52. ater — quality or quantity?

Anyone thinking of implementing a water project must clearly understand water quality and quantity requirements. This Technical Brief looks at these requirements and compares their importance in relation to improving people's health.

The previous Technical Brief discussed, in some depth, just how important good hygiene understanding and practice are; improved water quality or quantity alone will not necessarily improve health if communities do not have an understanding of the concepts of hygiene and disease transmission. If positive benefits are to ensue, communities must also have the will, and the financial and management capabilities to be able both to operate and maintain water projects, and to put into practice what they know about hygiene.

Water (or lack of it) can play a part in the transmission of diseases in various ways. The four water-related transmission routes are highlighted in Table 1.

Many of the water-borne, water-based and water-washed diseases are transmitted through the 'faecal-oral' route; pathogens or parasites from the faeces of one person are transmitted by various routes to the mouth of another, and in this way cause illness. Some diseases, however, such as skin or eye infections, diseases caused by lice or mites, or those caused by pathogens or parasites which penetrate the skin, are not transmitted by this route. For these diseases the main prevention strategies are improved hygiene understanding and practice, and reducing contact with the contaminated medium.

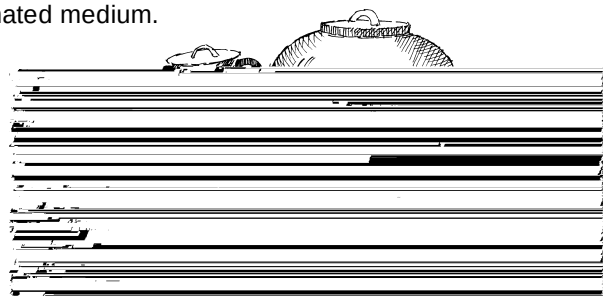


Table 1. Di ea e an mi i n and e en i e a egie
(A ss *et al.*, 1 3.)

Cla ifica i n	T an mi i n	E am le	e en i e a egie
-b (-b s s s b - s)	s s s s b s	s(.) s(.) s A	*quality* s s s s s
- s (s)	s ss s s s s s s b s	s(. b s) b s	
		s s ss	s s *quality* (s s) s (s s)
s -	b s s b b	b ss	s - s s s b s s s b s s b s s s s s s s s s

Table 2. Recommended minimum water-quantity requirements

Usage	Water usage (litres per head per day unless otherwise stated)
	15 25
	15 30
( )	220 300
	- 5
	- 40 60
	25 40

0 -

There are many water uses (e.g. drinking, cooking, washing, agriculture etc.) and the quantity and quality required for each varies. Drinking-water requirements are usually the most stringent.

Basic requirements for drinking-water

- There must be enough to prevent dehydration.
- It should be acceptable to the consumer. (A bad taste or colour, staining, or unpleasant odour can cause a user to choose an alternative source.)
- It should be free from pathogenic (disease-causing) organisms and toxic chemicals.
- It should not cause corrosion or encrustation in a piped water system, or leave deposits.

- others such as pH and turbidity can reduce the effectiveness of treatment processes such as disinfection.

Microbiological and biological contaminants are the major source of illness.

The World Health Organization (WHO) has produced guideline levels for quality for use as targets and as an aid for countries who wish to produce their own. In many regions, however, the WHO guideline levels may not be achievable in the short term and, therefore, interim national standards should be set which promote improved water quality and which are realistic. *Setting targets that are too high can be counterproductive; they may be ignored if they are not attainable.* National standards should reflect national conditions, priorities and capacity to improve water supplies, especially in small communities where the choice of source and treatment are limited, and finances are constrained.

E.coli (or thermotolerant coliforms) are used as indicators of faecal pollution. If *E.coli* are present then it is likely that pathogens are also present. The WHO guideline level for thermotolerant coliforms indicates that, for all water intended for drinking, none should be detectable in any 100ml sample. Alternative figures are often quoted which are more appropriate for rural communities and emergency situations (Table 5).

Water-quality data gives information about the present situation but does not show the patterns of intermittent or seasonal pollution. A *sanitary survey* (see pages 69-72) will give information about the likelihood of faecal pollution. *Local knowledge* and *local medical information* can also help in assessing pollution problems.

When making an assessment of drinking-water quality, the investigator should be aware that *drinking-water can often become contaminated from unclean collection vessels or storage containers in the home.*

In general, microbiological pollution levels of sources vary from low levels in rainwater (if it is collected in a clean environment), deep groundwater and springs (unless in an area of highly fissured rock), to high levels in shallow groundwater (unprotected hand-dug wells), rivers, streams

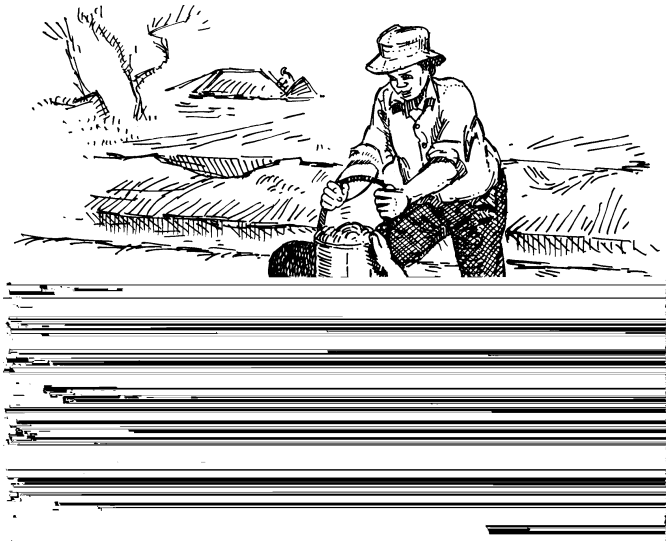
Quality can be improved by:

- source protection;
- improved hygiene awareness and practice;
- improved sanitation;
- water treatment;
- efficient and safe distribution to the consumer; and
- good storage practices.

Quality versus quantity

Steven Esrey highlights the relative impact of interventions on the reduction in diarrhoeal diseases (Table 6). From this it can be seen that quantity has a greater effect than quality, and also that good hygiene and sanitation practice have even greater impacts.

Tab 6. T c a a a
I R c a a (a . %)



Summary

When setting up a water-supply programme, the following points should be noted:

- In general, an increase in water quantity is more beneficial than an increase in water quality.
- The relative importance of water quality and water quantity depends on the situation. In urban areas or in refugee situations, for example, where large numbers of people live in close proximity, greater care must be undertaken to prevent epidemics. The quality of water, therefore, becomes more important.
- An excess supply of water can lead to other health hazards, such as standing water.
- In general, sanitation and hygiene understanding have a greater impact on health than improvements in water quality or quantity.

Further reading

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