



# **Environmental impacts of Swiss milk production in the mountain region**

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16<sup>th</sup> EGF-Symposium 2011 -  
AREC Raumberg Gumpenstein

# Background

- 70% of Swiss usable agricultural area (UAA) is covered by grassland
  - 27% of Swiss UAA is in the mountain region
  - Additionally: alpine pastures
- => Animal production (ruminants) very important
- Milk is the most important product for Swiss agriculture
  - As meat, milk production is associated with different impacts on the environment





# Materials and methods

- Data from the project LCA-FADN (2004-2011)
- Financed by FOAG
- Aim: Evaluation of the environmental impacts of Swiss farms
- Data collection over three years (2006-2008) on 100 farms
- Data collected on farm level, allocation to 14 product groups
- LCA calculation for the whole farm and for each product group
- Environmental impacts analysed: non-renewable energy demand, global warming potential, eutrophication, terrestrial and aquatic ecotoxicity



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Ökobilanzierungsstelle ÖBS

TSM Treuhand GmbH, Bern  
& ArGe Natur und Landschaft, Hergiswil



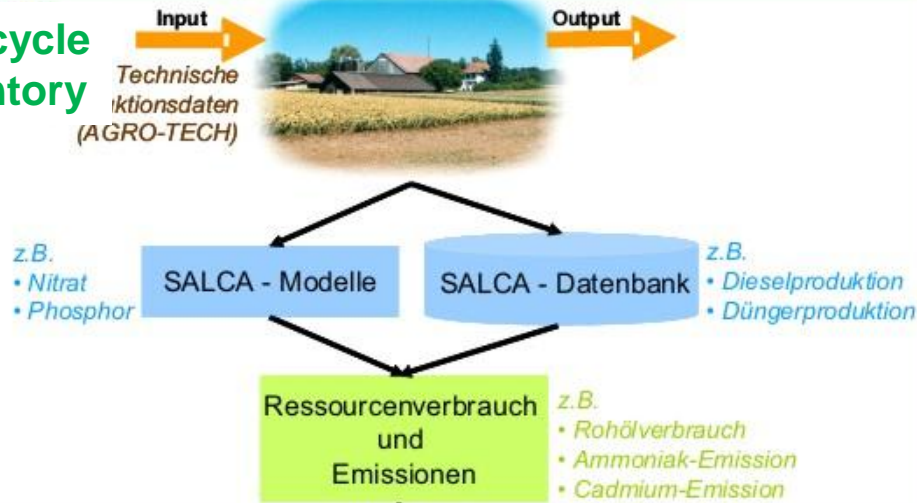
# Life cycle assessment

phase 1

Goal and scope definition

phase 2

