

# **Effect of uncertainty on GHG emissions and economic performance for increasing milk yields in dairy farming**

Monika Zehetmeier; M. Gandorfer; A. Heißenhuber

Technische Universität München-Weihenstephan

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## Outline

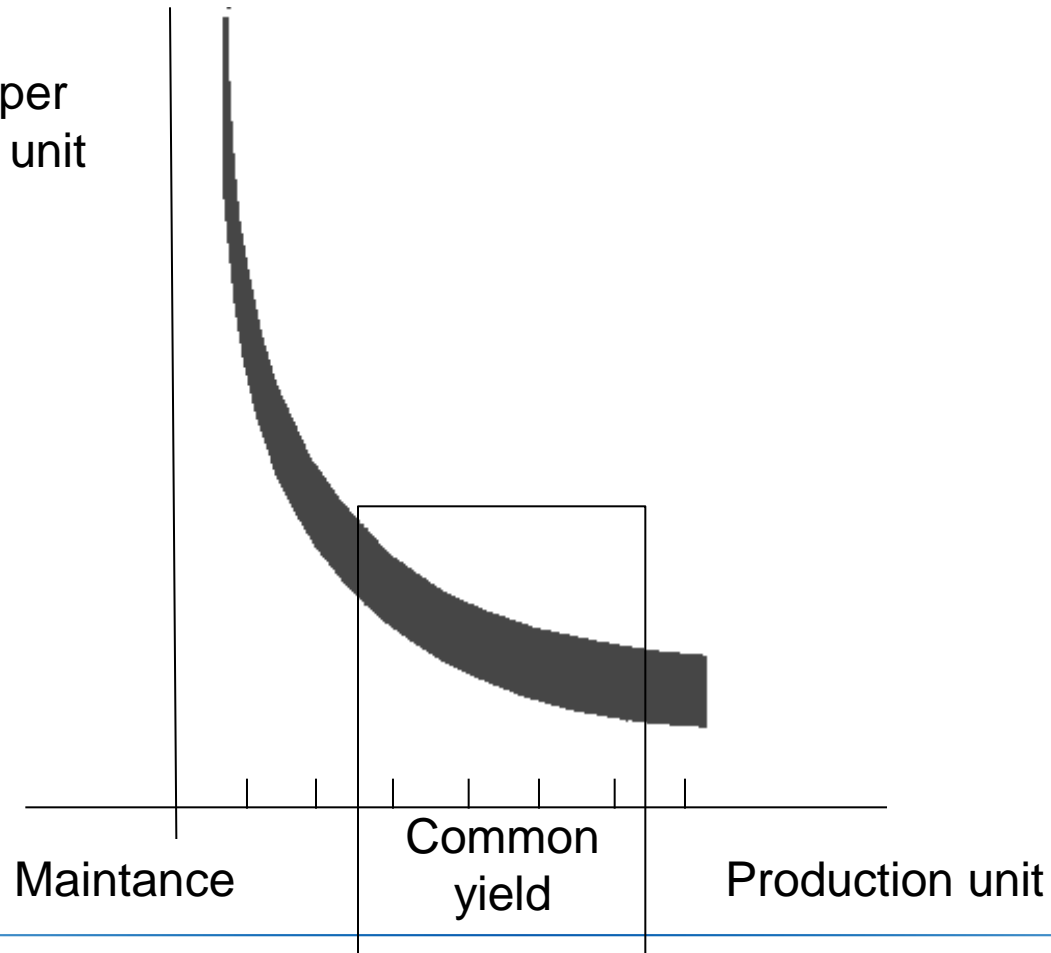
- Milk yield and GHG emissions
- Model description
- GHG emissions of cows with different milk yields
- Uncertainties of GHG emissions and production traits

