Greenhouse Gas Emissions of Organic and Conventional Foodstuffs in Austria

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FiBL BOKU

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FiBL – Research Institue of Organic Agriculture

Consultancy and Organic Agriculture

FiBL Switzerland: since 1973

- more 120 staff members

FiBL Austria: founded 2004

- hub and interface between science and practice
- 16 permanent staff members
- Climate working group: 5 members

FiBL Germany

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Project Development

1. **Pilotphase**
   - ***Conventional Austrian Standards* (*ÖPUL*-Standard)**
   - ***European Organic Standards* („BIO-EU-Standard“)**
   - **‚*Zurück zum Ursprung* organic products‘**

2. **Label**
   - **Render results visible to the consumers**
     → online

To date approx. 130 products were calculated

milk products (67), vegetables and fruits (20), bread products (38), poultry meat and eggs

Methods I/III

- **life cycle assessment** according to the guidelines of the **IPCC (2007)**
- based on **ISO 14040 and 14044** and **PAS 2050**
- along the **entire supply chain:** agricultural production including in up-stream production, processing, packaging, storage and transport to the individual supermarket branch
- **a climate assessment model was developed**
- **external review:** Ökoinstitut Freiburg and FiBL Schweiz

Methods II/III

The greenhouse gases included are:

- ⇨ CO_2, CH_4, N_2O, which were calculated in the form of **CO_2-equivalents**
- ⇨ **the balances were compiled using the program SIMA PRO 7.1.**
- ⇨ **detailed primary data** in the areas of agriculture, transport, processing, packaging and distribution were accessed from the Austrian supermarket corporation HOFER KG's organic product line, „Zurück zum Ursprung"
- ⇨ it was possible to calculate an Austria-specific **„supermarket standard" for transport, processing, packaging and distribution**

Methods III/III

secondary data

- ⇨ databases **GEMIS 4.42** (2007) and **ECOINVENT 2.0** (2007)
- ⇨ secondary data from approx. **200 national and international publications** and 20 Austrian national statistics

→ **it was possible to take the specific production conditions in Austria, as well as the current level of knowledge about LCA results into consideration**

Consideration of effects which have so far received little attention

1. **Land Use Change:**
   consideration of the **conversion of savannas** and **tropical land** through **soy cultivation** to agricultural land

   → over 90 % of soy used for animal feed in Austria is imported from Brazil

   → nearly **17 % of total global GHGE** (Smith et al. 2007)

2. **Humus accumulation:**

   through organic/ecological agriculture

   → Sequestration in biological systems, depletion in conventional systems (Küstermann et al. 2008; Hülsbergen et al. 2008)

