Relationships between CH_4 emissions and technico-economic data from commercial dairy herds

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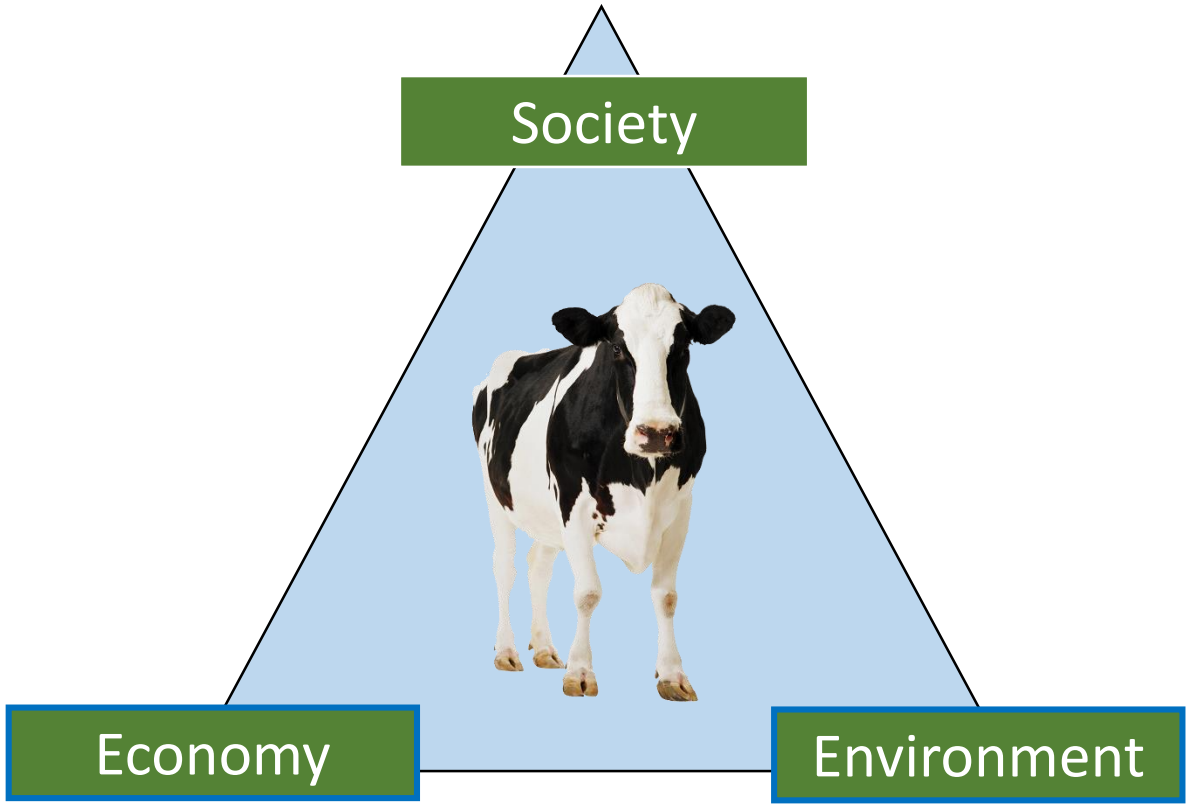