## Outline

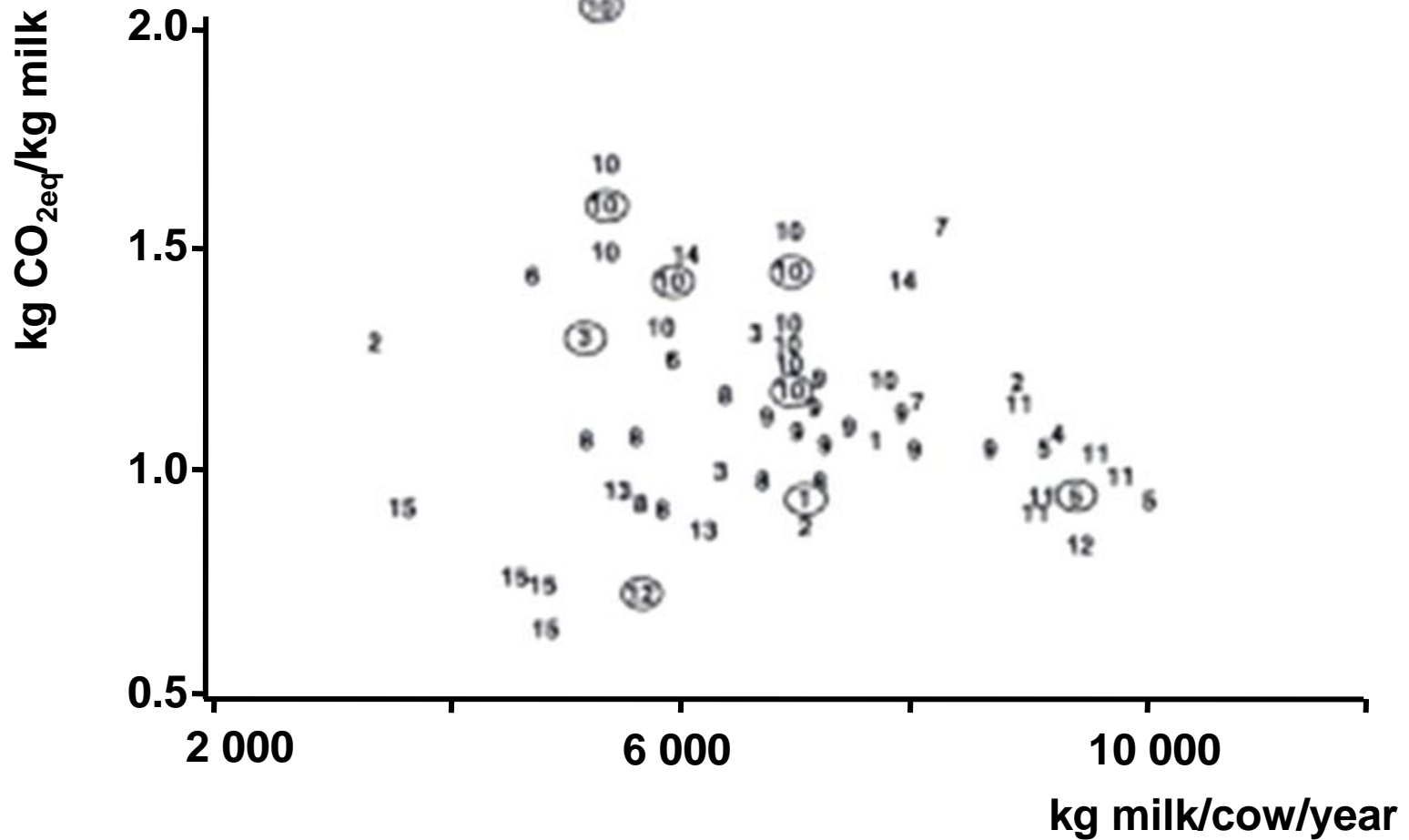
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# Milk yield and methane emissions

