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Introduction to ENVIRONMENTAL HEALTH

YEAR

1439-1440 Hijri

2018 - 2019 Gregorian





Objectives

- Enlist and elaborate on the common environmental problems (Global warming, Ozone depletion, Green house effects)
- Understand the effects of Environmental pollution and degradation on health
- Enlist and understand causes of Air, Water, soil, and food contamination
- Comprehend the water cycle and the WHO criteria for water quality
- Understand different measures of water, noise, and air pollution
- Understand role of international and the national agencies in environmental safety and regulations



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Health is
"a state of complete physical,
mental and social well-being and
not merely the absence of disease
or infirmity"





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Public health

is

"the science and art of preventing disease, prolonging life and promoting health

through the **organized efforts** and **informed choices of society**, **organizations**, public and private, **communities and individuals.** “



1.1. Environment:

In general, environment refers to the surroundings of an object





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Ecology

- The science of the relationships between organisms and their environments.
- Also called **BIONOMICS**.





The ultimate goal of ecology is to understand the nature of environmental influences on individual organisms,

their populations and communities, on landscapes and, ultimately, the biosphere (all life on Earth).

If ecologists can achieve an understanding of these relationships, they will be able to contribute to the development of systems by which humans will be able to wisely use ecological resources, such as **forests, agricultural soils, and hunted animals such as deer and fish.**





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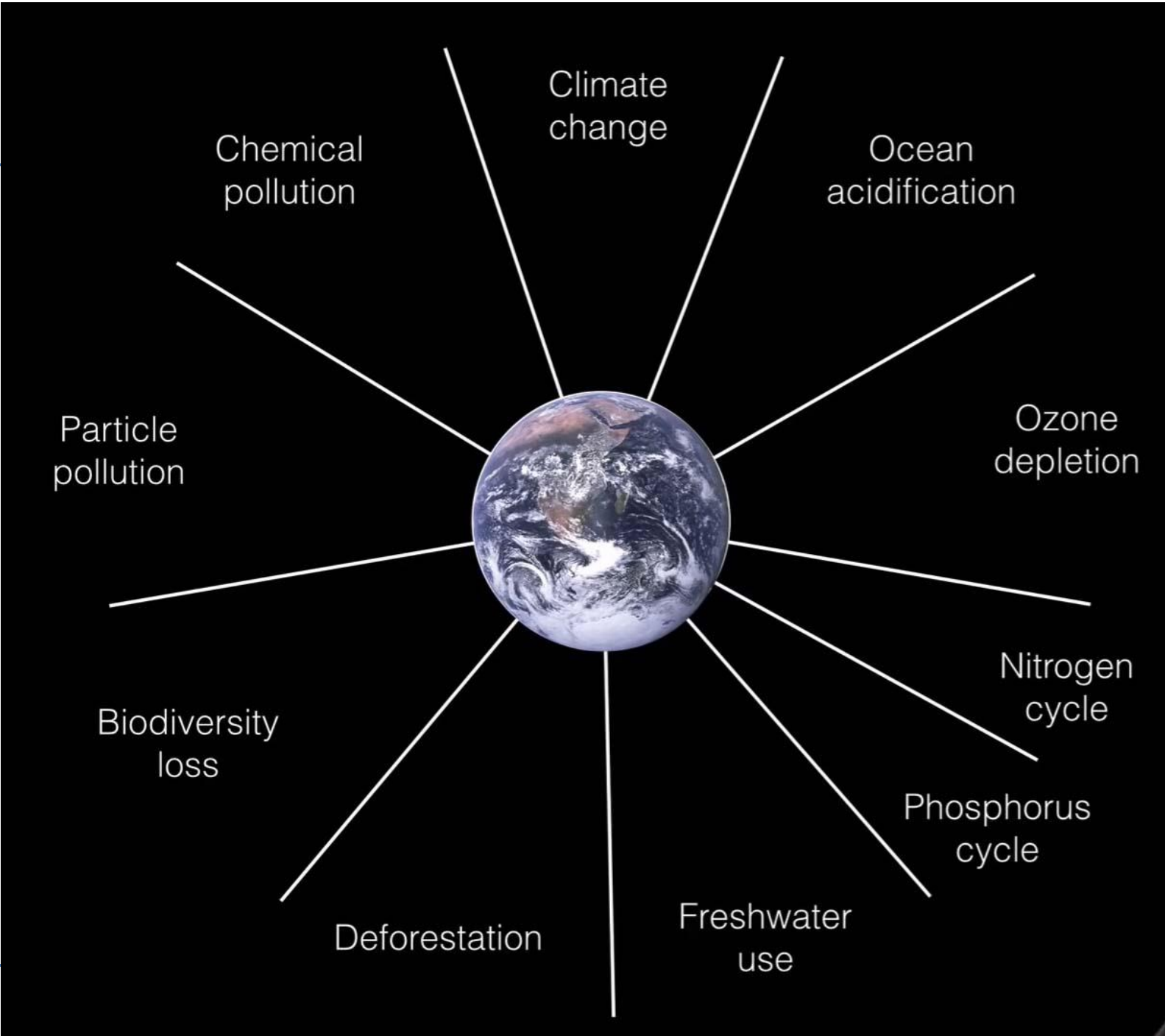
Environment

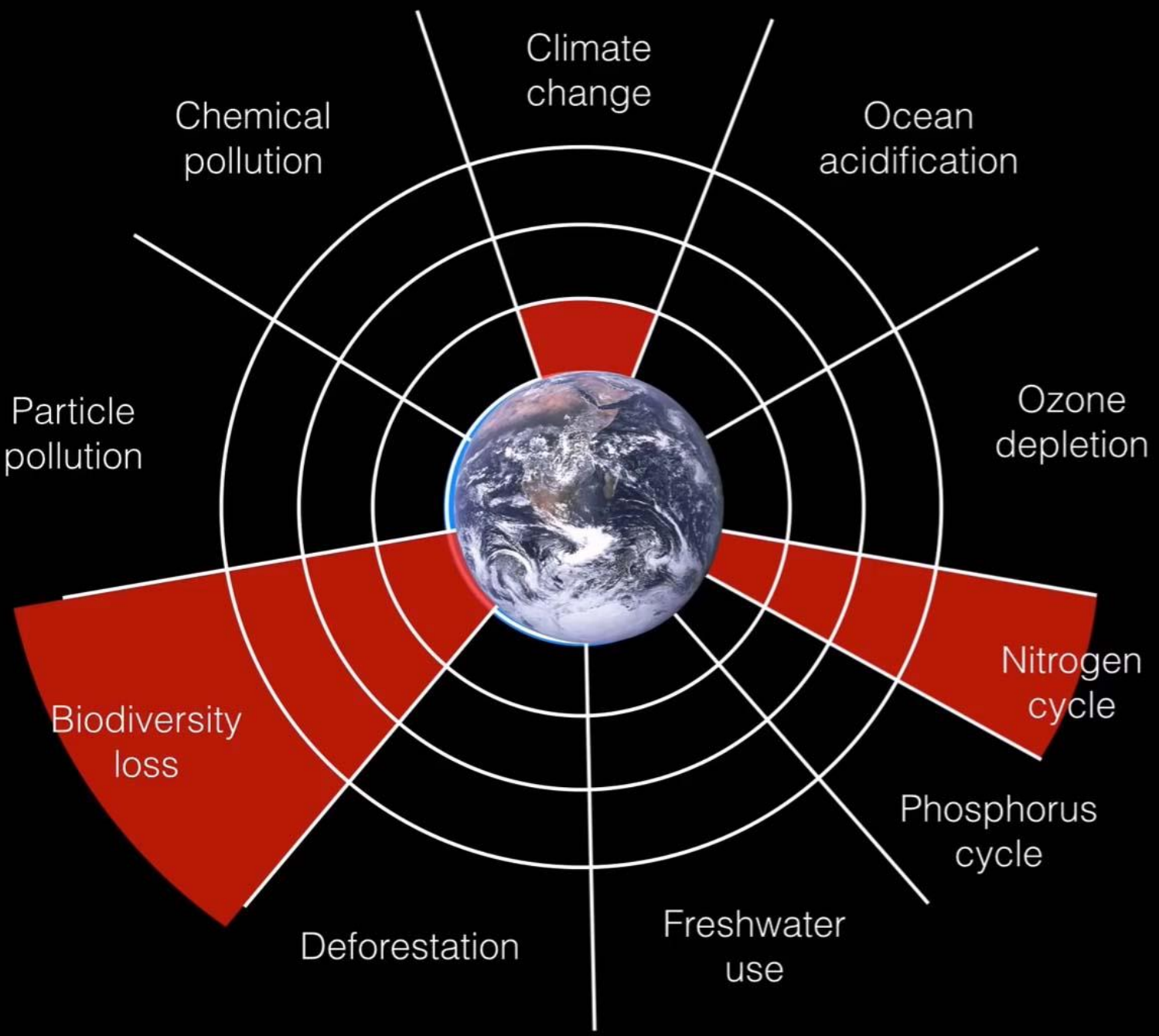
In general, environment refers to the surroundings of an **object**.

