**CONCEPT OF SUSTAINABLE EXISTENCE**

"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. “The concept of sustainable development can be interpreted in many different ways, but at its core is an approach to development that looks to balance different, and often competing, needs against an awareness of the environmental, social and economic limitations we face as a society. All too often, development is driven by one particular need, without fully considering the wider or future impacts. Sustainable development is about finding better ways of doing things, both for the future and the present. We might need to change the way we work and live now, but this does not mean our quality of life will be reduced.

Sustainable development is an approach to development that takes the finite resources of the Earth into consideration. This can mean many different things to different people, but it most commonly refers to the use of renewable energy resources and sustainable agriculture or forestry practices. It also entails the use of sustainable mineral use along with many other things. The idea is to create a system that is "sustainable", meaning one that can keep going indefinitely into the future.

Renewable energy sources like wind power and solar power are excellent examples of development strategies that are sustainable. Their sustainability is defined by their reliance upon infinitely available resources that are naturally occurring, constant and free to access. These factors mean that these resources will be indefinitely accessible by humans, which makes them sustainable resources.

Sustainable development does not always refer to environmental sustainability or other green topics. Sustainable development also needs to consider economic and social sustainability in order to fit within the parameters of sustainable development.

**IMPORTANCE OF SUSTAINABLE DEVELOPMENT**

It is no secret that people are living longer and that the global population is on the rise. In fact, the United Nations project that there will be more that 10 billion people living on the Earth by the year 2100. This explosion in population is perhaps one of the greatest reasons why sustainable development is so important.

**Protect Technological Resources**

The people coming into this world are coming into an increasingly technological age, where more people than ever are relying on technology for nearly every aspect of their lives. Of course, these technologies are not built out of thin air and good intentions. They require a significant array of minerals and other inputs simply to be manufactured. This doesn't account for the amount of resources required to develop them in the first place.

**Provide Basic Human Needs**

A rising population will also make use of the bare essentials of life such as food, water, and shelter. The provision of these essentials is based almost entirely around having an infrastructure that can sustain them for the long-term. If energy is continually developed on finite fossil fuels instead of sustainable options, the cost and environmental toll of supplying even basic needs can become staggering.

**Agricultural Necessity**

Agriculture will have to catch up with that growing population as well, figuring out ways to feed around 3 billion more people than it currently does. If the same unsustainable tilling, seeding, watering, spraying and harvesting methods are used into the future, they can become very costly as fossil fuel resources run out. [Sustainable agriculture](http://asi.ucdavis.edu/sarep/about/def) practices like crop rotation and effective seeding practices can help to promote high yields while protecting the integrity of the soil as it produces food for larger amounts of people

**Accommodate City Development**

As populations rise, cities will need to become larger to accommodate the influx of new residents. If these cities are developed non-sustainably, they will become more and more expensive to build and maintain over time. This is because the resources being used to develop the cities will be finite fossil fuels that will only get more expensive as they run out over time. The higher volume of these fuels required to produce energy for this larger population will also negatively influence the air of cities. If cities use sustainable development practices, they can conceivably make way for new housing and business developments indefinitely.

**Control Climate Change**

Climate change is another issue that can be at least partially remedied through sustainable development. Sustainable development practices would mandate a lower use of fossil fuels, which are not sustainable and which produce greenhouse gases. As the population rises, more people will be requiring more energy and will be putting an even greater strain on the world climate.

**Provide Financial Stability**

Sustainable development can also produce more [financially sustainable economies](http://sustainabledevelopment.un.org/index.php?menu=1224) throughout the world. Resource-poor economies will gain access to free and accessible energy through renewables while also having the opportunity to train workers for jobs that won't be displaced by the basic reality of finite resources. Jobs built around the "old" model of unsustainable development simply have no place in economies of the future. This has nothing to do with politics or ethics, but rather the bare mechanics of how economies [price out finite resources](http://www.motherjones.com/blue-marble/2013/04/charts-renewable-energy-fossil-fuels) over time. Industries built around reliance upon a resource that will not be accessible into the future will ultimately fail, leaving sustainable development as the only option moving forward.

