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Decomposition analysis of Dutch beverage packaging waste
An analysis of material efficient innovations

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Abstract

Decreasing the amount of waste that can be allocated to packaging has been prominent on the political agenda in the Netherlands for two decades. In this period, both policy and innovations have influenced the way products are packed and how the resulting waste is managed. The aim of this study is to gain more insight in how individual material management options have led to a change in the amount of final waste in the Netherlands in the period 1986–1999. For this purpose, we use a so-called decomposition analysis, which is widely used in energy studies, and apply this to the case of beverage packaging waste. The analysis shows a decomposition of the final waste in four different packaging materials (carton, glass, metal and plastic) and creates insight in the effects of (1) the change in product consumption, (2) the material substitution, (3) the change in packaging size, (4) the lighter packaging concepts, (5) the product re-use and (6) the material recycling. The main conclusion is that in the period 1986–1999, the largest reductions in final waste production were realized with product re-use and material recycling.

Keywords: Decomposition analysis; Material efficient innovations; Beverage packaging; Waste reduction

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1. Introduction

Since the end of the 1970s packaging and packaging waste is perceived as an important environmental topic. In the Netherlands, more than 300 companies voluntarily signed an agreement with the government to reduce the amount of packaging material and to stimulate recycling. These appointments were laid down in 'Convenant Verpakkingen I' in 1991. In 1994 the directive 'Packaging and Packaging Waste' was drawn up by the European Union. This directive had to be implemented by each member of the EU. The members are able to decide how they want to realize the objectives of the directive. As a consequence, the directive is implemented differently in the various member EU states (SVM-PACT, 2002). In the Netherlands, the implementation of the directive has taken place by means of a ministerial regulation: 'Packaging and Packaging Waste'. Waste prevention and recycling are key elements of the Dutch waste policy (OECD, 1998). The regulation requires the efficient use of 65% of all packaging introduced on the market before 30th of June 2001. Besides, it states the opportunity to accomplish a voluntary agreement between government and packaging industry to reach the regulation goals if this has (financial) benefits. The result was 'Convenant Verpakkingen II' signed on 15 December 1997 (VROM, June 2001).

During the years, several innovations have taken place. Some causing less, others causing more packaging waste. In Table 1, the objectives and results of Convenant Verpakkingen II are represented. According to this table, we can conclude that the central objective to limit the amount of final (landfilled and/or incinerated) packaging waste at a maximum of 940 kiloton is realized. Also, the objective concerning prevention is realized. Whereas, the objective for material recycling is not realized. This becomes clear when the results for each type of material are considered. The results for plastic and metal are near the intended results, but paper/cardboard and glass are clearly behind. Several aspects of the objectives of Convenant Verpakkingen II will be discussed. The prevention objective, for example, does not concern an absolute prevention of 10% in 2001 compared to 1986, because it is

Table 1
Objectives and results of Dutch Packaging Convenant II, for the period 1998–2001 (Commissie Verpakkingen, 2002; SVM-PACT, 2002)

Objectives for 2001	Results 1998	Results 1999	Results 2000	Results 2001
Final waste max. 940 kiloton	987 kiloton	924 kiloton	834 kiloton	924 kiloton
10% prevention	22%	23%	29%	27%
65% material recycling	61%	64%	65%	61%
Recycling per material				
85% Paper/cardboard[a]	70%	71%	71%	66%
90% Glass	79%	80%	80%	78%
80% Metal	79%	78%	78%	78%
27% Plastic[b]	14%	18%	23%	24%

[a] It concerns all paper/cardboard; also non-packaging. Both categories, packaging as well as non-packaging, have a target of 85% for material recycling. The target for beverage cartons is 15% material recycling. Stichting Hedra has send a letter of intent to the Minister to collect as much cartons as necessary to meet this target (VROM, 1997).

[b] There is a complementary exertion obligation of 8% material re-use, besides this obligation of 27% material re-use.