Health

A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity









Pollution:

Pollution is the introduction of pollutants or contaminants into a natural environment that causes instability, disorder, harm or discomfort to the ecosystem i.e. physical systems or living organisms.





Pollution can take the form of **chemical** substances or **energy**, such as noise, heat, or light.

Pollutants, the elements of pollution, can be foreign substances or energies, or naturally occurring;

When **naturally occurring**, they are considered Pollutants when they exceed natural levels.

1.3. Environmental health

Environmental health is the branch of public health that is concerned with all aspects of the natural and built environment that may affect human health.



Environmental health:

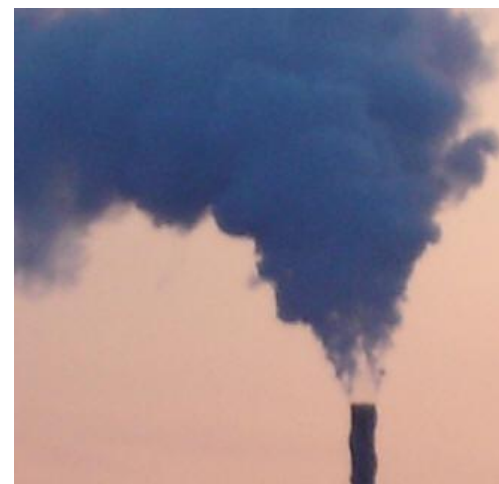
Those aspects of the human health and disease that are determined by factors in the environment.



It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health.

Concepts of Environment and health

Air quality, including both ambient outdoor air and indoor air quality, which also comprises concerns about environmental tobacco smoke.





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Climate Change And Public Health

What Causes Climate Change?

“Climate forcing”
whether natural or manmade
(anthropogenic) are events that cause
changes in the atmosphere and are a
significant cause of global climate change.





Greenhouse gases trap heat in the atmosphere and warm the Earth.

While some greenhouse gases occur naturally, human activities are amplifying the natural greenhouse effect and impacting the concentrations of gases in the atmosphere, thereby contributing to climate change.



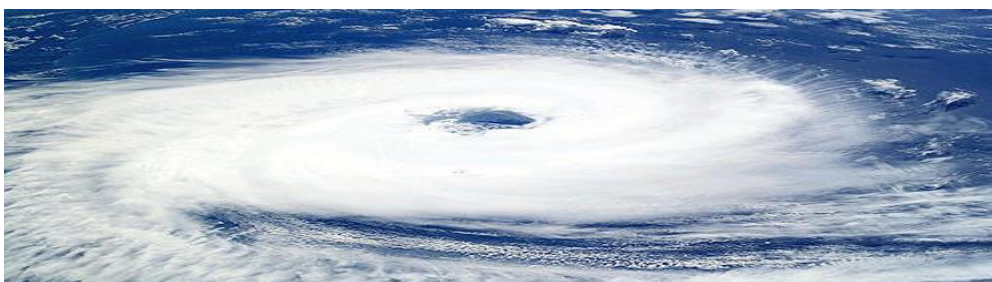
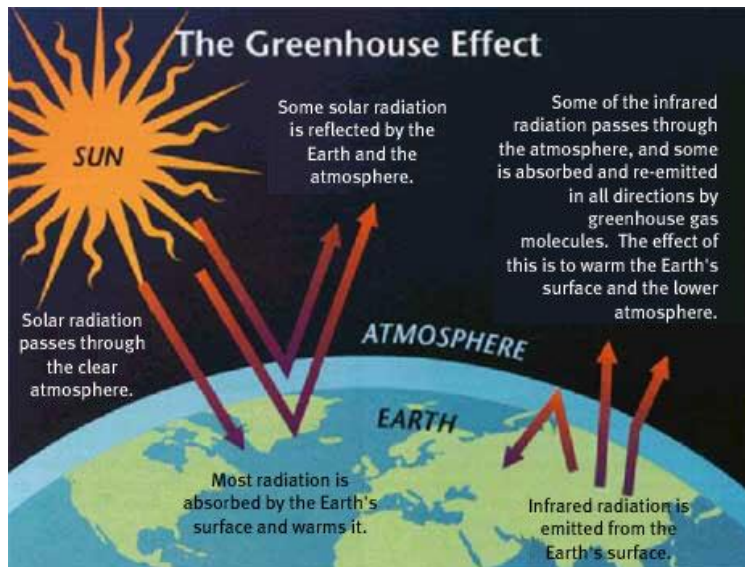


Global Emissions by Gas

- ✓ **Carbon dioxide** (CO₂) - Fossil fuel use is the primary source of CO₂.
- ✓ **Methane** (CH₄) - Agricultural activities, waste management, and energy use all contribute to CH₄ emissions.
- ✓ **Nitrous oxide** (N₂O) - Agricultural activities, such as fertilizer use, are the primary source of N₂O emissions.
- ✓ **Fluorinated gases** (F-gases) - Industrial processes, refrigeration, and the use of a variety of consumer products
- ✓ **Black carbon** (BC) is a solid particle or aerosol, not a gas, but it also contributes to warming of the atmosphere.

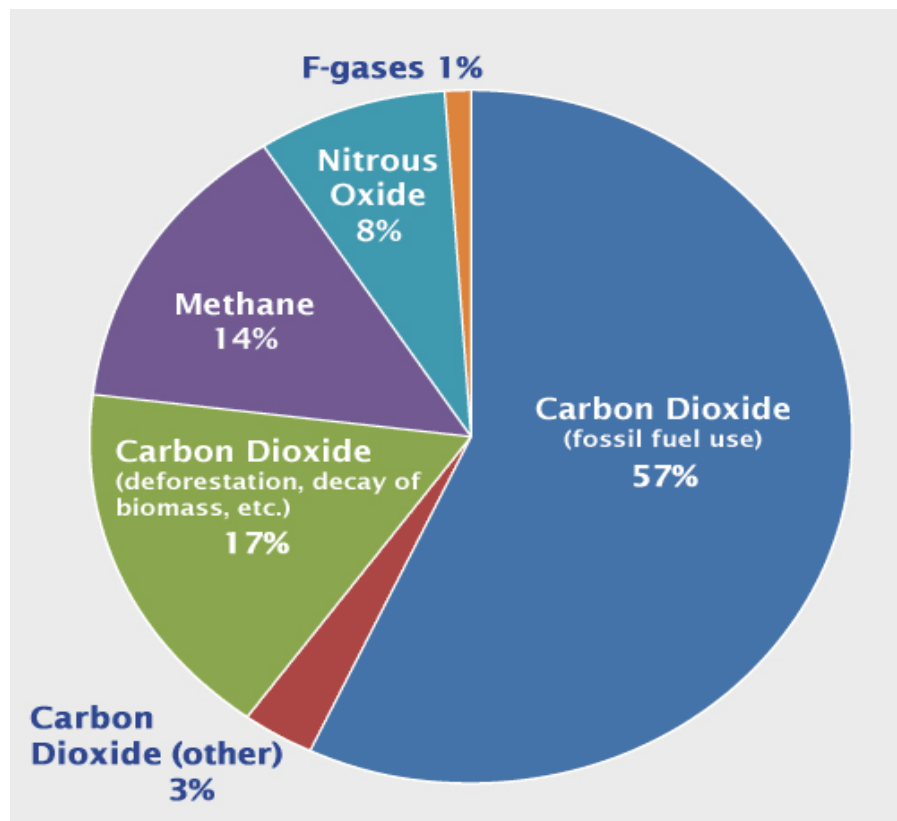


•Climate change and its effects on health.





