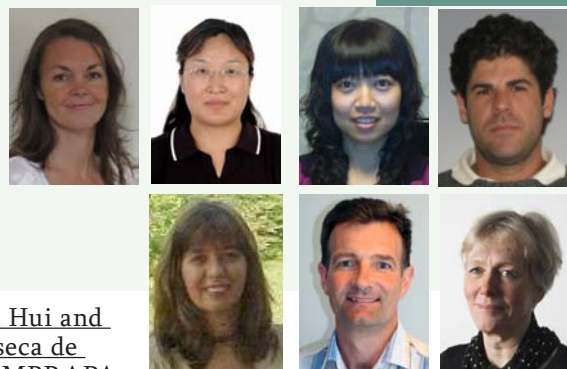


Transport is important in the carbon footprint of imported organic plant products



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Farmers or consumers may ask about the environmental implications when choosing organic products from afar. Is it sustainable to buy organic products from China or South America?

How much does the long-distance transport affect the climate and carbon footprint of the products? And does the organic production in the countries concerned benefit the environment? These are some of the questions raised – and the point of departure for a recently finalized PhD study.



Organic apples from Argentina, organic peppers from Israel and organic orange juice from Brazil – these are some of the products you will find in your local supermarket when you are considering what to buy. The organic products on shelf are not always produced in Denmark but imported from all over the world. Actually, the import

of organic products to Denmark has seen a four to five fold increase since 2003. The increased import of organic products is not only visible in the supermarket. Many organic farmers also feed their cattle with organic soybean from China or Italy.

Import of organic products to Denmark

Organic soybeans from China and organic orange

juice from Brazil was chosen as relevant case studies from the many organic products imported to Denmark. Figure 1 illustrates examples of organic products imported to Denmark.

China has seen a rapid development in the organic sector – and represents along with Brazil the country that has the largest export from Asia and South America, respectively. The

extraordinary growth in the major organic markets in Europe and North America offers promising export opportunities – and China and Brazil represents some of the countries with the largest areas grown organically.

Life cycle assessment of soybean and orange juice

We used Life Cycle Assessment (LCA) as a tool

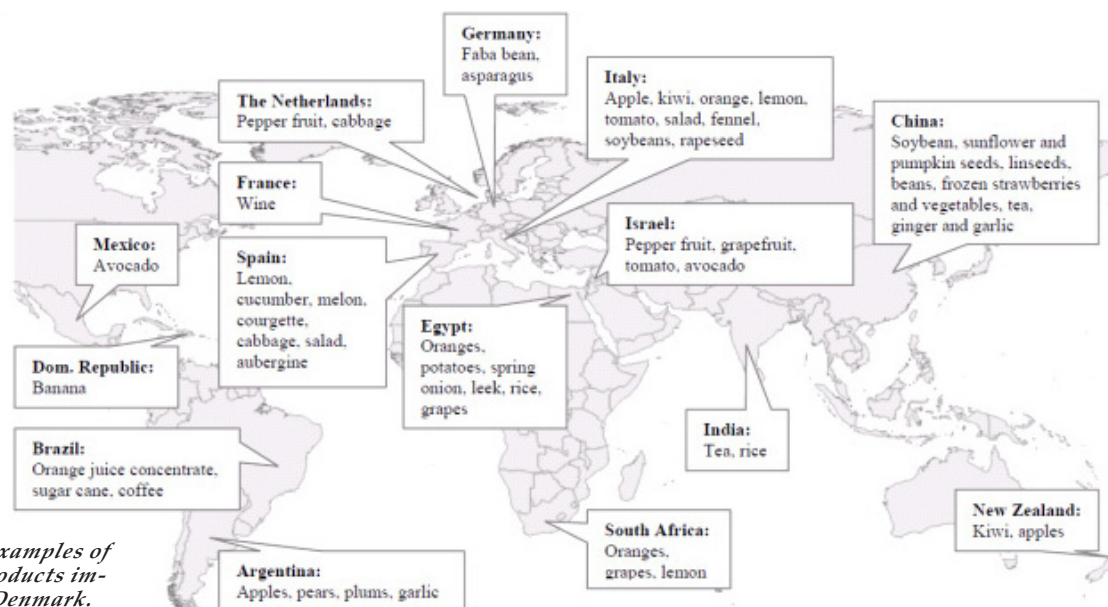


Figure 1. Examples of organic products imported to Denmark.



to calculate e.g. how much transport matters, with regard to climate and environment, when organic soybeans are imported from China to Denmark.

Life Cycle Assessment include all the relevant environmental impacts from the product chain – from the production of fertilizer and other inputs, over the emissions at the farm to the product ends up in the supermarket. Finally, the environmental impact per kg product can be calculated, which for global warming is expressed in kg CO₂ equivalents per kg soybeans or orange juice. CO₂

equivalents are the sum of the climate gasses CO₂, N₂O and CH₄ where the gasses are weighted according to their effect on the climate in the atmosphere in relation to CO₂.

