Carbon footprint of organic products

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Outline

1. What is a carbon footprint?
2. How do organic products perform?
3. How can the climate benefits of organic products be communicated to the consumer?
Man's footprint on the planet today.
Carbon Trust / Tesco footprint

“The carbon footprint of this juice is **260g** per 250ml serving and we have committed to reduce it. By comparison the footprint of Tesco 100% Pure Squeezed Orange Juice is **360g** per 250ml serving, which is higher because more energy is required to chill and transport 100% pure juice than concentration juice.”
Project information

Project commissioned by:
- W. Lampert Beratungsges.m.b.H. “Zurück zum Ursprung” / Hofer KG
- Austrian ministry of agriculture

Duration: 2 years (since July 2008)

Review:
- Öko-Institut, Freiburg

Internet-Link to the Project:
http://www.fibl.org/de/oesterreich/schwerpunkte-at/klimaschutz.html
Objectives of the project

1. to compare the greenhouse gas emissions (CO$_2$ eq) of organic foodstuffs, with foodstuffs grown conventionally

2. to render the results visible for the consumer
Scope of the project

120 foodstuffs were analysed:
- dairy products
- bread products,
- eggs, poultry
- fruit, vegetables, fruit juices

in 3 categories:
  a) Conventional foodstuffs
  b) Organic according to EU regulation
  c) Organic premium line, „Zurück zum Ursprung“
Methods

- CO₂ emissions assessed as a „Life cycle assessment“ (LCA) according to the guidelines of the IPCC (2007)
- along the entire supply chain (cradle-to-gate), from the agricultural production, processing, packaging, storage and retailing.
Methods

- CO₂, CH₄, N₂O, which were calculated as „CO₂-equivalents“
- Detailed primary data on agriculture, transport, processing, packaging and distribution from the Austrian supermarket corporation HOFER KG’s organic product line, „Zurück zum Ursprung“.
- 200 Austrian and international publications and
- 20 Austrian and international statistics and databases
Consideration of effects which have so far received little attention

1. Land Use Change: Consideration of the destruction of savannas and tropical land through soybean cultivation (over 90% of soybean used for animal feed in Austria is imported from Brazil).

2. Carbon Sequestration in the soil (humus accumulation) through organic agriculture
CO$_2$ emissions of a typical food supply chain

- Agricultural production
- Food processing
- Transport
- Agricultural inputs
- Packaging
- Storage
Overview of results

Organic products (Bio-ZZU and BIO EU) constantly show lower CO2 emissions than comparable, conventional products:

- Dairy products: 10 - 21% lower CO2 emissions (per kg)
- Bread and bread products: 17-45% lower CO2 emissions (per kg)
- Vegetables: 10-35 % lower CO2 emissions (per kg)
13,4% weniger CO₂ als herkömmliche Milch
Exemplary Results: Bread

- Conventional wheat bread: 563 g CO₂ eq/kg
  - Agriculture: 209 g CO₂ eq/kg
  - Mill: 270 g CO₂ eq/kg
  - Bakery: 24 g CO₂ eq/kg
  - Ingredients: 44 g CO₂ eq/kg
  - Packaging: 129 g CO₂ eq/kg

- Zurück zum Ursprung wheat bread: 423 g CO₂ eq/kg
  - Agriculture: 209 g CO₂ eq/kg
  - Mill: 24 g CO₂ eq/kg
  - Bakery: 44 g CO₂ eq/kg
  - Ingredients: 129 g CO₂ eq/kg
  - Packaging: 44 g CO₂ eq/kg
Exemplary Results: Kohlrabi

- Conventional Kohlrabi: 165 g CO₂ eq/kg
- Zurück zum Ursprung Kohlrabi: 130 g CO₂ eq/kg

The chart shows the CO₂ emissions for each stage of production:
- Agriculture: 106 g CO₂ eq/kg for Conventional and 71 g CO₂ eq/kg for Zurück zum Ursprung
- Transport: 58 g CO₂ eq/kg for both
- Storage: 1 g CO₂ eq/kg for both
Kohlrabi: CO₂-Emissions from horticulture

- Conventional Kohlrabi: 106 g CO₂ eq/kg
  - N₂O (fertilisation): 8.6
  - Tillage: 23.6
  - Seeding: 5.8
  - Cover: 13.5
  - Irrigation: 21.2
  - Plant protection: 6.4
  - Mechanisation: 23.5

- Zurück zum Ursprung Kohlrabi: 71 g CO₂ eq/kg
  - N₂O (fertilisation): 3.8
  - Tillage: 8.9
  - Seeding: 14.8
  - Cover: 21.2
  - Irrigation: 9.9
  - Plant protection: 13.9
  - Mechanisation: -3.9

Total reduction: 35.2%
Plain yoghurt 3.5 % fat

- Conventional yoghurt:
  - Agriculture: 159 g CO₂ eq/kg
  - Transport: 88 g CO₂ eq/kg
  - Dairy: 79 g CO₂ eq/kg
  - Total: 1.041 g CO₂ eq/kg

- Zurück zum Ursprung yoghurt:
  - Agriculture: 159 g CO₂ eq/kg
  - Transport: 88 g CO₂ eq/kg
  - Dairy: 79 g CO₂ eq/kg
  - Total: 1.154 g CO₂ eq/kg
Transport and processing

1.) Role of transport

- dairy products: 5-10%
- bread and bread products: 5-15%
- vegetables: 20-50%

In the case of transport, it is important to consider the efficiency of the transport means (advantages in transport with ships and large trucks compared with small trucks).

2.) Role of convenience

An important CO₂-saving effect in foodstuff processing is the avoidance of convenience, for example the freezing and re-baking of dough pieces in the production of bread (rolls):

→ increases the CO₂-saving from 17-25% to over 40%
Conclusions

- There are both feasible and successful ways to communicate climate benefits of organic products relative to conventional ones.
- CO₂ emissions depend on the specific product and supply chain.
- Results of the analysis are severely influenced by assumptions made.
- Communication of additional environmental benefits on organic products can raise consumer awareness and willingness to pay*.
- Climate change is only one of these benefits...

*http://fcp.coreportal.org
More information on the project:

http://www.fibl.org/de/oesterreich/schwerpunkte-at/klimaschutz.html

http://www.zurueckzumursprung.at/co2-fussabdruck/co2-ihres-produktes

http://www.fibl.org/de/oesterreich/schwerpunkte-at/klimaschutz.html
Thank you for your attention!