

Groundwater source types

From Earthwise

[Jump to navigation](#) [Jump to search](#)

[Africa Groundwater Atlas](#) >> [Resource pages](#) >> [Developing groundwater resources](#) >>

Groundwater Source Types

This page is still in development - please check back soon for updates.

Groundwater Source Types

The most common groundwater source types are **springs**, **hand-dug wells**, or drilled **boreholes**. (But be careful, as drilled boreholes are often also called wells!).

Many resources are available to support the choice of which groundwater source type to use in different environments or for different purposes. Some of these are shown in the section *Links to more information* at the bottom of this page.

- **Springs** are natural flows of groundwater from the underlying rock or unconsolidated sediment. Springs are dependent on the characteristics of the rocks, and their nature and yields are hugely variable. They often occur in specific hydrogeological environments. Because they are open at their source, springs are vulnerable to contamination. No equipment is needed to make a spring, but springs can be improved and made less vulnerable to contamination and drought by various developments, such as constructing a collection tank to store spring water, and installing a protective cover over the spring head.
- **Hand-dug wells** have been dug to access groundwater for thousands of years. They can only be dug in soft material, such as unconsolidated sediment like sand and gravel, weathered basement, or limestone. They are only appropriate where the groundwater level (water table) is shallow. They are usually less than 20 m deep and 1-2 m in diameter, but can be wider and much deeper. Little or no specialised equipment is needed to construct a well - just something to dig with, and a way of removing the spoil. Wells often need to be lined to keep them open, using materials like brick, stones, concrete rings or even lorry tyres. Open wells are vulnerable to contamination from the surface, and can be improved by installing a concrete apron around the top. Wells have large storage, which helps make them less vulnerable to drought, but because they typically tap only shallow groundwater, they can dry up in dry seasons or longer droughts.
- **Boreholes** are narrow diameter tubes drilled into the ground, usually vertically. Boreholes are also called tube wells or simply wells. They can be drilled more quickly and go deeper than hand-dug wells, and so can tap deeper, often more sustainable groundwater; they can be drilled through hard rocks and they can be more easily protected from contamination. There are many different techniques for drilling boreholes, some of which are more suited to certain hydrogeological environments. Usually, a motorised drilling rig is used, operated by specialist drillers. There are also manual drilling techniques.

Other, less common ways of accessing groundwater are by:

- **Collector wells**, which are vertical boreholes or wells modified by drilling horizontally out radially below the water table to increase the collection area for groundwater into the central

well, from where water is abstracted. They are often constructed in alluvium, next to ephemerally dry ('sand') rivers, with the horizontal radials drilled into the river bed deposits; or in weathered basement.

- **Infiltration gallery**, which is a horizontal trench or drain dug below the water table to abstract shallow groundwater, usually from unconsolidated alluvium, including sand rivers, or windblown deposits. The trench drains into a sump from where water is abstracted. The gallery may have to be lined to keep it open.
- **Qanats**, which are an ancient method of tapping and transporting groundwater in many parts of North African and the Middle East. A qanat comprises a mother well, often in alluvial deposits at the edge of a mountain range, and a gently inclined covered, underground channel which allows groundwater to flow downhill to a village.

Groundwater Abstraction Methods

Groundwater is abstracted in different ways, depending on the source type. Groundwater can be abstracted from boreholes and hand-dug wells by traditional methods (buckets, etc); by hand pumps; or by mechanical (e.g. diesel) or electrical submersible pump. Many resources are available to support the choice of which abstraction method to use, and some of these are shown in the section *Links to more information* at the bottom of this page.

Most rural water supply boreholes and wells in Africa are installed with hand pumps. There are many different types of hand pump, and the choice of which to use will depend on national standards, ease of maintenance and local expertise, availability of spare parts, the depth of water lift required, the groundwater chemistry (mild steel can corrode), and cost. RWSN provides many resources on [hand pumps](#), including technical manuals and a number of discussion documents on practice and policy.

Mechanical or electrical pumps may be most appropriate for higher yielding wells or boreholes.

Return to: [Africa Groundwater Atlas](#) >> [Resource pages](#) >> [Developing groundwater resources](#)

Retrieved from

'http://earthwise.bgs.ac.uk/index.php?title=Groundwater_source_types&oldid=40389'

[Categories](#):

- [Additional resources](#)
- [Africa Groundwater Atlas](#)

Navigation menu

Personal tools

- Not logged in
- [Talk](#)
- [Contributions](#)
- [Log in](#)

- [Request account](#)

Namespaces

- [Page](#)
- [Discussion](#)

Variants

Views

- [Read](#)
- [Edit](#)
- [View history](#)
- [PDF Export](#)

More

Search

Navigation

- [Main page](#)
- [Recent changes](#)
- [Random page](#)
- [Help about MediaWiki](#)

Tools

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)
- [Cite this page](#)
- [Browse properties](#)

• This page was last modified on 7 May 2019, at 17:06.

- [Privacy policy](#)
- [About Earthwise](#)
- [Disclaimers](#)



•



•

