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## Title

NUTRITION ECOLOGICAL ASSESSMENT OF PROCESSED FOODS

## Keywords

sustainability  
transdisciplinarity  
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assessment

## Short Summary

In this study a method for the nutrition ecological assessment of processed foods was developed. Nutrition ecological assessment means that the impact of processed foods and their industrial processing on health, environment, society and economy were evaluated. The method is based on a model for a nutrition ecological sensible food from which criteria and indicators were deducted.

Studies on sustainability performance of enterprises mostly focus on one of the three dimensions of sustainability (environment, society or economy). In contrast, the goal of this study is to consider four dimensions (the three dimensions of sustainability and health) simultaneously and equally.

## Introduction

Recently the market for highly processed foods and ready-to-eat meals has grown rapidly, both for organic and conventional products. Background for this development is (among others) the demographic change in society: the employment-rate of women, especially of mothers, has increased in the last years. Simultaneously consumers have become more and more interested on information on healthy foods in general as well on the environmental, social or economical



effects of food and food processing. While much research has been conducted on health aspects, little is known about the impact of food processing on environment, society and economy and even less about the simultaneous effect of all these dimensions. Also, most of the studies on the sustainability performance of enterprises focus on a single dimension of sustainability (mainly environment, see Kolk 2004). There is limited information on how enterprises, especially enterprises of the food chain, transfer the complete approach of sustainability into practice.

This reflects the traditional and dominant epistemological approach to science and also to nutrition science. This reductionist approach of studying single aspects or a combination of few aspects may lead to formally correct assessments but still provides a very restricted and biased view of reality.

## Nutrition ecology

Nutrition ecology is quite a new research area. To consider the multilayeredness and interrelatedness of nutrition and nutrition-related problems, the concept of nutrition ecology incorporates the four basic dimensions health, environment, society, and economy (Figure 1). These dimensions are addressed simultaneously and coequally. Each dimension includes a large number of areas encompassing the natural and cultural conditions of human life (Hoffmann 2004).

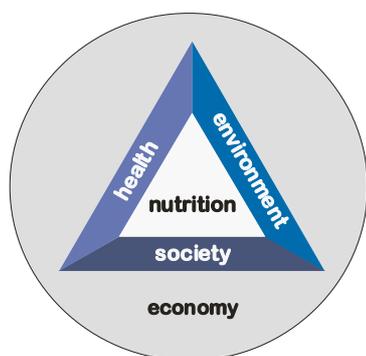


Figure 1. The four dimensions of nutrition

Research in the field of nutrition ecology is problem-oriented. The approach of nutrition ecology allows dealing with nutrition-related problems that are in the area of tension between science, the general public, and politics. Transdisciplinarity with its characteristics of integrating different disciplines (e.g. of basic and applied research) as well as actors in practice and working without disciplinary interests and methods (Brand 2000) is a suitable research approach for nutrition-related problems and for developing concepts for acting.

## Nutrition ecology and sustainability



Nutrition ecology is based on the same normative values as the concept of sustainability: meeting the needs of the present generation without compromising the needs of future generations (Brundtland 1987). Consequently, nutrition ecology research and sustainability research both have a normative, integrative and participatory approach, are multidimensional and demand a transdisciplinary research approach. As nutrition ecology focuses on nutrition-related problems the dimension health is considered in the same line as the dimensions environment, society and economy.

## Nutrition ecological assessment of highly processed foods

### Aims

In this study the approach of nutrition ecology and sustainability were applied to develop a method for the nutrition ecological assessment of processed foods with focus on the industrial processing of these food items. The first step towards this aim was to develop a model for a nutrition ecological sensible food. The second step was to deduct criteria and indicators from this model.

### Method

The study was designed as a transdisciplinary research project. The model for a nutrition ecological sensible food is based on an extensive involvement of representatives of different stakeholders along the food supply chain: Expert interviews with 22 representatives of organic and conventional food industry and two group discussions with representatives of farmers and consumers were conducted.

From this model criteria and indicators were deducted for the assessment of processed foods and their industrial processing in the dimensions health, environment, society and economy. A single criterion is represented by different sub-criteria and these mostly by more than one indicator.