Methane  
emissions per  
production unit



# Total GHG emissions and milk yield





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# Model description

**Milk production**

Dairy cows

	
6 000 kg	10 000 kg
8 000 kg	12 000 kg

Calves  
Breeding heifers

**Beef production**

Cull cow  
Bull, heifer, calf fattening  
Suckler cow

## Model Outputs

GHG emissions

Land requirement

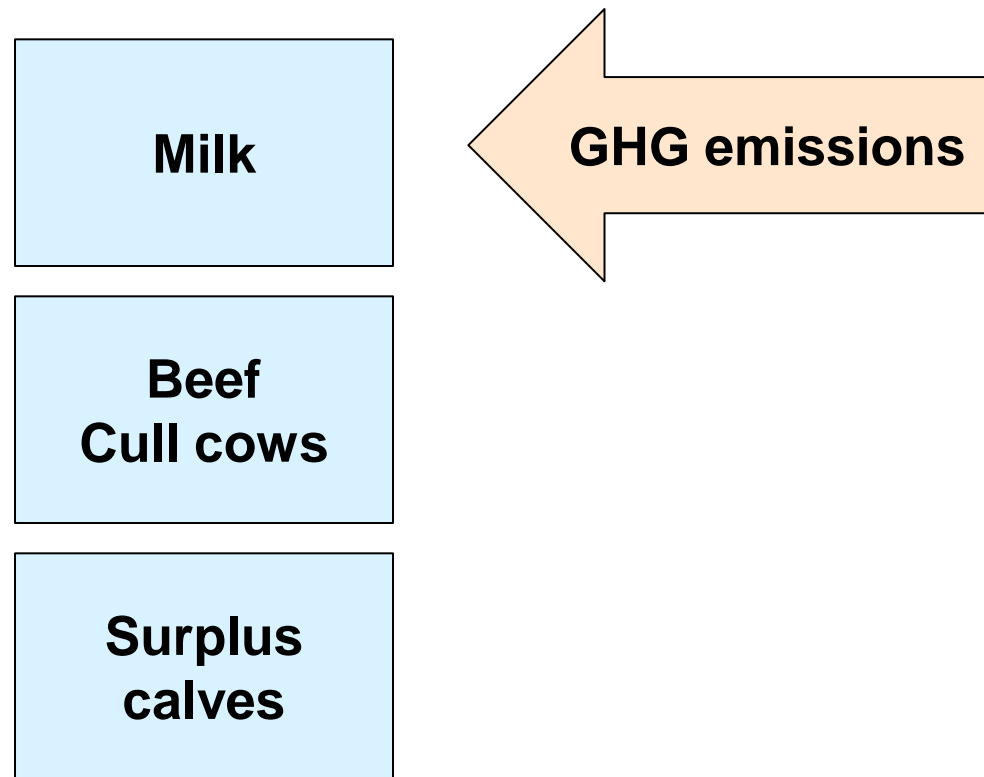
Milk and beef

Returns and costs

