

# GLOSSARY

## A

**Abiotic:** Non-biological.

**Abiotic element:** A physical or chemical feature of an environment or ecosystem.

**Absorption:** The process by which one substance is taken into the body of another substance.

**Absolute temperature:** Temperature measured from absolute zero.

**Acclimation:** The process during which an individual organism undergoes morphological and/or physiological adaptation to one or more abiotic elements.

**Acclimatization:** The process of adapting to abiotic environmental conditions, by phenotypic rather than genetic variation.

**Acid:** A substance which releases hydrogen ions when dissolved in water. A strong acid will release a large proportion of hydrogen ions whereas a weak acid will release a small proportion of hydrogen ions.

**Acid rain:** Generally, precipitation in any form, or dry deposition, with a pH lower than would be expected from natural and artificial causes.

**Acidity:** The ability of a water solution to neutralize an alkali or base.

**Actinomycetes:** Filamentous bacteria, many of which are valuable in the production of antibiotics.

**Activated Carbon:** A material that has a very porous structure and is an adsorbent for organic matter and certain dissolved gases.

**Activated sludge:** The active material, consisting largely bacteria and protozoa used to purify sewage.

**Activated sludge method:** A method of sewage treatment in which wastes are degraded by complex populations of aerobic microorganisms.

**Active transport:** The energy-requiring process by which molecules are carried across cell boundaries. Molecules are often concentrated inside cells as a result.

**Adaptation:** The fitness of a structure, function or entire organism for life in a particular environment, the process, brought about by natural selection, of becoming so fitted.

**Advanced waste treatment:** The removal of non carbonaceous materials such as excess phosphorus and nitrogen. The term implies treatment beyond secondary treatment, and advanced treatment is most effective after the organic matter has been removed.

**Adiabatic:** A thermal process occurring without any exchange of heat.

**Aerobes:** Organisms that can only exist with free oxygen.

**Aerobic organisms:** Organisms that can utilize oxygen as the final electron acceptor during metabolism.

**Aerodynamics:** The science dealing with the motion of gases and bodies in gases.

**Aerosols:** Gaseous, solid, or liquid materials distributed very finely in the air.

**Aerotaxis:** Responding to oxygen.

**Aflatoxin:** Any of several toxins produced by molds such as *Aspergillus flavus*; some are suspected of being carcinogenic.

**Agar:** A gelatinous polysaccharide, extracted from Ceylon moss, that is used to prepare solid media for cultivating bacteria.

**Agro-ecosystem:** A community of microorganisms, plants and animals, together with their abiotic environment, that occurs on farmed land, and including the crop species.

**Algae:** A group of simple aquatic plants capable of photosynthesis.

**Alternative energy:** Energy derived from sources other than the burning of coal petroleum or natural gas or from nuclear fusion or nuclear fission. Examples of alternative energy installations are biogas, solar power, hydroelectric power or wind power.

**Alum:** A common name for aluminum sulfate, used as a coagulant.

**Amalgam:** A solution of a metal in mercury.

**Ammonification:** The reduction of nitrates and nitrites to ammonium compounds by soil saprobes.

**Ammonia fertilizer:** A material with a high concentration of nitrogen compounds put on soil to stimulate plant growth.

**Anabolism:** The synthesis of complex molecules from simpler ones. All biosynthetic reactions take place in a living organism.

**Anaerobes:** Organisms that can exist without free oxygen e.g. bacteria, tape worms, in contrast to aerobes.

**Anaerobic biological treatment:** Any treatment that utilizes anaerobic organisms to reduce organic matter in wastes.

**Antibiotic:** A secondary biotic substance secreted by an organism which inhibits growth in other organisms.

**Antigen:** A substance that can incite the production of specific antibodies and can combine with those antibodies.

**Antiseptic:** A substance that inhibits or kills microbes.

**Antitoxin:** An antibody that neutralizes a toxin.

**Antagonism:** Opposing effects produced by drugs, hormones etc., on living systems.

**Anthropogenic:** Produced as a result of human activities.

**Anthropogenous:** An anthropogenous factor is a factor which is caused or created by Man.

**Aquifer:** A body of rock, or a zone within a body of rock, that contains sufficient saturated permeable material to yield economically significant quantities of ground water to wells and springs.

**Aquatic:** Occurring in water, existing in water, in contrast to terrestrial.

**Artesian aquifer:** An aquifer bounded above and below by impermeable beds or beds of distinctly lower permeability than that of the aquifer itself, causing the water to be under a hydrostatic pressure.

**Artificial recharge:** The practice of increasing, by artificial means, the amount of water that enters a ground water reservoir.

**Asbestos:** The fibrous form of several silicate minerals, at one time widely used for electrical and thermal insulation and fire protection and as a strong, durable and cheap construction material.

**Asbestosis:** A dust disease caused by the inhalation of asbestos fibers.

**Assimilation capacity:** The ability for pollutants to be absorbed by an environment without detrimental effects to the environment or those who use of it.

**Association:** A conceptual grouping of populations in a community characterized by particular dominant species.

**Autecology:** The study of the relationships between a single species and its environment.

**Autoclave:** A sterilizing device employing steam under pressure.

**Autolysis:** The decomposition of a dead micro organism by its own enzymes.

**Autotrophic nutrition:** The process by which an organism manufactures its own food from inorganic compounds.

**Axial-flow pump:** A pump in which the fluid is forced along parallel to the axis.

## **B**

**Balance of nature:** Ecological balance.

**Backwash:** The process in which beds of filter or ion-exchange media are subjected to flow opposite to the service -flow direction to loosen the bed and to flush suspended matter, collected during the service run, to waste.

**Bactericide:** An agent capable of killing bacteria.

**Bacteriophage:** A virus that infects bacteria.

**Bacteriostat:** An agent that prevents bacterial growth by interfering with reproductive and metabolic process.

**Batch culture - batch system:** An operational technique in biotechnological processes where one or more nutrients are fed to the bioreactor during cultivation and in which the product remain in the bioreactor until the end of the run.

**Becquerel (Bq):** The SI unit for the radioactivity of a substance that is decaying spontaneously at the rate of 1 disintegration per second. The Becquerel replaces the curie (Ci):  $1 \text{ Bq} = 2.7 \times 10^{11} \text{ Ci}$ .

**Benthic:** Applied to organism living close to the bottom of a lake or sea.

**Benthos:** The flora and fauna found on the bottom, or in the bottom sediments, of a sea or lake.

**Bentonite:** very fine clay formed by the alteration of volcanic ash deposits.

**Binomial system:** The system of naming organisms by two Latin words.

**Bioassay:** The quantitative measurement, under standardized conditions of the effects of a substance on an organism or part of an organism.

**Biocenosis:** The community of different life-forms regularly occurring in a biotope.

**Biochemical oxygen demand (BOD):** The amount of oxygen used for biochemical oxidation by a unit volume of water at a given temperature and for a given time.

**Biocides:** Agents that kill living organism. Sometimes the term is used as a synonym for pesticides.

**Biodegradation:** The breakdown of substances by microorganisms. Mainly aerobic bacteria.

**Biodynamic farming:** Farming according to principles lay down by Rudolf Steiner (1861 - 1925). Organic farming.

**Bioenergetics:** Considerations of energy flow in living systems.

**Biogeochemical cycling:** The pathways of nutrients through ecosystems.

**Biological control:** The control of pests by the use of the other living organisms.

**Biological - biochemical degradation:** The breakdown of a material (sewage, refuse, etc. ) by the action of organisms, bacteria, and weathering.

**Biological indicator:** A species or organism that is used to grade environmental quality or change.

**Biological magnification or biomagnification:** The phenomenon in which the concentration of a chemical substance such as a pesticide increases in the organism the higher the organism is on the food chain.

**Biological monitoring:** The direct measurement of changes in the biological status of a habitat, based on evaluations of the number and distribution of individuals or species before and after a change.

**Biomass:** The total quantity or weight of organisms in a given area or volume. (Or) Organic matter used as a fuel, especially in a power station for the generation of electricity.

**Biomass fuel:** A carbon based fuel derived from plants that were living recently as opposed to a fossil fuel.

**Biosphere:** That part of the Earth and its atmosphere in which organisms live. The portion of the earth in which living systems are encountered.

**Biotic factors:** Influences on the environment that result from the activities of living organisms.

**Biotope:** A habitat that is uniform in its main climatic, soil and biotic conditions.

**Bio waste-wet waste:** These are organic wastes such as food, vegetables and fruits which are sent to compost factory and converted into humus matter (stabilized organic matter).

**BOD:** Abbreviation for biochemical oxygen demand, the amount of oxygen needed to oxidize the organic material in a substance.

**Buffer:** A substance in a solution capable of neutralizing both acids and bases.

## C

**Calorie:** The amount of heat required to raise the temperature of 1 gram of water from 15 to 16 °C. (1 joule = 4,182 calories).

**Calorific value:** The number of units of heat obtained by the complete combustion of a unit mass of a substance.

**Capsid:** Protein coat that surrounds the nucleic acid of a virus.

**Capsule:** A gelatinous structure that surrounds some bacteria.

**Carrying capacity:** The steady state population density of a given habitat for a particular species.

**Carburetor:** A device which mixes air and gasoline for firing in an internal combustion engine.

**Catabolism:** The breaking down by organisms of complex molecules into simpler ones with the liberation of energy.

**Catabolite:** A compound that is capable of being degraded.

**Catabolite repression:** The inhibition of gene activity by an efficiently degraded catabolite.

**Catalyst:** A substance that speeds up the rate of a chemical reaction without being altered or depleted in the process.

