

# Introduction of Ecology and Ecosystem

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# Ecology

The word of Ecology comes from the Greek. Oikos which means home or a place to live and logos which means knowledge.

Ecology is the study of the interrelationships between living things and their environment

Ecology is broadly divided into

Autecology

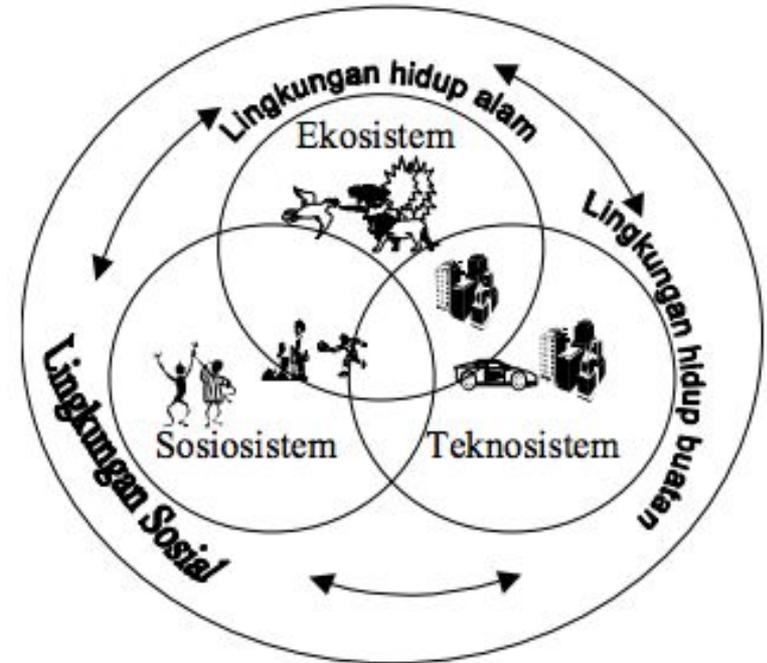
Synecology

# Components in the Environment

1. Abiotic components: non living elements
2. Biotic components: living organisms

## The Balance of Living Environment

1. Social System: Social environment
2. Tecnosystem: Man-made environment
3. Natural ecosystem: Natural environment without any intervention



# Definition of Ecosystem

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Republic of Indonesia Law 32/2009:

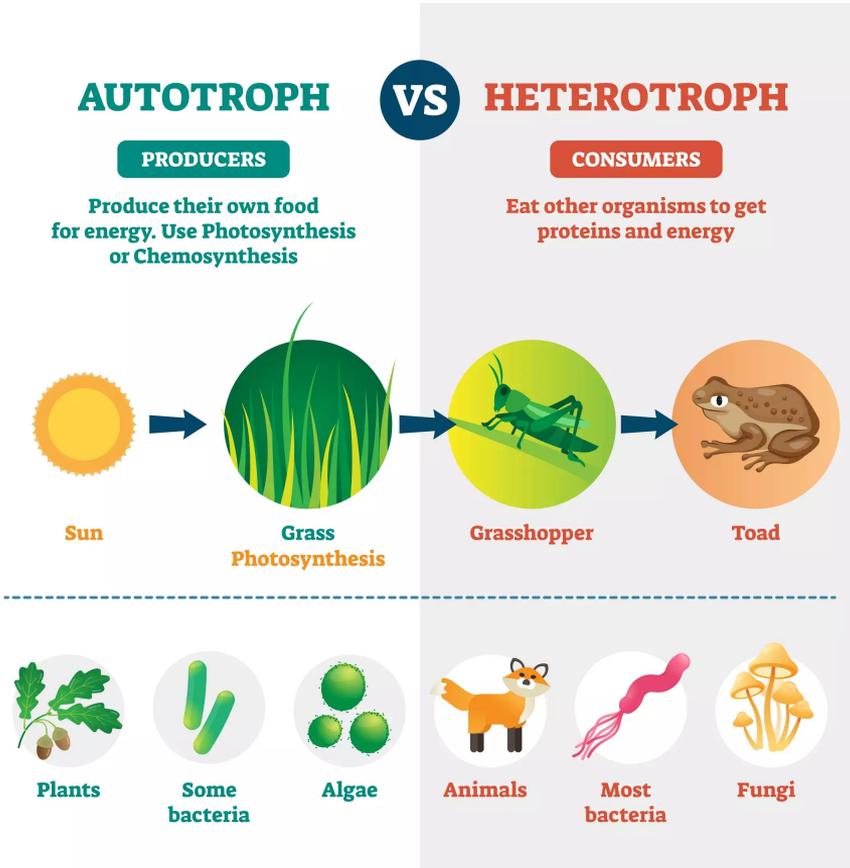
*Ekosistem adalah tatanan unsur lingkungan hidup yang merupakan kesatuan utuh-menyeluruh dan saling mempengaruhi dalam membentuk keseimbangan, stabilitas, dan produktivitas lingkungan hidup.*