Life cycle inventory



phase 3

Impact assessment



phase 4

Analyse



Application on farm

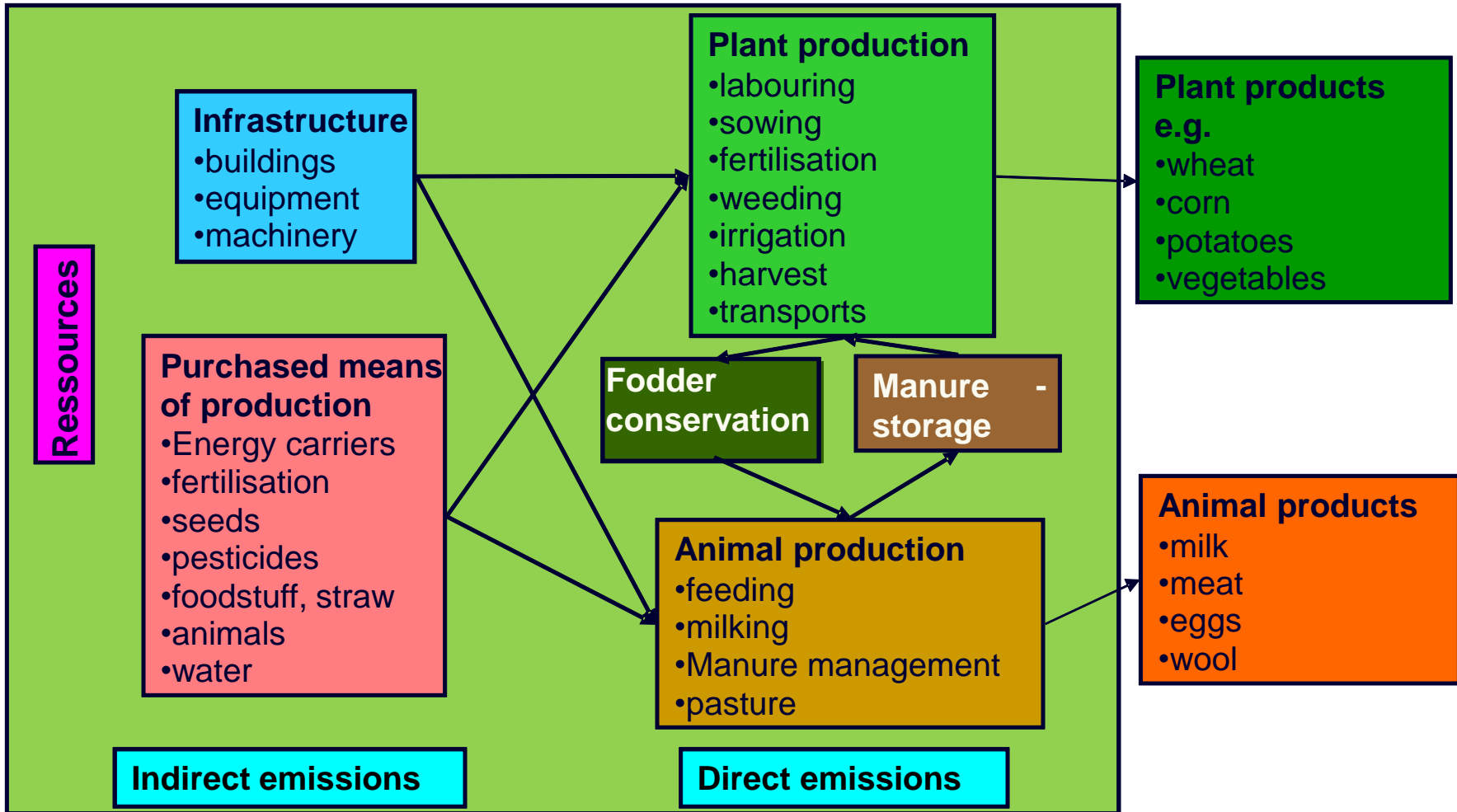


ISO-standards  
ISO 14040  
ISO 14044



# System boundaries

System boundary = farm gate





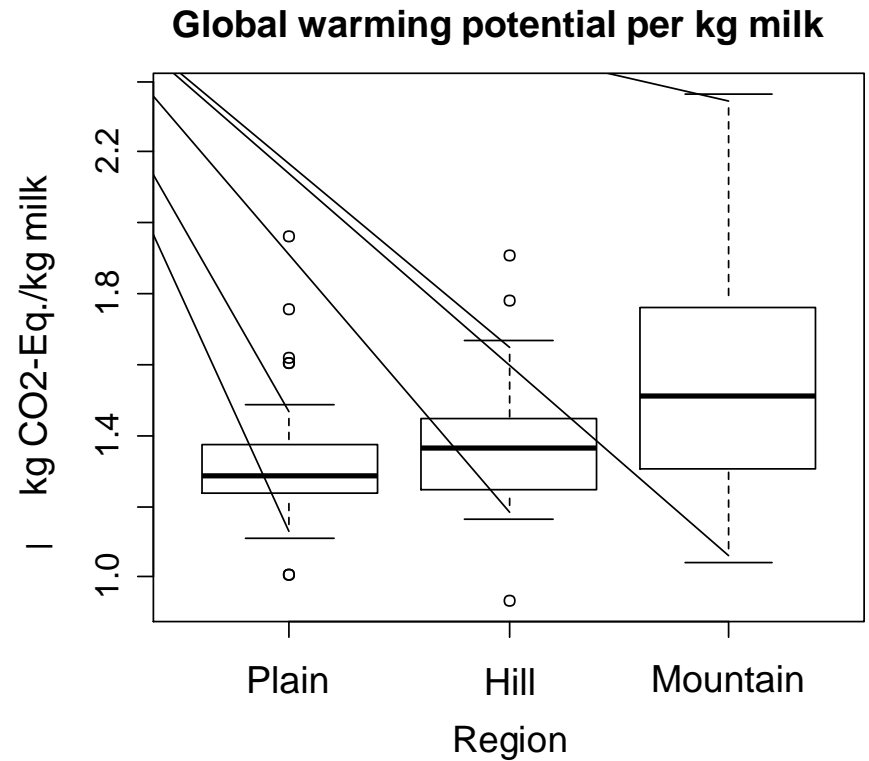
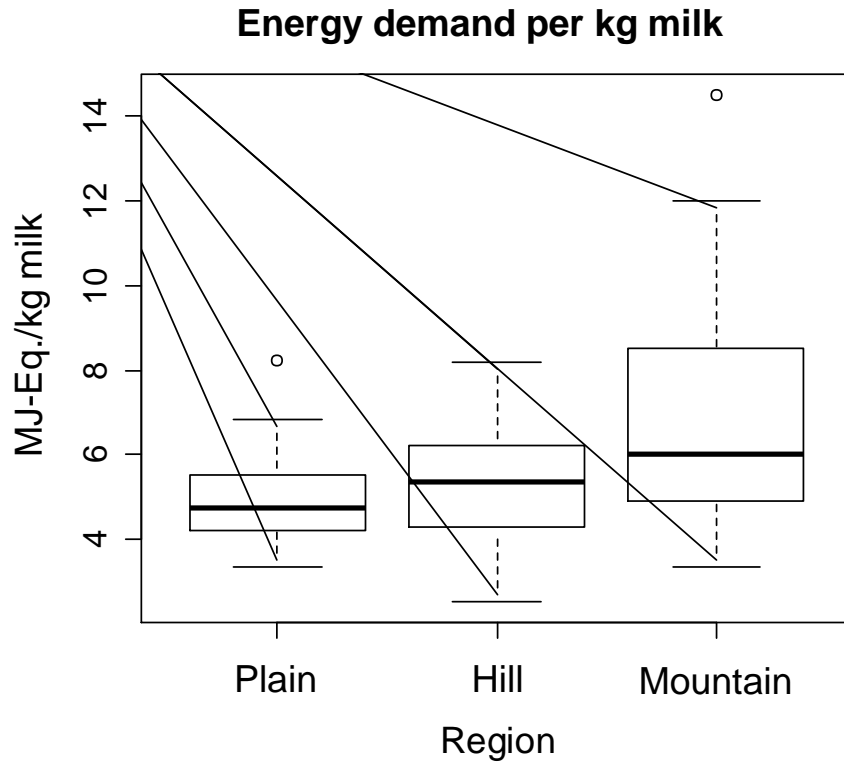
# Overview of the data set

**=> To minimize single-year effects, averages from the years 2007 and 2008 were used (66 farms)**

	Plain region	Hill region	Mountain region
Number of farms	30	20	16
UAA (ha)	28	23	23
Number of dairy cows	24	20	13
Milk yield per cow (kg/year)	6900	6500	6700
Amount of milk sold (kg/year)	150'000	116'000	73'000

