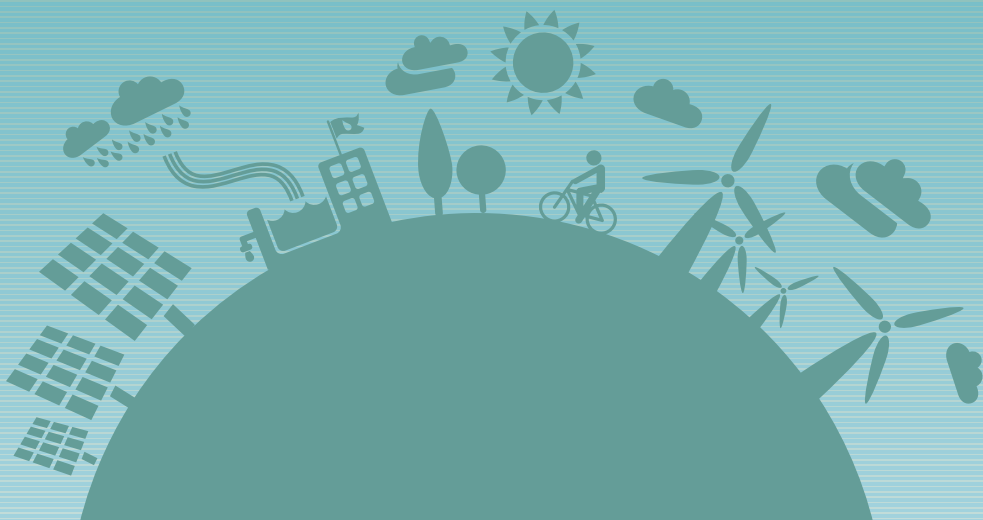


Milan Ščasný
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KAROLINUM

Environmentally Significant Behaviour in the Czech Republic: Energy, Food and Transportation



ENVIRONMENTALLY SIGNIFICANT BEHAVIOUR IN THE CZECH REPUBLIC: ENERGY, FOOD AND TRANSPORTATION

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Chapter 1:

Environmentally Significant Behaviour

Since the early 1970s, when the first studies on environmental behaviour (Arbuthnot & Lingg, 1975; Kinnear, Taylor, & Ahmed, 1974; Rickson, 1972) were published, many terms for behaviour related to the environment have emerged. In order to give some examples, we can mention several terms: green behaviour, pro-environmental or pro-ecological behaviour, environmentally significant behaviour, environmentally conscious behaviour, environmentally friendly behaviour, environmentally responsible behaviour, environmentally relevant behaviour, ecological behaviour, or environmental behaviour. The same terms were used in similar or different meanings and often were not properly defined, leading sometimes to confusion.

Based on common usage, it is possible to identify two types of terms. First, there are terms for behaviour with positive environmental effects (mostly reduction of environmental pressures), such as proenvironmental behaviour, environmentally friendly behaviour and environmentally responsible behaviour (Allen & Ferrand, 1999; Milfont, Duckitt, & Cameron, 2006; Oreg & Katz-Gerro, 2006). Second, several terms describe behaviour with important environmental effects both positive and negative, such as environmental behaviour and environmentally relevant behaviour (Grob, 1995; Harland, Staats, & Wilke, 1999; Poortinga, Steg, & Vlek, 2004).

An interesting contribution to conceptualization of behaviour related to the environment was made by Stern (2000) who suggested the term of “environmentally significant behaviour” that can be defined in two ways. First, it can be defined by its impact, “the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere”. Second, it can be also defined from the actor’s

standpoint as a behaviour that is undertaken with the intention to change the environment. The author finds both definitions to be important for research, albeit for different purposes. The impact-oriented definition is essential for identifying behaviours that “can make a large difference to the environment” (Stern, 2000, p. 408) and is crucial in order to make research useful. The intent-oriented definition is needed for understanding and changing the behaviours.

In this book, we elaborate on the impact-oriented definition of environmentally significant behaviour (Stern, 2000). However, the application of this definition of environmentally significant raises some issues that need to be tackled. In the following part of this chapter, these issues are discussed and our approach to them is explained.