Ecosystem is an order of environmental elements that is a whole unity and interact with one another in forming a balance, stability and productivity of living environment

# Components of Ecosystem Based in Its Function

Autotrophic

Heterotroph



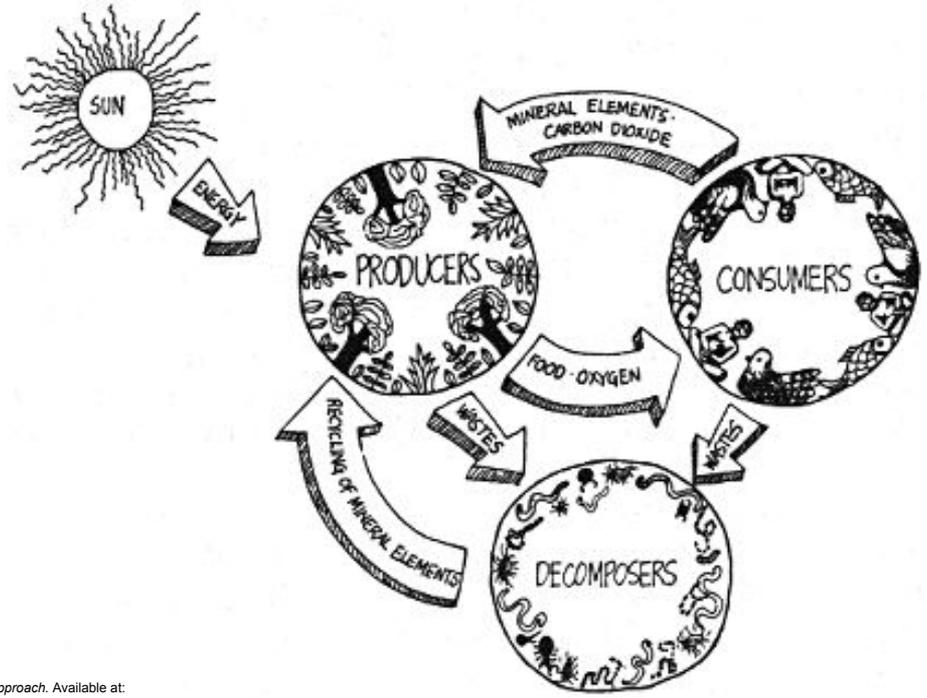
Bailey, R. (2020). What Is an Autotroph? Definition and Examples. Available at: <https://www.thoughtco.com/what-is-an-autotroph-definition-and-examples-4797321>