Sustainable dairy farming

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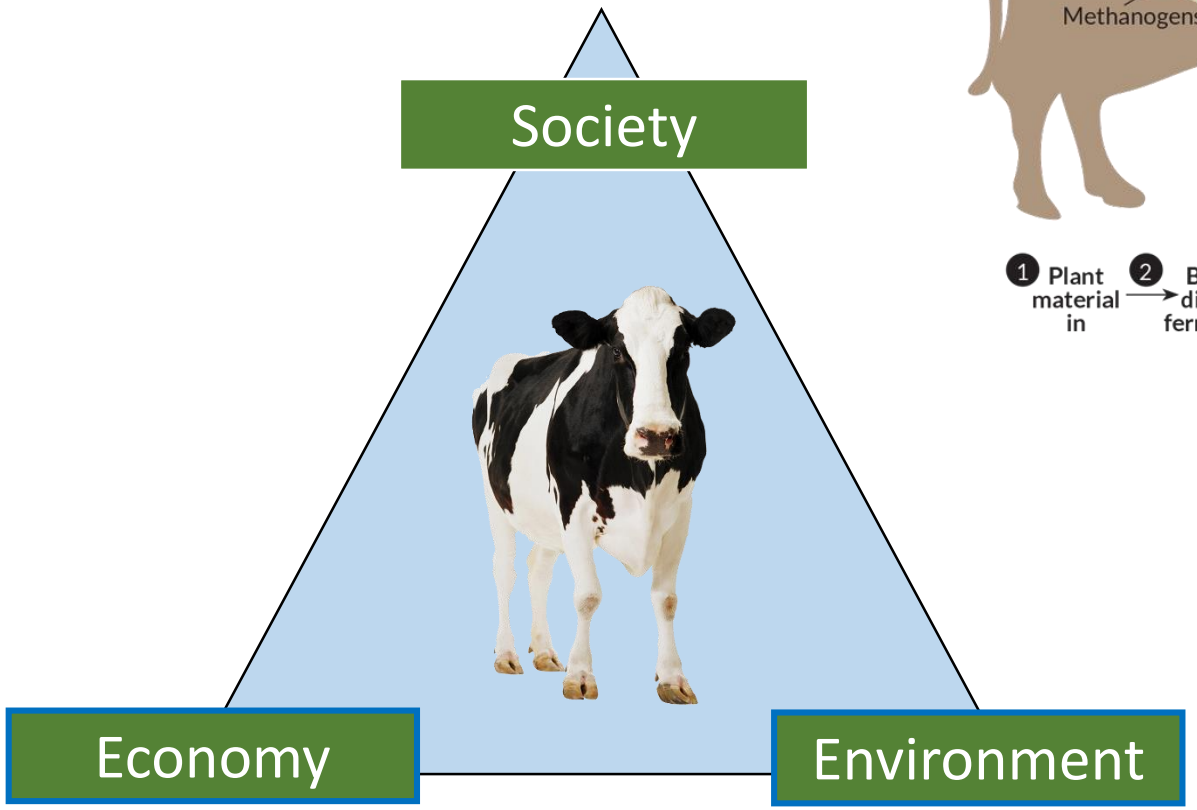

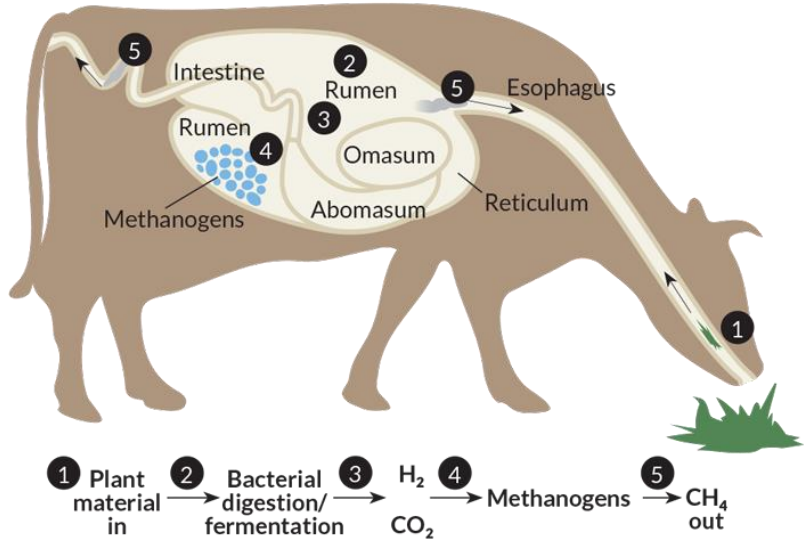

CH_4

e.g. GHG

Sustainable dairy farming

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Research on a **large scale** and with **on-farm data**

