

# Protection of water resources

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In humanitarian programmes, in terms of public health, the most frequent risk of pollution of water for human consumption is faecal contamination. Protection of water sources consists of excluding polluting activities from a certain area around the water point, and implementing measures that allow water quality to be maintained after abstraction, up to the time of consumption. Water resources may be differentiated according to their vulnerability to pollution (see Chapter 3).

## 1 Groundwater

### 1.1 Migration of bacterial pollution

See Chapter 13, Section 3.5.

### 1.2 Protection zone

#### 1.2.1 WELLS AND BOREHOLES

In a continuous environment, the protection zone is the area up to 30 m around the water point (Figure 1). Sources of pollution (latrines, waste pits, septic tanks etc.) must be located outside this zone, preferably downstream of it. It is important to maintain a minimum depth of 2 m between the bottom of latrine pits etc. and the water table.

#### 1.2.2 SPRINGS

The protection zone upstream of springs is also 30 m (Figure 2). It must be protected by an enclosure, preferably with a hedge.

A 0.50 m deep ditch must be dug to divert run-off water.

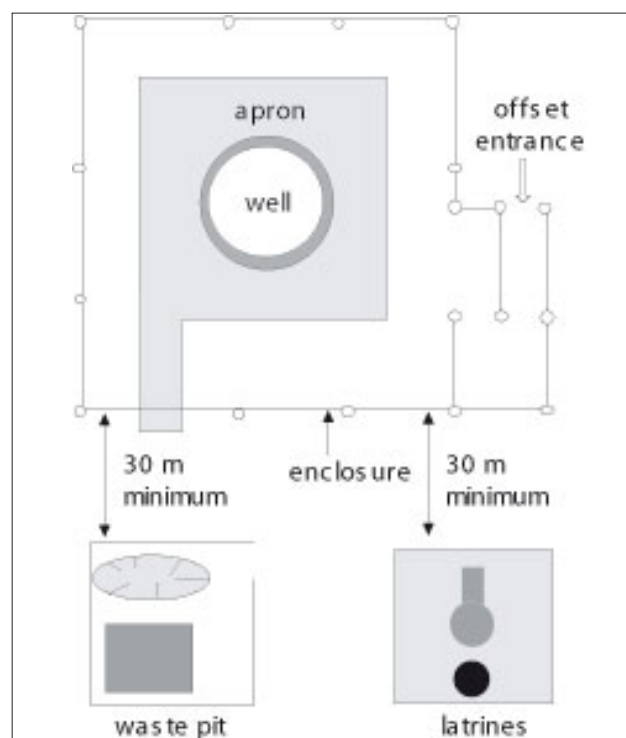


**Figure 1: Protection zone of a well/borehole in a continuous environment.**

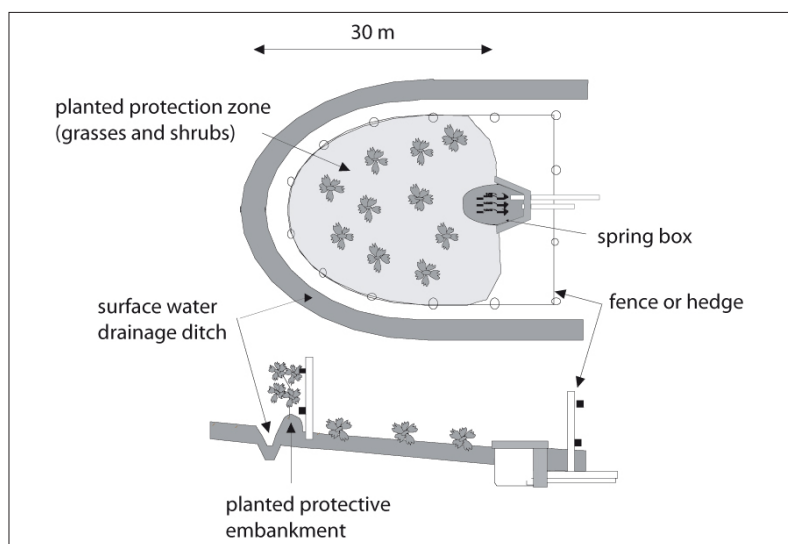


**Figure 2: Protection zone of a spring.**

To limit the erosion of the protection zone, which sometimes has a considerable slope, bushes and grass are planted (note: not trees), which also allows this zone to be distinguished from the surrounding terrain.

