

## Groundwater – More Valuable Than Gold

**Water can be found all around us. In streams, rivers and dams and even in the air. Water can also be found under the ground. Groundwater is an important part of the water cycle.**

**G**roundwater comes from rain, snow, sleet and hail that soak into the ground. The water moves down into the ground because of gravity, passing between particles of soil, sand, gravel, or rock, until it reaches a depth where the ground is filled, or saturated, with water.

The area that is filled with water is called the saturated zone and the top of this zone is called the water table. The water table may be very near the ground's surface or it may be hundreds of metres below.

Although groundwater exists everywhere under the ground, some parts of the saturated zone contain more water than others. An aquifer is an underground formation of permeable rock or loose material which can produce useful quantities of water when tapped by a well. These aquifers may be small, only a few hectares in area, or very large, underlying thousands

of square kilometres of the earth's surface.

Even if groundwater isn't used by people it may still play an important role in the local environment and sustain rural livelihoods in that way.

### GROUNDWATER IN SOUTH AFRICA

Groundwater, despite its relatively small contribution to bulk water supply (13%), represents an important and strategic water resource in South Africa. Owing to the lack of perennial streams in the semi-desert to desert parts, two-thirds of South Africa's surface area is largely dependent on groundwater. In these water-scarce areas, groundwater is more valuable than gold.

Although irrigation is the largest user, the supply to more than 300 towns and smaller settlements is also extremely important. Groundwater

### DID YOU KNOW?

About 22% of the world's available freshwater is stored underground.

has also become a strategic resource for village water supply in the wetter parts of the country, because of its cost-effectiveness in a widely scattered small-scale-user situation.

Over about 90% of the surface of South Africa, groundwater occurs in hard rock. Groundwater in these rocks is contained in fractures and in dolomite and limestone, in dissolved openings called fissures.

Hard rock aquifers are known as secondary aquifers because the groundwater occurs in openings which were formed after the rock was formed. Over the remainder of the country groundwater occurs in primary aquifers. These comprise porous sediments and groundwater is contained in the spaces between sand grains.

Primary aquifers are found in river (alluvial) sediments, in coastal sand deposits, and in the Kalahari deposits.

### GROUNDWATER POLLUTION

Just because water is underground doesn't mean it can't be polluted. Groundwater can be contaminated in all sorts of ways. Pollutants dumped on the ground or in landfills may leach into the soil, and work their way



## GROUNDWATER WORDS

**Aquifer:** A geologic formation(s) that bears water. A geological formation or structure that stores and/or transmits water, such as wells and springs.

**Baseflow:** Streamflow coming from groundwater seepage into a stream.

**Groundwater:** Water stored underground in rock crevices and in the pores of geologic materials that make up the Earth's crust.

**Recharge:** Water added to an aquifer. For instance, rainfall that seeps into the ground.

**Water table:** The top of the water surface in the saturated part of an aquifer.

down into aquifers. Pollutants include substances that occur as a liquid (such as oil); or can be dissolved in water (such as nitrate) or are small enough to pass through the pores in soil (such as bacteria).

Movement of water within the aquifer is then likely to spread the pollutant over a wide area, making the ground-


water unusable. Typical contamination sources include on-site sanitation (such as unlined latrines); waste disposal sites; burial sites; and animal husbandry.

## OVER-ABSTRACTION

While groundwater is an abundant resource it does not mean we should waste



it. The maximum quantity of groundwater that can be developed economically is estimated at about 6 000 million m<sup>3</sup> a year.

Some groundwater resources take a long time to replenish. If too much groundwater is extracted too fast, it may become depleted. Therefore, it is important to decide how much water can be extracted from an aquifer before it is developed. 

## MAKE A GROUNDWATER MODEL

Take a glass or clear plastic container and fill it with sand. Pour some water into the sand. This shows how water collects under the ground. Pour some water into the sand. What happens to the level of the water? We call this top level of the water the water table. Take a drinking straw and put it down into the wet sand. The straw is like a bore-hole. Suck up some water. What happens to the water table now?