lactating dairy cow CH_4

technical and **production** variables

economic variables

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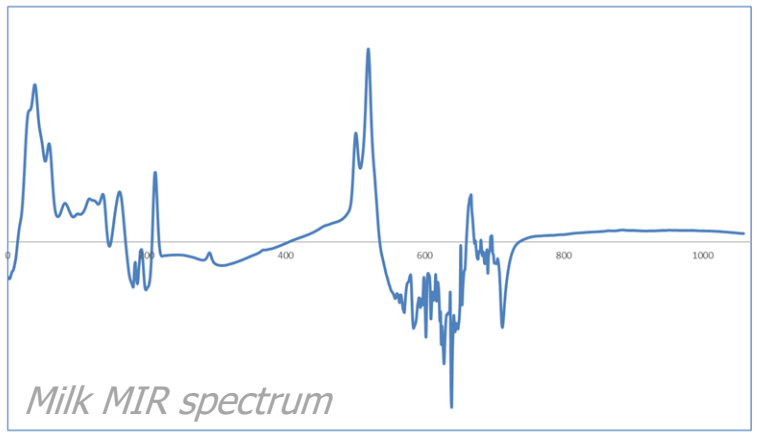
525 697 **individual CH_4 predictions** from **milk MIR** spectra ($R^2cv=0.70$ - *Vanlierde et al., 2016*) [MIR-CH_4 (**g/day**)]

↓

MIR-CH_4 (herd*year level) corrected for year effect

Milk recording



Milk MIR spectrum

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corrected for year effect

Accounting data
(Walloon Breeding Association - AWE)

↓

44 technical & economic variables
(herd*year level)
corrected for year effect

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Accounting data (Walloon Breeding Association - AWE)

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44 technical & economic variables (herd*year level) corrected for year effect

↓

Study of relationships between MIR-CH_4 and 44 technico-economic variables for **1024 herd*year records** (206 farms – 8 years)

↓

Pearson **correlation** coefficients (r)

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Correlations with technical variables: $0.07 < r < 0.38$ ($P < 0.05$)

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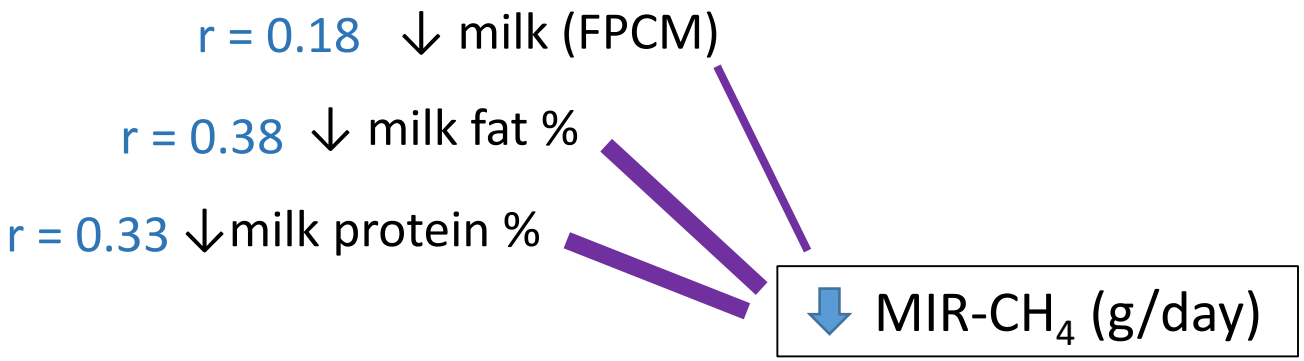

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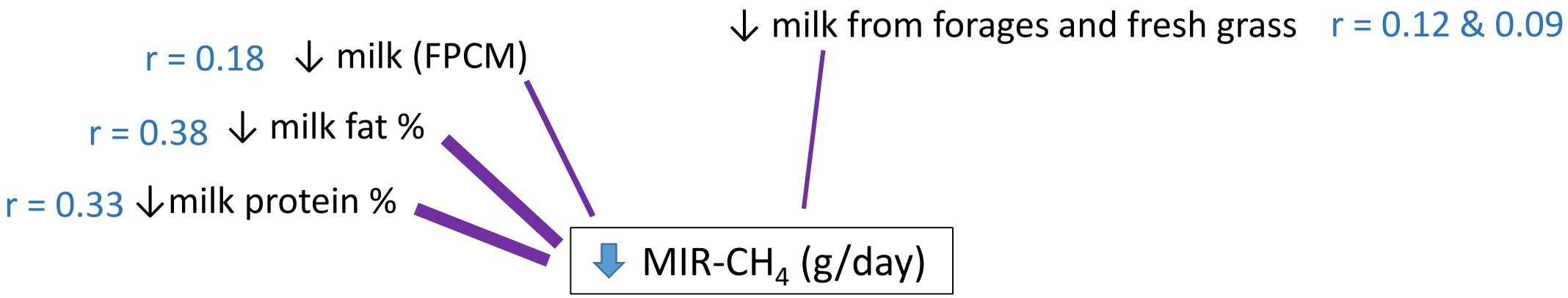
Correlations with technical variables: 0.07 < r < 0.38 (*P* < 0.05)



