



BOOK OF ABSTRACT

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I. SESSION DESCRIPTION

ID: T14b

Ecosystem services and adaptation to global change

Hosts:

	Title	Name	Organisation	E-mail
Host:	Dr.	Matthew Colloff	Fenner School of Environment and Society, Australian National University	matthew.colloff@anu.edu.au
Co-host(s):		Sandra Lavorel, Bruno Locatelli, Berta Martín-Lopez		sandra.lavorel@univ-grenoble-alpes.fr; bruno.locatelli@cirad.fr; martinlo@leuphana.de

Abstract:

Uncertain, novel changes to social-ecological systems caused by climate change and other drivers mean that we can no longer assume the ecosystem services we currently depend on for livelihoods and wellbeing will be supplied in future. As ecosystems change, so do their ecosystem services; some current ones will decline and new ones appear as altered water balance, temperature regimes and land uses impact on ecosystems and societies. Governance systems are emerging to address these issues, but it will increasingly fall to those whose livelihoods are most impacted to develop options for adaptation. Both bottom-up and top-down approaches to operationalising adaptation are required, including how ecosystem services can be conceptualised and used.

The ecosystem services that can help people adapt to changes in social-ecological systems have been termed 'adaptation services'. This framing provides a way to bridge the gap between normative concepts of ecosystem services and the need for adaptation to global change. An ecosystem services perspective that is 'global change-ready' reveals ecosystem properties that provide benefits to people under global change and supports inclusive learning, co-production and implementation of adaptation strategies.

In this session the objective is to focus on how ecosystem services can be used in adaptation initiatives, including case studies on design and implementation; re-framing of governance



structures; co-production and learning; overcoming operational barriers to develop opportunities and mainstreaming adaptation services into policy and management. The objective of the session is congruent with the conference theme of 'Ecosystem services in a changing world: moving from theory to practice'.

Goals and objectives of the session:

The objective is to discuss how ecosystem services can be used in adaptation initiative and to invite participants in the audience to propose their own case studies for a discussion on ecosystem services and adaptation. Some participants will be invited to prepare case studies in advance; others may be spontaneous.

Planned output / Deliverables:

A summary of the case studies, main discussion points, and ideas for new research collaborations on ecosystem services and adaptation to global change.

A blog article for the conference website.

Networking, collaboration and co-production on Ecosystem services and adaptation to global change

Related to ESP Working Group/National Network:

[Thematic Working Groups: T14 – Application of ES in Planning & Management](#)



II. SESSION PROGRAM

Date of session: Tuesday, 16 October 2018

Time of session: 14:30 – 18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
14:30–14:45	Matt	Colloff	Fenner School of Environment and Society, Australian National University	Nature's contributions to adaptation to climate change
14:45–15:00	Sandra	Lavorel	Laboratoire d'Ecologie Alpine, Grenoble, France	Nature's Contribution to Adaptation in the French Alps
15:00–15:15	Bruno	Locatelli	CIRAD–CIFOR, University of Montpellier	Ecosystem services for adaptation to climate change in mountains: Actors and worldviews
15:15–15:30	Sander	Jacobs	Research institute for nature and Forest INBO	Winter is coming: the fate of nature in Europe and Central Asia
15:30–15:45	Noelia	Zafra–Calvo	Basque Centre for Climate Change bc3	Acknowledging the multidimensional value of protected areas` contribution to people
15:45–16:00				Discussion
16:30–16:45	Giacomo	Fedele	Conservation International	Ecosystem services and transformative adaptation to



Time	First name	Surname	Organization	Title of presentation
				climate change
16:45–17:00	Paula	Harrison	Centre for Ecology & Hydrology	Evaluating the effectiveness of adaptation, mitigation and transformation pathways to high-end climate change for the balanced delivery of ecosystem services
17:00–17:15	Kevin	Thellmann	Institute of Agricultural Sciences in the Tropics and Subtropics (Hans–Ruthenberg–Institute), University of Hohenheim, Stuttgart, Germany	Assessing the efficiency of land use planning to preserve hydrological ecosystem services under scenarios of climate change in a mountainous watershed in Xishuangbanna, South–West China
17:15–17:30	Eliška	KrkoškaLorencová	Global Change Research Institute of the Czech Academy of Sciences	Stakeholder preferences for ecosystem–based adaptation measures in Czech cities
17:30–17:45	Johannes	Förster	Helmholtz Centre for Environmental Research – UFZ	Ecosystem–based adaptation in small island states: how an explicit focus on ‘ecosystem service opportunities’ can inform adaptation options