**Cell:** Volumetric elements of solid waste which is covered with natural soil or covering material and compacted in the sanitary landfill area.

**Cell recycle:** The return of a concentrated biomass to a continuous flow reactor.

**Centrifugation:** A process wherein gravitational force in excess of natural gravity is maintained due to rotary motion.

**Centrifugal pump:** A pump in which the fluid is caused to flow by centrifugal force.

**Chelate:** A compound containing a ligand (typically organic) bonded to a central metal atom at two or more points.

**Chemical oxygen demand (COD):** The weight of oxygen taken up by the organic matter in a sample of water, expressed as parts per million of oxygen taken up from a solution of boiling potassium dichromate in two hours. The test is used to assess the strength of sewage and trade wastes.

**Chemical - feed pump:** A mechanical device designed to introduce chemicals into a water system at a rate proportional to the water flow also called a chemical feeder.

**Chemo-autotrophic:** Applied to organisms that produce organic material from inorganic compounds using simple inorganic reactions as a source of energy.

**Chemotropic:** Applied to organism that obtains energy from any source other than light.

**Chemo-heterotrophs:** Organisms that use chemical energy and an organic source of carbon.

**Chemo-lithotrophs:** Organisms that grow in strictly mineral medium.



**Chemostat:** A device used to grow bacteria in the laboratory that allows nutrients to be added and waste products removed continuously.

**Chemotaxis, Chemotactic:** Movement of an organism in response to chemicals in the environment.

**Chloroplasts:** A plastid in eukaryotes that contains chlorophyll and is the site of photosynthesis and starch formation.

**Chlorination:** The use of chlorine gas or solutions of its compounds to disinfect water or as an oxidizing agent.

**Chlorinated hydrocarbons:** Organic compounds in which one or several of the hydrogen atoms have been replaced by chlorine atoms (as, for example, in solvents, pesticides, plastics).

**Chlorine demand:** A measure of the amount of chlorine which can be consumed by organic matter and other oxidizable substances in water without chlorine residuals.

**Chlorophyll:** A green pigment, present in algae and higher plants, that absorb light energy and thus plays a vital role in photosynthesis.

**Chromosome:** The array of genes responsible for the determination and transmission of hereditary characteristics.

**Ciliates:** Microorganisms covered with short, whip-like extensions called cilia.

**Cilium:** A short, projecting hair like organelle of locomotion, similar to a flagellum.

**Clarifier:** A settling tank.

**Clarification:** The process of making water clear and free of suspended impurities.

**Climate:** The long-term or integrated manifestation of weather.

**Coagulation:** The process in which very small, finely divided solid particles, often colloidal in nature, are agglomerated into larger particles.

**Coccus:** Spherical bacteria.

**Coenzyme:** A small organic molecule that transfers small molecules from one enzyme to another.

**Coliform:** Gram negative rods resembling E.coli and similar species that normally inhabit the colon.

**Colloid:** A phase so highly dispersed that surface forces are an important factor in determining its properties.

**Colonization:** Establishment of a site of reproduction of microbes on a material, animal, or person without necessarily resulting in tissue invasion or damage.

**Colony:** A group of bacteria in a culture derived from the multiplication of single cell; usually visible to the unaided eye.

**Coliform bacteria:** A group of bacteria that are normally abundant in the intestinal tracts of humans and other warm-blooded animals and are used as indicators when testing the sanitary quality of water.

**Combustion:** The reaction of a substance with oxygen at high temperature with the production of heat.

**Community:** Any naturally occurring group of organisms that occupy a common environment. The term is a general one, covering groups of various sizes. Group of interacting populations in a particular habitat.

**Competent:** A condition in which a bacterial cell is capable of taking up and integrating high molecular weight DNA into its chromosome.

**Competition:** The struggle for existence that results when two or more species have requirements which exceed the available supply. Interference between two populations at the same trophic level.

**Competitive inhibition:** The inhibition of enzyme activity caused by the competition between the inhibitor and the substrate for the active (catalytic) site on the enzyme.

**Compost:** A soil conditioner made by mixing organic wastes in a container in order to accelerate their decomposition. A matter which is suitable for the soil. It is produced by aerobic stabilization of organic solid wastes.

**Compound:** A chemical combination of two or more elements in definite ratios by weight in which the set of characteristics of each element is lost.

**Compressor:** An engine in which a fluid is placed under high pressure.

**Conductivity:** The quality or power of a medium to transmit electrical charges, in water, the conductivity is related to the concentration of ions capable of holding electrical charges.

**Conservation:** The preservation or protection from decay or destruction of anything whose loss it is desirable to prevent.

**Consolidation:** Squeezing together; making smaller and denser.

**Consumer:** A heterotrophic population in an ecosystem which is utilizing dead or living organic matter as a source of food.

**Consumptive use:** The difference between the total quantity of water withdrawn from the source for use and the quantity of water, in liquid (and, rarely, solid) form, returned to the source. It includes mainly water transpired by plants and evaporated from the soil.

**Contaminated Soils:** The term "**Contaminated Soils**" is applied to former waste disposal sites or storage places of toxic materials and top areas of land polluted by former industrial plants which have not been sealed according to the state of the art and thus represents a danger to the environment, especially to ground water.

**Contamination:** The introduction to the water or foodstuffs of substances containing toxins or live pathogens which constitute a hazard to human health.

**Contact stabilization:** A modification of the activated sludge process in which the wastewater is held in contact with a very high concentration of activated sludge for a short period of time. This is followed by quiescent settling and reaeration of a portion of the sludge prior to its recycling.

**Continuous flow system:** A biological system in which the feed substrates are fed to the reactor continuously. Usually the system is operated at constant volume so that the rate of outflow is equal to the rate of inflow.

**Control:** That part of an experimental procedure which is like the treated part in every respect except that it is not subjected to the test conditions.

**Control parameters:** Factors used in the design and operation of a process to control the rate of the process. For example, mean hydraulic retention time, hydraulic recycle ratio, and concentration sludge in the recycle to an activated sludge process are control parameters for the system.

**Convection:** The process by which heat is transferred through the movement of gases.

**Correlation:** The relationship between two variables, according to a specific range of values.

**Corrosion:** The conversion of iron and other metals to oxides and carbonates by the action of air and water.

**Cost-benefit analysis:** An economic technique for estimating the desirability of a proposed course of action, in which the advantages and disadvantages are listed, expressed in monetary terms and the totals compared.

**Cost-benefit ratio:** The ratio of the gross costs of a proposed activity to the gross benefits, both costs and benefits being discounted over the life of the project at an annual rate of interest.

**Cover glass:** A thin glass slip used to cover an object mounted on a glass microscope slide.

**Covering material:** Soil or another material which covers the compacted solid wastes in the sanitary landfill area.

**Cracking:** A process that uses heat to decompose complex substances.

**Cross section:** A view of a structure cut through at right angles to its axis.

**Culture:** A growth of microorganisms.

**Culture medium:** A preparation containing nutrients and growth factors suitable for the cultivation of microorganisms.

**Cyanides:** A class of very toxic compounds, ingestion or inhalation of which may cause death to mammals.

**Cyanobacteria:** Blue-green algae.

**Cytolysis:** Cell destruction, especially when brought about by the destruction of the plasma membrane.

**Cytype:** A sample member of population composed of individuals whose karyotype is identical and different from that of other populations.

## D

**Daily covering:** Covering material which covers the compacted solid wastes in order to prevent dust, flame, humidity, erosion, and esthetic view. It is applied daily.

**Dark field microscopy:** A microscopic technique in which objects appear brightly illuminated against a dark background.

**Death phase:** The stage in which the number of viable bacteria in a population decreases at an exponential rate.

**Dechlorination:** The removal of excess chlorine residual.

**Decibel (dB) :** A unit used to measure the intensity of sound , on a logarithmic scale based on measurements of sound intensity in watts per square meter and related to a reference  $10^{-12} \text{ W/m}^2$  , which is the intensity of the quietest sound perceptible to the human ear.

**Decomposition:** The separation of complex organic substances into simpler compounds.

**Decomposer:** Heterotrophic organisms in an ecosystem which obtain energy from the breakdown of dead organic matter to more simple substances.

**Decontamination:** Destruction of pathogenic microorganisms and viruses and their toxic products.

**Deep well pump :** A pump which operates beneath the surface of the fluid.

**Deflation:** The picking up and removal of loose material by the wind.

**Deformation:** Any change in the original form or volume of a rock body produced by any kind of forces.

**Demography:** The study of the age and sex structure, geographical distribution, rate of change of size , etc. of human populations.

**Denitrification:** A biological process in which nitrite are reduced to nitrogen gas. Denitrification plays a vital role in the nitrogen cycle, and it is an important engineering process for the removal of nitrogen from wastewaters. The metabolic process by which nitrate is reduced to nitrogen gas.

**Density:** The mass of a unit volume of a substance.

**Density current:** turbidity.

**Density-dependent:** Applied to a limiting factor in the growth of a population that is dependent upon the existing population density (e.g. disease, reproductive rate, access to food).