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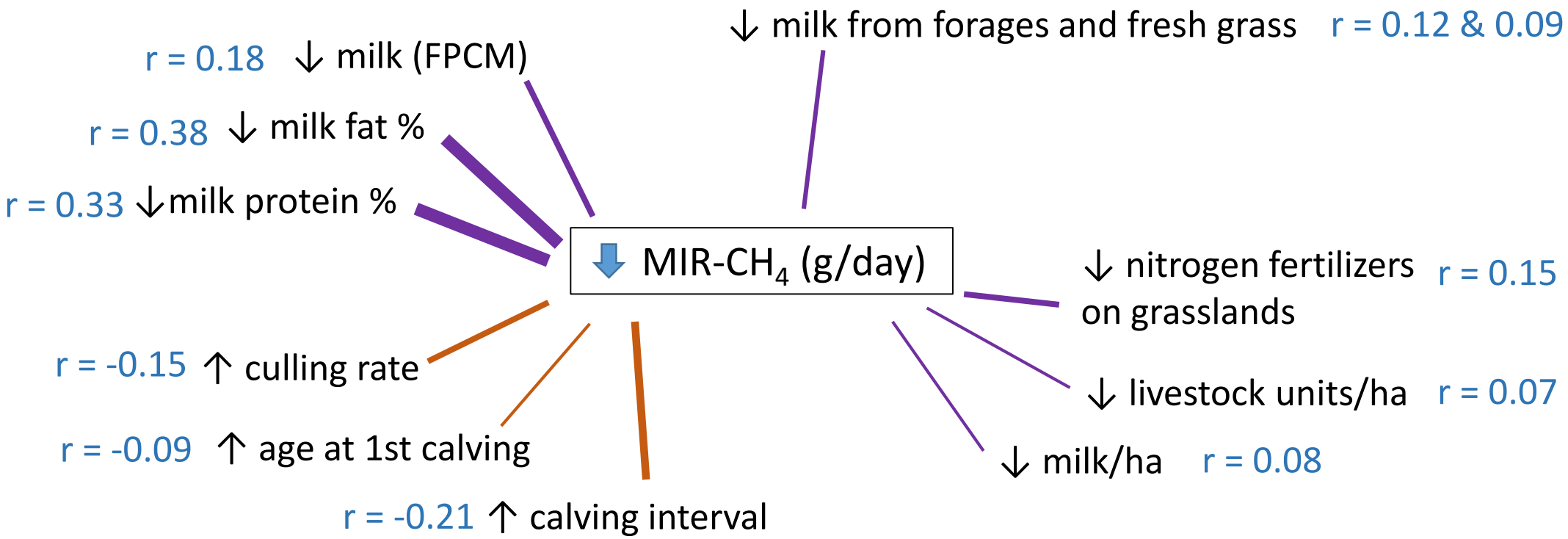
Correlations with technical variables: 0.07 < r < 0.38 (P < 0.05)



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Gross margin and labour income (per cow and per L FPCM)