7. *Type of submission: Invited speaker abstract*

T. Thematic Working Group sessions: T14b Ecosystem services and adaptation to global change

Nature's Contribution to Adaptation in the French Alps

First author: Sandra Lavorel

Other author(s): Matthew Colloff, Bruno Locatelli, Suzanne Prober, Enora Bruley, Baptiste Nettier

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Mountain socio-ecosystems offer a paradox of expected sensitivity to climate and socio-economic change, yet show exemplary long-term ecological and social resilience. Their future is thus highly uncertain. It is expected that traditional knowledge and innovation capacity should support future adaptation, and especially ecosystem-based adaptation. Here, we present results from a participatory study of adaptation pathways to global change based on long-term research in the French Alps. Using ecological data, ecosystem service and resilience modelling, and information from stakeholders on their ongoing adaptation and future livelihoods collected during workshops and interviews, we identified adaptation services, which provide the potential for people to adapt based on biodiversity, ecosystem functioning and properties of ecological resilience and transformability. Bundles of adaptation services include (i) ecosystem properties that are actively managed for climate adaptation, (ii) properties that emerge as co-benefits from this management, and (iii) adaptive properties that derive from responses to other drivers like markets and subsidies. Within each land use type, adaptation is thus also about managing synergies and trade-offs among these three categories of adaptation services. These trade-offs scale up to the entire landscape to determine the net adaptation benefits from ecosystems. Alternative adaptation pathways are negotiated from these benefits, while balancing other social and economic dimensions of adaptation. For this, barriers resulting from interactions among values, rules and knowledge need to be overcome through private, collective and institutional innovation. These include reducing resistance to technical innovation (e.g. for agronomic management) through strong and well-supported agriculture extension services, or by moving away from an economy highly dependent on subsidies to consumer-producer networks with demand for local, high environmental quality products. Overall, as adaptation unfolds, alternative pathways mobilise an increasing diversity of adaptation services that support the diversification of agriculture and tourism activities.

Nature's contribution to adaptation in the French Alps

Sandra LAVOREL



Matthew COLLOFF, Bruno LOCATELLI, Suzanne PROBER, Enora BRULEY, Baptiste NETTIER



OPINION

Ecological mechanisms underpinning climate adaptation services

SANDRA LAVOREL¹, MATTHEW J. COLLOFF², SUE McINTYRE², MICHAEL D. DOHERTY², HELEN T. MURPHY³, DANIEL J. METCALFE⁴, MICHAEL DUNLOP², RICHARD J. WILLIAMS⁵, RUSSELL M. WISE² and KRISTEN J. WILLIAMS²

