Talent for growth

Mind-set for ecology: how can grazing dairy cows contribute

Perspektiven für Weidegrünland und Weidehaltung in Mitteleuropa

Talent for growth

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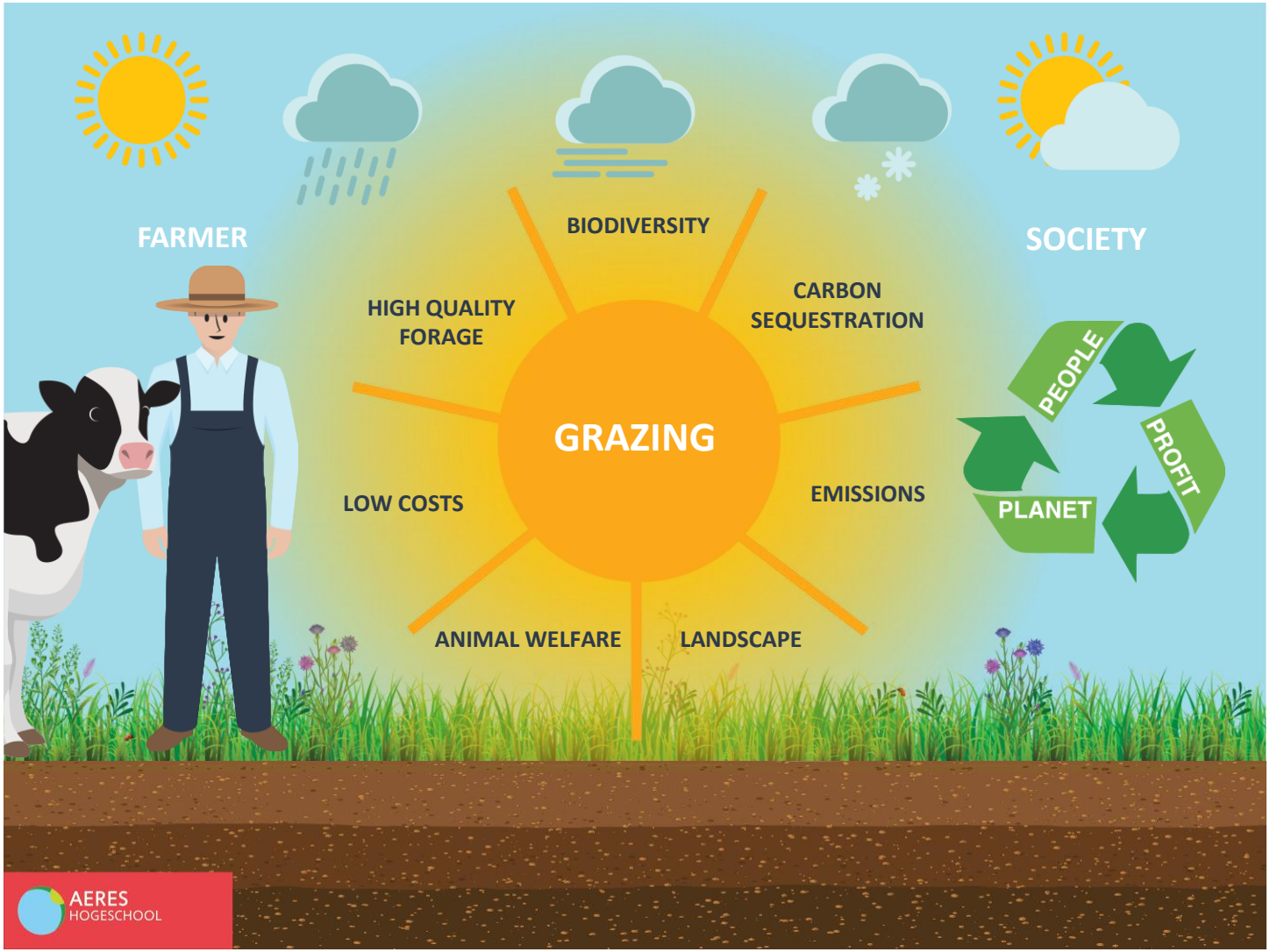
Dr. Agnes van den Pol-van Dasselaar

19 December 2022

Today

- Grazing is key
- Grassland and grazing in Europe
- Effect of grazing
- Mind-set
- Conclusions

Grazing is key


FARMER
BIODIVERSITY
SOCIETY
HIGH QUALITY FORAGE
CARBON SEQUESTRATION
GRAZING
PEOPLE
PROFIT
PLANET
LOW COSTS
EMISSIONS
ANIMAL WELFARE
LANDSCAPE
AERES HOGESCHOOL

Grassland and Grazing at Aeres

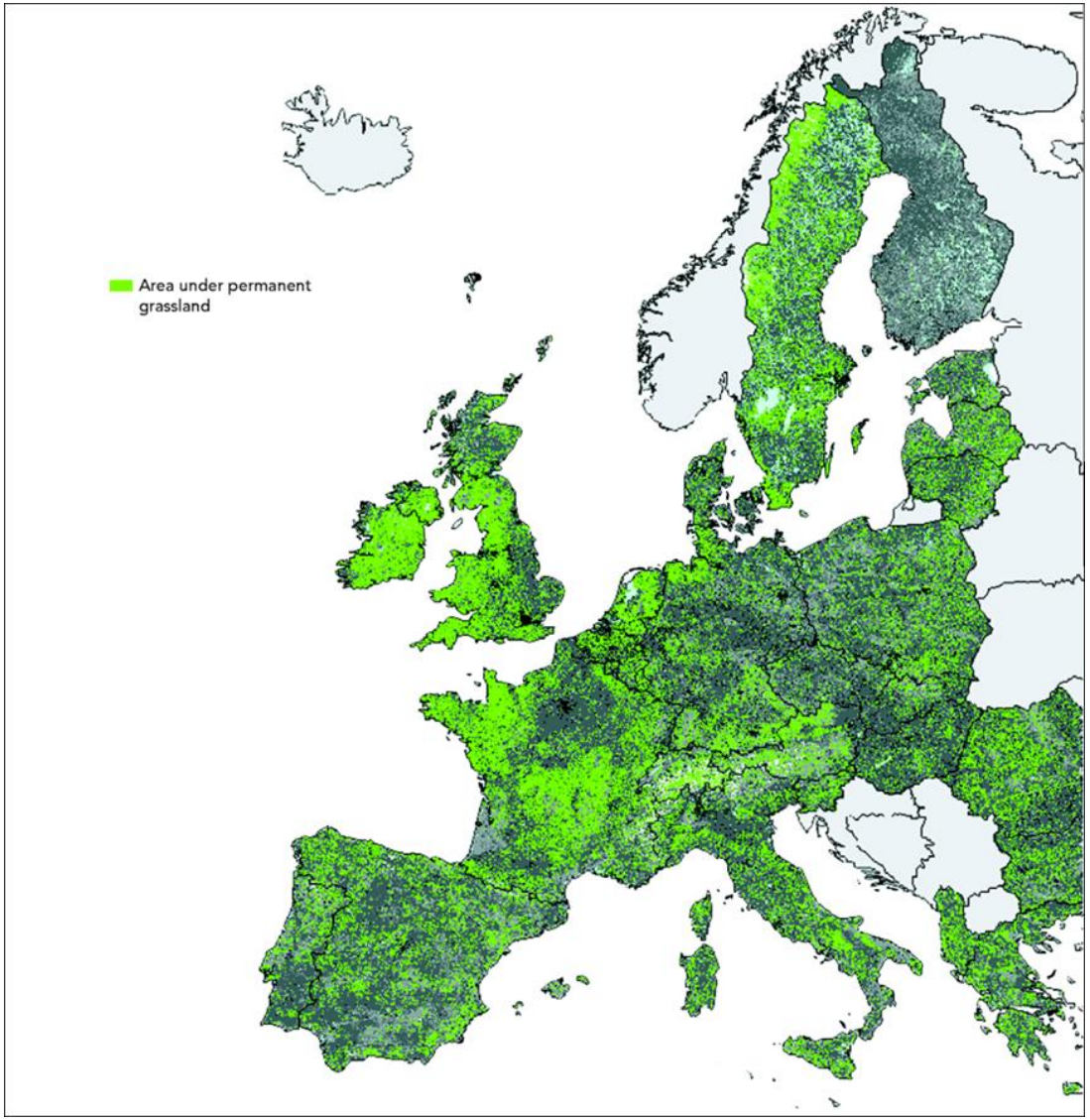
- **Research: How can grasslands be optimally managed and utilised to create value for farmers and society?**
- Grazing is key
- National and international

