Minimum water quantity needed
for domestic uses

WHO Regional Office for South-East Asia

How much water is needed?

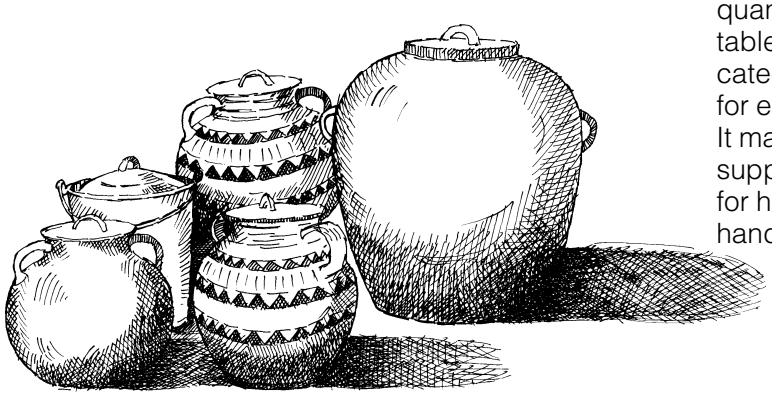
A water supply is an essential requirement for all people. Determining how much is needed is one of the first steps in providing that supply. Providing enough water to meet everybody's needs may be difficult in the short-term so water can be made available in stages. Continuous checking - including talking to the various users of the supply (especially women) will enable limited resources to be focused effectively. Providing water is never free; the water needs to be collected, stored, treated and distributed - providing too much water is a waste of money. Taking too much water from a limited source may deprive people elsewhere of water and have adverse environmental and health impacts.

Collect basic information

- How many people are there?
- How much does each individual use?

How many people are there?

Establishing the population to be supplied may not be easy after an emergency, but consulting administrators, feeding centres, community leaders and making direct observations (such as the average number of people per shelter and then counting shelters) can give various estimates of the population - don't just rely on one figure but compare independent assessments. Displaced people will also be moving about, so estimate changes in population. Include local populations as well as displaced people.



How much does each individual use?

People use water for a wide variety of activities. Some of these are more important than others, for example, having a few litres of water to drink a day is more vital than washing clothes - but people will need to wash if skin diseases are to be prevented and physiological needs met. Each additional use has health and other benefits, but with decreasing urgency (see Figure 1). This is often measured in litres per person (capita) per day (Lpcd).

A hierarchy of water requirements

People's needs are not always predictable - for example the need to wash sanitary towels or to wash hands and feet before prayer may be felt to be more important than other uses. Talk to people to confirm their priorities. Different populations may also have specific needs - such as using water for anal cleansing. Different genders will also have different priorities, with women being concerned about basic household needs at the top of the hierarchy, men perhaps having a concern for livestock, girls needing water to wash during menstruation and boys wanting to go for a swim! Waste, spillage and leaks also need to be taken into consideration. Hot or windy weather may increase people's individual needs.

To establish how much an individual needs, standard quantities have been established as guidelines (see table 1). These have been broken down into categories to increase the accuracy of the estimate, for example not all water will be needed at the house. It may be preferable to provide separate water supplies for bathing, washing or animals, as well as for hospitals, feeding centres and schools. Water for hand washing will be needed near latrines.