ORGanic varieties

Based on

⇨ Organic Farming **(EU-VO-834/07)**

→ **variety: BIO-EU**

additional requirements for „Zurück zum Ursprung“ farms

⇨ no soybeans imported from South-America

⇨ no silage

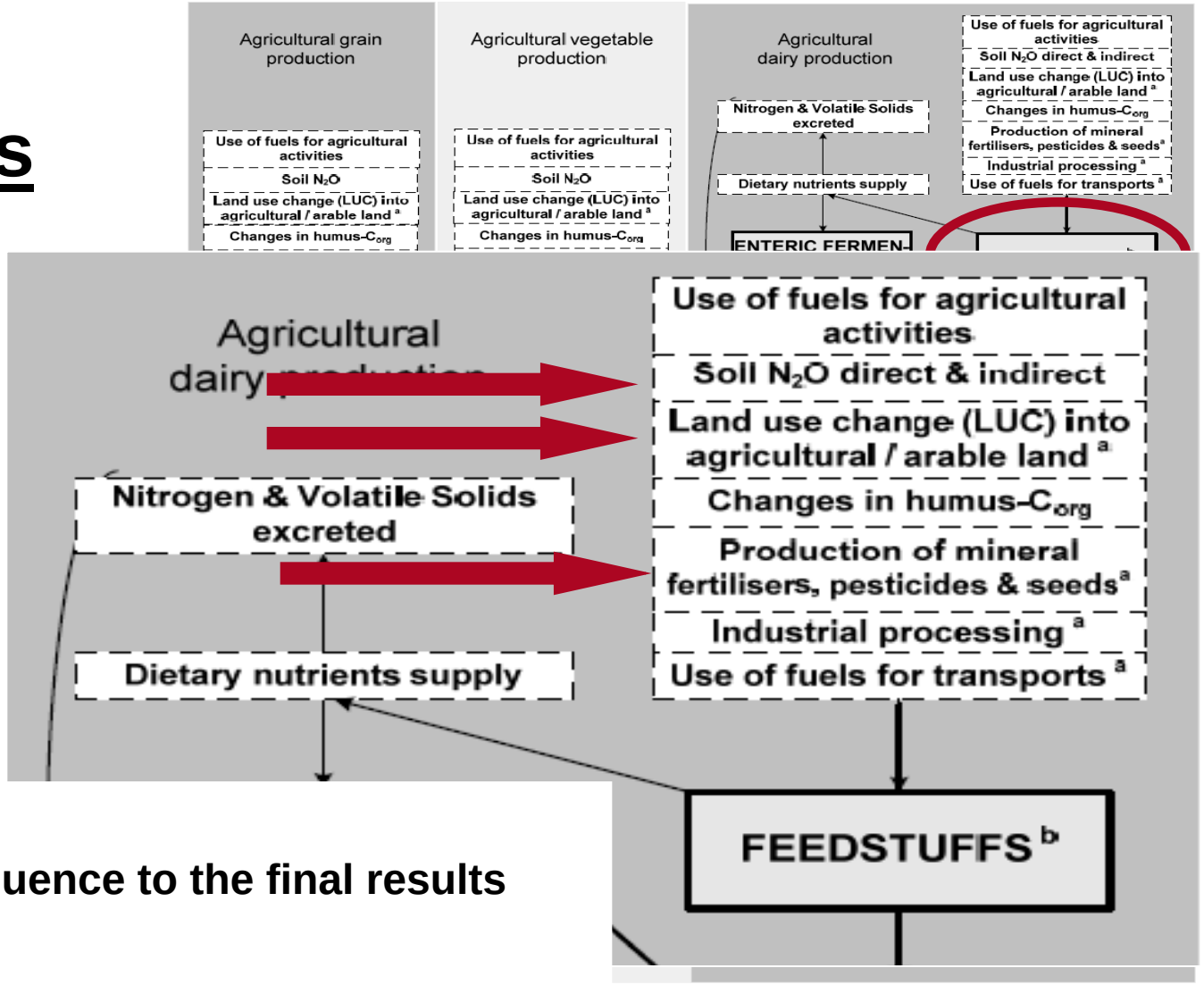
⇨ no vinasse and other readily soluble organic fertilizers (i.e. blood-, feathermeal …

⇨ animal husbandry

- 120 days per year grazing
- 180 days per year outdoors

→ **variety: BIO-ZZU**

System boundaries



Quelle: Hörtenhuber et al. 2010b

- **important influence to the final results**
- **Functional Unit = 1 kg product**

Hörtenhuber, S., Lindenthal, T., Markut, T., Theurl, M., Rudolph, G., 2010

Results overview

all products of the organic brand ‚Zurück zum Ursprung' have lower - superior - GHGE than analogous conventional products

- Milk products: 10-21%
- Bread: 25 %
- Bread Products: 31-45 %
- Vegetables: 10-35 %
- Poultry meat/eggs: 49-50 %