Global Emissions by Gas





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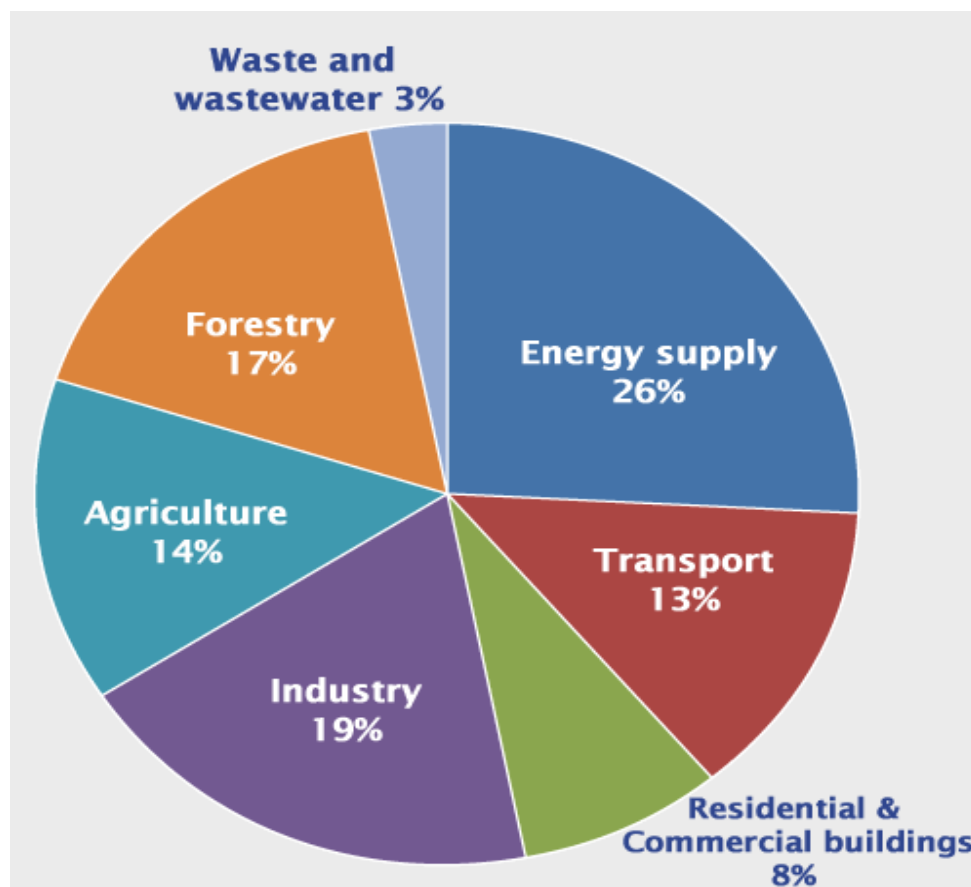
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Global Emissions by Source





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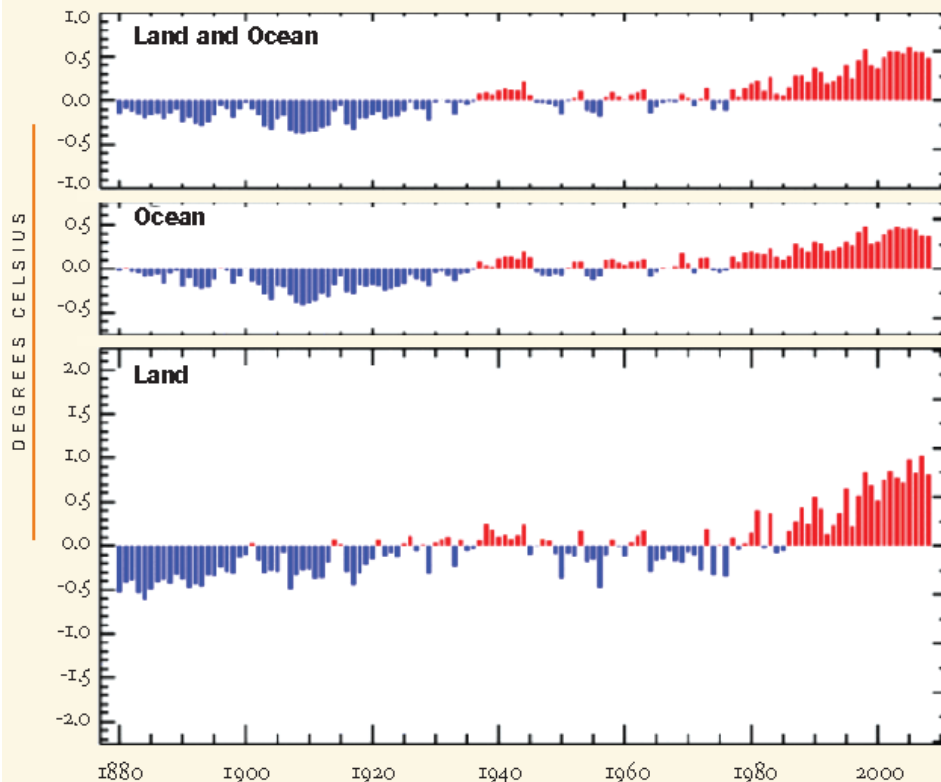
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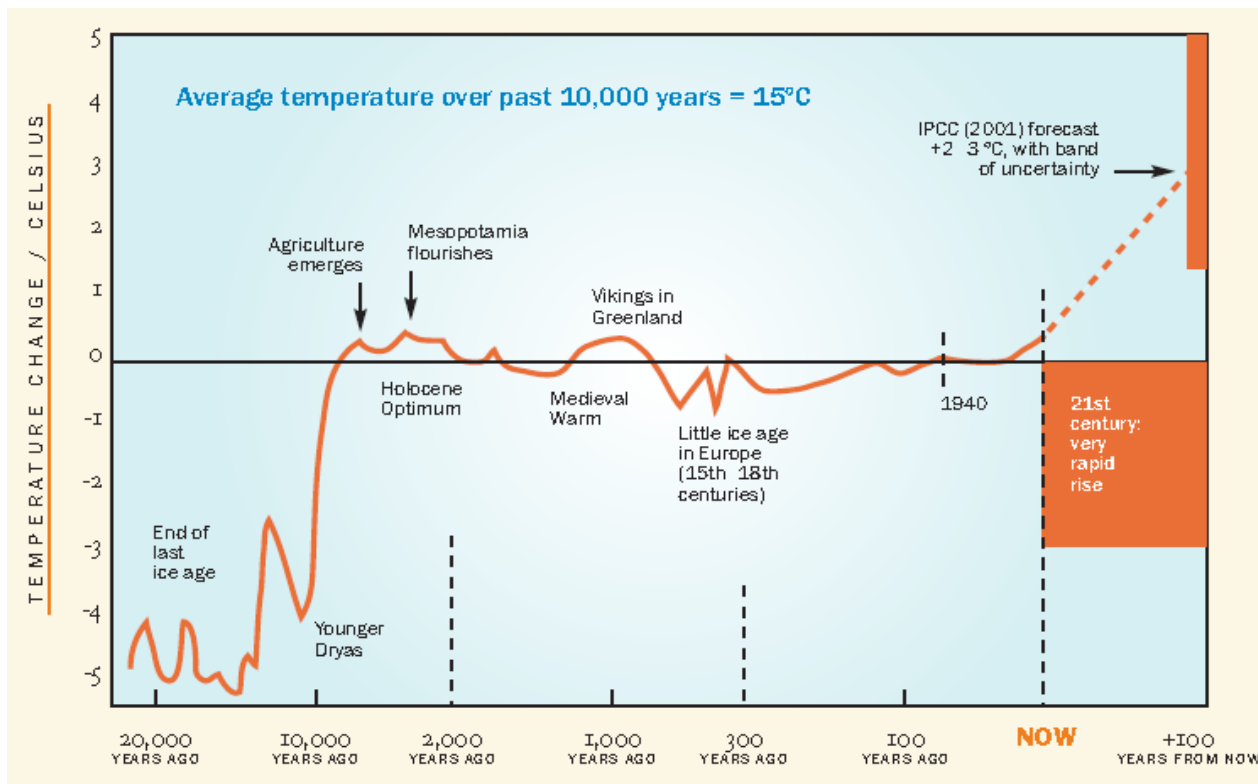
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Projecting the Future of Climate Change