- **Education and training**

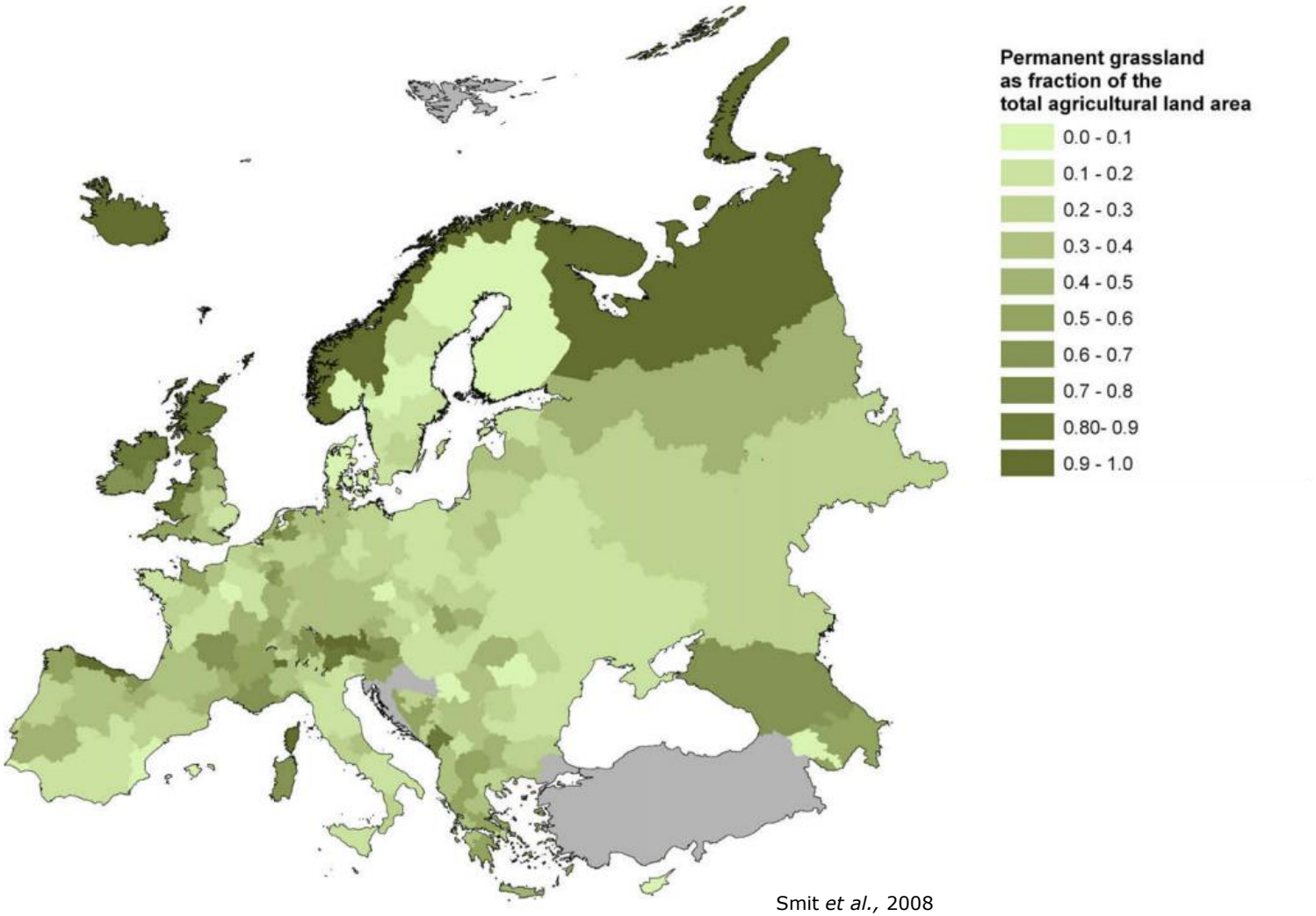
Aeres Farms

Grassland and grazing in Europe

Permanent grassland area in Europe

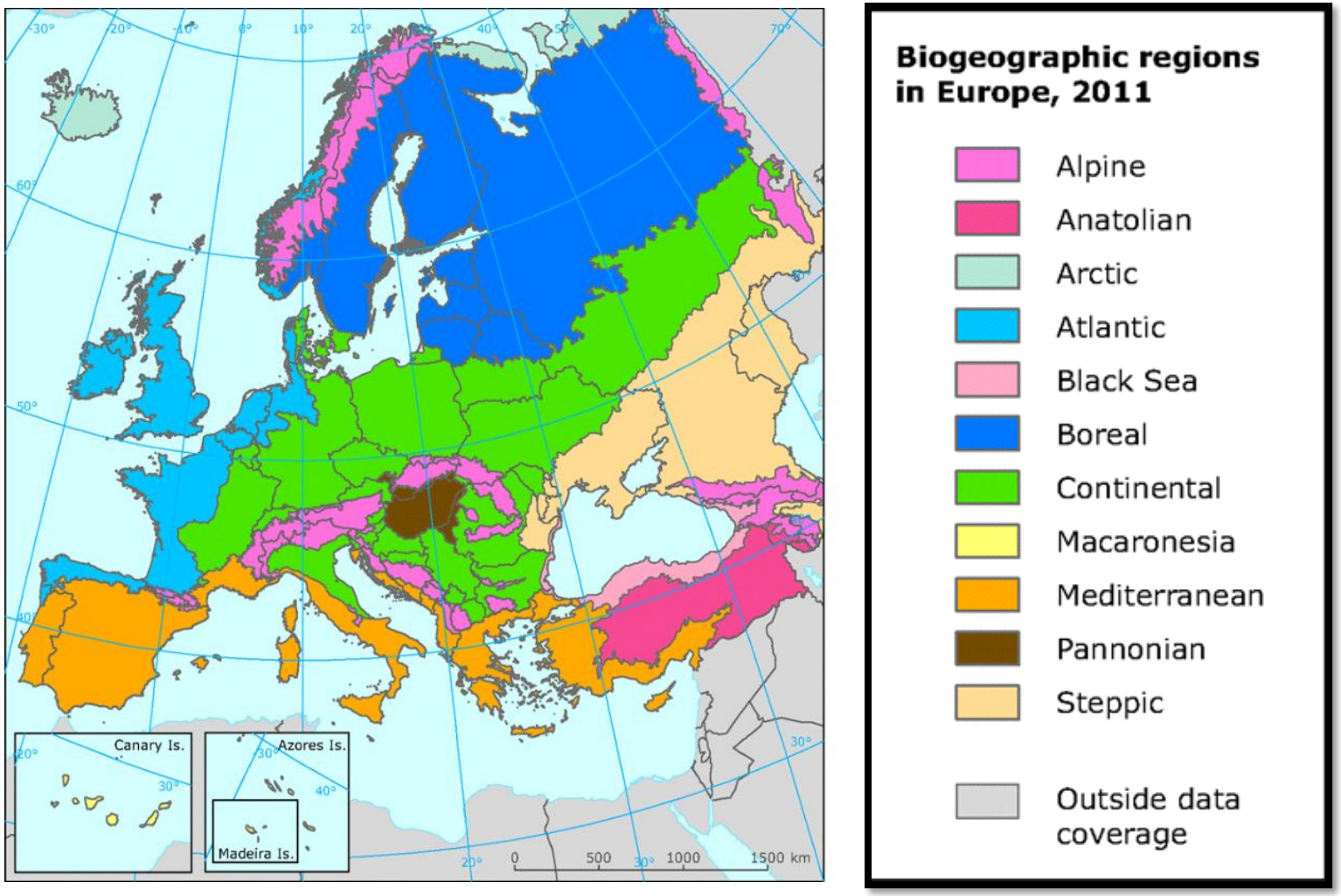


Fraction of the total agricultural land area

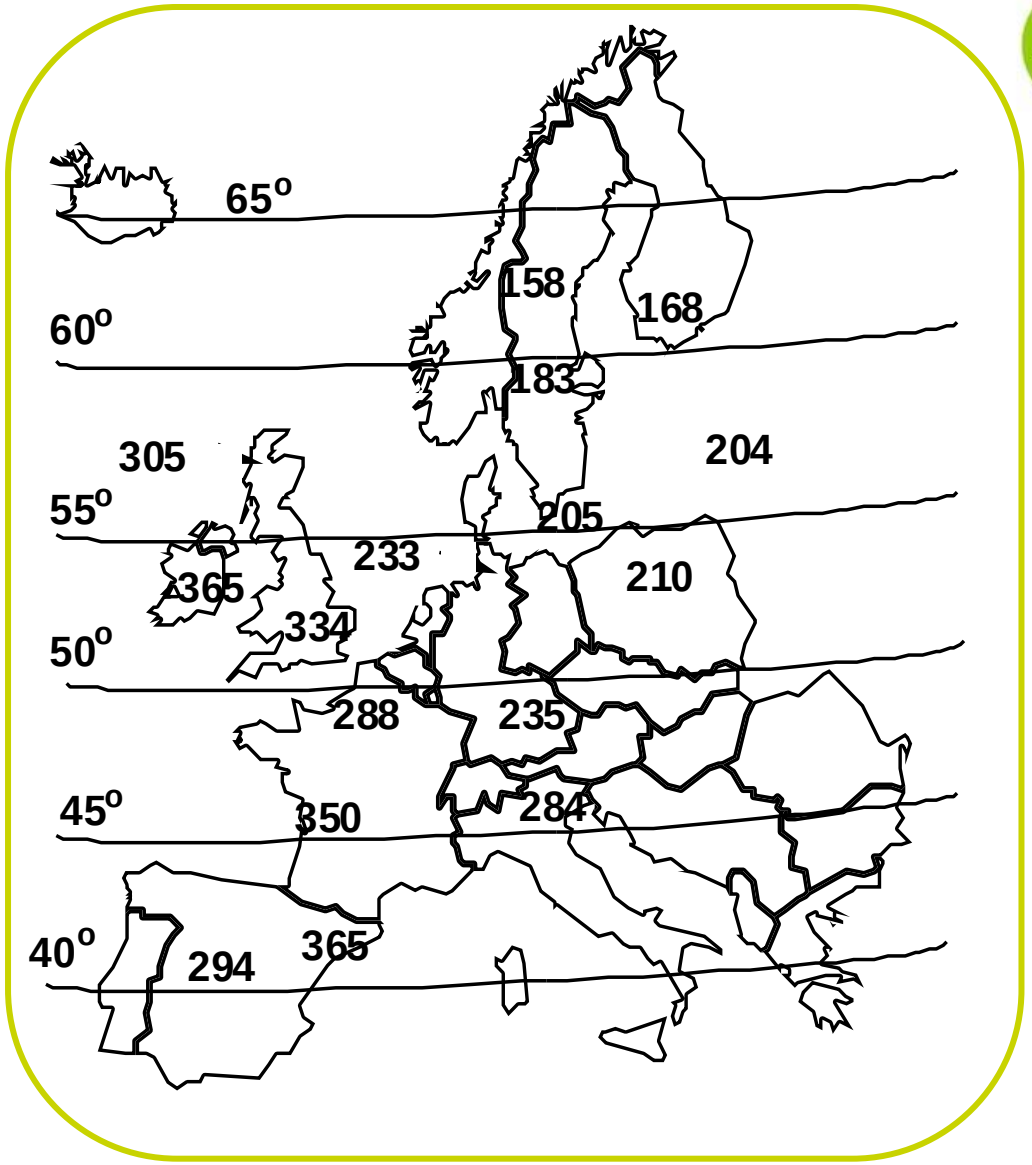


Smit *et al.*, 2008

Climate


Biogeographic regions in Europe, 2011
Alpine
Anatolian
Arctic
Atlantic
Black Sea
Boreal
Continental
Macaronesia
Mediterranean
Pannonian
Steppic
Outside data coverage
Canary Is.
Azores Is.
Madeira Is.
0
500
1000
1500 km

Length of the growing season in Europe, days >5°C



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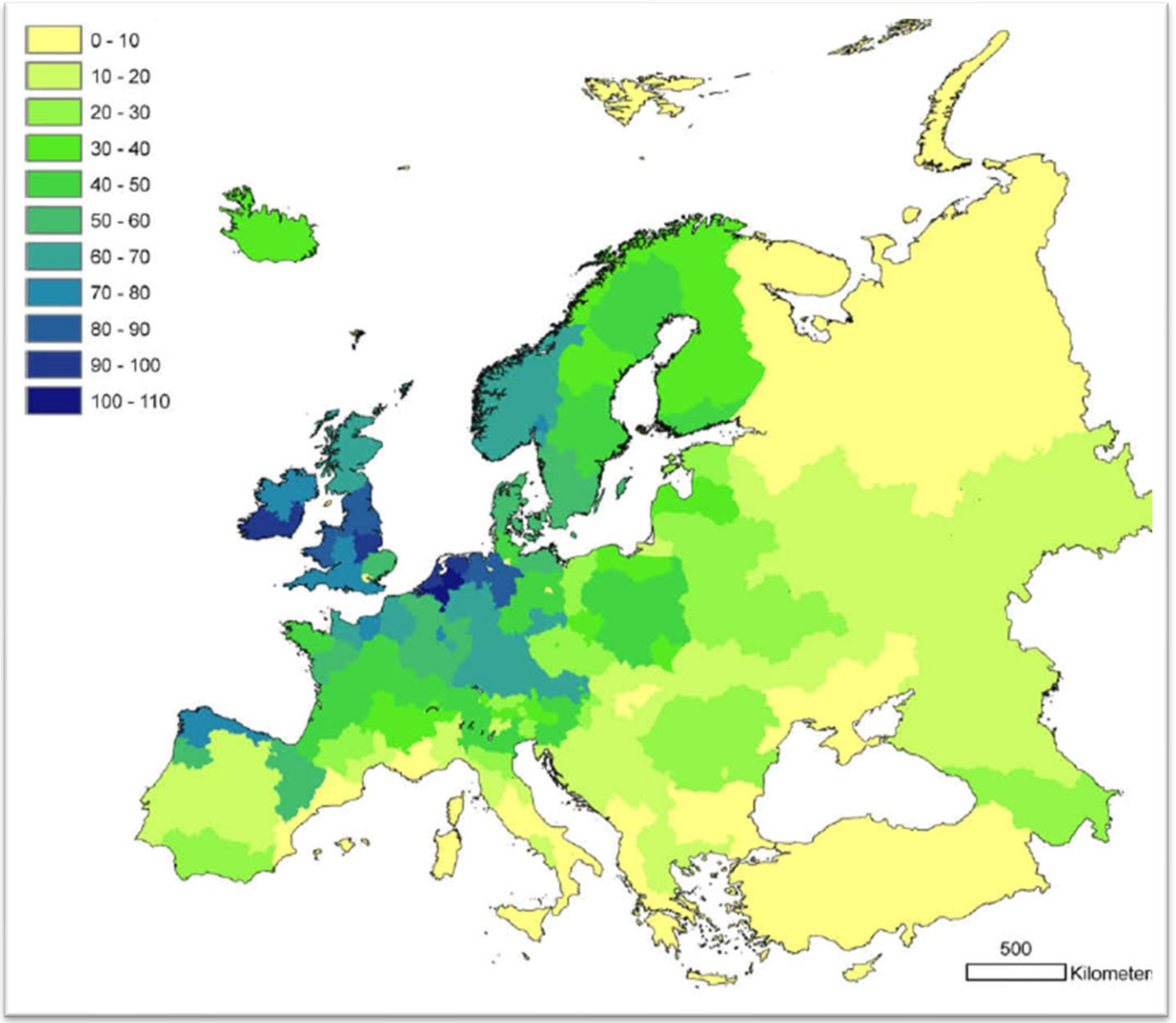
Estimated grassland productivity in decitons per hectare

(Smit et al. 2008, AgricSyst 98, 208-219, Eurostat 2014)



And grazing?

