

Glossary: Patterns and Change

Abiotic the non-living components of an ecosystem such as water and soil.

Acidification the change in the chemical composition of soil, which may trigger the circulation of toxic metals.

Adult literacy rate the percentage of the adult population with basic reading and writing skills.

Afforestation planting seeds or trees to make a forest on land that has not been a forest recently, or which has never been a forest.

Ageing population a rise in the median age of a population which occurs when fertility declines while life expectancy remains constant or increases.

Ageing ratio the proportion of people 65 years old and over to the total population.

Albedo the proportion of solar radiation that is reflected by a particular body or surface.

Anti-Malthusians also known as resource optimists; the optimists who argue that either population growth will slow well before the limits of resources are reached or that the ingenuity of humankind will solve resource problems when they arise.

Anti-natalist policy a population policy designed to limit fertility through the use of both incentives and deterrents.

Appropriate technology aid supplied by a donor country whereby the level of technology and the skills required to service it are properly suited to the conditions in the recipient country.

Aquifer a permeable rock that will hold water and permit its passage.

Biocapacity the capacity of an area or ecosystem to generate an ongoing supply of resources and to absorb its wastes.

Biodiversity the diversity of plant and animal life in a particular habitat or in the world as a whole.

Biodiversity hotspot an area with a particularly high level of biodiversity.



Biofuels fossil fuel substitutes that can be made from a range of agri-crop materials including oilseeds, wheat, corn and sugar.

Biome a naturally occurring organic community of plants and animals.

Biotic the living components of an ecosystem, such as plants.

‘Blue’ water precipitation that collects in rivers, lakes, wetlands and as groundwater. It is available for human use before it evaporates or reaches the ocean.

Business-as-usual the scenario for future patterns of production and consumption that assumes that there will be no major changes in attitudes and priorities.

Carbon credit a permit that allows an organisation to emit a specified amount of greenhouse gases; also called an emission permit.

Carbon farming involves using the plants grown on a farm to ‘harvest’ carbon from the atmosphere and return it to the soil.

Carbon footprint ‘the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organisation, event or product’ (UK Carbon Trust 2008).

Carbon sink an environmental reservoir that absorbs and stores more carbon than it releases, thereby offsetting greenhouse gas emissions.

Carbon trading a company that does not use up the level of emissions it is entitled to, can sell the remainder of its entitlement to another company that pollutes above its entitlement.

Carrying capacity the largest population that the resources of a given environment can support.

Census an official periodic count of a population including such information as age, gender, occupation and ethnic origin.

Child mortality rate the number of deaths of children under 5 years of age per 1000 live births in a given year.



Clean coal technology power plant processes that both increase the efficiency of coal-burning and significantly reduce emissions.

Climate change long-term sustained change in the average global climate.

Coal gasification a process that converts solid coal into a gas that can be used for power generation.

Communal conservancies legally recognised common property resource management organisations in Namibia's communal lands.

Community energy energy produced close to the point of consumption.

Condensation the change in state from a gas to a liquid.

Conduction the transfer of heat by contact.

Conservation of resources management of the human use of natural resources to provide the maximum benefit to current generations while maintaining capacity to meet the needs of future generations.

Convection the transfer of heat by the movement of a gas or a liquid.

Crude birth rate (generally referred to as the 'birth rate') the number of births per 1000 population in a given year. It is only a very broad indicator as it does not take into account the age and gender distribution of the population.

Crude death rate (generally referred to as the 'death rate') the number of deaths per 1000 population in a given year. Again it is only a broad indicator as it is heavily influenced by the age structure of the population.

Culture the total of the inherited ideas, beliefs, values and knowledge that constitutes the shared basis of social action.

Cumulative causation the process whereby a significant increase in economic growth can lead to even more growth as more money circulates in the economy.



Deforestation the process of destroying a forest and replacing it with something else, especially by an agricultural system.

Demographic transition the historical shift of birth and death rates from high to low levels in a population.

Demography the scientific study of human populations.

Dependency ratio the ratio of the number of people under 15 and over 64 years to those 15–64 years of age.

Desalination the conversion of salt water into fresh water by the extraction of dissolved solids.

Desertification the gradual transformation of habitable land into desert.