**Density-independent:** Applied to a situation in which the percentage mortality or survival of a species varies independently of population density.

**Desertification:** The process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agriculture.

**Detention period:** The average length of time for which a unit volume of fluid is retained in a tank during a flow process.

**Detergent:** A surface active agent used to remove dirt and grease from a surface. Soap is a detergent.

**Diatoms:** Single-celled alga whose cell walls are composed of polymerized ortho-silicic acid.

**Digestion:** The breaking down of complex food substances into simpler compounds, which can then be used in metabolism.

**Dilute:** Describes a solution which contains a relatively small quantity of solute.

**Diluted waste acid solution:** This is a waste product from the production of titanium dioxide, an important raw material in the dye industry; it contains 17 to 23 % sulphuric acid and heavy metals in soluble form and up to 15% green vitriol.

**Dilution:** The dispersal of a fluid within a much large receiving volume of another fluid.

**Discarded batteries:** Used batteries of various types, such as mercury, cadmium, nickel and lead-acid, may be sold for the recovery of reusable materials.

**Discharge:** The volume of water flowing past a given point in a stream channel in a given period of time.

**Disinfection:** The destruction of pathogens by applying agents (disinfectants) such as chlorine.

**Disposal:** Procedures which are related with some activities such as temporarily gathering at houses and places, collecting from these places, transporting to final station and appraising for saving of matter and energy. The last procedure includes recycling, recovery and reuse. Sanitary landfill and incineration are also disposal alternatives.

**Disposal well:** A well used to dispose of waste by injection into a deep aquifer.

**Dissolved oxygen (DO):** Oxygen molecules that are dissolved in water, usually expressed in parts per million (ppm).

**Dissolved solids:** The weight of matter in true solution in a stated volume of water, including both inorganic and organic matter.

**Distribution:** Arrangement or pattern; statistically, the way in which variety values are apportioned.

**Distributor:** A device or system designed to produce even flow through all sections of an ion exchanger or filter bed and to retain the filter medium in the tank or vessel.

**Domestic:** A term applying to a household or private residence.

**Domestic solid waste:** They are wasted from the houses, which are not stated on the list of hazardous waste. Also, wastes which are originated from the large green areas such as park, garden, picnic area, are classified into this category.

**Dominance (ecological):** The phenomena in which energy flowing through an ecosystem is directed especially through a limited number of populations.

**Dominant:** The characteristic, and often the tallest, species in a particular plant community. The dominant species is the one that exerts the greatest influence on the character of the community and may give it its name. A population which is characterized by the possession of ecological dominance in a given community.

**Dormancy:** A resting condition in which the growth of an organism is halted and its metabolic rate slowed.

**Doubling time:** Used in a demographic sense to indicate the period which is estimated will pass before population density doubles.

**Dried matter:** Amount of remainder after drying of a sample into an oven at 103° C for 24 hours until it reaches to constant weight, which is taken from solid wastes or composts.

**Dry wastes:** which can be collected by the containers for valuable materials such as glass, paper, cardboard, plastics, metals and similar recyclable wastes?

**Dust:** Solid particles (1-1100 micrometers in diameter) that are carried into the atmosphere, from which they settle by gravity.

**Dynamic stability:** In the atmosphere, in the presence of factors that induce turbulence, a condition in which small perturbations of the flow do not tend to grow.

## **E**

**Earthquake:** A shaking of the surface of the earth due to a shifting of material beneath the surface.

**Ecological capacity:** Carrying capacity.



**Ecological factor:** Any environmental factor that influences living organisms.

**Economic conservation:** The management of natural resources, or the environment, so as to sustain a regular yield of a commodity at the highest level feasible.

**Ecosphere:** The biosphere, together with all the ecological factors that act upon organisms. That portion of the earth which includes the biosphere and all the ecological factors which operate on the living organisms it contains.

**Ecosystem:** A community of interdependent organisms together with the environment they inhabit and with which they interact, and which is distinct from adjacent communities and environments. A conceptual unit formed from a defined series of interacting communities and all the environmental factors which operate upon them.

**Ecotoxicology:** The science of the effects of toxic substances on ecosystems or their parts.

**Ecotype:** A sub specific group that is adapted genetically to a particular habitat but which can interbreed with other ecotypes of the same species or cenospecies without loss of fertility.

**Edaphic factors:** Those chemical, physical and biological characteristics of the soil which affect an ecosystem.

**Effluent:** Generally, any fluid emitted by a source. More specifically, a waste fluid (usually liquid) produced by an agricultural or industrial process.

**Effluent charge:** A charge levied against a polluter for each unit of effluent discharged into public water.

**Effluent standard:** The maximum amount of a specified pollutant an effluent is permitted to contain.

**Elasticity:** The tendency of a material to return to its original shape after it has been placed under stress.

**Electron acceptor:** A chemical entity that accepts electrons transferred to it from another compound. It is an oxidizing agent that, by virtue of its accepting electrons, is itself reduced in the process. Oxygen is the terminal electron acceptor in aerobic metabolism.

**Electron carrier:** A molecule that accepts electrons ( is reduced) and passes them to another carrier or to a final electron acceptor.

**Electron donor:** A compound or element that furnishes electrons for reductive reactions.

**Electrostatic filter:** A device in which the application of static electric charge to a filter improves the efficiency with which it collects small particles.

**Embryo:** An organism in the process of developing from a fertilized or parthenogenetically activated ovum.

**Emission:** The reception of a substance from a remote source of emission , the opposite of emission.)

**Emission standards:** The maximum amount of a specified pollutant an effluent is permitted to contain.

**Emulsifier:** A material used to help mix an oily substance with water.

**Endotoxin:** A poisonous substance present in the cell walls of Gram negative bacteria.

**End product inhibition:** The inhibition of the first enzyme of a biosynthetic pathway by the end product of the pathway.

**Energy budget:** A record of the flow of energy through a system.

**Energy flow:** The passage of energy through the trophic levels of a food chain.

**Energy source:** Light or an oxidizable compound or element utilized by the cell in the synthesis of ATP.

**Engine curves:** Graphs showing the performance of an engine.

**Enrichment culture:** A technique used for isolating an organism from a mixed culture by manipulating conditions that favor growth of the organism sought and minimize growth of the other organisms present.

**Enthalpy :** The heat content of a body or system, usually given by the formula  $H=U+pV$  ; where H is the hat content, U the internal energy , p the pressure and V the volume.

**Entropy:** A measure of the degree of disorder within a system. The term is derived from thermodynamics; heat passes from warmer to cooler bodies, thus becoming dispersed more generally with time, so that within a closed system eventually all heat will be distributed evenly.

**Environment:** The natural world, as a whole or in a particular geographical area, especially as affected by human activity.

**Environmental Protection Agency (EPA) :** The federal agency of the US government, established in 1970, that is responsible for dealing with the pollution of air and water by solid waste, pesticides and radiation and with nuisances caused by noise.

**Environmental quality standards:** The maximum limits or concentrations of pollutants that are permitted in specific media.

**Environmental protection:** That part of resource management which is concerned with the discharge into the environment of substances that might be harmful, or that might have harmful physical effects and with safeguarding beneficial uses.

**Environmental Impact Assessment (EIA):** The identification and evaluation of the environmental consequences of a proposed development and of the measures intended to minimize adverse effects. Although there is no any definition which describes that what "Environmental Impact Assessment"

(Or)

Studies which are done for determining the effect of legal procedures, policies, programs, projects, and operation conditions on the biogeophysical environment and human health, finding out the magnitude of these effects, conclusion and printing studies of the results (Munn, 1979).

**Environmental resistance:** The restriction of population growth by the interaction of ecological factors.

**Environmental Impact Statement (EIS):** A written report, based on detailed studies carried out in the course of an environment impact assessment that describes the environmental consequences of a course of action in order to assist in decision-making.

**Enzyme:** A protein catalyst.

**Epilimnion:** The warmer uppermost layer of water, which lies above the thermocline in a lake, and which are subject to disturbance by wind.

**Erosion:** The breakdown of solid rock into smaller particles and its removal by wind, water or ice.

**Equilibrium:** The state in which the action of multiple forces produces a steady balance, resulting in no change over time.

**Equivalent weight :** The weight , in grams , of an element , compound, or ion which would react with or replace one gram of hydrogen, the molecular weight in grams divided by the valence.

**Etiology:** The science of the causes of disease and the complete range of factors which can lead to disease.

**Eukaryotic:** Complex cells characterized by a nuclear membrane, mitochondria, and chromosomes; distinct from prokaryotic.

**Euphotic zone:** The upper zone of a sea or lake into which sufficient light can penetrate for active photosynthesis to take place,

**Eutrophic:** Applied to the waters that are rich in plant nutrients and therefore highly productive, the large number of planktonic organisms sometimes rendering them cloudy.

**Eutrophication:** The enrichment of a water body with plant nutrients.

**Evaporation:** The change of phase from liquid to gas, the energy being supplied as latent heat from the surrounding medium.

**Evolution:** The process of cumulative change, usually gradual.

**Excretion:** The process by which an organism rids itself of the waste products of metabolism.

**Exotic:** Applied to a specific found in region to which it is not native.

**Exothermic:** Applied to animals which achieve any temperature regulation they possess through behavioral adjustment to external environmental conditions, rather than depending on internal physiological controls.

