



Lesson 1:

Environmental Monitoring

Meaning and Importance

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Lesson Objectives

Understand basic concepts of
environmental monitoring



Understand how drone technology
relates to Environmental Monitoring

Learn about skills and career paths
relevant to Environmental Monitoring



Environmental Monitoring



What is Environmental

Monitoring?

Definition: Environmental Monitoring is the practice used to evaluate the condition of the environment.

Through the systematic collection of data, it assesses the condition of the air, water and soil.

Main Purpose: Assessing environmental impact of human activity and guiding environmental protection practices.



Environmental Monitoring and Sustainability

1 Biodiversity Concervation

- By ensuring a healthy environment, biodiversity is protected and species are able to thrive in their natural habitats.
- SDG 14- Life Under Water and SDG 15 - Life on Land are the Sustainable Development Goals that are directly concerned with biodiversity and the protection of the natural habitats of species.

2 Accessible Resources

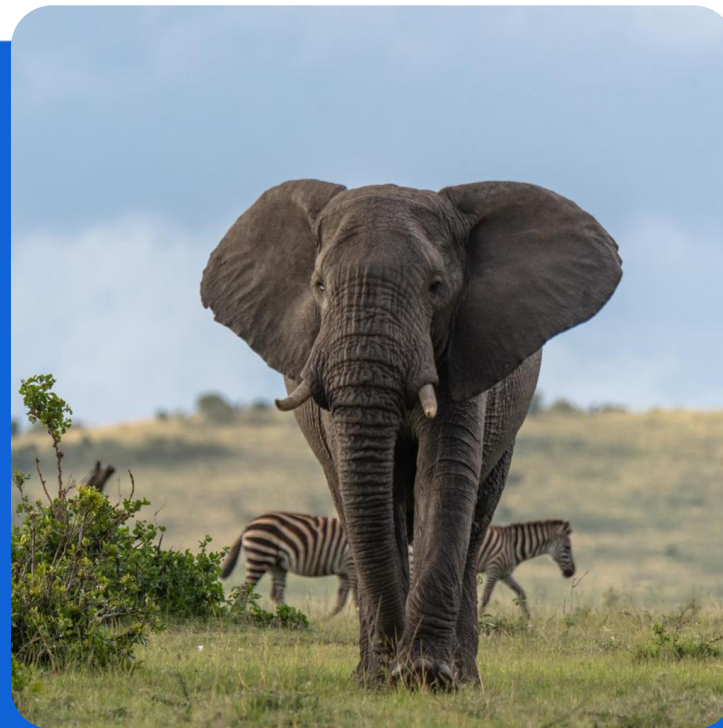
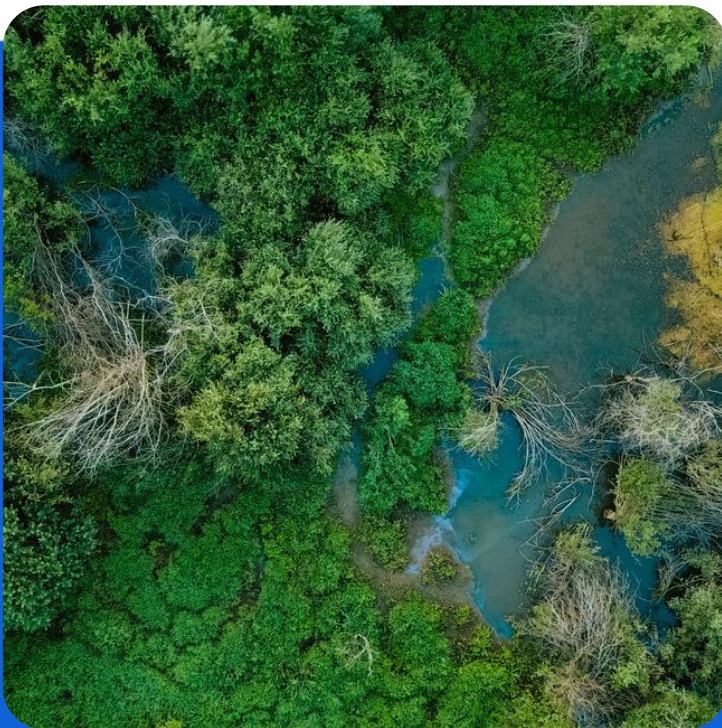
- Monitoring the state of vital resources such as water ensures that clean sources are accessible to all.
- SDG 6 - Clean Water and Sanitation aims to ensure availability of clean water for all. The progress of this goal is tracked through repeated water quality monitoring among other processes.

