



Professional English_II

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Ecology Ecosystems



Ecology

Ecology is the branch of biological science concerned with the distribution, abundance, and productivity of living organisms, and their interactions with each other and with their physical environment.

The choice of definition is not critical as long as it is remembered that the focus of ecology is on the interrelationships between living organisms and both their biotic (living) and abiotic (nonliving) environment.



Ecosystem

The term ecosystem was suggested by an English ecologist, Tansley. He defined it as including "not only the organism-complex, but the whole complex of physical factors forming what we call the environment?"(Tansley, 1935). There are several alternative definitions, all proposed by American ecologists. Lindeman (1942) proposed that "an ecosystem is any system composed of physical, chemical and biological processes active within any space-time unit." Whittaker (1975) suggested that "an ecosystem is a functional system that includes an assemblage of interacting organisms (plants, animals and saprobes) and 'their environment, which acts on them and on which they act." Odum (1971) proposed a longer but more explicit definition.

It is clear from these definitions that the term ecosystem is more of a concept than a specific physical entity- a concept with five major attributes.

1. The attribute of structure (Figure 3.2).Ecosystems are made up of biotic and abiotic subcomponents. At the very least, a terrestrial ecosystem must have green plants, a substrate, and an atmosphere, and in most ecosystems there must be an appropriate mixture of plants, animals, and microbes if the ecosvstem is to function.



Ecosystem

2. The attribute of *function*, the constant exchange of matter and energy between the physical environment and the living community. Because living and nonliving things are both composed of energy and matter, and because it is often difficult to define when organic material is alive and when it is dead, there are considerable advantages in looking at an ecosystem in terms of a physical-chemical entity. Within this entity there is a constant exchange of matter and energy between different components, some of which have the characteristics of life and some of which do not. This way of looking at ecosystems in no way denies the importance of the more traditional genetic view of life, it is complementary to it.

3. The attribute of *complexity*, which results from the high level of biological integration that is inherent in an ecosystem. All events and conditions in ecosystems are multiply determined. They are therefore difficult to predict without a considerable knowledge of the structure and functional processes of the system.



Ecosystem

4. The attribute of *interaction and interdependency*. So complete is the interconnectedness of the various living and nonliving components of the ecosystem that a change in any one will result in a subsequent change in almost all the others. The extent and completeness of this interaction and interdependency led some of the earlier ecologists to think of physical examples of the ecosystem concept (e.g., a hectare of forest, an agricultural field, or a small pond) as a sort of superorganism. This view has been rejected because although there are certain parallels between an individual and an ecosystem, the differences are too great to make the concept useful.

5. The attribute of *temporal change*. Ecosystems are not static, unchanging systems. In addition to the continuous exchanges of matter and energy, the entire structure and function of an ecosystem undergoes change over time.



Ecosystem

The importance of the ecosystem concept lies in its explicit recognition of complexity, interaction, functional processes, and change over time. Its weakness lies in the difficulty of using the concept for the identification, mapping, description, and study of specific ecosystems because of its failure to define their physical boundaries. An individual organism is a tangible entity. It has a clearly defined physical size. Populations and communities are also spatially defined entities, although their size may sometimes be rather difficult to define.



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