Monitoring of grazing

Grazing is not monitored explicitly at a European level

EGF Working Group “Grazing” provides insight since 2010

EGF Working Group ‘Grazing’

Surveys since more than a decade

- Opinions and thoughts
- Research results

Estimate of % dairy cows grazing

- Mainly ‘educated guesses’

Grazing in Europe

6 distinctive regions:

- North
- West
- Central
  - More than 50%
  - Less than 50%
- East
- South

Grazing in Europe - North

	2010	2014	2016	2019	2022
Norway			90	80	80 (75-95)
Sweden	100	100	100	100	100 (100-100)
Finland			70	80	70 (60-80)

Grazing in Europe - West

	2010	2014	2016	2019	2022
Ireland	99	98	95-100	95-100	96 (90-100)
UK		92	80-90	70-80	82,5 (70-90)

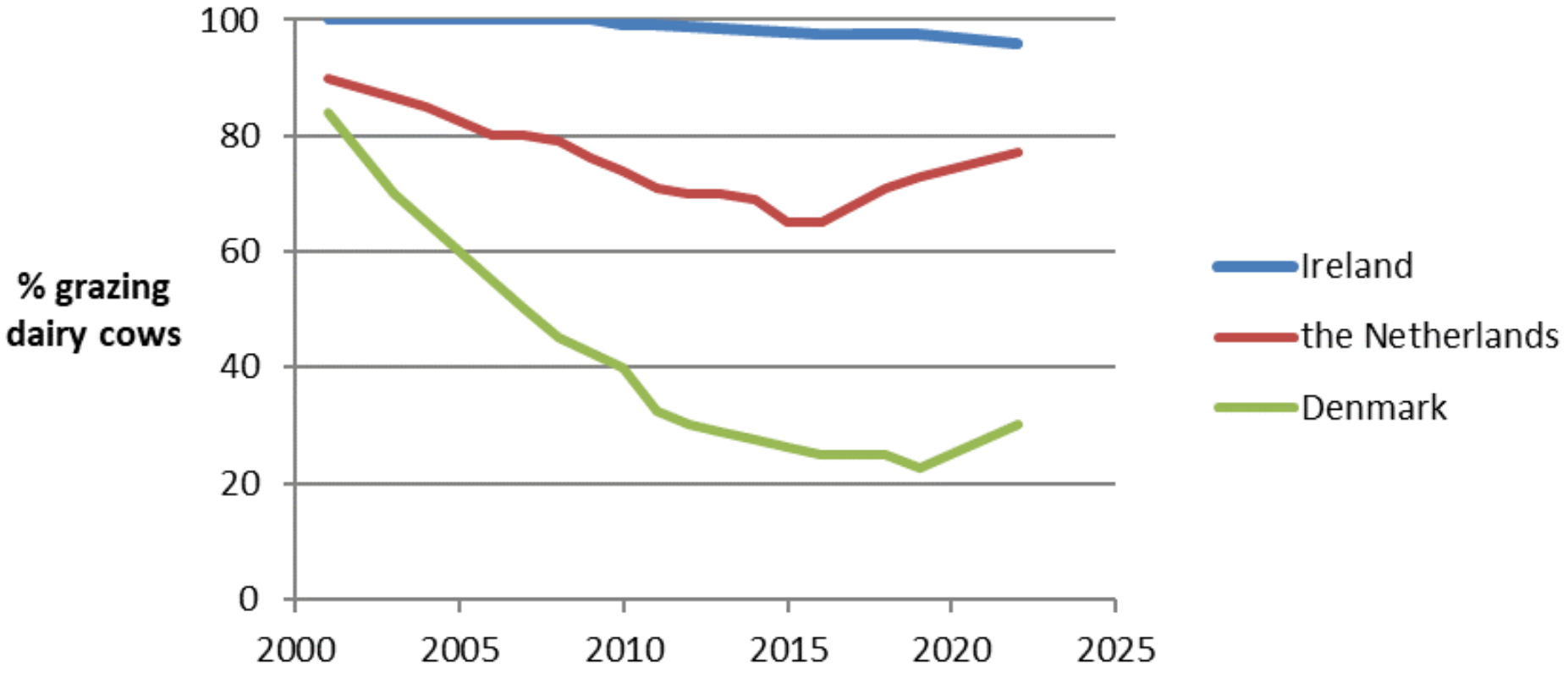
Grazing in Europe – Central – more than 50%

	2010	2014	2016	2019	2022
Netherlands		70	65	73	75-80
Belgium huge differences between Flanders (low) – Wallonia (high)	85-95	75-80	60-85	30-95	40-90
Luxembourg	75-85	73	75		30-50
France	90-95	90	75-95	90	50-90
Switzerland	85-100	75-90	80-97	70-90	94 (88-96)

Grazing in Europe - Central – less than 50%

	2010	2014	2016	2019	2022
Denmark	35-45	25-30	25	20-25	30
Germany	42		10-50	15-40	30 (20-50)
Austria	25		40	44	45

Grazing in Europe

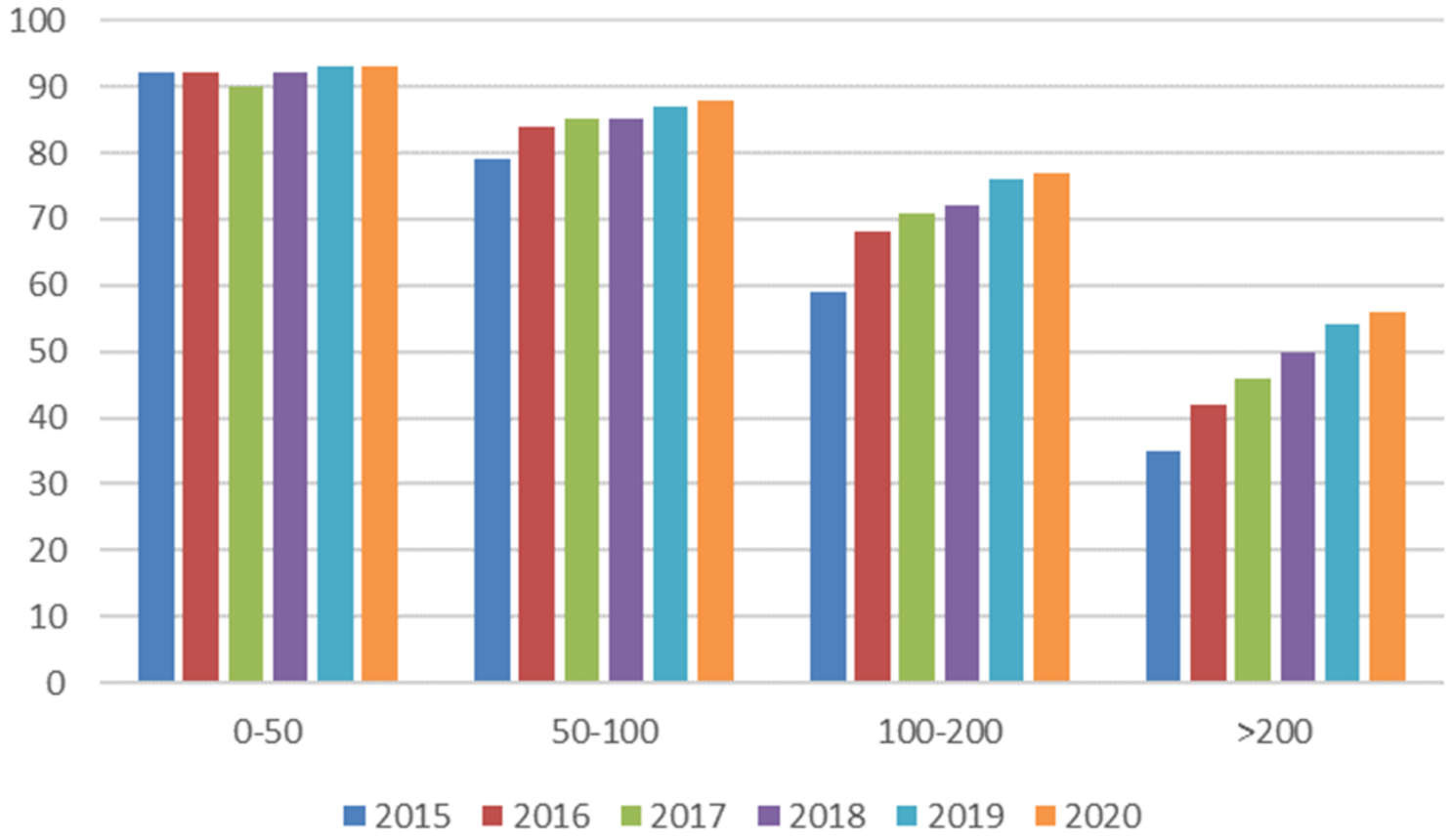


EGF Working Group Grazing

Van den Pol-van Dasselaar, Hennessy, Isselstein, 2020 – plus data survey 2022

NL: 18 June 2012 – Convenant Weidegang

Effect of herd size
Large herds start grazing
Netherlands, % cows grazing



CBS, 2021

Grazing in Europe

In general, the popularity of grazing is declining

…but there are exceptions….

Country specific

East and South Europe ‹ North and West Europe

Effect of grazing

Effect of grazing

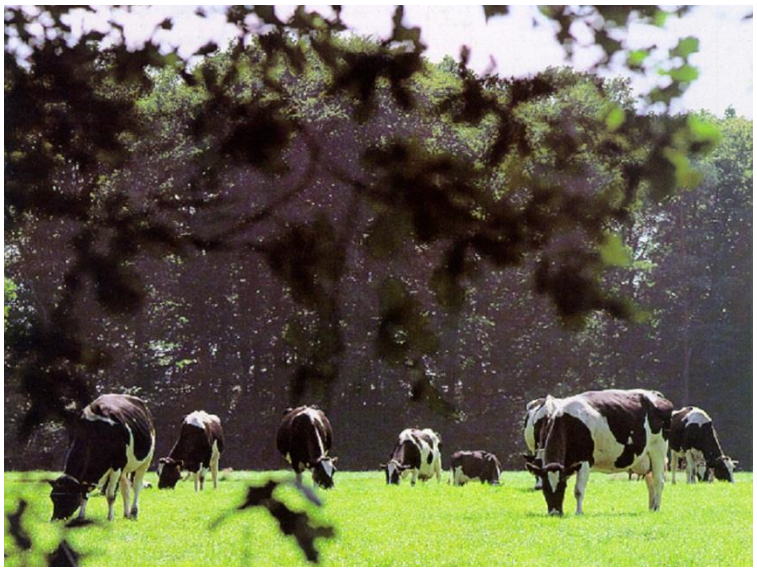
Society

Grazing system and society

Positive image of grazing animals in the landscape

Biodiversity of the landscape

Society associates grazing with animal welfare



Stakeholder consultation MultiSward

To determine the stakeholders' view on the importance of grasslands in Europe

Stakeholders:

- primary producer, policy maker, research and advice most important
- followed by NGO's (nature, environment), industry (processing, seed) and education

