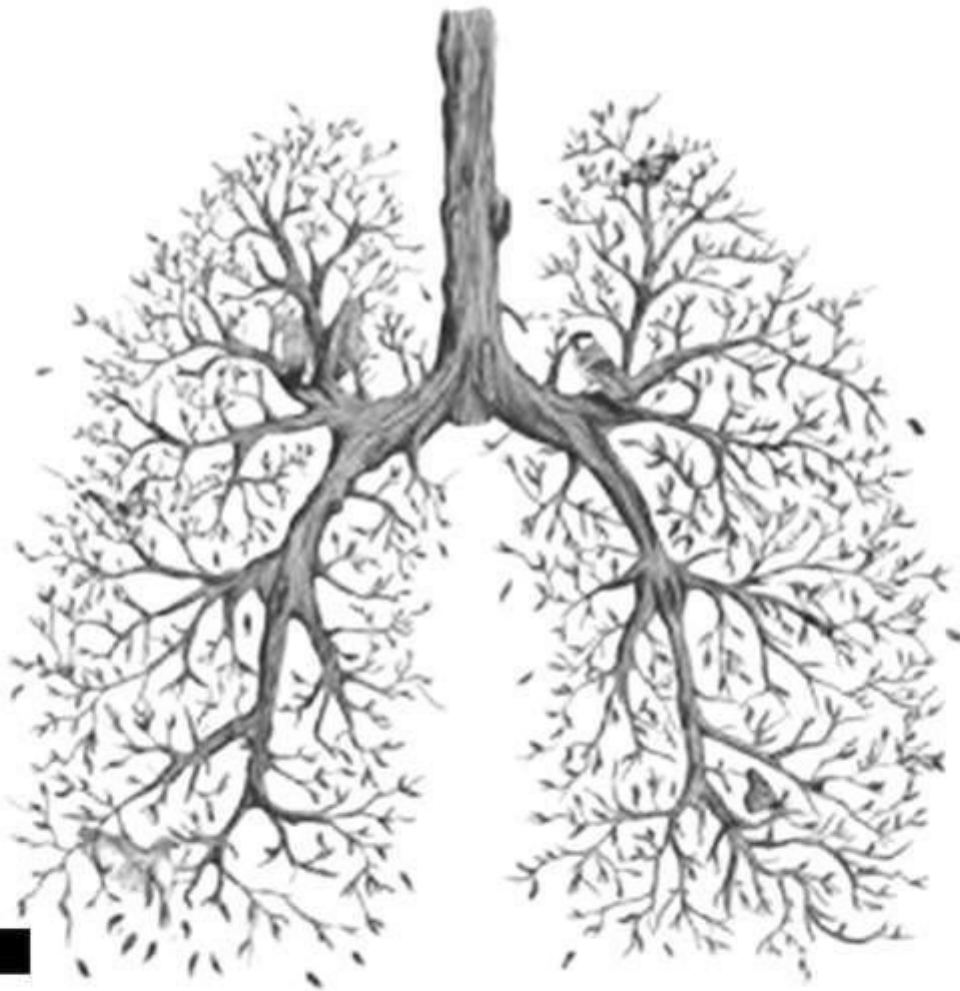


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Medical Committee  
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# Community Medicine




Slides

Sheet

Slide #: **19**

Doctor: **Dr. Madi**

Date:



Water pollution impact on health

Prof. Dr.Madi Jaghbir

## **introduction**

Water is fundamental for life and essential for nearly every human endeavor. Each person on earth requires about two liters of clean drinking-water each day, which amounts to 10 million m per day for the world's population.

Animal consumption is considerably more, but does not require the same quality as the water for human consumption.

Fresh water is a renewable resource, constantly purified and redistributed by the hydrologic cycle, but the distribution is uneven. Much global precipitation falls when or where it is not useful to humans.

Uneven distribution, inequitable access, and increasing pollution of water supplies may become the next major environmental crisis.

Conflict between regions for limited water supplies could cause social, political, and economic disruptions.

## **The water Cycle**

The water cycle consists of evaporation, condensation, and precipitation.

There are three principal “loops” in the cycle:

- The surface runoff loop, in which water runs across the ground surface and becomes part of the surface water system.
- The evapotranspiration loop, in which water infiltrates, is held as capillary water, and then returns to the atmosphere by way of evapotran-spiration.
- The groundwater loop, in which water infiltrates, percolates down to join the groundwater, and then moves through aquifers, finally exiting through springs, seeps, or wells, where it rejoins the surface water.