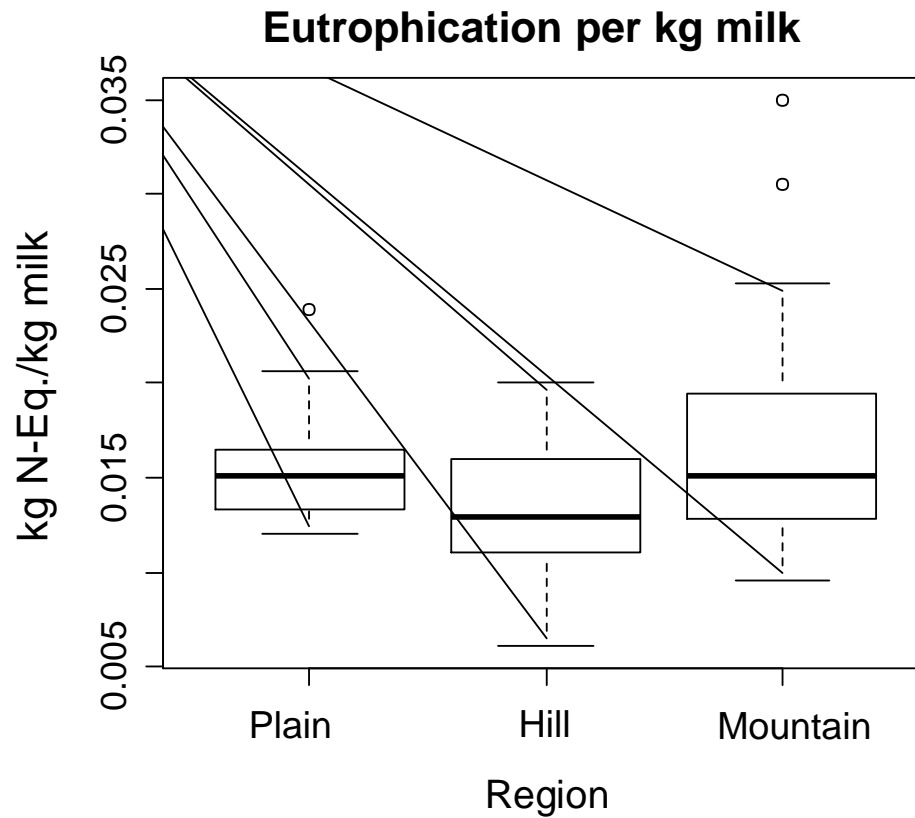


# Overview results (I)



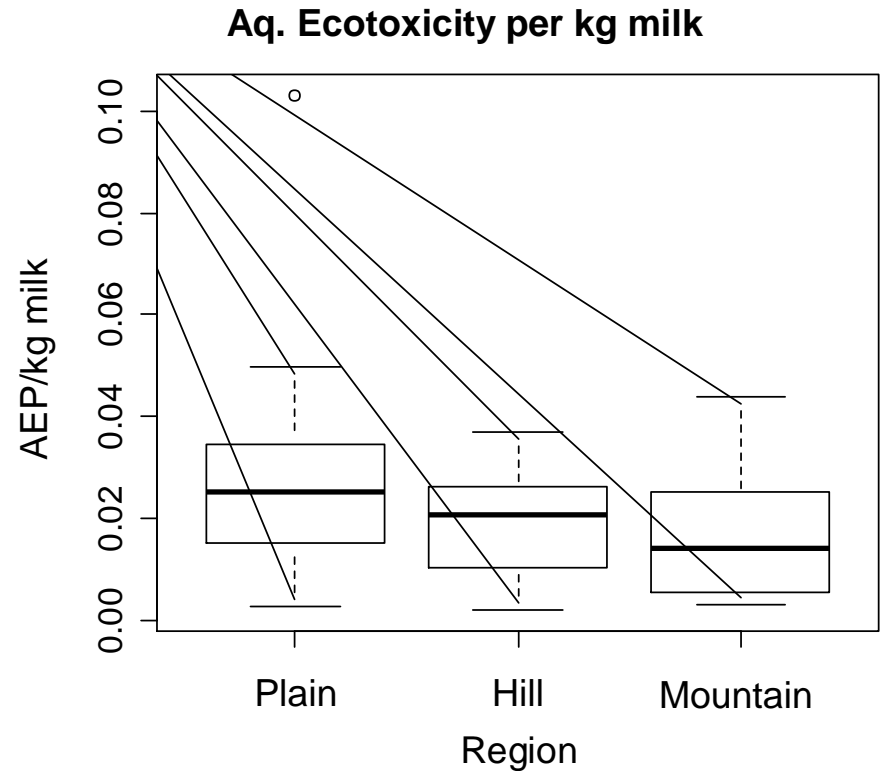
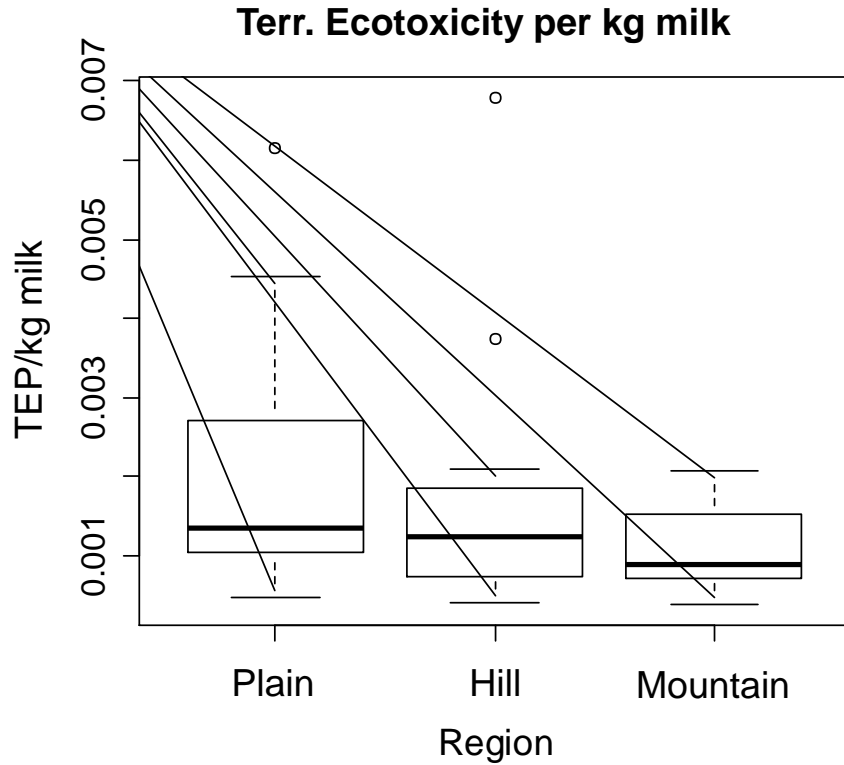


