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Introduction of Water Pollution

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Definition of **Clean Water**: Regulation of the Minister of Health Number 416/MEN.KES/PER/IX/1990

Air bersih adalah air yang digunakan untuk keperluan sehari-hari yang kualitasnya memenuhi syarat kesehatan dan dapat diminum apabila telah dimasak.

Key Points

Clean water is

- Water that is used for daily activities
- Water that meets health requirements
- Water that can turn into drinking water after boiled



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Physical

Some Characteristics of Clean Water

- | | |
|---------------------------|------------------------------------|
| 1. Odor | Has no odor |
| 2. Total Dissolved Solids | 1,000 mg/L |
| 3. Turbidity | 25 NTU |
| 4. Taste | Has no taste |
| 5. Temperature | +/- 3 degree Celsius of room temp. |
| 6. Color | 50 TCU |

Biological

- | | |
|-------------------|----------------|
| 1. Total Coliform | 50 CFU/ 100 mL |
| 2. E.Coli | 0 CFU/ 100 mL |



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Chemical

Some Characteristics of Clean Water

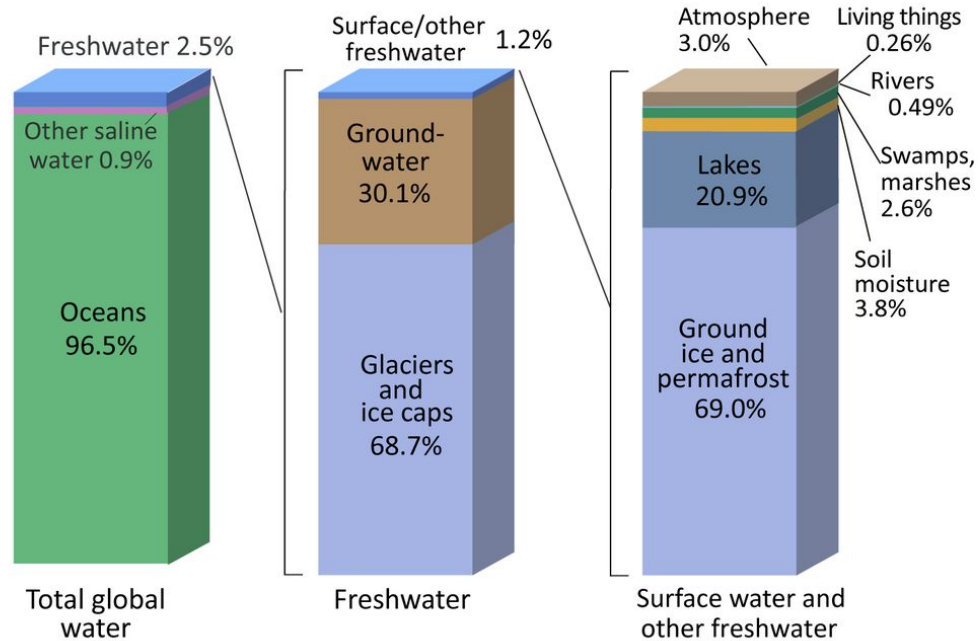
1.	pH	6.5 - 8.5
2.	Iron	1 mg/L
3.	Fluoride	1.5 mg/L
4.	Hardness (CaCO ₃)	500 mg/L
5.	Manganese	0.5 mg/L
6.	Nitrate as N	10 mg/L
7.	Nitrite as N	1 mg/L
8.	Cyanide	0.1 mg/L
9.	Detergent	0.05 mg/L
10.	Total Pesticides	0.1 mg/L



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Distribution of water



Credit: U.S. Geological Survey, Water Science School. <https://www.usgs.gov/special-topic/water-science-school>
Data source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources. (Numbers are rounded).