Appreciation

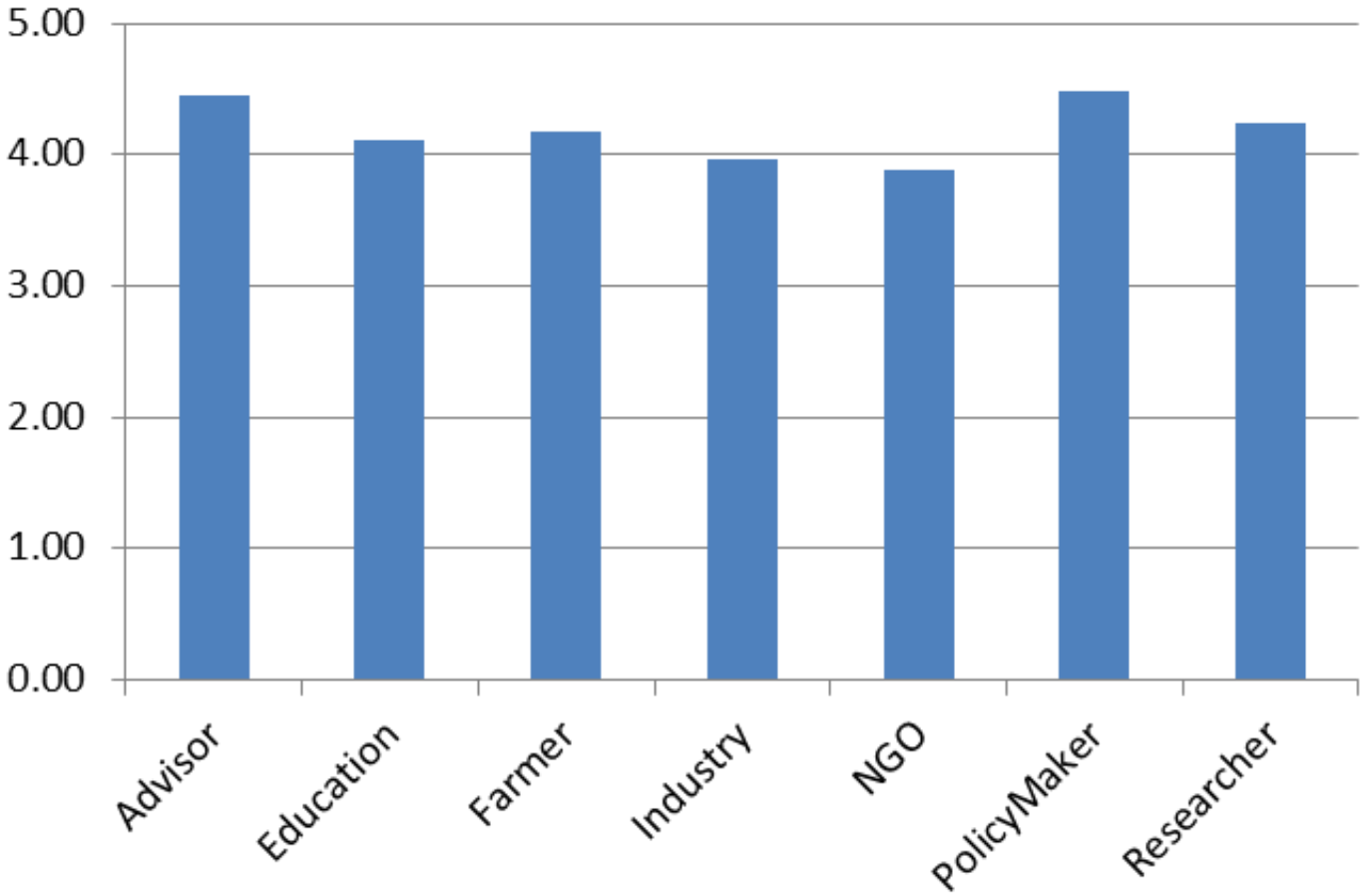
MultiSward survey among European stakeholders (Van den Pol-van Dasselaar, Goliński, Hennessy, Huyghe, Parente & Peyraud, 2014)

Important / very important functions of grasslands according to stakeholders:

- Grazing animals
- Animal production of high quality (especially milk)
- Biodiversity
- Beauty of the landscape

Grazing – stakeholder type

(Van den Pol-van Dasselaar *et al*., 2014)



Effect of grazing

Grass yield

Effect of grazing system on grass production

Losses:

- Grazing losses: trampling, faeces, urine
- Zero-grazing: harvest losses, preservation losses, feeding losses.

Grazing lower gross dry matter production than zero-grazing

Grazing: variation throughout the year

Balanced diet especially important for high-yielding dairy cows

Effect of grazing

Animal welfare

Effect of grazing system on animal welfare

Health, natural behaviour

Natural behaviour: requirements for food, water and rest, and also behavioural needs such as movement, social behaviour, foraging and play

Grazing gives much more scope for natural behaviour compared to conventional cubicle sheds

Effect of grazing on animal welfare

May reduce risk of mastitis

May benefit claw health

Results in large fluctuations in diet composition

In the field cows are exposed to rain and sun

In the field increased risk on pathogens

Often easier to prevent the disadvantages of grazing than to remedy the welfare disadvantages of stalls

“Today modern stables offer a lot of comfort and well being to animals, so that I think that on this point the differences are getting smaller and smaller”

EGF Working Group “Grazing” member, 2022

Effect of grazing

Environment

Effect of grazing on the environment

Grazing increases mineral losses

- Particulary nitrogen (N), but also P
- Import of N can increase by 50 kg ha^{-1} yr^{-1}

Type of nitrogen loss:

- More nitrate leaching
- More denitrification
- More nitrous oxide (N_2O)
- Less ammonia volatilisation (NH_3)

Effect of grazing on the environment

Less energy use

Less carbon dixode (CO_2) emissions

Less methane (CH_4) emissions

More carbon (C) sequestration

Effect of grazing

Biodiversity

Biodiversity

Biodiversity is all the different kinds of life you'll find in one area—the variety of animals, plants, fungi, and even microorganisms like bacteria that make up our natural world (WWF)

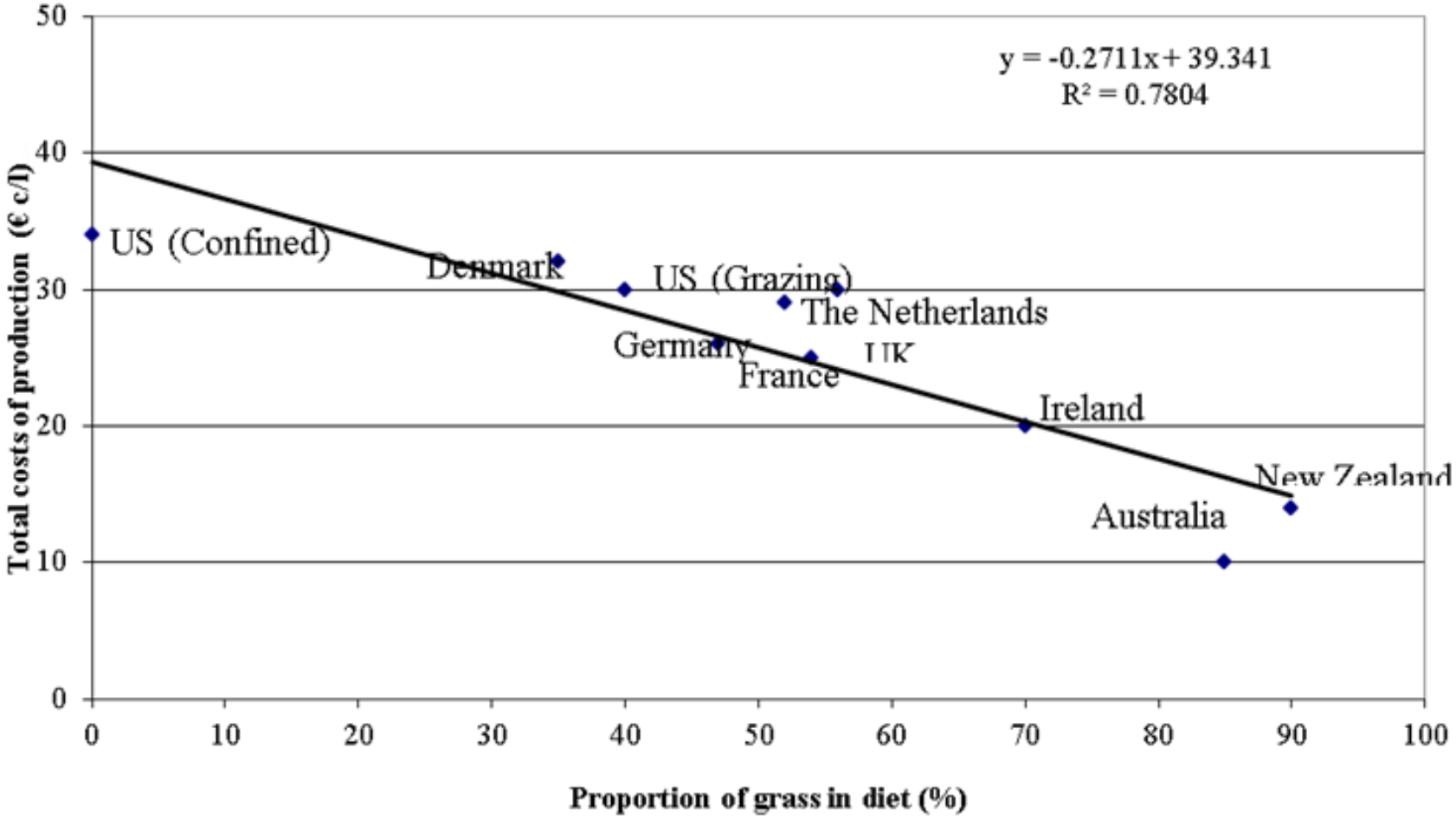
- Grazing leads to (bio)diversity

Grutto /
Black tailed godwit
Uferschnepfe

Effect of grazing

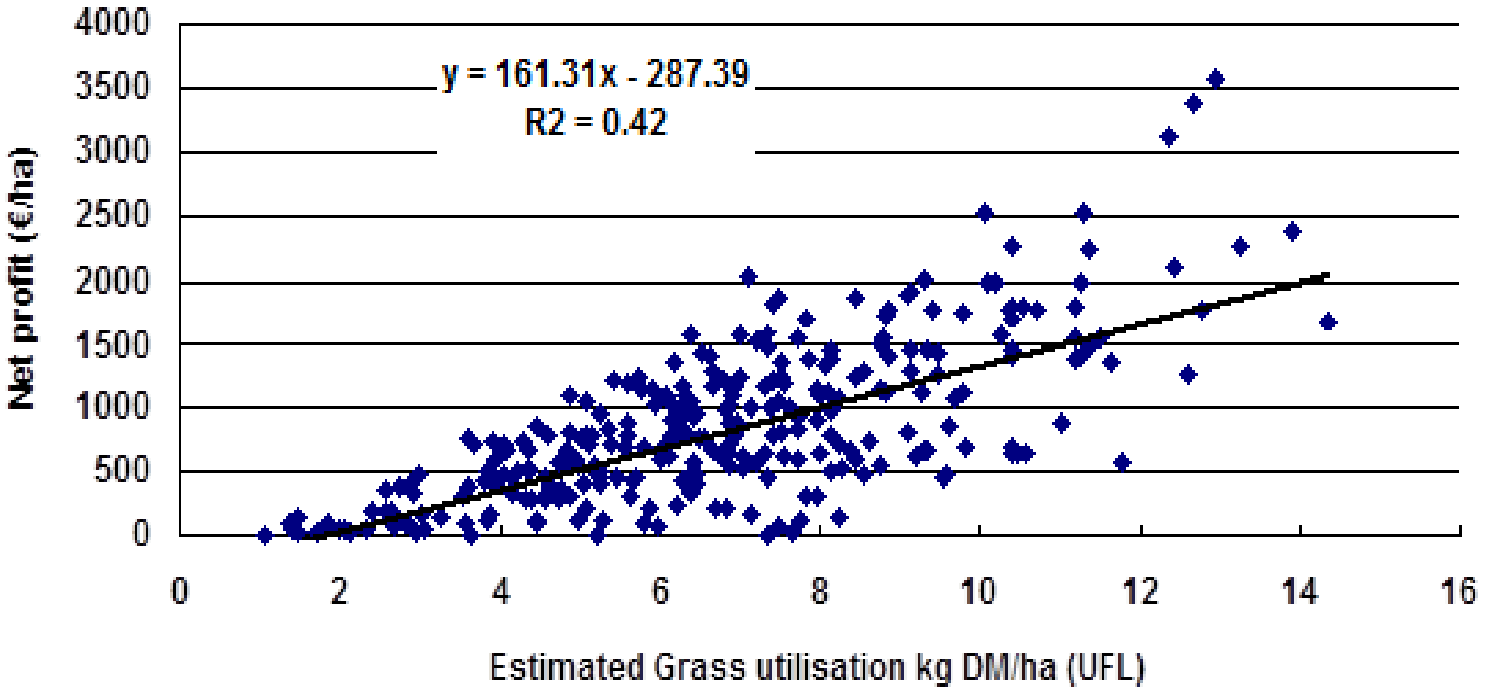
Economy

Grass based ruminant production as a low-cost strategy: more grass in the diet leads to lower costs



