Glossary of Key Terms

**Abiotic factor**

A non‑living, physical factor that may influence an organism or ecosystem; for example, temperature, sunlight, pH, salinity, precipitation.

**Biochemical oxygen demand (BOD)**

A measure of the amount of dissolved oxygen required to break down the organic material in a given volume of water through aerobic biological activity.

**Biodegradable**

Capable of being broken down by natural biological processes; for example, the activities of decomposer organisms.

**Biodiversity**

The amount of biological or living diversity per unit area. It includes the concepts of species diversity, habitat diversity and genetic diversity.

**Biomass**

The mass of organic material in organisms or ecosystems, usually per unit area. Sometimes the term “dry weight biomass” is used where mass is measured after the removal of water. Water is not organic material and inorganic material is usually relatively insignificant in terms of mass.

**Biome**

A collection of ecosystems sharing similar climatic conditions; for example, tundra, tropical rainforest, desert.

**Biosphere**

That part of the Earth inhabited by organisms, that is, the narrow zone (a few kilometres in thickness) in which plants and animals exist. It extends from the upper part of the atmosphere (where birds, insects and wind-blown pollen may be found) down to the deepest part of the Earth’s crust to which living organisms venture.

**Biotic factor**

A living, biological factor that may influence an organism or ecosystem; for example, predation, parasitism, disease, competition.

**Carrying capacity**

The maximum number of a species or “load” that can be sustainably supported by a given environment.

**Climax community**

A community of organisms that is more or less stable, and that is in equilibrium with natural environmental conditions such as climate; the end point of ecological succession.

**Community**

A group of populations living and interacting with each other in a common habitat.

**Competition**

A common demand by two or more organisms upon a limited supply of a resource; for example, food, water, light, space, mates, nesting sites. It may be intraspecific or interspecific.

**Correlation**

A measure of the association between two variables. If two variables tend to move up or down together, they are said to be positively correlated. If they tend to move in opposite directions, they are said to be negatively correlated.

**Crude birth rate**

The number of births per thousand individuals in a population per year.

**Crude death rate**

The number of deaths per thousand individuals in a population per year.

**Demographic transition**

A general model describing the changing levels of fertility and mortality in a human population over time. It was developed with reference to the transition experienced as developed countries (for example, those of North America, Europe, Australasia) passed through the processes of industrialization and urbanization.

**Diversity**

A generic term for heterogeneity. The scientific meaning of diversity becomes clear from the context in which it is used; it may refer to heterogeneity of species or habitat, or to genetic heterogeneity.

**Diversity, genetic**

The range of genetic material present in a gene pool or population of a species.

**Diversity, habitat**

The range of different habitats or number of ecological niches per unit area in an ecosystem, community or biome. Conservation of habitat diversity usually leads to the conservation of species and genetic diversity.

**Diversity index**

A numerical measure of species diversity that is derived from both the number of species (variety) and their proportional abundance.

**Diversity, species**

The variety of species per unit area. This includes both the number of species present and their relative abundance.

**Doubling time**

The number of years it would take a population to double its size at its current growth rate. A natural increase rate of 1% will enable a human population to double in 70 years. Other doubling times can then be calculated proportionately, that is, the doubling time for any human population is equal to 70 divided by the natural increase rate.

**Ecological footprint**

The area of land and water required to support a defined human population at a given standard of living. The measure takes account of the area required to provide all the resources needed by the population, and the assimilation of all wastes. (A method of calculation is provided in 3.8.2.)

**Ecosystem**

A community of interdependent organisms and the physical environment they inhabit.

**Entropy**

A measure of the amount of disorder, chaos or randomness in a system; the greater the disorder, the higher the level of entropy.

**Environmental impact assessment (EIA)**

A method of detailed survey required, in many countries, before a major development. Ideally it should be independent of, but paid for by, the developer. Such a survey should include a baseline study to measure environmental conditions before development commences, and to identify areas and species of conservation importance. The report produced is known as an environmental impact statement (EIS) or environmental management review in some countries. The monitoring should continue for some time after the development.

**Equilibrium**

A state of balance among the components of a system.

