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When chemicals are released into the earth and find their way into groundwater, this is known as groundwater pollution. This form of water pollution can also occur naturally due to a minor and undesired element, contaminant, or impurity in groundwater. It is referred to as contamination rather than pollution. On-site sanitation systems, effluent from wastewater treatment plants, landfill leachate, petrol filling stations, leaking sewers, hydraulic fracturing, and overuse of fertilizers in agriculture can all pollute groundwater. Natural pollutants such as arsenic and Fluoride can also pollute the environment. Using contaminated groundwater poses a health risk to the population, as it can lead to poisoning or the spread of waterborne disease.

Causes of groundwater pollution

- Contamination occurs when naturally existing soil and rocks chemicals dissolve in water. Iron, radionuclides, Sulfates, manganese, fluorides, arsenic, and chlorides are among these compounds. Others, such as potting soil components, may seep into underground water and move as particles. As per the WHO records, Fluoride and arsenic are the most common contaminants.
- Photographic chemicals, cooking oil, motor oil, pharmaceuticals, paint thinners, paints, garden chemicals, and swimming pool chemicals should not be disposed of in septic tanks or directly into the ecosystem since they can contaminate the environment. A licensed hazardous waste handler should be contacted to dispose of these compounds.
- To improve crop output, millions of tons of agricultural chemicals such as fertilizers and insecticides are utilized worldwide. These chemicals are also used by other places, such as golf courses. Excessive usage of these substances can lead to groundwater contamination. Pesticides, for example, have been known to stay in the ground for years and, when diluted by rains, seep further into groundwater.
- Abandoned wells are another source of ground pollution, as they can act as a conduit for toxins to reach aquifers. Poorly designed wells, which may be missing suitable casing and

covers, can lead to groundwater contamination if pollutants find their way into them. Mining activities are another source of contamination because soluble minerals can be leached from the sites into the groundwater through precipitation.

Effects of groundwater pollution

The various effects of the groundwater pollutants are: -

- Contaminated groundwater is hazardous to one's health. Human excrement may contaminate water sources when septic tanks are not installed correctly. Hepatitis-causing germs could be present in the excrement, causing irreparable liver damage. It can also induce dysentery, which causes severe diarrhea, dehydration, and mortality in certain cases. Poisoning from excessive pesticides and fertilizers, as well as natural chemicals, might cause additional health concerns.
- Contamination of groundwater supplies makes the area unfit for plants, humans, and animal life to thrive. The area's population decreases, and the value of the land decreases.
- Another effect is that industries that rely on groundwater for production suffer from reduced stability. As a result, industries in the impacted areas may rely on water from other regions, which could be costly.
- Groundwater pollution can lead to a harmful impact on the ecosystem. One such change is the loss of specific nutrients necessary for the ecosystem's self-sustenance. Additionally, when contaminants interact with water bodies, the marine ecosystem may be altered. As a result of too many toxins in the water bodies, aquatic species such as fish may die off quickly. Animals and plants that drink contaminated water may be harmed as well.
- Toxic compounds build up in aquifers over time, and once the contamination spreads, the groundwater may become unfit for direct human consumption. The consequences are severe, particularly for those who rely on groundwater during droughts.

Precautions to prevent ground water contamination

Landfills are supposed to have a protective bottom layer to prevent contaminants

from getting into the water. However, if there is no layer or it is cracked, contaminants from the landfill (car battery acid, paint, household cleaners, etc.) can make their way down into the groundwater.