Effects of innovative management options on permanent grassland (PG) in the mountain area of Switzerland

Gabriele Mack[1], Nadja El Benni[1], Sophie Tindale[2], Erik Hunter[3], Paul Newell Price[4] and Lynn Frewer[2]
[1]Agroscope, Socioeconomics Research Group, Tänikon, Switzerland; [2] Centre for Rural Economy, School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, UK; [3] Department of People and Society, Swedish University of Agricultural Sciences; Sweden; [4] ADAS Gleadthorpe, Meden Vale, Mansfield, Notts, NG20 9PD, UK

Motivation

- Various practices for managing permanent grasslands that entail trade-offs in the subsequent delivery of ecosystem services have been proposed.
- Understanding potential ES trade-offs from different stakeholder perspectives is essential for improving management options, promoting their adoption, and developing policy that is supported.

Aims

To assess the feasibility and potential effects on ES delivery, under Swiss alpine climatic, political and institutional conditions, of 6 management options:

1. Overseeding
2. Sward renewal
3. GrassCheck
4. Rising plate meters
5. Virtual fencing
6. Biodiversity management

Methods

Delphi survey with an interdisciplinary group of experts to gather information and opinions on the effect of innovative grassland management options and to obtain a reliable group position.

- 10 experts assessed the feasibility of six management options and their potential effect on ES.
- Experts: economist, social scientist, farm advisor, ecologist, soil scientist, livestock scientist, engineering and precision farming scientist, veterinary scientist, animal welfare scientist.
- An online study was conducted using two rounds of questionnaires with anonymous feedback of results between rounds.
- The two rounds - September and October 2020.

Delphi-study

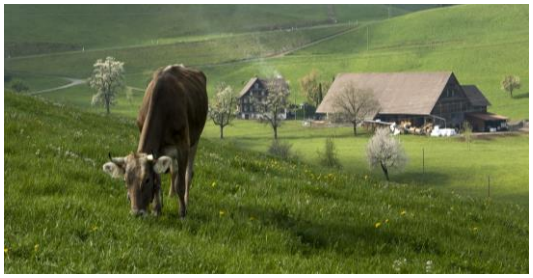
Results

- Expert consensus that:
  - Sward renewal and virtual fencing were not widely feasible in Switzerland.
- No expert consensus on whether:
  - Virtual fencing is positive or negative for animal health and welfare.
- Virtual fencing was considered to be positive for cultural ES such as recreation.
- Biodiversity management, over-seeding, and particularly sward renewal affect a wide range of ES.
- Measures for monitoring or predicting grass growth (e.g. GrassCheck and rising plate meters) do not affect regulating ES.

Effects that each management option is likely to have on delivery of ES

	Biodiversity Management	Over-seeding	Sward renewal	Grass-Check	Rising plate meters	Virtual fencing
Biodiversity	+	+	-	+/-	+/-	n.c.
Pollination	+	n.c.	n.c	+/-	+/-	+/-
Carbon storage	+/-	n.c.	-	+/-	+/-	+/-
Greenhouse gas emissions	n.c.	+/-	n.c	+/-	+/-	+/-
Flood control	+/-	+/-	-	+/-	+/-	+/-
Water quality	+/-	+/-	+/-	+/-	+/-	+/-
Prevention of soil erosion	+/-	+	-	+/-	+/-	+/-
Prevention of soil compaction	+/-	+/-	n.c	+/-	+/-	n.c.
Prevention of loss of organic soil matter	+/-	n.c.	-	+/-	+/-	+/-
Landscape aesthetics	+	+/-	n.c	+/-	+/-	n.c.
Recreation	+	n.c.	n.c	+/-	+/-	+
Animal health and welfare	n.c.	+/-	+/-	+	+	n.c.
Grass production for livestock	-	+	+	+	+	n.c.
Grass production for biomass	-	+	+	+	+	+/-

\+ More than 50% of the experts stated that the management option is likely to have a positive effect
+/- More than 50 % of the experts stated that the management option is likely to have neither a positive nor a negative effect
\- More than 50 % of the experts stated that the management option is likely to have a negative effect
n.c.: experts achieved no consensus.



Summary

- **Sward renewal should not be applied in the Swiss alpine regions because of its foreseeable negative environmental consequences.**
- **Biodiversity management is suited to Swiss alpine conditions, particularly when farmers are compensated for associated economic losses.**
- **There was no consensus on whether virtual fencing was positive or negative for animal health and welfare.**

SUPER-G SUSTAINABLE PERMANENT GRASSLAND

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