



Footprint

1. What do you mean by Ecological Footprint?

Mathis Wackernagel and William Rees at the University of British Columbia proposed this concept in 1992. Originally, they called the concept "appropriated carrying capacity". To make the idea more accessible, Rees came up with the term "ecological footprint", inspired by a computer technician.

Wackernagel and Rees (1996) published the book *Our Ecological Footprint: Reducing Human Impact on the Earth*.

The **Ecological Footprint** is a system of measurement that comprehensively compares human demand on nature against nature's capacity to regenerate. In other words, Ecological Footprint is the measure of how much biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates using prevailing technology and resource management practices.

The Ecological Footprint is measured in **global hectares** (used to measure the ecological footprint as well as biocapacity of entire Earth. When we understand both the terms, we can arrive at **ecological deficit**). Because trade is global, an individual or country's Footprint includes land or sea from all over the world.

There are two closely related concepts.

Humanity's Ecological Footprint

In terms of Ecological Footprint, One global hectare refers to average productive land and water an individual, population or entity requires producing all the resources it consumes.

When we say that world-average ecological footprint in 2007 was 2.7 global hectares per person (18.0 billion in total), this means that this was the individual person productive land and water required for producing all the resources he / she consumed.

The ecological footprint is a method promoted by the Global Footprint Network.

Global Footprint Network is an international non-profit organization founded in the year 2003. It is a key strategy has been to make available robust Ecological Footprint data.

Earth's biocapacity

In terms of Biocapacity, the Global Hectare refers to average biocapacity of any biologically productive areas on the planet. When we say, that the world-average biocapacity in 2007 was 1.8 global hectares per person (12 billion in total), this means that it is the amount of biologically productive land and water available per person on the planet.

In 2005 there were 13.4 billion hectares of biologically productive land and water available and 6.5 billion people on the planet. This is an average of 2.1 global hectares per person. Since the world's population is growing rapidly, this number is rapidly decreasing. In 2008, it became 1.8 Global Hectare Per person. In 2011, it may be even lesser than that.

Increasing population leads to decrease in the amount of biologically productive land and water available per person on the planet.





2. What does the Ecological Footprint measure?

The Ecological Footprint measures the amount of biologically productive land and water area an individual, a city, a country, a region, or all of humanity uses to produce the resources it consumes and to absorb the waste it generates with today's technology and resource management practices. Ecological Footprints can be calculated for individual people, groups of people (such as a nation), and activities (such as manufacturing a product). The Ecological Footprint of a person is calculated by considering all of the biological materials consumed, and all of the biological wastes generated, by that person in a given year. These materials and wastes each demand ecologically productive areas, such as cropland to grow potatoes, or forest to sequester fossil carbon dioxide emissions. All of these materials and wastes are then individually translated into an equivalent number of global hectares.

Calculation:

An amount of material consumed by that person (tons per year) is divided by the yield of the specific land or sea area (annual tons per hectare) from which it was harvested, or where its waste material was absorbed. The numbers of hectares that result from this calculation are then converted to global hectares using yield and equivalence factors. The sum of the global hectares needed to support the resource consumption and waste generation of the person gives that person's total Ecological Footprint.

3. How the Footprint Works?

Ecological Footprint accounting measures the demand on and supply of nature. **On the demand side**, the Ecological Footprint measures the ecological assets that a given population requires to produce the natural resources it consumes (including plant-based food and fibre products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions. **On the supply side**, a city, state or nation's bio capacity represents the productivity of its ecological assets (including



cropland, grazing land, forest land, fishing grounds, and built-up land). These areas, especially if left unharvested, can also absorb much of the waste we generate, especially our carbon emissions.

The Ecological Footprint tracks the use of six categories of productive surface areas: cropland, grazing land, fishing grounds, built-up land, forest area, and carbon demand on land.

4. What do you mean by Carbon Footprint?

In the modern world, the most relevant and disputed issues are the environmental problems and many institutions came up with different approaches to overcome the natural imbalance. Man-made climate change, or global warming, is caused by the release of certain types of gas into the atmosphere. The emissions of carbon resulted very serious consequences for humans and their environment. For that matter, Carbon Footprint and Carbon Offsetting have become relevant, especially for the understanding of gaseous emissions that led to the climate change.

