Food – an environmental perspective
What can we learn from environmental assessment?

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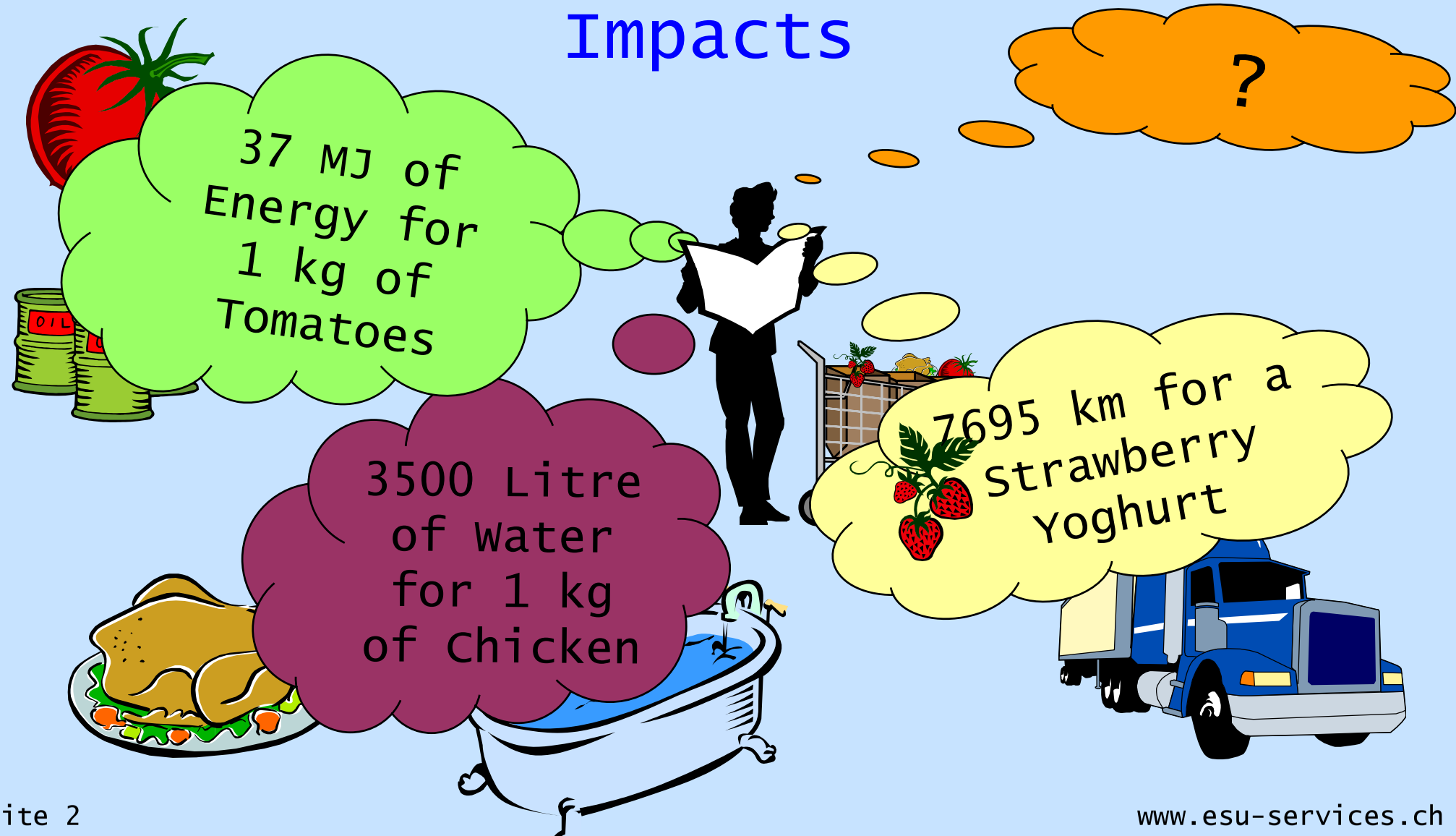
Food and Environmental Impacts



Content

- Introduction
- Methods: MFA, LCA
- Results:
  - MFA of food consumption
  - LCA results for vegetables, meat and mineral vs. tap water
- What do we learn?

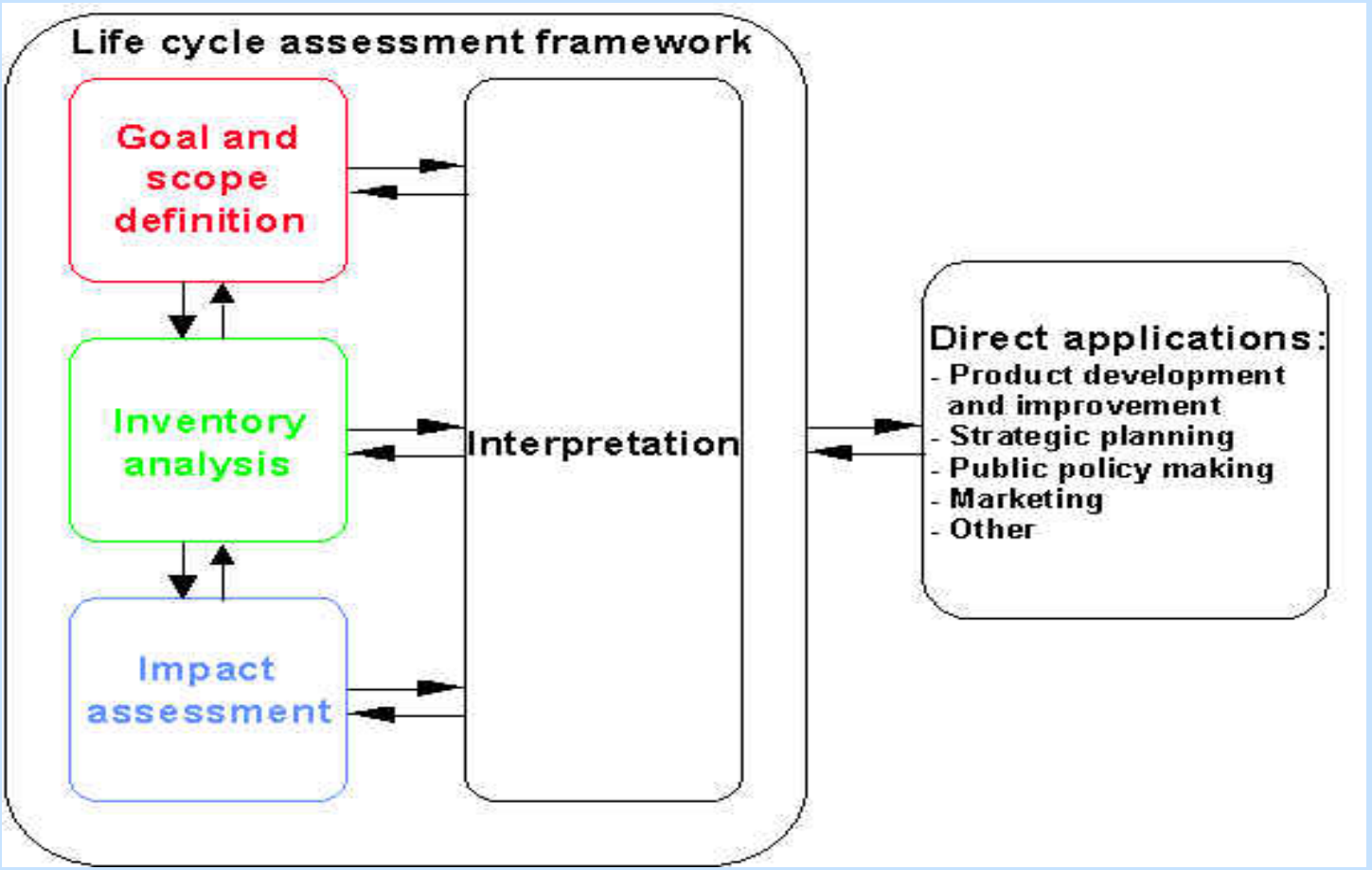
Material Flux Analysis

- Regional scope
- Describes material/substance/energy fluxes in a region during a definite time
- Indicators: materials, energy or substances (e.g. Phosphor)

Life Cycle Assessment

- „From cradle to the grave“
- Describes material and energy use as well as emissions for the production and consumption of a product/service
- Different assessment methods: Eco-indicator points, greenhouse potential, cumulative energy use etc.