Scope of examined behaviours

The first issue is the differing range of scope of examined behaviours in empirical studies of environmentally significant behaviours. Gatersleben, Steg and Vlek (2002) pointed out that two basic streams of empirical studies can be distinguished. The first category of studies focuses on one specific behaviour, such as the purchasing of organic food. Other scientists develop scales that comprehend different behaviours (e.g., Allen & Ferrand, 1999; Diekmann & Preisendörfer, 2003; Grob, 1995; Kaiser, 1998; Kaiser, Wölfling, & Fuhrer, 1999; Karp, 1996; McKenzie-Mohr, Nemiroff, Beers, & Desmarais, 1995; Milfont, Duckitt, & Cameron, 2006; Nordlund & Garvill, 2002; Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998; Schultz et al., 2005). These scales combine different behaviours, such as preferring paper bags to plastic ones, preferring showering to taking a bath. By means of statistical techniques, such as factor analysis and reliability analysis, researchers try to develop one or more scales of proenvironmental behaviour (Gatersleben, Steg, & Vlek, 2002).

In this book, we target several specific types of behaviour that fall into only one category of environmentally significant behaviour: to examine the category of consumer behaviour in relation to its environmental effects. Consumer behaviour can be defined as activities that people undertake when obtaining, consuming, and disposing of products and services (Blackwell, Miniard, & Engel, 2001, p. 6). Stern (2000) used the term private-sphere behaviours for a similar category of environmentally significant behaviour and empirically

distinguished it from other types of behaviours, namely environmental activism, non-activist behaviours in the public sphere, and other environmentally significant behaviours.

There are plenty of reasons for tackling the issue of consumer behaviour. First, although the growth of global population is a factor that increases pressures, “it is consumption and production patterns in developed countries, with developing countries catching up rapidly that are the key drivers of global environmental problems” (EEA, 2010, p. 6). In most countries, household consumption is responsible for more than 60% of the life cycle impacts of final consumption (United Nations Environment Program [UNEP], 2010). Second, changes in consumption behaviour are needed to complement technological developments as targeting consumption can tackle issues that production-focused and technology-focused policies cannot. Environmental benefits stemming from technical efficiency are partially or completely offset by consequential increases in consumption that are enabled by lower costs of production and/or use, which implies that more money can be spent on other/more goods and services, the so called rebound effect (Hertwich, 2008). Global environmental pressures that are experienced directly overseas but result from European consumption are not covered by current European production-related policies. These pressures can be directly reduced by affecting demand for specific types of imported goods (EEA, 2010).

Measurement of behaviours

The second issue is measurement of the performance of certain behaviour. In empirical studies, environmentally significant behaviour is measured via self-reported behaviour, other-reported behaviour, such as observation, or aggregate measures of the environmental outcomes of behaviours, such as meter readings (Chao & Lam, 2009; Gatersleben, Steg, & Vlek, 2002). However, most studies rely on self-reports in response to questionnaire items (Gatersleben, Steg, & Vlek, 2002), meaning that respondents are asked to report directly on their own behaviours (Lavrakas, 2008). Self-reported measures assume that people are able and willing to accurately answer direct questions about their behaviours (Stangor, 2011). The use of self-reported measures may lead to inaccurate reports of actual behaviour due to conscious or unconscious response biases, such as social desirability. However, many

studies show that the discrepancy between self-reported behaviour and actual behaviour is not systematic (for review see Gatersleben, Steg, & Vlek, 2002). Further, the studies that explored the effect of social desirability on reported environmental behaviour found that this effect is low or even non-existent (for review see Milfont, 2008). Finally, self-reported measures are relatively easy to construct and administer and allow the gathering of a lot of information in a short period of time (Stangor, 2011) and at lower costs. Therefore, we rely in this book on self-reported behaviours.

Moreover, there are other factors (not only response biases) that could result in discrepancies between reported behaviours and environmental impacts of these behaviours. Olsen (1981) specified several of such factors. One of the factors is related to the way the scales of proenvironmental behaviour are usually constructed. Respondents reporting many small conservation actions often receive a relatively high score on an action index, even though such actions may only have a marginal environmental impact. The weak point of some studies is that the choice of indicators of environmentally significant behaviour is based on the personal judgments of researchers. In order to measure behaviour more precisely, Grob (1995) for example, used a scale developed with the technical advice of experts in the Swiss and Cantonal Office of Environment.

Further, Olsen (1981) argued that researchers sum behaviours reported by respondents into an index, without taking into account the differences in their environmental impact; therefore this index may be a very imprecise indicator of environmentally significant behaviour. For these reasons, Poortinga, Steg and Vlek (2004) and Gatersleben, Steg and Vlek (2002) focused on household energy use measured by a scale developed on the basis of environmental science principles. These attempts are worth noting in order to examine the impact-oriented definition of environmentally significant behaviour. On the other hand, measuring households' home and transport energy use based on average annual energy use related to the possession or use of a few household goods is rather insufficient as an instrument for examining factors influencing behaviour defined by the impact on the environment.

