indicates that 20 liters per capita per day is the minimum quantity of safe water required to realise minimum essential levels for health and hygiene. Therefore, efforts should be made to incrementally secure this amount for each individual.

Water sources and quality

People do not have to get all their water from a single source. They may be provided with bottled drinking-water, but use water from a stream to wash their clothes.

As demand for water increases, generally the quality required for each use can be reduced. Water for cleaning a floor does not have to be of the same quality as drinking-water and water for growing subsistence crops can be of a lower quality still.

Figure 9.2. Water does not have to be of the same quality for all uses

Table 9.1. Simplified table of water requirements for survival (per person)

Type of need	Quantity	Comments
Survival (drinking and food)	2.5 to 3 lpd	Depends on climate and individual physiology
Basic hygiene practices	2 to 6 lpd	Depends on social and cultural norms
Basic cooking needs	3 to 6 lpd	Depends on food type, social and cultural norms
Total	**7.5 to 15 lpd**	lpd: Litres per day

Source: Adapted from Sphere. Also see WHO, 2011. *Guidelines for drinking-water quality, 4th edition.* World Health Organization, Geneva. http://www.who.int/water_sanitation_health/publications/2011/dwq_chapters/en/index.html

Sanitation and water requirement

The type of sanitation provided has a big impact on water requirement. Water-borne types of sanitation, such as flush toilets, require a large volume of water (up to 7L per person per use).

Pit latrines, or simple pour-flush toilets (Figure 9.3) have a much lower water requirement.

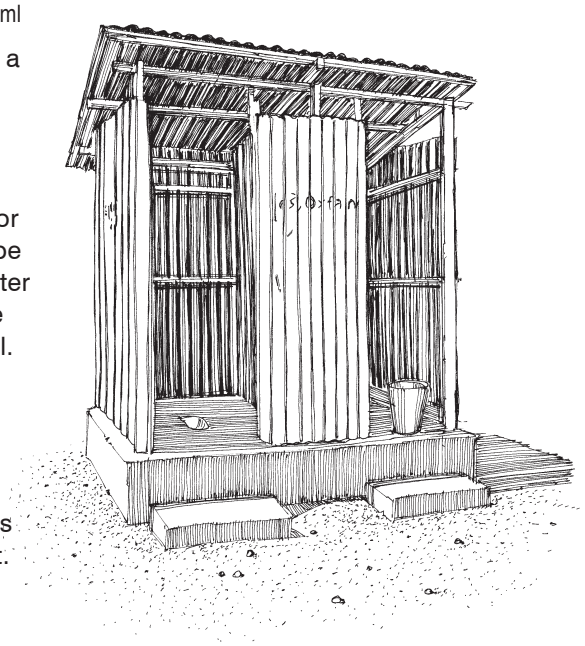


Figure 9.3. Pour-flush pit latrines

Accessibility

Even if plenty of water is provided, there may be other limits to its use, such as the time taken for people to travel and queue to collect it. If it takes more than 30 minutes to collect water, the amount they will collect will reduce (see Figure 9.4).

Providing washing and laundry facilities near the water points reduces the need to transport water.

Box 9.1. Minimum provision of domestic water containers

Two vessels 10-20L for collecting water plus one 20L vessel for water storage, (narrow necks and covers) per 5 person household.

Sphere (2004) suggests that in emergencies the maximum distance from any household to a water point be 500 metres and the maximum waiting time to collect water be 15 minutes.

Water for non-domestic use

Water is essential for many other services provided in emergencies, especially health care. Affected communities may also want to use water for religious activities and agriculture. Users, not providers, decide how they will use a scarce supply of water. If people consider their livestock to be more important than doing the laundry, then they will distribute the available water accordingly. Ensure that there is enough water to meet people's priority needs with enough left over to meet the priorities related to effectively managing the emergency! Table 9.2 suggests minimum water quantities for non-domestic uses.

Step-by-step improvements

In the first phase of an emergency, it may not be possible to meet all the water needs of the community. A staged-approach should be adopted with initial efforts focused on meeting survival needs (Figure 9.5). The service can be gradually be improved with time as resources allow (see Table 9.3).

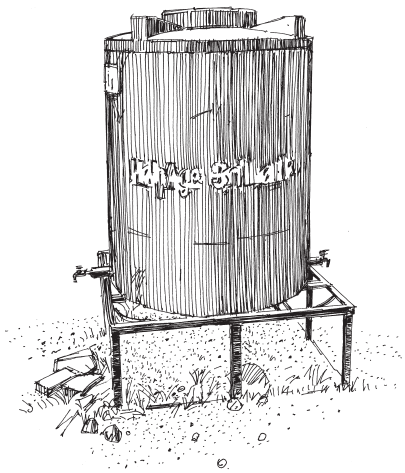


Figure 9.5. Meeting survival needs

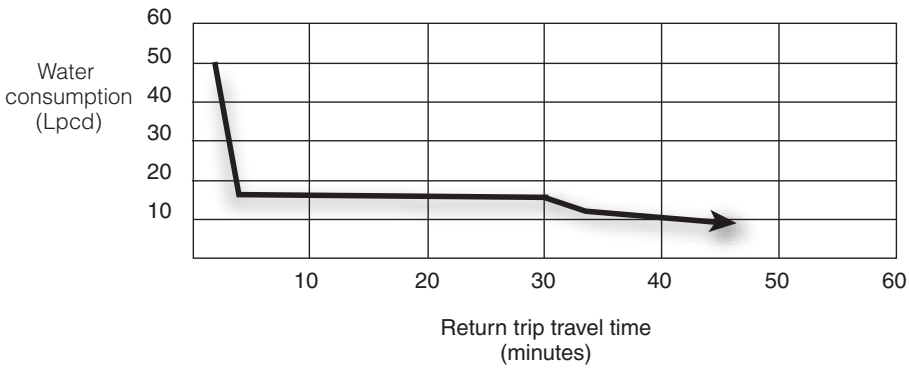


Figure 9.4. Relationship between water collection journey time and domestic consumption

