ECOLOGY

: INTRODUCTION

The word ecology is derived from the greek oikos, meaning house hold and logos meaning study .Literally ecology is the study of life at home or pattern of relations between organisms and their environment .The word ecology is of recent origin having been first proposed by the german biologist ERNST HAECKEL in 1869.

Biological spectrum as shown in figure below community,population,organisms,organ,cell and gene are widely used terms for major biotic levels shown in hierarchical arrangement from large to small.

Biotic Genes-Cells-Organs-Organisms-Population-Communities

Plus

Abiotic Matter -----------------------------------------------------Energy

Equals

Bio gentic- Cell - Organ-Organismic-Population-Ecosystem

System system- system-system-system - system

Figure:Levels of organization spectrum.Ecology focuses on the right-hand portion of the spectrum.That is the levels of organization from organisms to ecosystems.

In ecology the term population,originally coined to denote a group of people,is broadened to include groups of individuals of any one kind of organisms.

Likewise,community in the biological sense,include all the populations occupying a given area.

The community and the non living environment function together as an ecological system or ecosystem.

Biome is a convenient term in wide use for a large regional or subcontinental biosystem characterized by amajor vegetation type or other identifiying landscape aspect as ,for example,the temperate deciduous forest biome.

**Autoecology** is the [ecology](http://en.wikipedia.org/wiki/Ecology) of a single [species](http://en.wikipedia.org/wiki/Species), that is the relations between that species and its environment, how the species affects the environment and how it is affected by the environment. Autoecology includes for example [population ecology](http://en.wikipedia.org/wiki/Population_ecology).

Synecology: the branch of [ecology](http://dictionary.reference.com/browse/ecology) dealing with the relations between naturalcommunities and their environments.

## Biosphere : the portions of the earth that support life ,including the land waters and atmosphere.

## It is important to study Ecology because:

1. **Environmental Conservation**: By studying ecology, emphasis is put on how each species needs the other for peaceful coexistence. Lack of understanding ecology has led to degradation of land and environment which is home to other species thus leading to extinction and endangerment of species because of lack of knowledge e.g. dinosaurs ,mammoth, white shark ,black rhinos , sperm whales etc.

* **2.Resource allocation:** All the plants and animals need to share limited natural resources such as air ,minerals, space and environment .Lack of ecological know-how has led to deprivation and looting of these natural resources leading to scarcity as well as exploitation and competition.
* **3.Energy Conservation**: All species require energy whether light ,radiation ,nutrition etc. Poor understanding of ecology is seeing the destruction of the energy resources e.g. Non renewable sources like oil, coal, natural gas and also pollution and destruction of the Ozone layer.
* **4.Eco Friendliness**: Ecology helps to appreciate harmonious living among the species; this will ensure natural order of things is
* followed.
* **THE RELATIONSHIP BETWEEN ECOLOGY AND OTHER SCIENCES**  
  Physiology  
  The Ecology needs Physiology to understand how the organisms work and how this way of work acts on the relationship between the living beings.   
  The chemistry, that can help on the study of the chemical reactions involved on the environment and on the organisms, support us on this kind of study too.  
  Helps on the study of how the living beings evolved through the years and how these same living beings are supposed to change on the future, with all the environment changes that are happening.  
  Obviously, genetics are fundamental to this kind of study too.  
  The Ecology is closely related to other biological disciplines.   
  Evolution  
  Epidemiology  
  Using statistics' help, the epidemiology study the development of epidemics on the populations and support the Ecology.

CONCEPT OF THE ECOSYSTEM

Any unit (a biosystem) that includes all the organisms that function together(the biotic community) in a given area interacting with the physical environment ,so that a flow of energy leads to clearly defined biotic structures and cycling of materials between living and non living parties an ecological system or eco system.

The ecosystem is the basic functional unit in ecology,since it includes both organisms and abiotic environment,each influencing the properties of the other and both necessary for maintenance of life as we have it on the earth.

The term ecosystem was first proposed in 1935 by british ecologist A.G.TANSLEY.

In general there are two types of nutrition in ecosystem autotrophs and heterotrophs.

For green plants in general(algae,higher plants) water is oxidized with release of gaseous oxygen and the carbon dioxide is reduced to carbohydrate (CH2O).

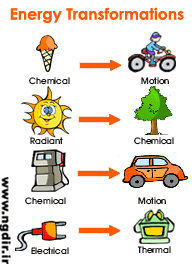
Sun light

CO2*+H2O--------🡪 (CH2O)+O2*

ENERGY:THE ENTROPY LAW

Energy is defined as the ability to do work. The Behaviour of following laws.The first law of thermodynamics,or the energy conservation law.States that energy may be transformed from one type in to another but is neither created nor destroyed.Like light transformed to heat.The second law of thermodynamics or the entropy law may be stated in several ways including the following:no process involving an energy transformation will spontaneously occur unless there is a degradation of the energy from concentrated form in to a dispersed form.ex:heat





PRODUCTIVITY

The primary productivity of an ecological system,community,or any part there of is defined as the rate at which radiant energy is converted by photosynthetic activity of producer organisms(chiefly green plants) to organic substances.

1.Gross primary productivity G.P.P.

Is the total rate of photosynthesis, including the organic matter used up in respiration during the measurement period.This is also known as total photosynthesis or total assimilation

2.Net primary productivity

Is the rate of storage of organic matter in plant tissues exceeding the repiratory use by the the plants during the period of measurement.

Net+Respiration=Gross Productivity

3.Secondary productivity

Is the rate of energy storage at consumer levels

S.P. should not be divided to gross or net.



Primary production: is the production of new organic matter or biomass by autotrophs in an ecosystem.The rate of primary production is the amount of biomass produced over some interval of time.Ecosystem ecologists distinguish between gross and net primary production.Gross primary production is the total amount of biomass produced by all the autotrophs in the ecosystem.Net primary production is the amount of biomass left over after autotrophs have met their ownenergetic needs.Net primary production is gross primary production minus respiration by primary producers, it is the amount of energy in the form of biomass available to the consumers in an ecosystem. PAGE 391.