In respect of the above mentioned measurement problems, instead of the construction of one scale of environmentally significant behaviour we develop one scale for each specific behaviour, such as the scale of cutting down on heating and air conditioning. In order to examine behaviours that significantly influence environmental quality (Steg & Vlek, 2009), we

use, as Steg and Vlek (2009) suggests, the results of environmental impact assessments that have been developed by environmental scientists. Based on these results, household consumption categories that contribute to pressures and environmental impacts to a larger extent are identified in following part of this chapter (see Figure 1.1 and Figure 1.2) and environmental effects of selected behaviours are discussed in detail in the corresponding chapters of this book.

Environmental impacts of individual behaviour or consumption categories

Third, the term “impact” has been also properly defined in the driver-pressure-state-impact-response framework (DPSIR), which has been adapted with some changes by many international organizations (Berge, Beck, Larssen, Moussiopoulos, & Pulles, 1997; EEA, 1999; UNEP, 1999, 2007). According to the DPSIR framework, Driving forces are social, demographic and economic developments brought to bear through changes in production and consumption which then put Pressure on the environment. As a consequence, the State of the environment changes, such as securing adequate conditions for health, resources availability and biodiversity. These changes have Impacts on human health, ecosystems and materials, which may evoke a societal Response that target the Driving forces, or the State or Impacts (EEA, 1999).

Although the use of the term “environmental impact” by Stern (2000) is in accordance with the DPSIR framework and refers to State and trends (see Figure 1.1), the link between individual behaviour, pressures and states is usually very complex, and often not even known. Probably for this reason, the few studies that seek to explain environmentally significant behaviour using the impact-oriented definition (Gatersleben et al., 2002; Poortinga, Steg, & Vlek, 2004) rely in fact on the drivers (defined in accordance with the DPSIR framework of UNEP 2007) that are associated with this behaviour (such as energy use). Although it seems to be quite difficult to find evidence on environmental impacts of individual behaviour, there are several studies available for industrialized countries on products and consumption categories that have the greatest impacts across their life cycle. Still, most of the studies focus on energy or greenhouse gas emissions and only a few studies include a wider range of environmental pressures (UNEP, 2010).

Direct and indirect consequences of behaviours

The fourth issue related to application of the impact-oriented definition of environmentally significant behaviour is decision whether to take into account only direct or also indirect consequences of one's behaviour. Direct pressures arise during the consumption of goods and services, such as emissions to air from motorised individual transport and energy sources used by households for heating etc. (EEA, 2011). Indirect pressures induced by consumption are all pressures generated along the whole production chains of goods (EEA, 2011). For example, direct energy use comprises the natural gas, electricity, heat, solid and motor fuels used directly by households. "Indirect energy use is the amount of energy that is used by the relevant production sector to produce and deliver goods (e.g., food) or services (e.g., public transport) to consumers" (Gatersleben et al., 2002, p. 340).

In order to illustrate the effect of consumption on the environment we applied the DPSIR framework to private (household) consumption. Figure 1.1 shows concrete environmental pressures and impacts of household consumption. Further, we report percentages of the total environmental pressures and impacts of the household consumption categories that contribute to environmental pressures and impacts to large extent (see Figure 1.1). However, the links between environmental impacts and human well-being are complex and sometimes difficult to measure (UNEP, 2010) and therefore we rely on general statements about impacts of environmental change on human well-being. Although there are available studies on health impacts due to environmental pressures, these studies do not address the health impacts of behaviour and life styles. In general, climate change, primary and secondary aerosols that result in respiratory problems seem to be the three most significant determinants of human health impacts (including potential human health impacts) (UNEP, 2010).

