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# How Safe is Your Drinking Water?

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# Agricultural Engineering Update

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AEU-42

## HOW SAFE IS YOUR DRINKING WATER?

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Water is a basic ingredient of life and a safe water supply is essential for our good health. Adequate supplies of clean drinking water, whether it comes from a well or from a municipal treatment plant should be everyone's concern. The recent drought conditions have forced many people to realize how critical adequate and safe water supplies really are to the well-being of their families and communities.

Recent amounts of contaminated surface and ground water supplies around Kentucky have caused increasing concern for the safety of drinking water throughout the state. If Kentuckians are to be assured of a continuing supply of clean and safe drinking water, then everyone must become aware of his/her own responsibility for cleaning up and protecting both the surface and ground water supplies.

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## Hydrologic Cycle

The water in use today is the same water that has been in use since the beginning of time; it has just been recirculated through nature's "hydrologic cycle" (hydrologic cycle is the circulation of water from the land and bodies of water to the atmosphere and back again). Water from lakes, rivers and ponds is heated by the sun, and vaporized into the air to form clouds. These clouds eventually burst, giving up water in the form of rain, snow, hail or sleet. When the water reaches the earth, some of it runs off the land as surface water and returns to rivers, lakes and the oceans to repeat the cycle. The water that soaks into the soil moves slowly through the layers of soil and rock to eventually return to the rivers, lakes, and oceans where it also evaporates and continues the cycle.

### Groundwater:

The water that soaks into the soil becomes part of the groundwater. This water moves slowly through layers of soil, sand, and rock where it may become a part of large underground reservoirs of water called aquifers. These water supplies can be reached by drilling wells or it may be released at the surface through a natural spring.

Although all water is recycled through the hydrologic cycle the movement of groundwater is very slow and may take many years to complete. Thus, any pollution of the groundwater supply may contaminate our drinking water supply for many years to come.

### Groundwater Contaminations

One of Kentucky's most important natural resources, groundwater, normally offers a clear, naturally filtered source of water at a constant temperature. However, water's natural ability to dissolve and carry materials allows it to be easily contaminated by human activities. Feed lots, septic tanks, uncapped and abandoned wells, improper use and disposal of toxic chemicals, landfills, leaking fuel tanks, etc., can all cause serious contamination of groundwater supplies. This problem is especially critical in limestone areas where sink holes are used as dump sites. These often lead directly to groundwater sources and can contaminate large underground aquifers and affect users miles away.

### Well Contamination:

Contamination of private wells and water sources is a serious problem in Kentucky. One indicator of well contamination is the bacterial levels in the water. One study found that 90% of the shallow hand dug wells and 33% of the drilled wells, which were not properly cased, had unsafe levels of bacteria in the water. Another study in eastern Kentucky indicated that 50% of the wells, 43% of the springs and 27% of the cisterns tested had unsafe levels of bacterial contamination. This contamination most commonly resulted from surface run-off or seepage of barnyard wastes, septic tanks and cesspools into the wells, cisterns or springs.

To protect the health of users of well water and the groundwater itself, from this type of contamination, Kentucky law now requires that all well drillers be certified by the state and that new wells must be constructed to minimum standards. For example, the well must be constructed a minimum

distance from sources of bacterial contamination. Furthermore, the well must be sealed off with a casing that prevents contamination from entering the well through the soil or from undesirable aquifers. This casing must also extend a minimum of four inches above the ground surface. (Cutting off the casing below the ground surface is the leading cause of well contamination.) Although there are no guarantees for safe drinking water, proper location, casing, capping, and sealing off a well are big steps toward preventing future problems.

### **Testing and Treating Water Supplies:**

Just because water is clear does not mean that it is safe. The only way of being certain of the quality of your private drinking water sources is to have the water tested. (Public water systems are required to meet minimum state standards.) A number of private and public laboratories are available in the state who will test for water quality. Your local Cooperative Extension Office or Health Department will have a listing of these laboratories. A variety of tests are available, but a basic test should include those for excessive bacteria and for nitrate levels that pose danger to infants and unborn babies. These tests should be run at least once per year to monitor the water quality. Other tests should also be run on a less frequent basis. These can monitor other changes in groundwater quality and provide a baseline should future contamination occur. The recommended tests will depend upon the area of the state and potential concerns for local contamination.

Most groundwater requires little or no treatment for safe use. However, new equipment and methods are now available for treatment of private water supplies. Your local driller, health department or well supplier can provide additional information if your water test results indicate any problems.

### **Conclusion:**

Poor drinking water quality is a particular problem in rural areas where over 95% of the population depends upon groundwater for drinking water, most of which comes from private wells. Groundwater quality must become everyone's concern, since it is much easier to prevent the contamination than clean up the resulting problem, which can cost millions of dollars and take years to complete.

You can help protect groundwater quality by:

1. Becoming familiar with the sources and means by which groundwater becomes contaminated.
2. Joining the "Kentucky Extension Homemakers Association" and other groups across the state in educating others about the problem. Start by sharing your new found knowledge with your family and friends.
3. Having your private drinking water supply tested.
4. Using caution and always following label instructions for use and disposal of any materials that could contaminate water supplies including the disposal of many common household products.