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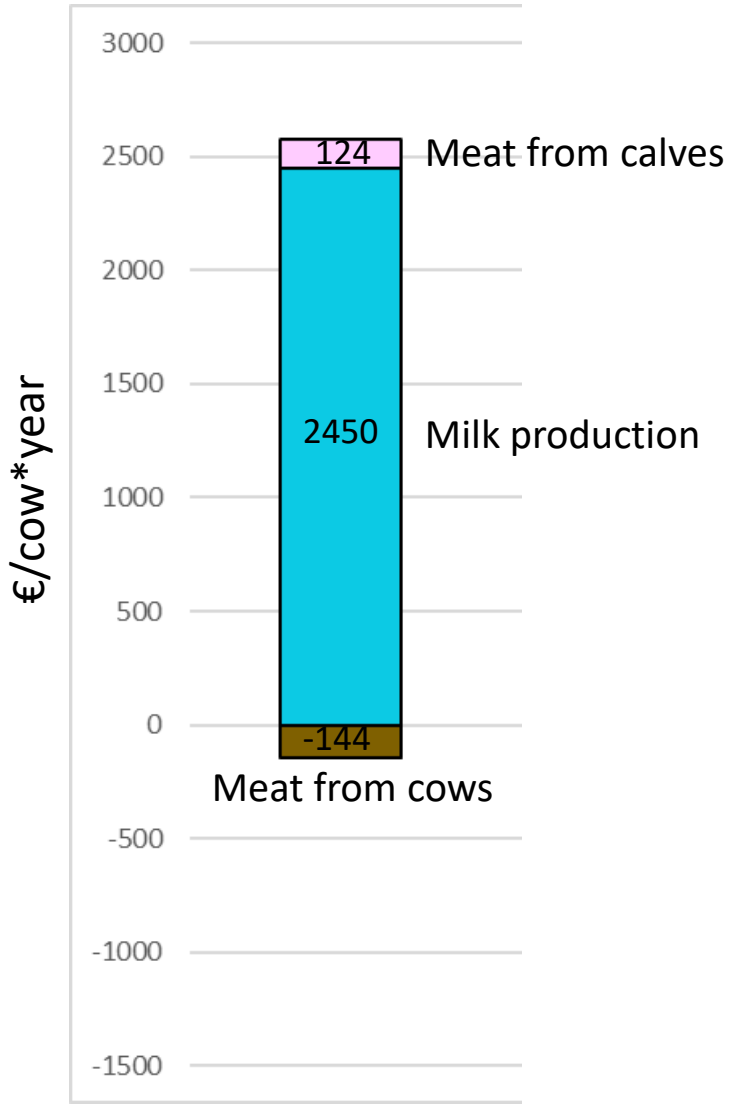
Gross margin and labour income (per cow and per L FPCM)



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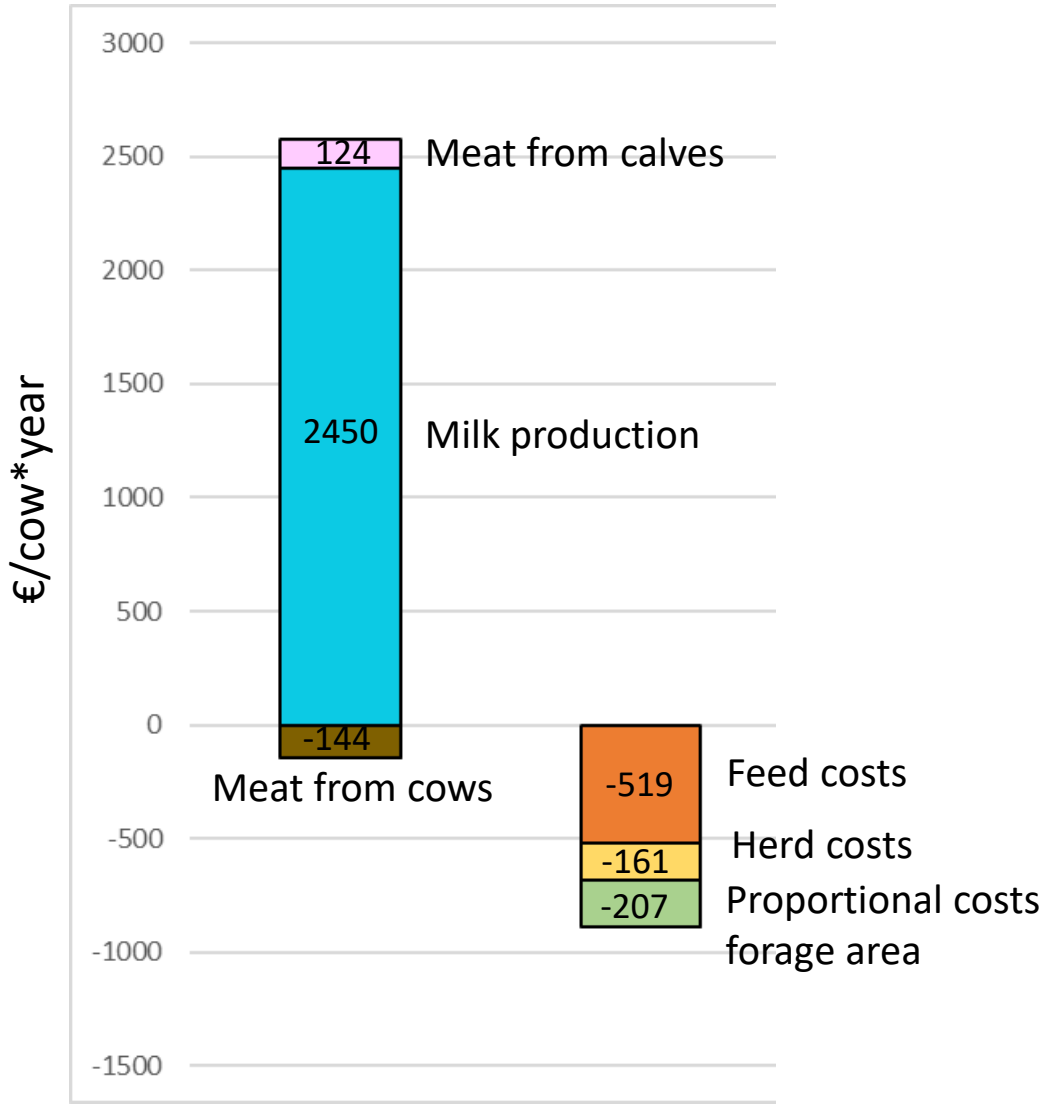