# Components of Ecosystem Based on Its Composition

Producers

Consumers

Decomposers



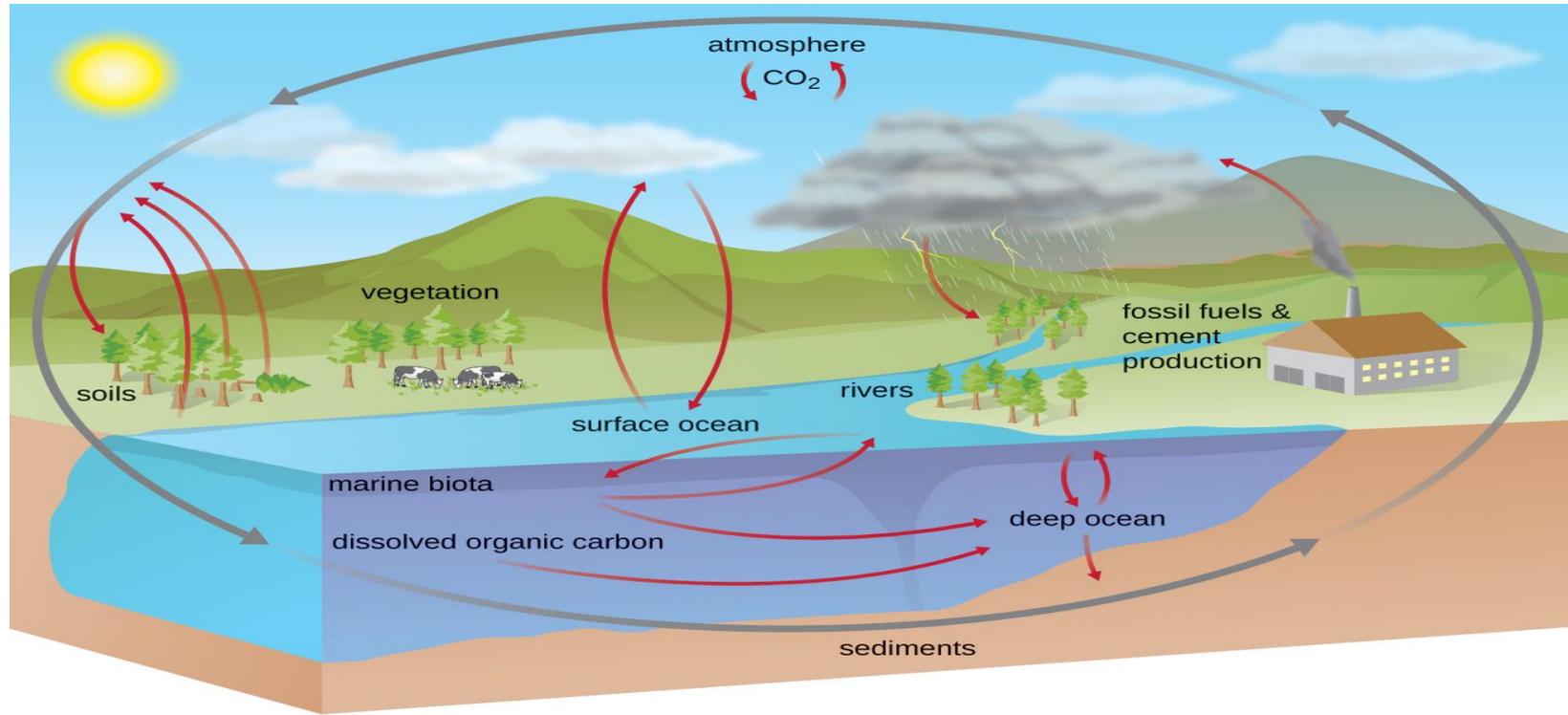
Jarzynowski, A. (2018). *The Food System: a cybernetic approach*. Available at: [https://www.researchgate.net/publication/322436603\\_The\\_Food\\_System\\_a\\_cybernetic\\_approach](https://www.researchgate.net/publication/322436603_The_Food_System_a_cybernetic_approach)