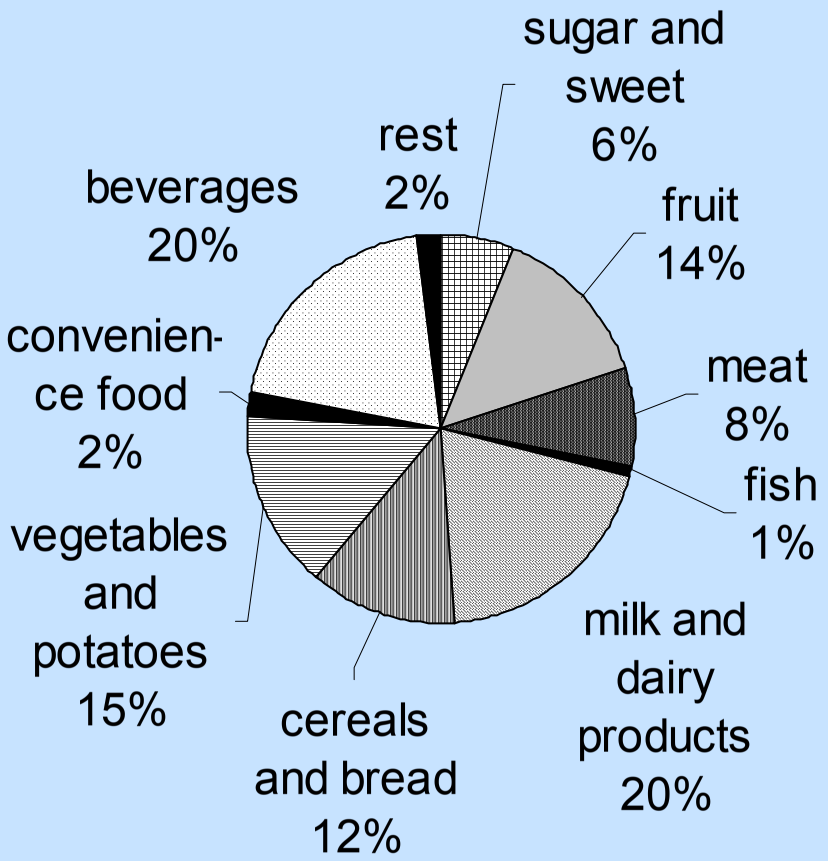
Life Cycle Assessment (LCA)
ISO-14040 Norm



MFA of Swiss food consumption

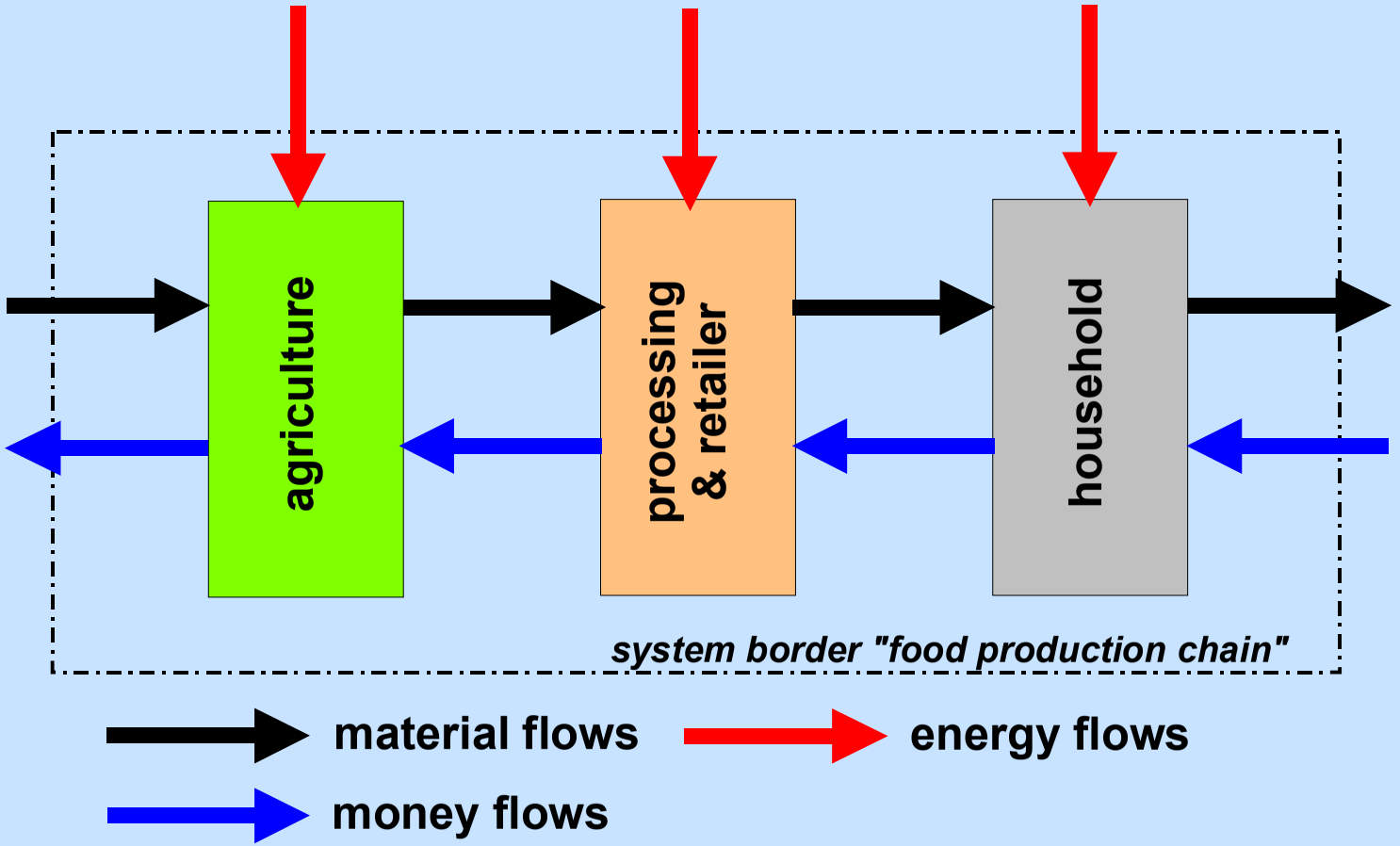
- Annual sale of a (regional) retailer for most important food products
  - Meat
  - Milk & dairy products
  - Vegetables
  - Fruits
  - Beverages (non-alcoholic)
- Material and energy use, land use
- (Money flows)

Composition of annual sale



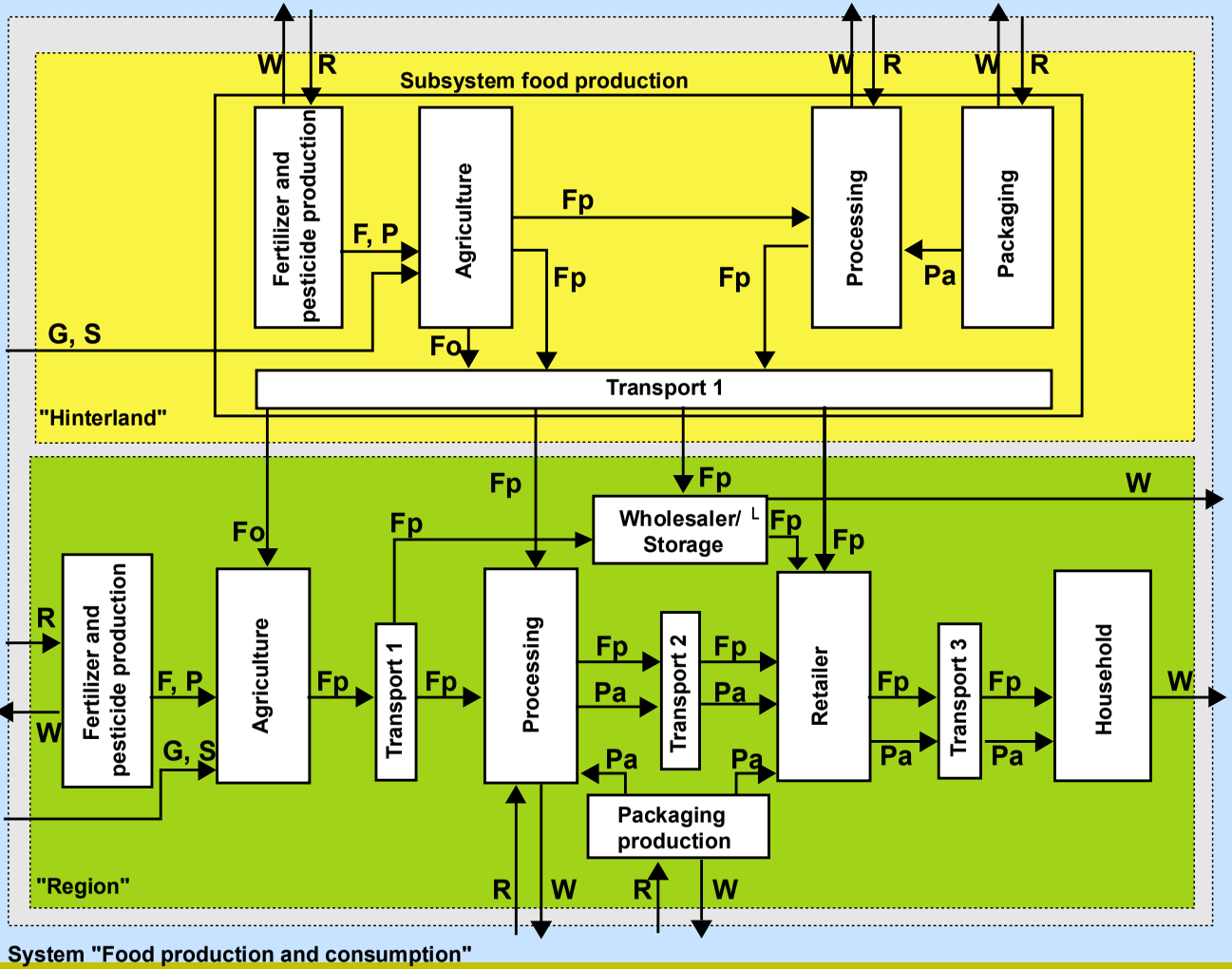
- Most important categories: Meat, Milk & dairy products, Vegetables, Fruits, Beverages (non-alcoholic)