January–December Global Surface Mean Temperature Anomalies





Variations in Earth's Average Surface Temperature Over the Past 20,000 Years





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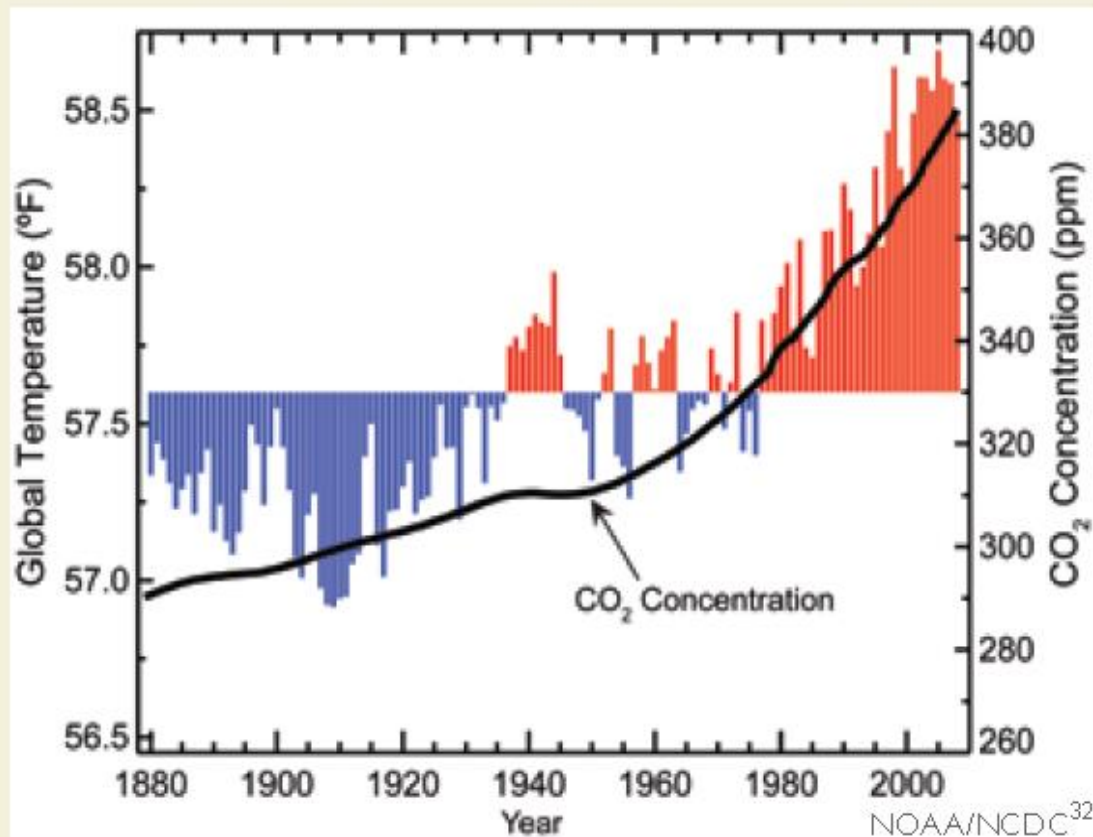
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Global Temperature and Carbon Dioxide





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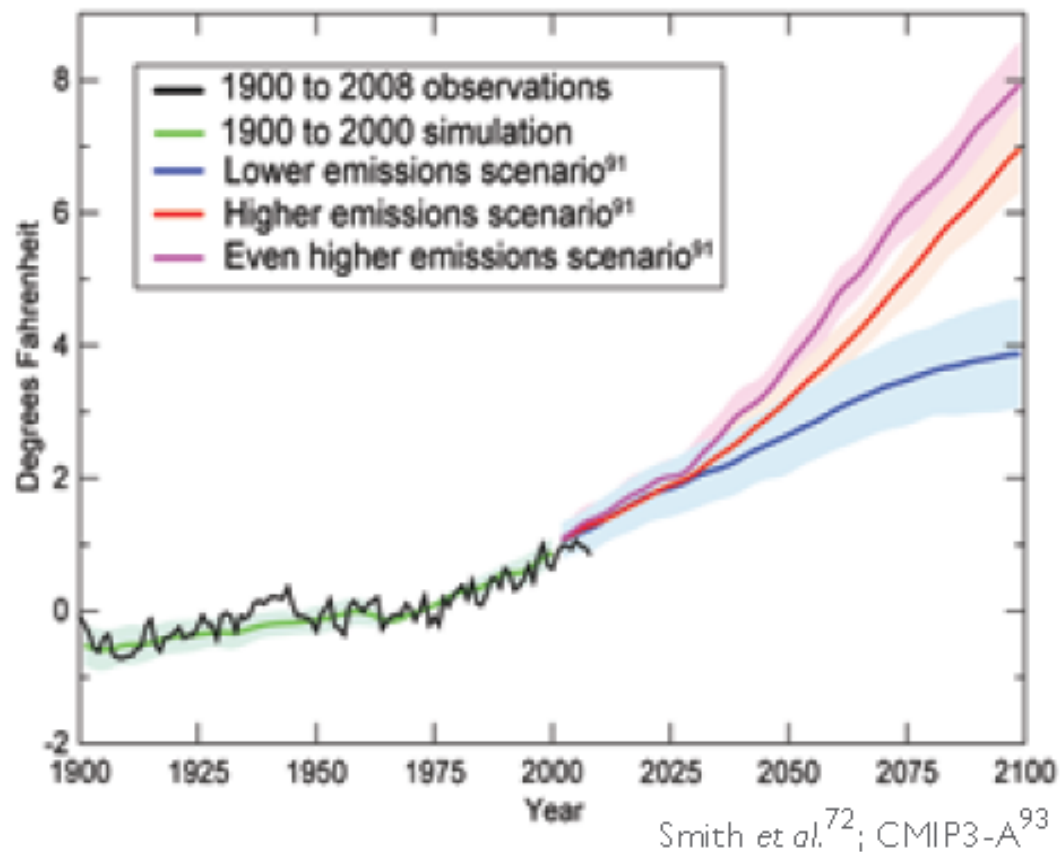
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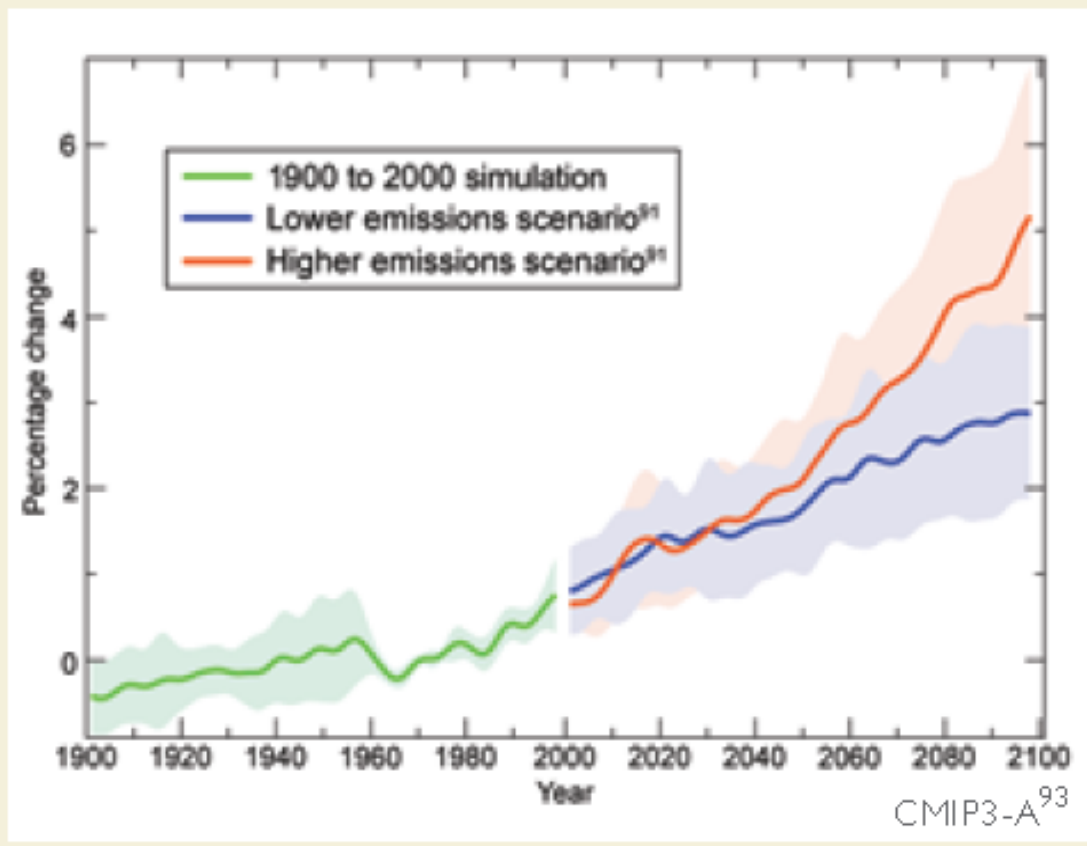
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Global Average Temperature 1900 to 2100





