

# Chapter 11

## A Modern Approach to Sustainable Resource Management: Ecological Footprint

**Gökhan Tenikler**

*Dokuz Eylül University, Turkey*

**Murat Selim Selvi**

*Namık Kemal University, Turkey*

### ABSTRACT

*The starting point of this chapter is the weakening ability of natural resources to meet the growing and diversifying needs of mankind. This chapter aims to draw attention to the “Ecological Footprint” as a measurable concept of impact of the production and consumption activities on the natural environment. However, every country demands more resources than it has, and developed countries, with their production and consumption patterns, are becoming the primary actors of injustice in the distribution of resources. As seen in the data used in this study, from individuals to countries, ecological footprint is growing steadily, whereas biocapacity to meet the needs is shrinking steadily. By using statistical data demonstrating the ecological footprint and biocapacity changes and differentiation among the countries by years, this chapter clearly reveals the need for a sustainable resource management.*

### INTRODUCTION

All creatures including humans are part of nature and they meet their basic needs from nature. To assemble basic needs from nature is a natural reflex. However, the production and consumption patterns and habits differ among individuals,

among communities and even among countries and the problem of protection of resources becomes more important. Limited resources are under even more pressure every day with the increasing world population. Natural and man-made resources are threatened due to crowding of cities, especially to the detriment of the development of rural areas, the

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negative effects of technology on the environment, non-rational factors such as economic development initiatives and environmental pollution.

First remarkable reactions to humanity's destructive impacts on nature have emerged in the 19th century. George Perkins Marsh, an American diplomat, who is considered to be America's first environmentalist (<http://www.nps.gov/mabi/historyculture/gpmarsh2.htm>) and the pioneer to the sustainability concept, has pointed out the role of developments in America and Western Europe in deforestation. Timberlands have been destroyed for the sake of farming activities. Trees have been used as firewood. Deforestation has affected the climate and as a result there have been cases of scarcity and erosion (Toprak, 2012).

Environmental pollution due to excessive consumption and the gradual decrease of the amount of resources, is a serious threat in to meet current and future needs of the growing population. People are moving away from nature, meeting the basic requirements while at the same time not caring about how they meet their requirements. Living creatures, including especially the human being, have strong "effect" all over the world. This effect is a natural result of the relationship in the role between plants and animals. However, people, have exceeded the limits of the relation between natural environment and them. Here the result of the sum of the effects on the ecological environment as a result of production and consumption of the people, is called "ecological footprint".

In recent years, many models have been developed for calculating quantitative sustainability of resources. "Ecological footprint" is one of these models developed to measure the levels of individuals and society and its impact on the sustainability of the natural ecosystem. Ecological footprint approach has the purpose of measuring the current amount of pristine natural resources and productivity. It is a new calculation method and technique that provides solutions for the prevention of resource consumption unlimited.

## **Content of Ecological Footprint Concept**

There have been a number of previous similar approaches to the concept of ecological footprint. "Sustenance space of cities" which Mark Jefferson referred to the UK's urban geography on 1997 concept is one of them and is evaluated as the ecological footprint of the concept of the modern state (Moffatt, 1999). This concept told the story of the English industrial cities that were dependent on imports from other areas of the planet (Mcmanus & Haughton, 2006).

In 1965 Swedish academic Georg Borgstrom, who developed the "ghost acres"<sup>1</sup> concept is another similar approach to the ecological footprint. The concept was focused on "adequate nutrition for a growing Population" (Mcmanus & Haughton, 2006). In 1991, MacNeill and colleagues extended this approach to include other consumption concerns, and renamed the concept "shadow ecologies" (McManus, 2005).

In 1980, another concept is "phantom planet" used by Catton. The coiner of this term, William Catton points out, this extra capacity gives humanity the illusion of living on a larger planet and encourages human expansion beyond the regenerative capacity of the biosphere (Wackernagel & Monfreda, 2004).

The ecological footprint concept, has been provided in the literature at the beginning of the 90s by the Swiss national Mathis Wackernagel and Canadian ecological economist William E. Rees. Wackernagel and his doctoral thesis advisor Rees, have developed an ecological footprint approach in a joint study at the University of British Columbia in Canada. The starting point of this study is one of the basic concepts of animal biology actually "carrying capacity". They were also inspired by another study on carrying capacity, or more precisely the dynamics of economic growth on a resource constrained planet. (Amend et al., 2010)

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