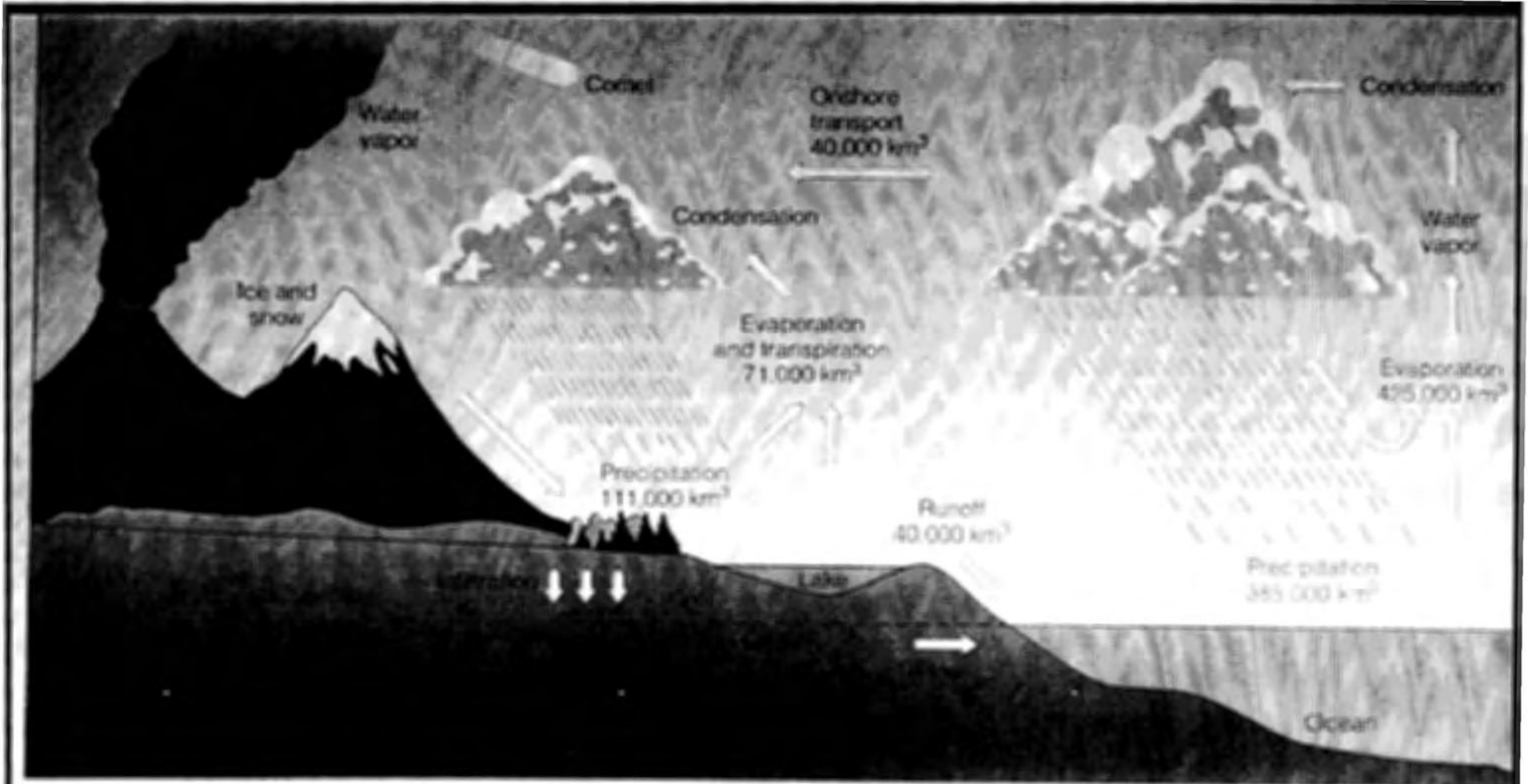