# Overview results (II)





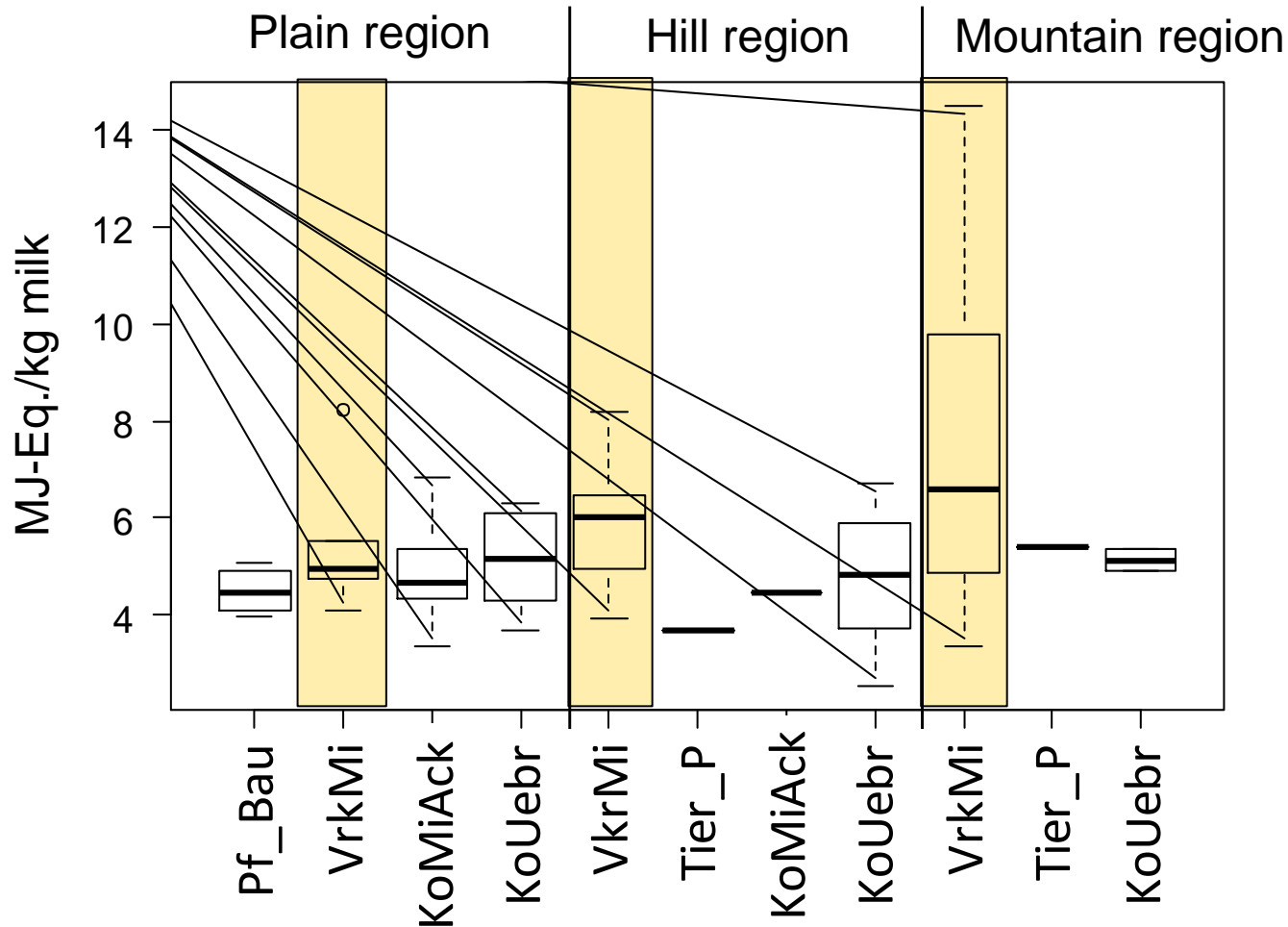
# Overview results (III)