Adaptation Services

Concept

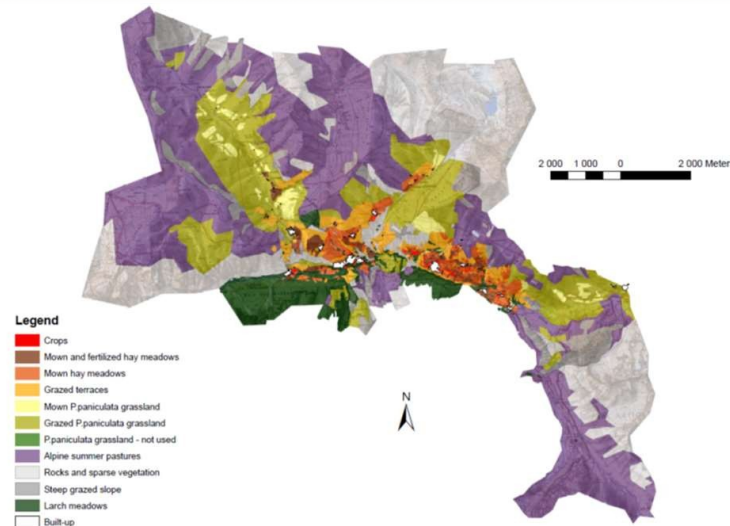
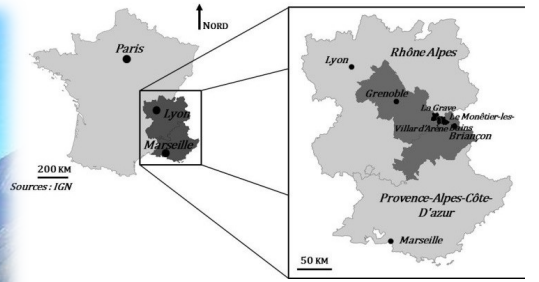
The benefits people derive from the capacity of ecosystems to moderate and adapt to the effects of climate change

➤ Key ideas :

- Ecological resilience can support people adaptation to climate change
- The value of some services, especially regulation services, increases under climate change
- Inevitable transformation of some ecosystems under climate change can create new values for people if transformation is anticipated
- Adaptation services require a proactive rather than reactive approach

Case study:

Adaptation services in the Central French Alps



Legend

- Crops
- Mown and fertilized hay meadows
- Mown hay meadows
- Grazed terraces
- Mown P. paniculata grassland
- Grazed P. paniculata grassland
- P. paniculata grassland - not used
- Alpine summer pastures
- Rocks and sparse vegetation
- Steep grazed slope
- Larch meadows
- Bull-up

Land uses

- Alpine summer pastures
- Grazed P. paniculata grassland
- Mown P. paniculata grassland
- Larch meadows
- Grazed terraces
- Mown hay meadows
- Mown and fertilized hay meadows
- Crops