lower GHGE in each category per 1 kg product

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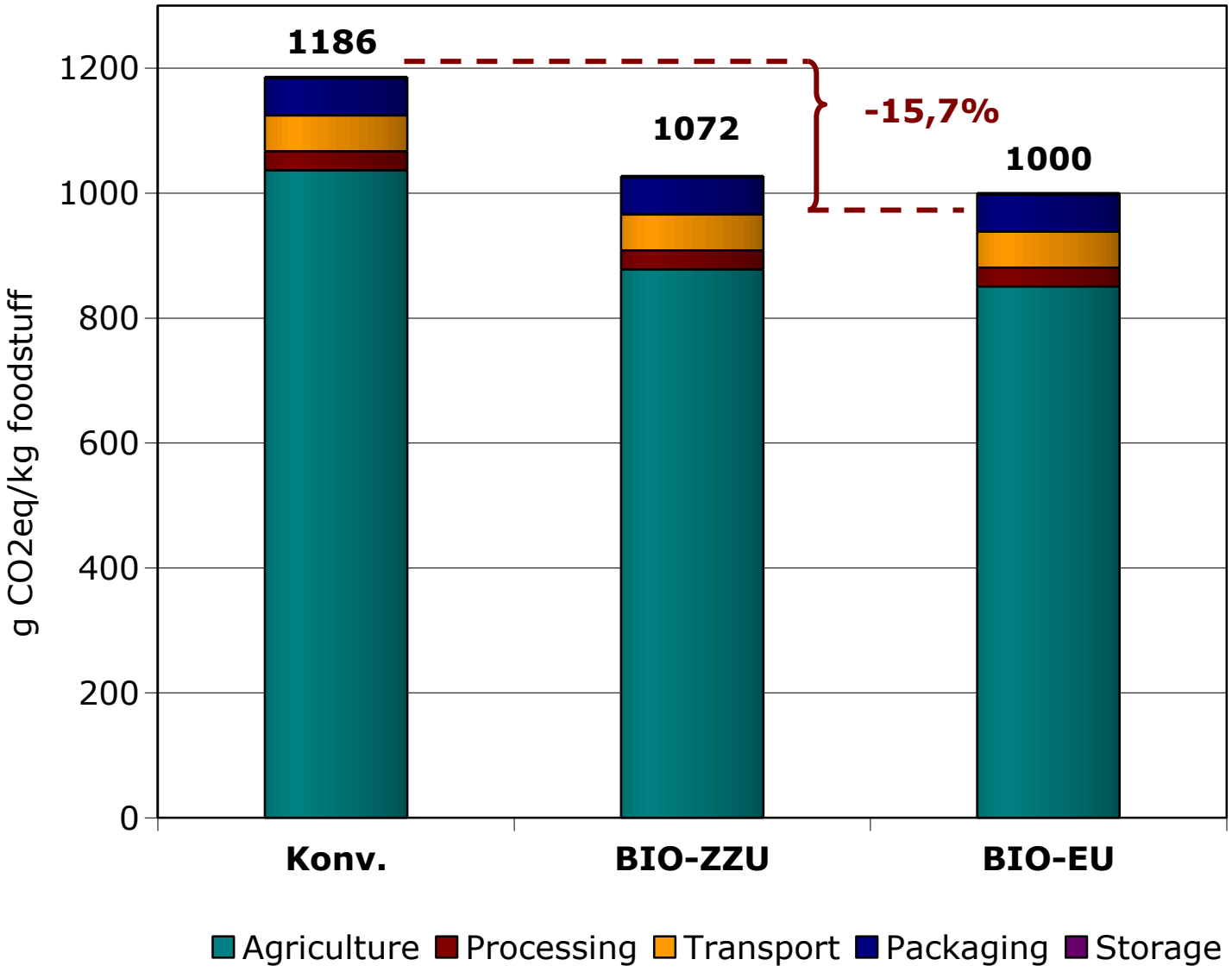
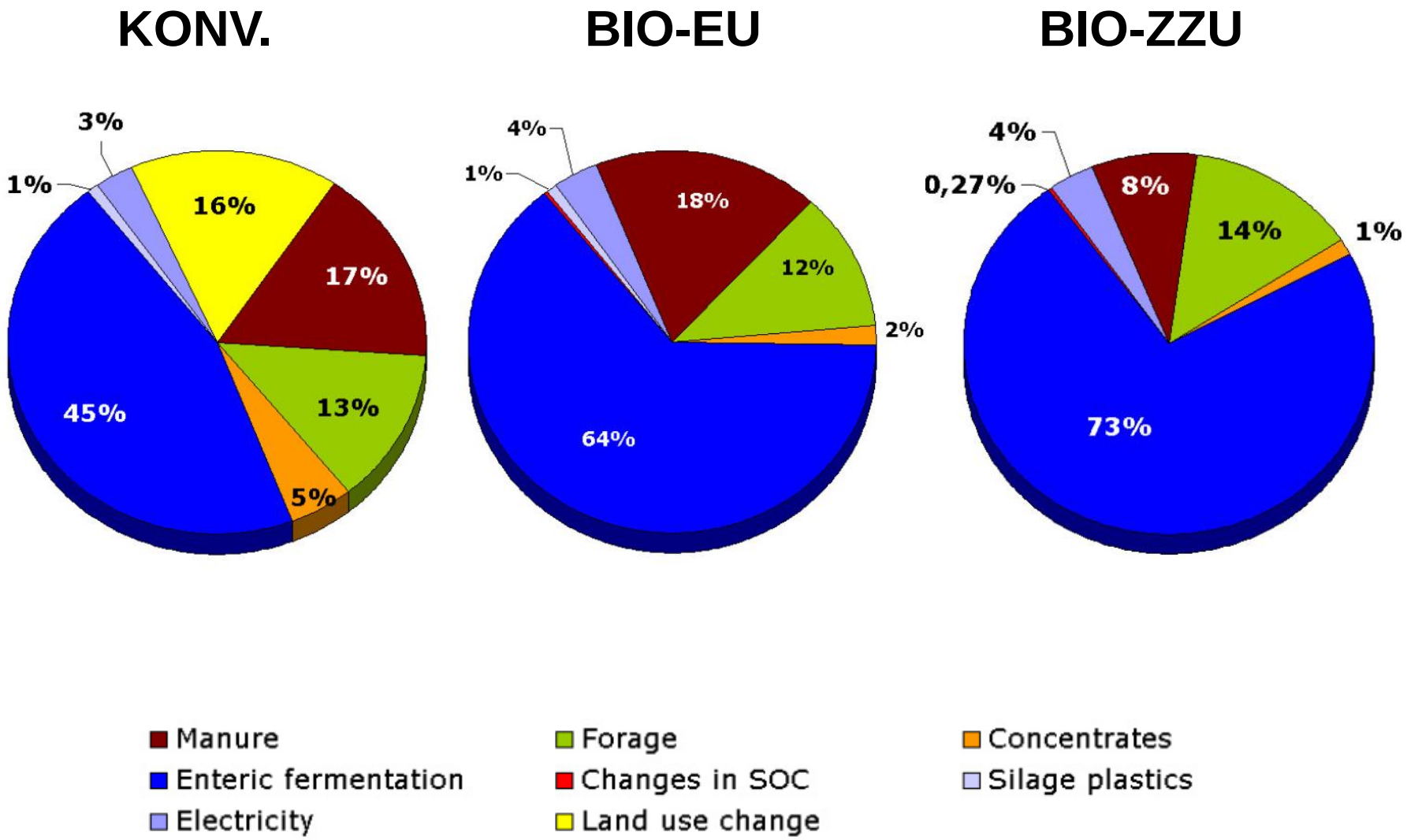