We surveyed a number of organic and conventional farms in Jilin, China (soybeans) and São Paulo, Brazil (oranges) and followed the product chains to Denmark. Inputs, outputs and emissions were inventoried on the farms and in the processing and transport. Details can be found in publications on OrganicEprints (Knudsen et al. (2010), <http://orgprints.org/17327/> & Knudsen et

al. (2011), <http://orgprints.org/18417/>).

Transport is responsible for half of the carbon footprint value

The results show that half of the carbon footprint from organic soybean from China was related to transport (see Figure 2). Approximately the same was found for the orange juice from Brazil.

This finding is in agreement with English studies which showed that transport accounted for approx. 40-70% of the carbon footprint of imported plant products transported by ship and/or truck. For meat products though, transport does not

account for a great share (max. 20%) since the total carbon footprint of meat are much higher than for plant products. However, the absolute contribution from transport is of course the same. Figure 3 provides an overview of examples of greenhouse gas contributions from transport when agricultural products are imported from different countries in the world – counted as kg CO₂ equivalents per kg product.

Interestingly, the results show that the same or even more CO₂ is emitted when products are transported by truck from Southern Europe

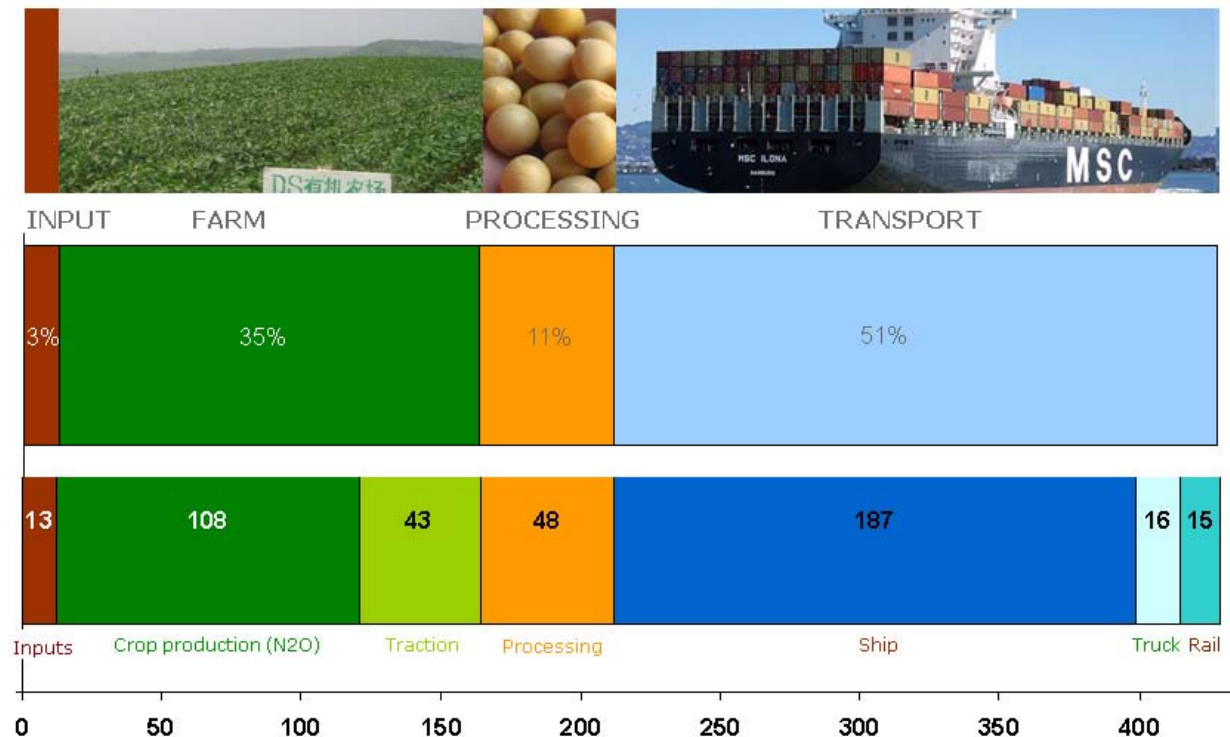


Figure 2. Greenhouse gas emissions from 1 ton of soybeans produced in the Jilin Province in China and transported to the harbor of Aarhus in Denmark (global warming potential (kg CO₂ eq. ton soybeans per year).



the farming systems, the results show that the organic soybean produced in the case study area in China has a lower environmental impact than the conventional with regard to greenhouse gas emissions, nutrient enrichment and use of non-renewable energy.

Brazilian orange juice

The results from the Brazilian orange juice are not as straight forward. In the study, small-scale organic and conventional orange plantations were compared. The main differences were the absence of pesticides and higher crop diversity at the small-scale organic farms. Furthermore, the small-scale organic farms were compared to the large-scale organic orange plantations.

The results showed that the large-scale organic plantations had higher greenhouse gas emissions, copper use (towards plant diseases), nutrient enrichment and

as compared to transport from South America by ship. In the total carbon footprint of the product, this contribution from transport should be added to the greenhouse gas emis-

sions from the production. The emissions from the agricultural production can vary depending on whether it is outdoor production with few inputs or production in heated greenhouses,

which has a much higher climate impact.