MFA food production



➢ Main proc.: agriculture, processing/distrib.,household

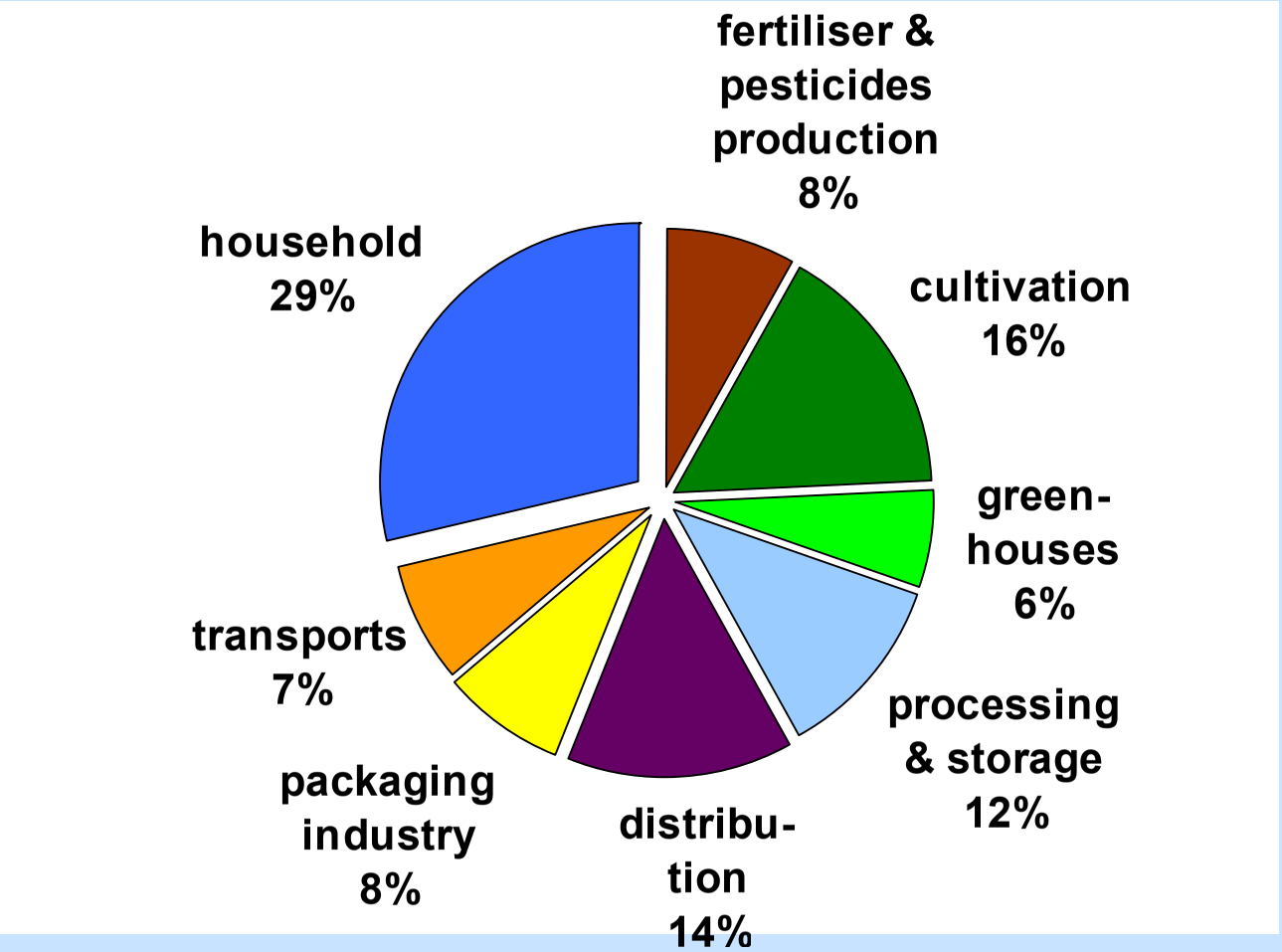
MFA food production



F: Fertilizer
Fo: Fodder
Fp: Food products
G: Growth
Pa: Packaging
R: raw materials
S: seeds
W: waste

