

# The Ecological Footprint As a Tool for Awareness-raising on Individual and Collective Responsibility

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**The "ecological footprint" concept could be used to great advantage as an educational tool in the framework of communication and education actions around the concept of responsibility, with a view to becoming aware of our responsibility for the impact of our own lifestyle on the environment. It therefore carries significant potential for the development of a responsible attitude.**

Following is a short presentation of the concept (definition and applications) and a few ideas on the educational potential of the concept for an initiation to the concept of responsibility.

## What is an "ecological footprint"?

An "ecological footprint" is an environmental indicator, a tool for the analysis of the sustainability of a specific mode of natural-resource management. It is an indicator that can be used as a basis for scheduling and implementing policies: urban, regional, state, and global.

An "ecological footprint" is defined as the area, from an ecological point of view, needed to produce all resources that a person, a city, a state, or humankind as a whole consumes and to absorb all the concomitant waste produced, with the help of existing technology. [1] An "ecological footprint" is measured in global hectares.

To calculate an ecological footprint, it must be remembered that for the production and consumption activities in a given place, resources are used that come from various places of the world. In addition, the environmental impacts of the production / consumption will have repercussions on regions far from the specific place. For this reason, an "ecological footprint" is calculated as the sum of these areas, any place on earth.

The calculation can be made for all types of product, agricultural or industrial, such as cereals, cotton, wood, fossil fuels, etc. The analysis is based mainly on the data published by the United Nations and by the Intergovernmental Panel on Climate Change (IPCC).

The calculations sometimes take into account some very detailed elements, such as the level of the trophic chain at which the consumed fish are placed. Fish that are at the higher levels of the trophic chain consume a larger part of the primary production of the ocean, compared to those that are at lower levels. The ecological footprint of a given population for fish consumption is therefore calculated as an interrelationship between the consumed quantity and the trophic chain. Thus, if we consume a ton of cod, at level 4 of the trophic chain, we get a footprint 10 times greater than if we consume a ton of sardines, at level 3.

The data for the ecological footprint of a country refer to the consumption of resources per country for domestic consumption: imports are added and exports subtracted. The difference between the footprint of a country and its biological capacity (to which a margin should be added for the protection of biodiversity) constitutes the "ecological deficit" of the country. The countries (or regions) that are in deficit need to import the ecological capacity that they are lacking. Countries that have smaller footprints than their ecological capacity have an "ecological surplus." Usually, these countries use their remaining available area to produce export goods.

Analysis shows that a large number of developed country relies exclusively on the ecological productivity of land that is outside of their borders. Calculations that have been made for Holland show that to cover the country's consumption levels of food, forest and energy products in 1994, 14 to 15 times more land was needed than the country's area. Data gathered by the Dutch government show that Holland uses about 100,000 square kilometers of agricultural land, especially in the countries of the third world, for the production of food goods. Analysis of the ecological footprint (analysis in natural, not economic terms) shows that this "developed" economy causes enormous deficits in other regions of the planet.

Calculations of the "ecological footprints of nations" containing data for the whole of the planet were published for the first time in 1997, following a request from Earth Council, to be presented to the convention organized 5 years after the

Rio Conference of 1992. The calculations were made by the organization "Redefining Progress" in the United States, in collaboration with various researchers and foundations, as well as the Center for Sustainability Studies of the Universidad Anáhuac de Xalapa in Mexico. The ecological footprints of 146 countries was calculated, which includes about 100% of the world population. The latest updated survey for "the ecological footprints of nations" was published in November 2002. [2]

The ecologically productive area of the earth (land and sea) has been calculated at 11.4 billion hectares. The earth's population was 5.9 billion in 1999. Dividing these two numbers gives the result that the biological capacity of the planet per person in 1999 amounted to 1.9 hectares. Considering that 12% of the ecologically productive area of the planet should be left for use by other species, the available area for every individual, on a global level, is reduced from 1.9 to 1.7 hectares. This figure, 1.7 hectares, constitutes the reference for comparison of every country's ecological footprint.

However, this average level reflects the current situation and does not take into account the expected increase in world population. When the world population will have reached 10 billion in approximately 30 years, as expected, the available area for every individual will be reduced to 1.1 hectares.

According to the results of this study, the consumption of natural resources by humankind as a whole exceeds the reproduction capacity of the biosphere by about 20%. In other words, the biosphere needs one year and three months to renew what humankind consumes in one year. Humankind thus overexploits the earth's natural capital.

