

The supply of clean drinking water will be increasingly difficult

The dependability of drinking water in the US is not good and it's even worse elsewhere.

In February 2009, United Nations Deputy Secretary-General Asha-Rose Migiro warned that “two-thirds of the world’s population will face a lack of water in less than 20 years, if current trends in climate change, population growth, rural to urban migration and consumption continue”.

Rising living standards, increasing population, urbanization and global warming is making the supply of clean water increasingly difficult. In many instances the only possible solution will be reuse of water. In reuse of water the efficiency of removal of contaminants will be even more important than it is in conventional water treatment.

State-of-the art disinfection has completely eliminated pandemic gastrointestinal infections in Europe. However, it has been estimated by authorities (Swedish Infection Protection Agency) that about half of all acute gastrointestinal cases are caused by drinking water – the other half by food poisoning. One of the reasons for this is that *microorganisms* like *Cryptosporidium* pass through the utility and are not killed by disinfectants. Other threats that are not adequately dealt with are *Legionella* which according to emerging research is an undiagnosed culprit in many cases of pneumonia, some of them lethal.

Contamination of water with bacteria and virus is as old as history and water industry’s greatest success lies in the elimination of microbes. However a large number of new problems are emerging!

Many of the new chemicals that have been developed during the last century end up in ground- and river water - water being a “universal solvent”. Pesticides, insecticides and fertilizers are well known problems. Pharmaceuticals are relatively new.

According to recent research, some pharmaceuticals in the drinking water have a negative impact on male sperm count and thus on male fertility. They may also affect male potency. The same effects have been observed with nonylphenols, very common industrial by-products, which are found in effluents from many diverse industrial activities.

Also naturally occurring minerals, such as fluoride and *arsenic*, may have harmful effects on human health. The arsenic poisoning in Bangladesh, which WHO calls the worst mass-poisoning in history, is well known. It may affect more than 100 million people.

Concentration of natural arsenic is extremely high in some of the several millions of bore-wells in Bangladesh and people suffer from severe symptoms caused by immunosuppression. Arsenic contamination to a lesser degree has been discovered in at least another seventy countries. As pressure on water increases new ground water resources must be exploited which may contain arsenic and other detrimental minerals. Old villagers in Bangladesh called the ground water “the Devils Water”, but the young aid workers thought it was just superstition.

Arsenic in water has no smell, no taste and no color and is the mineral which is most difficult to remove from water for state-of-the art technology because it requires treatment with special ion-exchange resins or other chemical means.

Arsenic exists in well water all over the world, together with many other less obvious natural poisons which may have been dormant for millions of years but now are brought out by increased ground water pumping.

No matter how well the water is treated by the water treatment plants, an addition of residual disinfectants will need to be added to protect water from infection during transportation in pipes. Sometimes the disinfectants give a smell or taste to the water that is clearly discerned by the consumer, in which case many reject the use of tap water and turn to bottled water.

In areas where the need for disinfection is less, the consumer may not notice any smell, taste or coloring. Yet, water will contain amounts of both disinfectant and disinfection by-products that researchers have found to be both carcinogenic and teratogenic.

The contaminants mentioned above are only examples of troublesome substances. There are many others. Of the 100 000 chemicals invented by man during the last century, about 30 000 are considered dangerous. There is no chance any longer to remove either man made or natural poisons from rivers, lakes or ground water. We need to eliminate them from our drinking water.

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