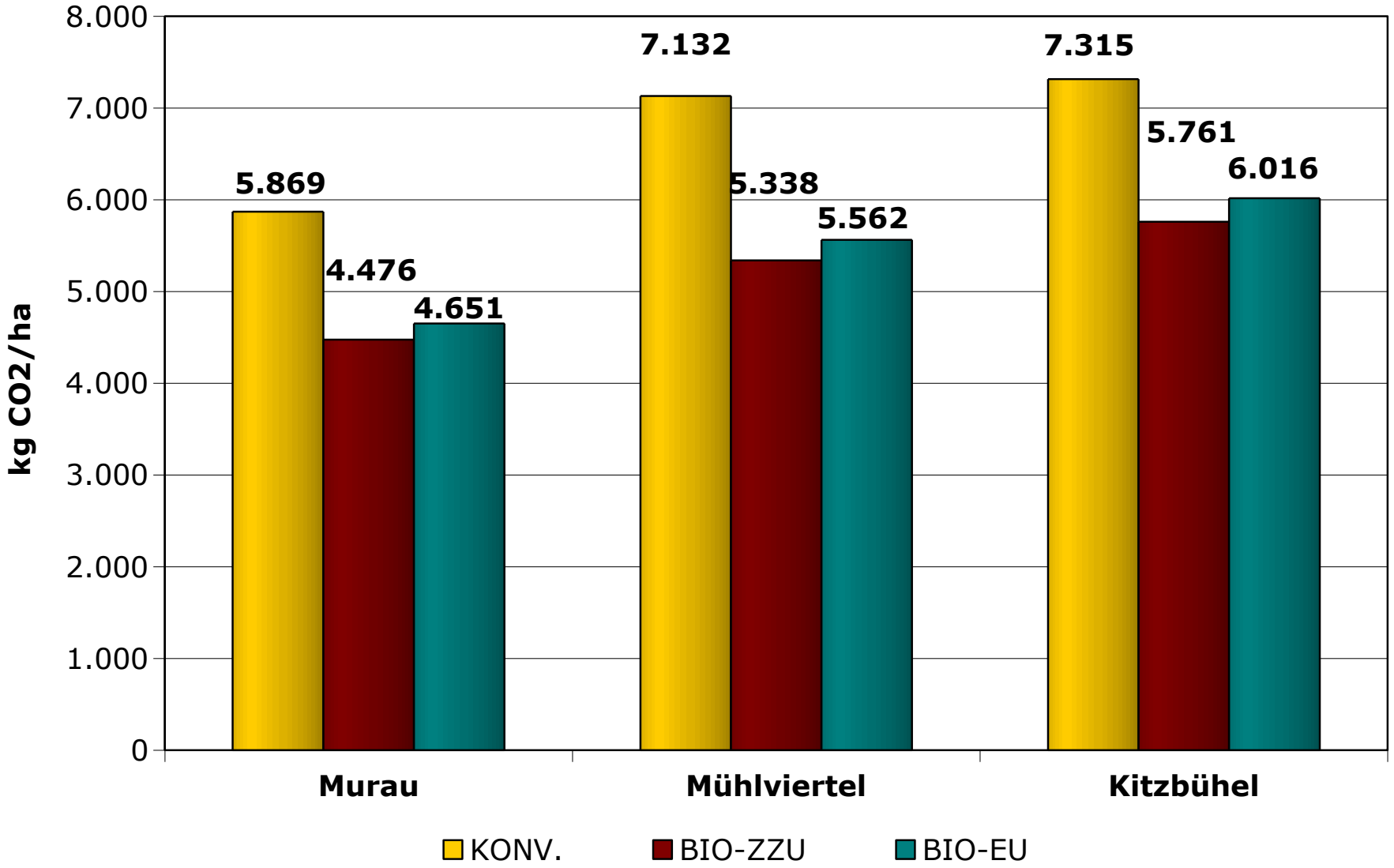
Milk (Tyrol): total CO_2-eq emissions