Further, we present empirical evidence on the household consumption categories that contribute to global pressures to the largest extent. As can be seen in Figure 1.2, household consumption categories with the highest share are housing, water, electricity, gas and other fuels, transport, and food. Figure 1.2 shows the proportion of these categories in total global pressures caused by household consumption in 9 EU countries (Austria, Czech Republic, Denmark, France, Germany, Italy, the Netherlands, Portugal, and Sweden). The pressures induced by household consumption comprise direct and indirect pressures. Both

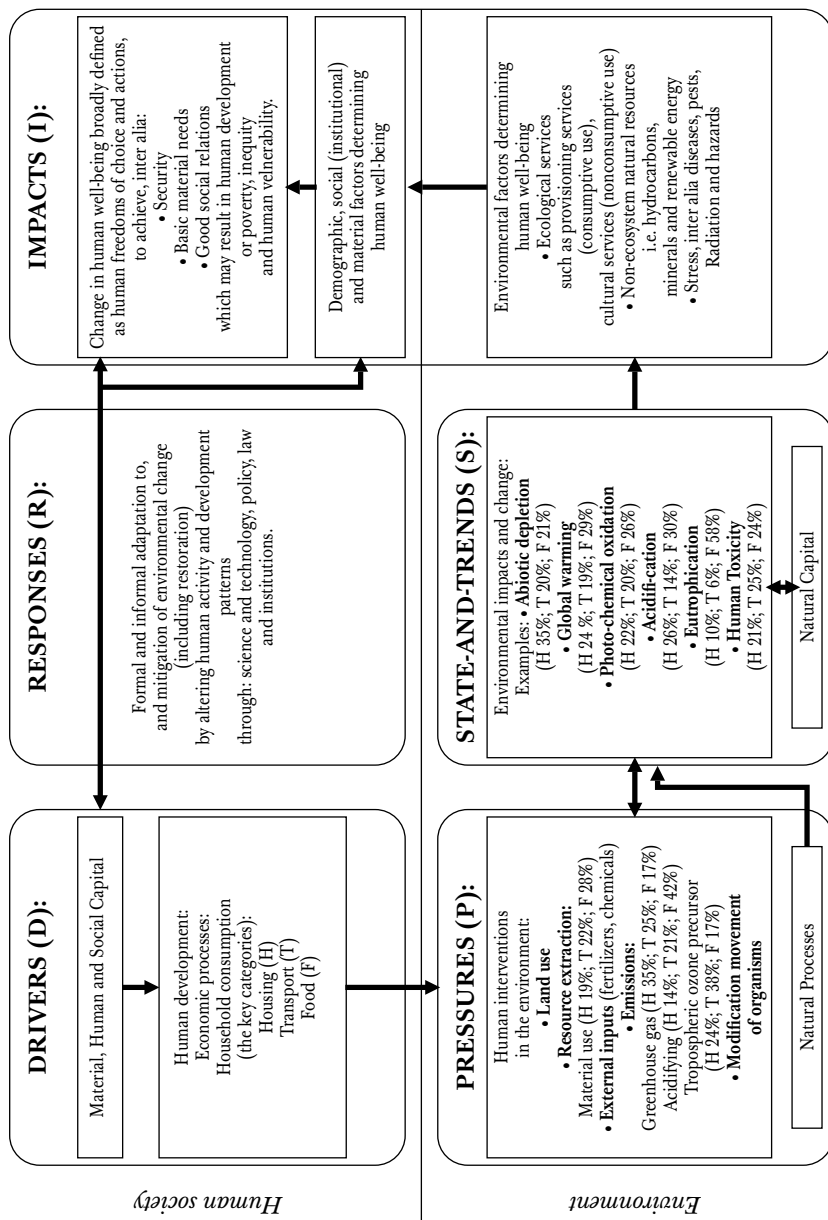
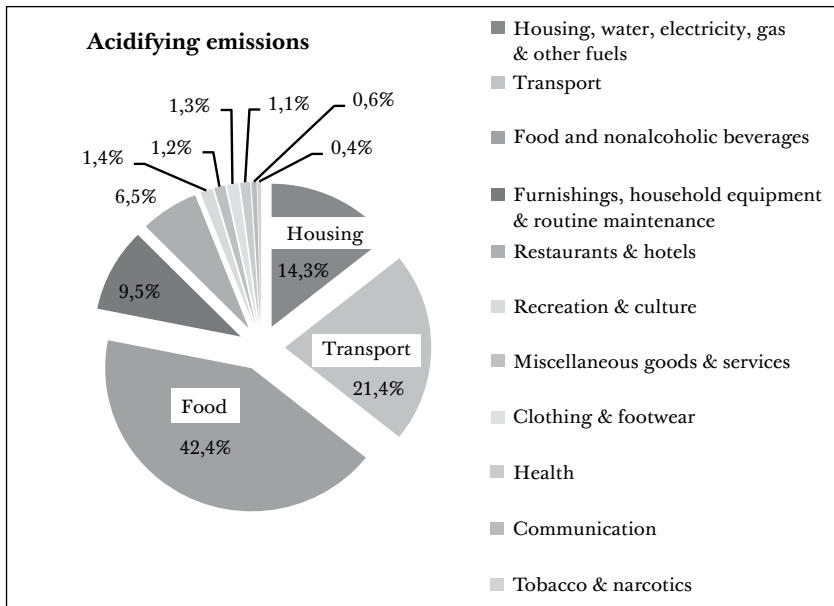
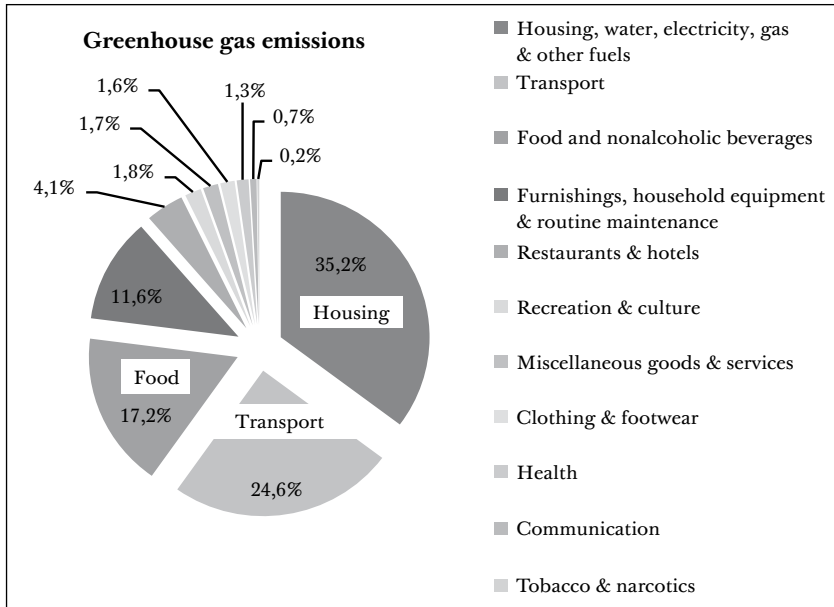