Feed conversion ratio (feed input/unit food output) total/edible

## Allocation methods – GHG emissions

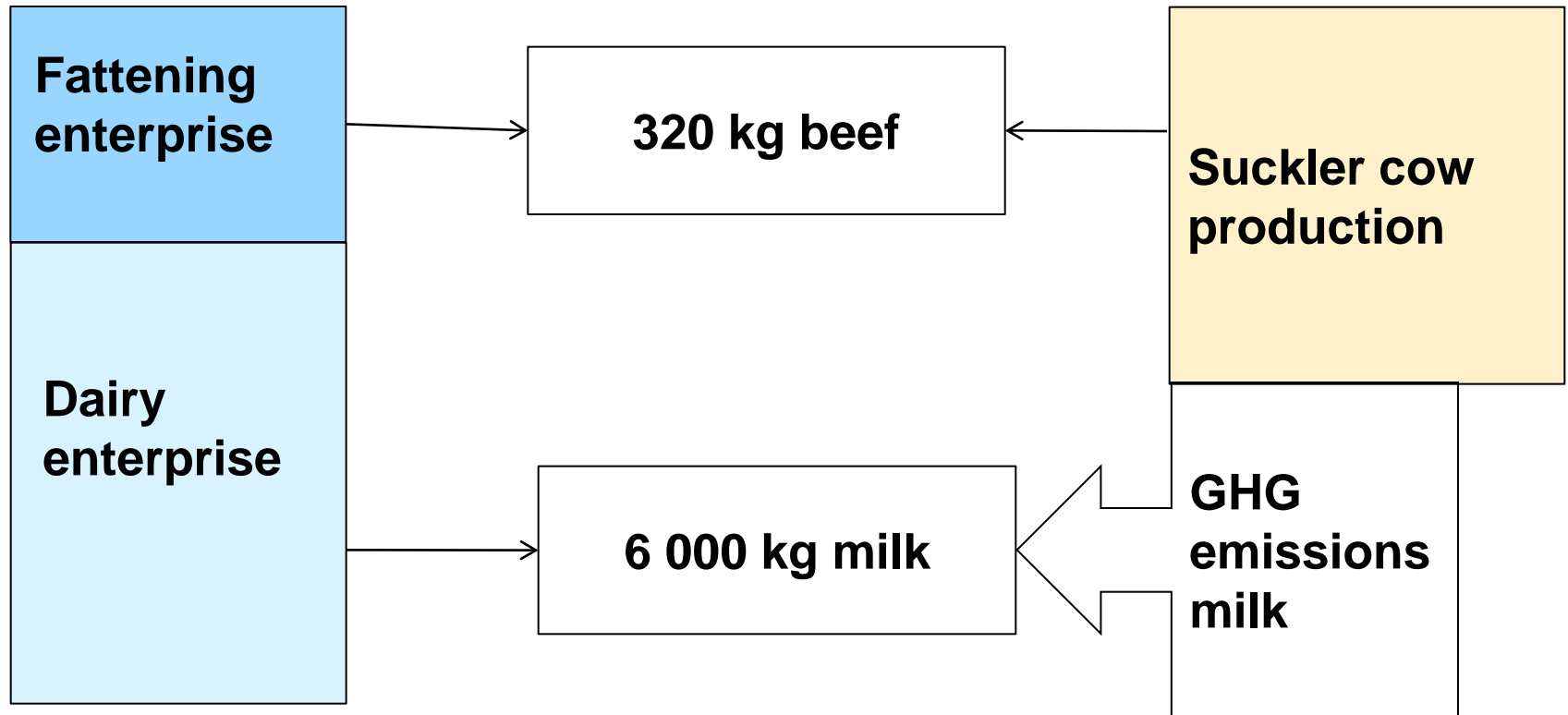
### All to milk





# Allocation methods – GHG emissions

## System expansion



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## GHG emissions of cows with different milk yields

		6 000 kg	8 000 kg	10 000 kg	12 000 kg
<b>All to milk</b>	kg CO <sub>2eq</sub> /kg milk	1.35	1.13	0.98	0.85
<b>System expansion</b>	kg CO <sub>2eq</sub> /kg milk	0.43	0.43	0.57	0.51