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Sources of Water

Surface water

Ground water

Ocean

Rain water



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Definition of **Water Pollution**: Decree of the Minister of Population and Environment No.02 / MENLH / I / 1998

Pencemaran air adalah memasuknya atau dimasukkannya makhluk hidup, zat, energi dan atau komponen lain ke dalam air oleh kegiatan manusia, sehingga kualitas air turun sampai ke tingkat tertentu yang menyebabkan air tidak dapat berfungsi sesuai dengan peruntukannya

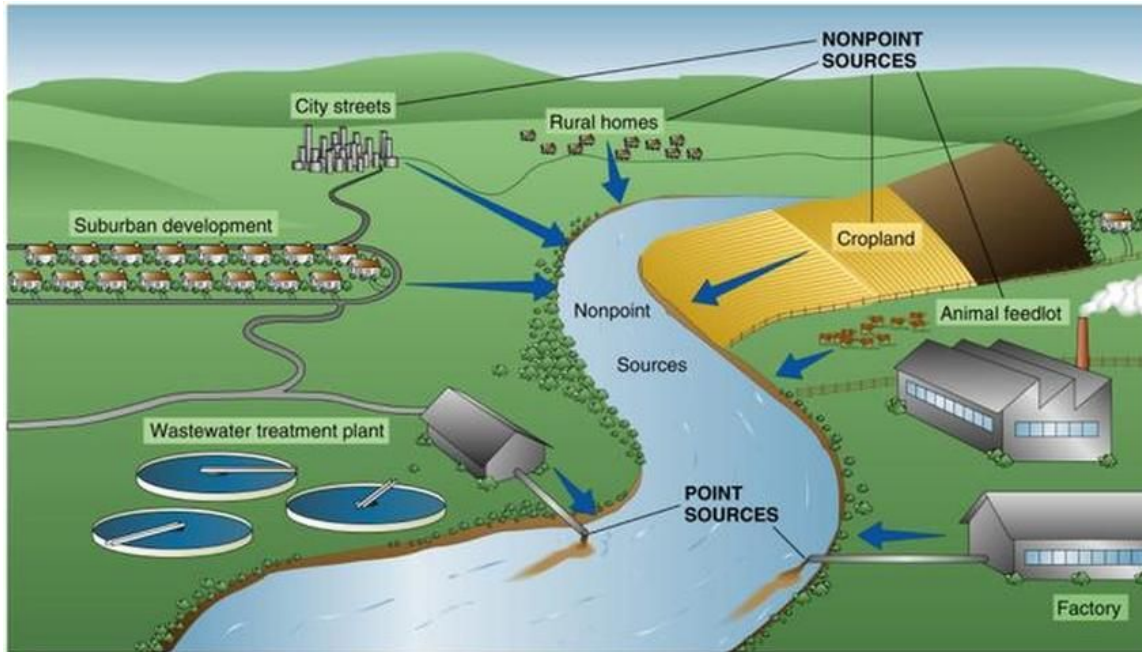
Key Points:

Water pollution

- The entry or inclusion of living things, substances, energy into water
- Quality of water drops

Water Pollution Sources

Point Source Water Pollution



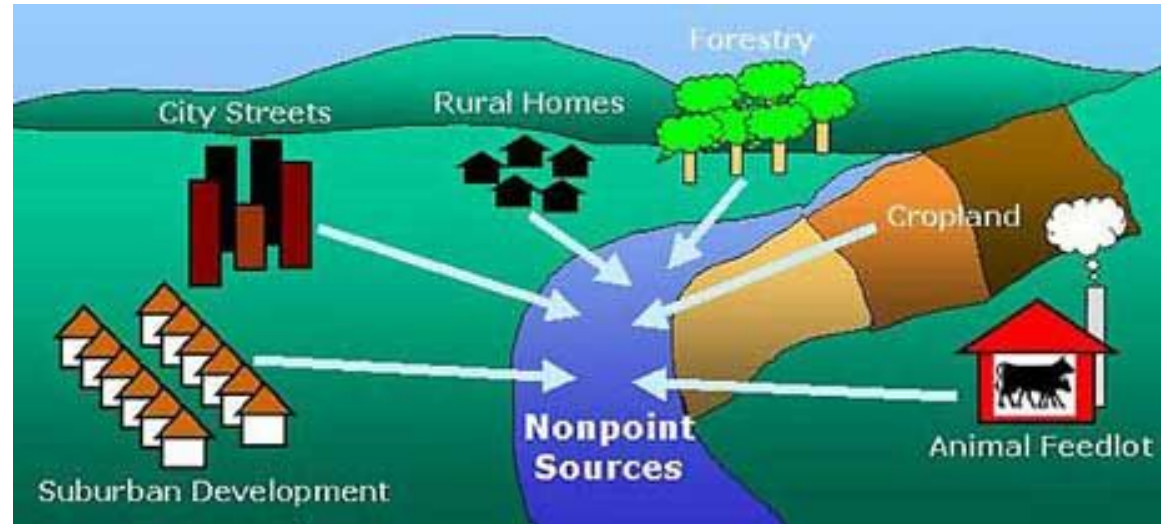
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Point source water pollution comes from a discrete source, such as a pipe or drain flowing from an industrial activity

Water Pollution Sources

Non Point Source Water Pollution

NPS pollution is usually caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.