Figure 1.1 DPSIR framework applied to private (household) consumption
 Source: Figure elaborated from UNEP (2007), data on environmental pressures (EEA, 2011) and environmental impacts (Huppel et al., 2006).



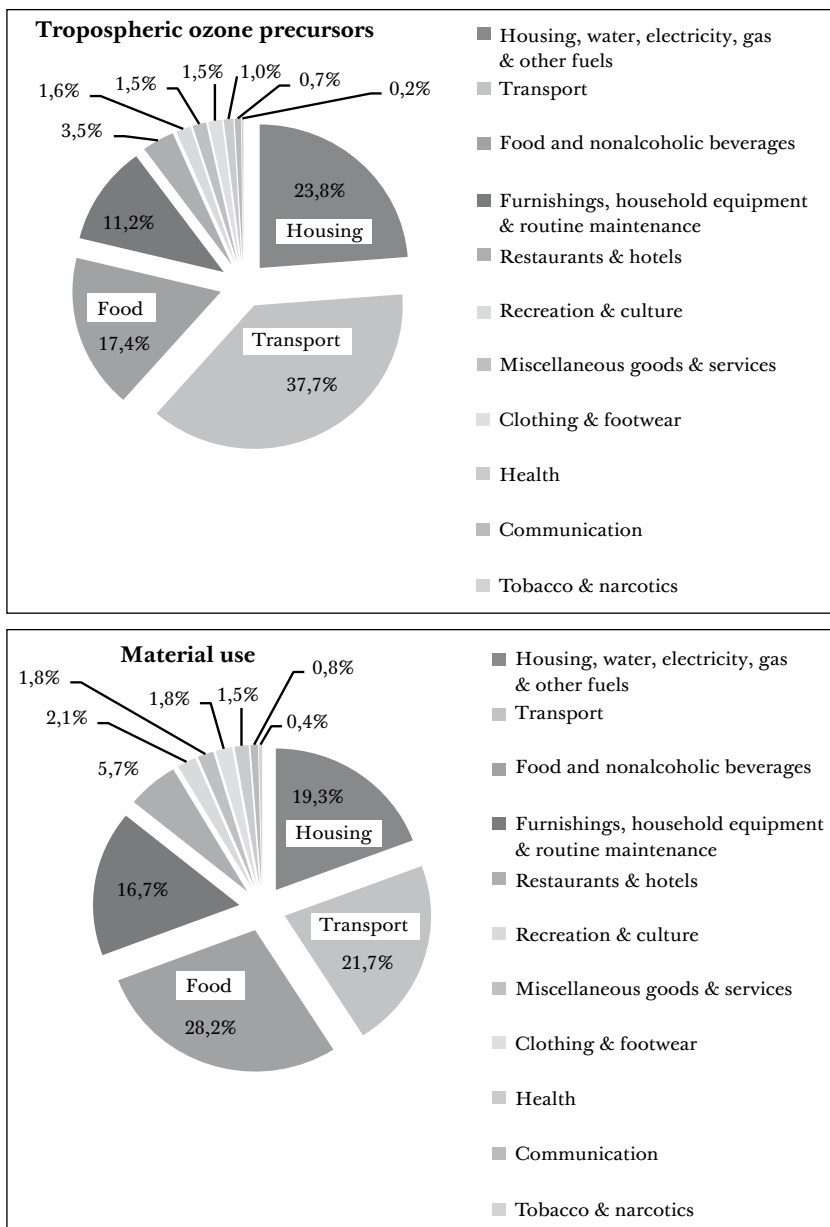
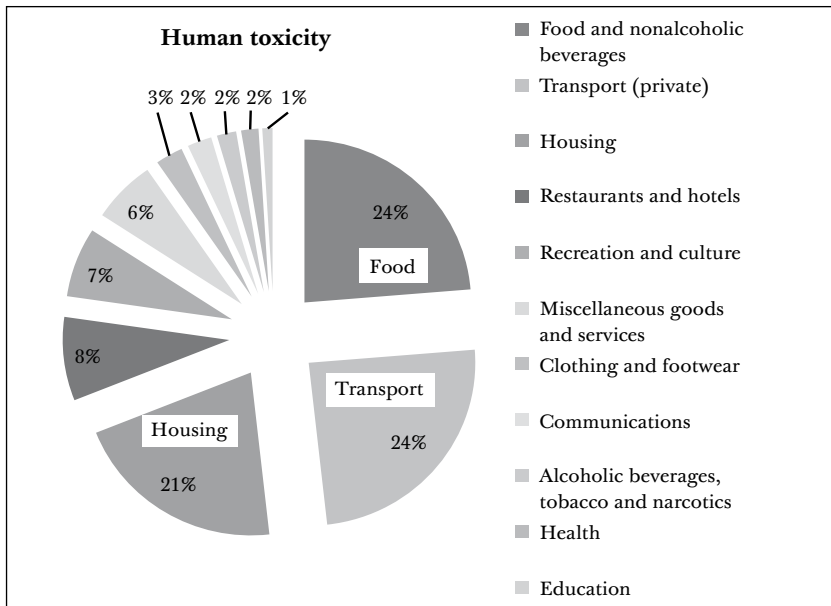
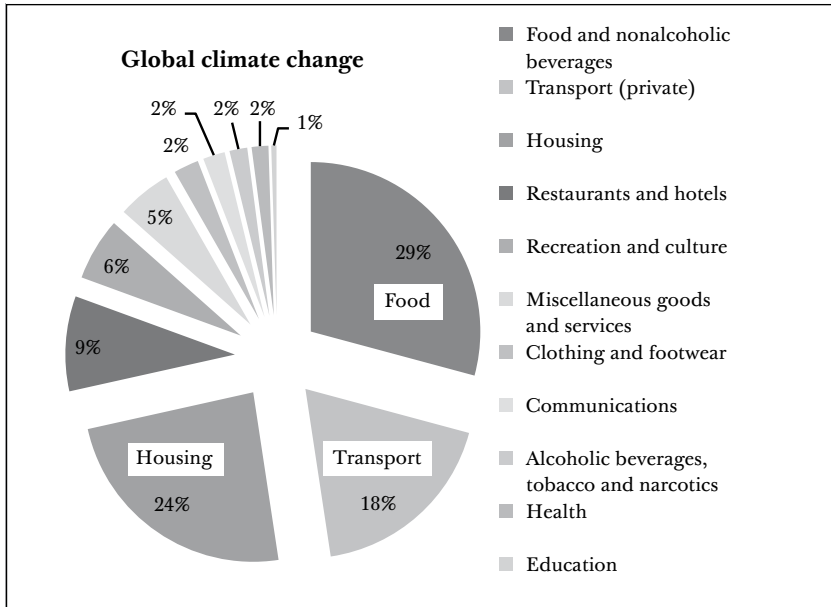