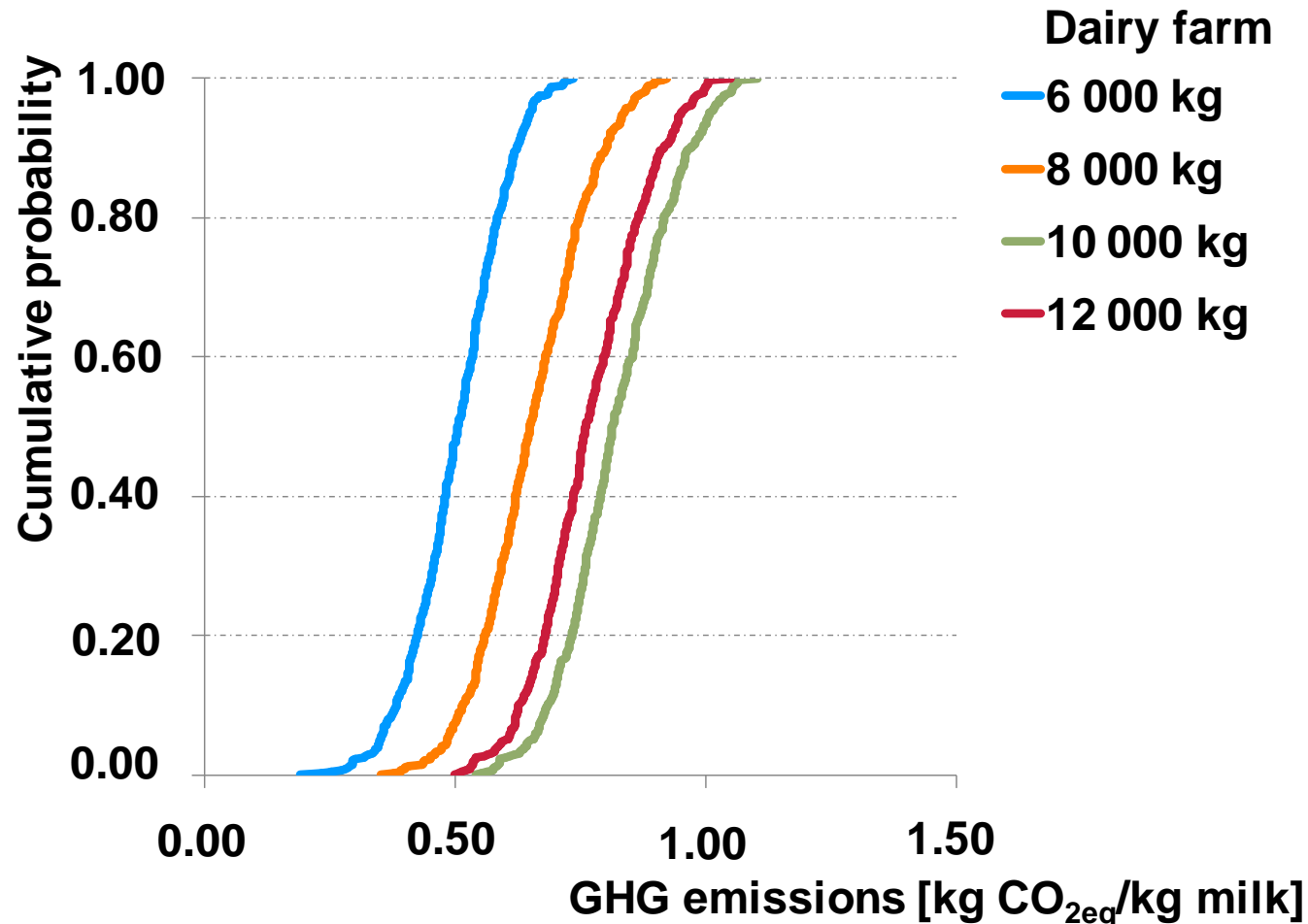
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- **Uncertainties of GHG emissions** and production traits

## Uncertainties of GHG emission factors

- Enteric methane emissions
- N<sub>2</sub>O-emissions from N application and grazing
- Emission factor for soybean meal (0.34 – 6.02 kg CO<sub>2eq</sub>/kg DM)

