

HEALTH AND SANITATION

Good health is important for everyone – appropriate treatment and avoiding becoming ill in the first place. Some environmental aspects of poor health are obvious but many have been understated.

Diseases are caused by microorganisms such as bacteria, viruses and protozoa, sometimes transmitted directly from person to person, animal to person, or through the air. But many are present in water (e.g. poliomyelitis virus) or even the soil (e.g. tetanus, anthrax).

Good health depends on adequate nutrition. Food and water contain essential chemical substances. Deficiency diseases occur if levels are too low but some essential substances can be harmful in excess, for instance fluorides. The right balance is needed. The precise composition of food and of water depends on the circumstances in which plants are grown, animals are raised, or water is abstracted.

Many natural and artificial substances are potentially harmful to health in sufficient quantities (e.g. heavy metallic elements, volatile organic compounds) and may occur in air, soil or water. Some become concentrated in plant or animal tissues and may become concentrated when one organism eats others (e.g. concentration of pesticides in birds of prey). Similar principles apply to people.

Contaminants and pollutants may be solid, particulate, liquid or gaseous, and organic or inorganic. They can arise from “point sources”, for instance from leakage at the end of a pipe, or be diffused, such as chimney emissions spread into the air. If diluted enough by air or water, these may present no problem. If emissions cannot disperse quickly, pollution becomes a serious hazard. Both local and pervasive problems have increased with industrialization, intensive farming and large population concentrations.

A potentially toxic substance in soil or water does not necessarily cause a problem. Chemical state is also important. For instance, a high concentration of lead in a soil may not be a concern if there are no organisms to ingest it, or it is in a chemical state that is not readily absorbed into organisms. If, however, it can be readily assimilated there is a real problem. Changes to the chemical environment may make a potential toxin either more or less dangerous. Therefore caution is needed when altering local chemical conditions in water, soils or rocks.

Sanitation is crucial. Safe disposal of sewage through drains, without leakage into the ground or water, and proper treatment of processing facilities is essential for large volumes. Smaller amounts stored in septic tanks need to be emptied carefully, and disposed of properly. Soakaways are safe if the ground conditions are right and there are no nearby vulnerable water supplies. Spreading of inadequately treated sewage as a fertilizer, or irrigation with polluted water, can make crops unsafe.

Mineral irritants can also cause serious harm. For instance, inhaled asbestos fibres lead to fatal diseases of the lung. This is well known in the manufacturing and construction industries but it is appreciated less that fibres are also released from certain types of rocks exposed in arid areas. Other types of dust can also give rise to lung diseases (e.g. silicosis due to quartz dust).

High levels of radiation from nuclear tests, accidents, and X-ray equipment are well known. Some coolant water from nuclear installations has been linked to contamination of sediments and soils. Air, ground, water, crops and livestock can be affected. Radioactive radon gas is released from certain minerals of uranium and radium and can accumulate to dangerous levels in poorly ventilated spaces.

Ultraviolet light from the sun is essential to photosynthesis in plants and to natural synthesis of vitamin D in people, but it can damage exposed skin, leading to skin cancers. The degree of hazard is greatest in mountainous and arid areas. It has increased where natural filtering in the upper atmosphere has decreased. It is unclear at present whether such changes are long term or temporary.



Laying in mains sewerage pipe



roadside monitoring traffic emission

It is important therefore to establish which problems exist, where and how severe these are and to develop strategies for talking precautions and for soil, water and air management to reduce risks. This requires careful studies of the environment and of susceptible populations. Where contaminants are involved strategies are needed to reduce exposure and improve public awareness, especially amongst vulnerable groups of people, of sensible precautions without causing unnecessary alarm.



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