Economic implications of a protein transition: Evidence from Walloon beef and dairy farms

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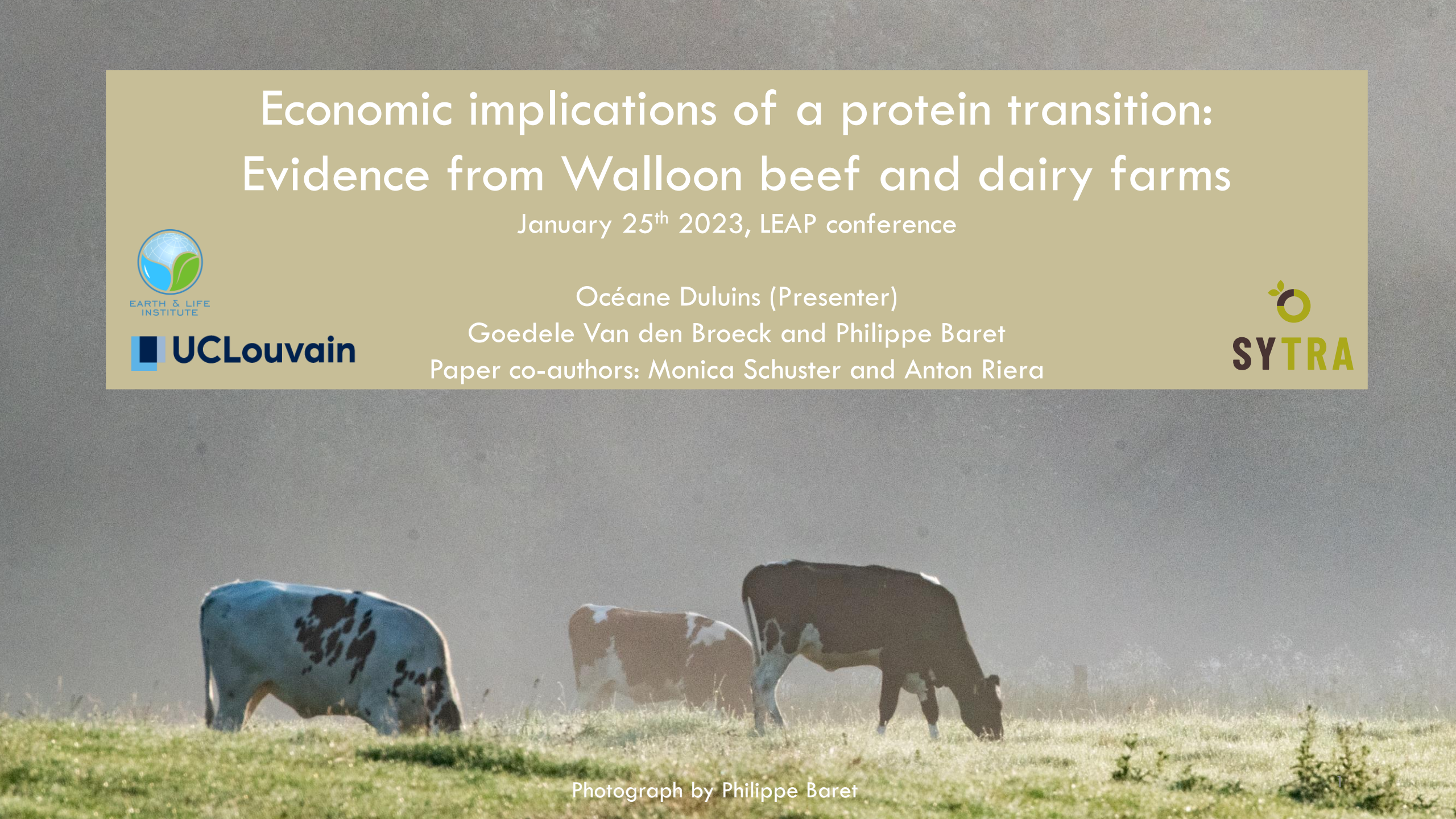


Photograph by Philippe Baret

Livestock production is confronted with major challenges

Feed

GHG

Environmental issues

Water and air pollution

Processed meat

Health issues

Red meat

Antibiotics use

Animal welfare issues

Abuses in slaughterhouses

Biomass conversion

Key ecosystem services

Landscape and biodiversity

Carbon storage

Soil fertility

The protein transition as a solution?