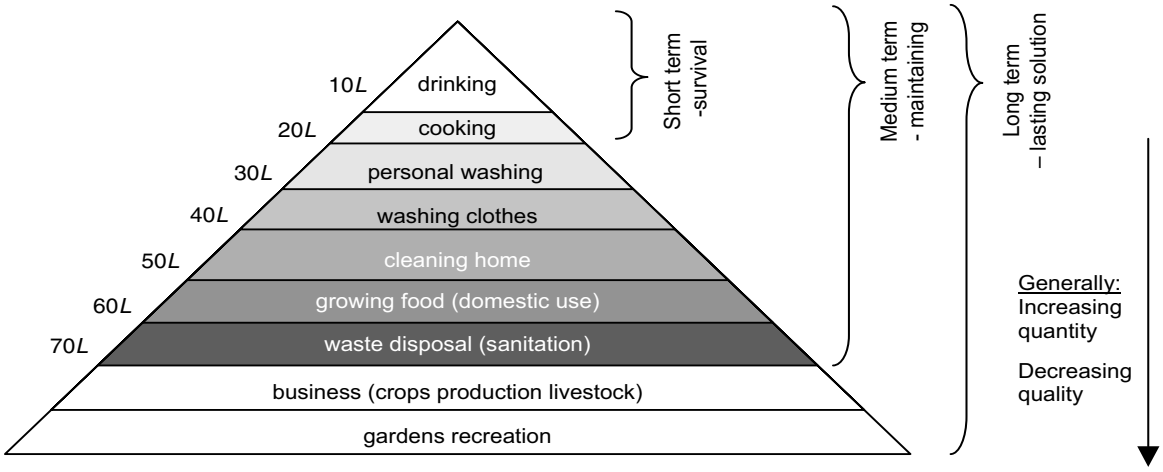


Figure 1. Hierarchy of water requirements (inspired by Abraham Maslow's (1908-1970) hierarchy of needs)

Water does not all have to come from the same source, thus people may be provided with bottled drinking water, but use a stream to wash their clothes in. As demand for water increases, generally the quality needed for each use can be reduced - water for cleaning a floor does not have to be of drinking water standard and water for growing subsistence crops can be of a lower quality still. Thus, before the quantity of water can be established, some decisions need to be made.

Decide:

- what needs are going to be catered for; (eg. only drinking or drinking, cooking and washing)
- what is the programme for implementation; (eg. provide limited water initially and a full supply later)
- what sources are available; (eg. are resources limited, what is the water quality) and
- who is managing each supply (e.g. which organisation is responsible for domestic supplies, hospital supplies, needs of schools).

Managing demands

It may be that some water demands can be reduced by providing alternatives. Water borne sanitation (flush toilets) is a luxury that needs a large volume of water (up to 70L per person per day) - pit latrines or simple pour-flush toilets should be the first choice. Some water requirements may be met by using lower quality water (untreated) or recycling water. Encouraging drought resistant crops or keeping livestock that can survive on less water can reduce demands, as can providing alternative livelihoods that require less water.

Ensure supply is having an impact

Supplying water does not mean it is all having the desired impact. Look at the whole 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 people do not have enough water containers. Providing more water may cause drainage problems if there are no facilities for disposing of sullage.

Evaluate

- see how much water people are actually using
- and when and where they use it

Table 1. Some standard water requirements

Standard: All people have safe access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene. Public water points are sufficiently close to shelters to allow use of the minimum water requirement.

Key indicators:
- At least 15 Lpcd is collected.
- Flow at each water collection point is at least 0.125 litres per second.
- There is at least 1 water point per 250 people.
- The maximum distance from any shelter to the nearest water point is 500 metres.

Guidelines:
Individuals:
Minimum " survival" allocation. 7 Lpcd (sustainable for only a few days)
- Drinking 3-4 Lpcd
- Food preparation, cleanup 2-3 Lpcd

Medium term allocation: 15-20 Lpcd (sustainable for a few months)
- Drinking 3-4 Lpcd
- Food preparation, cleanup 2-3 Lpcd
- Personal hygiene 6-7 Lpcd
- Laundry 4-6 Lpcd

Other needs
- Health Centres. 5 litres per Out-Patient; 40-60 litres per In-patient
- Hospital (with laundry facilities). 220-300 litres per bed
- Schools 2 litres per student; (10-15 litres per student if water-flushed toilets).
- Feeding Centres. 20-30 litres per patient
- Camp Administration. (Staff accommodation not included) 5 Lpcd
- Staff accommodation. 30 Lpcd
- Mosques. 5 litres per visitor
- Sanitation (hand-washing, cleaning latrines etc.). depends on technology.