**Eutrophication**

The natural or artificial enrichment of a body of water, particularly with respect to nitrates and phosphates, that results in depletion of the oxygen content of the water. Eutrophication is accelerated by human activities that add detergents, sewage or agricultural fertilizers to bodies of water.

**Evolution**

The cumulative, gradual change in the genetic characteristics of successive generations of a species or race of an organism, ultimately giving rise to species or races different from the common ancestor. Evolution reflects changes in the genetic composition of a population over time.

**Feedback**

The return of part of the output from a system as input, so as to affect succeeding outputs.

**Feedback, negative**

Feedback that tends to damp down, neutralize or counteract any deviation from an equilibrium, and promotes stability.

**Feedback, positive**

Feedback that amplifies or increases change; it leads to exponential deviation away from an equilibrium.

**Fertility**

In the context of human populations, this refers to the potential for reproduction exhibited in a population. It may be measured as fertility rate, which is the number of births per thousand women of child‑bearing age. Alternatively it may be measured as total fertility, which is simply the average number of children a woman has in her lifetime.

**Gaia**

The Gaia hypothesis (developed by James Lovelock and named after an ancient Greek Earth goddess) compares the Earth to a living organism in which feedback mechanisms maintain equilibrium.

**Global warming**

An increase in average temperature of the Earth’s atmosphere.

**GNP**

Gross National Product, the current value of all goods and services produced in a country per year.

**Greenhouse gases**

Those atmospheric gases which absorb infrared radiation, causing world temperatures to be warmer than they would otherwise be. This process is sometimes known as “radiation trapping”. The natural greenhouse effect is caused mainly by water and carbon dioxide. Human activities have led to an increase in the levels of carbon dioxide, methane and nitrous oxide (dinitrogen oxide, N2O) in the atmosphere, and there are fears that this may lead to **global warming**.

**Habitat**

The environment in which a species normally lives.

**Halogenated organic gases**

Usually known as halocarbons and first identified as depleting the ozone layer in the stratosphere. Now known to be potent greenhouse gases. The most well known are chlorofluorocarbons (CFCs).

**Isolation**

The process by which two populations become separated by geographical, behavioural, genetic or reproductive factors. If gene flow between the two subpopulations is prevented, new species may evolve. See **evolution**.

***K* -strategist**

Species that usually concentrate their reproductive investment in a small number of offspring, thus increasing their survival rate and adapting them for living in long‑term climax communities.

**Latitude**

The angular distance from the equator (that is, north or south of it) as measured from the centre of the Earth (usually in degrees).
**LEDC**

Less economically developed country: a country with low to moderate industrialization and low to moderate average GNP *per capita*.

**MEDC**

More economically developed country: a highly industrialized country with high average GNP *per capita*.

**Model**

A simplified description designed to show the structure or workings of an object, system or concept.

**Mutualism**

A relationship between individuals of two or more species in which all benefit and none suffer. (The term symbiosis will not be used.)

**Natural capital**

A term sometimes used by economists for natural resources that, if appropriately managed, can produce a “natural income” of goods and services. The natural capital of a forest might provide a continuing natural income of timber, game, water and recreation.

**Natural capital, non-renewable**

Natural resources that cannot be replenished within a timescale of the same order as that at which they are taken from the environment and used; for example, fossil fuels.

**Natural capital, renewable**

Natural resources that have a sustainable yield or harvest equal to or less than their natural productivity; for example, food crops, timber.

**Natural capital, replenishable**

Non‑living natural resources that depend on the energy of the Sun for their replenishment; for example, groundwater.

**Natural increase, rate of**

The form in which human population growth rates are usually expressed:

Inward and outward migration is ignored.

**Niche**

A species’ share of a habitat and the resources in it. An organism’s ecological niche depends not only on where it lives but also on what it does.

**Parasitism**

A relationship between two species in which one species (the parasite) lives in or on another (the host), gaining all or much (in the case of a partial parasite) of its food from it.

**Plate tectonics**

The movement of the eight major and several minor internally rigid plates of the Earth’s lithosphere in relation to each other and to the partially mobile asthenosphere below.

**Pollution**

The addition to an environment of a substance or an agent (such as heat) by human activity, at a rate greater than that at which it can be rendered harmless by the environment, and which has an appreciable effect on the organisms within it.