Altitude

- 2200-2700m
- 1900-2200m
- 1300-1900m

Climate change adaptation

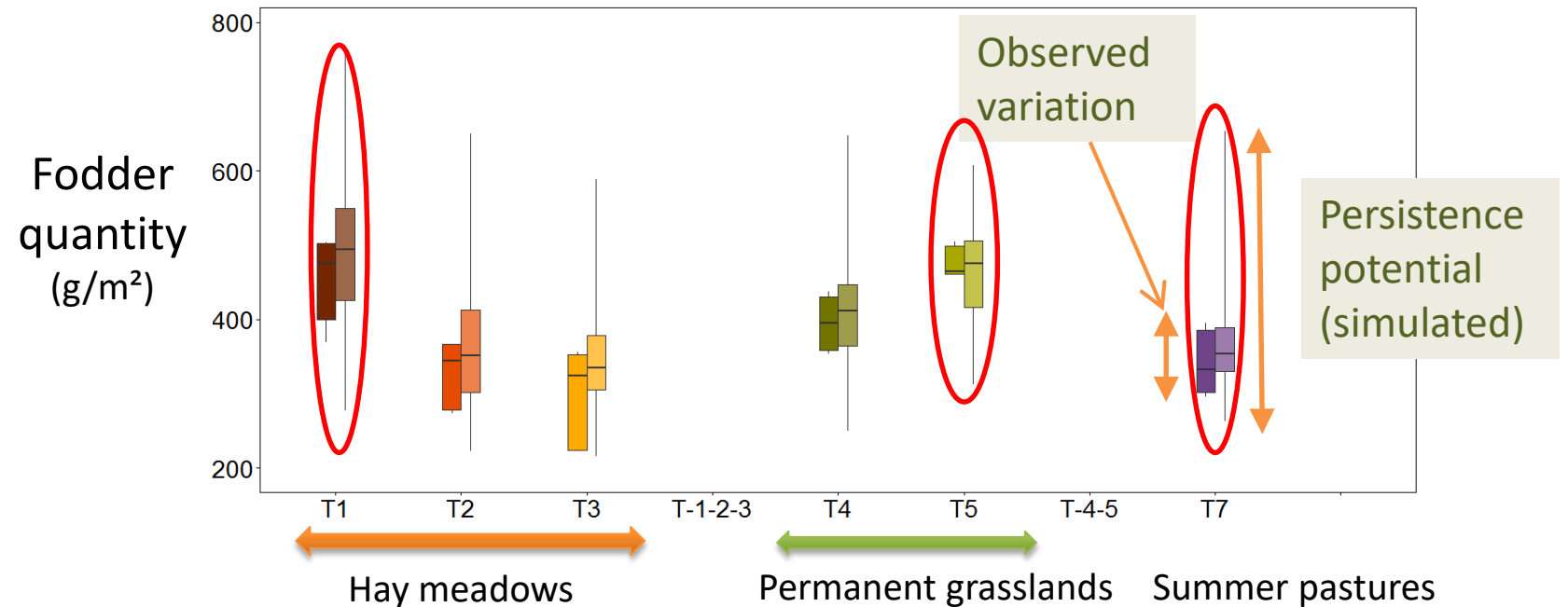
FUTURE CHALLENGES

- Climate :
 - +2°C by 2050
 - ↗ inter-annual variability
 - ↘ grassland production
 - ↘ winter sport opportunities
 - Glacier melt , ↗ risks
- Uncertain socio-economic context:
 - Markets
 - Agri-environmental policy
 - Demand for tourism

'SEEDS OF HOPE' VISION

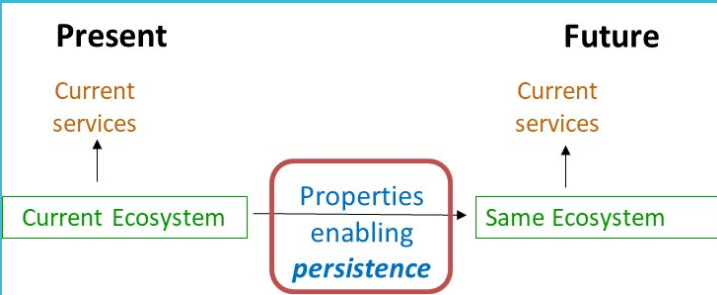
- High quality of life
 - Attachment to an aesthetic natural and cultural landscape
 - Healthy and socially rich
- Diversification of agriculture and tourism activities
 - Adaptation of grassland management for livestock production
 - New crops
 - Increased summer tourism: heat escape, soft tourism, science tourism

Persistence of fodder production



Persistence of fodder production supported by plant functional diversity within fertilised hay meadows (T1) and summer pastures (T7), and by resistant grass in permanent pastures (T5)