**Exposure:** The concentration of environmental factors, for example chemicals, which a particular object is exposed to.

**Exponential growth:** The increase in a value over a period by a fixed percentage of the original value, such that the increase in each period is equal to the original value plus the interest accumulated in the preceding period.

**Extended aeration process:** A modification of the activated sludge process in which all of the sludge from the secondary clarifier is returned to the aeration chamber. The process is intended to achieve total oxidation of both the inflowing waste and the biomass produced in the process.

**Extracellular:** Outside of the cell wall. Applied to processes that occur outside the cells of an organism.

**Extinction:** The disappearance of a population as a result of the total failure of any individuals within it to reproduce the unique genotypes which it contains.

## **F**

**Facultative:** Used to describe organisms that are able to grow in either the absence or presence of a specific environmental factor

**Facultative anaerobe:** An organism that can grow in the presence or absence of oxygen.

**Fauna:** The animals of a particular region or period of time.

**Faunal regions:** Regions of the world with distinct natural faunas.

**Fecal coliform:** Matter containing or derived from animal or human waste containing one or more of the coliform groups of bacteria.

**Fecal streptococcus:** Matter containing or derived from animal or human waste containing one or more of the streptococcus groups of bacteria.

**Fermentation:** The breakdown of organic substances by organisms with the release of energy; especially the anaerobic breakdown of carbohydrates by yeasts and bacteria to form carbon dioxide and ethanol or other organic compounds.

**Fertilizer:** Any substance that is applied to land as a source of nutrients for plant growth. It may be a waste that is being recycled (e.g., farmyard manure, crop residues or compost) or produced industrially.

**Field capacity:** The greatest amount of water it is possible for a soil to hold in its pore spaces after excess water has drained away.

**Filament:** A threadlike structure.

**Filter:** A device of porous material that removes dirt from air that is forced through it.

**Filtration:** Passage of an aqueous or gaseous carrier, water or air through a porous medium (sand, charcoal, etc.) for the purpose of trapping undesirable materials, usually in suspension, in the water or air.

**Final covering:** Covering material which acts like daily covering material on the top of the landfill area.

**First trophic level:** Food chain. A number of organisms that form a series through which energy is passed.

**Flagellata:** A class of protozoa whose adult members swim by means of flagella.

**Flocculation:** A process of contact and adhesion whereby the particles of a dispersed substance form large clusters or the aggregation of particles in a colloid to form small lumps, which then settle out.

**Flora:** The plants of a particular region or period of time.

**Flotation :** The process in which immiscible liquid particles , such as grease and oil or particulate solid, such as clays or bacteria, are separated from aqueous suspension due to a density difference.

**Flow:** As used here, air or gas which is involved in the movement of a body through it.

**Fly ash:** Finely divided particles of ash that are entrained in flue gases resulting from the combustion of fuel or other material.

**Food chain:** The succession of populations through which energy flow in an ecosystem as a result of consumer - consumed relationships.

**Food web:** A complex scheme incorporating food chain relationships between populations at various trophic levels in an ecosystem.

**Formation:** Term used for a classificatory category of vegetation characterized by dominants of a specific life form.

**Fossil fuel:** A fuel derived from ancient organic remains.

**Fragmentation:** A form of asexual reproduction in which a filament composed of a string of cells breaks up and forms new organisms.

**Free-swimming:** Not attached; capable of independent movement.

**Frequency:** The number of occurrences or cycles per second.

**Friction:** The resistance to the motion of two surfaces against each other.

**Fumigation:** A rapid increase in air pollution close to ground level, which sometimes leads to very high concentrations of pollutants for an hour or more.

**Fungicide:** An agent that kills fungi.

## G

**General Waste:** No special treatment is necessary for this waste which can be disposed of with municipal waste. Food waste from tuberculosis or similar category treatment areas should be autoclaved before disposal.

**Gene:** An element of deoxyribonucleic acid that transmits a hereditary characteristic.

**Generation time:** The time required for one cell to divide into two.

**Gene frequency:** The ratio of the occurrence of one allele of a gene in the population in a relation to other alleles of this same gene.

**Geotropism:** A growth response of plants in which the stimulus is gravity.

**Genotypic:** Applied to variation which arises in an individual as the result of its possession of a specific genome.

**Glycolysis:** The anaerobic first stage in the liberation of energy from food during respiration.

**Gravity:** The force that tends to pull all bodies toward the center of the earth.

**Gross productivity:** The rate which energy is procured by a particular trophic level or levels in an ecosystem.

**Growth factor:** An organic compound other than the carbon and energy source that an organism requires and cannot synthesize - for example, a vitamin or an amino acid.

**Ground water:** Water in the saturated zone found under hydrostatic pressure.

## H

**Habitat:** A physical portion of the environment over which a particular population is dispersed. The dwelling place of a species or community.

**Halocline:** The boundary between two masses of water whose salinities differ.



**Halogen:** Halogens are the most reactive nonmetallic elements. The halogens include fluorine, chlorine, bromine, iodine, and astatine.

**Halogenate:** The incorporation of one of the halogens fluorine, chlorine, bromine or iodine in an organic compound.

**Halophile :** An organism that prefers or requires a high salt medium.

**Hardness:** A measure of soap-neutralizing ions present in water; predominantly magnesium and calcium, but other alkali metal ions contribute to the effect.

**Household Hazardous Waste (HHW):** Any unwanted household product labeled as flammable, toxic, corrosive, or reactive. The most common products include aerosols, anti-freeze, asbestos, fertilizers, motor oil, paint supplies, photo chemicals, poisons, and solvents.

**Heat labile:** Destroyed by heating at 100°C for 20 minutes.

**Heat stable:** Resistant to destruction by heating; heat stable toxin of E. coli resists boiling for 30 minutes.

**Herbicides:** Chemical agents for combating weeds.

**Herbivore:** A heterotroph which obtains energy from the consumption of usually living plants.

**Heterogeneous microbial population :** A microbial population, for which the initial seed was obtained from some natural source expected to contain a diversity of microorganisms, developed in a system in which no attempt is made to control the species present other than the selection imparted by the environmental or operational conditions under which the cells are being grown.

**Heterotrophic:** Used of an organism which obtains energy from the breakdown of complex organic substances.

**High density polyethylene (PEHD=HDPE) :** High density plastic material used at bottom parts of non-alcoholic beverage containers, flower pots, drainage pipes, and geomembrans etc.

**Holding structure:** Any excavation, pond, or closed embankment used to contain water or another solution until needed.

**Homeostasis:** The balanced condition of a biological process in which there is no change in the final products of a particular reaction.

**Home range:** the area over which an animal generally moves in obtaining its food.

**Huge solid waste:** They are consisted of domestic materials such as refrigerator, wash machine, and armchair, which could not be used and have huge volume.

**Humidifier:** A mechanical device for increasing the amount of water vapor in the air.

**Humus:** The more or less decomposed organic matter in the soil.

**Hydration:** The chemical addition of water to a compound.

**Hydraulic gradient:** The change in static head per unit of distance in a given direction. If not specified, the direction generally is understood to be that of the maximum rate of decrease in head.

**Hydrophilic:** Compounds to which water molecules adhere.

**Hydrological cycle:** The circulation of water through the drainage basins on which precipitation falls and eventually back to the atmosphere.

**Hydrolysis:** The chemical decomposition or splitting of a compound by reaction with water.

**Hydrogen cyanide:** A poisonous gas that has been implicated in industrial accidents.

**Hydrophilic:** Having an affinity for water.

**Hydrosphere:** Water covering of the Earth (seas, inland waters, ground water, water bound in air and ice).

**Hydrostatic head:** The height of a vertical column of water.

**Hypolimnion:** The colder, non-circulating layer of water in a lake lying below the thermocline.

## **I**

**Imhoff tank:** It is a chamber suitable for the reception and processing of sewage. It may be used for the clarification of sewage by simple settling and sedimentation, along with anaerobic digestion of the extracted sludge.

**Immunity:** The ability of an organism to combat infection by parasites.

**Immune system:** The system of cells and organs involved in the production and functioning of antibodies.

**Impact:** It is a change which is caused by an activity which affects the natural, economical and social elements of the environment, directly or indirectly, for a long or short period, permanently or temporarily, positively or negatively.

**Incineration:** Burning of garbage in special facilities utilizing inherent thermal values of solid wastes.

**Incinerator:** A device in which solid, semi-solid, liquid or gaseous combustible material is burnt as a means of disposal. If the material does not support combustion auxiliary fuel is added. Many types of industrial and domestic wastes are incinerated and there are many types of incinerator to deal with different wastes.

**Incubation period:** The time between the infection of the individual by a microorganisms and the first manifestation of the disease.

**Indicator:** A substance that changes from one color to another in response to a specific chemical reaction.

**Indicator species:** Species whose presence indicates certain environmental conditions.

**Indicator agar:** Agar medium containing a component that is changed in a unique way a particular species of microorganisms.

**Inducer:** A substance responsible for activating certain genes.

**Industrial waste:** Solid material that is discarded from trading, commercial and industrial premises and requires disposal. It can be divided roughly into five categories: a) general factory rubbish, uncontaminated by factory process waste, b) relatively inert process waste, c) flammable process waste, d) acid or caustic wastes, e) indisputably toxic wastes.