➢ Production outside region included in analysis

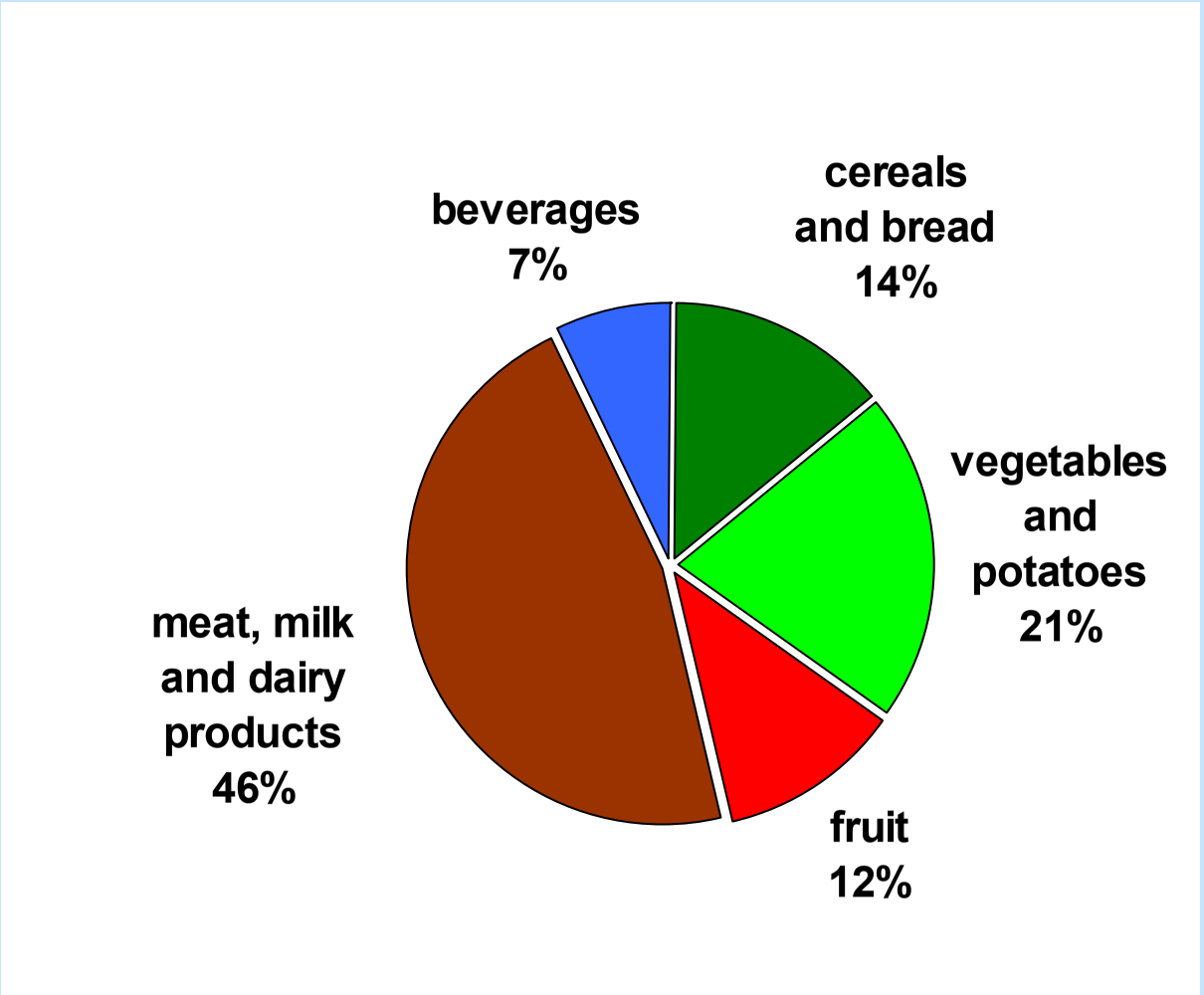
Energy: importance of processes



Faist, 2000

➢ 1/3 household, 1/3 processing&retailer, 1/3 agriculture

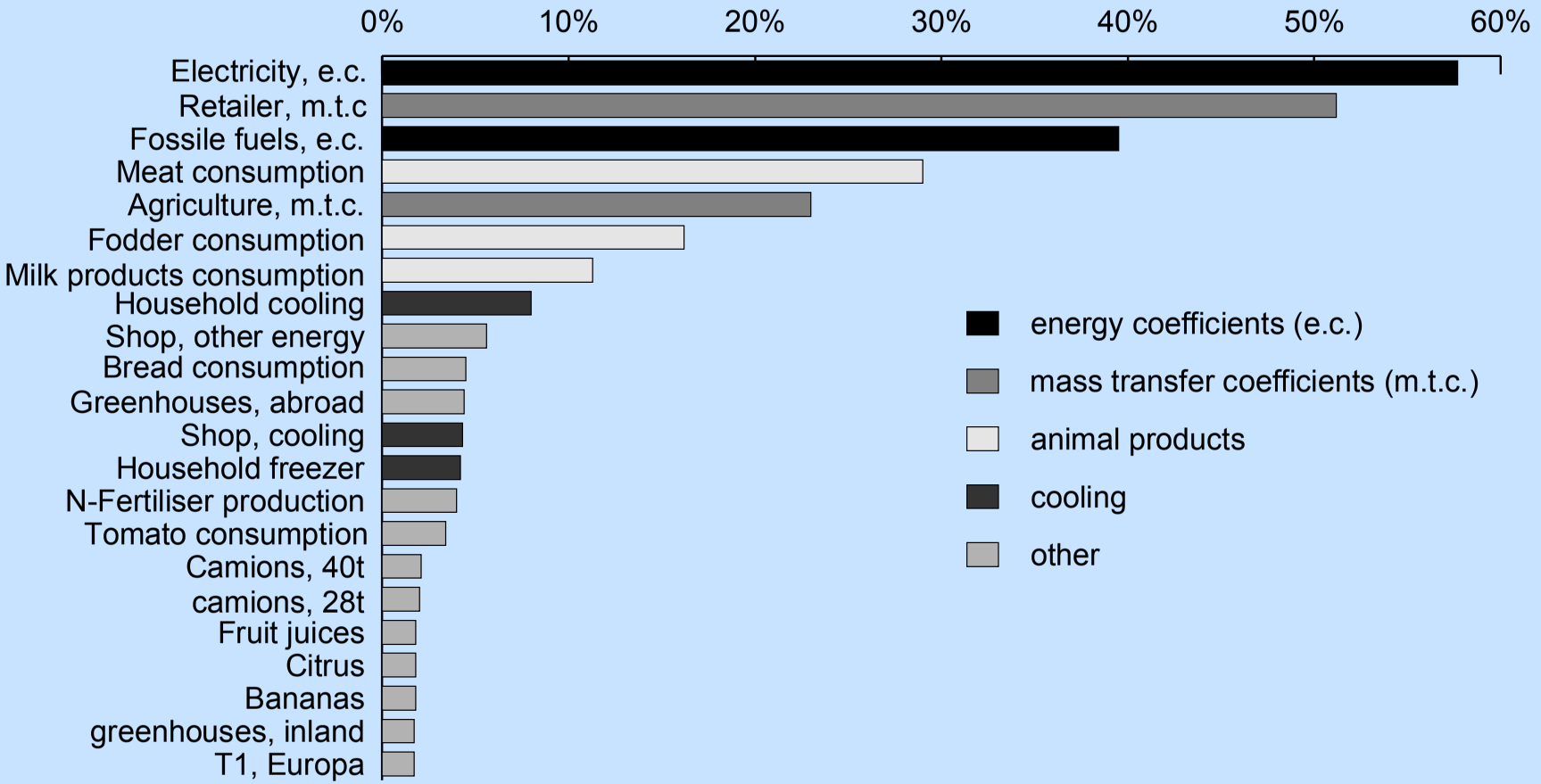
Energy: importance of food products



Faist, 2000

➢ Meat & dairy products most important category

Sensitivity analysis: energy



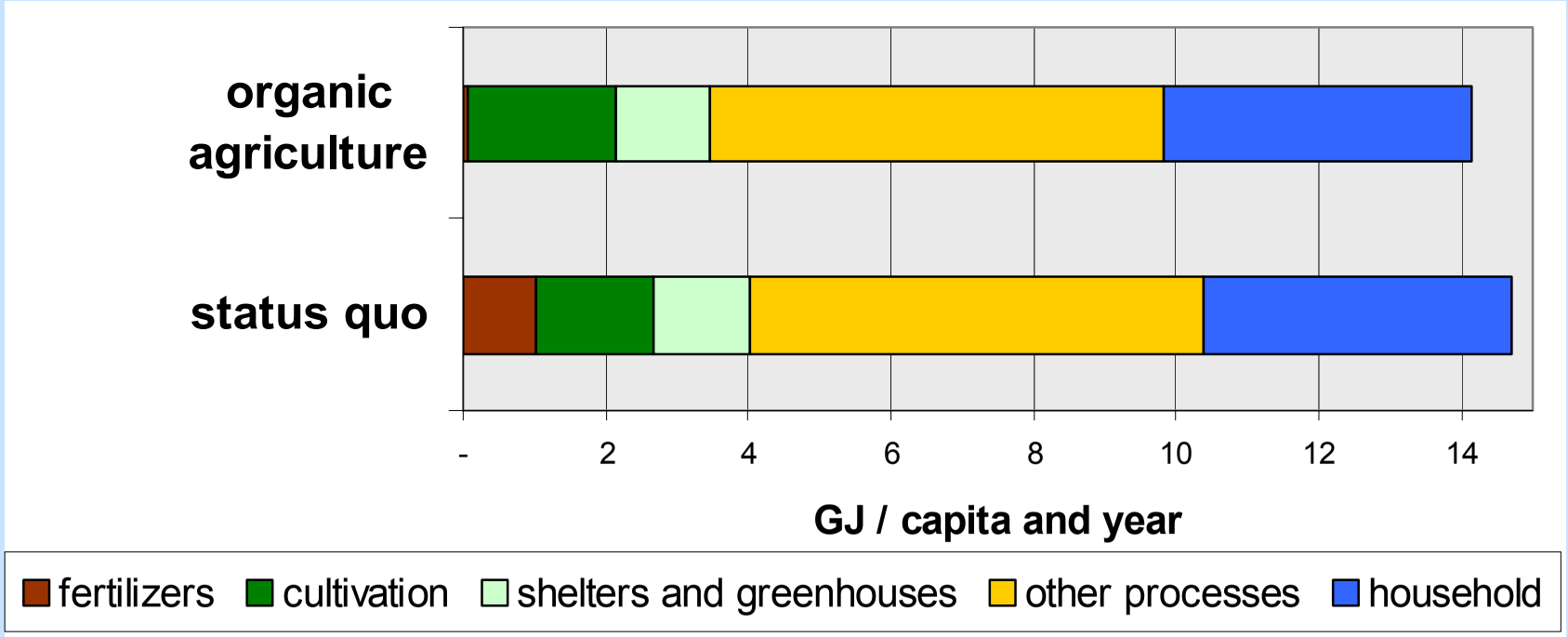
Faist, 2000

➢ Efficiency of energy production, losses are important

Scenarios

- „Organic agriculture“: all food products with organic production
- „Cooling“: Improving cooling energy use with BAT devices
- „Full vegetarian“: change of diet no animal products