**Sustain Biodiversity**

Biodiversity suffers through overconsumption and unsustainable development practices. Beyond the basic ethical quandary presented by this fact, there is the further concern that these species are a part of a food web that humans rely on. For example, if unsustainable agricultural practices are used concerning pesticides, bees and other pollinators could be negatively impacted. Without bees, at least [19 major food crops](http://www.accuweather.com/en/features/trend/19-crops-that-would-disappear/68073) would suffer and [nearly 50%](http://www.fastcodesign.com/1672866/this-is-what-our-grocery-shelves-would-look-like-without-bees) of the food in most grocery stores would be non-existent. In addition, unsustainable development pollutes the oceans, which are home to a significant amount of algae species that humans rely on for a significant amount of the [oxygen they breathe](http://www.ecology.com/2011/09/12/important-organism/).

**Ecological Balance**

[Ecological balance](http://www.borealforest.org/index.php?category=glossary&%20page=forestry_term&content=forestry_terms_de) has been defined as "a state of dynamic equilibrium within a community of organisms in which genetic, species and ecosystem diversity remain relatively stable, subject to gradual changes through natural succession." and "A stable balance in the numbers of each species in an ecosystem."

The most important point being that the natural balance in an ecosystem is maintained. This balance may be disturbed due to the introduction of new species, the sudden death of some species, natural hazards or man-made causes. In this field trip, we will explore how human population and development affects the ecological balance.

In a society, many jobs help keep it running smoothly. A doctor, mail carrier, garbage man, waiter, and farmer all play an important role in our society. Similar to a society, species in an ecosystem each have a role in keeping the ecosystem running smoothly. For example, predators keep the population of mice under control, insects pollinate flowers, and worms decompose leaf litter. All species are important and help keep the ecosystem balanced. **Ecological balance** is a term describing how ecosystems are organized in a state of stability where species coexist with other species and with their environment.

**Principles of Sustainable Development**

Many governments and individuals have pondered what sustainable development means beyond a simple one-sentence definition.

The ***Rio Declaration on Environment and* *Development***fleshes out the definition by listing 27 principles of sustainability.

**Principle 1**

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

**Principle 2**

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

**Principle 3**

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

**Principle 4**

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

**Principle 5**

All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

**Principle 6**

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

**Principle 7**

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities.

**Principle 8**

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

**Principle 9**

States should cooperate to strengthen endogenous capacity building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

**Principle 10**

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available.

**Principle 11**

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and development context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

**Principle 12**

States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international agreement.

**Principle 13**

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in a speedy and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

**Principle 14**

States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

**Principle 15**

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

**Principle 16**

National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

**Principle 17**

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

**Principle 18**

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

**Principle 19**

States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

**Principle 20**

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

**Principle 21**

The creativity, ideals and courage of the youth of the world should be mobilized to build a global partnership in order to achieve sustainable development and ensure a better future for all.

**Principle 22**

Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

**Principle 23**

The environment and natural resources of people under oppression, domination and occupation shall be protected.

**Principle 24**

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

**Principle 25**

Peace, development and environmental protection are interdependent and indivisible.

**Principle 26**

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

**Principle 27**

States and people shall cooperate in good faith and in a spirit of partnership in the fulfillment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