Protein transition :

Rebalancing of protein consumption between animal and alternative proteins

→ Better for the **environment**, for **health** and **animal welfare**

The Walloon context

~ 5,000 dairy farms
~ 6,500 beef farms

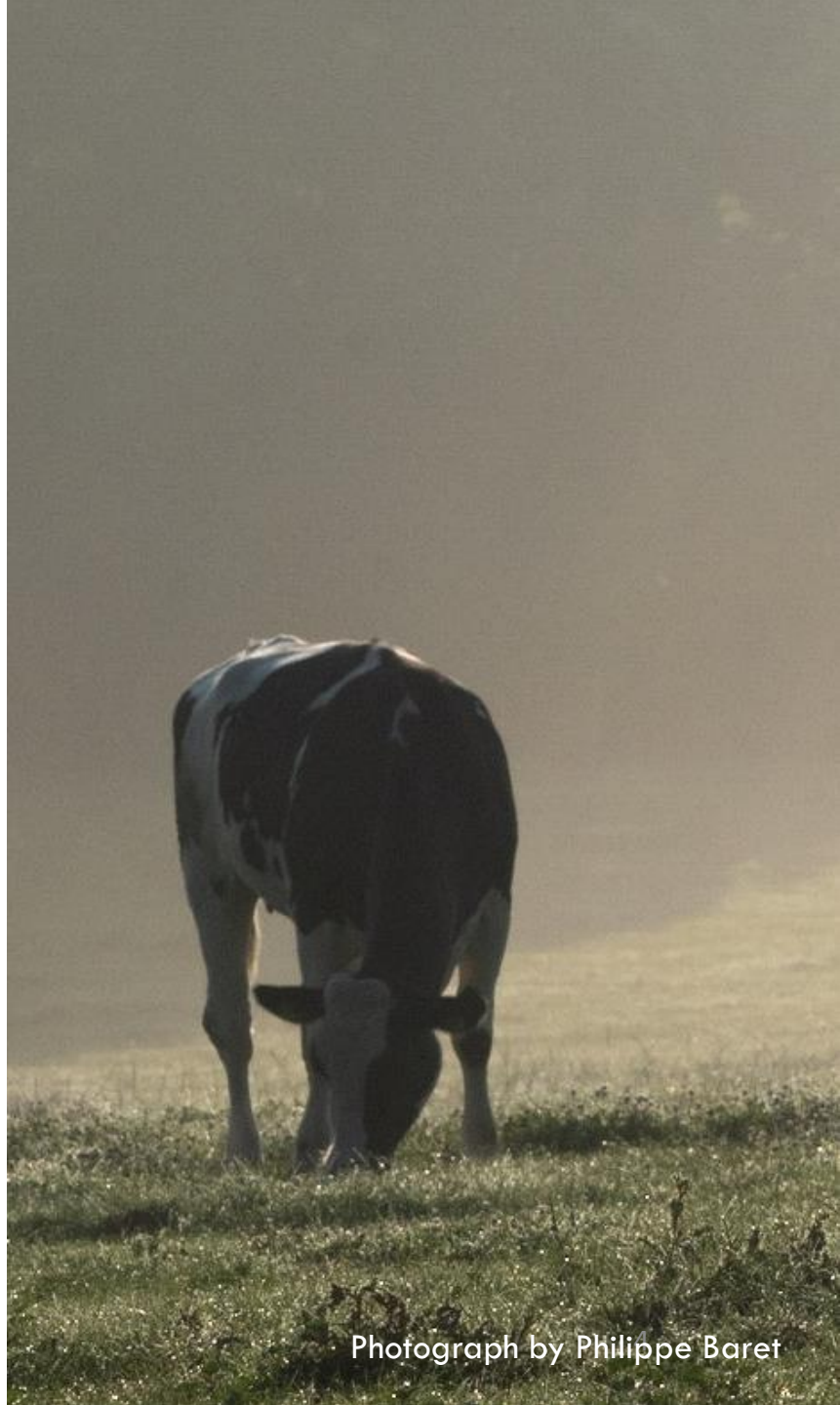
} 48% of farms ⟷ 1,1 million cattle

Diversity of livestock production systems:

- Feed and grazing practices
- Land size, etc.