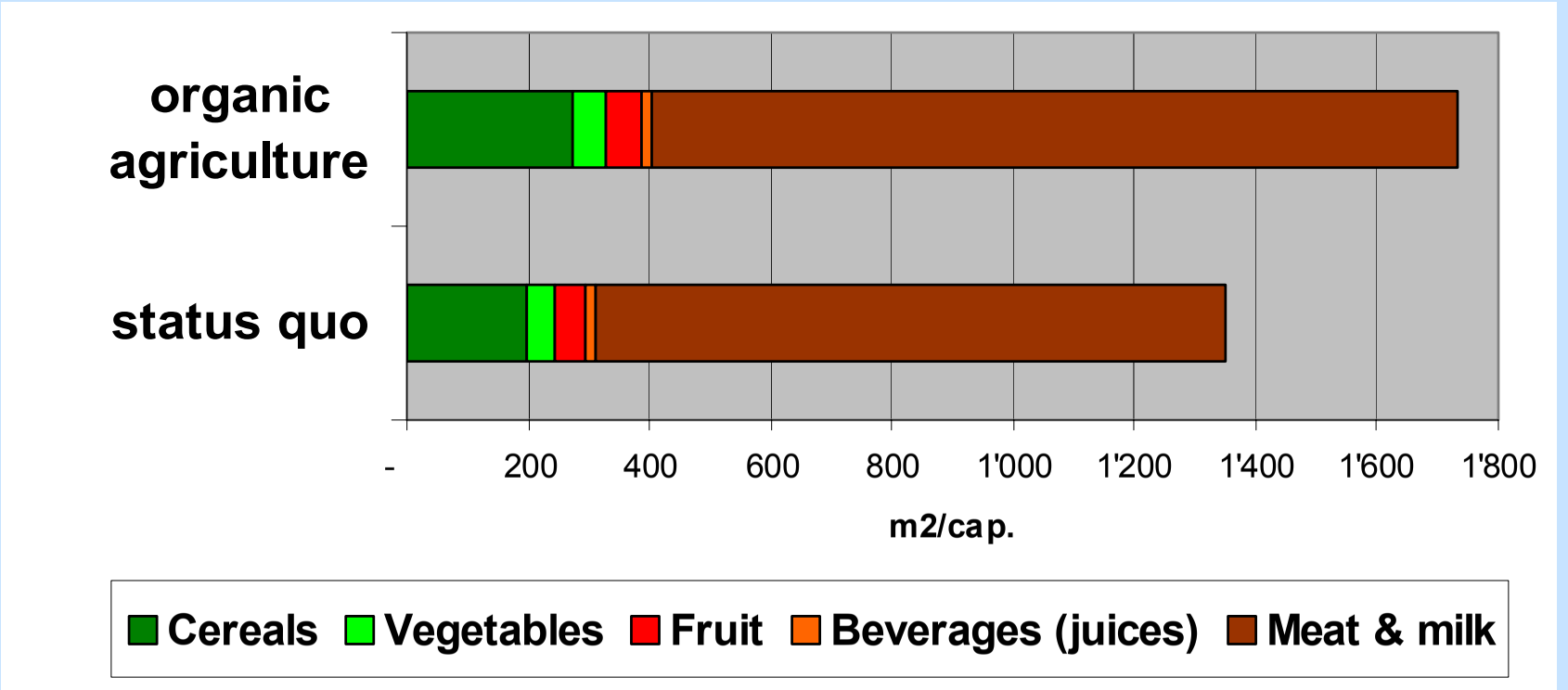
Organic agriculture - energy



Faist, 2000

➢ Small reduction in energy use

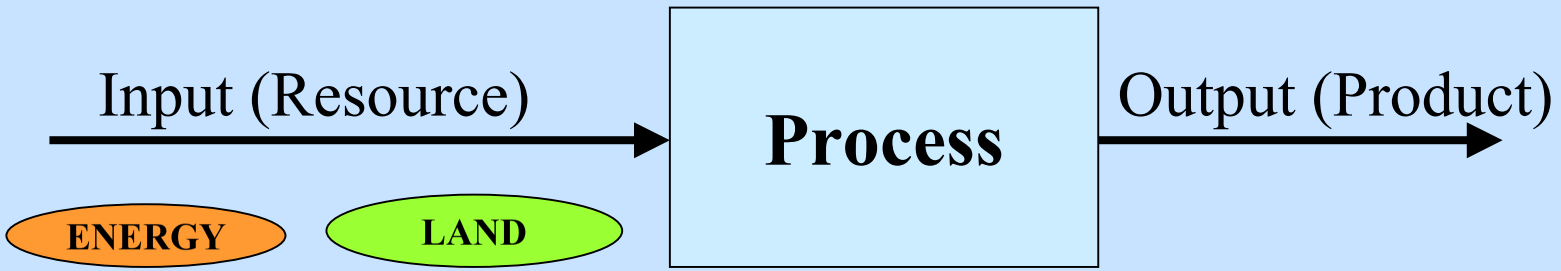
Organic agriculture - land use



Faist, 2000

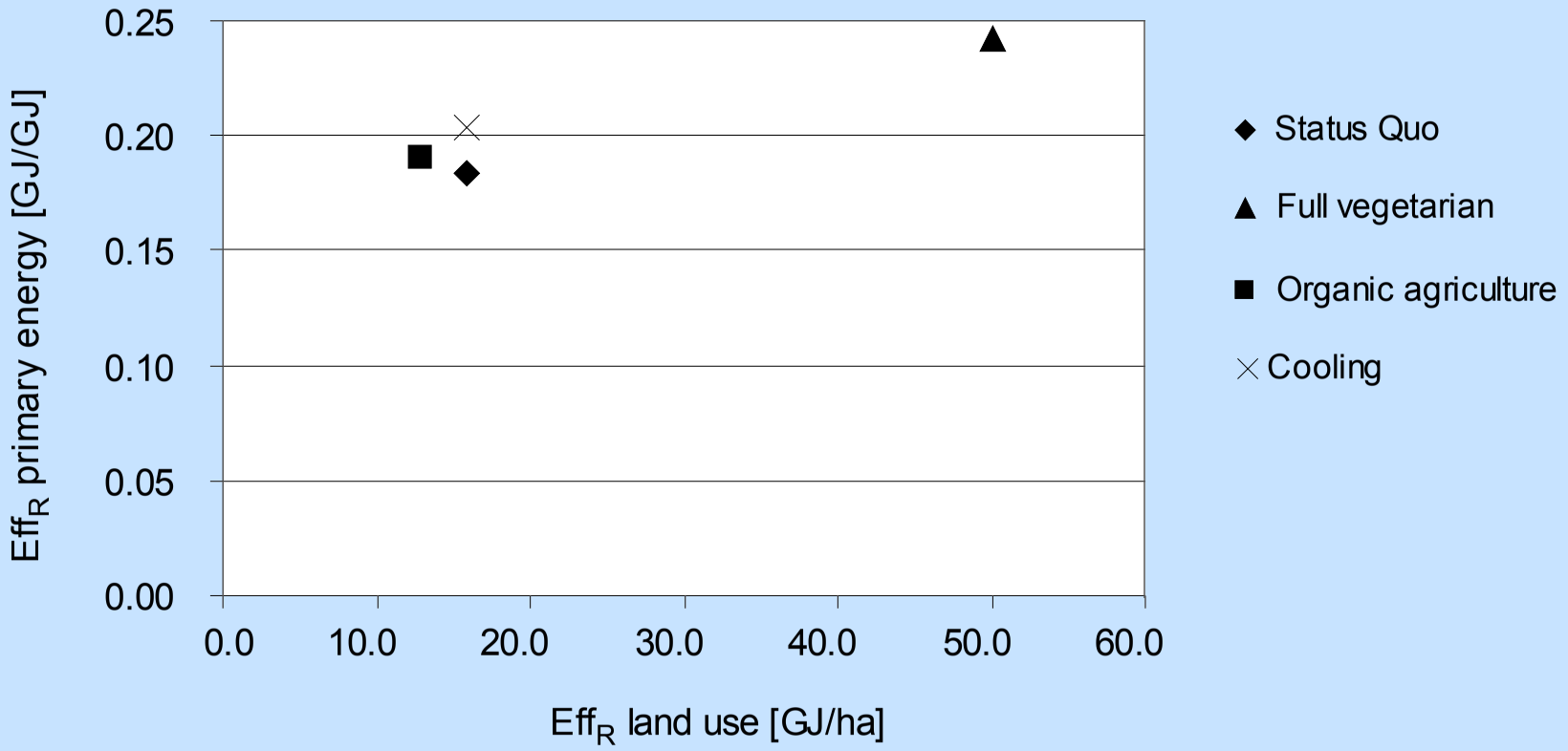
- Land use increases (15%)

Resource efficiency



- Resource efficiency = Products (GJ nutritive value)/Resource use (GJ energy or ha land)

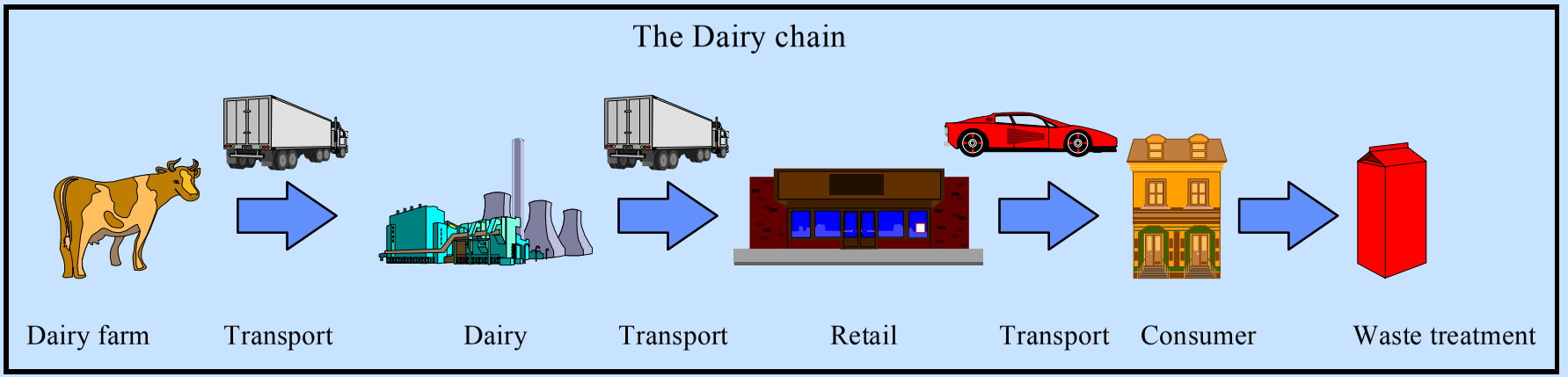
Results of scenarios



Faist, 2000

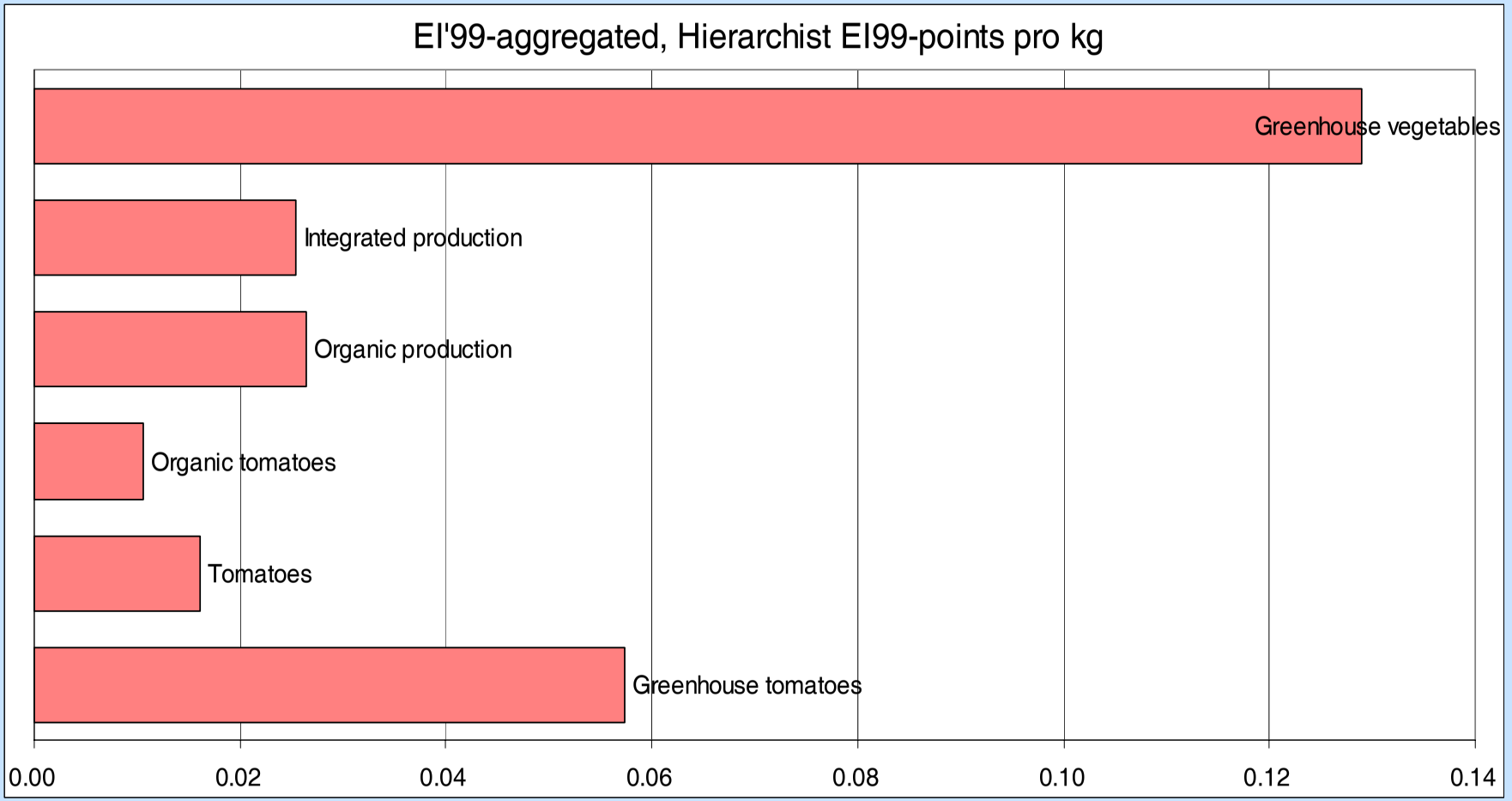
➢ Scenario full vegetarian has effect on resource eff.