The assessment of the environmental, social and economical impact mainly focuses on the industrial processing rather than on the products themselves. In all dimensions there are criteria to assess the long-term performance of the foods and their industrial processing.

To evaluate the performance of the criteria and indicators they were applied to three processed foods replacing a meal from conventional and organic companies.

### Results

Figure 2 demonstrates the four dimensions of nutrition and a selection of the criteria and subcriteria for the nutrition ecological assessment of processed foods.

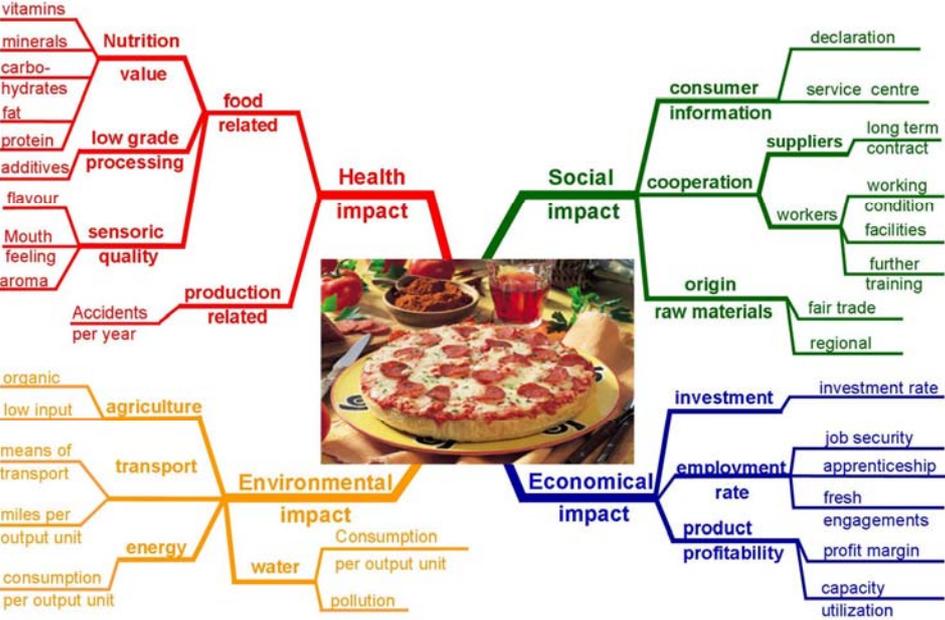


Figure 2. Dimensions, criteria and indicators for the nutrition ecological assessment of processed foods

For the dimension health there is a distinction between the health impact of the product and the health impact of its industrial processing. Criteria for assessing the health impact of the product are among others food composition, sensory quality of the product, food safety, quality of the raw material and additives.

One example for assessing the health impact of the processing is its impact on the workers, an according indicator the average number of accidents per year and worker.

The environmental impact is assessed by the criteria like packaging, transport, primary energy use, pollution of water and air, origin of agricultural raw material. An example for an indicator for the origin of agricultural raw material is the proportion of products from organic agriculture or proportion of products from regional agriculture or companies.

The criteria for measuring the social impact are separated in social impact of the product on consumers like declaration and product information, social impact of the processing along the food chain like long-term contracts for suppliers and the social impact on workers and employers. Examples for indicators for the social

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impact of the social impact on workers and employers are further training possibilities and social benefits like access to fitness studios.

The economic impact is assessed by criteria like investment, employment rate and product profitability. Examples for indicators for product profitability are capacity utilization and profit margin.

## Perspectives

The model of a nutrition ecological sensible processed food offers a base for the simultaneous and equal assessment of different dimensions of nutrition. It reflects the normative values of sustainability, represents a participatory process and integrates scientific and practical knowledge.

The assessment of processed foods with criteria and indicators based on this model allows enterprises as well as consumer or decision makers to achieve valuable information on potentials and weaknesses of the sustainability performance of processed foods, on conflicts of interests or on side effects of actions. It also allows depicting more comprehensively the impact of foods and of planned actions.

By evaluating the model as well as the criteria and indicators the method to assess processed foods may be improved in an iterative process.

## Acknowledgement

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