# Biogeochemical Cycles

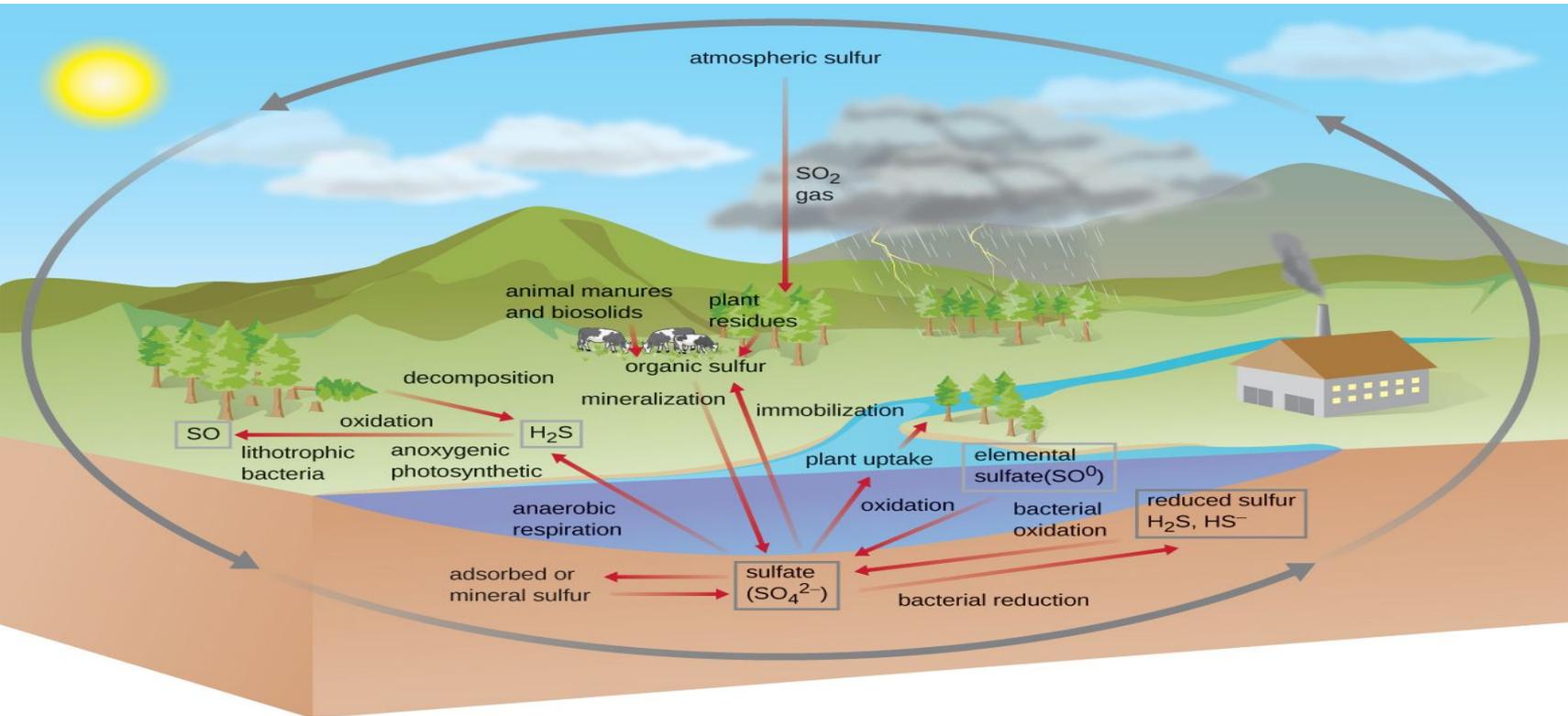
Biogeochemical cycle is the flow of chemical elements between living organisms and the environment.

Biogeochemical cycle is essential since it regulates the important elements such as carbon, nitrogen, sulfur, and bioremediation by cycling them which enables the continued survival of ecosystems.

# Biogeochemical Cycles (Carbon Cycle)



# Biogeochemical Cycles (Sulphur Cycle)



Biology Libre Text (2019). *Biogeochemical Cycles*. Available at [https://bio.libretexts.org/Bookshelves/Microbiology/Book%3AMicrobiology\\_\(OpenStax\)/08%3A\\_Microbial\\_Metabolism/8.7%3A\\_Biogeochemical\\_Cycles](https://bio.libretexts.org/Bookshelves/Microbiology/Book%3AMicrobiology_(OpenStax)/08%3A_Microbial_Metabolism/8.7%3A_Biogeochemical_Cycles)  
 The Environmental Literacy Council (n.d.). *Sulfur Cycle*. Available at <https://enviroliteracy.org/air-climate-weather/biogeochemical-cycles/sulfur-cycle/>