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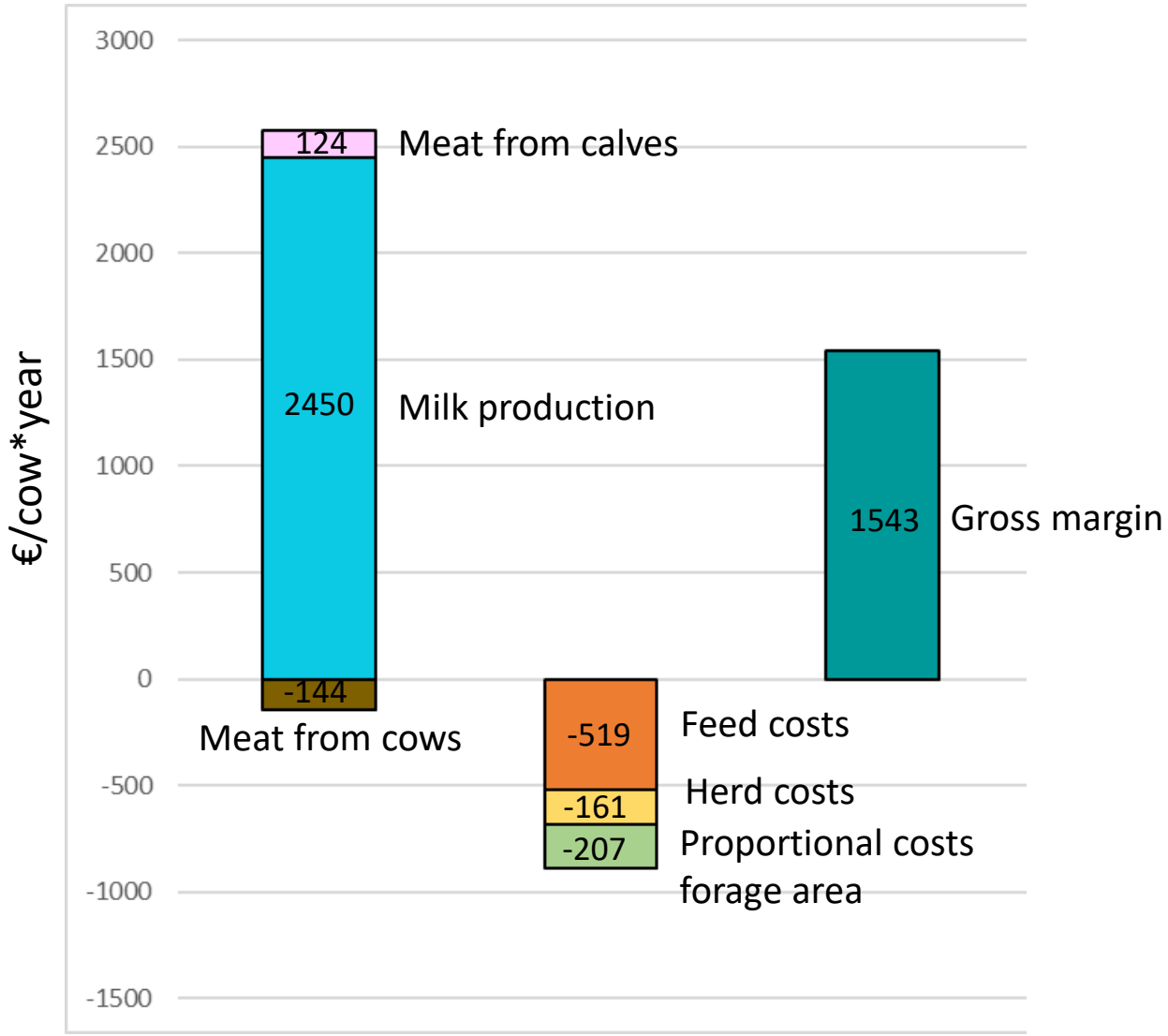
Gross margin and labour income (per cow and per L FPCM)