## 2 Surface water

It is very difficult to protect surface water from pollution. However, surface water is easy to access, and is therefore often used as a water source in emergency situations.

### 2.1 Exploitation of a stream

It is rare to be able to decide where a population should be located, and most interventions take place on sites that are already settled. Along a stream, good site planning takes into account flow direction and water usage, making sure that pollution of the watercourse is restricted (drainage), and placing the latrines more than 30 m away from the stream, downstream of the site (Figure 3).

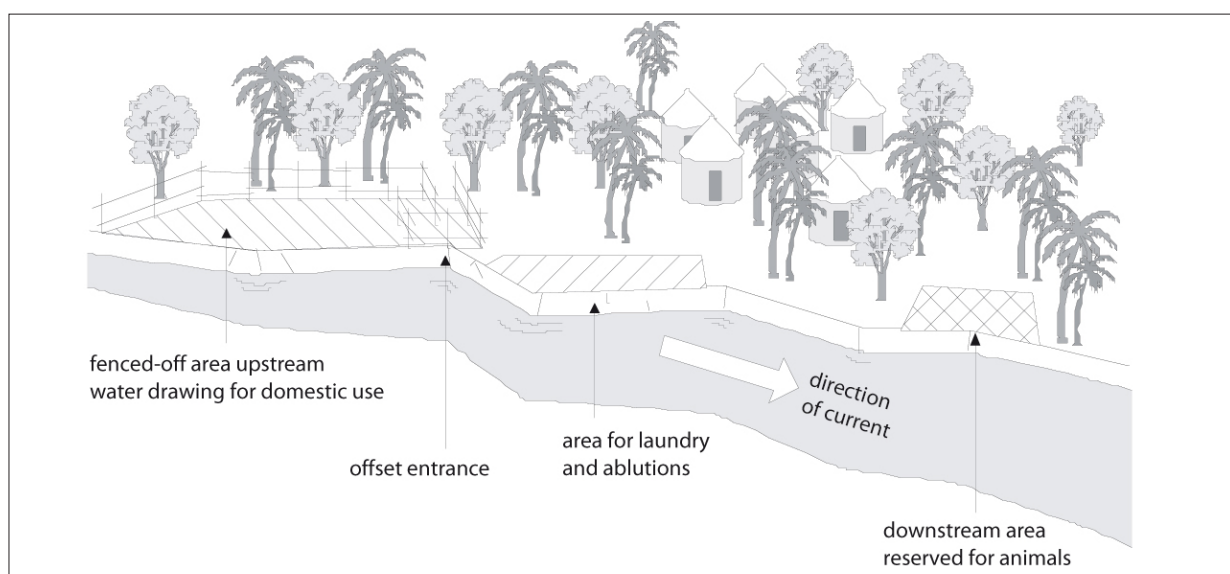


**Figure 3: Example of a layout along the bank of a river.**

Water for domestic use is abstracted upstream, in a well-defined area reserved for this purpose; a fence or hedge with an offset entrance keeps animals out. Just downstream, an area is created for clothes washing (and possibly ablutions). Much further downstream, another area is reserved for watering animals.

## 2.2 Protecting ponds

In certain areas such as Africa and Asia, ponds are the only water source used. They contain stagnant surface water, which presents many problems: they are difficult to protect, pollution is not carried away as there is no flow, and they have limited capacity to ‘digest’ organic pollution, which is frequent.

An example of protection works carried out by ACF in Myanmar is shown in Figure 4.



**Figure 4: Pond layout**  
(Myanmar, ACF, 1997).

## 3 Abstraction, transport and storage of water

Water pollution often occurs at water points during abstraction. It is therefore important to protect wells, springs and boreholes correctly. Monitoring of the bacteriological quality of borehole water carried out in a bedrock area by ACF (Sudan, 1996-1997) showed a relationship between water pollution and the quality of borehole grouting and surface works; surface works are mentioned in Annex 14 and in the sections dealing with specific types of water point.

Protective measures must not stop at the water point: they must be applied until the moment the water is consumed. It is therefore necessary to prevent water from becoming polluted during transport and storage.

Vessels must be closed, and cleaned regularly (if possible with 100mg/l chlorine solution – see Chapter 12). It is preferable to use jerrycans than buckets. If buckets are used, water has to be taken with a cup or other container, which may be exposed to flies, dirty hands etc., whereas if a jerrycan is used, the water can be poured out or taken via a tap.