Livestock and agriculture
- 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

Actual values depend on many variables (such as cultural practices and climate) that should be assessed by specialists

From the water point to the home

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 get it. If people take more than 30 minutes to collect water, the amount they will collect will reduce (see Figure 3). The amount of storage facilities available is also important (see Table 2). Washing facilities near the water points reduce the need to transport water.

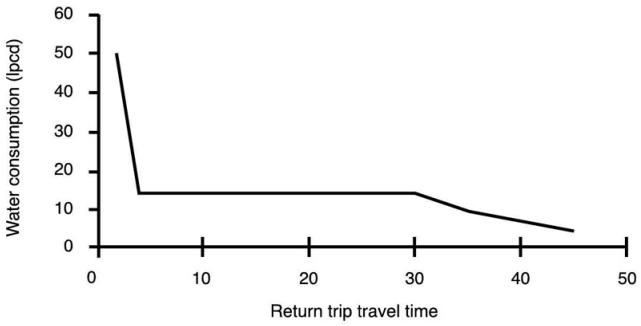


Figure 3. Typical relationship between water collection journey time and domestic consumption (after Cairncross & Feachem 1993)

Table 2. Water collection standards

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

What happens to waste water?

Simply supplying as much water as possible is not the best solution. Once more than the basic quantity is available, any additional water will eventually need to be disposed of (spillages, sullage or wastewater). The costs of supplying water will therefore need to take the costs of disposing of this used water safely.
Some water can be re-cycled, reducing the need for both supplying and disposing of water - for example using sullage and spilled water from washing facilities can be used to grow crops.

Resources

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

House, Sarah & Reed, Bob (2000) *Emergency water sources: guidelines for selection and treatment* WEDC: Loughborough University http://wedc.lboro.ac.uk/publications/

Sample calculation

How much water is needed for a refugee camp for 5,000 displaced people (including 2000 school age children), 25 relief agency staff, and 75 cows?

Decisions

Water for crops will not be provided
Water for livestock will rely on a river
Water for the hospital is the responsibility of another agency and will be a separate supply system. A feeding centre, however, will be supplied with water.
Staff will be resident during the initial stages but will be able to travel into the camp at a later date and are not included in that calculation
Assume 10% wastage (from spills, leaks, waste)
School will not be operational until after phase 1 and will not have flush toilets
Assume some further population movement

Phase 1 - an emergency supply

Domestic use:	5000 x 7 litres	= 35,000L (7 Lpcd)
Feeding centre	5000 x 20 litres	= 100,000 L (20 Lpcd)
Staff centre	25 x (5 + 30) litres	= 875 L (5 Lcpd for office plus 30 Lcpd for accommodation)
	total	= 135,875 L plus 10% leakage
		≈ 150,000 litres per day

Phase 2 - a long-term solution

Domestic use:	4500 x 20 litres	= 90,000 L (planned decrease in population, but increase allowance to 20 Lpcd)
Feeding centre	1000 x 30 litres	= 30,000 L (feeding vulnerable groups only but providing 30 Lpcd)
Staff centre	25 x 5 litres	= 125 L (staff no-longer resident)
School	2000 x 2 litres	= 4,000 L (2L per pupil)
	total	= 124,125 L plus 10% leakage
		≈ 137,000 litres per day

Evaluate

Long term treatment facilities limited due to difficulties in importing chemicals, so reduce domestic demand by providing washing facilities using partially treated water.

World Health Organization

Regional Office for South-East Asia
Mahatma Gandhi Marg
New Delhi, 110002,
India

Phone: (+91-11) 2337-0804
Fax: (+91-11) 2337-8438
E-mail: wsh@whosea.org
http://www.whosea.org

This information has been prepared by WEDC
Author: B. J. Reed **Series Editor:** R. A. Reed **Design:** G. McMahon **Illustrations:** R. J. Shaw **Graphics:** Ken Chatterton
Water, Engineering and Development Centre, Loughborough University, Leicestershire, UK.
Phone: +44 1509 222885 Fax: +44 1509 211079 E-mail: WEDC@lboro.ac.uk www.lboro.ac.uk/wedc