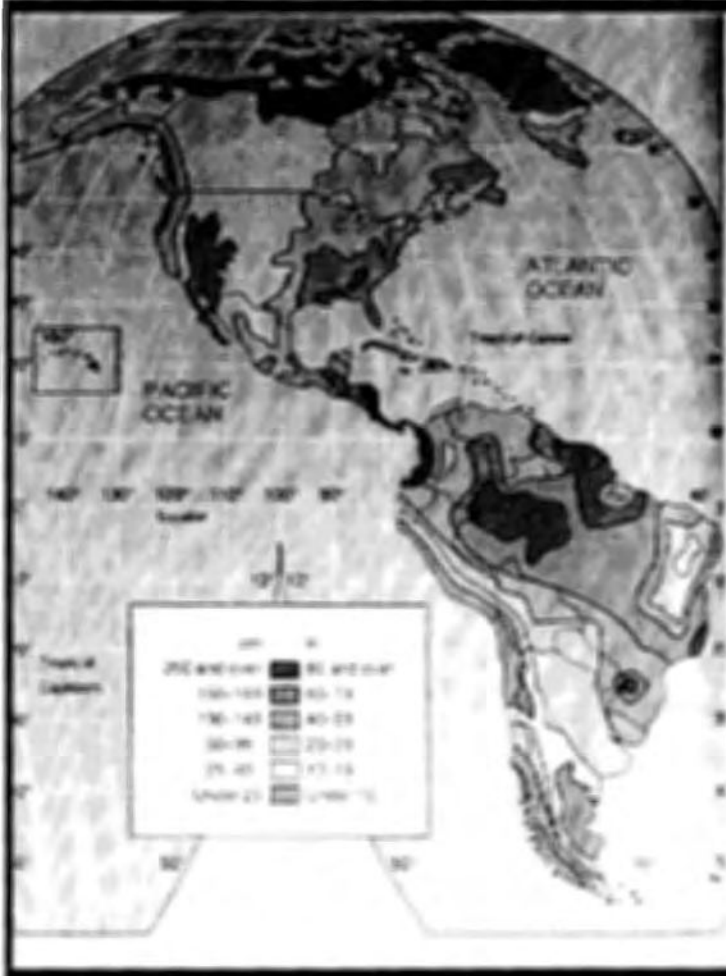