# Biogeochemical Cycles (Bioremediation)

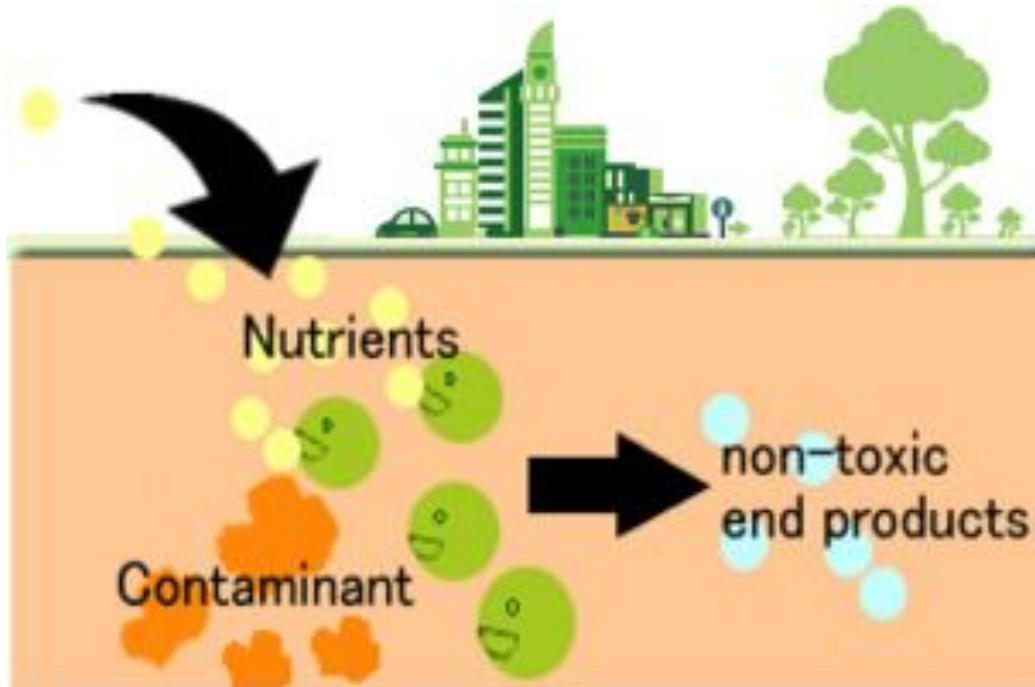
Microbial bioremediation leverages microbial metabolism to remove xenobiotics or other pollutants.

## Types of Bioremediation

In situ Bioremediation

Ex situ Bioremediation

# Biogeochemical Cycles (Bioremediation)



Essential bacteria in bioremediation is bacteria of the genera *Rhodococcus* and *Pseudomonas*

# Humans' activities that disturb the balance of ecosystem

## Illegal Logging

Due to illegal logging, deforestation occurs, thus:

- Increase occurrence of erosion
- Increase occurrence of flood in rainy season
- Increase drought in dry season
- Loss of biodiversity

 The Jakarta Post

NEWS > NATIONAL

### North Sumatra Police probe illegal logging as possible cause of deadly floods

Apriadi Gunawan  
The Jakarta Post

Medan / Fri, January 3, 2020 / 12:47 pm



Gunawan, A. (2020). *North Sumatra Police Probe Illegal Logging as Possible Cause of Deadly Floods*. Available at <https://www.thejakartapost.com/news/2020/01/03/north-sumatra-police-probe-illegal-logging-as-possible-cause-of-deadly-floods.html>



The New York Times



The Coronavirus  
Outbreak >

**LIVE** Latest Updates Maps and Cases Vaccine Tracker Understand Pooled Testing

### *Floods Afflict Ukraine as It Tries to Control the Coronavirus*

Environmentalists say illegal logging in the Carpathian Mountains is contributing to flooding. Rising waters forced the partial evacuation of a hospital treating Covid-19 patients.

Kramer, A. (2020). *Floods Afflict Ukraine as It Tries to Control the Coronavirus*. Available at <https://www.nytimes.com/2020/06/24/world/europe/ukraine-flood-coronavirus.html>

# Diseases Caused by Unbalanced Ecosystem

## Unwise Waste - Disposal

Unwise waste-disposal. Things that happen due to unwise waste disposal

- Increase water-related diseases such as diarrhea
- Increase infertility of soil
- Increase breeding places of vectors