3 Emissions Monitoring

- Monitoring carbon emissions and their effect helps keep corporations in line with environmental regulations.
- SDG 12 - Sustainable Production and Consumption wants to limit the footprint of corporations and

Environmental Monitoring: Environmental Benefits

- Monitoring and preserving ecosystem health
- Monitoring and preserving biodiversity
- Identifying and dealing with pollution
- Keeping records of environmental values



Environmental Monitoring: Social Benefits

- Monitoring pollution and protecting human health
- Maintaining a high standard of living conditions
- Social understanding of environmental state and issues
- Connecting cultural identity with natural resources



Environmental Monitoring: Governance Benefits

- Ensuring adherence to environmental regulations
- Enforcing environmental accountability
- Monitoring success of environmental programs and initiatives
- Guiding the development of environmental policies





Environmental Monitoring Categories



Air Quality

Monitoring
Measures air
borne
pollutants

Assesses
presence of
contaminants
in water bodies



Water Quality
Monitoring



Soil Quality

Monitoring
Measures
nutrients and
pollutants in soil

Tracks diversity,
health and
habits of
species



Biodiversity
Monitoring



Waste

Monitoring
Measures
environmental
pressure of waste

Focus: Air Quality Monitoring and Drones

Air Quality Monitoring aims to help us understand the level of air pollution, the characteristics of the atmosphere and how the overall air quality can be improved.

There are two approaches commonly used in air quality monitoring:

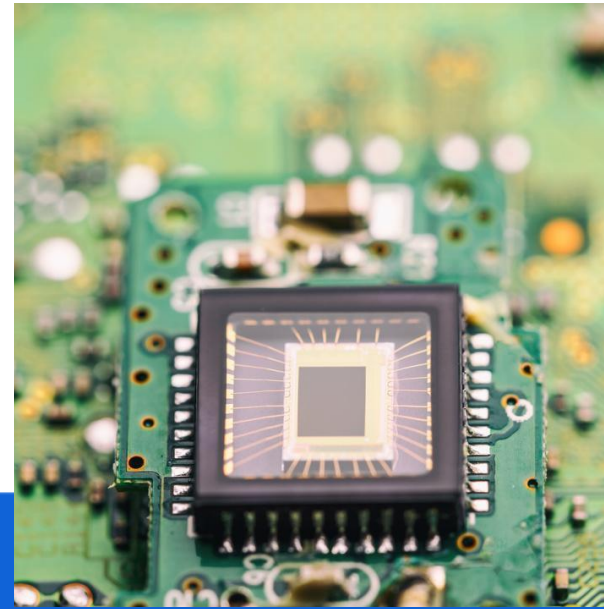
1. Passive Sampling: Relies on diffusion to sample gases and vapors
2. Active Sampling: Involves a pump that passes air through a sampling container

Air Quality Monitoring Tools



Drones

- Programmable, easy to utilize devices
- Can equip them with sensors and other



Sensors and IoT Devices

- Gas Analysers
- Air Quality Sensors
- Thermometers
- IoT = Access to the



AI and Data Analysis Tools

- AI and data analysis tools help organise the data and draw conclusions

Air Quality Monitoring Applications

Urban Air Quality Monitoring

Purpose: Assess what citizens are exposed to on a worst case scenario or on a general level.

Monitoring processes are carried out by governments, educational facilities, researchers, NPOs, corporations and

even individuals.



Industrial Emissions Tracking

Purpose: Minimize environmental hazards, monitor industrial footprint and operations management

In the EU, large industrial and livestock plants are obligated to monitor and make efforts to control their emissions.

Environmental Monitoring: Useful Skills

1 Environmental Interpretation

- In order to understand the state of the environment and the meaning of the gathered values, knowledge in environmental interpretation is very useful in environmental monitoring projects.

2 Data Analysis

- Data analysis skills are needed to organize, analyze and fully utilize the information gathered through all the specialized environmental monitoring equipment. The processing of this data will lead to important conclusions.

3 Programming

- Operating drones and planning drone missions are heavily reliant on programming skills.
- Programming knowledge can also be of assistance in the data analysis phase.

Environmental Monitoring: Relevant Careers

A variety of careers are relevant to environmental monitoring. Environmental Scientists, Data Analysts, Field Technicians, Programmers, Foresters, Environmental Engineers are only some examples.

Working on environmental monitoring is possible through a governmental

Environmental Scientist



Data Analyst



Field Technician



Programmer



Questions

- How do you think environmental monitoring helps fight climate change?
- How does technology improve environmental monitoring and especially air quality monitoring?
- What challenges do you think environmental monitoring is facing?

What are your questions?



Additional Resources

Further Reading

<https://unece.org/environmental-monitoring>

<https://www.pem.tuc.gr/en/index.php?>

Videos

[Environmental Monitoring](#)

[Environmental Monitoring and IoT](#)

[Mr Copernicus: an introduction to Europe's environment monitoring programme](#)



Thank you for your
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