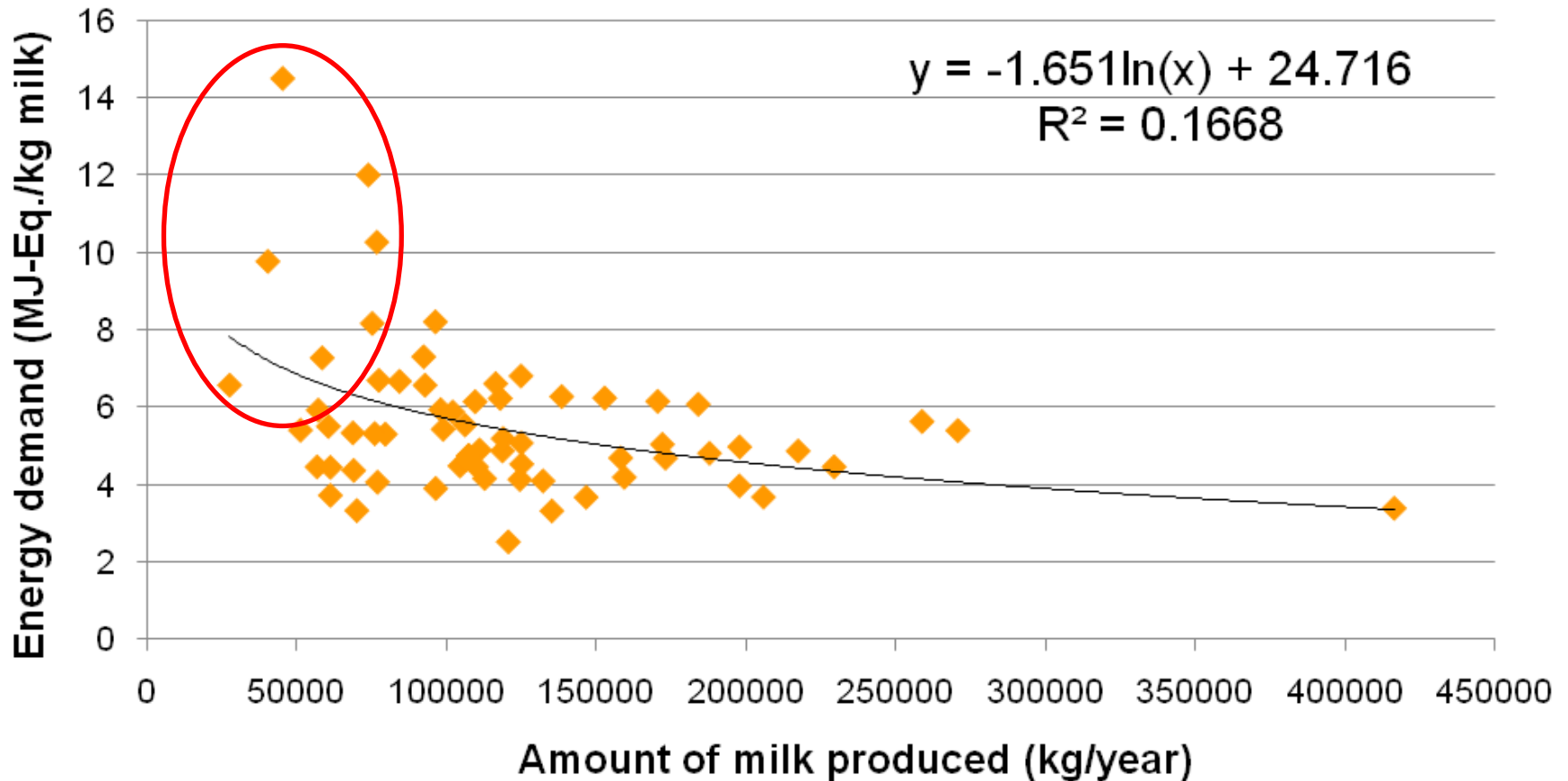


# Comparison farm-types per region

## Energy demand per kg milk

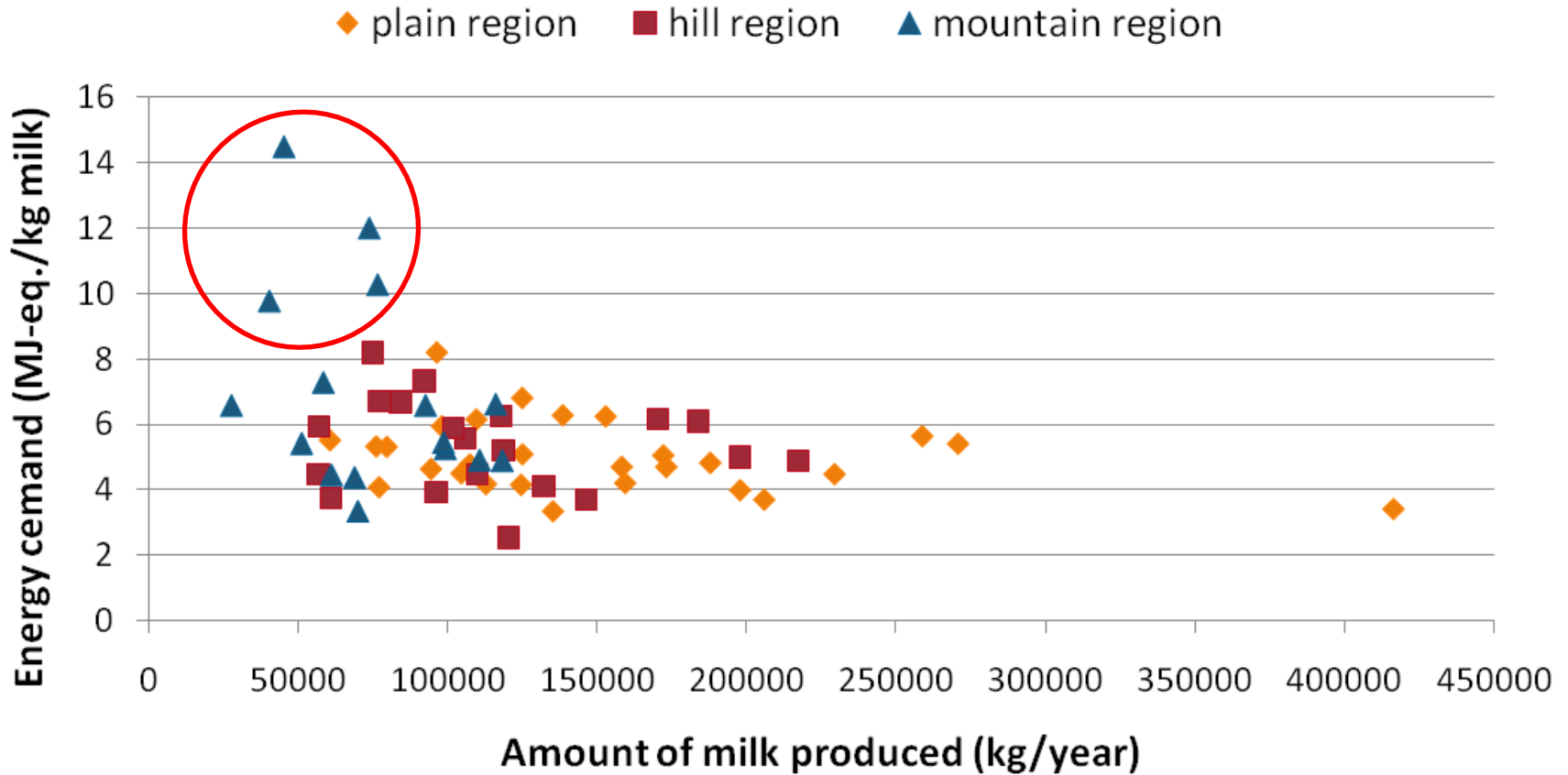


# Relationship with amount of milk sold



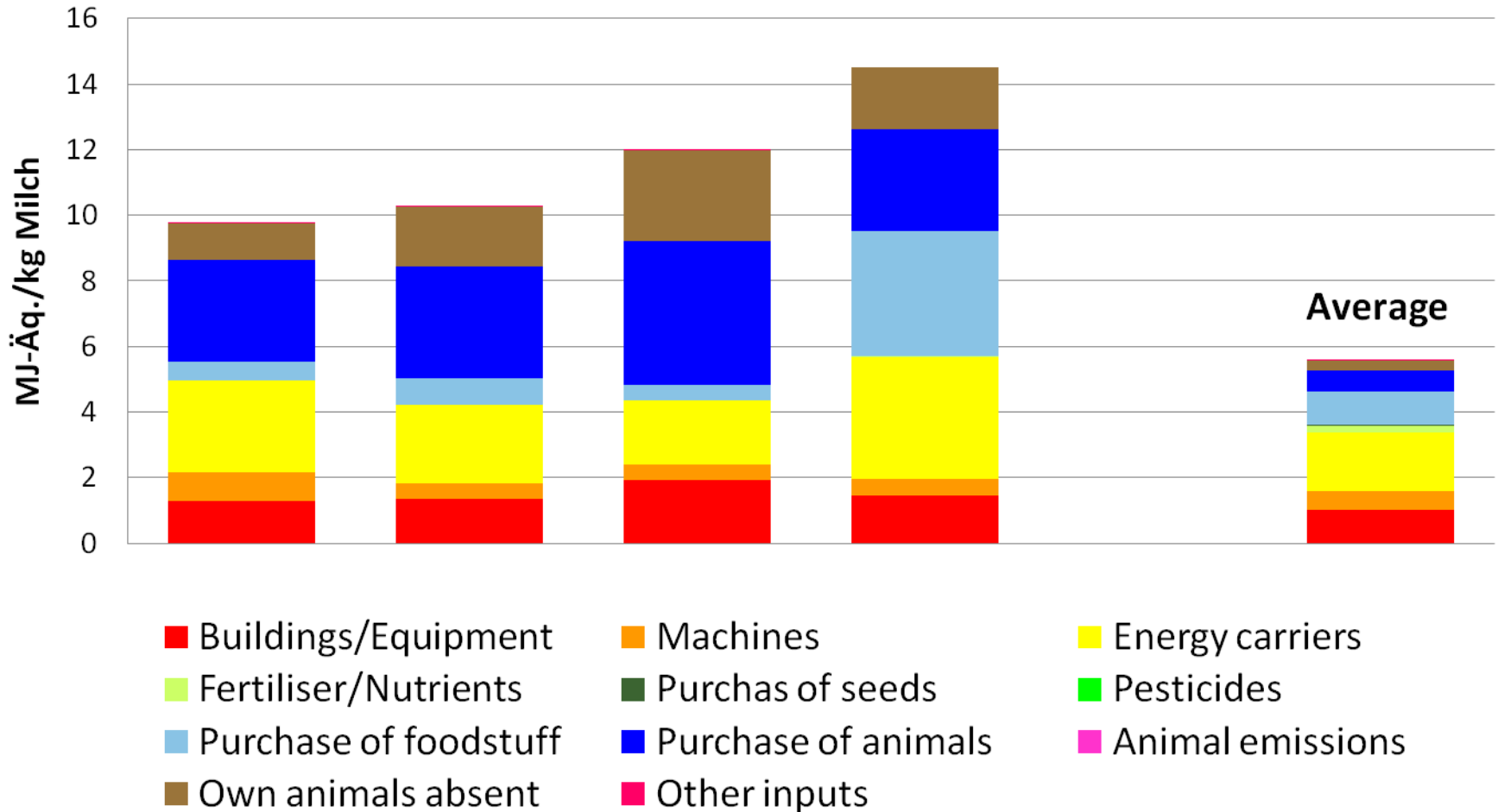
# Relationship with amount of milk sold

## Energy demand vs. amount of milk produced





# Comparison of the 4 highest farms with the average of all farms





# Conclusions

- Farms in the **mountain region** are at risk to have a **higher energy demand** and **global warming potential** per kg milk produced than farms in the plain region
- **Geographical constraints** are important
- **Size** plays a role, but is **not decisive**
- **Remarkable variability** between individual farms
- **Existing potential for optimization**
- It is **possible** for **small farms** in the mountain region to produce with the **same** amount of energy than farms in the plain region!
- **Inter-farm variability** is an important factor to study in order to improve Swiss milk production in the mountain region



# Outlook

- **Analysis** of the **best-performing farms** in total and per region
- Deduction of **crucial factors** for environmental performance
- *Combination with economic indicators*
- **Recommendations** for environmental management of Swiss milk producing farms
- **Publication** to come



# Thank you!



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