Global Increase in Heavy Precipitation 1900 to 2100





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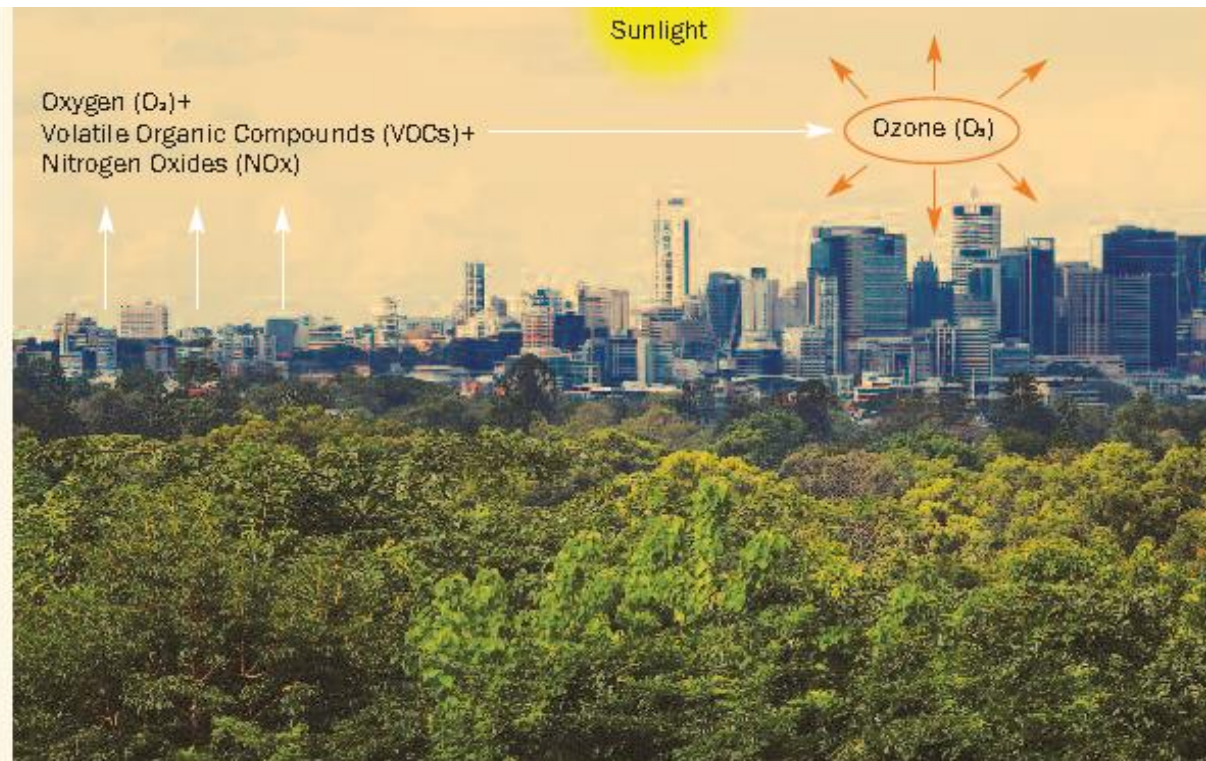
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Ground-level Ozone Formation





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Arctic Sea Ice Annual Minimum

1979



2007





Categories of human health consequences of climate change:

1. Asthma, Respiratory Allergies, and Airway Diseases
2. Cancer
3. Cardiovascular Disease and Stroke
4. Foodborne Diseases and Nutrition
5. Heat-Related Morbidity and Mortality
6. Human Developmental Effects
7. Mental Health and Stress-Related Disorders
8. Neurological Diseases and Disorders
9. Vectorborne and Zoonotic Diseases
10. Waterborne Diseases





