

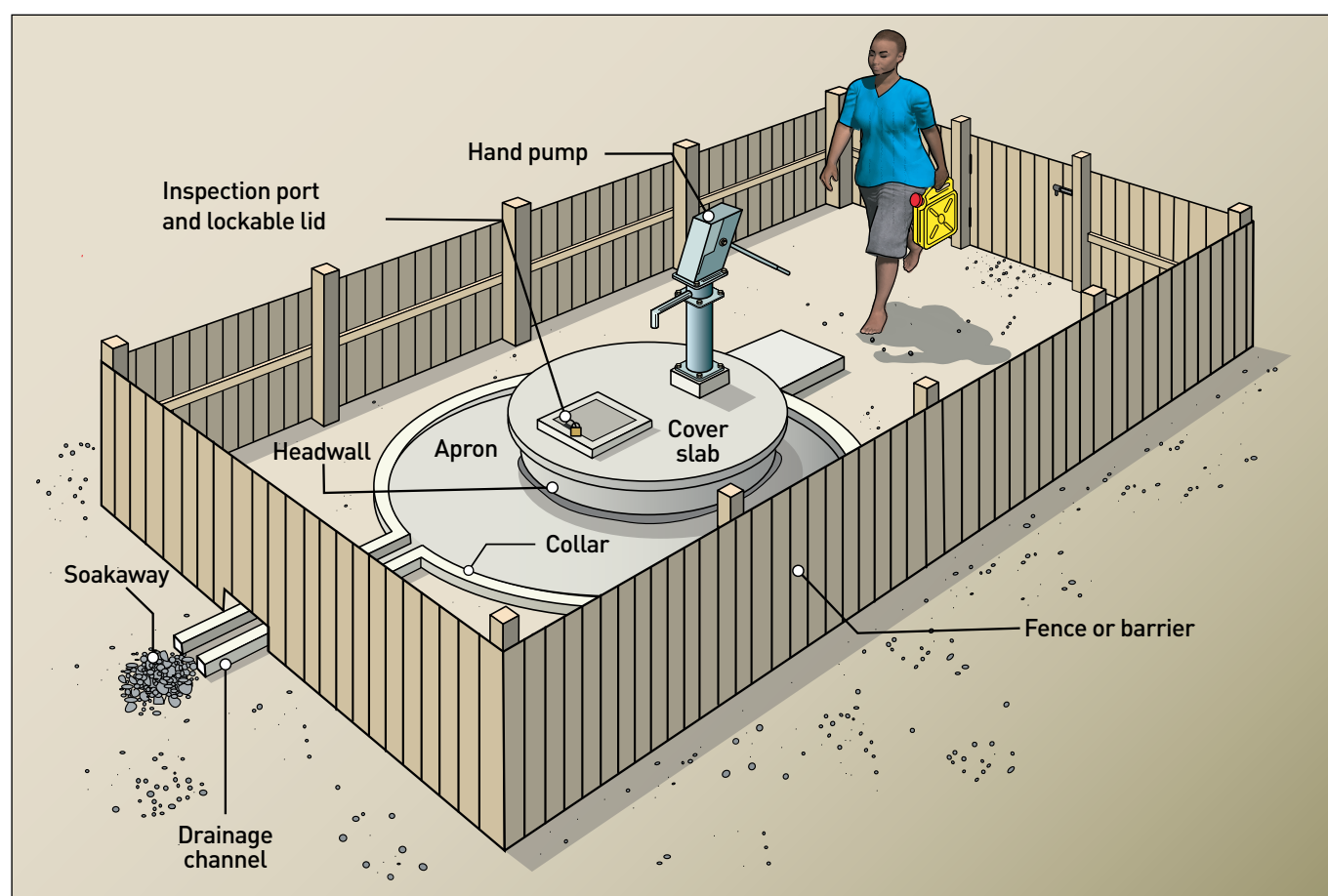
# Dug well with a hand pump

**A dug well consists of an excavated hole in the ground, from which drinking-water may be accessed from a groundwater aquifer (which is typically shallow).**

Though groundwater sources are generally considered to be of a higher quality than surface water sources, appropriate disinfection/treatment of groundwater is recommended where there is a risk of contamination.

**Improved dug wells** are lined, covered, and fitted with a secure water lifting device, such as a pump or windlass, to provide safe drinking-water.

**Unimproved dug wells** (i.e. open or uncovered wells) are particularly susceptible to contamination, and should be avoided where possible.



**Figure 1** A common dug well with hand pump

Dug wells can be accessed for operations and maintenance (e.g. disinfection) or improvement works (e.g. rehabilitation or deepening), and will rarely be less than 1 meter in diameter.

It is important to ensure that the well is an appropriate depth and width to produce sufficient quantities of water, otherwise alternative, and possibly less safe, sources of drinking-water may be sought by the users.

Figure 1 illustrates an appropriately designed dug well with a hand pump that is commonly encountered.

A section view of the belowground elements of the well is presented in Figure 2.

It should be noted that, although these figures represent a typical dug well design, different designs exist that may also be appropriate for the provision of safe drinking-water.

Typical risks (or hazards) associated with a dug well with a hand pump are presented in the corresponding sanitary inspection form. Note that these risk factors do not represent all possible risks that may be present.

