Groundwater Management for Safe Drinking Water

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Groundwater is the main source of drinking water for billions of people worldwide. Hence, contamination of groundwater is a matter of grave concern that can have a devastating effect on the health of people for whom it is the main source of daily water supply. Proper groundwater management involves cleaning and filtering of the groundwater to make it fit for consumption.

Causes of groundwater pollution

Although groundwater is considered one of the freshest and safest sources of water by many, in the past decades excess use of chemicals in agriculture has contributed significantly to groundwater contamination. Through the soil, the agricultural contaminants may seep into the groundwater, thereby increasing the concentration of the pollutants in the water.

In urban areas, leaking sewers and seepage of wastewater through the soil into the groundwater are common causes of degradation of groundwater. Despite strict environmental regulations, the role of effluents discharged by industrial units in polluting the groundwater cannot be overlooked. The industrial pollutants usually contain mercury, zinc, cadmium, chromium and other toxic substances that are extremely hazardous for the health.

Presence of excess iron and arsenic in groundwater is another area that needs to be addressed through groundwater management. Both iron and arsenic occur naturally in the aquifers. Drilling deep wells may destruct the underlying rocks, resulting in transportation and dissolution of these metals in the groundwater. Groundwater with high concentration of iron has an unpleasant taste and is orange in color. Although, iron is not considered a health risk, water containing large amounts of iron is unsuitable for laundry and increases staining and blocking of pipes and plumbing fixtures.

Drinking water contaminated with arsenic is extremely hazardous for the health. Discoloration and thickening of the skin, chronic abdominal pain, diarrhea, nausea, vomiting, loss of sensation in hands and legs, partial paralysis and vision loss are common in areas where people consume water with high concentration of arsenic. Arsenic contamination is linked to several cancers.

Groundwater management

An effective filtering system can remove these contaminants including iron and arsenic from the groundwater. In most countries, the law requires the water to be processed before consumption. Several options are available for cleaning the groundwater. Common filtering technologies include pump and treat, a process in which the groundwater is first lifted to the surface and then treated with chemicals or biological ingredients to remove the contaminants. The common chemical treatment methods include purifying the water with oxygen or ozone, ion exchange, membrane separation, carbon absorption and chemical precipitation.

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