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Ozone Hole

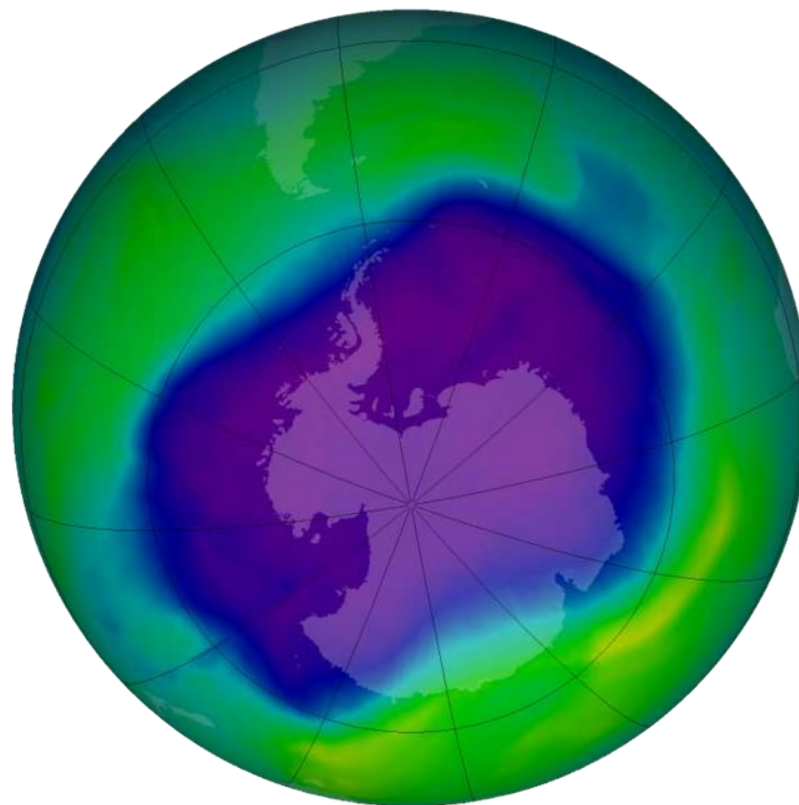
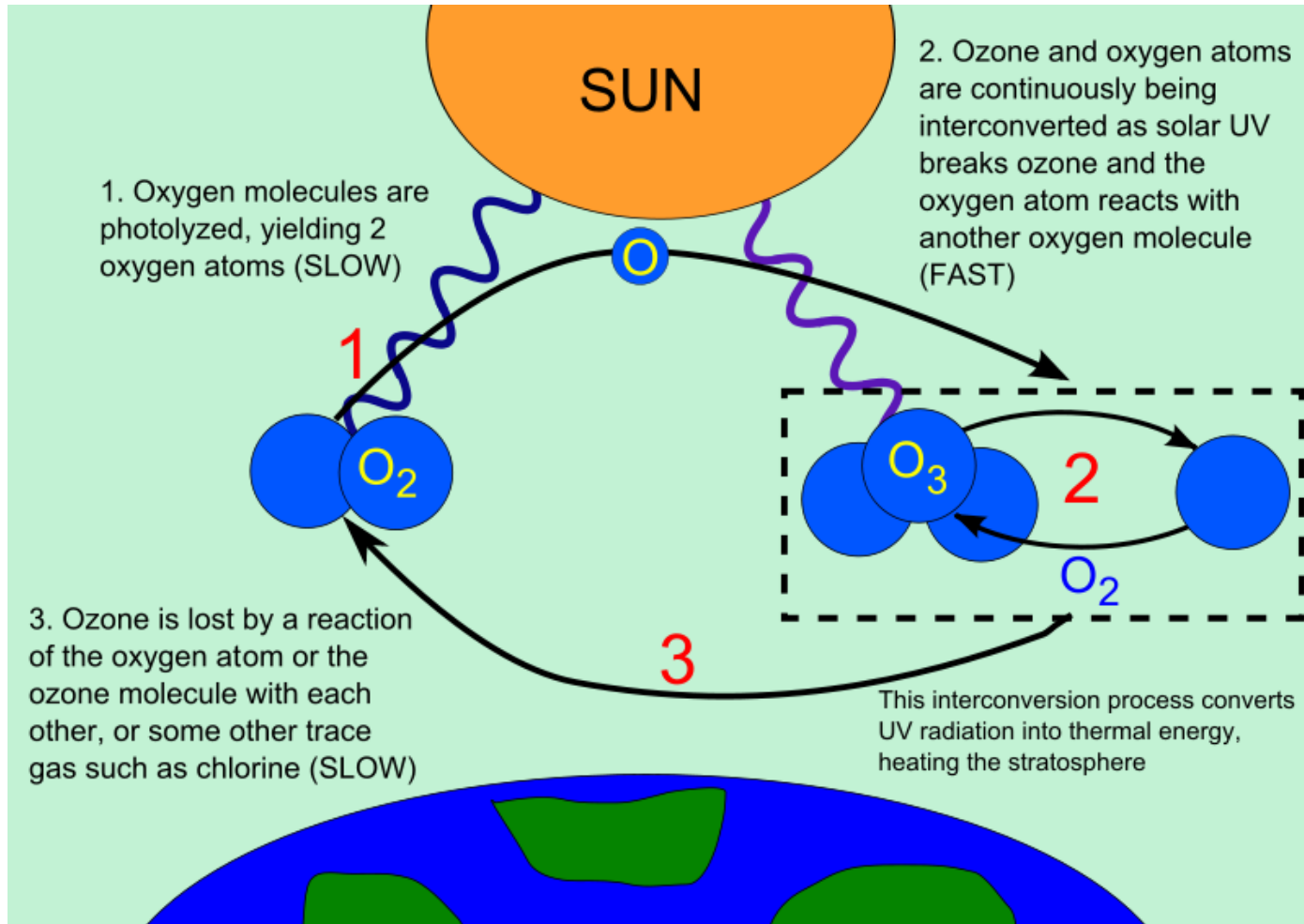


Image of the largest Antarctic ozone hole ever recorded (September 2006), over the Southern pole







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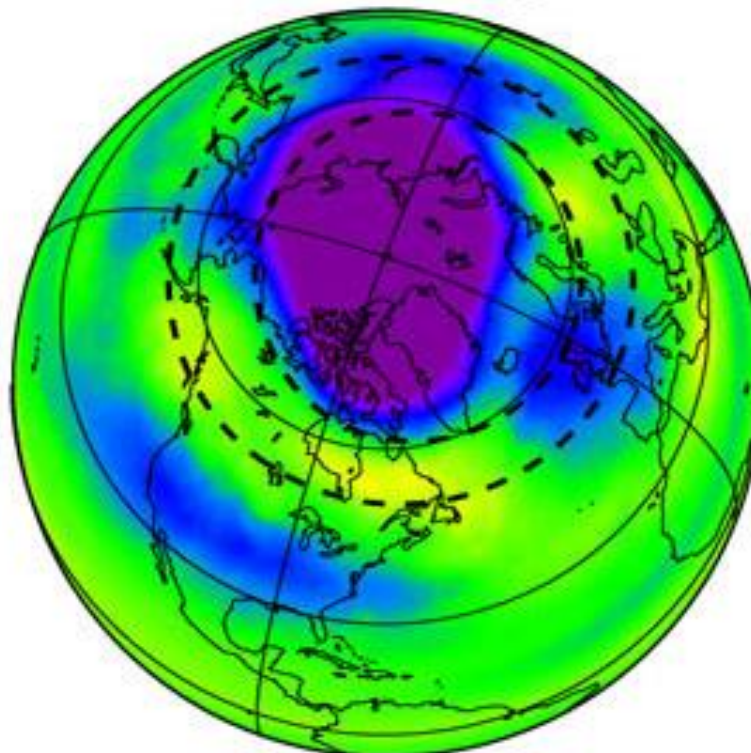
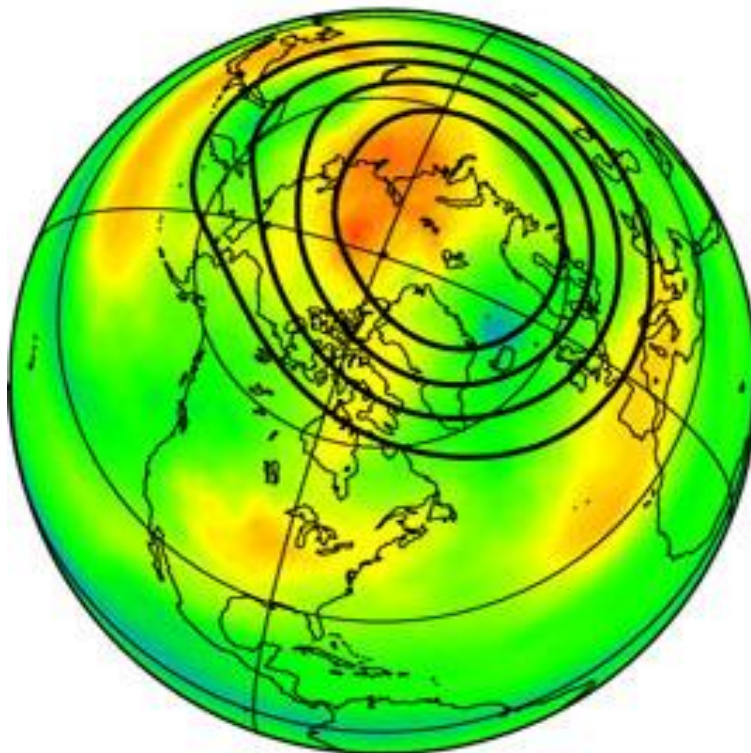
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— Strong Long Wave

----- Weak Long Wave



1984

1997

Total Column Ozone





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Environmental Health Concerns

- **Disaster preparedness and response.**



• **Food safety,**

including in agriculture,
transportation, food
processing, wholesale and
retail distribution and sale.