**Pollution, non-point source**

The release of pollutants from numerous, widely dispersed origins; for example, gases from the exhaust systems of vehicles.

**Pollution, point source**

The release of pollutants from a single, clearly identifiable site; for example, a factory chimney or the waste disposal pipe of a factory into a river.

**Population**

A group of organisms of the same species living in the same area at the same time, and which are capable of interbreeding.

**Productivity, gross (GP)**

The total gain in energy or biomass per unit area per unit time, which could be through photosynthesis in primary producers or absorption in consumers.

**Productivity, gross primary (GPP)**

The total gain in energy or biomass per unit area per unit time fixed by photosynthesis in green plants.

**Productivity, gross secondary (GSP)**

The total gain by consumers in energy or biomass per unit area per unit time through absorption.

**Productivity, net (NP)**

The gain in energy or biomass per unit area per unit time remaining after allowing for respiratory losses (R). Other metabolic losses may take place, but these may be ignored when calculating and defining net productivity for the purpose of this course.

**Productivity, net primary (NPP)**

The gain by producers in energy or biomass per unit area per unit time remaining after allowing for respiratory losses (R). This is potentially available to consumers in an ecosystem.

**Productivity, net secondary (NSP)**

The gain by consumers in energy or biomass per unit area per unit time remaining after allowing for respiratory losses (R).

**Productivity, primary**

The gain by producers in energy or biomass per unit area per unit time. This term could refer to either gross or net primary productivity.

**Productivity, secondary**

The biomass gained by heterotrophic organisms, through feeding and absorption, measured in units of mass or energy per unit area per unit time.

***r* -strategist**

Species that tend to spread their reproductive investment among a large number of offspring so that they are well adapted to colonize new habitats rapidly and make opportunistic use of short-lived resources.

**Sere**

The set of communities that succeed one another over the course of succession at a given location.

**Smog**

The term now used for any haziness in the atmosphere caused by air pollutants. Photochemical smog is produced through the effect of ultraviolet light on the products of internal combustion engines. It may contain ozone and is damaging to the human respiratory system and eyes.

**Society**

An arbitrary group of individuals who share some common characteristic such as geographical location, cultural background, historical timeframe, religious perspective, value system, and so on.

**Soil**

A mixture of mineral particles and organic material that covers the land, and in which terrestrial plants grow.

**Soil profile**

A vertical section through a soil, from the surface down to the parent material, revealing the soil layers or horizons.

**Speciation**

The process through which new species form. See also **evolution**.

**Species**

A group of organisms that interbreed and produce fertile offspring.

**Stable equilibrium**

The condition of a system in which there is a tendency for it to return to a previous equilibrium condition following disturbance.

**Standing crop**

See **biomass**.

**Steady‑state equilibrium**

The condition of an open system in which there are no changes over the longer term, but in which there may be oscillations in the very short term. There are continuing inputs and outputs of matter and energy, but the system as a whole remains in a more or less constant state (for example, a climax ecosystem).

**Succession**

The orderly process of change over time in a community. Changes in the community of organisms frequently cause changes in the physical environment that allow another community to become established and replace the former through competition. Often, but not inevitably, the later communities in such a sequence or sere are more complex than those that appear earlier.

**Sustainability**

Use of global resources at a rate that allows natural regeneration and minimizes damage to the environment. For example, a system of harvesting renewable resources at a rate that will be replaced by natural growth might be considered to demonstrate sustainability.

**System**

An assemblage of parts and the relationships between them, which together constitute an entity or whole.

**System, closed**

A system in which energy, but not matter, is exchanged with its surroundings.

**System, isolated**

A system that exchanges neither matter nor energy with its surroundings.

**System, open**

A system in which both matter and energy are exchanged with its surroundings (for example, natural ecosystems).

**Trophic level**

The position that an organism occupies in a food chain, or a group of organisms in a community that occupy the same position in food chains.

**Zonation**

The arrangement or patterning of plant communities or ecosystems into parallel or sub‑parallel bands in response to change, over a distance, in some environmental factor. The main biomes display zonation in relation to latitude and climate. Plant communities may also display zonation with altitude on a mountain, or around the edge of a pond in relation to soil moisture.