

SER Europe Conference 2018

Restoration in the Era of Climate Change

9 – 13 September 2018, Reykjavik, Iceland

Presentation

Domestic livestock as ecosystems engineers: Possibilities and pitfalls - Linking case study and landscape approach

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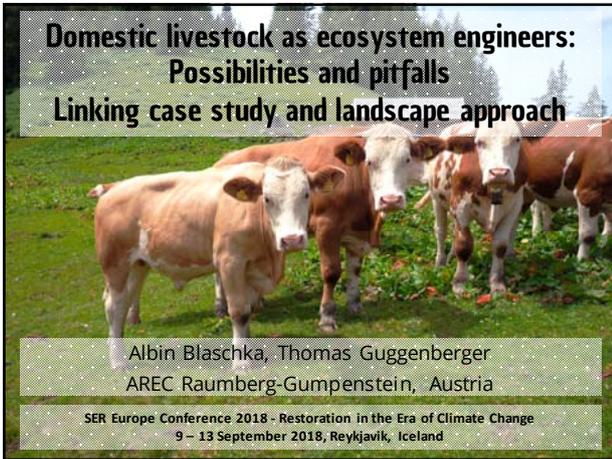
For large scale restoration of cultural landscapes consisting of low-productivity ecosystems, the use of livestock has turned out to be an effective tool for management and restoration.

Here, the combined lessons from several case studies dealing with high pasture management and restoration using livestock in the Austrian Alps are discussed. These lessons can be summarised best by five topics: People, scale, governance, “wicked problems” and local knowledge. Ecological Restoration has to consider working within a social-ecological ecosystem and to follow a landscape approach.

Browsing or grazing livestock has the potential to influence natural processes: Trampling, nutrient relocation and different behavioural patterns influence habitats directly, but livestock shapes the landscape also indirectly, as a distinct land-use pattern with its people, traditions and logistics. Using livestock, it is possible with low effort to keep or restore an open landscape, thus preserving such often endangered extensive ecosystems and habitats with a high diversity.

Working with livestock also brings constraints and responsibilities, leading to pitfalls: Often, the vegetation to change (e.g. working against shrub encroachment) has a reduced carrying capacity for livestock - Requirements for restoration and nutritional requirements of animals are opposing needs. This is one of several wicked problems which can arise, which has to be tackled already during the planning phase, with involvement of owners, clear priorities and transparent procedures/contingency plans.

On the social-ecological side, doing restoration work using livestock broadens the scope of agriculture into a stewardship for the landscape and connects restoration work with the local community and economy, interacting with other land uses, fostering a multifunctional landscape. For pursuing ecological goals using livestock, it is most of the time necessary to follow cultural goals. Done right, considering the five points mentioned, the benefit is a sustainable, low cost method for the restoration of open habitats.



**Domestic livestock as ecosystem engineers:
Possibilities and pitfalls
Linking case study and landscape approach**

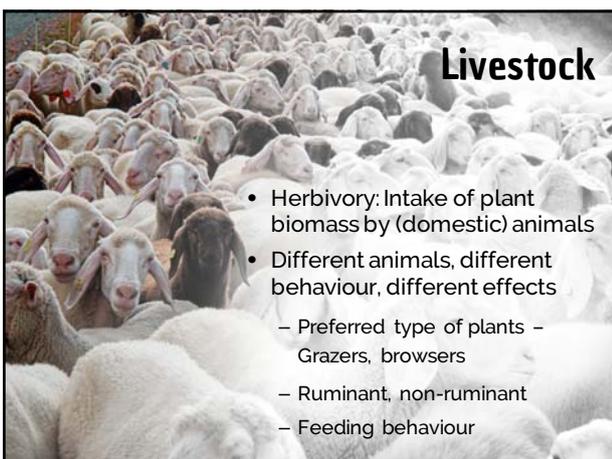
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Context

- Alps / High Pastures
- Restoration Continuum
- Cultural landscape
- Social-ecological ecosystem
- Landscape approach



Livestock

- Herbivory: Intake of plant biomass by (domestic) animals
- Different animals, different behaviour, different effects
 - Preferred type of plants – Grazers, browsers
 - Ruminant, non-ruminant
 - Feeding behaviour



**Possibilities:
Management, Restoration and ecosystem engineering**

- Removal of biomass
- Nutrient relocation
- Trampling – opening of soil
- Connecting habitats with forage

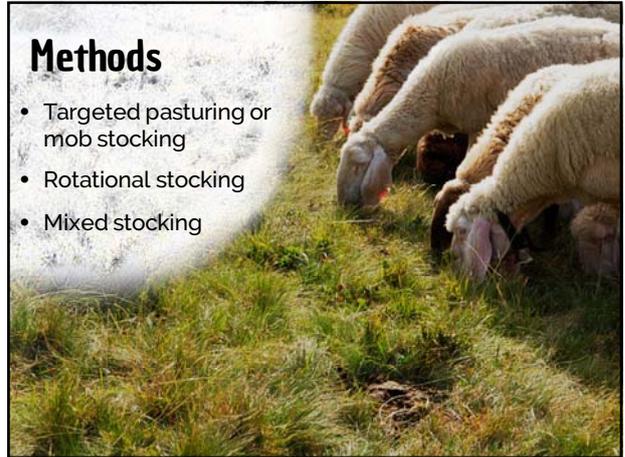
Possibilities: Management, Restoration and ecosystem engineering



- Against encroachment
- For heterogeneity
- “Jump-Starting” and steering succession

