

# **A dominance analysis of greenhouse gas emissions, beef output and land use of German dairy farms**

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EAAP – Denmark - 20<sup>th</sup> August 2014

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## Context I

- Dual purpose Fleckvieh breed still plays an important role in some countries (30% in Germany, 80% in Austria, 50% in Slovenia and Czech Republic, 16% in France and Switzerland)
  - Competitiveness in terms of GHG emissions
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## Context II

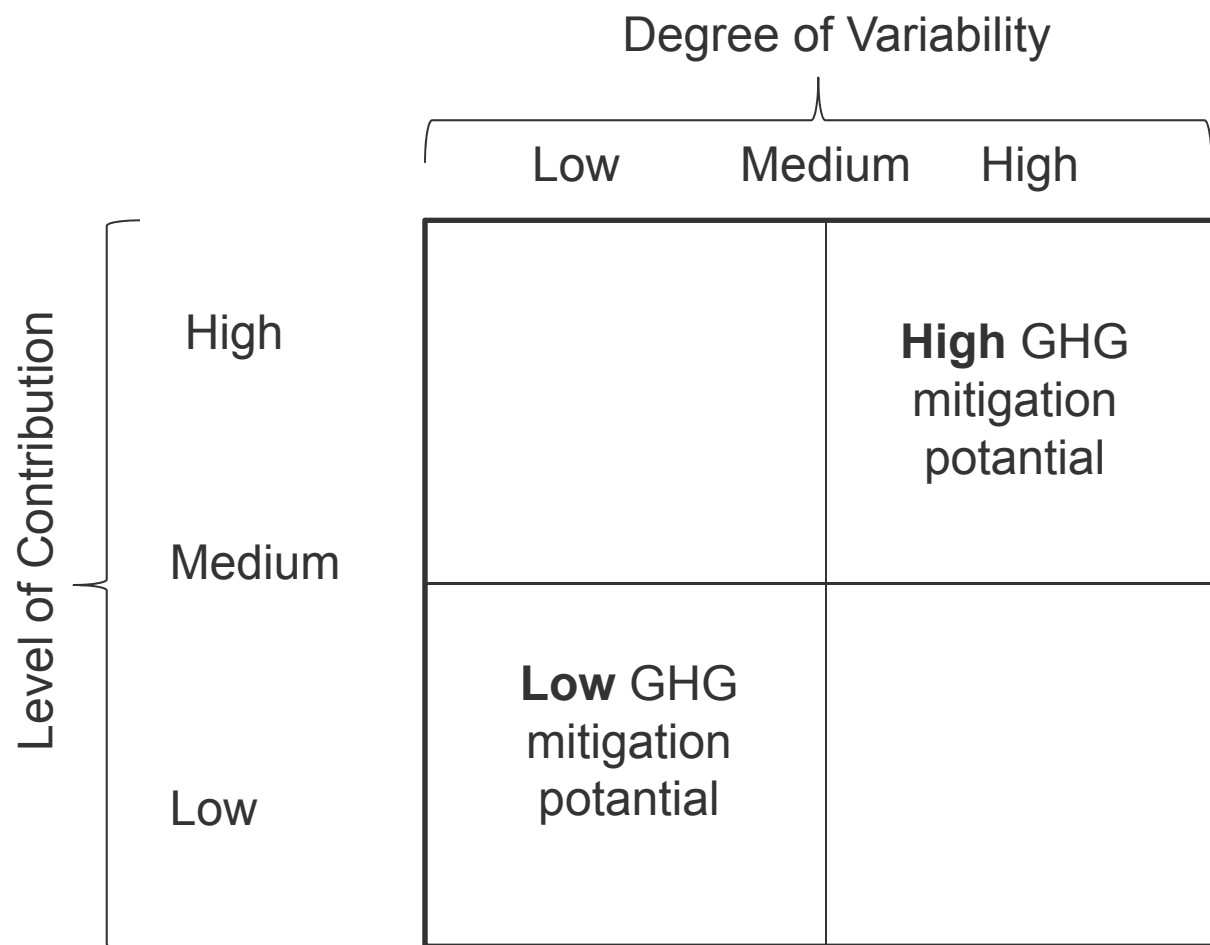
- Modelling approaches: System boundary, uncertainties in GHG modelling, (Flysjö et al., 2012; Zehetmeier et al., 2012; O'Brien et al., 2013; del Prado et al., 2012....)
  - Some studies give insight into variability of GHG emissions between farms of one system (Cederberg and Flysjö, 2004; Thomassen et al., 2008,..)
    - Emissions from products and production systems in general
    - Significance of single variables
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## Research question

Opportunities to mitigate GHG emissions?