Dillon *et al.*, 2005

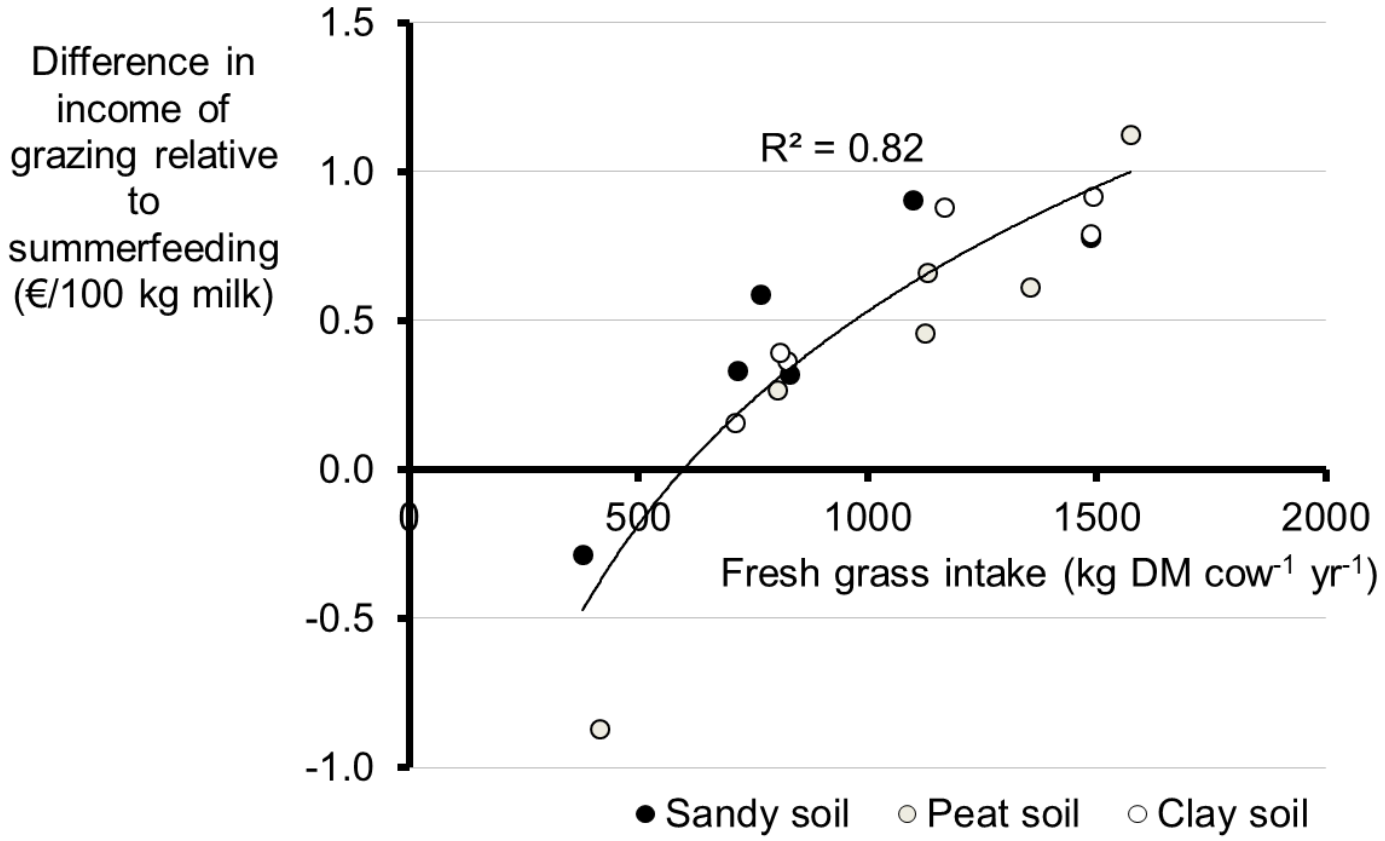
Irish commercial farms



Shalloo, 2009

Economy – grass intake crucial factor

Source: Van den Pol-van Dasselaar *et al*., 2014



Effect of grazing

Labour

Effect of grazing system on labour

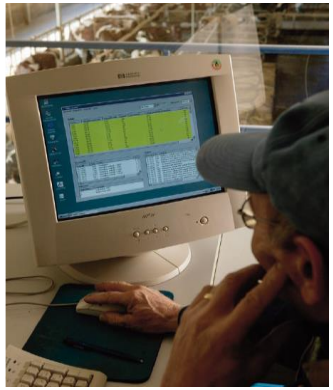
Labour input is lowest for day and night grazing

Grazing only during the day and zero-grazing require approximately the same labour input (3-5% more)

Calculations show that grazing yields the best returns per hour worked

However, also the quality of the labour counts!

- Easy – difficult
- Light - heavy



Effect of grazing

Summary

Advantages of grazing

Natural behaviour

Animal health aspects

Environment: less ammonia volatilisation, energy use, methane emission, more carbon sequestration

Biodiversity

Milk quality: fatty acid composition

Image of dairy farming

Labour and economy

Disadvantages of grazing

Labour: management

Less grass yield

Lower grass utilisation

Animal health aspects like unbalanced diet

Environment: nitrate leaching, denitrification, nitrous oxide emissions, N losses, P losses

The effect of grazing on various aspects

The effect of grazing (unrestricted grazing, restricted grazing, no grazing) on various aspects. The score ranges from - - to ++, with ++ signifying that the system concerned scores positive for the point in question, e.g. high health, low losses.			
	Unrestricted	Restricted	No grazing
Grass yield and grass use	-	+	+
Balanced diet	-	+/-	++
Natural behaviour	++	++	+
Animal health	++	+	+/-
Nitrate leaching, N_2O emission	-	+	++
Ammonia volatilisation	++	+	+/-
N losses	-	+	++
P losses	-	+/-	+
Energy use, CH_4 emission	+	-	- -
Fatty acid composition of milk	++	+	+/-
Labour: hours work per year	++	+	+
Economics	+	+	-
Image of dairy farming	++	+	-

Van den Pol-van Dasselaar

Mind-set

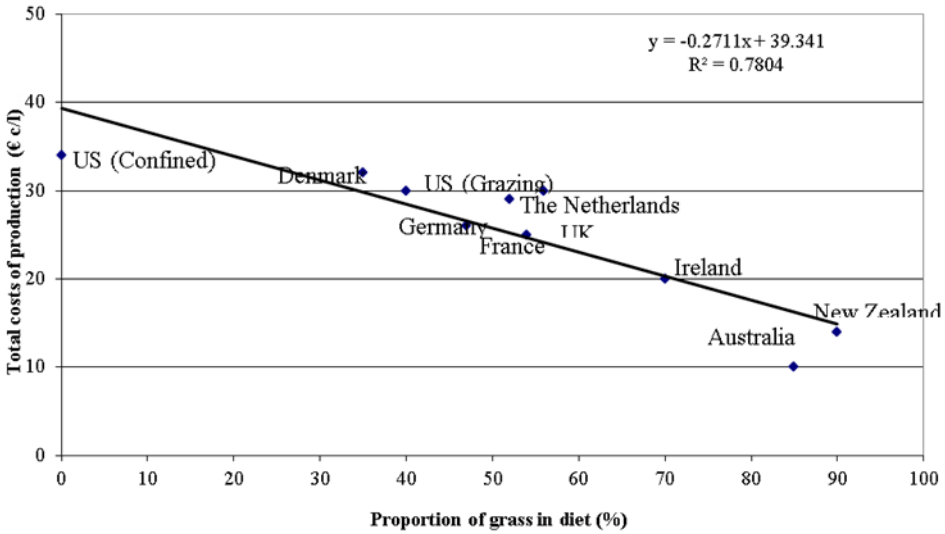
Grass based ruminant production as a low-cost strategy

Different opinions

Some say yes

Others say no

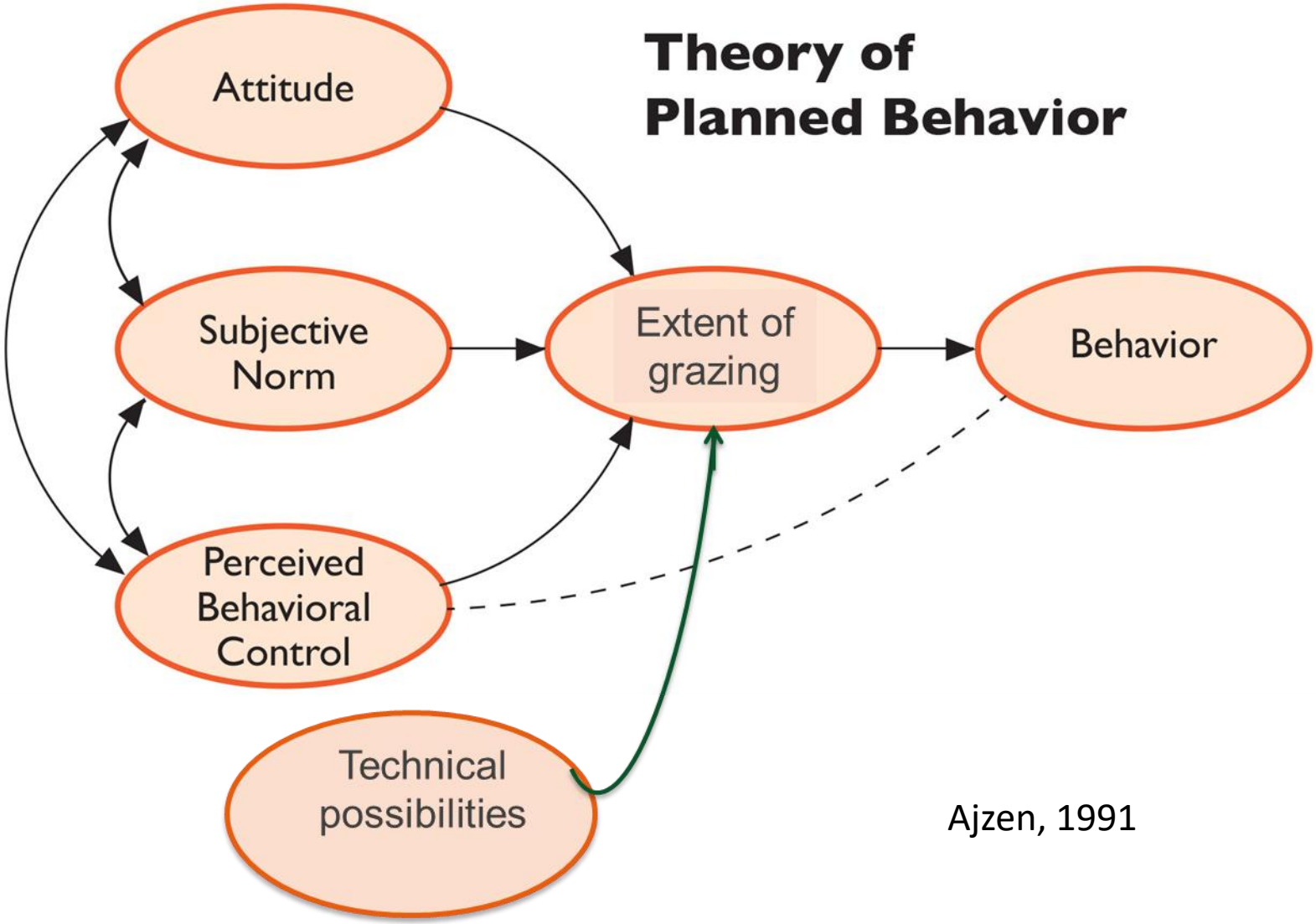
- Not achievable in some areas due to farm / pedoclimatic conditions
- Intensification leads to less grazing
- Perceived as impossible by some farmers



