

The World's Water Wells Are Drying Up!

by Lance Endersbee

An Australian civil engineer and tunneling expert reviews the disastrous state of world groundwater, and shows why it is often not replenished by rainfall, contrary to the textbook models.



Jack Dykinga/USDA

Around the world, groundwater from deep wells is the main source of drinking water for more than three billion people. In addition, a large proportion of the food supply in many poor countries is based on irrigation from wells. However, almost all of the world's wells have falling water levels, and declining yield, and already, many have run dry.

These deep water wells cannot be replenished from rainfall. The source of the groundwater that supports these three billion people lies in the interior of the Earth. There is a continuing release of water from the interior towards the surface of the Earth, and we see that in the steam of volcanoes, and the



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This article is adapted from the first chapter of his new book, *A Voyage of Discovery: A History of Ideas About the Earth, With a New Understanding of the Global Resources of Water and Petroleum, and the Problems of Climate Change*, which is available from the Monash University Bookstore website, <http://bookshop.monash.edu.au>. It is used here with the kind permission of the author.

water gushing from deep ocean vents. Over geological time, some of the rising water was trapped in the path towards the surface of the Earth, and accumulated as underground reservoirs of water.

There are resources of groundwater underlying most of the flat lands of the world. From early times, men dug wells by hand, and lifted water in buckets for their needs. Many civilizations were established where groundwater was available at oases or in shallow wells. The ancient Romans built aqueducts to bring springs of groundwater to their many cities around the shores of the Mediterranean. Vitruvius, a Roman engineer and architect, describes in his book, written in the First Century B.C., the methods the Romans used to find and test underground sources of water. He tells of the adverse properties of some spring waters. There are cautionary tales about a little well at Susa, the capital of Persia, where those who drink of the water lose their teeth, and a well in the Alps where those who drink the water immediately fall lifeless. There are also

wells with healing properties, such as the acid springs in Campania that have the power to break up stones in the bladder. Vitruvius advises on the tests for good water: The first test is to look at the physique of the people who dwell in the vicinity!

Today, in the United States, groundwater provides drinking water for over one half of the population. The same applies in much of Europe, India, China, and many other countries.

The pattern of dependence on groundwater that had continued for centuries began to change from about 1950. The population of the world was continuing to increase, there was growth of cities and expansion of city water supplies based on the use of groundwater, and in rural areas there was the introduction of mechanical pumps and commercial agriculture based on groundwater. As a consequence, there was a simultaneous and rapid growth in the use of groundwater all around the world. In countries like India and China, in North Africa and the Middle East, the use of shallow hand-dug wells, and hand lifting of water, was replaced by drilled bores and mechanical pumps. The use of fertilizers enabled a very great increase in yield, but that required much more water. There was a vast increase in the areas under irrigation from groundwater.

There was a rush to exploit the limited groundwater resources. The groundwater was freely available at the cost of a bore and a pump. There was competition to use more and more groundwater. Water tables dropped, and farmers drilled deeper bores, and installed more powerful pumps. Almost simultaneously, all around the world, the wells began to run dry, and governments were quite unable to control the extraction of groundwater, or protect the resources.

Most governments did not know where the wells were, or the depth of the wells. Governments did not record water levels, but were certainly informed when farmers complained when their wells ran dry. Farmers, governments, and their professional advisors, had all believed that the wells would flow forever.

The groundwater rush was like a gold rush; it was a great uncontrolled bonanza. The International Water Management Institute has estimated that the total global withdrawal of groundwater is now about 1,000 cubic kilometers each year, but it is quite unsustainable. This great global rush to exploit available groundwater resources in our time is a one-off extraction of a limited natural resource.



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Around the world, ground water sources are drying up. Here, clockwise: A woman draws well water in Zambia; a village water well in India; a Pakistani farmer pumps underground water for irrigation; and Mexican farmers walk in a dried up irrigation ditch near Rio Bravo, during the 1996 drought year.



Courtesy of Lance Endersbee

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