**Infection:** Invasion of tissues by microorganisms or viruses with or without the production of disease.

**Infectious wastes:** They could be categorized into three groups. The first group includes tools which carry the illness and are wasted from the clinics and wanted to insulate by the authorized hospital person. The second group includes pathogenic wastes such as tissue, blood, organ, guinea pig, organisms, etc., which are originated from the laboratories. The third group includes pathogenic samples which are wasted from operating room and emergency room.

**Infiltration:** The penetration of a permeable solid body or mass by a fluid that fills spaces within it. It is the process by which water seeps into the soil.

**Infiltration rate:** The speed with which water penetrates the soil. It is governed by the texture of the soil, the amount and type of vegetation cover, and the slope of the ground.

**Interaction:** The phenomena which occurs when individuals sympatric populations encounter one another.

**Interference:** An interaction detrimental to one or more competing sympatric populations.

**Intermediates:** Compounds in a biochemical pathway that are metabolized further.

**In vitro:** In a test tube or other container as opposed to a plant or animal.

**In vivo:** In a living plant or animal as opposed to in a test tube or other container.

**Ionic environment:** A collection of all the charged atoms or groups of atoms in a particular environment.

**Ion exchange:** A reversible replacement of certain ions by others; the direction of the exchange depends upon the affinities of the ion exchange for the ions present and the concentrations of the ions in the solution.

**Ion exchange capacity:** The quantity of a particular ion that can be replaced by ion exchange.

**Irritability:** The response of living systems to external stimuli.

**Irrigation:** The artificial watering of land.

## J

**Joule:** The derived SI unit of energy, being the work done when a force of 1 newton displaces a point 1 metre, and the work done per second by a current of 1 ampere flowing through a resistance of 1 ohm. It is named after James Prescott Joule

## K

**Karyotype:** The chromosome complement of the nuclei of individual organisms within a population.

**Kelvin:** The SI unit of thermodynamic temperature, pressure and volume of water at which the solid, liquid and gaseous phases are in balance (the triple point) contains 273,16 Kelvin's. A temperature expressed in K is equal to the temperature in degrees Celsius plus 273,15° C, the intervals between Kelvin's and degrees Celsius being identical. The name degrees Kelvin and symbol ° K have been discontinued, the correct usage now being simply Kelvin or K.

## L

**Lag phase:** The initial period of very slow growth following the inoculation of a culture medium.

**Lagoon:** An earthen holding pond for wastewater, usually used for biological treatment of the waste. Lagoons may be mechanically aerated (aerated lagoons), they may be designed to enhance anaerobic metabolism (anaerobic lagoons).

**Log phase:** The period of growth following the lag phase during which very rapid growth occurs.

**Land reclamation:** The treatment of any unusable land (e.g., slag heaps, quarries, gravel pits, etc.) usually by filling with refuse (see land-fill) or leveling, until the land can be brought into productive use.

**Landfill:** The disposal of refuse by tipping it on land. Often the refuse is used to fill in old mine workings or low-lying land, to reclaim land from water or to create a feature on flat land. If the refuse is deposited in prepared trenches or holes, over which earth can be heaped at the end of each day, this is called controlled tipping in the UK and Sanitary Land-Fill in the USA.

**Land use:** The deployment of land for any use. Competition for limited areas of land requires the establishment of priorities among claims, which is the object of land use planning.

**Latent:** Currently inactive but capable of becoming active.

**Leachate:** Water that has percolated through soil, or a filter material, containing soluble substance and that, therefore, contain amounts of these substances in solution. Liquid which percolate through solid wastes.

**Leach field:** Area where septic tank effluent is distributed for natural leaching.

**Leaching:** The removal of the soluble constituents of a rock, soil or ore (that which is leached being known as the leachate) by the action of percolating waters. Leaching is a major process in the development of porosity in limestone in the secondary enrichment of ores and in the formation of soils.

**Legumes, leguminous plants:** Plants that often have symbiotic nitrogen-fixing bacteria associated with them, such as peas, beans clover, alfalfa, and so on.

**Lime:** The common name for calcium oxide ( $\text{CaO}$ ).

**Limestone:** A sedimentary rock consisting chiefly of calcium carbonate, primarily in the form of the mineral calcite.

**Limnology:** The study of the physical, chemical and biological components of fresh water.

**Lipid:** A diverse group of organic substances that are relatively insoluble in water, but soluble in alcohol, ether, chloroform, or other fat solvents.

**Lithosphere:** The uninhabited and, under normal conditions, solid materials of the Earth's crust.

**Lithotrophs:** An organism that uses an inorganic electron donor.

**Logarithmic growth:** The phase of growth in which the time required for doubling of the cell mass is constant.

**Logistic curve:** As applied to populations, an S-shaped curve of population growth which is initially slow, steepens, and then flattens out at an asymptote determined by the carrying capacity.

## M

**Macronutrient:** An element or compound that is needed in relatively large quantities by an organism. Crop plants require amounts ranging from a few kilograms to a few hundred kilograms per hectare of carbon, hydrogen and oxygen (supplied from carbon dioxide and water), as well as nitrogen, potassium and phosphorus (supplied from the soil)

**Marine:** Belonging to the sea.

**Mass production:** The making of large numbers of identical products in a factory, often using production line techniques.

**Mesophilic microorganisms:** Microorganisms whose optimum temperature for growth lies between 20 - 45 °C.

**Metabolism:** All the chemical reactions that take place in a living organism, comprising both anabolism and catabolism. Basal metabolism is the energy exchange of an animal at rest.

**Metabolite:** A substance that is involved in metabolism.

**Methane:** An odorless, colorless and asphyxiating gas that can explode under certain circumstances and that can be produced by solid wastes undergoing anaerobic decomposition.

**Methane oxidizers:** A group of Gram-negative bacteria capable of utilizing methane as their sole carbon and energy source.

**Metropolis:** The chief city, often the capital city, of a country or region.

**Microaerophilic organisms:** Organisms that requires low concentrations of oxygen for growth.

**Micronutrient:** An element or compound that is required by living organisms, but very small amounts. Plants require a few grams to a few hundred grams per hectare of iron, manganese, zinc, boron, copper, molybdenum and cobalt.

**Migration:** (1) The establishment of a plant species in a new area. (2) Movements particular animals carry out regularly, often between breeding places and winter feeding grounds.

**Mineralization:** The microbial breakdown of humus and other organic material in soil to inorganic substances. The release of inorganic chemicals from organic matter during the process of aerobic or anaerobic decay.

**Mineralize:** To convert an element from an organic to an inorganic form.

**Mitochondria:** Organelles in plant and animal cells that contain the respiratory enzymes.

**Mitosis:** A process of chromosome duplication.

**Molecular diffusion:** The spontaneous intermixing of different substances by molecular movement, giving uniform concentrations.

**Molecular Weight:** The relative weight of an atom or molecule based on a scale in which the H atom is assigned the weight of 1.0.

**Molecule:** The smallest part of a compound that retains all the properties of the compound.



**Monitoring programme:** The systematic measuring, quantitatively or qualitatively, of a phenomenon or the presence of a substance, over a period of time. Experiments and demonstrations are observed (monitored) in this way. monitoring programs are often use to provide information on the distribution in space or time of pollutants, so that effective measures may be developed to limit their harmful effects should the results of the programme indicate that remedial measures are necessary.

**Monocline:** A localized zone of steeply dipping beds in a region of horizontal to low.

**Mortality:** The rate of removal of individuals from a population by death.

**Mutation:** A transmissible change in the structure of a gene or chromosome.

**Mutagenicity:** The capability of certain activating factors (e.g., chemicals, radiation) to trigger off changes in the genetic material of a cell.

**Mulch:** A material (e.g., straw, paper, plastic sheeting) that is used to protect. The surface of the soil from erosion. Where the mulch is composed of biodegradable material it becomes incorporated into the topsoil to become HUMUS.

**Municipal waste:** Substances discarded as unusable by private households, offices, shops, etc., but not the waste products of industrial processing or manufacturing. Municipal waste is composed typically of paper, organic matter, plastics, metals and non-metallic minerals (e.g., ash). Historically, the content of plastics has increased rapidly, and the ash content has decreased. Such waste is generally collected for disposal by incineration, LAND-FILL, composting or destructive distillation, and in some areas it is used as fuel to generate heat or power.

**Mutagen:** An agent (e.g., X-rays, gamma rays, mustard gas) that can induce MUTATION.

**Mutagen, mutagenic agent:** Any agent that increases the frequency at which DNA is altered (mutated).

**Mutation:** A sudden change in the chromosomes of a cell, most mutations being due to changes in the DNA of individual genes, others to alterations in the structure or number of chromosomes.

**Mutualism:** An association in which both partners benefit.

# N

**Nanno-plankton:** The smallest of the phytoplankton.

**Natality:** The rate of addition of new individuals to a population by birth.

**Natural selection:** The author of *The Origin of Species by Means of Natural Selection*, which revolutionized concepts of evolution by proposing a mechanism for it, and *The Descent of Man*, which advanced evidence for the evolution of humans from sub human forms.

**Natural resource ecosystem:** A natural ecosystem in which one part is of use to humans.

**Net productivity:** The increase in energy content of an ecosystem after deducting the amount lost in respiration at all trophic levels.