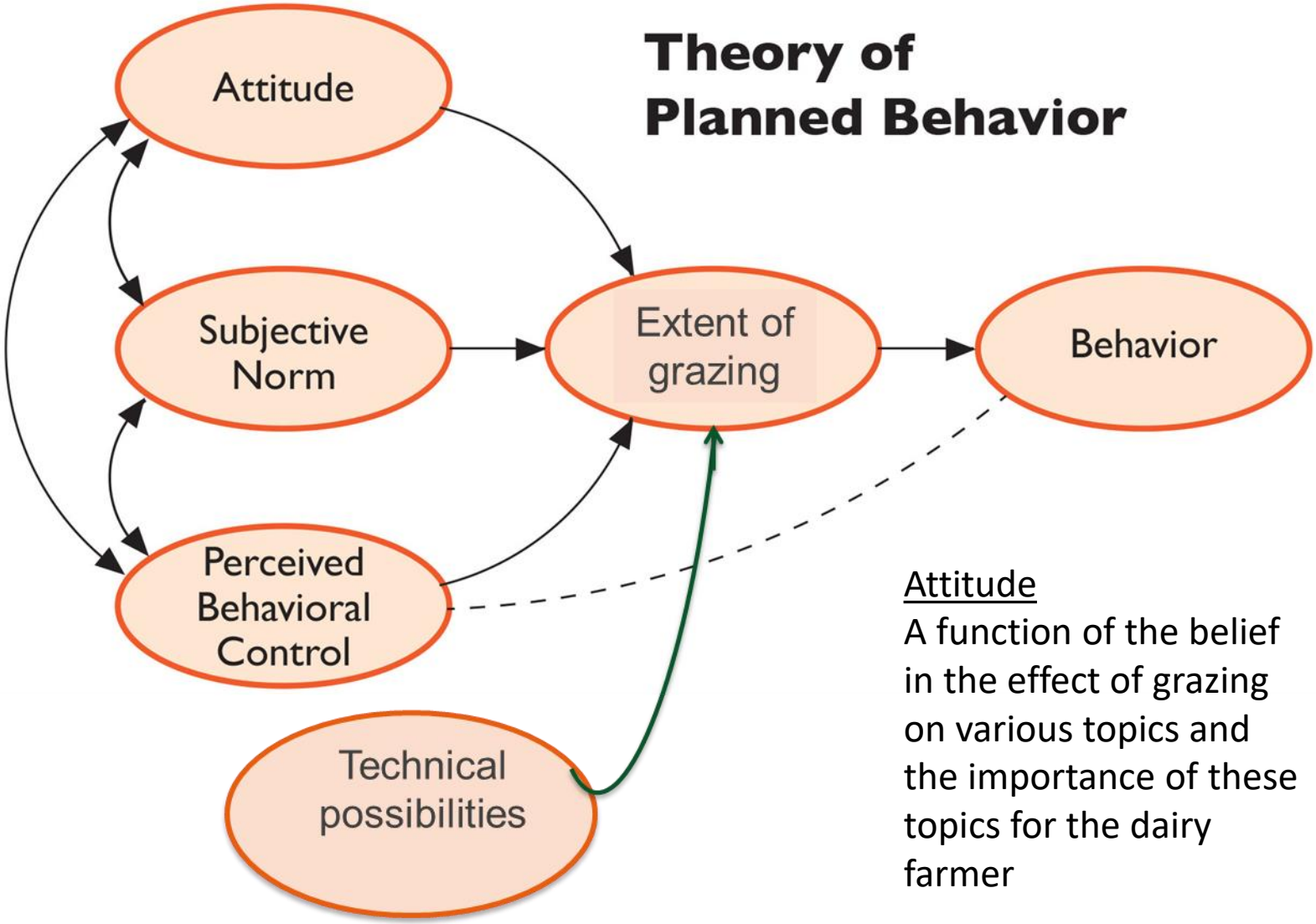
The importance of the mind-set of the farmer

Farmers are key actors since they decide on the day to day management of the farm

What is the effect of the mind-set of the farmer on the extent of grazing on commercial dairy farms?

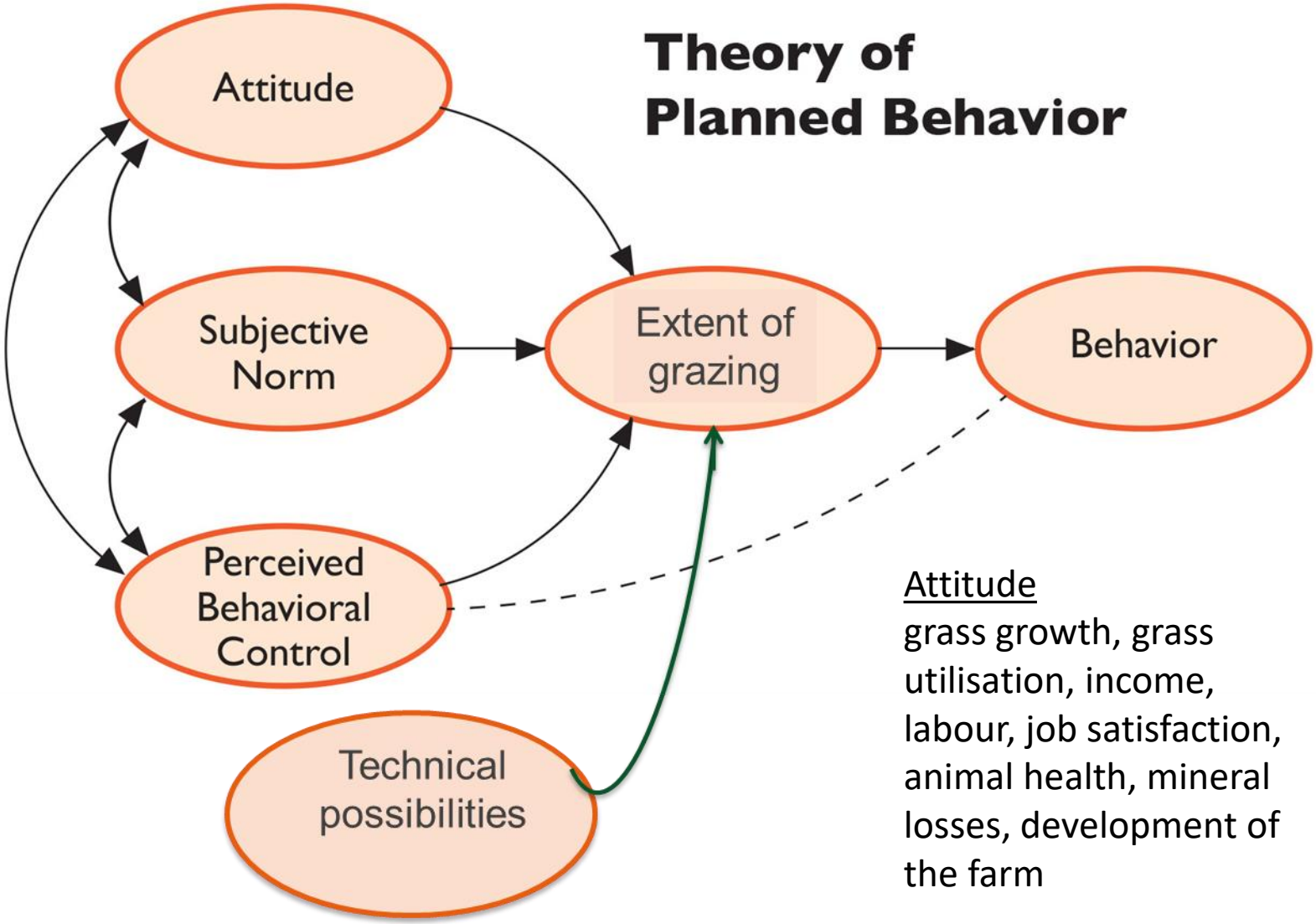

Theory of
Planned Behavior
Attitude
Subjective
Norm
Perceived
Behavioral
Control
Extent of
grazing
Behavior
Technical
possibilities

Ajzen, 1991

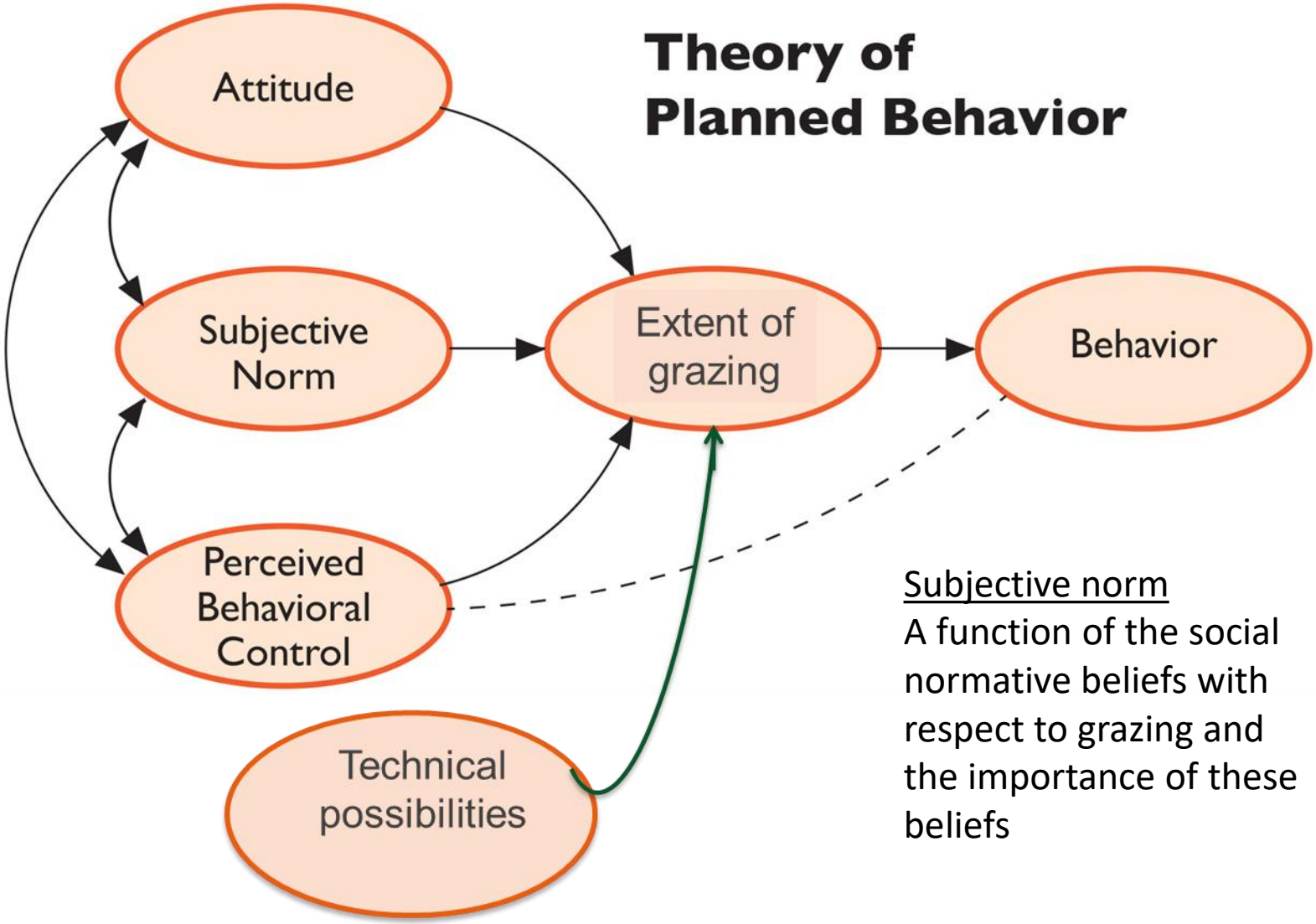


Attitude

A function of the belief in the effect of grazing on various topics and the importance of these topics for the dairy farmer

