AN APPROACH FOR THE APPLICATION OF THE ECOLOGICAL FOOTPRINT IN THE PHARMACEUTICAL INDUSTRY

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Abstract

The Ecological Footprint (EF) is a fashionable but also a controversial concept for measuring sustainability of regions, countries or even individual or communal lifestyles. A few approaches have been released recently for the application of the EF as an environmental indicator in certain industry sectors. In the pharmaceutical industry, monitoring environmental performance has become an essential process. In this paper we explored the applicability of the EF as an environmental indicator in order to examine the sustainability of the leading pharmaceutical company in Hungary.

Key words: Ecological Footprint, pharmaceutical industry, environmental performance

INTRODUCTION

The pharmaceutical industry employs 15,000 and gives work indirectly for further 30,000 people in Hungary. There are 89 manufacturers registered with the National Institute of Pharmacy. This sector contributes to the national GDP with more than 1.000 million EUR, which means a 1.35 % share (Káló Z., 2007). Pharmaceutical enterprises are often blamed for environmental pollution, however these companies were amongst the very first to recognise the importance of the Corporate Social Responsibility (CSR) model. Methods for monitoring environmental performance have been developed but their accuracy is always a questionable parameter open to criticism (Fiala N., 2008).

The term 'Ecological Footprint' (EF) was created by William E. Rees in 1992 (Rees W.E., 1992). In 1996, the improved concept of the EF was published in the book 'Our Ecological Footprint: Reducing human impact on Earth' (Rees W.E. and Wackernagel M., 1996). According to the authors, EF is defined as the amount of water and land area that the population in question would hypothetically need in order to satisfy its consumption needs and to absorb the generated wastes. Therefore, the aim of the EF is to provide a simple measure of sustainability. During the last

decade, the EF has become a widely applied tool for the demonstration of human impact on Earth (Shakir Hanna S.H. and Osborne-Lee I.W., 2011). Besides, a few attempts have been made to adapt the EF methodology to analyse the sustainability of industrial enterprises or sectors (Herva M. et al., 2008). In this paper, our purpose was to explore the applicability of the Ecological Footprint as an environmental indicator in the pharmaceutical industry.

MATERIAL AND METHOD

Estimation of the EF requires a sequence of calculation that will turn the original input values into space units, commonly hectares (ha). When examining the environmental performance of a pharmaceutical company, one must take into consideration all the relevant processes related to the firm's activity. In Fig 1, we give a brief explanation of these procedures.

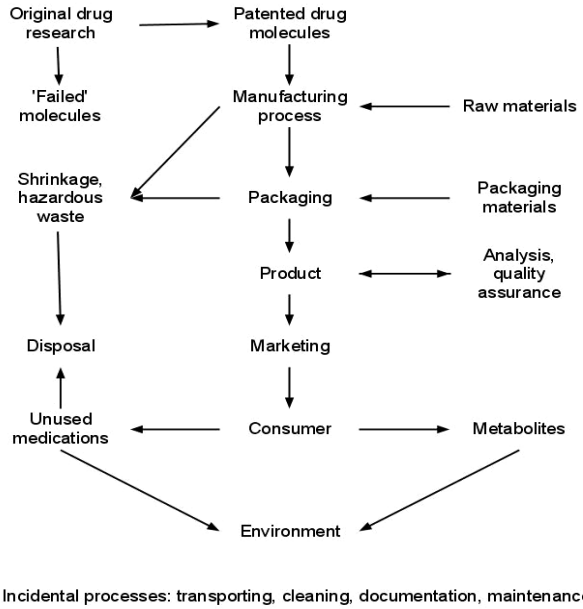

Fig. 1 Process flowsheet describing the pharmaceutical industry

As demonstrated in Fig. 1, the impact of pharmaceutical companies on the environment is considerably diverse. The methodology of the EF deals with the theoretically required built-up land, forest land, fishing ground, grazing land, cropland and the carbon footprint associated with the investigated activity. The final value of the EF of production is calculated as: EF=(P/YN)*YF*EQF, where P is the amount of a product harvested or carbon dioxide emitted, YN is the national average yield for P (or its carbon

uptake capacity), and YF and EQF are the yield factor and equivalence factor, respectively, for the land use type in question (Ecological Footprint Atlas, 2010).

We have chosen the Sustainability Report of the Sanofi-aventis/Chinoin (SaC) group to investigate. SaC is the leader pharmaceutical company of the Hungarian market. The Sustainability Report is relevant for the period 2008 to 2009 and was presented according to the Global Reporting Initiative (GRI) protocol G3.

RESULTS AND DISCUSSIONS

According to the Sustainability Report, the total annual carbon dioxide emission of the company is 70.000 tonnes, including emission related to production, transportation, energy consumption and waste incineration.

For the calculation of the carbon footprint (CF) we can take into consideration the recommendations of Siche et al. to simplify the previously quoted equation: the annual carbon uptake of the Earth is 0.2 t/ha, as stated by the Intergovernmental Panel on Climate Change. Therefore, CF=70,000 t/0.2 t/ha=350,000 ha. This equation refers to the global impact of the emitted carbon dioxide instead of the domestic effects, since greenhouse gases influence the climate globally (Siche R. et al., 2010; IPCC, 1996).

Table 1.

Features of the EF components related to the sustainability of pharmaceutical companies (and values in the case of SaC)

Ecological footprint components	Value	Relevance	Measurability
Carbon footprint	350,000 ha	conciderable	fair
Built-up land	n/a	moderate	exact
Forest	n/a	moderate	estimation
Cropland	n/a	moderate	estimation
Pasture	n/a	marginal/indirect	indirect
Fisheries	n/a	marginal/indirect	indirect

Main features of the EF components related to the present case and the pharmaceutical companies in general are summarized in Table 1. We categorized the components according to our experience with the SaC Sustainability Report and to the process flowsheet (Fig 1). As shown in Table 1, carbon footprint is a fairly measurable and the most important component of the EF. Build-up land can easily and exactly be calculated or measured but its magnitude is a few hectares only.

Calculation of other components of the Ecological Footprint requires specific data, e.g. the harvested forestry or crop products supporting the activity of the company. In the case of pharmaceutical companies, this might mean e.g. the paper and herbal raw materials used up. In the Sustainability Report of SaC no pertinent data regarding these special fields were found, that is, the value of the total EF could not be calculated.

CONCLUSIONS

The EF methodology is quite impressive when the goal is to illustrate the unsustainable lifestyle of developed countries and its impact on the planet. On the other hand, difficulties come when one tries to estimate the EF of a company or sector with complex processes. Only a very limited number of standards are available even in databases dealing with the EF. This may be the reason why carbon footprint has become a separate measure of sustainability in the industrial sectors. However, carbon footprint usually means only the amount of the emitted carbon-dioxide, not the area required for the uptake.

In the case of SaC, we have found data for global carbon footprint calculation but no way to estimate the remaining components of the total EF. Even if we had had proper data, the final value of the EF would have been calculated for only a subjectively defined range of processes described in Fig. 1. Other methods may turn out to be more accurate for estimating sustainability in the pharmaceutical or other industrial sectors.

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