# INTRODUCTION

## 1. Definition:

The word "ecology" was coined in 1866 by the German biologist Ernst Haeckel from two Greek words: oikos, meaning house or habitat, and logos, meaning science. Ecology therefore appears as the science of habitat, studying the conditions in which living beings exist and the interactions of all kinds that exist between these living beings and their environment. The aim is to understand the mechanisms that enable different species of organisms to survive and coexist by sharing or competing for available resources (space, time, energy, matter). By extension, ecology draws on related sciences such as climatology, hydrology, oceanography, chemistry, geology, pedology, physiology, genetics, ethology, etc. This makes ecology a multidisciplinary science!

## 2. Fields of intervention:

Ecological studies conventionally focus on three levels:

**The individual, the population and the community.**

**- An individual** is a specimen of a given species.

**- A population** is a group of individuals of the same species occupying a particular territory at a given time.

**- A community** or biocenosis is the set of populations of the same environment, animal population (zoocenosis) and plant population (phytocenosis) that live in the same environmental conditions and in close proximity to each other.

Each of these three levels is the subject of a division of ecology:

- **the individual** concerns autoecology: this is the science that studies the relationship between a single species and its environment. It defines the tolerance limits and preferences of the species studied in relation to the various ecological factors and examines the action of the environment on morphology, physiology and ethology.

- **the population** relates to population ecology or population dynamics: this is the science that studies the qualitative and quantitative characteristics of populations: it analyses variations in the abundance of various species in order to find the causes and, if possible, predict them.

- **the biocenosis** concerns synecology: this is the science that analyses the relationships between individuals belonging to the various species of the same group and between these species and their environment.

## 3. Notion of ecological system :

**Ecosystem:**

An ecological system or ecosystem was defined by the English botanist Arthur Tansley in 1935.

By definition,

**an ecosystem** : is a system, i.e. a set of interacting elements. It is a biological system made up of two inseparable elements, the biocenosis and the biotope.

**The biocenosis** is the group of organisms that live together (zoocenosis, phyocenosis, microbiocenosis, mycocenosis, etc.).

**The biotope (ecotope)** is the fragment of the biosphere that provides the biocenosis with the essential abiotic environment. It is also defined as the set of abiotic ecological factors (substrate, soil "edaphotope", climate "climatope") that characterise the environment in which a given biocenosis lives.

**The biosphere** is the part of the Earth's crust where life is possible. The biosphere comprises part of the lithosphere (the solid part of the Earth's crust), part of the atmosphere (the gaseous layer surrounding the Earth) and part of the hydrosphere (the part of the Earth's system made up of water). The biosphere refers to all these environments and all the living beings that live in them.

Example: a forest made up of trees, herbaceous plants, animals and soil.

**Ecosystem: forest.**

**Biocenosis: phytocenosis (trees, herbaceous plants) and zoocenosis (animals).**

**Biotope: soil.**

Ecosystems are often classified by reference to the biotopes concerned. We speak of :

- **Continental (or terrestrial)** ecosystems such as: forest ecosystems (forests), grassland ecosystems (meadows), agro-ecosystems (agricultural systems);

- **Continental water ecosystems**, for lentic ecosystems of calm, slow-renewing water (lakes, marshes, ponds) or lotic ecosystems of flowing water (rivers);

- **Oceanic ecosystems** (seas, oceans).