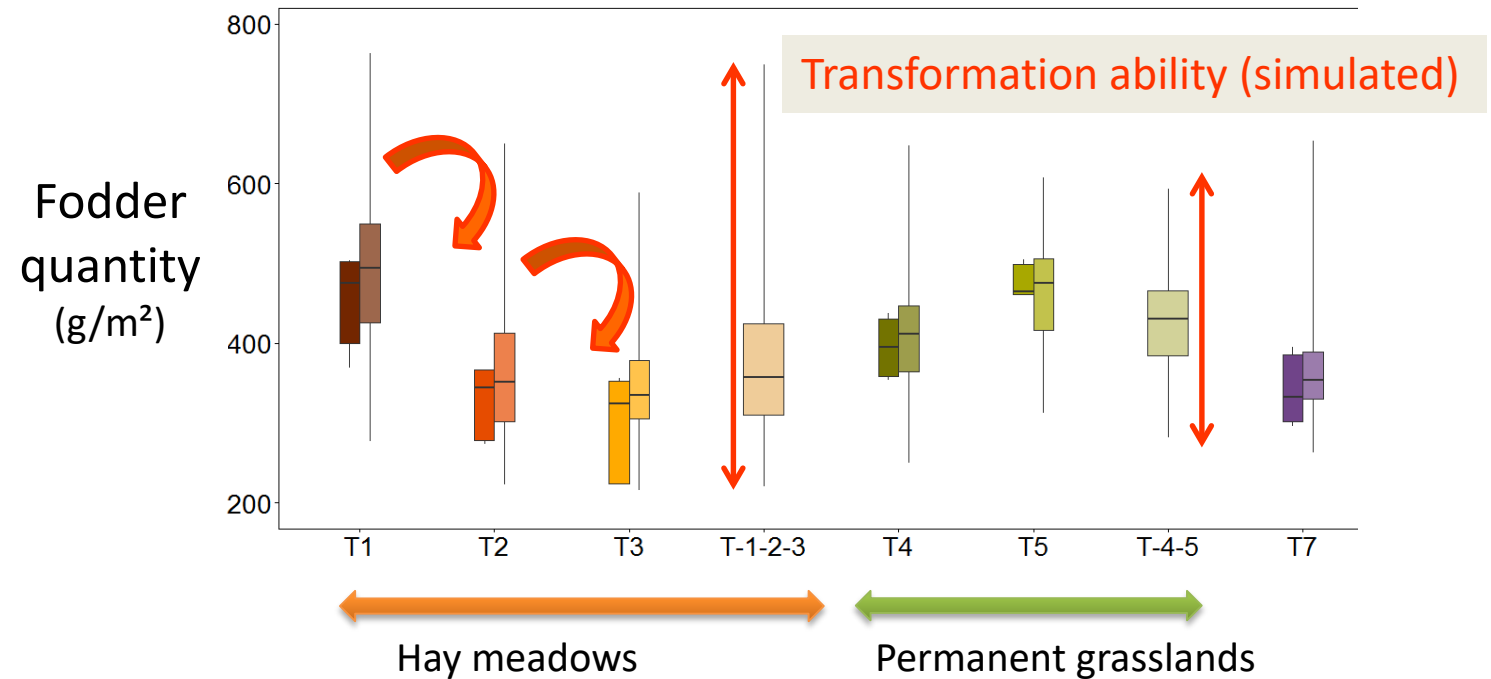
➤ Intrinsic value of ecological resilience



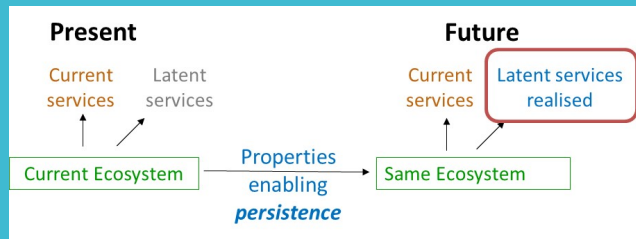
- Requires active adaptation of grassland management
- Maintain mowing
 - Fertilise to benefit from good years, build hay stocks
 - Buffer areas
 - Adapt stocking; tactical summer grazing



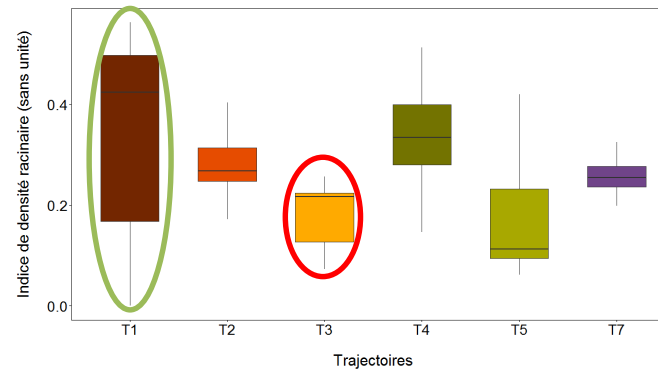
Transformation potential of mountain grasslands



- High transformation ability of hay meadows : responsiveness to management
- Agency for managing adaptation



- Latent values become realised in new context of climate and land use change



- Erosion control by fertilised hay meadows
- Grazing terraces is detrimental to erosion control
- Management adaptation for persistence of fodder production provides co-benefits for erosion control