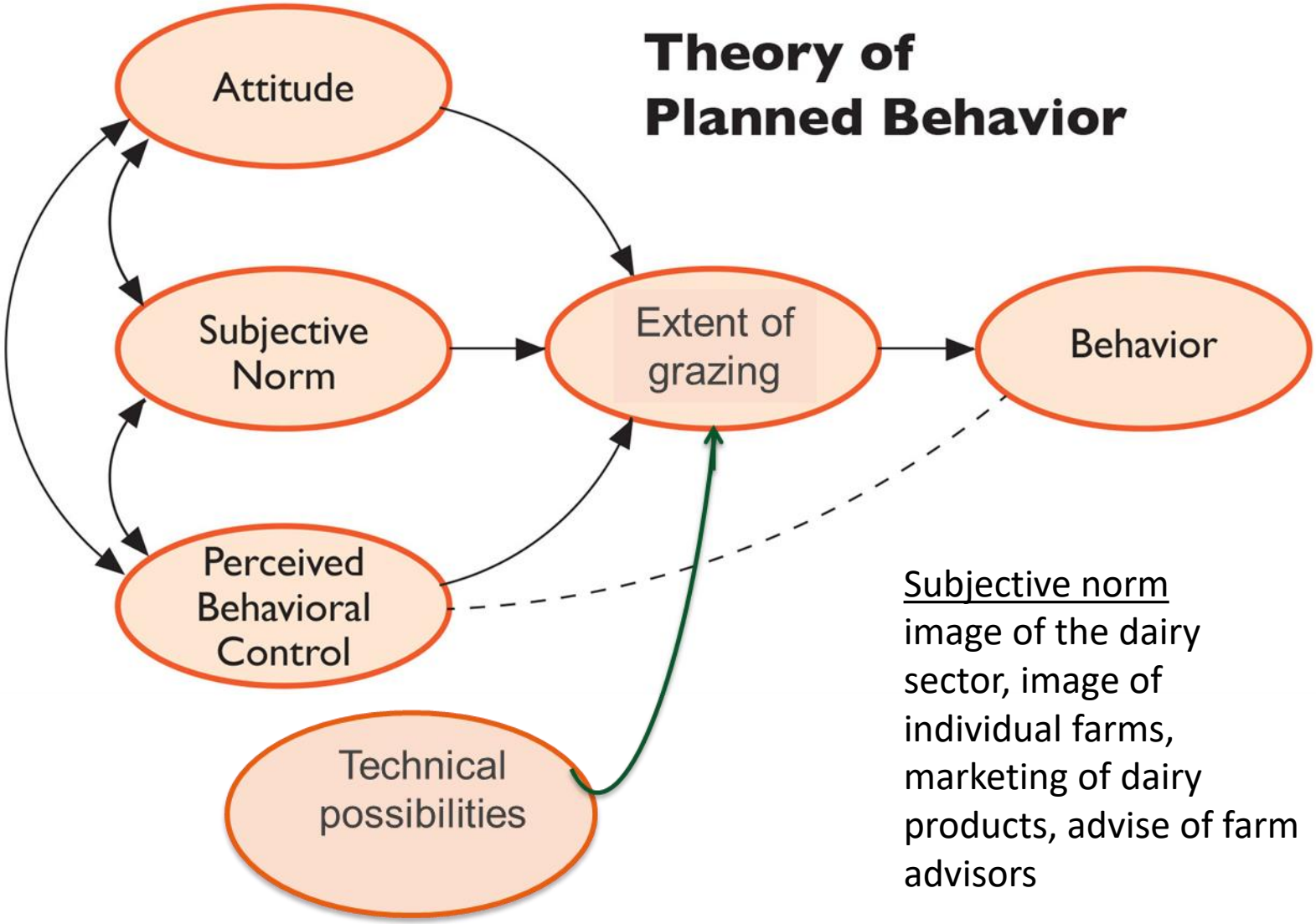


Attitude
grass growth, grass utilisation, income, labour, job satisfaction, animal health, mineral losses, development of the farm

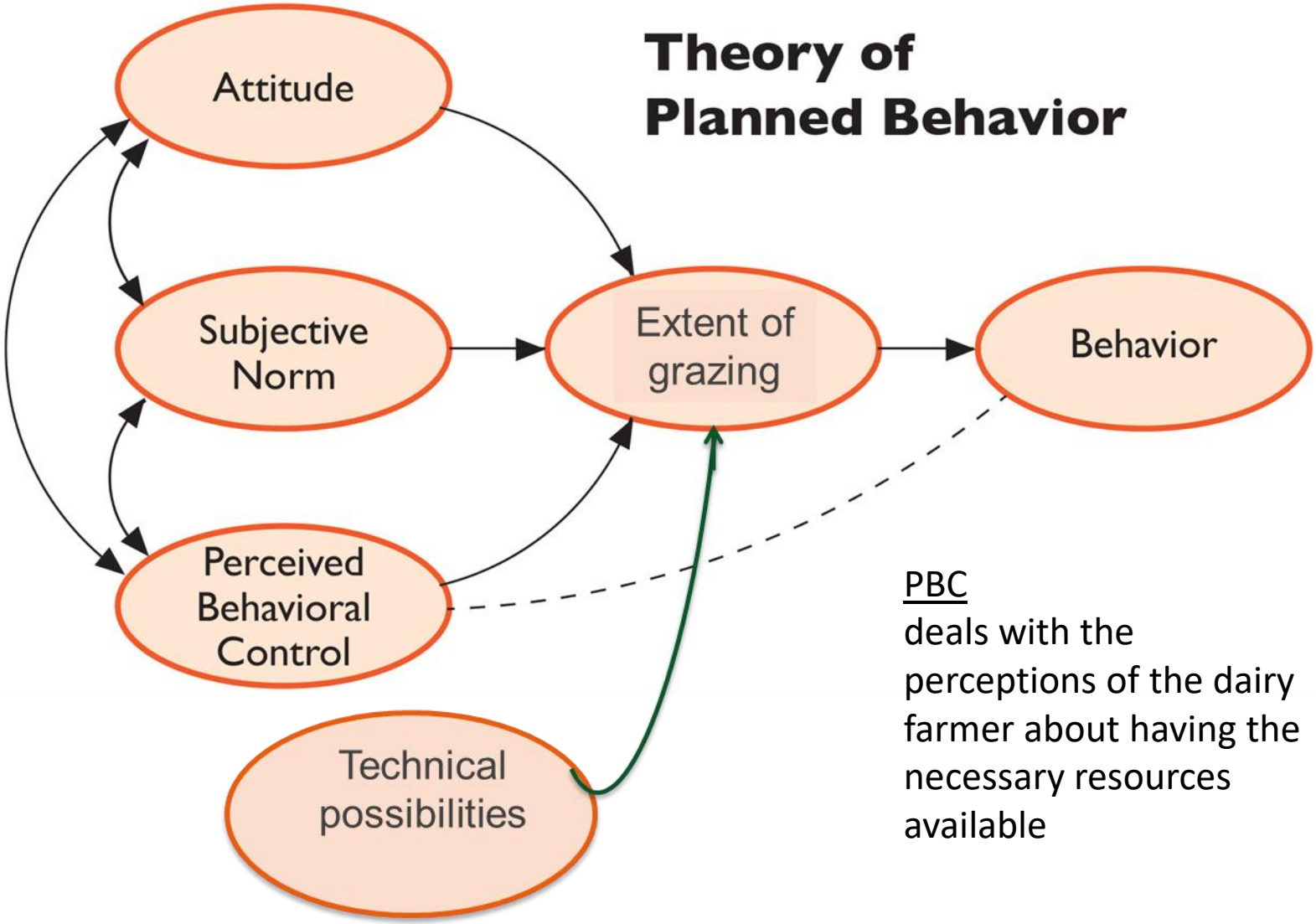


Subjective norm

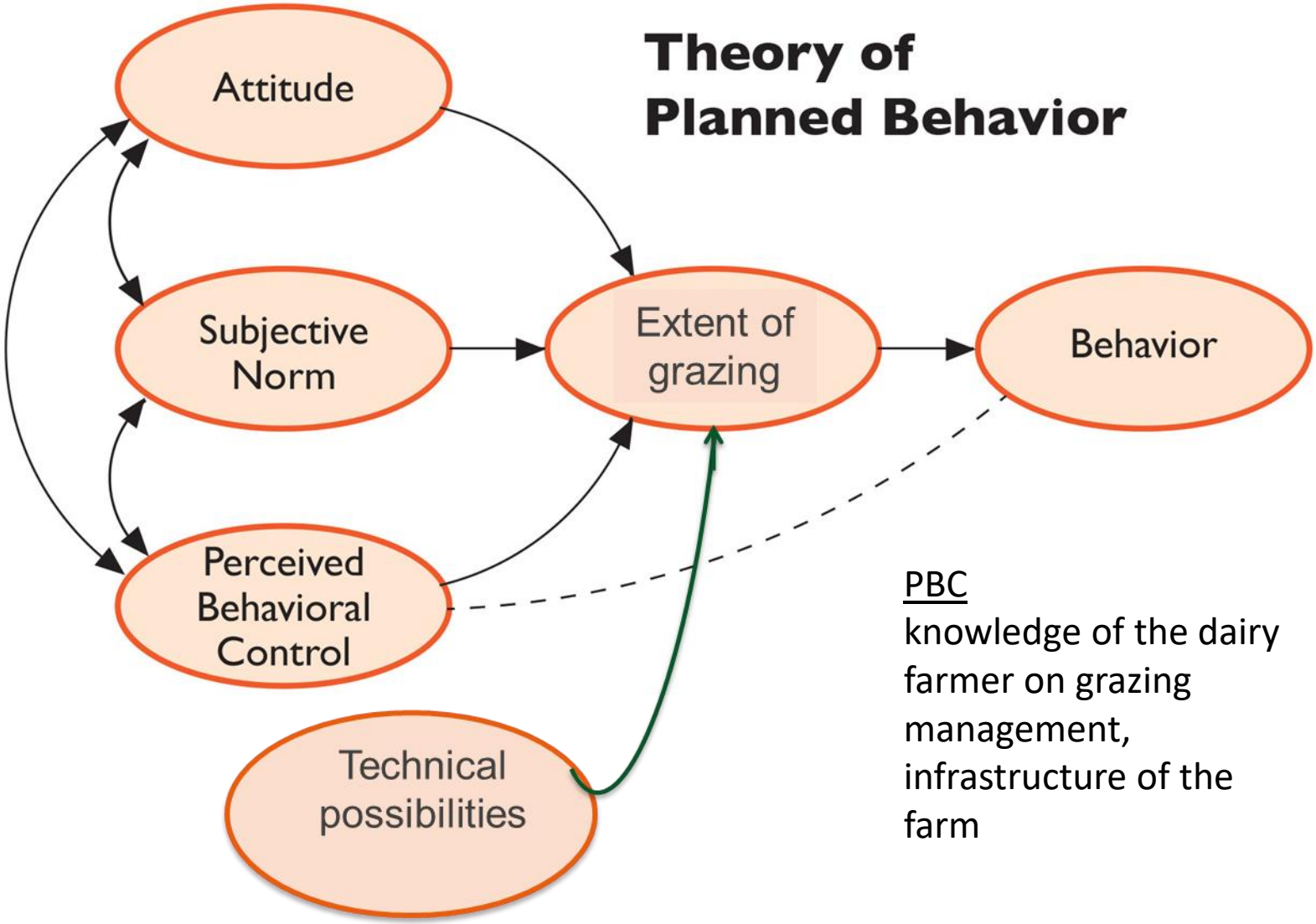
A function of the social normative beliefs with respect to grazing and the importance of these beliefs