- Change in system
  - Sources of variation – and relative importance
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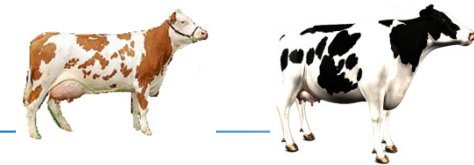
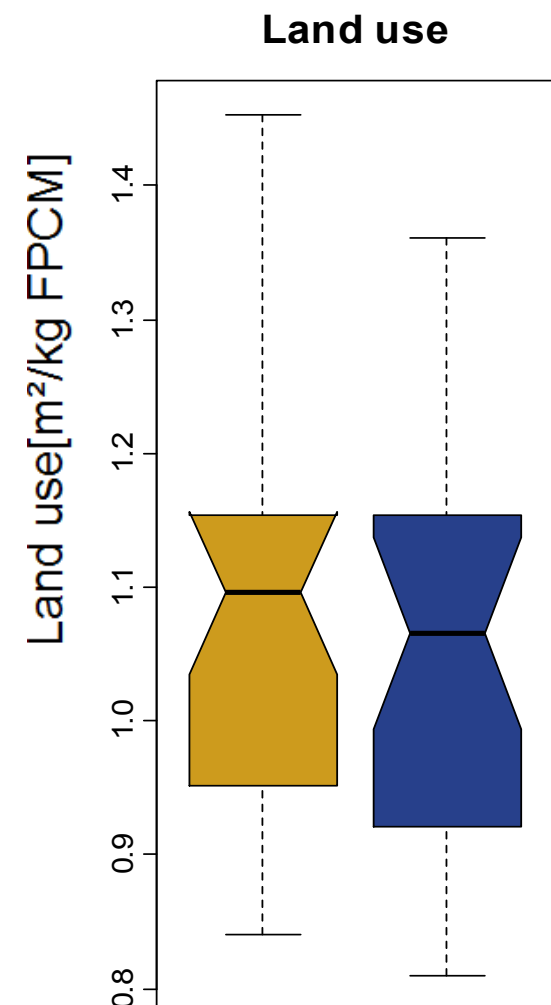
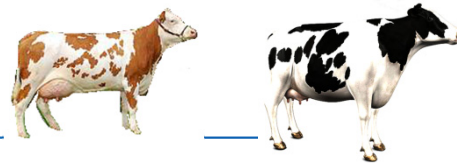
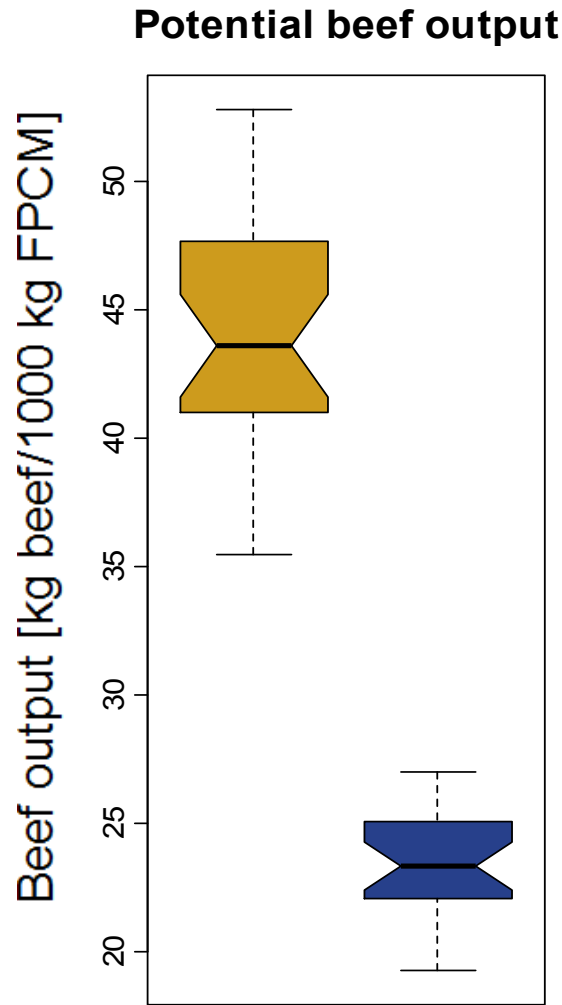
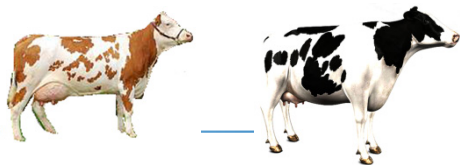
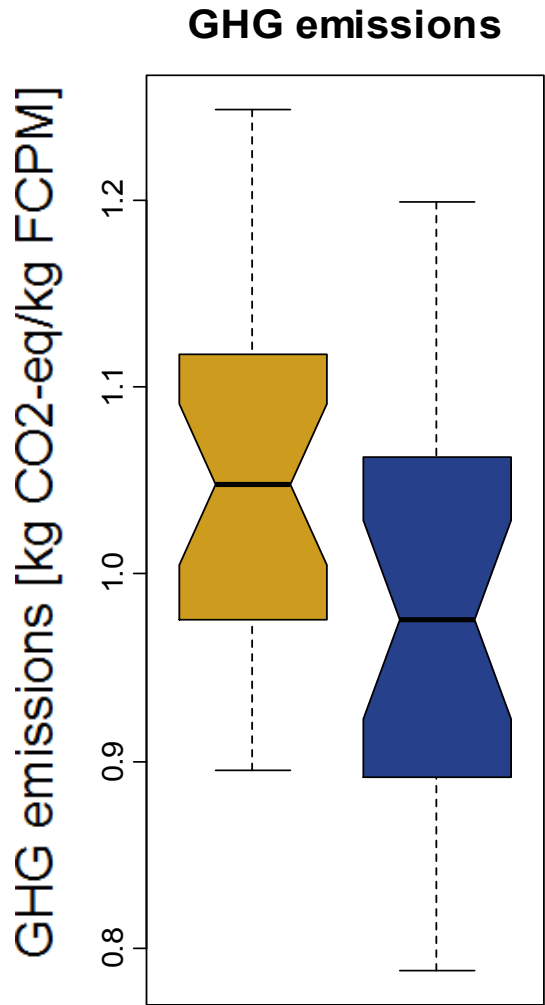
## Identifying important variables