Figure 1.2 Direct and indirect global pressures caused by private (household) consumption distributed by consumption (COICOP) category in selected EU Member States, 2005
Source: EEA (2011) (modified by the authors)



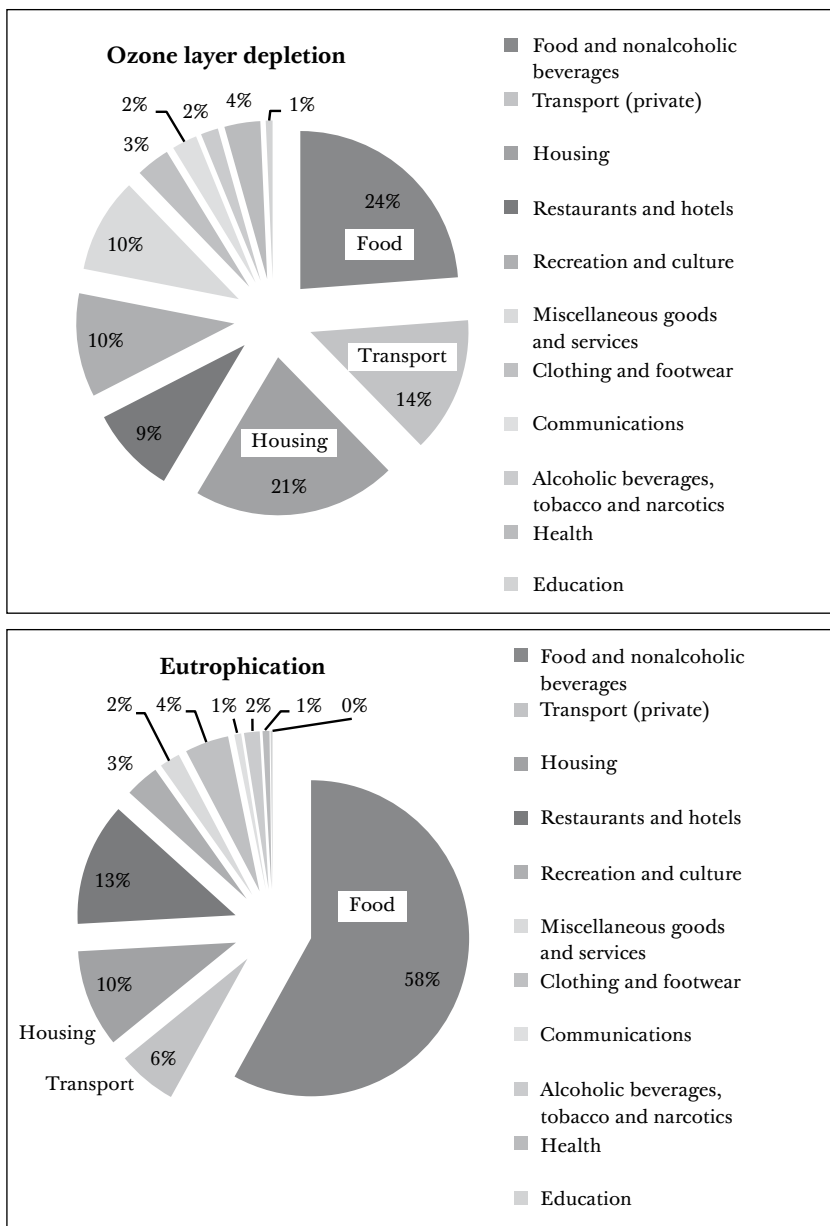


Figure 1.3 Environmental impacts of household consumption distributed by consumption domains in the EU25 (Environmental scores (%) for 12 aggregate consumption domains)
Source: Figure created by the authors from data in Huppel et al. (2006).

the pressures of goods produced domestically and imported goods were included and four environmental pressures were analysed – greenhouse gas emissions; acidification emissions; tropospheric ozone precursors and material consumption (EEA, 2011).