## Uncertainty GHG emissions – System expansion



## Outline

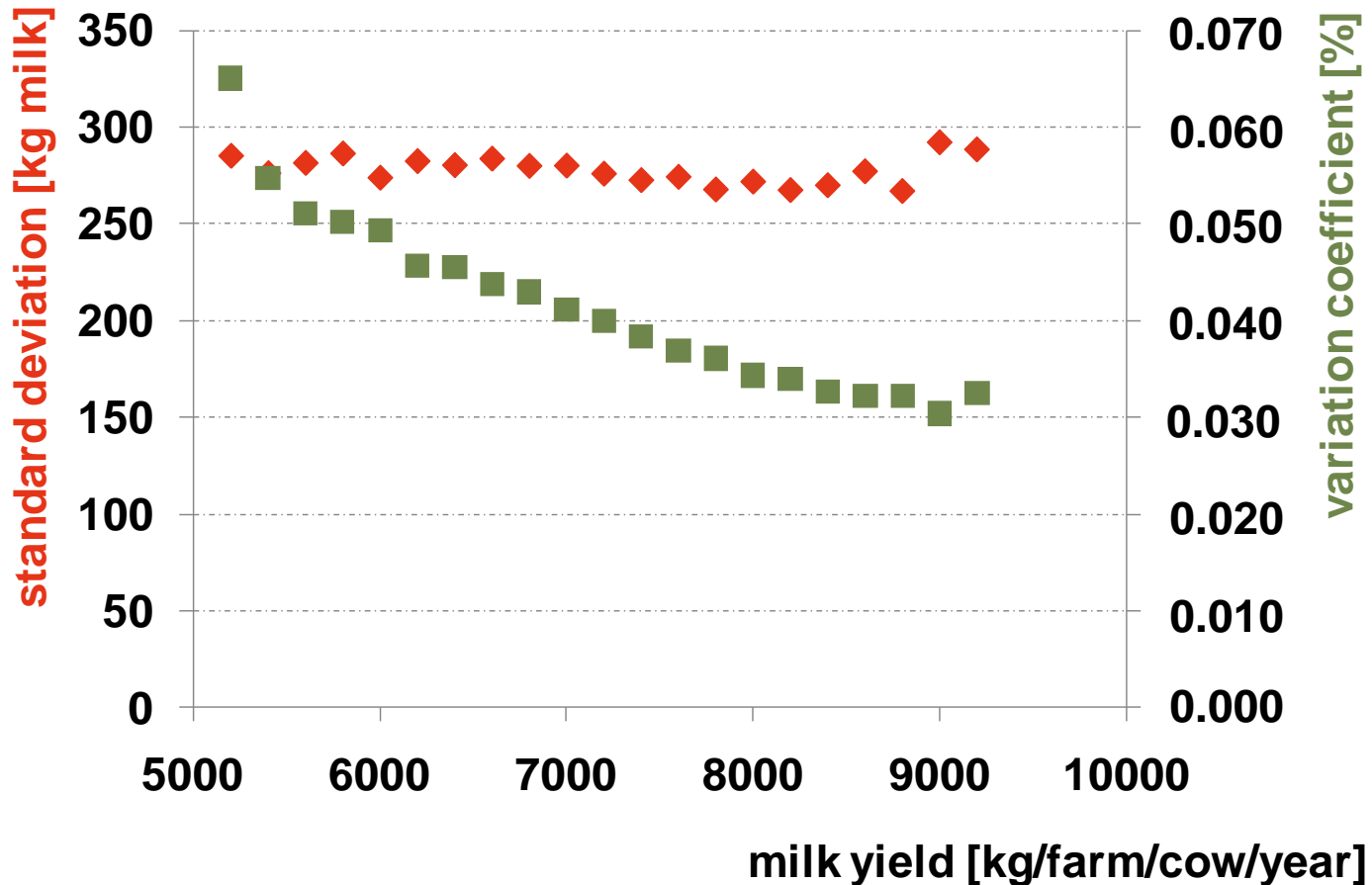
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- **Uncertainties of GHG emissions and production traits**