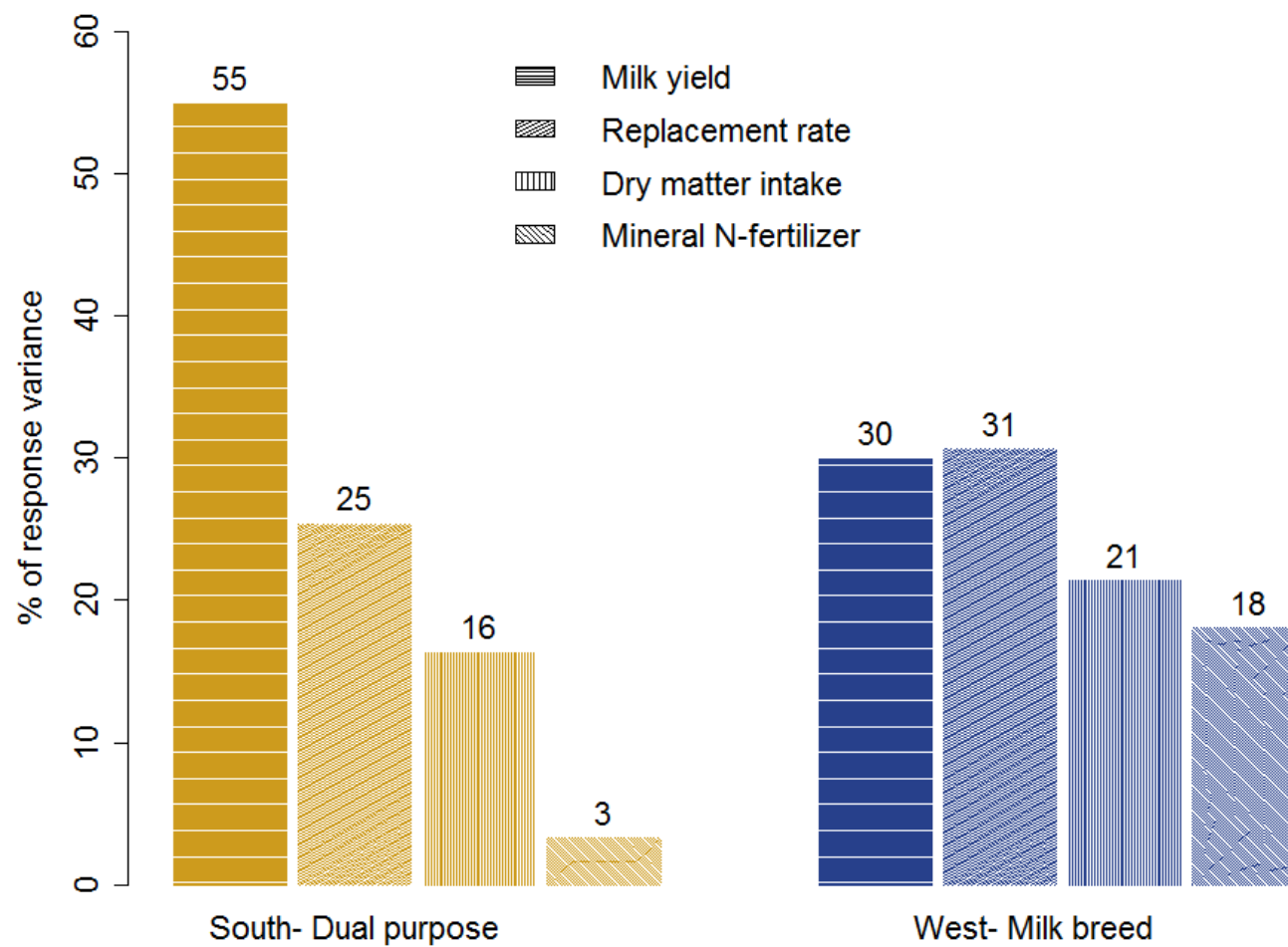
## Farm characteristics and production traits

Item	Unit	South – Dual purpose		West – Milk breed	
		Mean	(max-min)	Mean	(max-min)
Number of farms	#	27		26	
Dairy cows	#	86	(145-49)	149	(457-67)
Milk yield	kg FPCM/cow per year	8600	(9840-7507)	9600	(10680-8186)
Replacement rate	%	29	(55-14)	27	(51-15)
Calving interval	days	380	(416-359)	410	(461-380)
Feed intake dairy cow	kg DM/cow/year	7081	(8816-6153)	7686	(8700-7033)