Food and non-alcoholic beverages, private transport and housing (including water, electricity, gas, other fuels, furnishings, household equipment, and routine house maintenance) are also the largest contributing consumption domains to most of the environmental impacts by consumption in the 25 European countries (Huppel et al., 2006). The impact categories that are covered by this study are abiotic depletion, global climate change, ozone layer depletion, human toxicity, ecotoxicity, photochemical oxidation, acidification, and eutrophication. This study presents the resulting scores on the impact categories “as a percentage of the European (EU25) total score in the impact category, that is, in normalized form” (Huppel et al., 2006, p. 133). In order to graphically present the resulting scores on the selected impact categories, we created Figure 1.3 from the data reported in this study. Overall, results are quite similar for all environmental impact categories. However, there are exceptions concerning transport and food domain. While transport has a high score on human toxicity, food is responsible for a large share of eutrophication (Huppel et al., 2006) (see Figure 1.3).

In conclusion, studies targeting industrialized countries indicate that housing, mobility, food and electrical appliances typically represent over 70% of the household consumption impacts (UNEP, 2010). Also according to Tukker and Jansen (2006), housing, transport, and food are the three main policy priorities which are the cause of for 70% of the environmental impacts in most categories, although only 55% of the final expenditure are spent on them in the 25 EU countries. Thus, this book is focused on transport (propellant consumption and passenger car ownership) and behaviours related to energy consumption (one-time efficiency retrofits, curtailments), and food consumption (organic food buying behaviour).

Chapter 2:

Factors of Consumption Behaviour and Their Policy Relevance

The preceding Chapter 1 has pointed to the environmental significance of consumption behaviour. The main aim of this chapter is to explain to the reader the limitations of our approach in terms of practical lessons to be learned from this book, but also why we think that this book can still serve a practical purpose in spite of these limitations.

As has been outlined in the previous chapter, this book focuses on three broad types of domestic consumption behaviour that together are responsible for the bulk of households' environmental impacts: consumption of energies in households, consumption of food, and transportation. As a matter of fact, the three classes of consumption behaviour are very different and could be further subdivided into distinct behavioural categories. Consequently, models that are used in the empirical literature to capture in simplified form the relationships between diverse factors and consumption activities (for their overview see, e.g., Jackson et al., 2005) are usually not used across the full range of consumption activities but rather in one specific area where their application seems to be most appropriate.

The focus of the present book is not so much to explain as to describe consumption behaviour. This book specifically aims to describe the socio-economic and demographic factors that segment the population with respect to consumption behaviours addressed in this book. As explained in the section below, socio-economic and demographic factors are relatively more distant precursors of consumption behaviour. We try to justify the focus of the present book on how the consumer population is segmented along socio-economic and demographic lines in the concluding section of this chapter.

What are the determinants of consumption behaviour?

As already noted, consumption behaviour is influenced by many factors that may even be specific to certain types of consumption. Monetary factors such as available income or the cost of a particular commodity certainly play a role but the empirical literature shows that other factors may be even more important. On the other hand, socio-demographic factors are frequently found to affect behaviour indirectly and their influence on consumption behaviour is usually mediated by more proximal variables. Let us now look more in detail at the specific consumption behaviours addressed in this book and their determinants as found in the empirical literature.

Energy consumption and energy conservation

Energy consumption and energy conservation are two broad topics addressed in Chapter 3 (demand for energy), Chapter 4 (efficiency investments) and Chapter 5 (energy saving curtailments) of this book. Models that are used to explain energy consumption and energy conservation are usually very complex (cf. Black et al., 1985). The main difference between energy consumption and energy conservation with regard to their determinants is that energy consumption is usually very closely related to the socio-demographic structure of the household, while energy conservation is affected by socio-psychological factors (Abrahambse and Steg, 2009). The reason for this difference probably lies in the fact that demand for energy is derived demand which reflects the preferences of individuals only indirectly (through their preferences for services generated by energy-consuming appliances), while conservation actions are usually motivated.

Besides sociodemographics (see Halvorsen and Larsen, 2001), energy consumption is also sensitive to energy prices and disposable income (see our thorough discussion of price and income elasticities in Chapter 3 of this book) as well as some macro-factors such as cultural standards (e.g., convenient indoor temperature – see Krström, 2006), availability of energy and particularly heating-energy resources (see Brůha and Ščasný, 2006), and, quite obviously, climatic conditions (Mensur, Mendelsohn and Morrison, 2008).

Clearly energy conservation is linked to perceived energy consumption (Black et al., 1985): people make efforts to save energy that they would otherwise consume. However, as already mentioned, energy conservation is distinct from energy consumption in that internal motivation plays more important role here. Nonetheless, internal motivation is not the only