LCA of food products



➢ LCA focuses on life cycle from cradle to grave

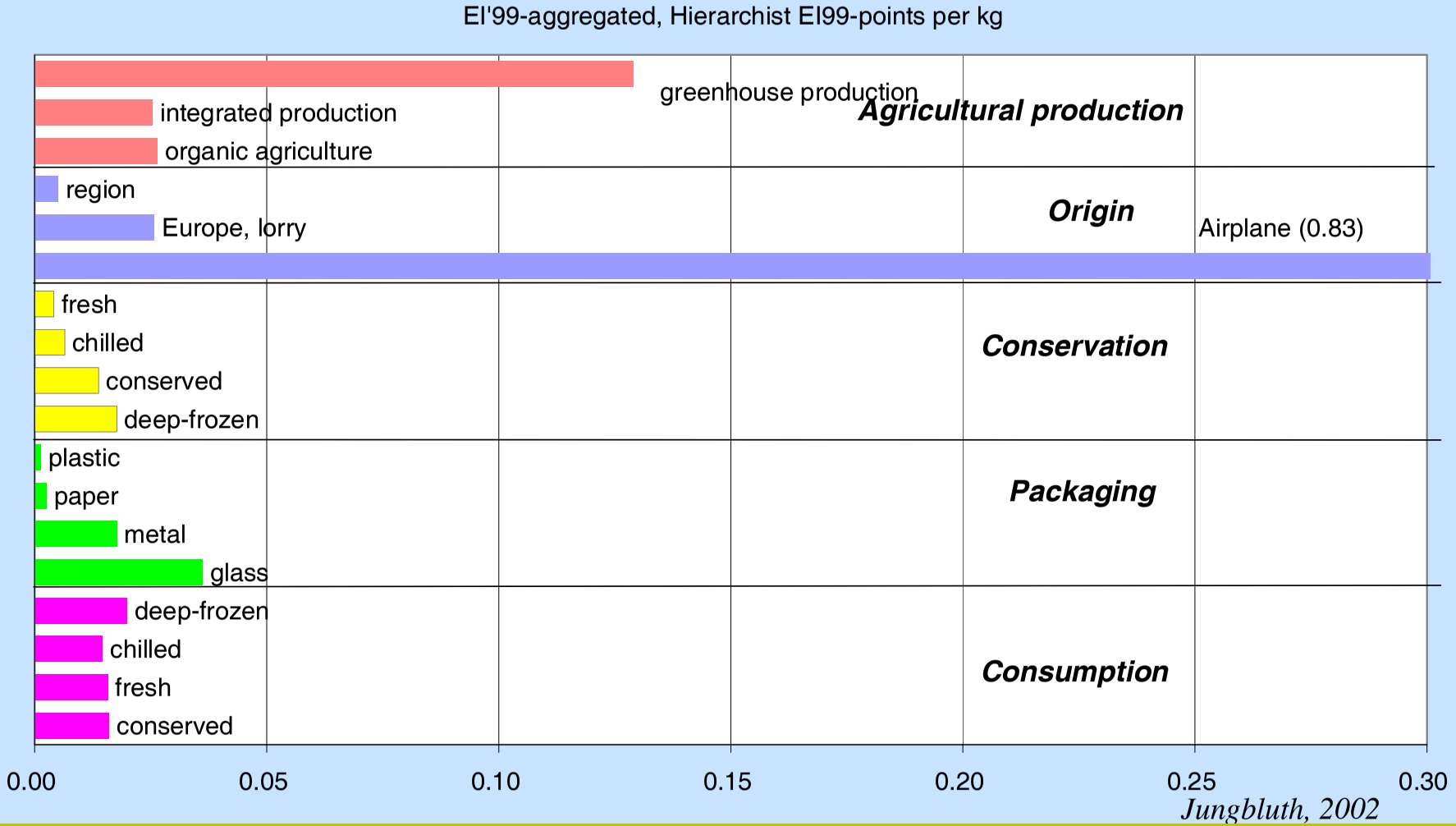
Comparison of vegetables



Jungbluth, 2000

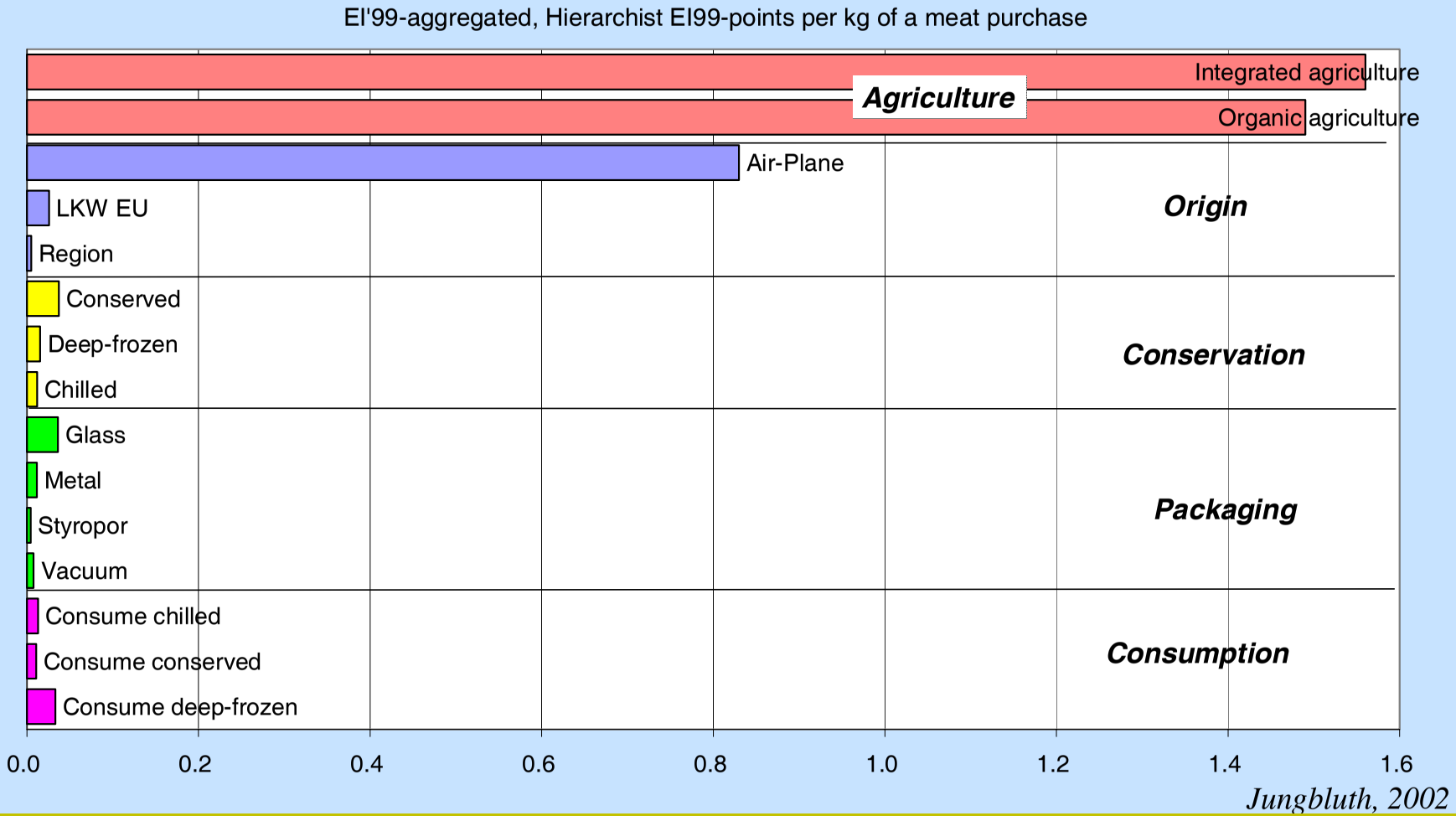
- Great differences between different products