**Niche:** The specific part of a habitat occupied by an organism. The role an organism plays in an ecosystem.

**Nitrate:** Salt of nitric acid.

**Nitrification:** The conversion by aerobic soil bacteria (nitrifying bacteria) of organic nitrogen compounds into nitrates ( $\text{NO}_3^-$ ), which can be absorbed by green plants. Dead organic matter is broken down into substances such as ammonia, which reacts with calcium carbonate forming ammonium carbonate. Ammonium carbonate is oxidized to nitrite ( $\text{NO}_2^-$ ) by nitrite bacteria (*Nitrosomonas*), then nitrites are converted to nitrates by nitrate bacteria (*Nitrobacter*).

**Non-systematical landfill area:** A landfill area in which solid wastes are wasted randomly without any precautions for human and environmental health and dumped without any covering material. Sometimes these solid wastes are burned; finally, dust, smoke and odor occur.

**None epidemic sludge:** Treatment sludges which contain no epidemic bacteria and other microorganism after some procedures such as chemical and thermal conditioning, thermal drying, heating, composting and chemical stabilization.

**Nucleic acids:** Ribonucleic acid (RNA) and deoxyribonucleic acid (DNA).

**Nutrient budget:** An estimate setting out for a particular living system the amounts of essential mineral nutrients which are taken up or lost.



**Obligate aerobes:** Those organisms that have an absolute requirement for oxygen gas.

**Obligate anaerobes:** Those organisms that cannot utilize oxygen gas. Some members of this group are killed by traces of oxygen.

**Obligate intracellular parasites:** Grow only inside living cells.

**Oligotroph:** An oligotroph is an organism that can live in an environment that offers very low levels of nutrients. They may be contrasted with copiotrophs, which prefer nutritionally rich environments. Oligotrophs are characterized by slow growth, low rates of metabolism, and generally low population density.

**Oligotrophic environment:** An environment deficient in nutrients.

**Open community:** A community that is readily colonized by other organisms because some niches remain unoccupied.

**Open cut mining:** The working of coal or an ore by removing the overburden to expose the ore body, which is removed and may be partly processed on site.

**Opportunist, opportunistic:** An organism that causes disease only in hosts with impaired defense mechanisms, which might result, for example, from wounds, alcoholism, and so on.

**Optimum temperature:** The temperature at which an organism grows most rapidly.

**Order:** A commonly used population classification category which in general usage is often employed to cluster together similar families.

**Organelle:** A specialized part of a cell analogous to an organ in higher forms of life.

**Organ:** A structure composed of different tissues coordinated to perform a special function.

**Organic farming:** Farming without the use of industrially made fertilizers and pesticides, according to the principles laid down by Sir Albert Howard, Lady Eve Balfour and others, and as modernized and interpreted in Britain by the Soil Association.

**Organic matter:** Amount of remainder after drying and incinerating of a sample into an oven at 625° C for 3 hours, which is taken from solid wastes or composts.

**Organotroph:** An organism that uses an organic compound as the electron donor.

**Orthophosphate:** The inorganic form of phosphate and the only form readily available for use by most plants and microorganisms.

**Osmotic pressure:** The pressure that develops when a pure solvent is separated from a solution by a membrane that allows only solvent molecules to pass through it.

**Other garbage and solid wastes:** are such as ash, slag, stone, porcelain, etc. which are directly sent to landfill areas.

**Ovulation:** The release of a ripe egg from an ovary.

**Oxidation:** The removal of an electron.

**Oxidation pond:** A shallow lagoon or basin in which waste water is purified by sedimentation accompanied by aerobic and anaerobic treatment.

**Oxidizing agents:** Any substance that oxidizes another substance and is itself reduced in the process.

**Ozone:** O<sup>3</sup> is formed by the influence of ultraviolet radiation in the earth's upper atmosphere. It is also formed by the simultaneous occurrence of nitrogen oxides and hydrocarbons in conjunction with solar radiation. O<sub>3</sub> is a powerful oxidation agent which can harm humans, plants and materials.

**Ozone layer :** A layer of the atmosphere, about 20 - 50 kilometers above the surface, in which the concentration of ozone is higher than elsewhere in the atmosphere due to the dissociation and reformation of oxygen molecules exposed to high frequency ultraviolet radiation.

## **P**

**Package treatment plant:** A transportable unit for sewage treatment that is capable of achieving a desired quality of effluent.

**Parasitism:** A close association between living organisms of two different species during which one partner - the parasite - obtains food at the expense of the other the host.

**Particle:** A small, discrete mass of solid or liquid matter.

**Passive diffusion:** A process in which molecules flow freely into and out of a cell so that the concentration of any particular molecule is the same on the inside as it is on the outside of the cell.

**Pasteurization:** The partial sterilization of a liquid by heating at a relatively low temperature (80°C).

**Pathogen:** Pathogenic organism. An organism that causes a communicable disease

**Pathogenesis:** The process by which disease develops.

**Pathological waste:** Waste that may contain pathogens and whose disposal might therefore threaten public health.

**PCDDs:** Polychlorinated dibenzodioxines, generally known as dioxins (see also dioxine). In particular, tetrachlorideben-zodioxine (TCDD) is highly toxic.

**PCDFs:** Polychlorinated dibenzofuranes. They belong to the chlorinated hydrocarbons and are similar in structure and effect to the PCDDs.

**Peat:** Organic soil, often many meters deep, composed of partly decomposed plant material. It forms under anaerobic conditions in waterlogged areas such as fens and bogs.

**Percentage timer:** A timing device used in conjunction with chemical feeders to control the rate at which a chemical is added to the water system.

**Permeases:** A system of enzymes concerned with the transport of nutrients into the cell.

**Permeability:** The capacity of a structure to permit the movement of a fluid through it.

**Pesticides :** A general term for chemical agents that are used in order to kill unwanted plants, animal pests or disease causing fungi, and embracing insecticides, herbicides, fungicides, etc.

**Petri dish:** A circular, shallow, covered dish used in the cultivation of bacterial colonies.

**Pharmaceutical waste:** All unwanted pharmaceuticals should be returned to the pharmacy, which will determine the most suitable method of disposal.

**Phenotype:** The outward expression of the genes.

**Phenotypic:** Pertaining to the characteristic of the mature individual organism, which is the result of interaction during development between the genotype and the environment.

**Photiczone:** The surface waters of a sea or lake, penetrated by sunlight. This zone includes the euphotic zone and dysphotic zone.

**Photosynthesis:** The chemical process during which green plants convert carbon dioxide to organic food substances.

**Photo-oxidants:** Photo-oxidants are air impurities which are formed from nitrogen oxides and reactive hydrocarbons as a secondary result of photochemical processes in the atmosphere under the influence of solar radiation.

**Phototrophic:** Applied to organisms that obtain energy from sunlight.

**Phytotoxic:** Poisonous to green plants.

**Phytoplankton:** The floating and swimming algae and prokaryotic organisms of lakes and oceans.

**Pile:** A long piece of wood, steel or concrete driven into the ground to support a load.

**Plankton:** The small and microscopic organisms drifting or floating in the sea or fresh water, consisting chiefly of diatoms, protozoans, small crustaceans, and the eggs and larval stages of larger animals. Many animals are adapted to feed on plankton, especially by filtering the water.

**Plastics:** Organic polymers of a wide variety of types and uses. Commonly plastics fall into two groups -thermoplastic and thermosetting- depending on their behavior upon being heated.

**Platform:** A stable, flat area on which a thin sequence of sediments may accumulate.

**Plug flow system:** A hydraulic regime in which the components flowing into a reactor experience little or no mixing as they proceed through the reactor from inlet to outlet.

**Plume:** Chimney effluent composed of gases and particulates. The form of the plume depends on turbulence in the atmosphere. Descriptions of plumes use such words as looping, coning, fanning, fumigating and lofting.

**Pollen:** Microspores of seed-producing plants. Each pollen grain contains a much reduced male gametophyte. Pollen grains are transferred by wind, water, birds or other animals to the ovules or stigmas where pollen tubes containing male nuclei grow out and penetrate the embryo sac.

**Pollution:** The direct or indirect alternation of the physical, thermal, biological or radioactive properties of any part of the environment in such a way as to create a hazard or potential hazard to health, safety or welfare of any living species. Pollution may occur naturally, but the term is more commonly applied to changes wrought by the emission of industrial pollutants or by the careless discharge or disposal of human domestic wastes r sewage.

**Polychlorinated biphenyl:** An extremely toxic chemical contained in transformers and capacitors.

**Polyethyleneterephthalate (PET):** PET is one of these resins preferred for non-alcolic bevarage containers owing to its particularities of being a cheap, light but rigid material capable of retaining carbonation.

**Polymer:** A substance formed by the joining together (polymerization) of simple basic chemical units (monomers) in a regular pattern.

**Polypeptide:** A chain of amino acids joined by peptide bonds. Another term for a protein.

**Polysaccharide:** Long chains of monosaccharide subunits.

**Polyvinyl chloride (PVC)** : One of the most common plastic, used in the manufacture of clothing, furniture, gramophone records and containers, and produced by the polymerization of vinyl chloride.

**Population density:** The size of a population in relation to the area in which it occurs, expressed as the number of individuals per unit area.

**Population:** A group of individuals, sharing some feature in common and living in a particular defined area that is considered without regard to interrelationship among them.