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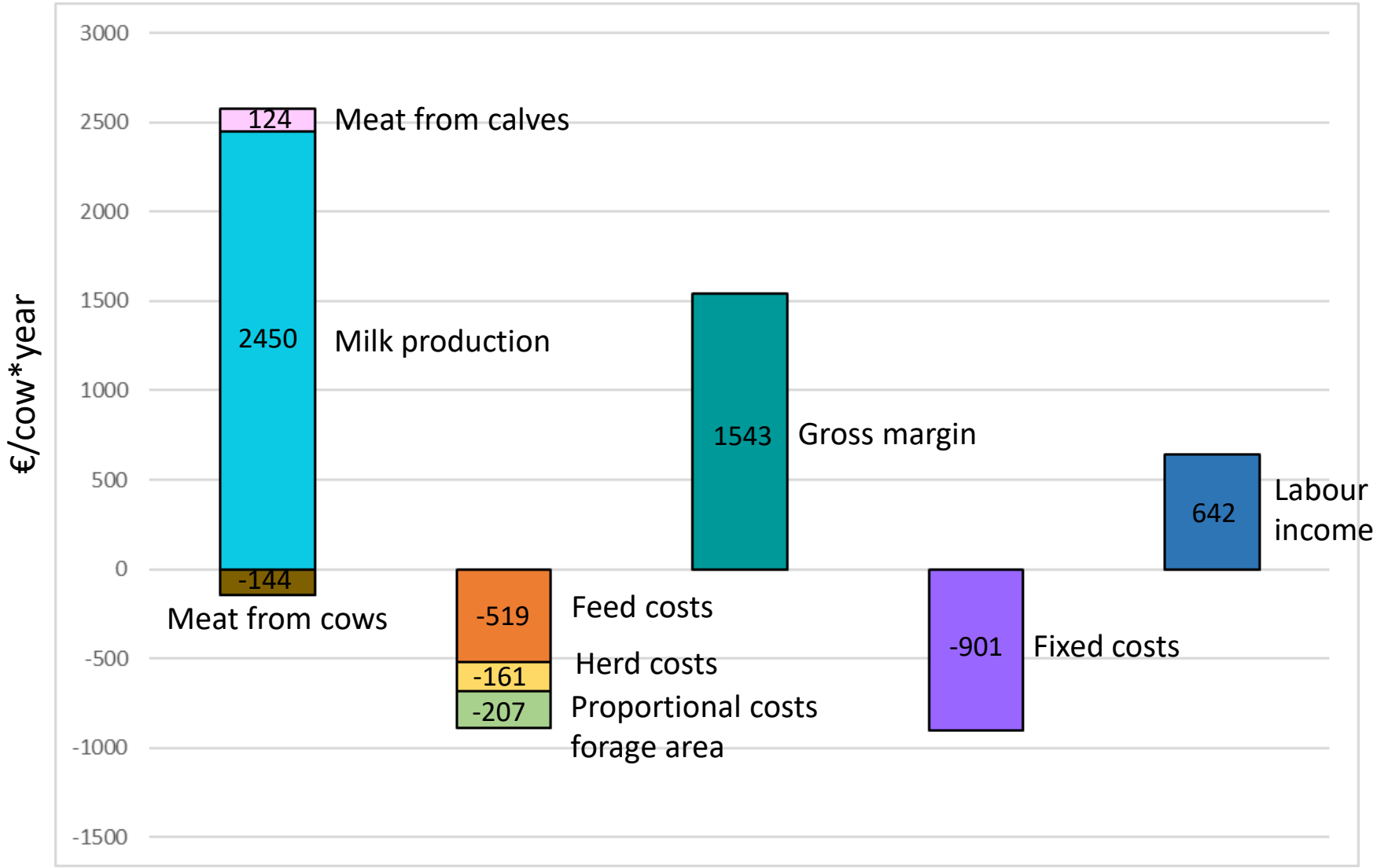
Gross margin and labour income (per cow and per L FPCM)