Hazardous materials management

including hazardous waste management, contaminated site remediation, the prevention of leaks from underground storage tanks and the prevention of hazardous materials releases to the environment and responses to emergency situations resulting from such releases.



- **Housing**, including substandard housing abatement
- **Childhood lead poisoning prevention.**
- **Land use planning**, including smart growth.



- **Liquid waste disposal**, including city wastewater treatment plants and on-site waste water disposal systems, such as septic tank systems and chemical toilets.



- **Medical waste management and disposal.**



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- **Noise pollution control.**



- **Occupational health and industrial hygiene.**
- **Radiological health**, including exposure to ionizing radiation from X-rays or radioactive isotopes.

- **Recreational water illness prevention,** including from swimming pools, spas and ocean and freshwater bathing places.



- **Safe drinking water.**



Solid waste management, including landfills, recycling facilities, composting and solid waste transfer stations





- **Toxic chemical exposure** whether in consumer products, housing, workplaces, air, water or soil.



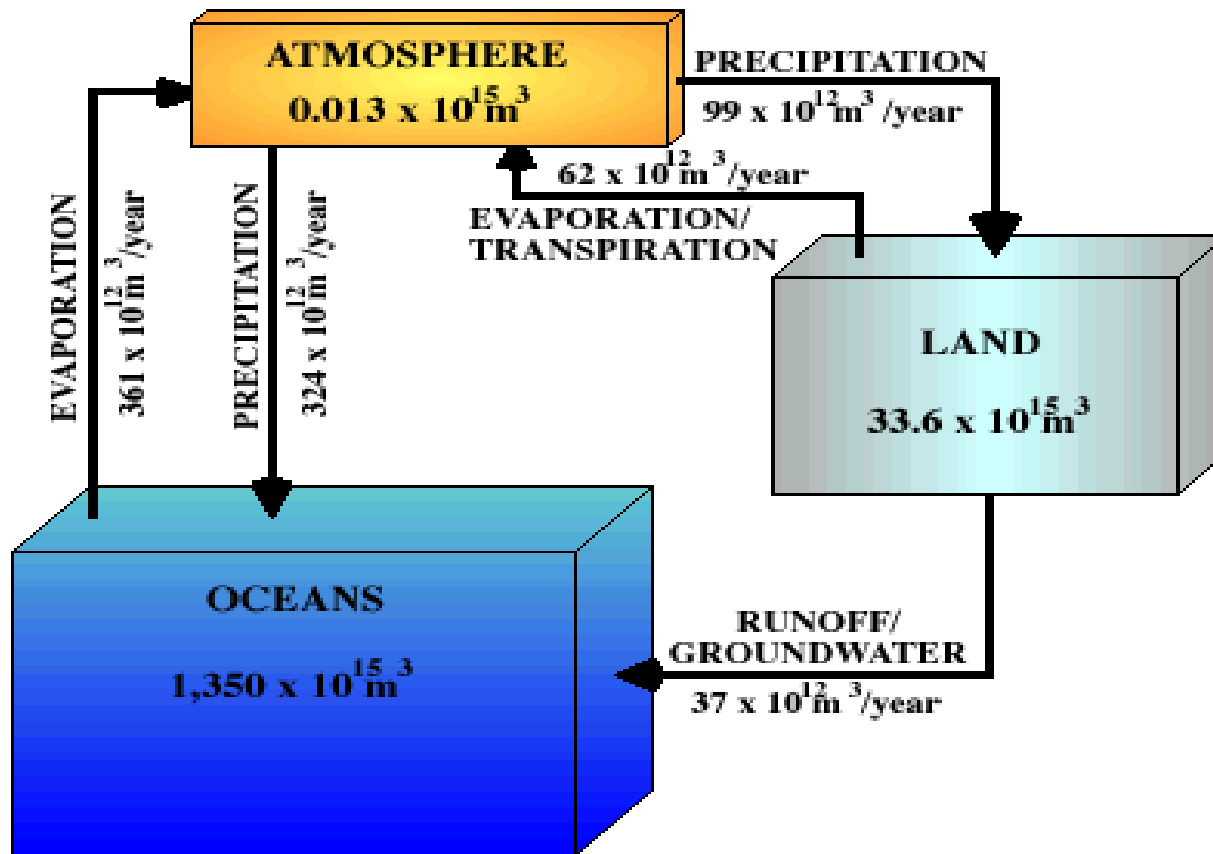


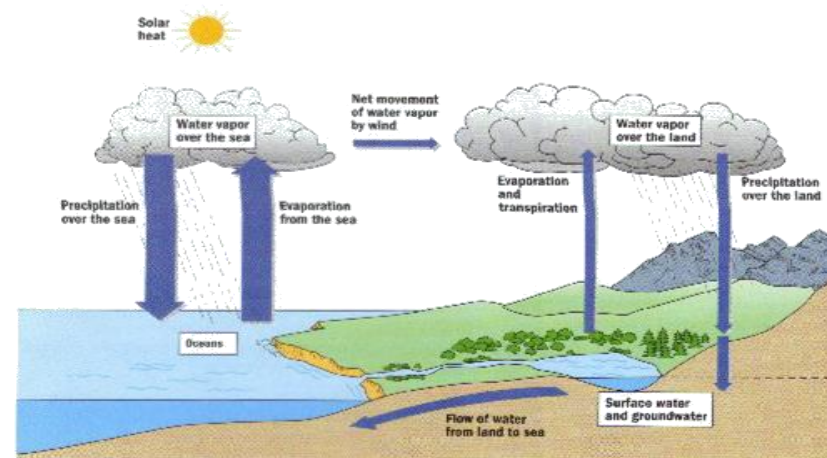
Household Hazardous Waste

- Paints and solvents
- Automotive wastes (used motor oil, antifreeze, etc.)
- Pesticides (insecticides, herbicides, fungicides, etc.)
- Mercury-containing wastes (thermometers, switches, fluorescent lighting, etc.)
- Electronics (computers, televisions, cell phones)
- Aerosols / Propane cylinders
- Cleaning agents
- Refrigerant -containing appliances
- Some specialty Batteries (e.g. lithium, nickel cadmium, or button cell batteries)
- Radioactive waste (some home smoke detectors are classified as radioactive waste because they contain very small amounts of a radioactive isotope of americium).