**Sustainable Development Goals**

|  |  |
| --- | --- |
|  | * End poverty in all its forms everywhere |
|  | * End hunger, achieve food security and improved nutrition and promote sustainable agriculture |
|  | * Ensure healthy lives and promote well-being for all at all ages |
|  | * Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all |
|  | * Achieve gender equality and empower all women and girls |
|  | * Ensure availability and sustainable management of water and sanitation for all |
|  | * Ensure access to affordable, reliable, sustainable and modern energy for all |
|  | * Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all |
|  | * Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation |
|  | * Reduce inequality within and among countries |
|  | * Make cities and human settlements inclusive, safe, resilient and sustainable |
|  | * Ensure sustainable consumption and production patterns |
|  | * Take urgent action to combat climate change and its impacts\* |
|  | * Conserve and sustainably use the oceans, seas and marine resources for sustainable development |
|  | * Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss |
|  | * Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels |
|  | * Strengthen the means of implementation and revitalize the global partnership for sustainable development.   **CHALLENGES OF SUSTAINABLE DEVELOPMENT**  There are a number of economic, social, technological, demographic and environ­mental megatrends underlying these challenges—a deeper globalization, persistent inequalities, demographic diversity and environmental degradation—to which a sustainable development agenda will have to respond.   * Development tends to simplify ecosystems and reduce their diversity of species. And the species once extinct, are not renewable. So sustainable development requires the conservation of plant and animal species and should requires that the adverse impact on the quality of air, water and other natural elements are minimized so as to sustain the ecosystems overall integrity. * The environmental impact of human activity and the strong sustainability challenge that it poses are tightly related to the megatrends identified above. To decom­pose their overall effects and shed more light on the many inter linkages, it is useful to draw on the impact identity, which relates demographic, socioeconomic and technologi­cal changes to their environmental impact. * There is also a strong scientific consensus that global warming is induced by hu­man behaviour, predominantly by fossil fuel use and, to a smaller extent, by changes in land use and deforestation. * The heterogeneity among countries exists side by side with persistent inequalities, of which income inequality is only one, if the most visible, dimension. While global income inequal­ity has receded slightly in recent years, inequalities within many countries have been rising. These trends are complex and driven by many, often structural and country-specific factors, and they are tightly linked to social, environmental and political inequalities. Nonetheless, globalization has important direct and indirect impacts on inequality. Left unaddressed, these inequalities threaten sustainable development prospects in multiple ways. * Owing to the convergence of mean incomes of developing and developed economies, global income inequality has been falling in recent years, albeit to a very small degree, and from a very high level. In the wake of the great global divergence in incomes that started with the industrial revolution in the nineteenth century, location rather than socioeconomic status or class is still responsible for the overwhelming share of overall income inequality. * In general, non renewable resources like fossil fuels and minerals, their use reduces the stock available for future generations.   **RESOURCE USE AND SUSTAINABILITY**  Resources are the backbone of every economy. In using resources and transforming them, capital stocks are built up which add to the wealth of present and future generations. However, the dimensions of our current resource use are such that the chances of future generations - and the developing countries - to have access to their fair share of scarce resources are endangered. Moreover, the consequences of our resource use in terms of impacts on the environment may induce serious damages that go beyond the carrying capacity of the environment. These effects risk being aggravated once the developing world has taken up growth and resource use similar to the industrialized countries. Natural resources occur naturally within environments that exist relatively undisturbed by humanity in a natural form. A natural resources often characterized by amounts of biodiversity and geo diversity existent in various ecosystems. E.g: fresh water, air, living organism such as a fish, or it may exist in an alternate form which must be processed to obtain the resources such as metal ores, oil and most forms of energy. Rainforest is an example of an undisturbed natural resource. Forest provides timber for humans, food and shelter for flora and the fauna. The nutrient cycle between organisms form food chains and biodiversity of species.  Waterfalls provide spring water for humans, animals and plants for survival and also habitat for marine organisms. The water current can be used to turn turbines for hydroelectric generation. Ocean is an example of a natural resource. Ocean waves can be used to generate wave power which is a renewable energy.  Ocean water is important for salt production and providing habitat for deep water fishes and other fauna and flora. There are biodiversity of marine species in the sea where nutrient cycles are common. Wind is a natural resource that can be used to generate electricity.  **Potential resources** – Potential resources are those that exist in a region and may be used in the future. For example, petroleum occurs with sedimentary rocks in various regions, but until the time it is actually drilled out and put into use, it remains a potential resource.  **Actual resources** – Actual resources are those that have been surveyed, their quantity and quality determined and are being used in present times. The development of an actual resource, such as wood processing depends upon the technology available and the cost involved.  **Renewable resources** can be replenished naturally. Some of these resources, like sunlight, air, wind, etc., are continuously available and their quantity is not noticeably affected by human consumption. Though many renewable resources do not have such a rapid recovery rate, these resources are susceptible to depletion by over-use.  **Reserve resources** – The part of an actual resource which can be developed profitably in the future is called a reserve resource. Stock resources are those that have been surveyed but cannot be used by organisms due to lack of technology. For example: hydrogen.  Access of water is a vital human need. Rivers are the reliable source of water. Reliable water supply is critical not only for survival and health but also for agriculture and health but also agriculture and industry. Globally crop irrigation accounts for73 percent of the demand for water, Industry for 21 percent, domestic use for 6 percent This proportion is varied from one region to another.  Biomass in the form of fuel wood is the dominant source of energy. Biomass fuels in the form of wood and animal dung are still widely used throughout the world. Biomass energy is obtained directly from the burning of plant matter. Charcoal is a form of biomass energy. Animal dung is a form of biomass energy in which plant matter is processed in the digestive tracts of animals before it is made available for use as a fuel. E.g.: Methane. Fossil fuels are renewable resources formed from fossil and from which energy can be made available for various purposes called fossil fuels. It includes Coal, Petroleum, Natural gas etc.  **Fossil fuels** are fuels formed by natural processes such as anaerobic decomposition of buried dead organisms. The age of the organisms and their resulting fossil fuels is typically millions of years, and sometimes exceeds 650 million years. Fossil fuels contain high percentages of carbon and include coal, petroleum, and natural gas. They range from volatile materials with low carbon: hydrogen ratios like methane, to liquid petroleum to nonvolatile materials composed of almost pure carbon, like [anthracite](http://en.wikipedia.org/wiki/Anthracite) coal. Methane can be found in hydrocarbon fields, alone, associated with oil, or in the form of methane clathrates.  The Energy Information Administration estimates that in 2007 the primary sources of energy consisted of petroleum 36.0%, coal 27.4%, natural gas 23.0%, amounting to an 86.4% share for fossil fuels in primary energy consumption in the world. Non-fossil sources in 2006 included hydroelectric 6.3%, nuclear 8.5%, and others (geothermal, solar, tidal, wind, wood, waste) amounting to 0.9%.World energy consumption was growing about 2.3% per year.  Strictly speaking, fossil fuels are a renewable resource. They are continually being formed via natural processes as plants and animals die and then decompose and become trapped beneath sediment. However, fossil fuels are generally considered to be non-renewable resources because they take millions of years to form, and known viable reserves are being depleted much faster than new ones are being made.  The use of fossil fuels raises serious environmental concerns. The burning of fossil fuels produces around 21.3 billion tons of carbon dioxide (CO2) per year, but it is estimated that natural processes can only absorb about half of that amount, so there is a net increase of 10.65 billion tones of atmospheric carbon dioxide per year (one ton of atmospheric carbon is equivalent to 44/12 or 3.7 tons of carbon dioxide). Carbon dioxide is one of the greenhouse gases that enhances radioactive forcing and contributes to global warming, causing the average surface temperature of the Earth to rise in response, which the vast majority of climate scientists agree will cause major adverse effects. A global movement towards the generation of renewable energy is therefore under way to help reduce global greenhouse gas emissions.  Non-renewable resources either form slowly or do not naturally form in the environment. Minerals are the most common resource included in this category. By the human perspective, resources are non-renewable when their rate of consumption exceeds the rate of replenishment/recovery. A good example of this are fossil fuels, which are in this category because their rate of formation is extremely slow (potentially millions of years), meaning they are considered non-renewable. Some resources actually naturally deplete in amount without human interference. Eg: Radio-active elements such as uranium, which naturally decay into heavy metals The mineral deposits are not distributed uniformly all over the surface of earth, they are concentrated only in certain parts. India is not self- sufficient in ores of metals requirement. Every year we are spending huge amounts for importing metals. At the very same time India occupies prominent position in the world market for the production of some minerals like Mg, Al, Mn, Thorium, Titanium, Mica, Iron etc. |