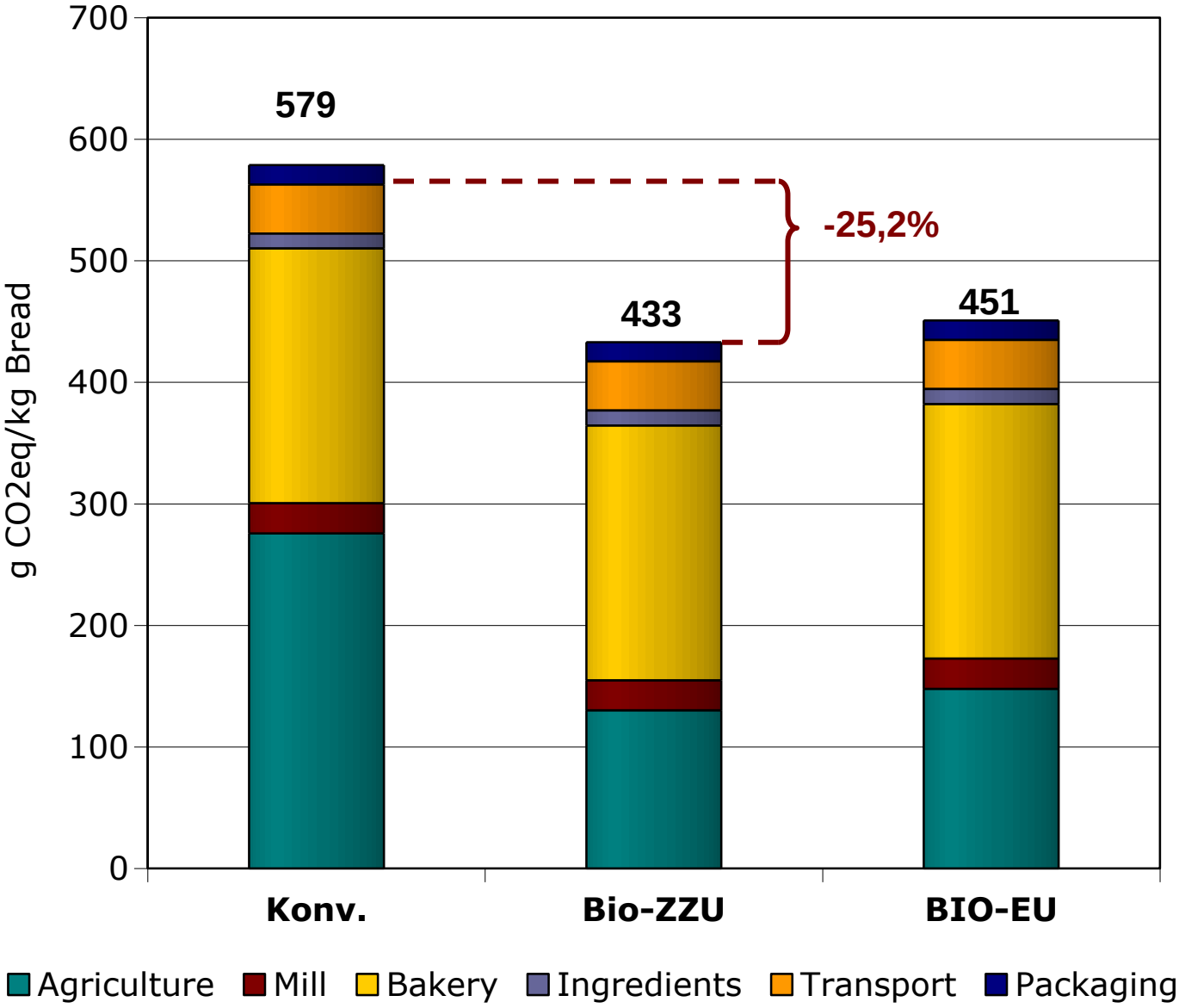
Raw milk: emissions from agriculture