Destination footprint the environmental impact caused by an individual tourist on holiday in a particular destination.

Development the use of resources to improve the quality of life in a country.

Development gap the difference in income and the quality of life in general between the richest and poorest countries in the world.

Diaspora the dispersal of a people from their original homeland.

Diffusion the spread of a phenomenon over time and space.

Dust storms a severe windstorm that sweeps clouds of dust across an extensive area, especially in an arid region.

Ecological footprint a sustainability indicator, which expresses the relationship between population and the natural environment. It sums the use of natural resources by a country's population.

Economic core region the most highly developed region in a country, with advanced systems of infrastructure and high levels of investment resulting in high average income.



Economic optimum the level of population which, through the production of goods and services, provides the highest average standard of living.

Economic water scarcity when a population does not have the necessary monetary means to utilise an adequate source of water.

Ecosystem a dynamic complex of plant, animal and micro-organism communities and their nonliving environment interacting as a functional unit.

Ecotourism a specialised form of tourism where people experience relatively untouched natural environments such as coral reefs, tropical forests and remote mountain areas, and ensure that their presence does no further damage to these environments.

Education the gradual process of acquiring knowledge, understanding and skills.

Elderly dependency ratio the ratio of the number of people aged 65 and over to those aged 15–64 years.

Emigration the migration of people from a country to one or a number of other countries.

Endemism a state in which species are restricted to a single region.

Energy balance the balance between incoming solar radiation and outgoing terrestrial radiation.

Energy crisis a serious shortage of energy that interrupts domestic supplies and has an impact on all sectors of the economy.

Energy pathways supply routes between energy producers and consumers which may be pipelines, shipping routes or electricity cables.

Enhanced greenhouse effect this results from human activities that increase the concentration of naturally occurring greenhouse gases and leads to global warming and climate change.

Environmental impact assessment a document required by law detailing all the impacts on the environment of a project above a certain size.

Environmental sustainability meeting the needs of the present without compromising the ability of future generations to meet their needs.



Evaporation the change in state from a liquid into a vapour.

Evapotranspiration the combined processes of evaporation, sublimation and transpiration of the water from the Earth's surface into the atmosphere.

External forcings processes both outside and within the atmosphere that can force changes in climate.

Fair trade when producers of food, and some non-food products, in developing countries receive a fair deal when they are selling their products.

Fast-breeder reactor a nuclear reactor in which the chain reaction is maintained mainly by fast neutrons. It is capable of producing more fissionable material than it consumes.

Fertility rate the number of live births per 1000 women aged 15–49 years in a given year.

Flow renewable resources are resources that do not need regeneration, such as solar power.

Forced migration this occurs when the individual or household has little or no choice but to move.

Foreign direct investment overseas investments in physical capital by transnational corporations.

Formal sector jobs in the formal sector are known to the government department that is responsible for taxation, and to other government offices. Such jobs generally provide better pay and much greater security than jobs in the informal sector.

Gender according to the World Health Organization, gender refers to the socially constructed roles, behaviours, activities and attributes that a given society considers appropriate for men and women.

Geopolitics political relations among nations, particularly relating to claims and disputes pertaining to borders, territories and resources.

Geothermal energy the natural heat found in the Earth's crust in the form of steam, hot water and hot rock.



Geothermal gradient the rate at which temperature rises as depth below the surface increases.

Gini coefficient a statistical technique used to show the extent of income inequality in a country. With values between 0 and 1, a low value indicates a more equal income distribution while a high value means more unequal income distribution.

Global brightening an increasing amount of sunlight reaching the Earth's surface caused by an intensification of solar radiation.

Global dimming a worldwide decline of the intensity of the sunlight reaching the Earth's surface, caused by particulate air pollution and natural events, for example volcanic ash.

Global hectare one global hectare (gha) is equivalent to one hectare of biologically productive space with world average productivity.

Global warming the increase in the average temperature of the Earth's near-surface air in the 20th and early 21st centuries and its projected continuation.

GNI at purchasing power parity (PPP) the GNI of a country is converted into US dollars on the basis of how the value of the currency compares with that of other countries.

Green Revolution the introduction of high-yielding seeds and modern agricultural techniques to developing countries.

Green technology new technologies that aim to conserve the natural environment and resources.