## Uncertainties production traits

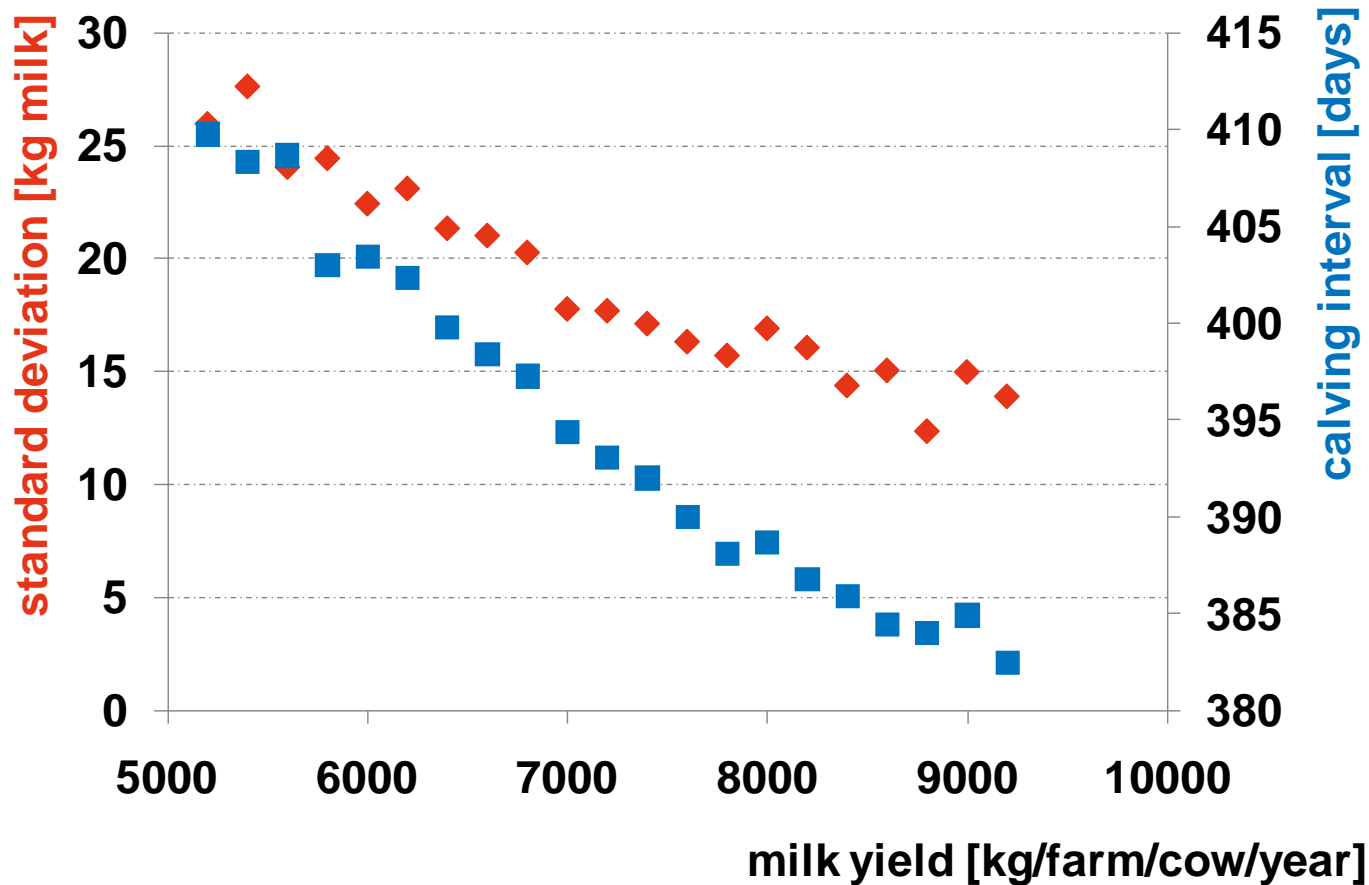
- Milk yield
- Calving interval
- Replacement rate
- Milk price change due to milk contents