# Variability within the system

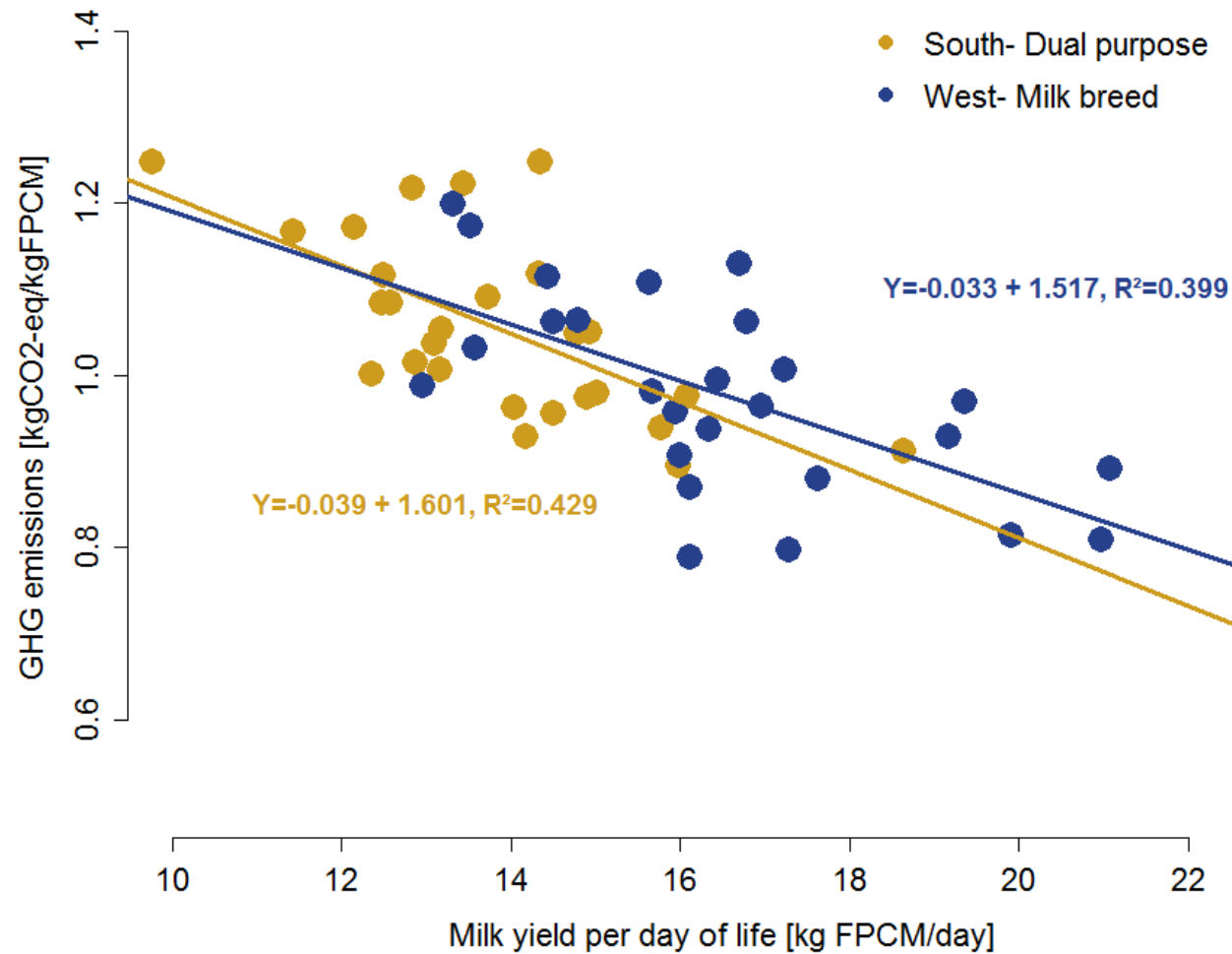


## Dominance Analysis – GHG emissions

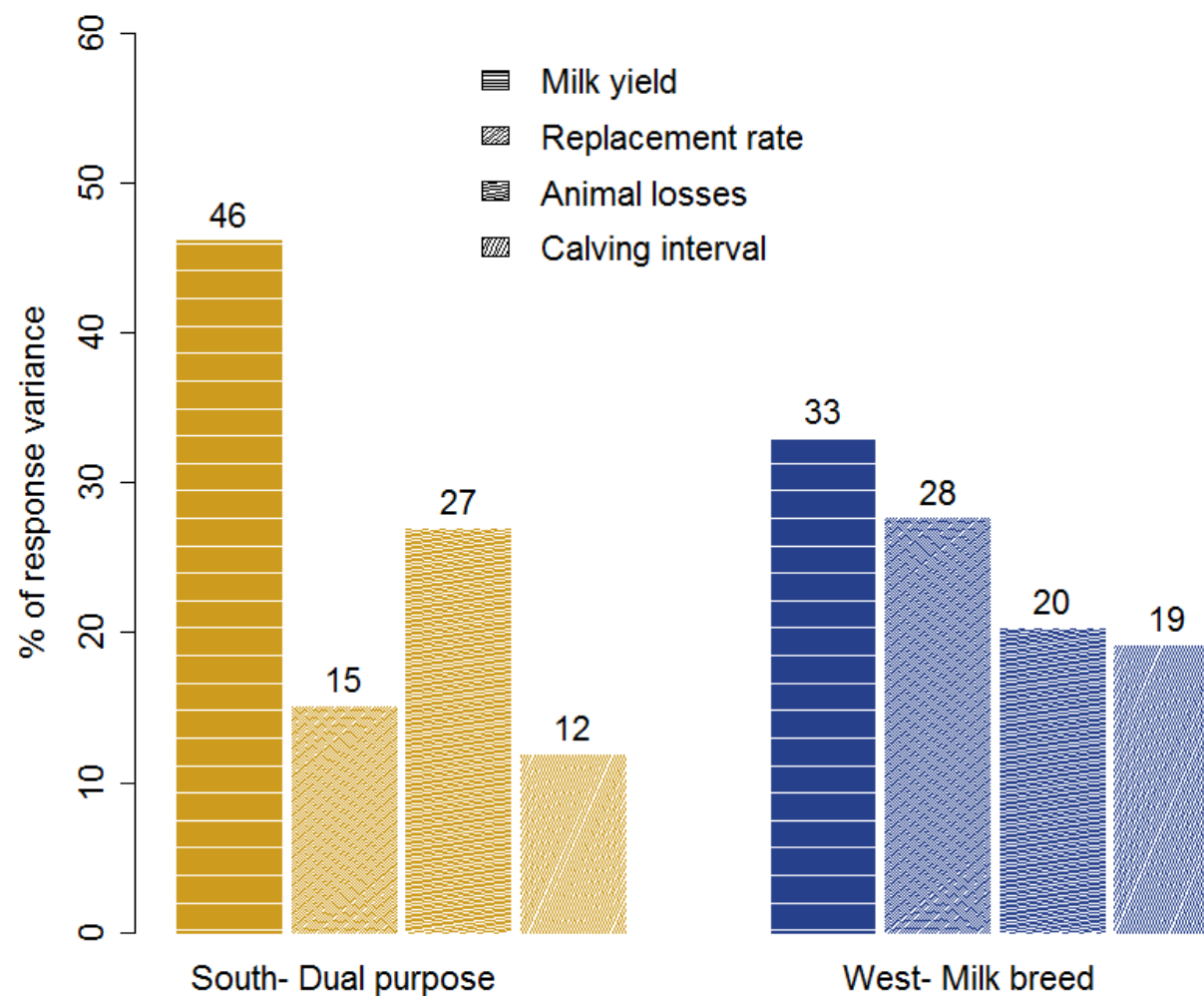




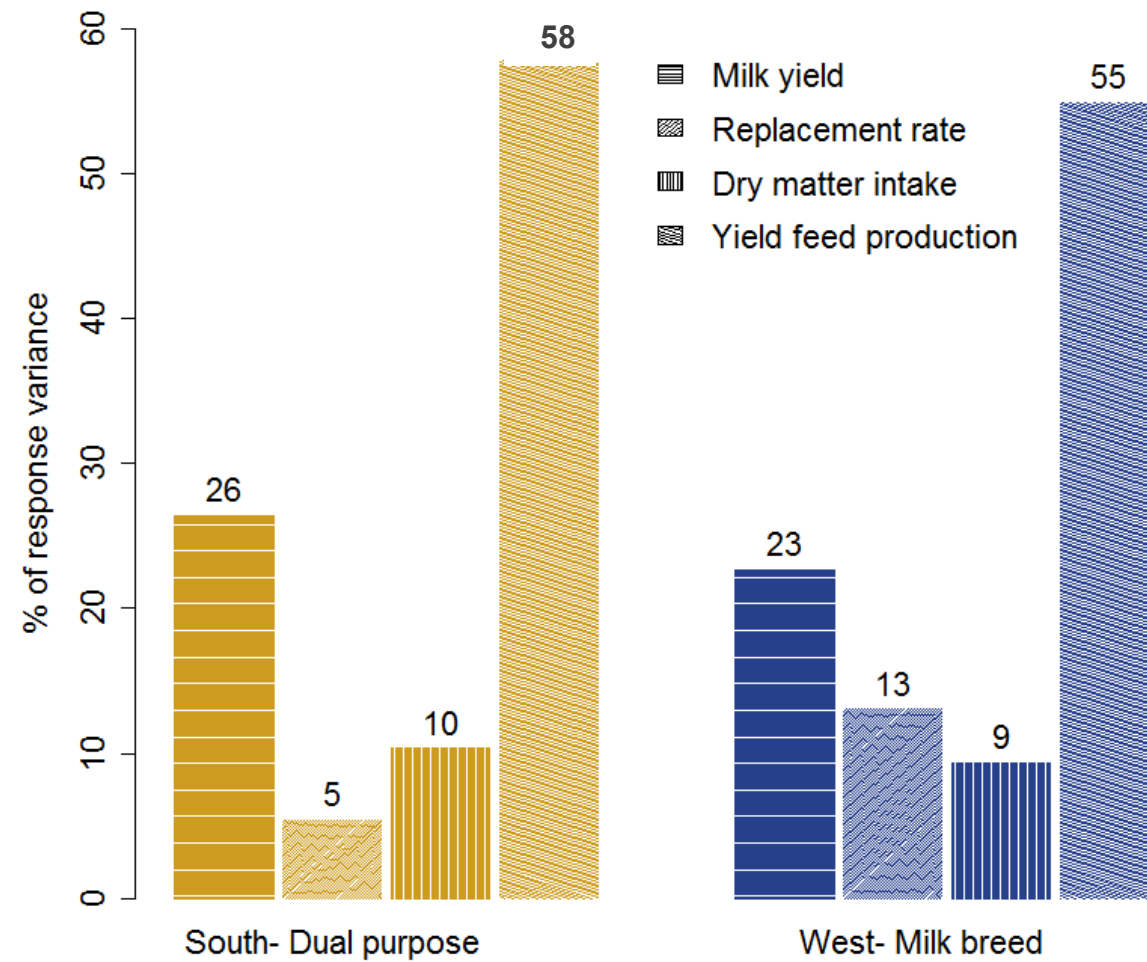
## GHG emissions per kg of FPCM as a function of milk yield per day of life



## Dominance Analysis – Potential beef output



## Dominance Analysis – Land use



## Conclusions

- Need to identify „important“ variables
  - Identify net GHG mitigation options
  - Potential beef output and land use as additional indicators
  - Outlook
    - opportunity costs of land use: quantity and quality
    - site-specificity of dairy system evaluation
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Thank you!