Table 9.2. Guidelines for minimum emergency water quantities for non-domestic use

Use	Guideline quantity
Health centres and hospitals	5 litres/out-patient; 40-60 litres/in-patient/day. Additional quantities may be needed for laundry equipment, flushing toilets, etc.
Cholera centres	60 litres/patient/day; 15 litres/carer/day
Therapeutic feeding centres	30 litres/in-patient/day; 15 litres/carer/day
Operating theatre/maternity	100 litres / intervention
SARS isolation	100 litres / isolation
Viral Haemorrhagic Fever isolation	300-400 litres / isolation
Schools	3 litres/pupil/day for drinking and hand washing (use for toilets not included: see below)
Mosques	2-5 litres/person/day for washing and drinking
Public toilets	1-2 litres/user/day for hand washing; 2-8 litres/cubicle/day for toilet cleaning
All flushing toilets	20-40 litres/user/day for conventional flushing toilets connected to a sewer; 3-5 litres/user/day for pour-flush toilets
Livestock/day	Cattle, horses, mules: 20-30 litres per head; goats, sheep, pigs: 10-20 litres per head, Chickens: 10-20 litres per 100
Vegetable gardens	3-6 litres per square metre per day

Source: Adapted from Sphere

Table 9.3. Suggested quantities of water, and distances of water points from shelters at different stages of an emergency response

Time – from initial intervention	Quantity of water (litres/person/day)	Maximum distance from shelters to water points (km)
2 weeks to 1 month	5	1
1 to 3 months	10	1
3 to 6 months	15 (+)	0.5

Source: Adapted from Sphere. Also see WHO, 2008. *Essential environmental health standards in health care*. World Health Organization, Geneva. http://www.who.int/water_sanitation_health/hygiene/settings/ehs_hc/en/

Calculating water demand

A large number of assumptions have to be made to calculate the total water requirements in an emergency. Often, basic information is not available and the situation changes very quickly. Box 9.2 shows how total water demand can be estimated and the types of assumption that have to be made. Remember, it is only an estimate! Demand can be much higher or lower than estimated, so allow as much flexibility as possible in the amount of water you can actually provide.

Ensuring supply has an impact

Providing water does not always mean it will have the desired impact on, for example, the protection of health. Look at the entire water supply system and identify weak points. Providing more water to a tap stand will not necessarily increase consumption if it is too far away, or if people do not have enough water containers. Providing more water may cause drainage problems if there are no facilities for disposing of sullage. Regularly check how much water people are actually using; when and where are they using it; and how they are using it.

Box 9.2. A sample calculation

How much water is needed for a camp of 5,000 displaced people (including 1,000 primary school age children), 25 relief agency staff, and 75 cows?

The camp has a mosque and a small health centre without patient facilities. Each family has been provided with a pit latrine and most people use water for anal cleansing. A feeding centre is currently provided but is expected to close once the health of the population has stabilized. A primary school will be constructed at a later stage.

Decisions

- Water for crops will not be provided.
- Staff will be resident during the initial stages of the emergency but will be able to travel into the camp at a later date and are not normally included in this calculation.
- Assume 10% wastage from spills, leaks and waste.

Phase 1: Survival supply (litres)			
Domestic use:	5,000 x 7.5	=	37,500
Feeding centre (small children estimated number):	500 x 30	=	15,000
Carers:	500 x 15	=	7,500
Relief staff:	25 x 30	=	750
Health centre : (assume 250 visits per day):	250 x 5	=	1,250
Mosque (assume all adults visit daily):	3,000 x 2	=	6,000
Cattle:	75 x 20	=	1,500
Total :		=	*69,500*
Add 10% leakage:		=	6,950
Approximate litres per day:		=	76,450

Phase 2: Long-term solution (litres)			
Domestic use (assume population remains static):	5,000 x 15	=	75,000
Staff office (daily office use only):	25 x 5	=	125
School:	1,000 x 3	=	3,000
Health centre:	250 x 5	=	1,250
Mosque:	3,000 x 5	=	15,000
Cattle (allow for some growth in numbers):	100 x 30	=	3,000
Total		=	*97,375*
Add 10% leakage		=	9,737
Approximate litres per day:		=	107,112

Further information

House, Sarah and Reed, Bob (2000) *Emergency Water Sources: Guidelines for selection and treatment,* WEDC, Loughborough University, UK. http://wedc.lboro.ac.uk/publications/

The Sphere Project (2004) *Humanitarian Charter and Minimum Standards in Disaster Response.* The Sphere Project: Geneva, Switzerland. http://www.sphereproject.org

U.S. Agency for International Development, Bureau for Humanitarian Response, Office of Foreign Disaster Assistance (OFDA) (1998) *Field Operations Guide for Disaster Assessment and Response* http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/resources/index.html#fog

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Editorial contributions, design and illustrations by Rod Shaw
Line illustrations courtesy of WEDC / IFRC. Additional graphics by Ken Chatterton.

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