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	r with MIR-CH_4 (g/day)
Gross margin (€/cow per year)	0.19
Gross margin per L FPCM (€/L)	0.09
Labour income (€/cow per year)	0.18
Labour income per L FPCM (€/L)	0.16

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↓MIR-CH_4 (g/day) ↔ ↓gross margin and ↓labour income (per cow or L FPCM)

↕

↓ Milk production

↓ Value of meat production from calves and cows

↑ Herd costs per L FPCM

↑ Fixed costs per L FPCM

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Correlations: $0.07 < r < 0.38$ → weak relationships

Possible reasons:

- Other variables?
- MIR-CH_4 predictions
- Data at **herd** level (~~individual animals~~)
- **On-farm** data (~~controlled conditions~~), large **variability** in management practices in the population => interactions and antagonistic effects between variables
- …

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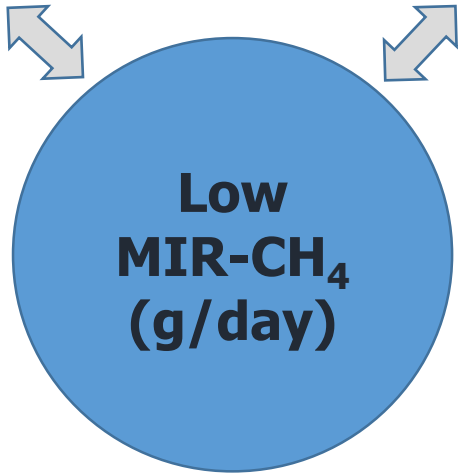
Conclusion:

Extensive or suboptimal management practices

Low economic results



Weak relationships
between MIR-CH_4 and technico-economic data when considering farms with different management practices

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Next steps?

- Studying more deeply interactions and co-evolution between technico-economic variables & MIR-CH_4
- Using MIR-CH_4 and accounting data in advanced studies (e.g. whole-farm) to address efficiency of dairy farming systems

Thank you for your attention

Acknowledgments

Data:

LIÈGE université Gembloux Agro-Bio Tech

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Comité du Lait

Financial support:

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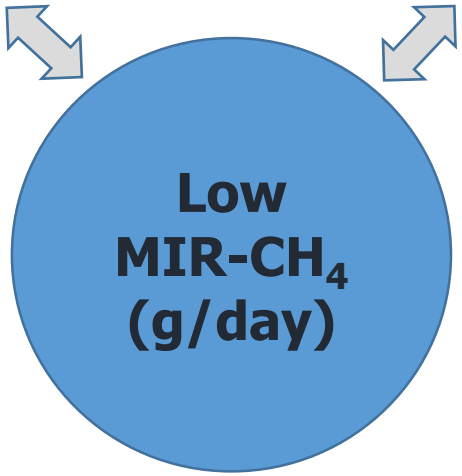
Take home message

Extensive or suboptimal management practices

Low economic results



Weak relationships
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