Innovative use of grassland for a sustainable intensification of agriculture at landscape scale

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Background

Ecosystem services from grassland

- grassland (herbage) based livestock production systems

- biodiversity at landscape level

- soil conservation, no/low erosion risks

- carbon sequestration

- clean surface and ground water

Background

However: services at risk

- production

- biodiversity

- soil fertility

- climate

- water

Background

However: services at risk

- production

- biodiversity

- soil fertility

- climate

- water

Through

- under utilization/abandonment

- poor management

- intensive utilization

Challenges

How to sustain ecosystem services

- Developing livestock production systems that resolve trade offs among production and environmental target

- Multiple uses/production systems for multiple functions

Developing grazing systems

Background

Scientific debate on the role of grazing livestock

- development of agricultural landscapes

- ecosystem functioning of grasslands/rangelands

- development of agricultural production systems

Grazing in Europe (% dairy cows) in different regions of Europe. Data from the European Grassland Federation WG Grazing; mainly educated guesses.

(van den Pol van Dasselaar et al. 2020)

Region and Country	2010	2011	2014	2016	2018	2019
West						
Ireland	99	99	98	95–100	95–100	95–100
UK				80–90	80–95	70–80
Central; grazing <50%						
Denmark	35–45	30–35	25–30	25	20–30	20–25
Germany	42			10–50	20–42	15–40
Austria		25		40	44	44
East						
Poland				20	20	30
Estonia		35				10
Lithuania			50–70		75	
Czech Republic	20			3	5	
Bosnia Herzegovina		5				
Slovenia	25			20	20–40	20–40
Hungary				2–3	3–5	3–5
Bulgaria				50		

Constraints to grazing that could be resolved by technology according to the WG Grazing members. (van den Pol van Dasselaar et al. 2020)

Problem/Constraint	Examples of Technology to Be Developed
Labour	Anything that reduces labour, virtual fencing, cow traffic management, how to motivate cows, drones to measure grass and to fetch the cows
Grass intake per individual cow is not known	Develop predictors, e.g., in the milk, and cow sensors, e.g., on cow bites, head position, automatic regulation of supplementary feeding
Grass supply is not known	Real-time information, use of drones
Grass quality is not known	Non-destructive real-time grass quality analyses
Data are available, but cannot be translated to advice	Develop advisory systems. Develop rules of thumb
Environmental problems	Precision farming and site-specific management can lead to better use of nutrients, better managed cutting and grazing, detection of poisonous plants

Vision

Using innovative technologies to shape future grazing systems that sustain and improve…..