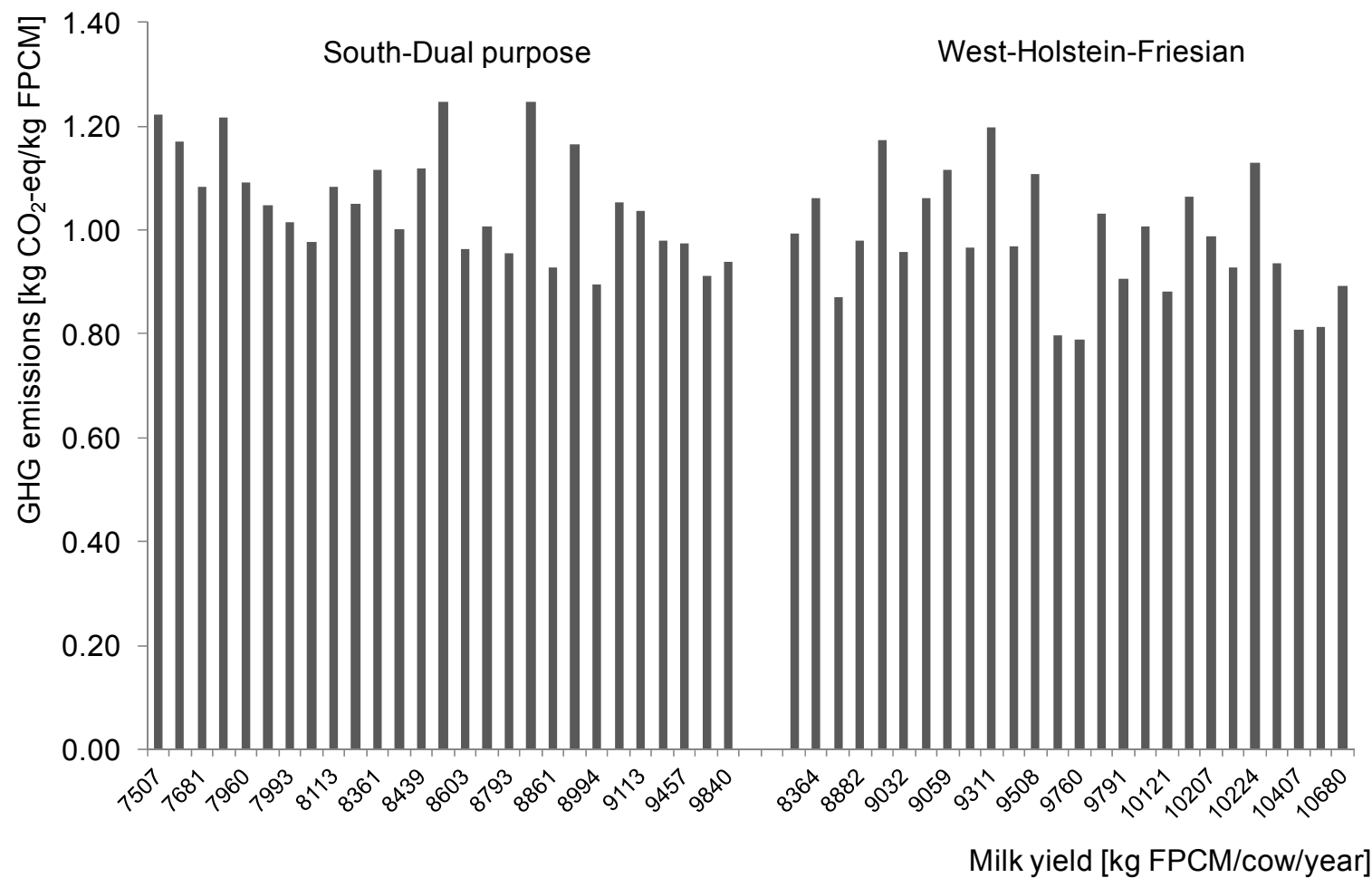
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M. Zehetmeier<sup>a,c,\*</sup>, H. Hoffmann<sup>a</sup>, J. Sauer<sup>a</sup>, G. Hofmann<sup>c</sup>, G. Dorfner<sup>c</sup>, D. O'Brien<sup>b</sup>