Sensitivity analysis: Vegetables



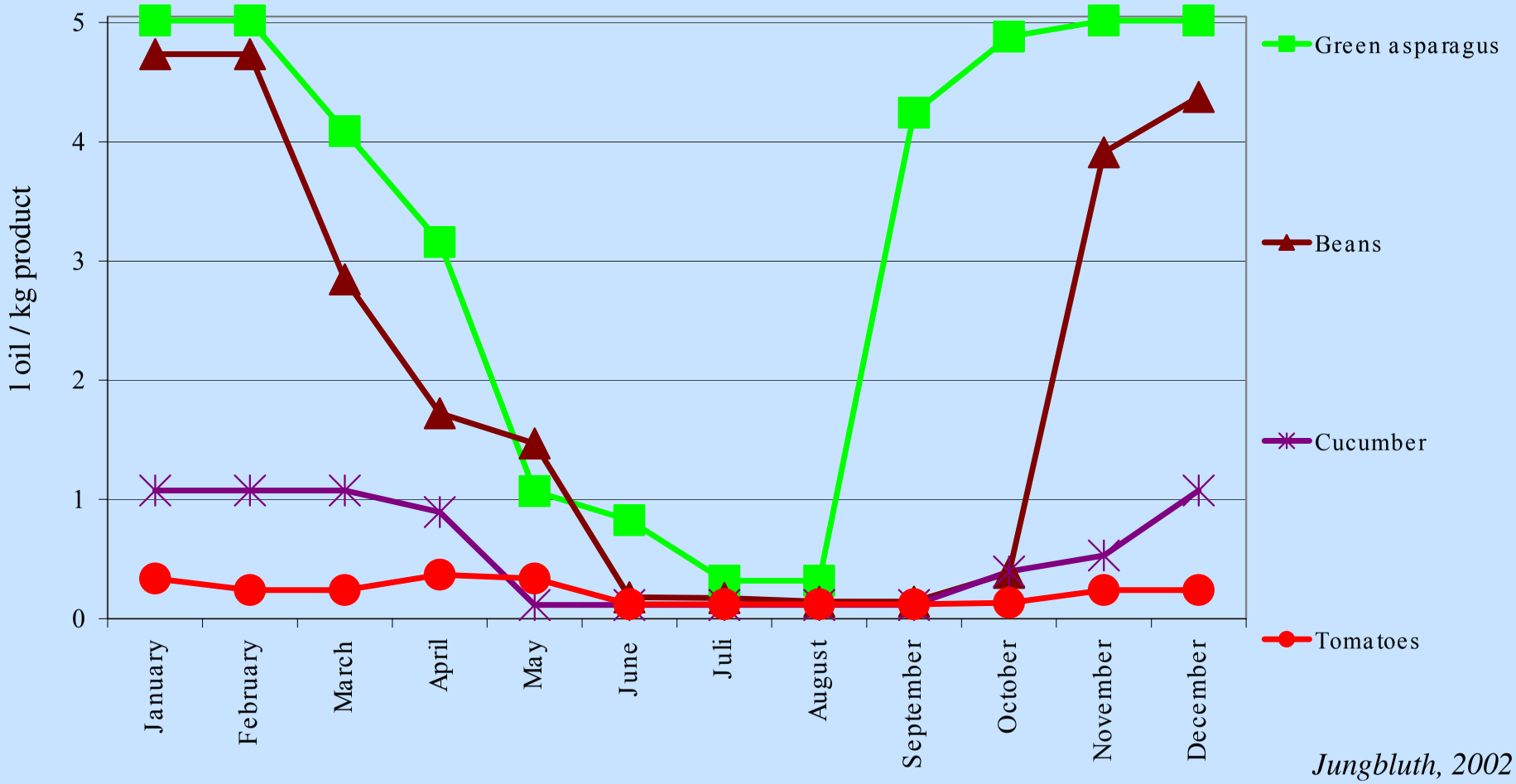
- All characteristics are important

Sensitivity analysis: Meat



➢ Agricultural production dominates total impacts

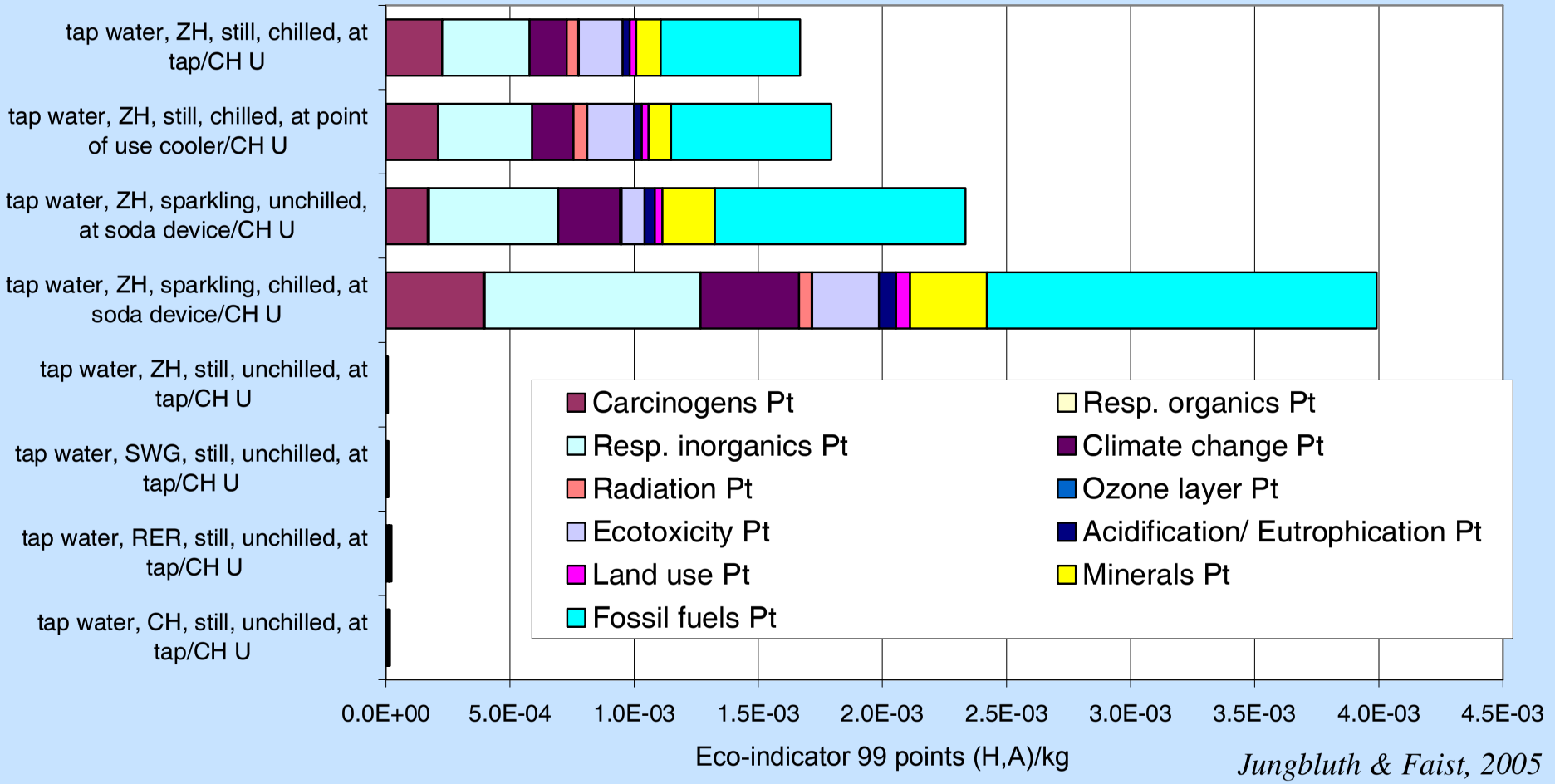
Seasonal products



Jungbluth, 2002

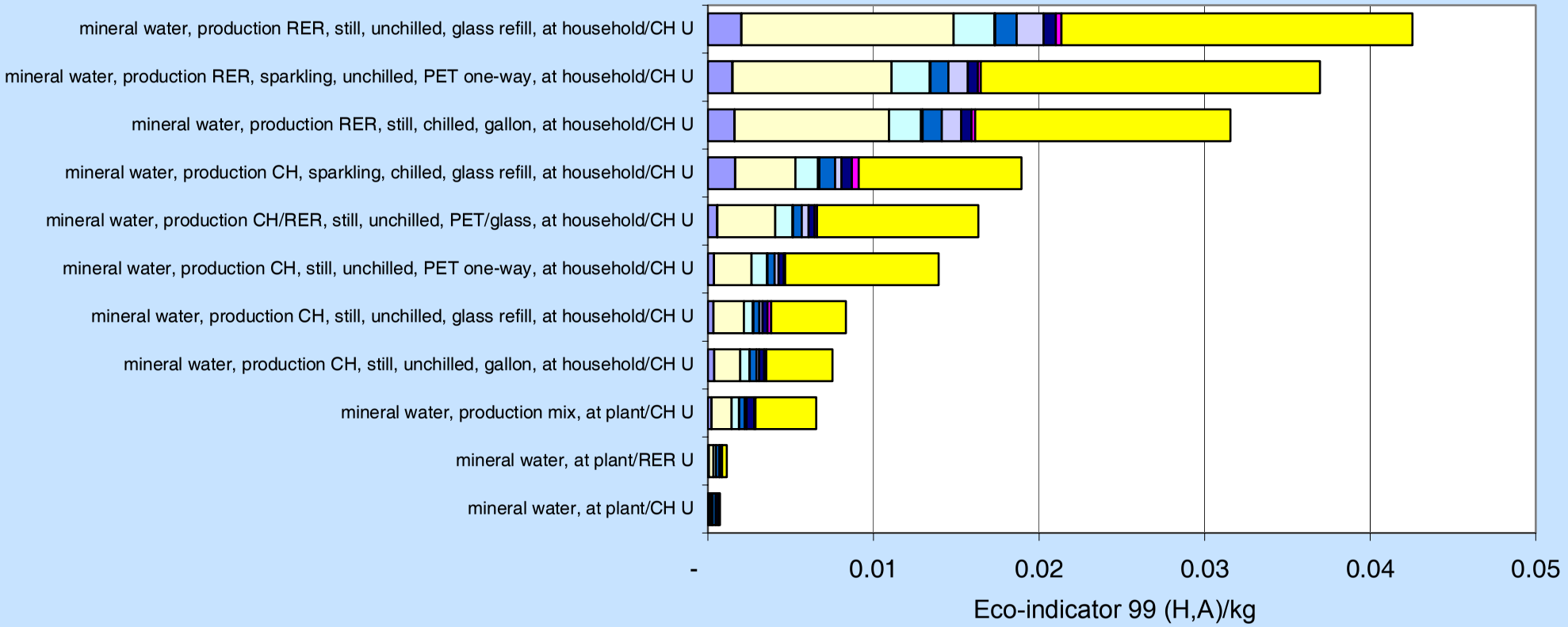
➢ Depending on season energy use becomes 5x bigger!