**Population dynamics:** The study of changes in population densities with time.

**Population ecology:** The study of the factors that affect the number of individuals of a particular population present in a specified area over a period of time.

**Porosity:** The percentage of pore space in a rock. Porosity in sedimentary rocks ranges from less than 1 percent to more than 50 percent and depends on the sorting, angularity and packing of the grains, as well as on the degree of cementation of the rock.

**ppb:** Abbreviation for parts per billion.

**ppm:** Abbreviation for parts per million.

**Pre-adaptation:** The possession of characteristics that provide an advantage for an organism when it is exposed to new conditions.

**Precipitation** : (1) The settling out of water from cloud in the form of dew, rain, hail, snow etc. (2) The formation of solid particles in a solution; the settling out of small particles.

**Primary economy:** An economic system in which the principal activities, and so the main sources of wealth and employment are connected with agriculture, mining and the obtaining of primary commodities.

**Primary productivity:** The rate at which energy is taken into an ecosystem through the activity of producers.



**Primary treatment:** The removal of separable materials from wastewaters by sedimentation.

**Processing plant:** A plant which is built up for recovery and reuse, composting, incineration, energy production, volume reduction, sanitary land filling , to make wastes unarmful for environment.

**Producer:** Autotrophic populations, usually of green plants, which procure energy from outside an ecosystem and direct it into the system .

**Production:** (1) Gross production rate; the rate of assimilation shown by organisms of a given trophic level. (2) Gross primary production; the assimilation of organic matter or biocontent by a plant community during a specified period. (3) Net primary production; the biomass or biocontent incorporated into a plant community during a specified period of time.

**Production ecology:** The study of biomes in terms of the production and distribution of food, and hence the flow of energy within them.

**Productivity:** (1) Primary productivity; the amount of organic mat-ter made in a given time by the atrophic organisms in an ecosystem. (2) Net productivity; the amount of organic matter produced in excess of that used up by the producing organisms during respiration thus representing potential food for the consumers of the ecosystem.

**Prokaryotic:** Applied to organism or cells whose genetic material is not enclosed by a nuclear membrane , and that do not possess mitochondria or plastids. Bacteria and Cyanophyta are the only prokaryotic organisms.

**Protista:** The kingdom that comprises all the simple organisms .

**Prototroph, prototrophy :** An organism that has on organic growth requirements other than a source of carbon and energy.

**Protozoa:** A group of organisms.

**Pseudomonas spp:** A common group of sulfa-reducing bacteria causing accelerated corrosion of pipes.

**Pulverization:** An intermediate step in refuse disposal in which refuse is broken into small particles, so reducing its volume.

**Pumping station:** An installation for raising sewage to a higher elevation, or for pumping mains water supplies.

**Pure culture:** A culture that contains only a single strain of an organism.

**Pyrolysis:** A way of breaking down burnable waste by combustion in the absence of air . High heat is usually applied to the wastes in a closed chamber, and all moisture evaporates and materials break down into various hydrocarbons in liquid and gas phase, and carbon like residues.

## Q

**Quota:** The ratio of the quantity of recollected containers to the quantity of containers filled as of years, for the purpose of recycling and disposal of filled plastic or metal containers.

## R

**Radial drainage:** River systems that form a radial pattern. Radial drainage is typical of high mountain areas or systems on volcanic cones.

**Radical:** A group of two or more atoms that acts as a single atom and goes through a reaction uncharged, or is replaced by a single atom.

**Radioactivity:** property exhibited by certain types of matter of emitting energy and subatomic particles spontaneously. ... It is, in essence, an attribute of individual atomic nuclei.

**Range management:** The planning and management of the use of grazing land in order to sustain maximum livestock production consistent with the conservation of the range resource.

**Raw sludge:** Treatment sludge which is not dewatered dried and digested.

**Reactor:** A vessel in which a commercial fermentation process is carried out.

**Receptor, receptor sites:** Attachment sites on a cell surface.

**Recombination:** The re-assortment of characters within linkage groups as a result of the crossing over which occurs during meiosis in reproductive tissue.

**Recovery:** Recovery is a general term used to describe the extraction of economically usable materials or energy from wastes. The concept may involve recycling or conversion into different and sometimes, unrelated uses.

**Recycling:** Procedure which is carried out without any chemical and biological treatment for some reusable materials such as paper, plastic, glass and can. These materials can be returned into economical processes.

**Reducer:** Heterotrophic individual which utilizes the chemical energy of organic matter while breaking it down to more simple substances.

**Reduction:** The removal of oxygen, the addition of hydrogen, or the addition of electrons.

**Regression:** The dependence of one variable upon another independent variable.

**Regressive:** Applied to a body of water or to sediments associated with a lowering of sea level.

**Relative humidity:** The percentage of moisture in air compared to the maximum it might contain.

**Renewable resource:** A resource that can be exploited without depletion because it is constantly replenished. The includes agricultural crops and fish, provided stocks are not over fished, and is extended to cover the energy of solar radiation, wind, waves and tides.

**Replication:** Synthesis of a copy. Cells replicate by increasing in size and dividing to produce two daughter cells identical with the original cell.

**Reservoir:** As used here, a substance in which the temperature remains constant.

**Resource:** A means that is available for supplying an economic want. Minerals and fossil fuels are described as stock, resource or reserves.

**Respiration:** The process whereby oxygen is taken into an organism and carbon dioxide is given out.

**Retaining wall:** A wall to hold a bank of soil in position.

**Reuse:** The use of a waste material or product more than once. Example; containers on deposit or multi way bottles.

**Reverse osmosis:** A process for the removal of dissolved ions from water is forced through a semi permeable membrane, retaining most ions while transmitting the water.

**Risk estimation:** An actuarial technique, used in assessing the relative costs and benefits of a particular technology, that compares actual recorded incidence of death or injury to humans to the number of people using the technology, extended over many years.

**Rotary pump:** A pump in which the fluid is caused to flow by the rotary action of gears or similar moving parts.

**Rotation:** A turning around , as of a wheel on its axis.

**Run-off:** Water from rain or snow that runs off the surface of the land and into streams and rivers.

## **S**

**Salinity:** The degree of concentration of salt solutions, determined by measuring the density of the solution using a salinometer (a type of a hydrometer), by titration, by measuring the electrical conductivity of the solution, etc..

**Saline water or solution:** Water or an aqueous solution containing an excessive amount of dissolved salts, usually over 10 000 mg/l.

**Sand clay:** A mixture of sand and clay, used for road surface, clay becomes hard when it has baked in the sun.

**Sanitary land-fill:** A US term for the dumping of domestic refuse compacted on site and covered regularly by a layer of earth. Microorganisms decompose the organic part of the refuse. This is engineered burial of refuse but in many places the term is synonymous with a rubbish dump or waste tip.

**Sanitary landfill area:** A landfill area in which solid wastes are spread out as thin layers, compacted and covered with soil, daily. In this technique, sanitary precautions have been applied, accurately.

**Saprophyte:** An organism that obtains food in solution from the dead or decaying bodies of other organism.

**Saturation:** A relative humidity of 100 percent measured by comparing the difference in readings between a dry bulb and wet bulb thermometer.

**Screen:** The portion of a well casing that is slotted or perforated to permit the flow of water into the well.

**Screening:** The operation of passing loose materials through a screen of known mesh so that constituent particles are separated into defined sizes.

**Secondary treatment:** A process to remove the amount of dissolved organic matter in waste water and to reduce further the suspended solids.

**Secondary pollutant:** A pollutant formed in the environment by the combination or reaction of other pollutants.

**Secondary productivity:** The procurement of energy by heterotrophs.

**Secondary thickening:** In a woody perennial plant, the formation of secondary vascular tissue as a result of the activity of cambium in the stems and roots.

**Secondary sorting:** This operation will be made at places where a solid waste is dispatched for disposal or recycling.

**Sedimentation:** The separation of an insoluble solid from a liquid in which it is suspended by settling under the influence of gravity or centrifugation.

**Sedimentary cycle:** The circulation of nutrients in an ecosystem which involves geological weathering and erosion with the eventual recovery of the elements by the uplift of marine sediments to form land masses.

**Selection:** Differential reproduction in individuals of a population arising from a variety of conditions on in the individual optima and tolerant limits.

**Selection pressure:** A measure of the effects of natural selection on the genetic composition of a population.

**Selective inhibitors:** Substance added to growth media that inhibit one species of organism but not another.

**Selective species:** A species found most usually in a particular community, but also, rarely, in other communities.

**Semi permeable:** The passage of some materials but not others.

**Separate collection:** Household and particularly industrial wastes will be collected in separate containers or tins manually or with tools according to their types.

**Septic tank:** A watertight sedimentation tank for sewage in which solids settle and are decomposed anaerobically. A common facility for the treatment of household sewage in rural areas.

**Sewage:** Domestic and industrial waste in a liquid or semi liquid state.

**Shock loading:** Any of several types of abrupt change in the environment in a biological treatment process.

**Single cell protein:** (SCP). Protein derived from unicellular organisms grown on a hydrocarbon substrate.

**Slag:** The non-metallic residue from the smelting of metallic ores that generally forms as a molten mass floating on the molten metal.

**Sludge:** (1) Thick mud often greasy. (2) The suspended solid matter in industrial effluent or sewage after partial drying.