Calculations of the ecological footprints of nations only account for a very small fraction of the real impact of our activities on the earth, because so far we do not have enough data for various operating factors. For instance, the impacts of activities that destroy nature's renewal capacity systematically cannot be calculated, such as the use of substances and products for which the biosphere has a low absorption capacity (plutonium and other radioactive elements linked to the production of nuclear energy). Similarly, there is no way to calculate the impacts of processes that destroy the biosphere irreparably (deforestation, desertification, disappearance of species).

In addition, in the calculations of the organization Redefining Progress's study, the use of fresh water is not taken into account, nor are the impacts of solid, liquid and gas waste (with the exception of carbon dioxide). Thus, the numbers that are given are conservative and the impact of our activities on the earth is a lot greater.

Here are a few examples of calculations for the level of a country. In 1999, the ecological footprint of Sweden was 6.7 hectares per capita. This footprint is smaller than the biologically productive area of Sweden, which was 7.3 hectares. [3] Is Sweden a sustainable country? Its footprint is about three times greater than the 1.7 hectares available per inhabitant of the earth. If every individual lived at the average Swede's standard of living, the earth could not support the current population of the earth for long. Egypt has a footprint of 1.5 hectares, which is smaller than the 1.7 hectares available for every individual. Is Egypt a sustainable country? It cannot be admitted as such because it has a biologically productive area of 0.8 hectares, so it has a deficit of 0.7 hectares.

The ecological footprint of the United States is 9.7 hectares, while the available area is 5.3. The country thus has a deficit of 4.4 hectares. Papua New Guinea has a 1.4 hectare footprint and a biologically productive area of 14 hectares, so it has a "surplus" of 12.6 hectares.

### **What is the use of calculating an ecological footprint?**

First of all, calculations show that the minimal condition for the sustainability of the earth, as a whole, is that humankind's footprint should be lower than the global available biological capacity. However, the rising pace of economic development, at least in the poorest countries, is necessary for their socioeconomic sustainability. At the same time, any increase in the use of natural resources, at the global level, is not sustainable from an ecological point of view.

At the level of a country (a region, or a city), calculations of the ecological footprint show the level of deviation from the average biological capacity of the earth and from the biological capacity of the country itself. In case of deficit, these calculations show the level of effort that is needed to reduce the country's (region's, or city's) footprint on the earth. For instance, the consumption of fossil fuels covers more than half of the footprint of industrial countries. High use of renewable resources could decrease this footprint significantly. These calculations still constitute one more argument to underscore the search for autonomy and ecological balance within a region instead of seeking to increase interregional interrelations.

In parallel, these calculations can be used as a basis for the definition of strategies and policies: as an argument to institute taxes for activities that cause the greatest impacts (consumption of fossil fuels), to subsidize the use of renewable energy sources, as a basis for the calculation of taxes and subsidies, etc.

## Becoming aware of our own ecological footprint

Publicizing the results of the calculations of the ecological footprint of a city, a region, or a nation can raise interest in the local community for the question of the sustainability of its current lifestyle, as well as lead to a public debate on the social and economic parameters of this question. In schools, mini-research could be done on the ecological footprint of a township, a city, or a region on the basis of existing data (which in itself can become an educational project), or to try to establish indicators of the social and ecological debt of the countries of the North to the countries of the South.

Teachers and communications persons can find material on this subject on the Internet, where there are several Web sites that provide a popularized presentation of the concept and show how our daily habits constitute our footprint on the earth. Some of these Web sites have forms that make it possible to calculate our personal footprint by entering simple data, such as how many times we have used our washing machine in the week, how many times we have taken a shower or a bath, etc. [4]

Being able to account for our own ecological footprint makes it possible to understand that the impacts of our activities go beyond the narrow limits of our city, region, or country. Trade makes it possible to decrease the impacts on the local natural capital, but transfers the negative impacts of our overconsumption to distant regions and countries. Through these calculations, we become aware of the interdependence of our lifestyle and its environmental impacts on the rest of the planet. We become aware of our own responsibility, as individuals and as a social group.

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[1] Rees W., "Revisiting Carrying Capacity: Area-Based Indicators of Sustainability, Population and Environment", Journal of Interdisciplinary Studies, Volume 17, Number 3, January 1996, Human Sciences Press, Inc.

[2] Wackernagels M., C. Monfreda and D. Deumling, "Ecological Footprint of Nations. How Much Nature Do They Use? How Much Nature Do They Have?", Redefining Progress, Sustainability Issue Brief, November 2002 Update.

[3] Wackernagels M., op. cit.

[4]

► <http://www.ecovoyageurs.ca>

► <http://www.globalfootprints.org>

► <http://www.earthday.net>

► <http://www.redefiningprogress.org>

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