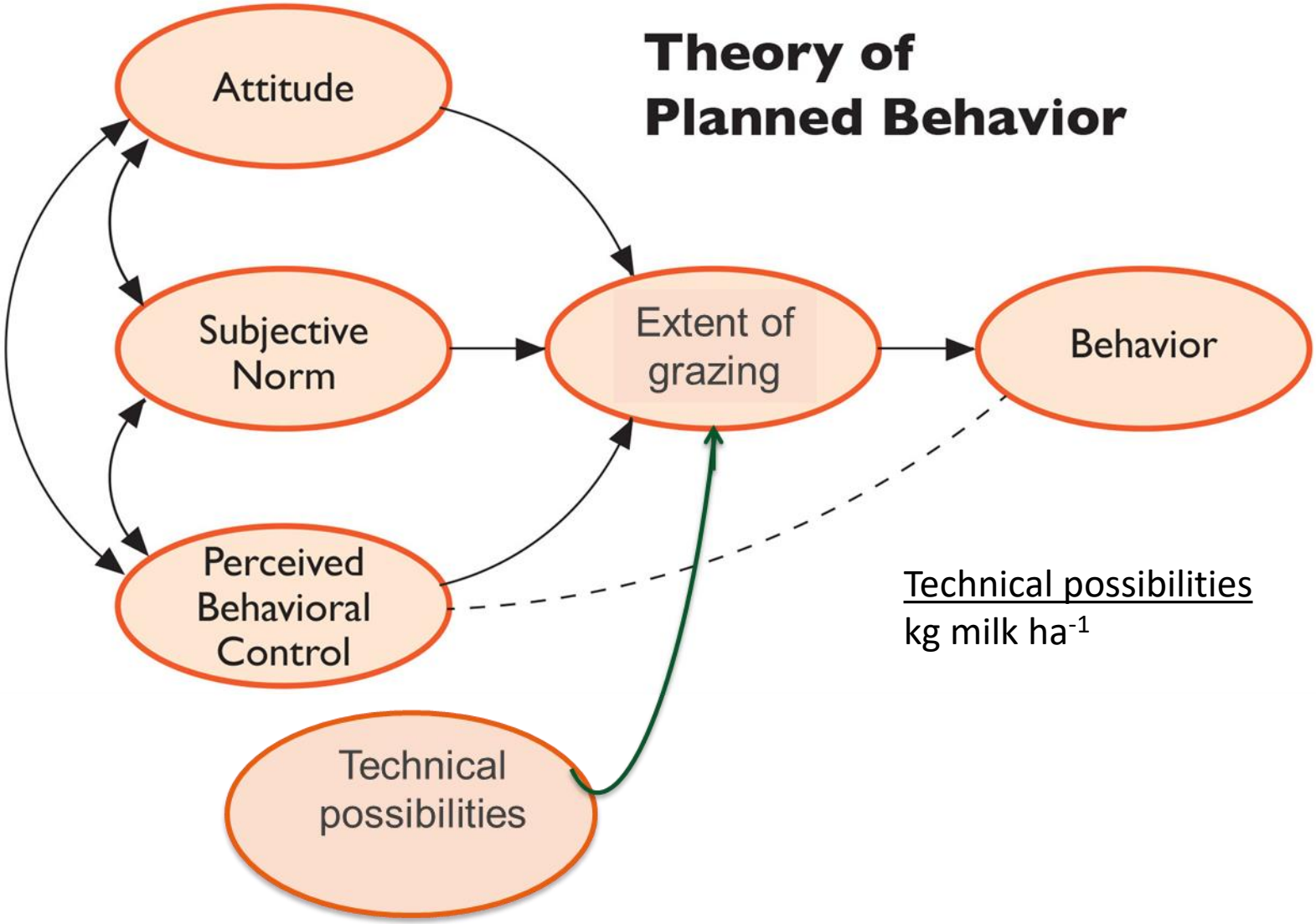
Subjective norm
image of the dairy sector, image of individual farms, marketing of dairy products, advise of farm advisors



PBC
deals with the perceptions of the dairy farmer about having the necessary resources available



PBC
knowledge of the dairy farmer on grazing management, infrastructure of the farm


Theory of
Planned Behavior
Attitude
Subjective
Norm
Perceived
Behavioral
Control
Extent of
grazing
Behavior
Technical
possibilities
Technical possibilities
kg milk ha-1

Methods

- On-line questionnaire to commercial dairy farmers
- 212 valid responses on attitude, norms and perceived behavioural control
- Combined with technical data and economic data of annual accounts
- Factor analysis to understand the structure of the items
- Multiple linear regression
  - Extent of grazing (hr cow^{-1} yr^{-1}) dependent variable

Factor analysis and multiple linear regression (extent of grazing as dependent variable)

47%
of variation in the extent of grazing!

- 0.01 level: Farm Continuity Beliefs, Perceived Behavioural Control and Milk production per ha
- 0.05 level: Social Normative Beliefs

(van den Pol-van Dasselaar *et al.*, 2016)

Drivers and barriers

- Driver: Social Norms
- Barrier: Grass Yield
- Driver/barrier: Farm Continuity and Perceived Behavioural Control
  - Consistent with choices in grazing management

Survey European farmers 2018
Opinions and perceptions
>1,000 grassland farmers

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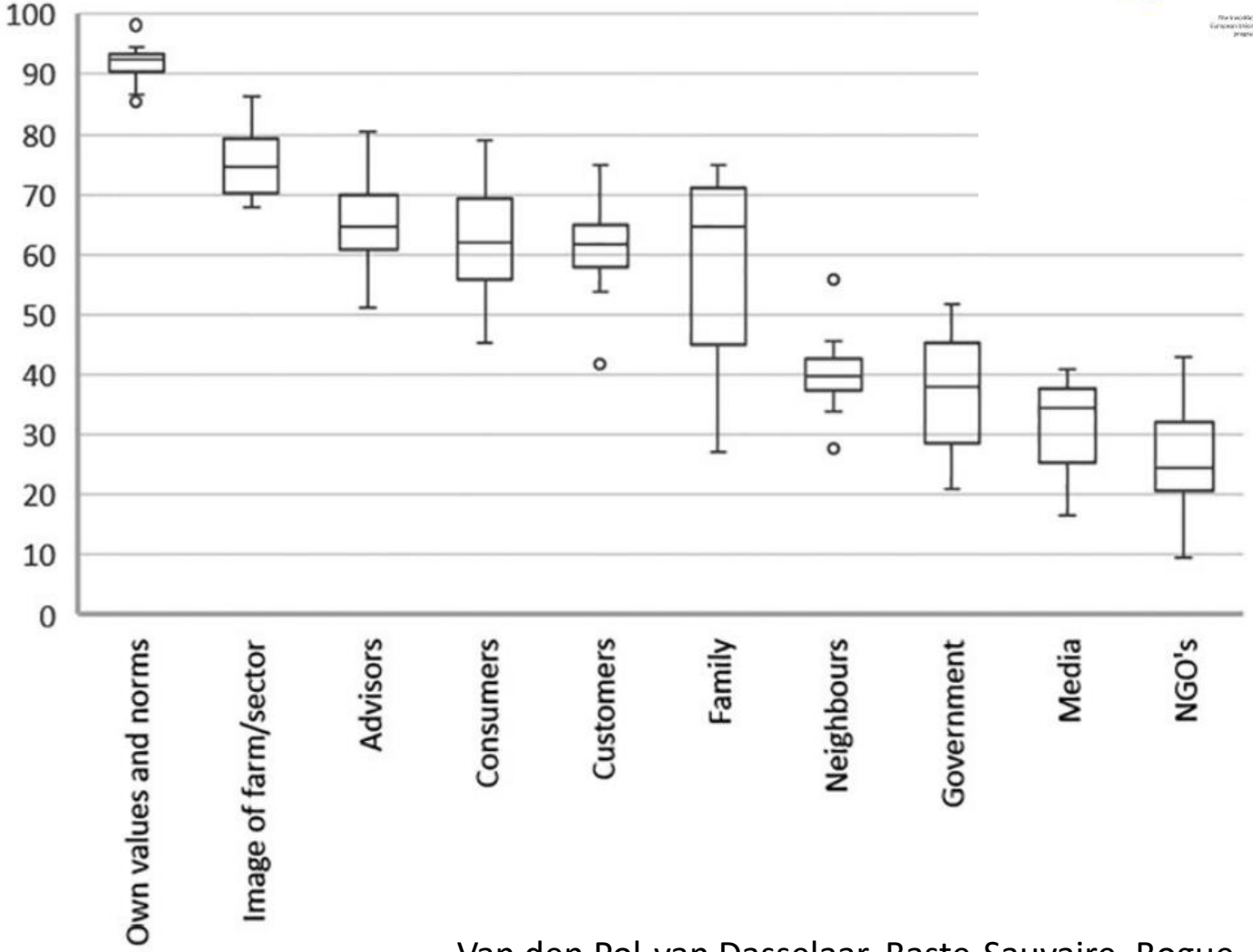
Importance of people/items on decisions with respect to grasslands



Van den Pol-van Dasselaar, Baste-Sauvaire, Bogue, Carlsson, Delaite, Goliński, Isselstein & Peratoner, 2019

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Mind-set farmer

Farmers with grazing:

- Grazing has positive effects
- Grazing is possible on my farm

Farmers without grazing:

- Grazing has negative effects
- Grazing is not possible on my farm

Choices farmers consistent with opinion farmers

Mind-set farmer affects extent of grazing

Mind-set of the farmer

How can mind-set be changed?

- Education
- Changes in the social and economic environment

Cognitive dissonance

Mind-set of the farmer

Farmers try to avoid cognitive dissonance

- change of opinion
- change of behaviour
- change of perception (Festinger, 1962)

Capacity building next generation of grazing farmers

- Mind-set of young farmers
- Young Farmers Tours
- Mutual learning

Grazing 4 AgroEcology

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Funded by the European Union

Mind-set

https://www.youtube.com/watch?v=LZA1vEGz14Q

Conclusions

Take home messages

- Grazing provides multiple benefits to farmers and to the whole society
- Grazing is declining in many parts of Europe
- Grazing is advantageous for ecology, but there are no generic solutions for all situations
- Grazing has advantages and disadvantages; it is not a black and white story
- Extent of grazing depends on farm situation, management and farmer's attitude, preferences and knowledge (mindset farmer)
- Don't forget:
  - Farmers are key actors – mind-set important
  - Special attention for young farmers and farm advisors, they determine the future of grazing


Vielen Dank!

Talent for growth