'Green' water that part of total precipitation that is absorbed by soil and plants, then released back into the air.

'Grey' water water that has already been used for one purpose, but can possibly be reused for another purpose.

Gross Domestic Product (GDP) the total value of goods and services produced in a country in a year.



Gross National Income (GNI) comprises the total value of goods and services produced within a country (i.e. its GDP), together with its income received from other countries (notably interest and dividends), less similar payments made to other countries.

Gross National Income per capita the GNI of a country divided by its total population.

Ground heat the warming of the subsurface of the Earth.

Groundwater water found below the surface which is not combined chemically with any minerals present.

Heatwave a prolonged period of excessively hot weather.

Human Development Index (HDI) a measure of development that combines three important aspects of human well-being: life expectancy, education and income.

Ice sheet a thick layer of ice covering extensive regions of the world, notably Antarctica and Greenland.

Igapo forest that part of the rainforest which grows near the rivers on land that is flooded for at least part of the year.

Immigration the migration of people into a country from one or a number of other countries.

Incineration a waste treatment technology that involves the combustion of organic materials and/or substances. Incineration and other high-temperature waste treatment systems are described as 'thermal treatment'.

Indigenous population people descending from the original ethnic groups(s) to populate a country. Other ethnic groups migrating to that country at a later period of time may come to dominate the indigenous population in various ways.

Infant mortality rate the number of deaths of infants under 1 year of age per 1000 live births in a given year.



Informal sector the part of the economy operating outside of official recognition.

Employment is generally low-paid and often temporary and/or part-time in nature.

Insolation the heat energy from the Sun consisting of the visible spectrum together with ultraviolet and infrared rays.

Internal migration migration within the same country.

Internally displaced people as for a refugee, people who are forced to leave their home, but in this case they remain in the same country.

International aid the giving of resources (money, food, goods, technology etc.) by one country or organisation to another poorer country. The objective is to improve the economy and quality of life in the poorer country.

Landfill a site at which refuse is buried under layers of earth.

Latent heat the quantity of heat absorbed or released by a substance undergoing a change of state, such as water vapour condensing into water droplets.

Latosol a major soil type of the humid and high temperature tropics with a shallow A horizon but a thick B horizon comprising clay, sand, and sesquioxides of iron and aluminium which, respectively, endow it with a red or yellow colour. Much of the silica has been leached from latosols, and they tend to be of low fertility.

Least developed countries (LDCs) the poorest and weakest economies in the developing world as identified by UNCTAD.

Life expectancy (at birth) the average number of years a person may expect to live when born, assuming past trends continue.

Low-carbon economy where significant measures have been taken to reduce carbon emissions in all sectors of the economy.



Malnutrition the condition that develops when the body does not get the right amount of the vitamins, minerals and other nutrients it needs to maintain healthy tissues and organ function.

Marginalisation the process of being pushed to the edge of economic activity, of being largely left out of positive economic trends.

Median age the age at which half the population is younger and half is older.

Microcredit tiny loans and financial services to help the poor, mostly women, start businesses and escape poverty.

Microgeneration generators producing electricity with an output of less than 50 kW.

Migration the movement of people across a specified boundary, national or international, to establish a new permanent place of residence. The UN defines 'permanent' as a change of residence lasting more than one year.

Multiplier effect where an increase in the money supply in a region sets off an upward spiral of development as this money circulates in the economy.

Natural decrease when the number of births is lower than the number of deaths.

Natural greenhouse effect the property of the Earth's atmosphere by which long wavelength heat rays from the Earth's surface are trapped or reflected back by the atmosphere.

Neo-Malthusians also Malthusians; the pessimistic lobby who fear that population growth will outstrip resources leading to the consequences predicted by Thomas Malthus.

Net migration the difference between immigration and emigration for a particular country.

Newly industrialised countries (NICs) countries that have undergone rapid and successful industrialisation since the 1960s.

Non-governmental organisations (NGOs) national or international private organisations, which are distinct from governmental or intergovernmental agencies.



Oil sands also known as tar sands or extra heavy oil: naturally occurring mixtures of sand or clay and water which form an extremely dense and viscous form of petroleum called bitumen.