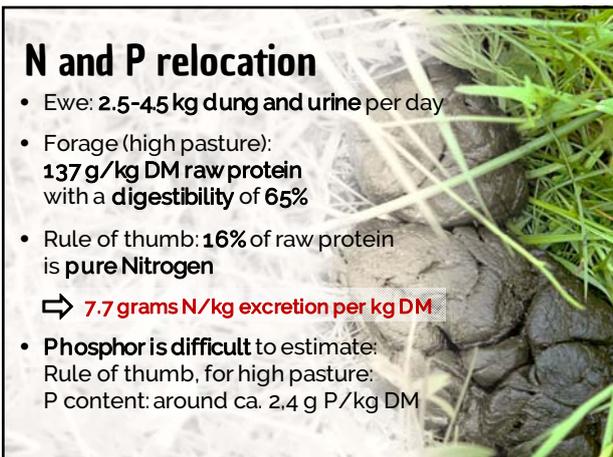
Methods

- Targeted pasturing or mob stocking
- Rotational stocking
- Mixed stocking



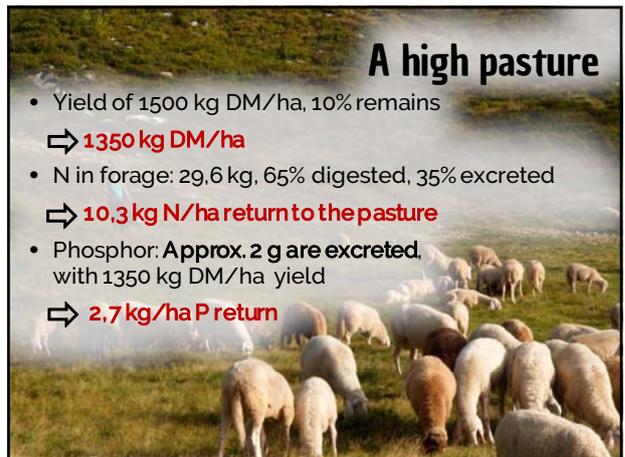
N and P relocation

- Ewe: **2.5-4.5 kg dung and urine** per day
- Forage (high pasture):
137 g/kg DM raw protein
with a **digestibility** of **65%**
- Rule of thumb: **16%** of raw protein
is **pure Nitrogen**
⇒ **7.7 grams N/kg excretion per kg DM**
- **Phosphor is difficult** to estimate:
Rule of thumb, for high pasture:
P content: around ca. **2.4 g P/kg DM**



A high pasture

- Yield of **1500 kg DM/ha**, **10%** remains
⇒ **1350 kg DM/ha**
- N in forage: **29,6 kg**, **65%** digested, **35%** excreted
⇒ **10,3 kg N/ha return to the pasture**
- Phosphor: **Approx. 2 g** are excreted,
with **1350 kg DM/ha** yield
⇒ **2,7 kg/ha P return**



Failures arise from **social** processes
as much as from **ecological** processes

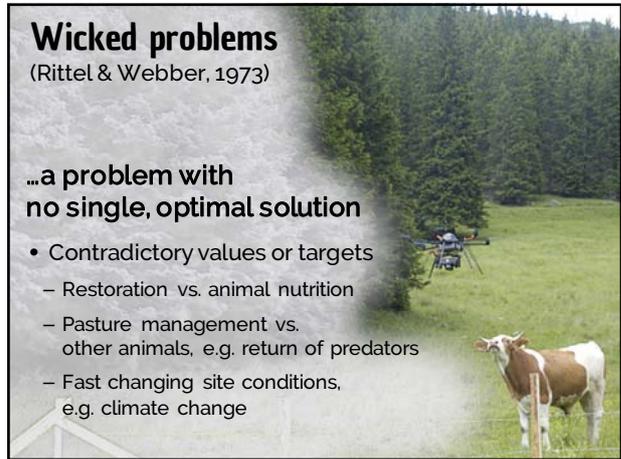
- Availability of animals, personnel
- Economic questions, logistics
- Nutrition, continuous yield

Wicked problems

(Rittel & Webber, 1973)

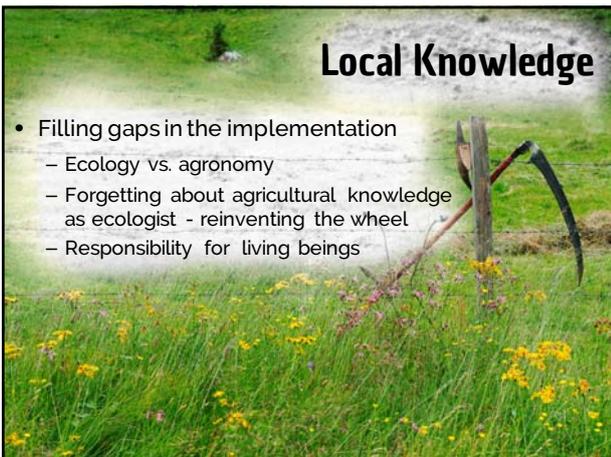
...a problem with
no single, optimal solution

- Contradictory values or targets
 - Restoration vs. animal nutrition
 - Pasture management vs. other animals, e.g. return of predators
 - Fast changing site conditions, e.g. climate change



Local Knowledge

- Filling gaps in the implementation
 - Ecology vs. agronomy
 - Forgetting about agricultural knowledge as ecologist - reinventing the wheel
 - Responsibility for living beings



People

- Hidden agendas
- Conflict of interests
- Free-rider
- Community building
- Connecting people with processes and projects



Landscape is more than a physical space but a social ecological system

Scale

- Solutions at suitable scale
 - Spatially: Pasture – plot/area/landscape
 - Organizational/Institutional
 - Creating hierarchies



Governance

A social ecological system combines social and ecological actors and processes influencing each other

⇒ **Interface between legislation, administration, management/land use – Think scale!**



Thank you!

Old ecologists never die, they just end up being badly trained social scientists...

Corey J. A. Bradshaw - <https://conservationbytes.com>