Economic precarity of some farmers

Dependence on feed imports

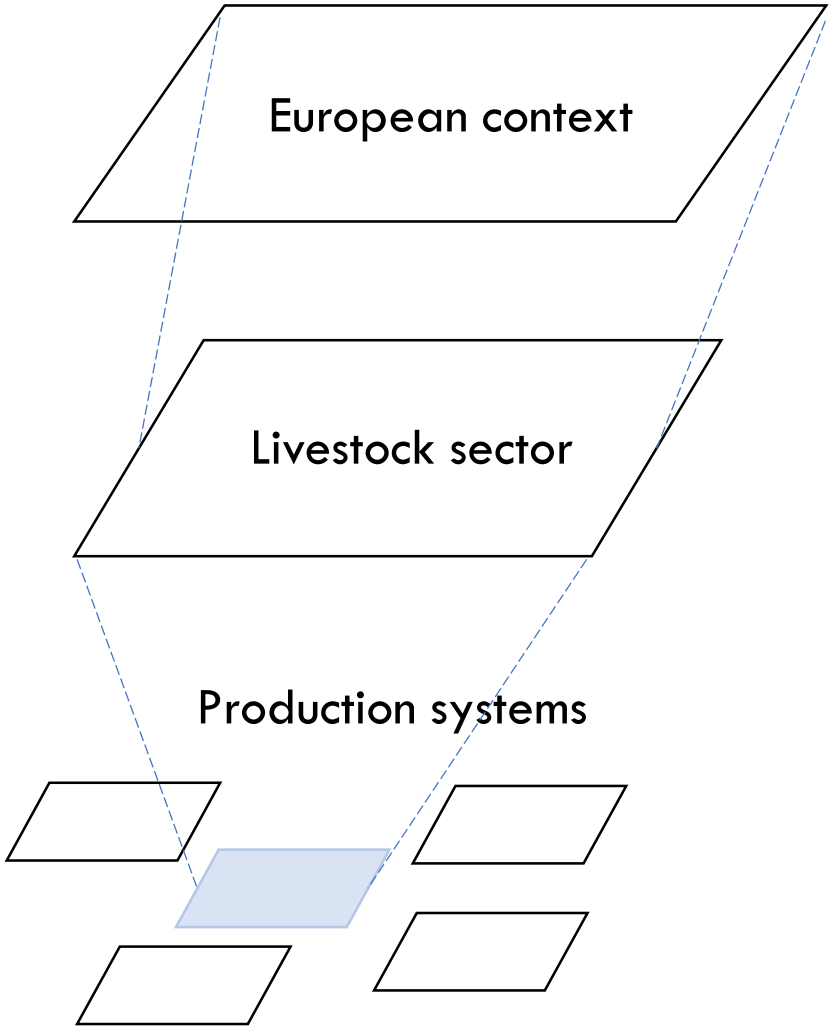

Photograph by Philippe Baret

Livestock production systems are embedded in a multi-level system

Macro-level
e.g. Europe

Meso-level
e.g. Belgium

Micro-level
e.g. Farms



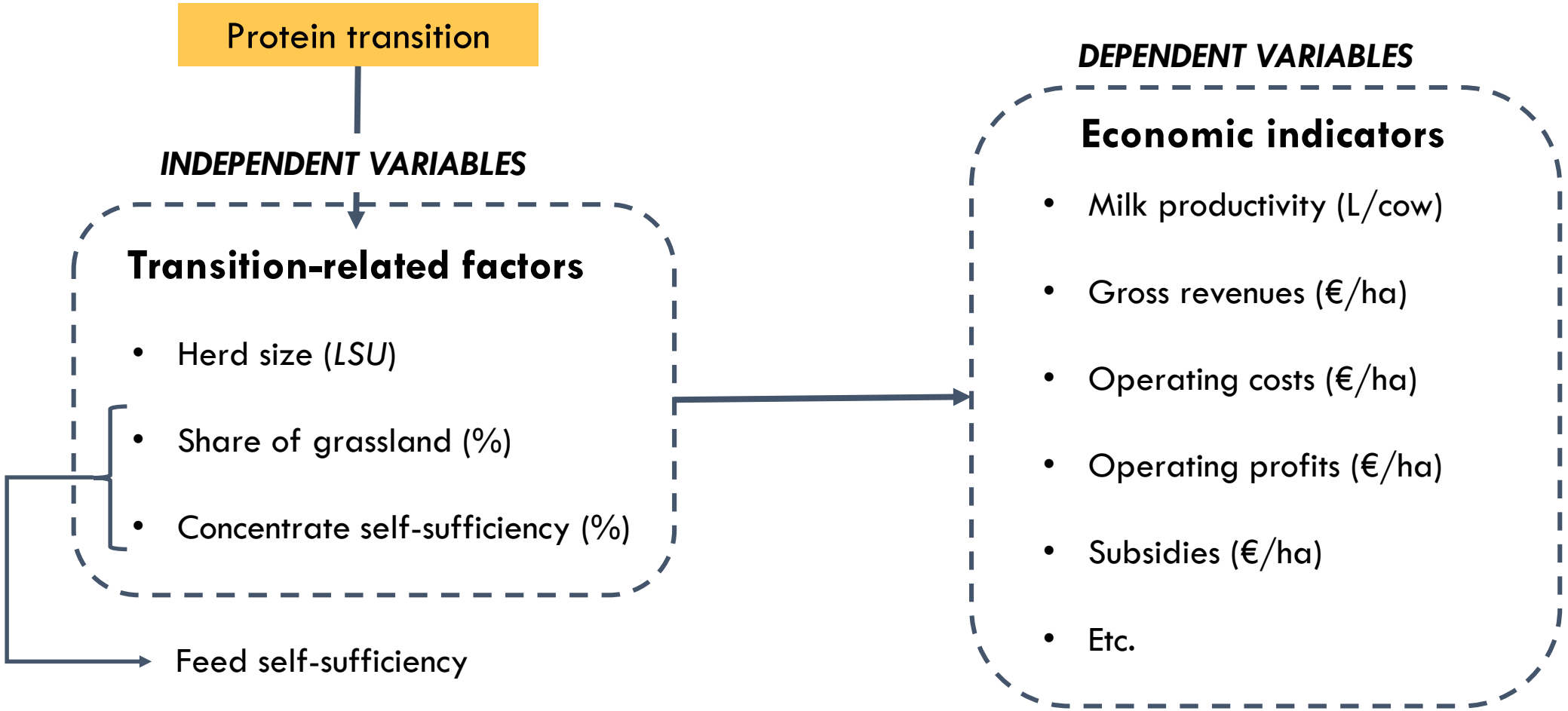
Research questions

1) How will the protein transition impact the **economic performance** of Walloon **beef** and **dairy** farms ?
2) Will the **two sectors** be impacted in the same way?

→ Accounting for **diversity**

Source : De Vylder, Unsplash (2022)

Three factors associated with a protein transition



Data and methods

Database: Farm Accountancy Data Network (FADN)

Specialized dairy (OTE450) and **beef farms** (OTE460)

Panel data: 2014-2017 (Unbalanced pool)

Number of observations:

- **Beef sector: 208** – 65 farms
- **Dairy sector: 324** – 95 farms

Data analysis: Random model effects

Model estimated: $Y_{it} = \alpha + \beta X_{it} + \theta_t + \upsilon_t + a_i + u_{it}$

Dairy farms are more profitable and less subsidy-reliant

			Dairy sector	*Beef sector*	*Sector comparison*
Number of observations			*N = 324*	*N = 208*	
Name		**Unit**	**Mean**	**Mean**	**Two-sided p-value**
Milk productivity		L/cow	6,322	/	/
Gross revenues/ha	a	€/ha	2,918	1,810	***
Operating expenses/ha	b	€/ha	1,319	1,061	**
Operating profits/ha	c = a-b	€/ha	1,599	748	***
Operating profit margin	a/c	%	55	42	***
Subsidies/ha		€/ha	402	600	***
Subsidy dependence	Subsidies/Gross revenues	%	13	28	***

Significant differences tested using two-sided t-tests: p<0.1; p<0.05**; p<0.01****

Dairy farms rely more on the use of concentrates

		Dairy sector	*Beef sector*	*Sector comparison*
Number of observations		*N = 324*	*N = 208*	