FIGURE 15.2 The hydrologic cycle moves water constantly between aquatic, atmospheric, and terrestrial compartments driven by solar energy and gravity. Total annual flows shown here are in thousands of cubic

kilometers. The total annual runoff to the ocean is 103,000 km<sup>3</sup>.



Scale: 1:100,000, 1:200,000, 1:500,000





## Water resources

Of all the world's water, 97% is in saline oceans and of the remaining 3%, of which by far the largest part-69%-is in the form of snow and ice, fresh water upon which humans depend accounts for only 0.008%.

Humans take fresh water from whatever source they can. In some cases this means capturing precipitation directly in a rain barrel under a downspout. The major sources of fresh water, however, are surface water, namely rivers and lakes, and groundwater



## Uses of fresh water

The major uses of fresh water are divided among three major categories:

Domestic

Industry

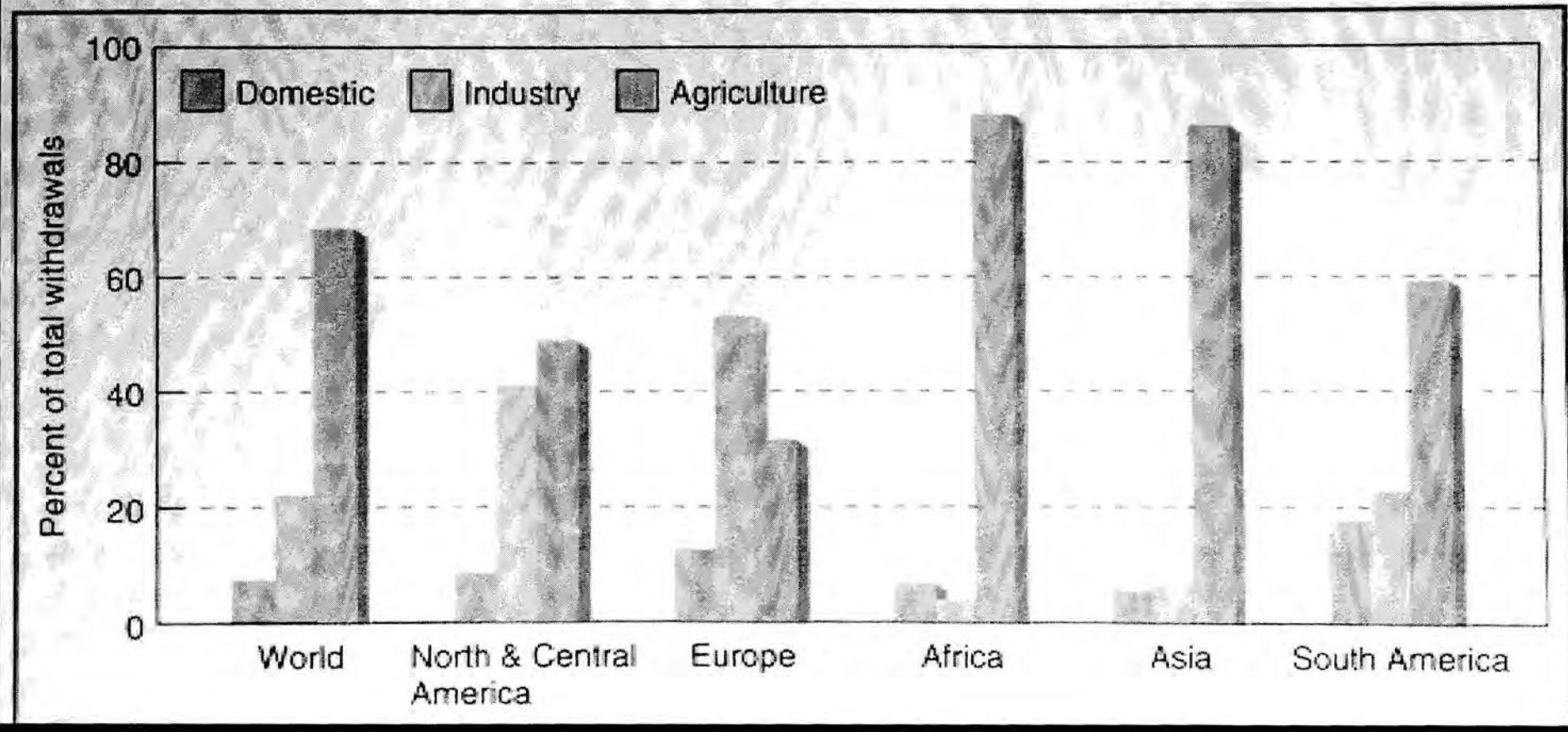
Agriculture


Worldwide, far and away the largest use of water is for irrigation (70%); second is for industry (23%); and third is for direct human consumption (8%). these percentages vary greatly from one region to another, depending on natural precipitation and degree of development.

Water is also used in the generation of hydroelectric and thermoelectric power. Water is used as a vehicle for the transportation of goods and people, as a means of recreation through swimming and boating, and as a natural habitat for many forms of fish and wildlife.



Human usage of water is divided among three major categories, as shown. The percentage used in each category varies with climate and relative development of the country. A dry-climate, less-developed region uses most of its water for irrigation (e.g., Africa), whereas moist-climate, industrialized countries (e.g., Europe) require the largest percentage for industry. (From World Resources Institute, "World Resources," WRI, 1992/1993, p. 161.)





# Human impact on the water cycle

Changing the surface of earth

Polluting the water cycle

Withdrawing water supplies:

Overdrawing water resources

Consequences of overdrawing surface water

- inevitable shortage

- ecological effects

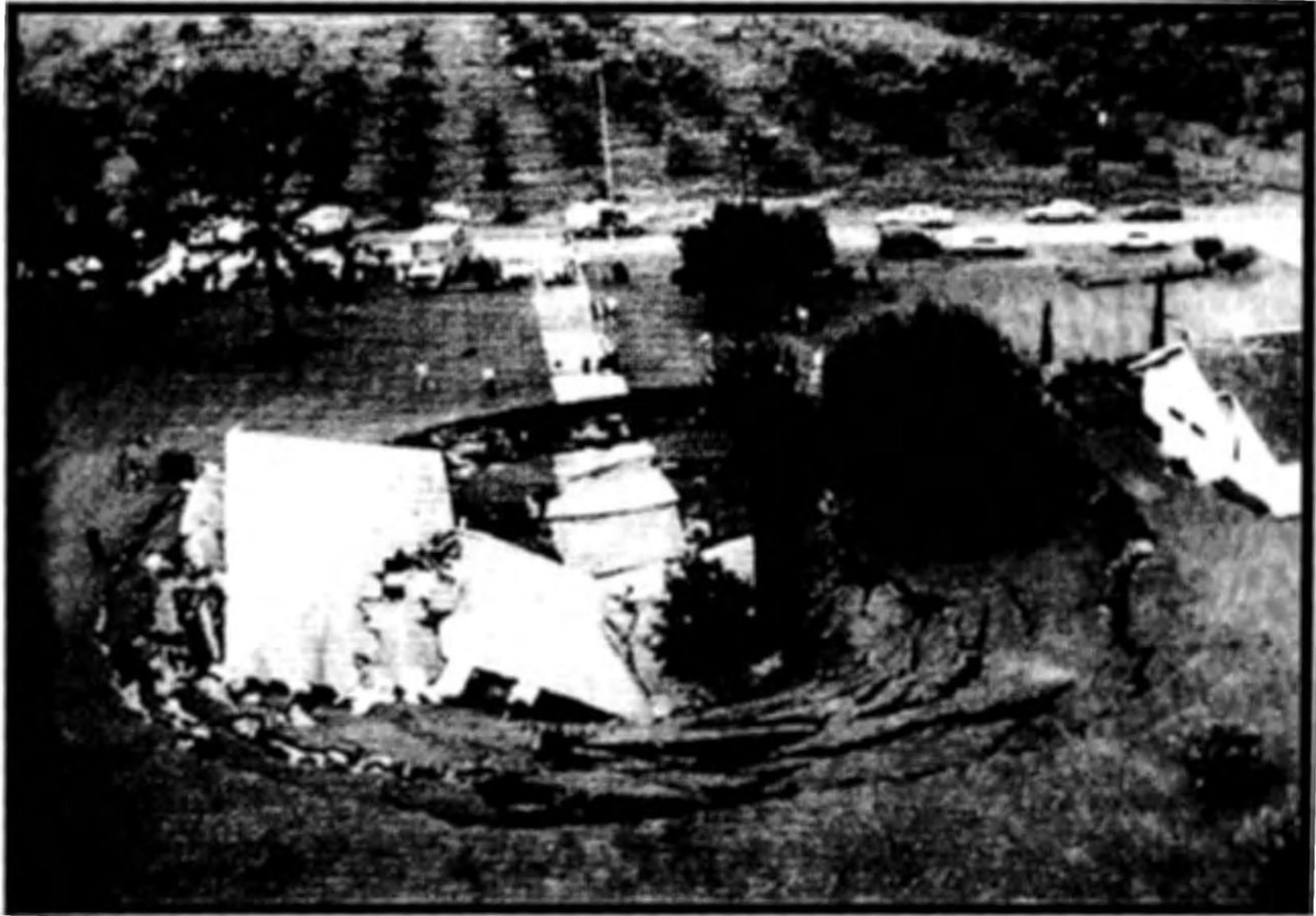
Consequences of overdrawing groundwater

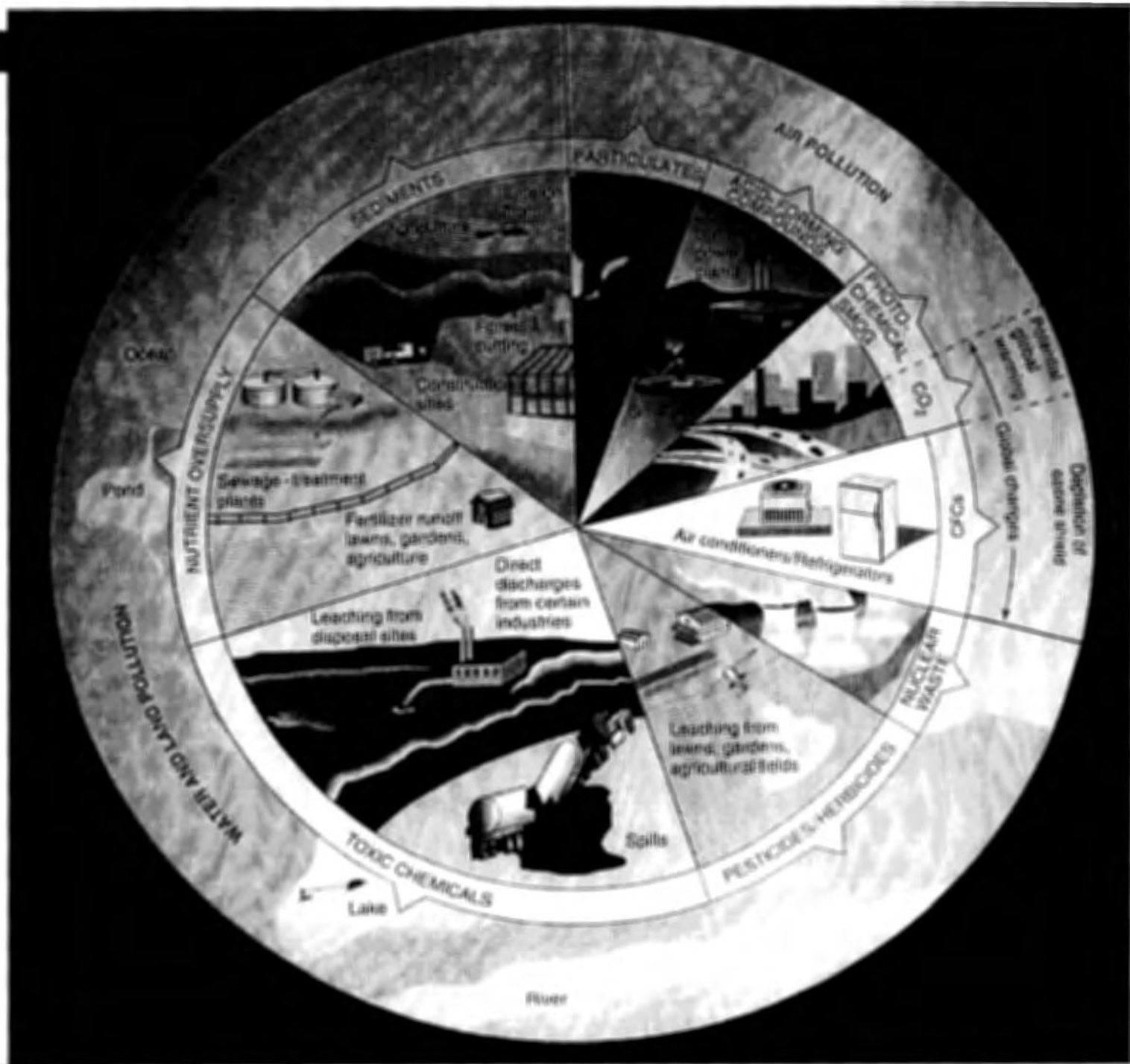
- Falling water tables and depletion

- Diminishing surface water

- Land subsidence

- saltwater intrusion








**Most of the diseases associated with water are communicable.**

**These diseases are classified in a number of ways:**

**Waterborne disease:** These arise from the contamination of water by human or animal faeces or urine infected by pathogenic viruses or bacteria, which are directly transmitted when the water is drunk or used in the preparation of food. such as Cholera, typhoid, and cryptosporidiosis

**Water-washed diseases:** This category of diseases is affected more by quantity of water than by quality. Infrequent washing and inadequate personal hygiene are the main factors in these types of disease, such as diarrhea , and skin and eye infections.