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Categories of Water Pollution

Groundwater

- From pesticides and fertilizers to waste leached from landfills and septic systems

Surface water

- Farm waste and fertilizer runoff
- Municipal and industrial waste discharges
- Random garbage

Ocean water

- Chemicals, nutrients, and heavy metals from farms, factories, and cities
- Marine debris
- Oil spills and leaks

Effects of Water Pollution (on Environment)

- Disruption of the life of aquatic organisms due to reduced oxygen content (O_2)
- Death of insects and useful creatures due to excessive use of pesticides
- Algae explosion and aquatic plants (eutrophication)



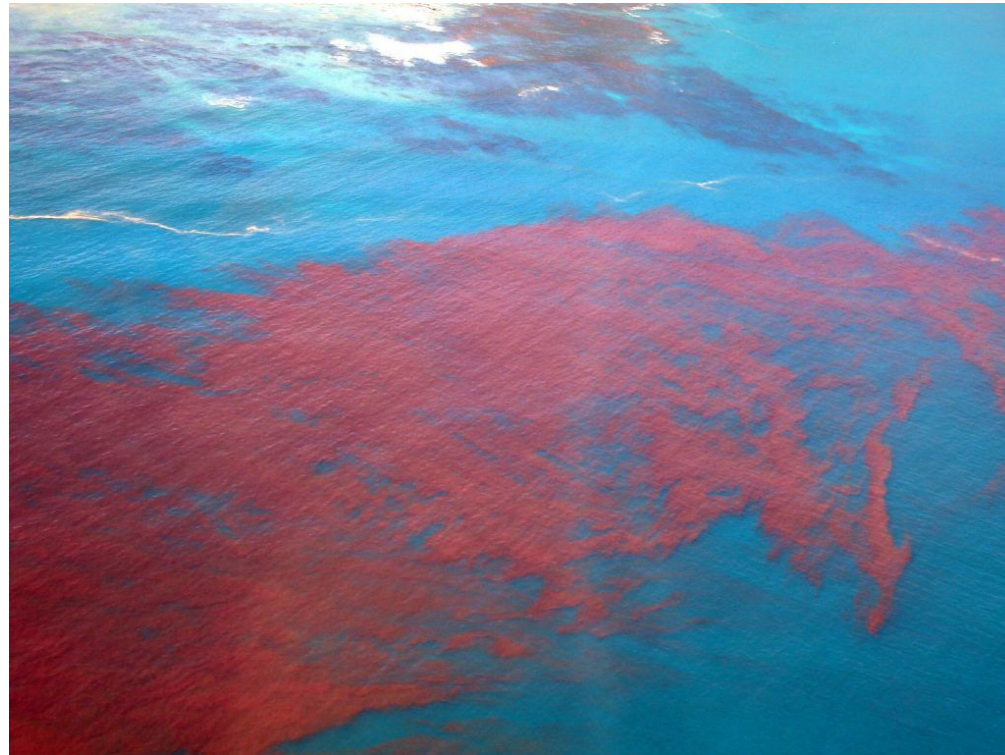


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Red Tide

A "red tide" is a common term used for a harmful algal bloom. Harmful algal blooms, or HABs, occur when colonies of algae—simple plants that live in the sea and freshwater—grow out of control while producing toxic or harmful effects on people, fish, shellfish, marine mammals, and birds.



Effects of Water Pollution (on Humans' Health)

- The contamination of Hg may cause minamata diseases
- The contamination of Cd may cause itai-itai disease
- Cell mutations, cancer, and leukemia also may occur due to water pollution



Minamata disease (Hg)



Itai itai disease (Cd)



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Clean Water Supply Principles

Quality

Meet chemical, physical, biological requirements

Quantity

The amount of water available

Continuity

Continuity is where water must be available continuously even during dry season.

