

DOI: <http://doi.org/10.21698/simi.2021.ab16>

A REVIEW ON ENVIRONMENTAL INDICATORS FOR THE ASSESSMENT OF THE IMPACT OF ECONOMY ON ENVIRONMENT

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Keywords: *circular economy, environmental economy, sustainable development*

Introduction

The transition from linear economy models to circular bioeconomy, as envisaged by the most recent European policies, needs to be supported by a multiple fold approach with policies and regulatory papers on both economic, environmental and social domains. In this context, environmental policy is a coherent set of measures and means aimed at preserving the support capacity of natural systems. It needs to be based, among others, on extensive evaluation of environmental effects of the transition phase, projected in the entire value chain, starting from the primary production to industrial technological flows, logistics and marketing. It becomes therefore obvious that the evaluation of the efficiency of any economic activity must also include the determination of the impact it has on the environment and on society in general. Thus, by identifying and calculating environmental indicators it can be quantified the effects of the exploitation of natural resources and the impact on the environment and its quality. Based on the analysis of the statistical indicators taken into account, a series of adequate environmental policies may be implemented. The scientific literature reports on various categories of indexes, such as: Index of Sustainable Economic Well-being; Human Development Index; Environmental Sustainability Index; Environmental performance index; Global Green Economy Index; Ecological footprint; Carbon footprint; Water footprint; Index of Sustainability.

Materials and methods

This article is an overview of several environmental indicators that can be used to assess the environmental impact of economic activities, with a highlight of their definition, classification, methodologies for assessment and calculation.

Results and conclusions

Environmental Indicators are calculated in order to evaluate the fulfillment of the environmental objectives as being set by governmental rules, regulations and recommendations. In the same time, they represent a simple method to inform the

stakeholders, be there general public, policy makers, economic operators and NGO's on the state of the environment. Nevertheless, the indicators can be used as a quantitative diagnostic tool for the identification of changes and trends in the environment.

For example, *ecological footprint index* is used to assess the environmental impact generated by human demand for natural resources to meet human needs. It is related to the load capacity of the planet, meaning, the ability of the earth to regenerate the resources that human extract from the system. According to the Global Footprint Network, in 2017 the global ecological footprint was 2.2 hectares per human being for a biocapacity of 1.8 hectares. In fact, this indicator is more realistic at the country level, since some countries in the first world exceed it, such as Australia (9.3), the United States (8.2) or Japan (5). In contrast, countries under development, such as several South America countries have an ecological footprint below 1.9. For Romania's ecological footprint in 2017 was 3.4.

The *carbon footprint* is used to assess the impact of human activities on the environment (in CO₂ equivalent). It indicates the amount of greenhouse gases that a person, company, industry or city produces directly or indirectly. In 2018, Romania's carbon footprint measured in metric tons per capita was 3.84, compared with EU's average of 6.42, and 15.33 for Luxemburg, as measured by world bank.

Environmental Performance Index (EPI) is used to quantify the environmental performance of the different policies implemented by a country over a given period of time. EPI for Romania, as calculated in 2018 by Yale Center for Environmental Law & Policy, was 64.7 while for Denmark who own the highest EPI of the analyzed countries, was 82.5. It is common to think that the conservation and protection of the environment is reliant exclusively on the actions of policy and decision makers, NGO's and business environment. Although the actions of the three categories of stakeholders have a decisive implication, each citizens individual actions is also generating a great impact on several environmental issues such as recycling and climate change. These individual actions are activated from ecological balance awareness or environmental awareness. The intensity of human activity increases the pressure on the environment and its ecological balance, either through uncontrolled and sometimes excessive consumption of available resources, exhaustion of physical space, or through the disposal of waste and waste streams that environment cannot absorb in a natural process over short to medium periods of time.

Therefore, dissemination of environmental indexes values to all stakeholders is of great importance for triggering the appropriate behaviour towards environmental conservation and protection.

Acknowledgements. This paper has been financially supported within the project entitled: "Support Center for IWE research - innovation projects competitive in Horizon 2020", ID 107540. This project is co-financed by the European Regional Development Fund through Competitiveness Operational Programme 2014 - 2020.