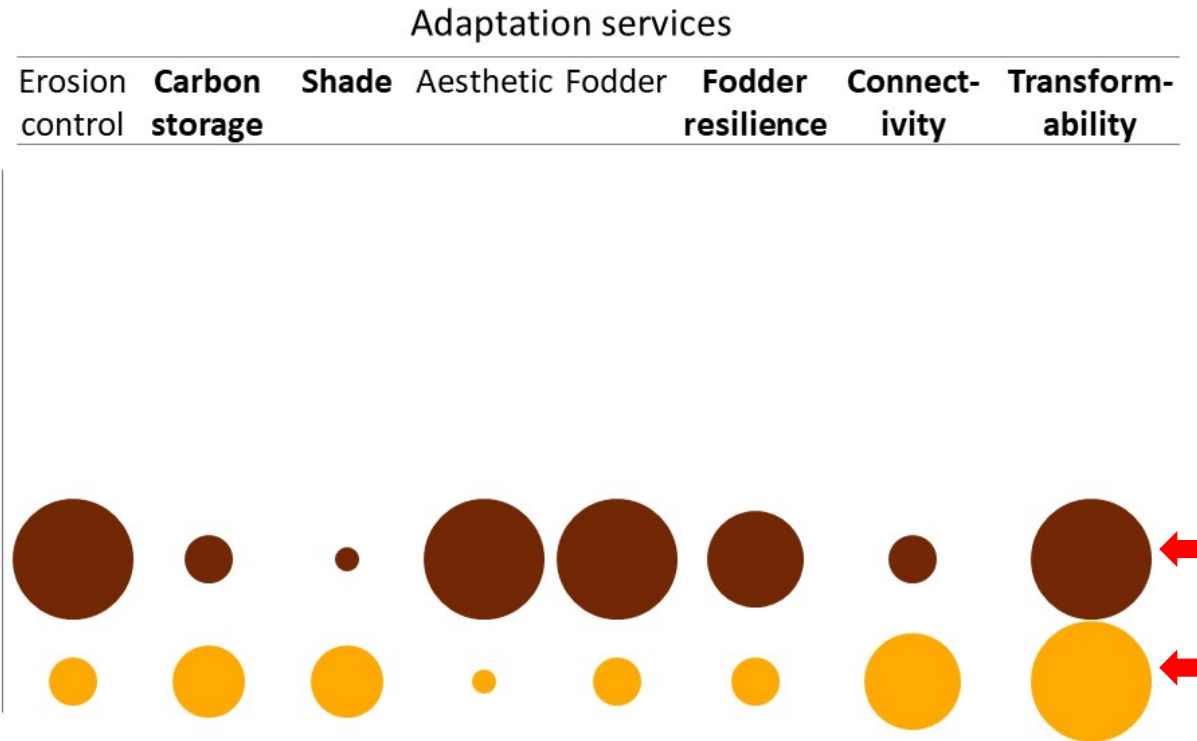
Trade-offs and synergies among adaptation services