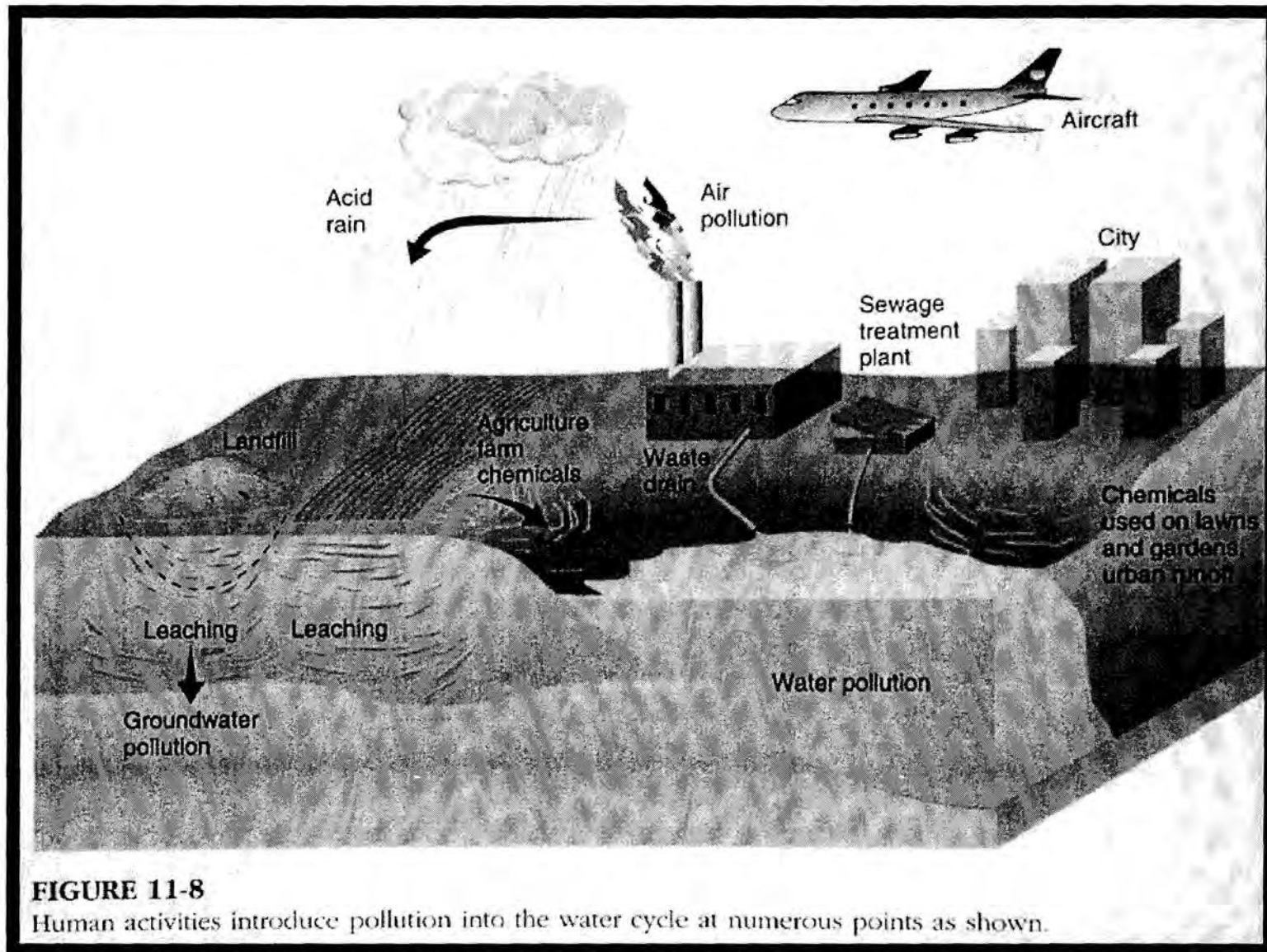
**Water-based disease:** Water provides the habitat for intermediate host organisms in which some parasites pass part of their life cycle. These parasites are later the cause of disease in people as their infective larval forms in fresh water find their way back to humans, either by boring through wet skin or by being ingested with water plants, minute water crustacea, or raw or inadequately cooked fish. Schistosomiasis is an example of water-based disease.

**Water-related disease:** Water may provide a habitat for insect vectors of water-related disease. Mosquitoes breed in water and the adult mosquitoes may transmit parasite diseases such as malaria, and virus infections such as dengue, yellow fever and Japanese encephalitis.





**Water-dispersed infections:** The aforementioned categories are primarily problems of developing countries. A fifth category of diseases associated with water is emerging in developed countries infections whose agents can proliferate in freshwater and enter the body through the respiratory tract. Some freshwater amoebae that are not usually pathogenic can proliferate in warm water and, if they enter the host in large numbers, can invade the body along the olfactory tracts and cause fatal meningitis. These bacteria can be dispersed as aerosols from air-conditioning systems; such as Legionella.



**FIGURE 11-8**

Human activities introduce pollution into the water cycle at numerous points as shown.

## Chemical Pollutant

*Elements and compounds that are directly harmful to living things are called **toxic chemicals**.* Toxic chemicals are either inorganic or organic.

*Inorganic* chemicals are elements or compounds that lack carbon.

*Organic* chemicals are compounds that contain carbon.

Many organic chemicals are derived from organisms.