Dug wells can be excavated by hand or with machinery, and usually consist of the following main components:

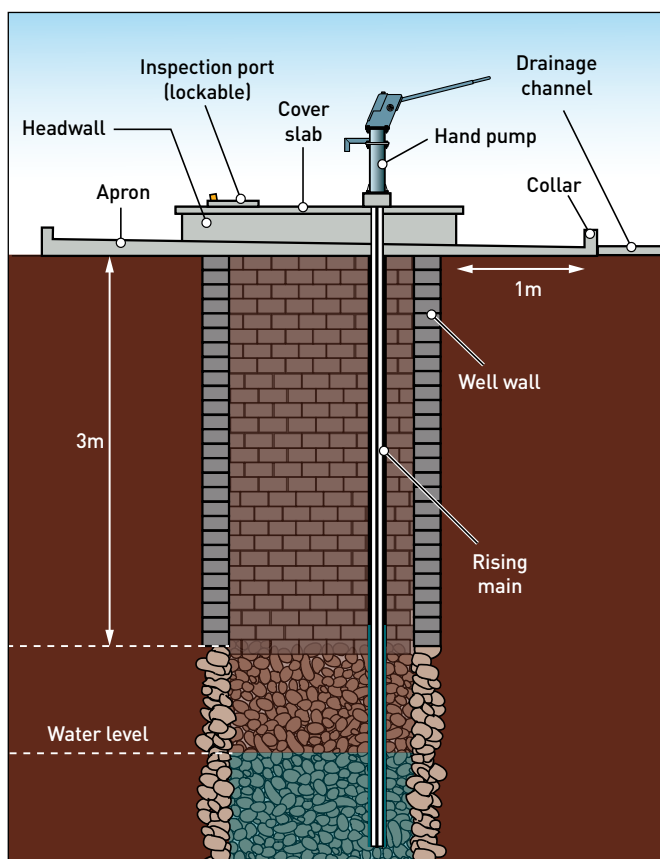
- **Hand pump:** Draws water from the aquifer and delivers it through a rising main (or pipe) to the point of collection above the surface. The pump should be in working order and good condition, and securely fitted to the cover slab (i.e. tightly fitted with no gaps) to prevent contaminants from entering the well.
- **Cover slab:** A raised stone, brick or concrete cover built over the well when the well wall (lining) is complete. The cover slab should prevent contaminants from entering the well and provide a hard-standing area for users. May also be referred to as the “well cover”.
- **Inspection port:** Permits access for inspection, operations and maintenance, or improvement works. The inspection port should always be closed when not in use and should have a lockable sealed lid to prevent contaminants from entering the well and vandalism.
- **Well wall:** The wall (or lining) between the well and the surrounding ground which prevents the well from collapsing. Typically constructed with reinforced concrete rings, masonry with bricks or concrete blocks. The top 3 meters (minimally)<sup>a</sup> of the well should be lined with an impermeable barrier (e.g. bricks and mortar) to prevent any surface water from draining into the well. The well wall beneath the water level should be permeable to facilitate the entry of groundwater into the well.
- **Headwall:** The part of the well wall (or lining) aboveground at a convenient height for collecting water that helps to prevent spilt water, rainfall and surface runoff from entering the well.
- **Apron:** A reinforced stone, brick or concrete floor built around the headwall to protect the well from surface contamination. The apron should be at least 1 meter<sup>a</sup> wide all around the headwall and should slope downwards from the hand pump towards a collar to ensure adequate drainage.
- **Collar:** The raised edge of the well apron that captures water and directs it away from the well via a drainage channel, preventing water from ponding and stagnating in the well area.
- **Drainage channel:** Guides water away from the well, usually towards a drainage area (or soakaway) where the water can infiltrate back into the ground. The drainage channel should slope downwards away from the apron to prevent water ponding. Drainage water may also be used for watering livestock or other agricultural activities, provided these are conducted at a safe distance downhill of the well facility.<sup>a</sup>

- **Soakaway:** A defined drainage area consisting of a hole in the ground filled with coarse material (e.g. rubble, stones) which allows water to drain back into the earth. A soakaway prevents water from ponding and stagnating in the vicinity of the well, and should be located at a safe distance downhill from the well.<sup>a</sup>
- **Fence or barrier:** A physical barrier to keep animals away from the well area, which may prevent animals from excreting close to the well or damaging the well itself. May also prevent unauthorized access to the well facility. Ideally, the fence or barrier should be constructed at least 15 meters<sup>a</sup> from the well.

### Additional considerations for dug wells

After a new dug well is constructed, disinfection (e.g. with a chlorine solution) is required before the water is used.<sup>b</sup> Periodic disinfection may also be required (e.g. after flooding).

Activities other than water collection (e.g. laundry, washing, bathing etc.) should be carried out at a safe distance<sup>a</sup> from the well facility (preferably, downhill).



**Figure 2** A dug well with hand pump (section)

- For guidance on determining appropriate minimum safe distances for potentially contaminating activities, refer to [Guidelines for drinking-water quality, 2nd edition: Volume 3 - Surveillance and control of community supplies](#) (WHO, 1997).
- See [Technical notes on drinking-water, sanitation and hygiene in emergencies: cleaning hand-dug wells](#) (WHO/WEDC, 2013).