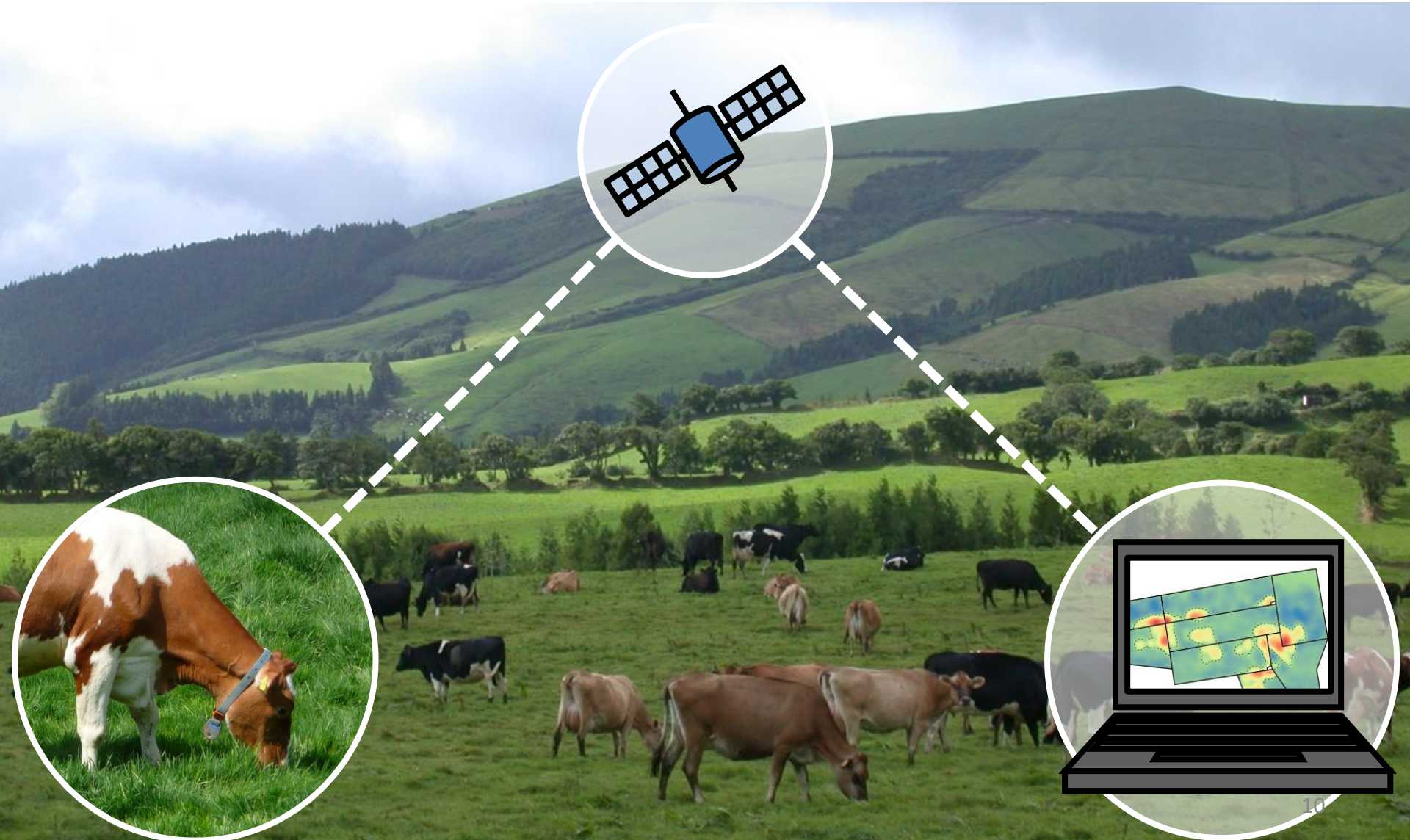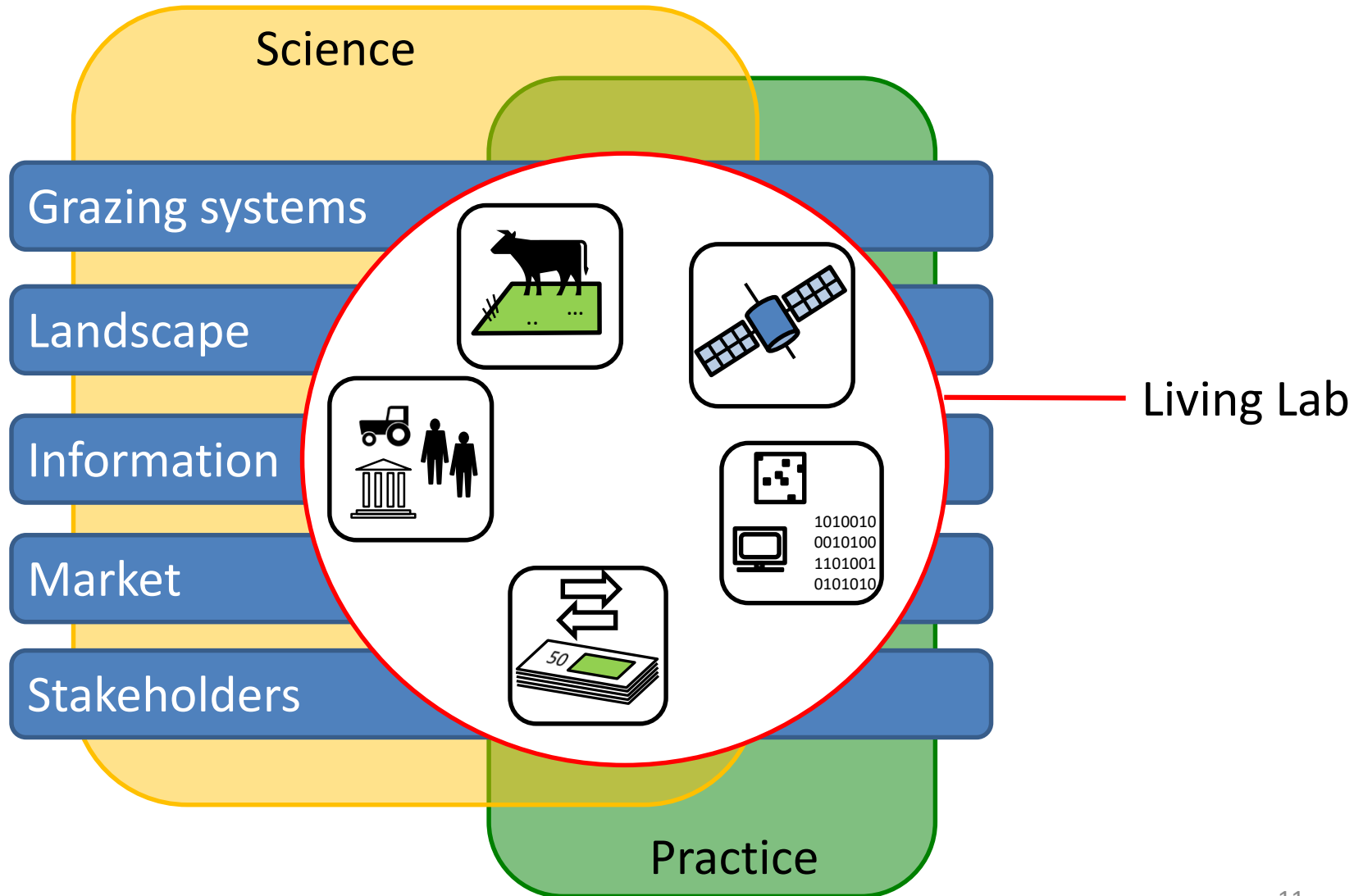| ….the agricultural added value (forage, livestock) of grasslands	…..the diversity of habitats & biota and other ecosystem services	….appreciation of grasslands in the society