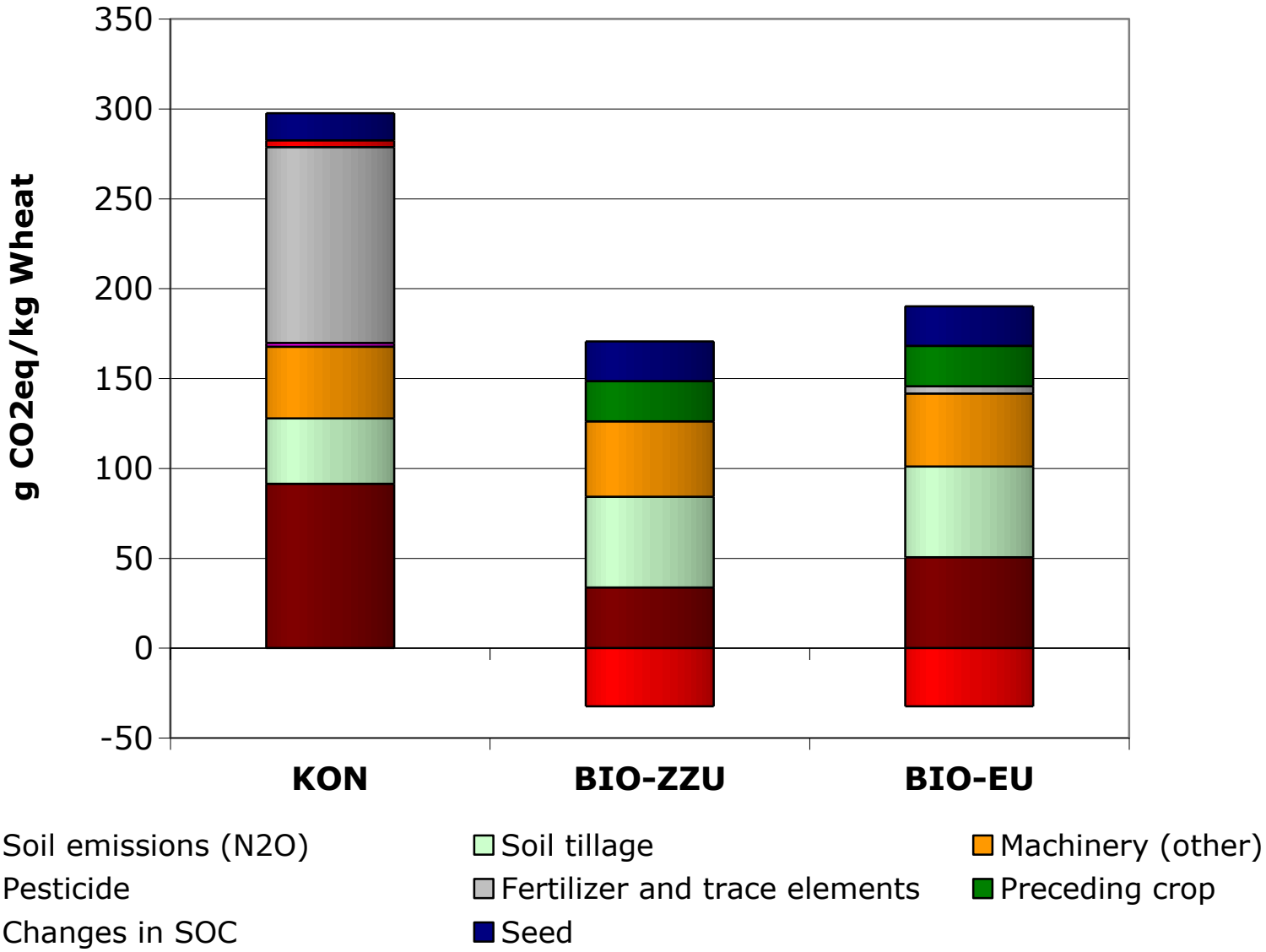
Raw-milk: total CO_2-eq emissions per hectare area