Optimum population the one that achieves a given aim in the most satisfactory way; the term is mainly understood in an economic sense where the highest average living standard is reached (the economic optimum)

Optimum rhythm of growth the level of population growth that best utilises the resources and technology available. Improvements in the resource situation or/and technology are paralleled by more rapid population growth.

Organization of the Petroleum Exporting Countries (OPEC) the current members are: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela.

Overfishing a level of fishing resulting in the depletion of the fish stock.

Overgrazing the grazing of natural pastures at stocking intensities above the livestock carrying capacity.

Overpopulated when there are too many people in an area relative to the resources and the level of technology available.

Overshoot occurs when humanity's demand on nature exceeds the biosphere's supply, or regenerative capacity.

Peak oil production the year in which the world or an individual oil-producing country reaches its highest level of production, with production declining thereafter.

Perennial crops crops that do not die off once harvested (those that do are called annual crops), existing for years before reseeded may be required.

Periphery the parts of a country outside the economic core region. The level of economic development in the periphery is significantly below that of the core.



Photovoltaic systems solar panels that convert sunlight directly into electricity.

Physical water scarcity when physical access to water is limited.

Population momentum the tendency for population growth to continue beyond the time that replacement level fertility has been achieved, because of a relatively high concentration of people in the child-bearing years. This situation is due to past high fertility rates which results in a large number of young people.

Population policy When a government has a stated aim on an aspect of its population and it undertakes measures to achieve that aim.

Population pressure when population per unit area exceeds the carrying capacity.

Population projection the prediction of future populations based on the present age-gender structure, and with present rates of fertility, mortality and migration.

Population pyramid a bar chart, arranged vertically, that shows the distribution of a population by age and gender.

Population structure the composition of a population, the most important elements of which are age and sex.

Positive feedback when an increase of one phenomenon results in an increase in another.

Potable water water that is free from impurities, pollution and bacteria, and is thus safe to drink.

Primary product dependent countries that rely on one or a small range of primary products for most of their exports.

Privatisation the sale of state-owned assets to the private sector.

Product stewardship a system of environmental responsibility whereby producers take back a product, recycling it as far as possible, after the customer has finished with it.

Pro-natalist policy a population policy that aims to encourage more births through the use of incentives.

Pro-poor growth to increase incomes of the poorest people at rates above the national average.



Pro-poor strategies development schemes that focus on the reduction of poverty and the narrowing of the income gap between poor people and the population as a whole.

Environmental sustainability has become central to such approaches in recent years.

Proved oil reserves quantities of oil that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Pull factors positive conditions at the point of destination that encourage people to move.

Push factors negative conditions at the point of origin that encourage or force people to move.

Quotas agreement between countries to take only a predetermined amount of a resource. Quotas may change on an annual or longer time period basis.

Rate of natural change the difference between the birth rate and the death rate.

Rationing very much a last resort management strategy when demand is massively out of proportion to supply. For example, individuals might only be allowed a very small amount of fuel and food per week.

Recolonisation the re-establishment of organisms into habitats that they previously occupied.

Recycling the concentration of used or waste materials, their reprocessing, and their subsequent use in place of new materials.

Recycling deserts areas where rates of recycling are well below the national or regional average.

Reforestation re-establishing a forest after its removal.

Refugee a person who has been forced to leave home and country because of 'a well-founded fear of persecution' on account of race, religion, social group or political opinion.

Remittances money sent back by migrants to their family in the home community.



Replacement level fertility the level at which each generation has just enough children to replace themselves in the population. Although the level varies for different populations, a total fertility rate of 2.12 children is usually considered as replacement level.

Repowering replacing first-generation wind turbines with modern multi-megawatt turbines, which give a much better performance.

Reserves-to-production (R/P) ratio the reserves remaining at the end of any year are divided by the production in that year. The result is the length of time that those remaining reserves would last if production were to continue at that level.

Resource depletion the consumption of non-renewable, finite resources that will eventually lead to their exhaustion.

Resource nationalisation when a country decides to place part (or all) of one or a number of natural resources (e.g. oil and gas) under state ownership.

Resources any aspect of the environment that can be used to meet human needs.

Reuse this involves extending the life of a product beyond what was the norm in the past, or putting a product to a new use and extending its life in this way.

River system all of the streams and channels draining a river basin, comprising a main river and its tributaries.