Name	**Units**	**Mean**	**Mean**	**Two-sided p-value**
Herd size	LSU	121.40	147.43	***
Grazing livestock density	LSU/SFL	1.96	2.23	***
Cattle area	Ha	64.73	68.64	
Share of grassland	%	84.37	88.07	**
Concentrate total	Kg/year/farm	122,581	73,620	***
Concentrate autonomy	%	6.00	18.78	***
Labour	Annual work unit	13.54	27.56	***

Significant differences tested using two-sided t-tests: p<0.1; p<0.05**; p<0.01****

Source: Mindy (Hotline)

Dairy sector

	Gross revenues a	Operating expenses b	Operating profits c = a-b	Operating profit margin d = a/c
Herd size	↗	↗	↗	~
Share of grassland	↘	↘	~	↗
Concentrate self-sufficiency	~	↘	↘	↗

Arrows represent a statistically significant correlation at 1% or 5%.

1) Operating profit margin is indifferent to herd size

2) Extensive grazing systems providing environmental services and economic benefits

Photograph by Philippe Baret

Beef sector

1) Most economic indicators are not dependent on farms characteristics
2) But subsidies are

    Grazing livestock density and the size of the farm positively correlated to subsidies per hectare and subsidy dependence

3) Without subsidies, farmers are facing economic losses

→ Business model based on subsidies rather than on actual market supply and demand factors

Conclusions

The economic implications of the protein transition are very different depending on the sector.

Policy implications:

Dairy sector: support to more autonomous production systems based on-farm fodder production

Beef sector: how to gear a protein transition in which breeders are not left behind ?

Thank you for your attention !

Article available in **Frontiers in Sustainable Food Systems**

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Complementary presentation by Riera Anton this afternoon