Vision

Concept

Science

Grazing systems

Landscape

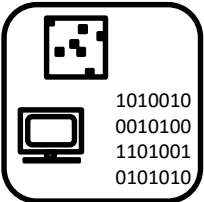Information

Market

Stakeholders

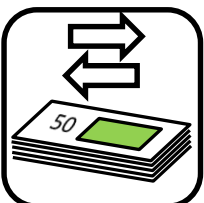Living Lab

Practice

Methodology

Grazing systems: Smart farming technologies, e.g. virtual fencing, grazing management, ecosystem service assessment
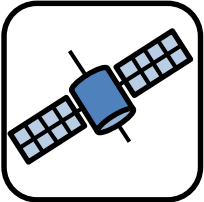
Landscape: Remote sensing technologies, high resolution spatio-temporal assessment of grass swards (forage, nature)

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Information: Interactive multilayer information system, analysis and provision of information to stakeholders
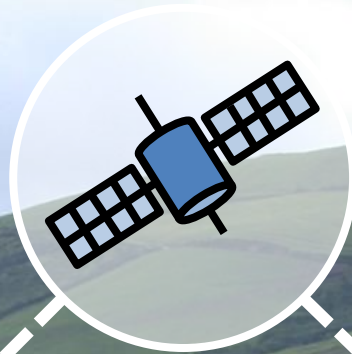
Market: Valorization grassland, agricultural added value, remunaration of ecological goods and services

Stakeholders: Transformation science approach, participation and co-Development, ‚Living Labs'

GIVE WAY
TO STOCK

Vision

**thank you
for attention**