Salinisation the condition in which the salt content of soil accumulates over time to above normal levels; occurs in some parts of the world where water containing high salt concentration evaporates from fields irrigated with standing water.

Scaling-up process expanding effective programmes to reach larger numbers of people in a broader geographical area.

Sensible heat the heat energy that causes a change in temperature of a substance but does not contribute to a change in state.



Sex ratio the number of males per 100 females in a population.

Slum a heavily populated urban area characterised by substandard housing and squalor.

Social business forms of business that seek to profit from investments that generate social improvements and serve a broader human development purpose.

Social norms the rules for how people should act in a given group or society. These rules are often different for men and women. Any behaviour that is outside these norms is considered abnormal.

Soil aggregates soil particles that are closely bound together are called peds or aggregates.

Soil buffering capacity the capacity of soil to absorb contaminants.

Soil degradation the physical loss (erosion) and the reduction in quality of topsoil associated with nutrient decline and contamination.

Soil profile the vertical variations that occur in the characteristics of a soil from the surface to the underlying rock.

Soil structure the shape and arrangement of aggregates gives soils a characteristic structure, e.g. blocky, platy, crumb or prismatic.

Solar constant the amount of solar energy received per unit area, per unit time on a surface at right angles to the Sun's beam at the edge of the Earth's atmosphere.

Solar forcing radiative forcing caused by changes in incoming solar radiation.

Status (with regard to gender) the relative position or standing of men and women in a society.

Strategic Petroleum Reserve the USA's reserve supply of oil, which should last for about three months in the event of severe interruptions to imported oil.

Subsidy financial aid supplied by government to an industry for reasons of public welfare, the balance of payments etc.

Substitution the use of common and thus less valuable resources in place of rare, more expensive resources. An example is the replacement of copper by aluminium in the manufacture of a variety of products.



Supply shock a significant interruption to supply due to an environmental, economic or political event.

Sustainable agriculture agricultural systems emphasising biological relationships and natural processes, which maintain soil fertility thus allowing current levels of farm production to continue indefinitely.

Sustainable development development that seeks to meet the needs of the present without compromising the needs of future generations.

Terms of trade the price of a country's exports relative to the price of its imports, and the changes that take place over time.

Thermal expansion as sea and ocean temperatures increase, the water molecules near the surface move further apart, so the water volume increases and the sea level rises.

Tipping point the point at which the damage caused to global systems by climate change becomes irreversible.

Total allowable catch the maximum quantity of fish that can be caught each year.

Total fertility rate the average number of children that would be born alive to a woman (or group of women) during her lifetime, if she were to pass through her child-bearing years conforming to the age-specific fertility rates of a given year.

Trade deficit when the value of a country's exports is less than the value of its imports.

Tragedy of the commons the idea that common ownership of a resource leads to over-exploitation as some nations will always want to take more than other nations see as their fair share.

Tropical rainforest a rainforest found near the equator, typically characterised by high temperature and rainfall, poor soil, and a high diversity of plant and animal species.

Troposphere the lowest layer of the atmosphere.

Tropospheric ozone human-produced ozone, a result of air pollution.



Unconventional natural gas natural gas that is more difficult to access and therefore more expensive to extract than 'conventional' reserves.

Underpopulated when there are too few people in an area to use the resources available efficiently.

Unemployment gender ratio the female unemployment rate as a percentage of the male unemployment rate.

Universal soil loss equation a mathematical model used to describe soil erosion processes.

Urbanisation of poverty the gradual shift of global poverty from rural to urban areas with increasing urbanisation.

Virtual water the amount of water that is used to produce food or any other item and is thus essentially 'embedded' in the item.

Voluntary migration when the individual or household has a free choice about whether to move or not.

Water footprint a person's water footprint is the volume of fresh water the individual uses directly and in the production of the goods and services that the person consumes.

Water table the top of the water-saturated part of a permeable rock. During periods of very high rainfall the water table may extend into the soil and possibly reach the surface of the ground.

Water-scarce area place where water supply falls below 1000 cubic metres per person a year.

Water-stressed area place where water supply is below 1700 cubic metres per person per year.

Youth dependency ratio the ratio of the number of people 0–14 to those 15–64 years of age.