Difference between organic and conventional soybean

When we focus on the environmental effects of

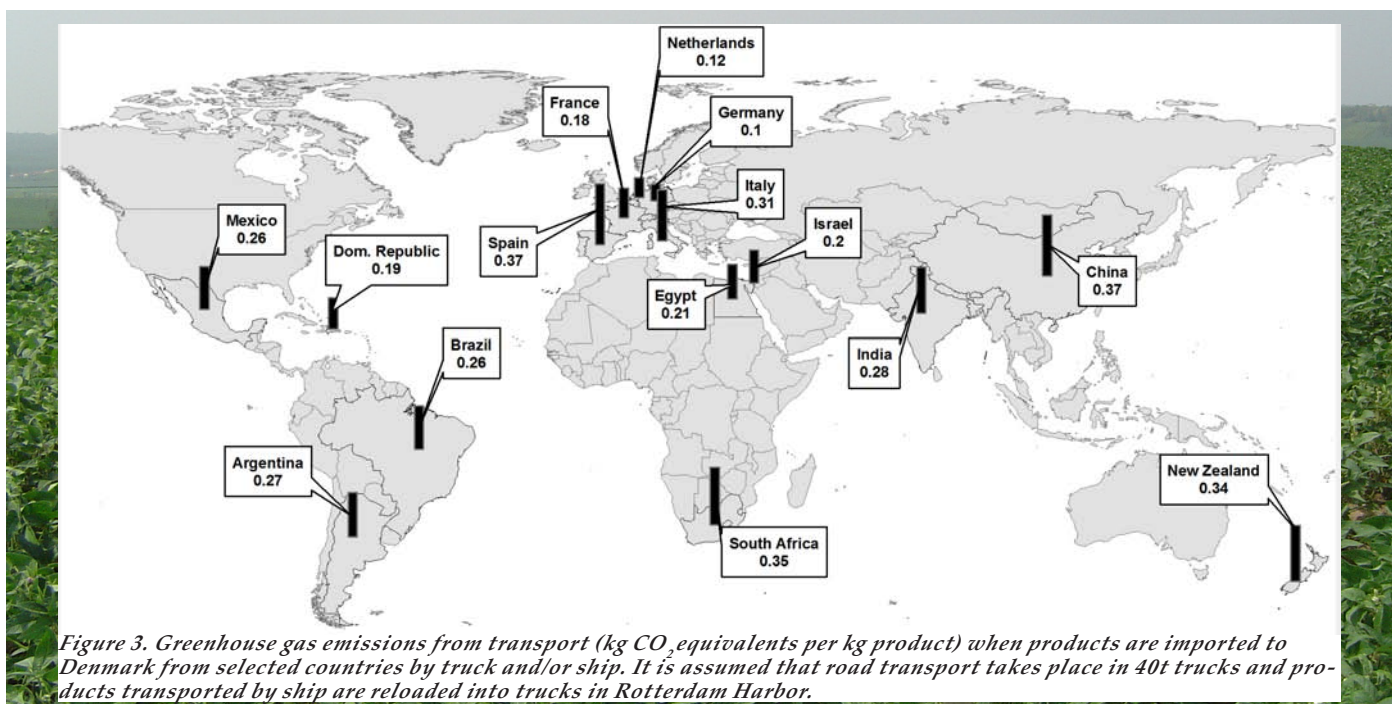


Figure 3. Greenhouse gas emissions from transport (kg CO₂ equivalents per kg product) when products are imported to Denmark from selected countries by truck and/or ship. It is assumed that road transport takes place in 40t trucks and products transported by ship are reloaded into trucks in Rotterdam Harbor.

lower crop diversity per hectare compared to the small-scale organic farms. The same tendency was visible when the environmental impacts were accounted per kg orange.

These observations suggest that there is a need for more focus on how different certified organic productions comply with the organic ideas and principles. There might also be a need for scrutinizing the organic regulations with regard to regulating especially greenhouse gas emissions and biodiversity. In the carbon footprint calculations of agricultural products, soil carbon

changes have not traditionally been included in many previous studies.

Results of this study indicate that the difference in carbon footprints of organic and conventional plant products was widened when soil carbon changes was included in the calculations.

Remember other contributions to climate change and other sustainability aspects

In the debate, of how much transport matters when importing organic products, it is important as a consumer to be aware of other food related contributions to climate change that can be

reduced, such as reducing food waste, minimizing unnecessary shopping related transport in cars etc.

Furthermore, it is important to be aware that sustainability deals with many other aspects than climate, such as biodiversity, nutrient enrichment and socioeconomic issues. As a consumer, the choice of which organic products to buy is also related to impact of the agricultural production in the country concerned – both environmentally and socioeconomically.

More information
Read more in the PhD dissertation: ["Environmental assessment of imported organic products : Focusing on orange juice from Brazil and soybeans from China"](#) 2011.