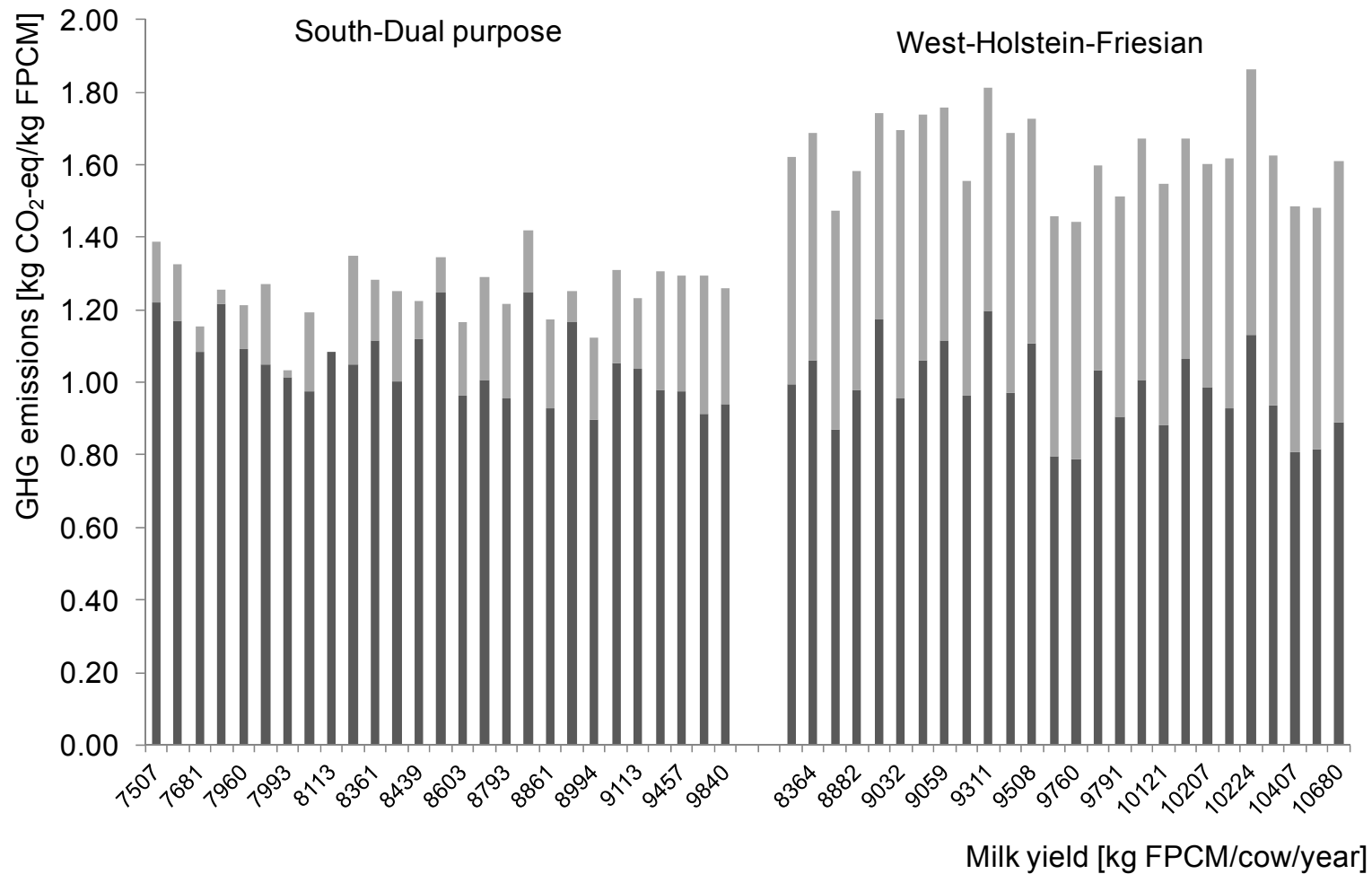




# GHG emissions per kg milk depending on milk yield

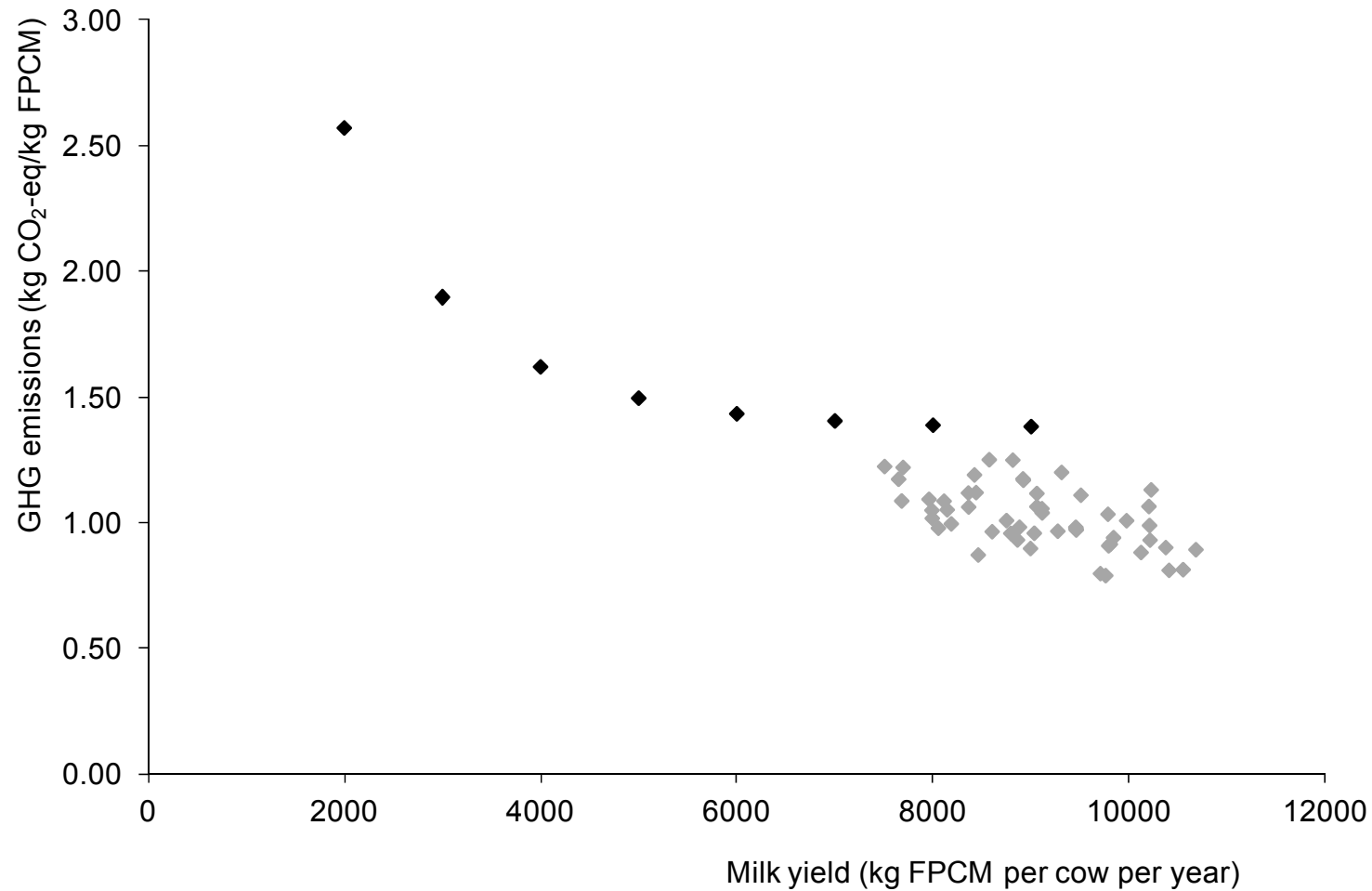


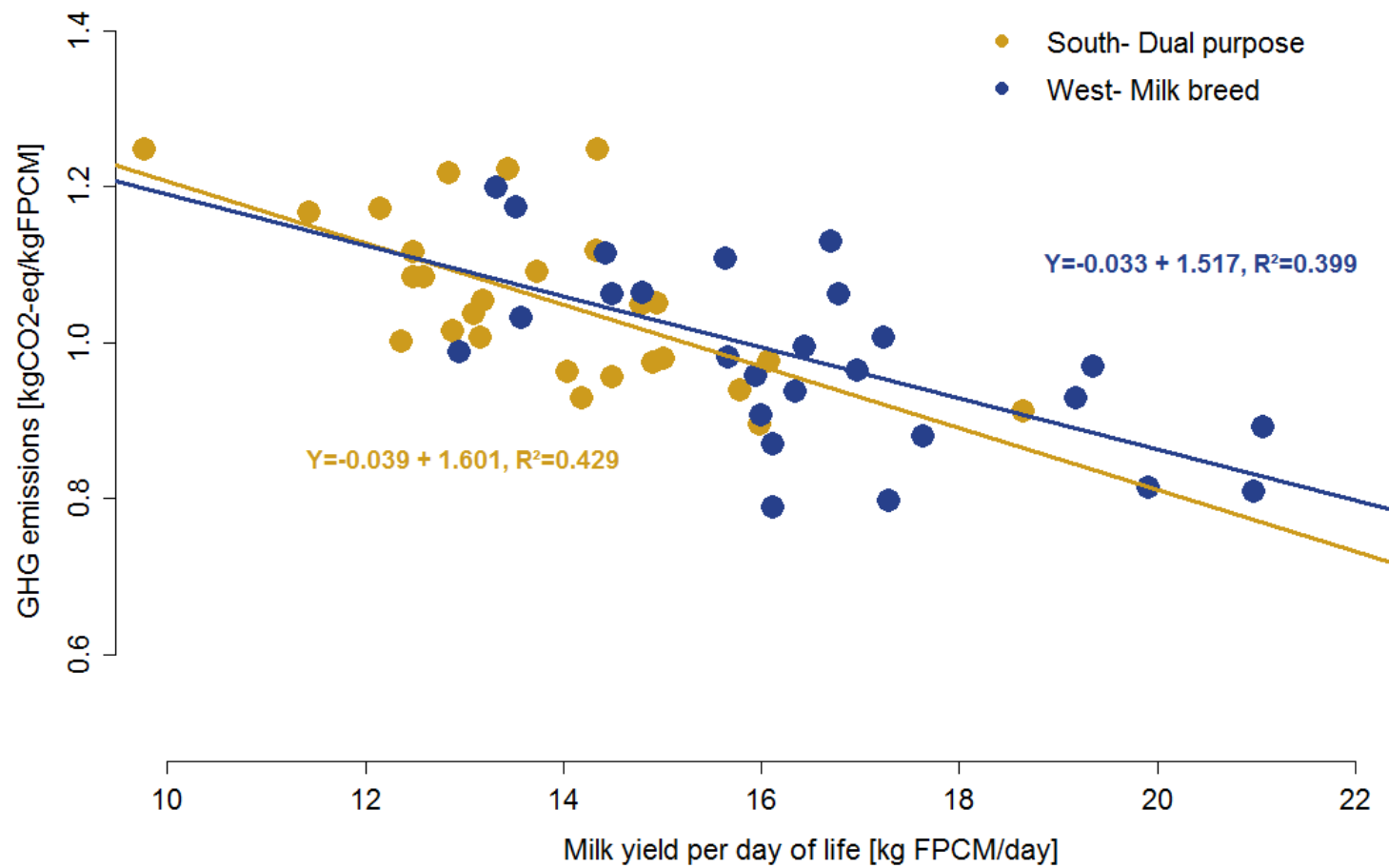
# GHG emissions per kg milk depending on milk yield – constant beef production





## GHG emissions per kg of FPCM as a function of milk yield/cow/year





# Zusammenhänge zwischen THG-Vermeidung, Nahrungssicherheit und Fläche