When we compare various forms of energy generation: Nuclear, Hydro, Coal, Gas, Solar Cell, Peat and Wind generation technology, we find that Coal has the largest Carbon footprint among others. Coal is followed by Oil, Natural Gas and Geothermal Energy. The hydroelectric, wind, and nuclear power always produce the least CO₂ per kilowatt-hour than any other electricity sources.

The Kyoto Protocol recognizes 6 GHGs and Carbon footprint considers all six of the Kyoto Protocol greenhouse gases viz. Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydro fluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆).

5. What does the Carbon Footprint measure?

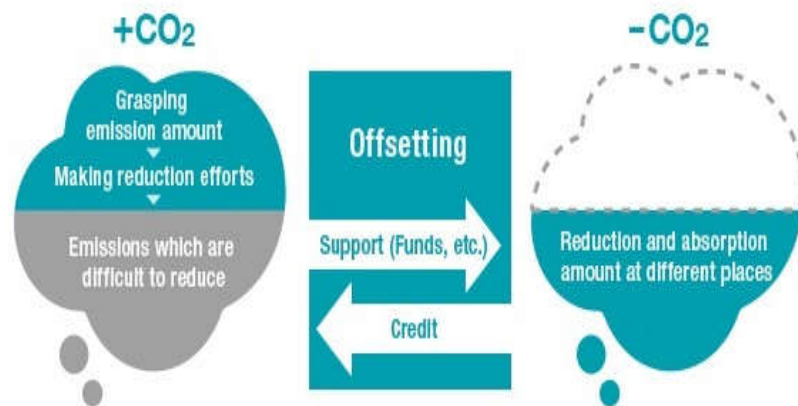
A carbon footprint is measured in **tons of carbon dioxide equivalent (tCO₂e)**. The carbon dioxide equivalent (CO₂e) allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO₂. CO₂e is calculated by multiplying the emissions of each of the six greenhouse gases by its 100 year global warming potential (GWP).

Carbon footprint can be defined as the total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide (CO₂).

There are two types of carbon foot printing which are given below:

Organisational: Emissions from all the activities across the organisation such as energy use, industrial processes and company vehicles.

Product: Emissions over the whole life of a product or service, from the extraction of raw material and manufacturing rights through to its use and final reuse, recycling or disposal.



6. How can be reduced carbon footprint?

1. By replacing a regular light bulb with a compact fluorescent lamp (CFL) which can save 150 pounds of carbon dioxide each year.
2. Use of public transport and carpool: We can reduce carbon emissions through walking, ridding bike, carpool and using public transport.
3. We can reduce carbon emissions by using recycled products and recycling materials.
4. Planting a tree is always a good idea. A single tree can absorb one ton of carbon dioxide over its lifetime.
5. By using certified energy efficient appliances and equipment will also reduce carbon footprint.
6. Encourage and support greenhouse-reducing practices in our community.



7. What is Carbon Offsetting?

Carbon Offsetting can be defined as the mitigation of carbon footprints through the development of alternative projects such as solar, wind, tidal energy or reforestation. The emission of greenhouse gasses is a global problem and carbon offsets work on the idea that any reduction in any area is worthwhile. It basically measures how much carbon dioxide (CO₂) we have produced just by going about our daily lives.

Offsetting carbon and obtaining credits for reduction of carbon emissions by adopting "flexible mechanisms: Under Kyoto Protocol, United Nations Framework Convention on Climate Change (UNFCCC) members is divided into two groups: Annex 1 countries include mainly the OECD and eastern European industrialized countries and the Non Annex-1 countries are the developing economic. Three emission trading based 'flexibility mechanisms' were adopted to help in minimizing the global economic cost of achieving the agreed emission reductions. They are namely International emission trading that would involve the transfer of the Assigned Amounts Units (AAU) among the Annex 1 countries. Joint Implementation (JI) involves project based activities undertaken between Annex 1 countries. Clean Development Mechanism (CDM) involves emission reduction projects undertaken in non Annex- 1 countries. For each tonne of CO₂ that an industry in the developing world saves by adopting cleaner technology or energy efficiency or shifting to non-conventional sources of energy generation, the United Nation's body on climate change gives a certificate called Certified Emission Reduction (CER) to the concerned industry. The company receiving the CER can sell the surplus credits (collected by surpassing the emission reduction targets) if any, to entities in the developed countries either immediately or through a future market at a price that is mutually agreed upon by both the parties involved in the deal. In the process the entities in the developed countries find it cheaper to buy "offsetting" certificates rather than achieving emission reductions in their own backyard.



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