WATER POLLUTION



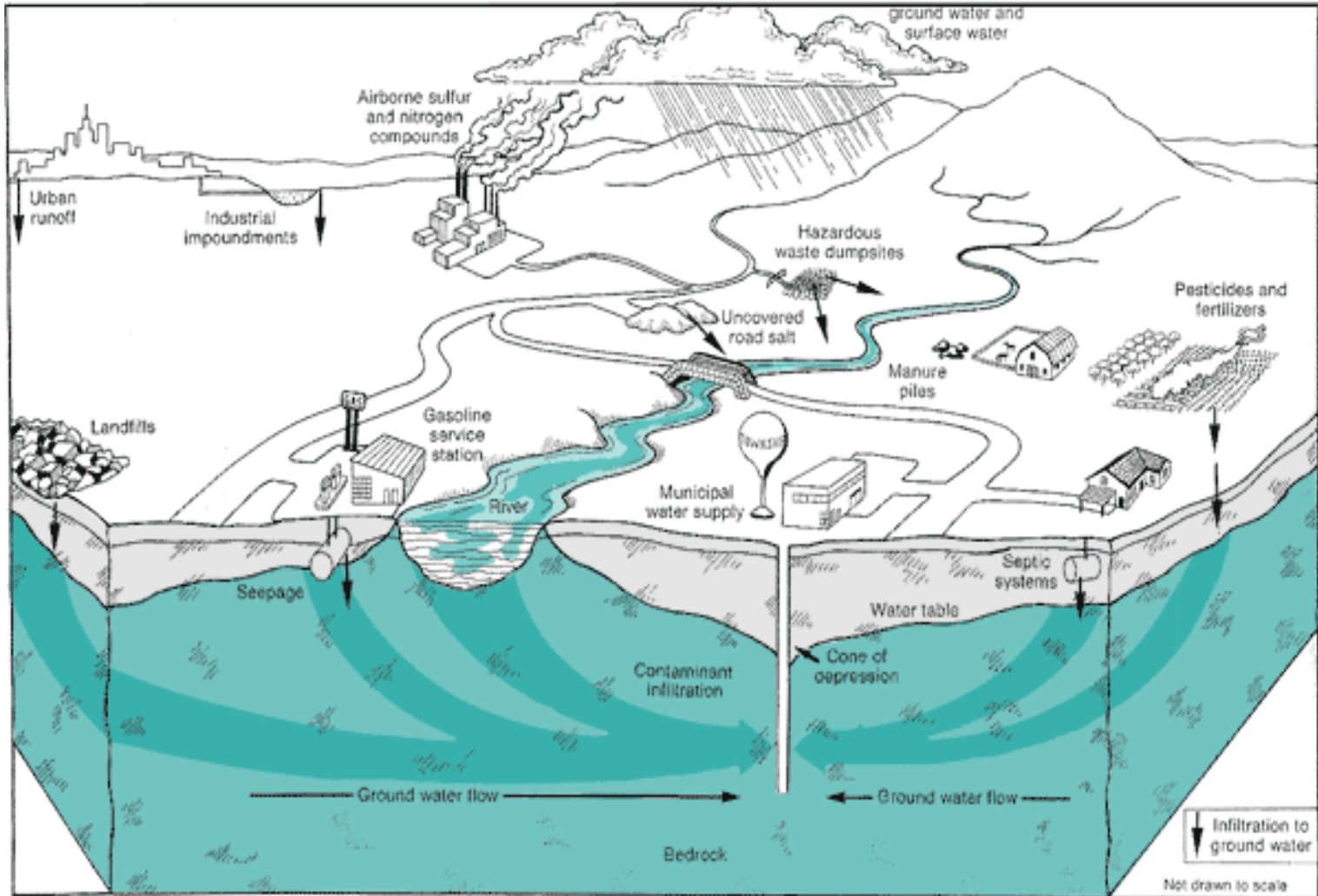


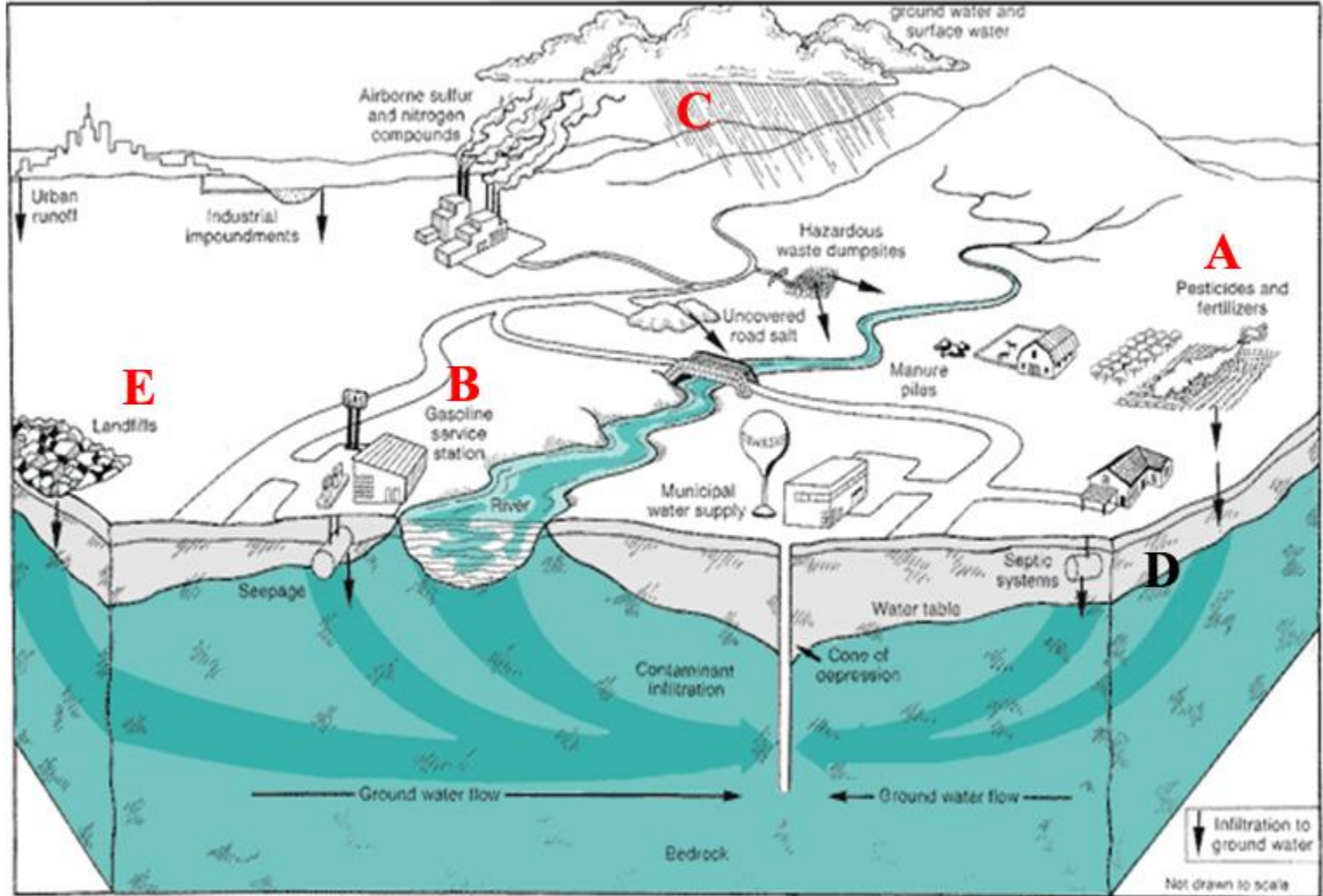
- Evaporation and Transpiration
- Condensation and Precipitation
- Runoff and infiltration
- Streams
- Groundwater – held in aquifers



Sources of Pollution & Causes of Contamination

- Improper Waste Disposal
- Improper Well Construction
- Poor Site Selection
- Wells Not Properly Abandoned
- Improper Waste Storage
- Lack of Information on Hazardous Sites or Activities





Water Disinfection

1. Chlorination. using chlorine
2. Ozonization. using ozone
3. Bromination. using bromine.
4. Iodination. using iodine.
5. Exposure to Ultra Violet Rays using UV Rays.
6. Heating. By boiling
7. Addition of lime. using lime.
8. Exposure to Ultra Sonic Waves.

Chlorination is the most common method for ease of control and low cost in addition to its effectively.



Applying Chlorination in rural areas:

This could be carried out with any powder or solution containing Cl_2 as:

- Chlorinated lime = **Bleaching powder**, 25-35% Cl_2
- HTH = **High test hypochlorite powder**, 70-75% Cl_2 .
- Sodium hypochlorite solution**, 15% Cl_2





Ex. Water quantity = 100 m³/day.

Residual Cl₂ required = 0.5 ppm

Cl₂ demand = 0.6 ppm

Cl₂ dose = 1.1 ppm

So every 1 m³ needs 1.1 gm Cl₂

100 m³ need 100 x 1.1 = 110 gm Cl₂/day

for one month 110 x 30 = 3300 gm Cl₂

Every 1 gm of HTH contains 0.75 gm Cl₂

$$100 \times 1.1 \times 30$$

So amount of HTH needed = $\frac{100 \times 1.1 \times 30}{0.75} = 4400$ gm HTH / month

$$0.75$$

= 4.4 Kg HTH / month

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THANK YOU