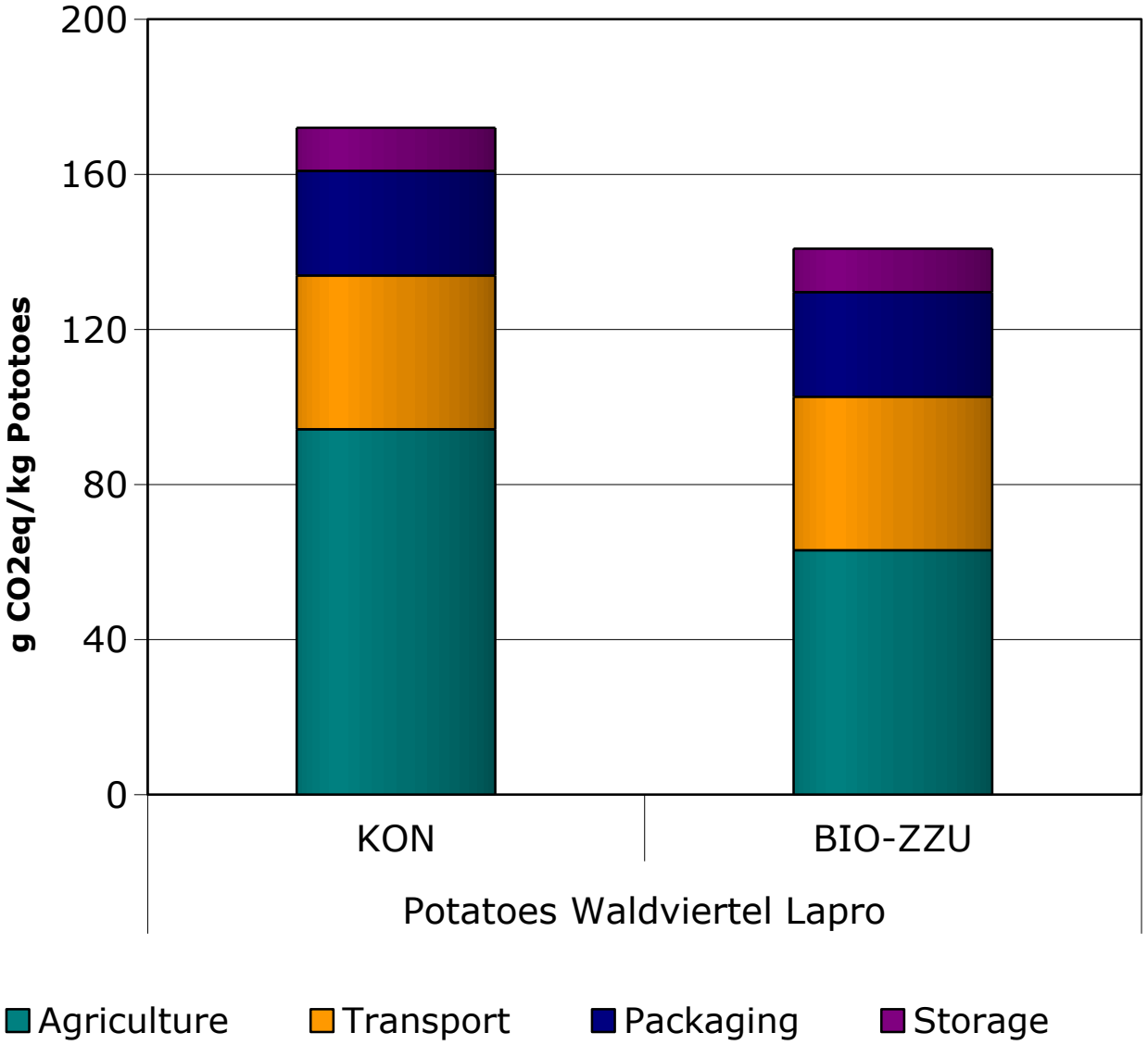
Wheat bread: total CO_2-eq emissions



Wheat: CO_2eq-emissions from agriculture



Vegetables
Potatoes: total CO_2eq-emissions



Outlook for further research

- Recalculation Now

- Fine-tuning of N_2O-emissions (i.e. leaching)
- Milk products: allocation via caloric value rather than fat
- Primary data: ascertain still more accurate data
- LUC: modification of fodder rations
- Soil organic carbon: apply lcafood2010 workshop outcomes

> Thank you for your attention!

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

Lindenthal, T., Markut, T., Hörtenhuber, S., Rudolph, G. (2009): CO2-eq-emissions of organic and conventional foodstuffs in Austria - Results summary of 74 CO2-balanced products. Executive summary.

S. Hörtenhuber, T. Lindenthal, B. Amon, T. Markut, L. Kirner and W. Zollitsch (2010): Greenhouse gas emissions from selected Austrian dairy production systems—model calculations considering the effects of land use change. (264 KB) Renewable Agriculture and Food Systems.

http://www.zurueckzumursprung.at/co2-und-klimaschutz/co2-fussabdruck/lebensmittelproduktion/