Tap water scenarios



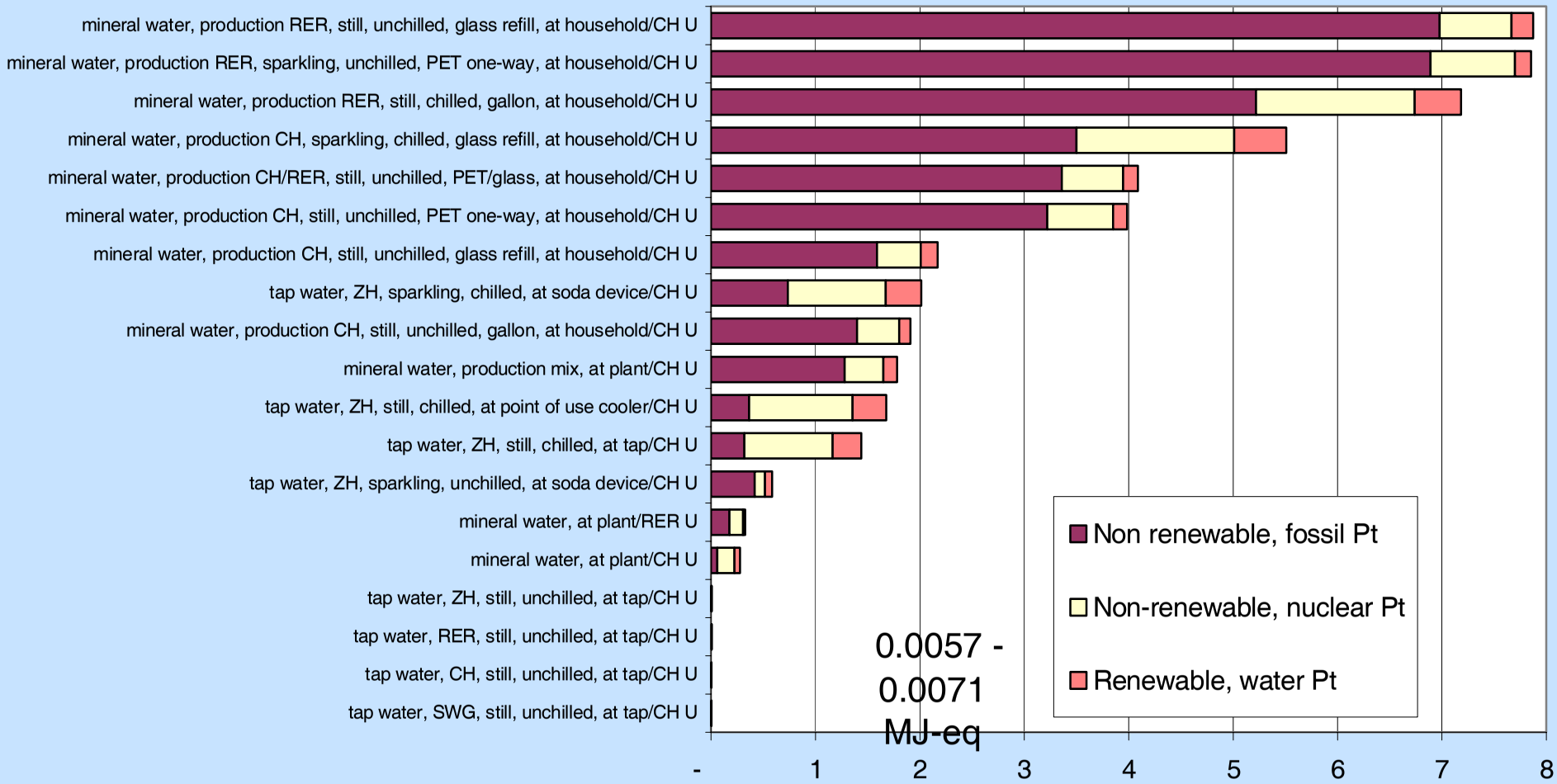
Jungbluth & Faist, 2005

Comparison of mineral water



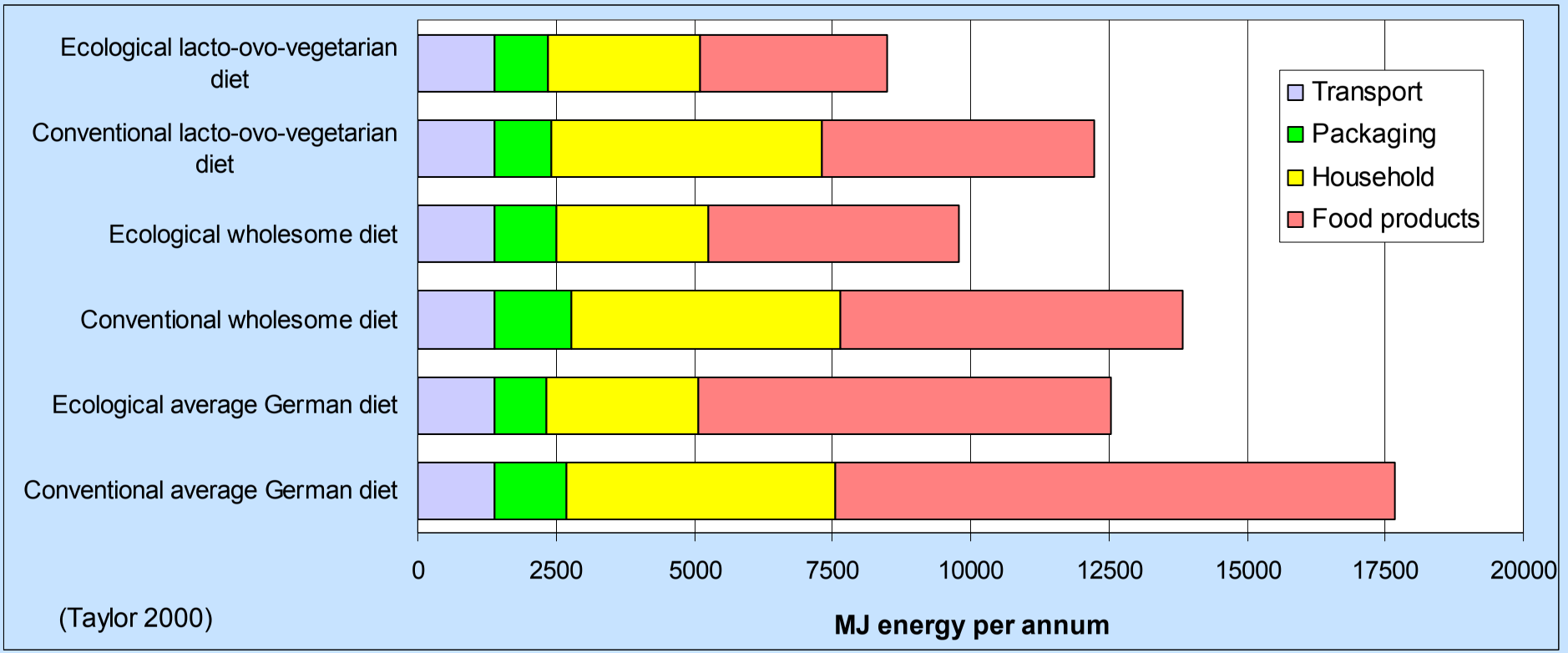
Jungbluth & Faist, 2005

Cumulative energy demand



Jungbluth & Faist, 2005

Effect of diet



- Diet has an effect on energy use

What do we learn (1)?

- Reduce consumption of meat and dairy products.
- Avoid fresh products from overseas or Europe, which have been transported by air. Buy regional products.
- Prefer seasonal products and avoid greenhouse vegetables.

What do we learn (2)?

- Reduce energy consumption in household (fridge, freezer etc.)
- Reduce consumption of frozen products.
- Prefer unchilled tap water to chilled mineral water.

THANK YOU FOR YOUR ATTENTION!