**Smog:** Originally, a contraction of smoke and fog.

**Smoke:** An aerosol of minute solid or liquid particles formed by the incomplete combustion of a fuel.

**Softening:** The process of removing the hardness-producing ions in exchange for less detrimental ions.

**Soil drainage:** The removal from the soil of water that is surplus to the requirements of the use to which the soil is to be put.

**Soil map:** A map that shows the distribution of soil types in relation to other features of the land surface.

**Soil moisture:** Water in the soil either held by capillary attraction or in the process of movement toward the water table.

**Soil:** Weathered, unconsolidated surface material in which plants anchor their roots and from which they derive nutrients and moisture.

**Solid waste (SW):** They include materials which are wasted after using and treatment sludges. They must be regularly, continuously and accurately collected and disposed with respect to human and environmental health .

**Soil type:** A subdivision of a soil series based on the texture.

**Somatic:** Pertaining to the soma or to the body wall of an animal.

**Solution:** In soil, water entering the ground encounters organic matter containing carbon dioxide and acid ions which become dissolved in the water.

**Special waste (dangerous waste, hazardous waste, intractable waste ):**To qualify as special waste a substance must be sufficiently toxic to present a hazard to human health or risk of serious environmental contamination.

**Species:** A group of similar individuals having a common origin and continuous reeding system.

**Species packing:** Extensive diversification into species population within a comparatively narrow range of variation.

**Spray:** Liquid droplets greater than 10 micrometers in size , created by mechanical disintegration processes. Spray is a source of salt particles in the atmosphere.

**Stabilization:** The increase of dominance that ends in a stable climax, produced by the invasion of species leading to the establishment of a population most completely fitted for the prevailing conditions.

**Static stability:** In the atmosphere, the condition in which small vertical displacements of a parcel of air cause gravitational restoring forces in the absence of horizontal wind. This is the case if the lapse rate is greater than the adiabatic lapse rate.

**Sterilization:** Rendering an object or substance free of all viable microorganisms or viruses.

**Still:** An apparatus for distilling used to prepare alcoholic drinks, distilled water and other purified liquids.

**Stratosphere:** Upper layer of the atmosphere from 12 to 50 kilometers.

**Stratification:** The arrangement of material in discrete layers. In the atmosphere, the forming of stable horizontal layers that do not intermingle, because the lapse rate is less than the adiabatic lapse rate.

**Structural proteins:** Proteins that form part of the organism or virus.



**Structure:** The spatial and other arrangements of species within an ecosystem. The structure takes account of the composition of the biological community, including species, numbers, biomass, life cycle and spatial distribution; the quantity and distribution of the non-living materials. The range or gradient of conditions such as temperature, light etc.

**Sublimation:** The change in a substance between the solid and the gaseous phase without passing through the liquid phase.

**Submersible pump:** A pump designed to fit into a well and operate below the water level.

**Substrate:** The surface to which an organism is attached or upon which it moves. The material on which a microorganism grows. The particular substance or group of substances that an enzyme activates.

**Succession:** The replacement of one community by another as a result of changes in the environment.

**Sulfur bacteria:** Bacteria that oxidize hydrogen sulfide or sulfur to sulfuric or sulfurous acid.

**Sulfate reducing bacteria:** A group of bacteria capable of reducing sulfates in water to hydrogen sulfide gas. They have no sanitary significance and are classed as nuisance organisms.

**Surface pressure:** Normally, the atmospheric pressure inside a Stevenson Screen.

**Surface runoff:** Water flowing across the soil surface into a channel.

**Suspension:** As used here, the state of balance in which the body of a car is held on the springs and shock absorbers.

**Sustainable development:** Economic development that can continue indefinitely because it is based on the exploitation of renewable resources and causes insufficient environmental damage for this to pose an eventual limit.

**Sustainable yield:** The maximum extent to which a renewable resource may be exploited without depletion.

**Symbiosis:** A close and mutually beneficial association of organisms of different species. The occurrence of cellulose-digesting protozoans in the guts of wood-eating cockroaches and termites is a symbiotic relationship, as the insects cannot digest cellulose unaided and the protozoa cannot live independently.

**Symbiotic relationship:** Intimate relationship between members of different species.

**Syndrome:** A particular group of signs and symptoms that occur together.

**Synergism:** A cooperative effort between two or more species of bacteria resulting in something the individual species could not have accomplished alone.

**Synergistic action:** The cooperative action of two distinct organisms such that the growth of one assists the growth or activity of the other.

## **T**

**TDT, thermal death time:** The amount of time needed to kill bacterial spores at a certain temperature.

**TCDD:** Dioxin.

**Technosphere:** That part of the physical environment built or modified by humans.

**Tensiometer:** An instrument used to measure the amount of water in the plant root area of a soil.

**Terrestrial:** Belonging to the Earth, or to the mainland; existing on the mainland, in contrast to aquatic.

**Tertiary treatment:** A third stage in the treatment of waste water, usually involving the removal of soluble plant nutrients which might cause eutrophication were they released into still or slow-moving fresh water.

**Texture:** The size, shape and arrangement of the particles that make up a surface deposit, rock or soil.

**Thermal pollution:** The raising of the temperature of part of the environment by the discharge of substances whose temperature is higher than the ambient.

**Thermocline:** The layer of the water in a lake that lies between the epilimnion and the Hypolimnion.

**Thermograph:** A instrument for recording changes in temperature as a line on a rotating drum.

**Thermophilic microorganisms:** Microorganisms that grow well at temperatures over 45°C . Examples include bacteria in hot springs, manure heaps and fermenting hay ricks.

**Thermosphere :** That part of the upper atmosphere in which temperature increases with height.

**Trace elements:** Elements that are necessary in extremely small amounts for the proper functioning of metabolism in plants and animals. Most are probably constituents of enzymes. Higher plants need traces of copper , zinc, boron, molybdenum and manganese. Any element present in minute quantities in an organism, soil, water, etc.

**Tracer:** A substance used to determine the flow rate and direction of water movement in a stream or aquifer.

**Toxicity:** The degree to which a substance is poisonous. Toxicity is divided into acute toxicity (assimilated once), sub chronic toxicity (repeated assimilation over a short period of time), and into chronic toxicity (repeated assimilation over a long period of time)

**Transcription:** The process of transferring genetic information coded in DNA into informational RNA.

**Transformation:** Modification of the properties of cells, also a shortened form of DNA-mediated transformation in bacteria.

**Transpiration:** The loss of water vapor from a plant, mainly through the stomata and to a small extent through the cuticle and lenticels.

**Treatment sludge:** Dewatered and dried materials which are produced after procedures such as physical, chemical and biological treatment of domestic and/or industrial waste waters.

**Trophic level:** A particular step occupied by a population in the process of energy transfer within an ecosystem.

**Troposphere:** Lower layer of the atmosphere, of significance for the weather.

**Turbulence:** An irregular movement of a fluid in which, in general, no two particles of the fluid follow the same path. Most natural movement of fluids is turbulent rather than laminar, and in air turbulence is a major cause of mixing.

**Turn-over:** The continuous, balanced process of generation and loss of cells or molecules in living systems. The turn-over time is the time needed for the replacement by turn-over of the cells or molecules equivalent to the total biomass of a population, or the time taken for an individual organism to mature, die and undergo decomposition.

## U

**Ubiquitous:** Occurring everywhere.

**Urbanization:** The migration of people in substantial numbers from rural to urban areas. Urbanization is characteristic of regions in the early stages of industrialization and is marked in third world countries.

## V

**Vegetation:** The plants of an area considered in general or as communities, but not taxonomically; the total plant cover in a particular area, or on the Earth as a whole.

**Vegetative cell:** The growing or feeding form of a cell.

**Velocity:** Speed and direction. The wind velocity is the wind speed and the direction from which the wind blows. Velocity is sometimes used informally to mean speed alone.

**Virulence:** The relative capacity of a pathogen to overcome body defenses.

## W

**Warm rain:** Rain falling from water clouds as opposed to ice clouds.

**Waste water:** Polluted water from households and commercial and industrial sources which no longer corresponds to the condition of not having been influenced by man. A distinction is made between "domestic waste water" and "commercial and industrial waste water".

**Waste containing asbestos:** Precautions for handling, disposal or reuse should be consistent with the hazard of asbestos dust at trace contaminant levels. Enclosure of such waste into a "fixed" substance should be done under conditions that prevent the release of asbestos fibers to the air. Waste contaminating asbestos may be disposed of under controlled conditions at landfill sites authorized to receive such waste.

**Water table :** The surface between the zone of saturation and the zone of aeration; that surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

**Wet bulb:** A thermometer bulb maintained wet with distilled water , usually by means of a muslin wick.

**Wetland:** An area covered permanently, occasionally or periodically by fresh or salt water up to a depth of 6 meters.

**Wild dumping:** Wastes of different kind and consistence are deposited without any plan and without permission

**Wind rose:** A diagram summarizing the frequencies of winds of different strengths and directions as measured at a specified point over an extended period of time.

**Wood alcohol:** Methanol.

## X

**Xerophyte:** A plant possessing xeromorphic characters.

Y

There are no terms starting with the letter Y.

Z

**Zero emissions:** An engine, motor or other energy source that does not produce any gas or release any harmful gases directly into the environment.

S