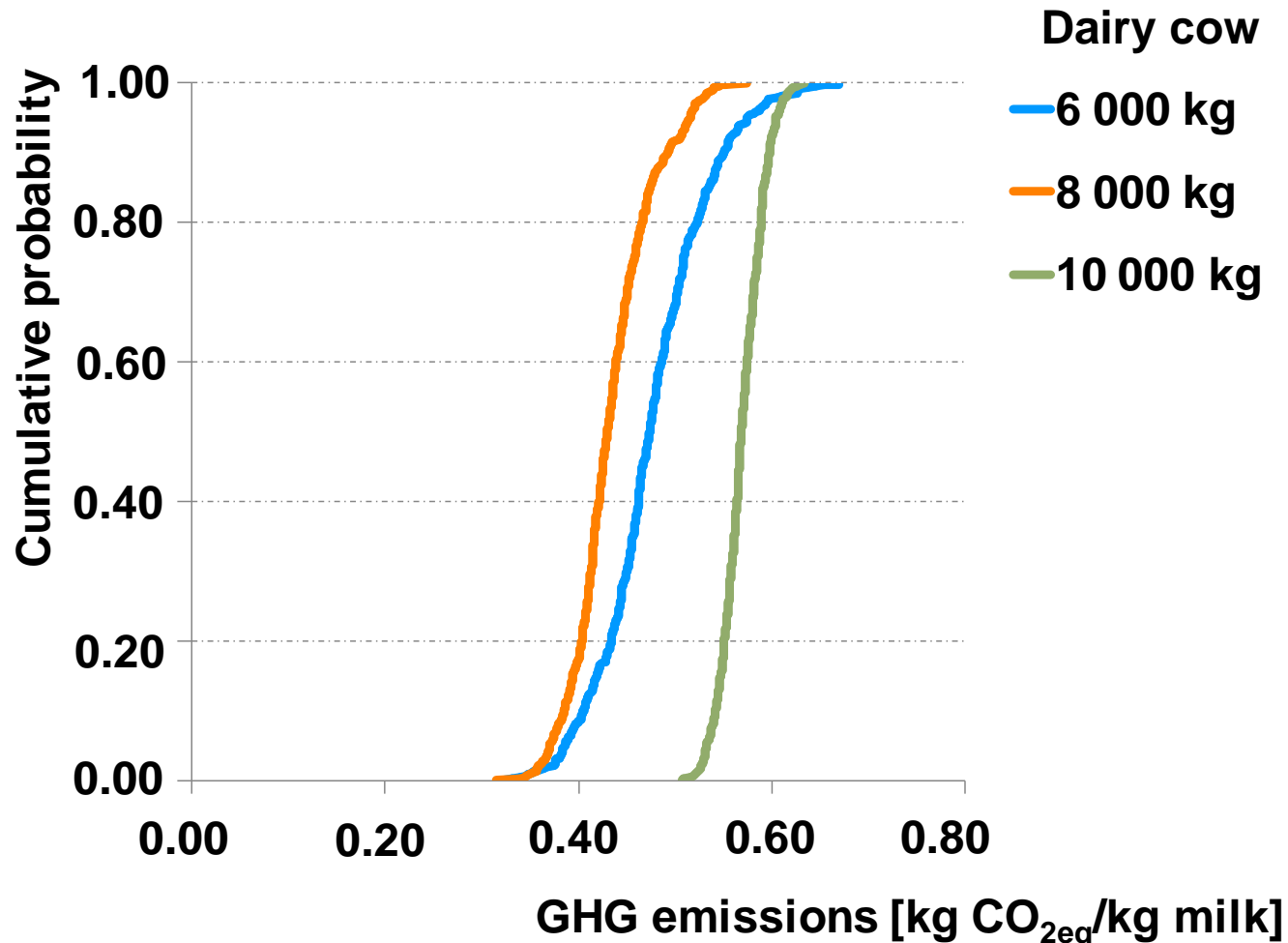
# Uncertainties production traits – milk yield (dual purpose breed)



# Uncertainties production traits – calving interval (dual purpose breed)



# Uncertainty GHG emissions – production traits – System expansion



## Conclusions

- Effect of increasing milk yield per cow on GHG emissions
  - Allocation methods
  - Emission factors
  - Production traits
- More potential to reduce GHG emissions within lower yielding dairy farms
- System approach is needed to evaluate intensification in dairy farming