Land uses

Mown and fertilized hay meadows

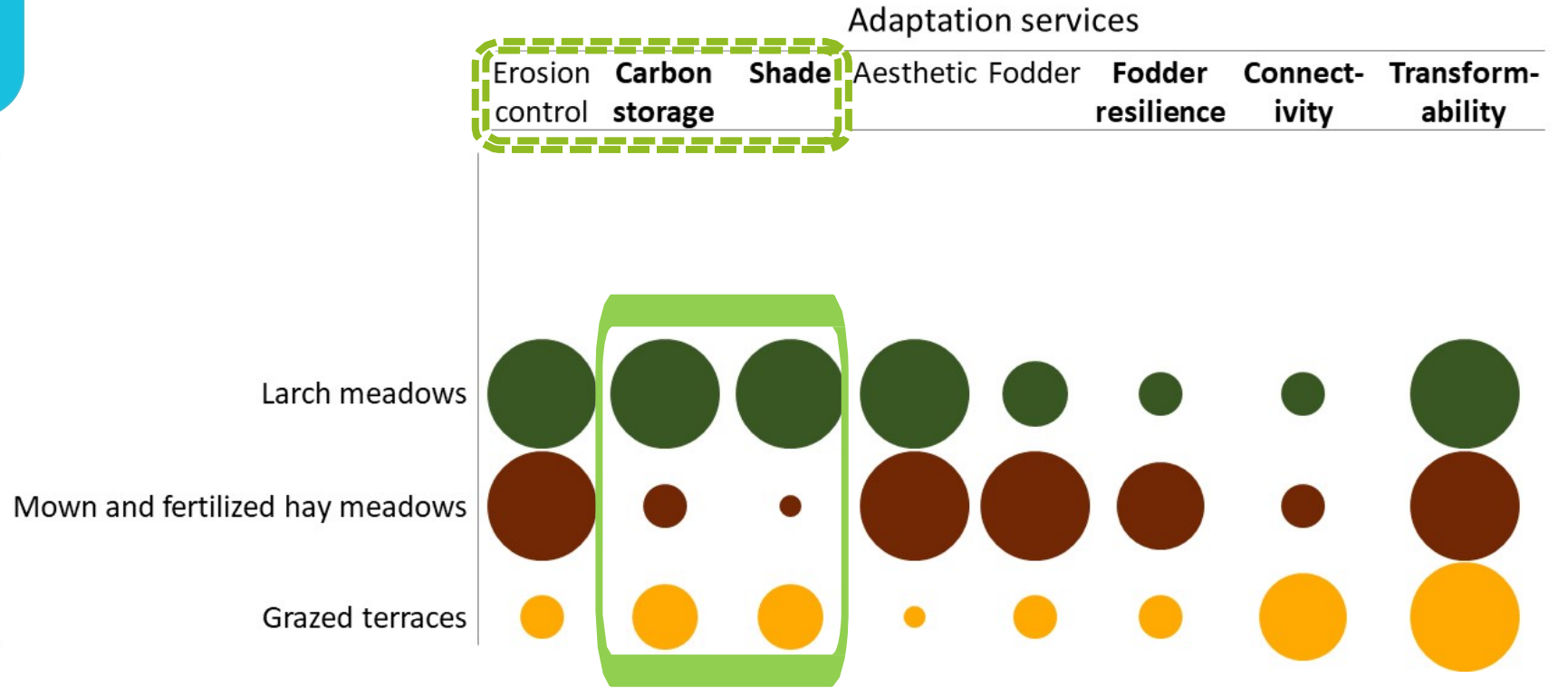
Grazed terraces



Trade-offs and synergies among adaptation services



Land uses



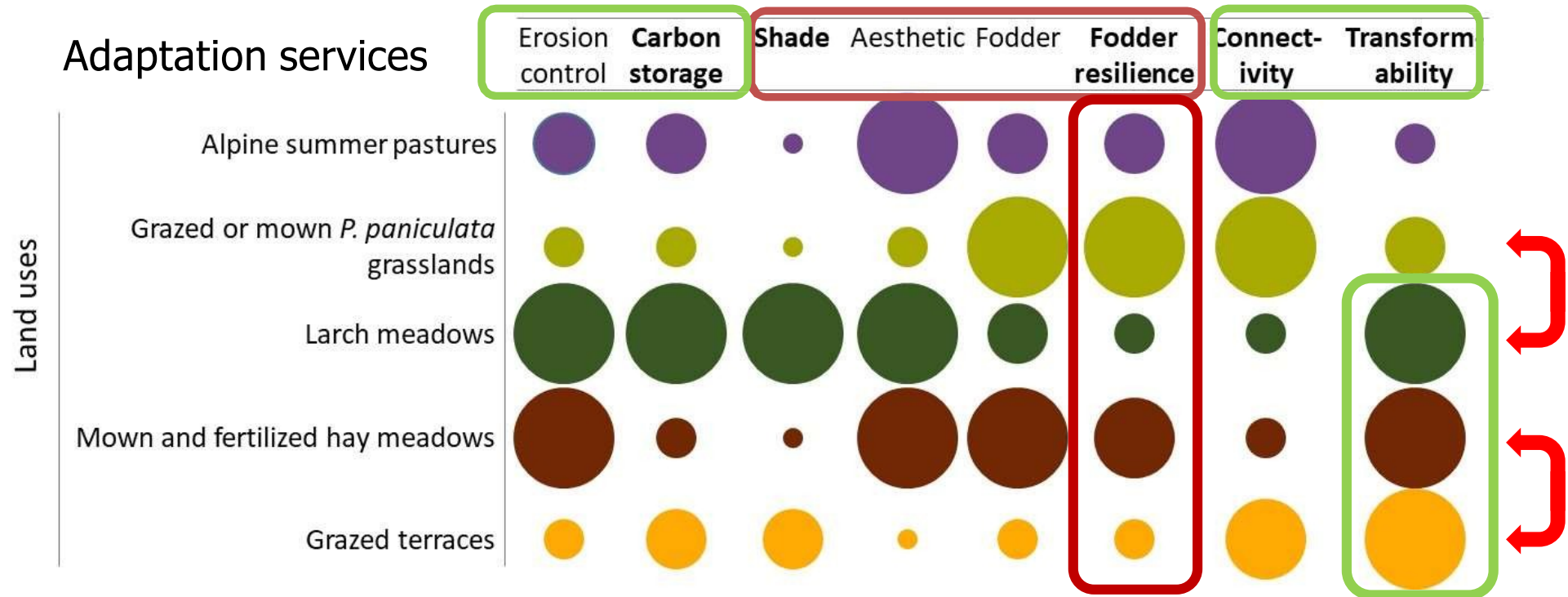
Adaptation service bundles



Deliberate adaptation

Co-benefit of adaptation

Adaptation services

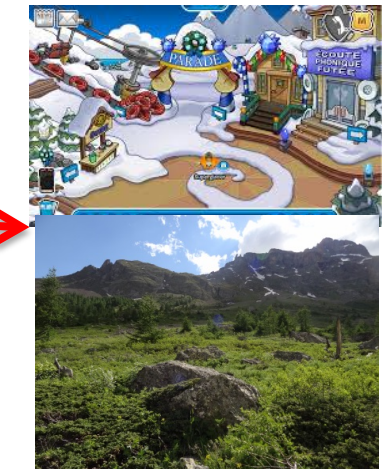
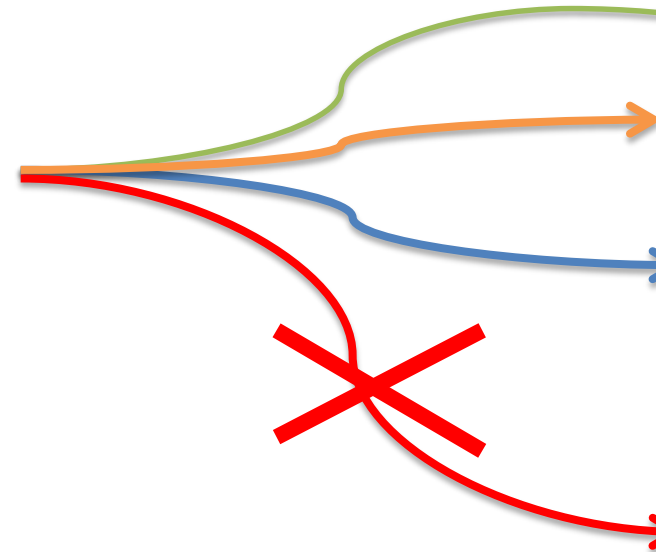


Conclusion:

Pathways to adaptation

- Deliberate management for adaptation facilitates multiple adaptation services across a diverse cultural landscape
- Will require changes in decision context
 - Cross-scale interactions of values and institutions
 - Proximal management decisions for maintaining mowing and fertilisation on terraces
 - Local farm-system economic viability based on market and subsidy support for local livestock and novel products
 - Support for collective management and decision processes
 - Today, weak mobilisation of adaptation services by actors, although not a knowledge deficit

Thank you for your attention!

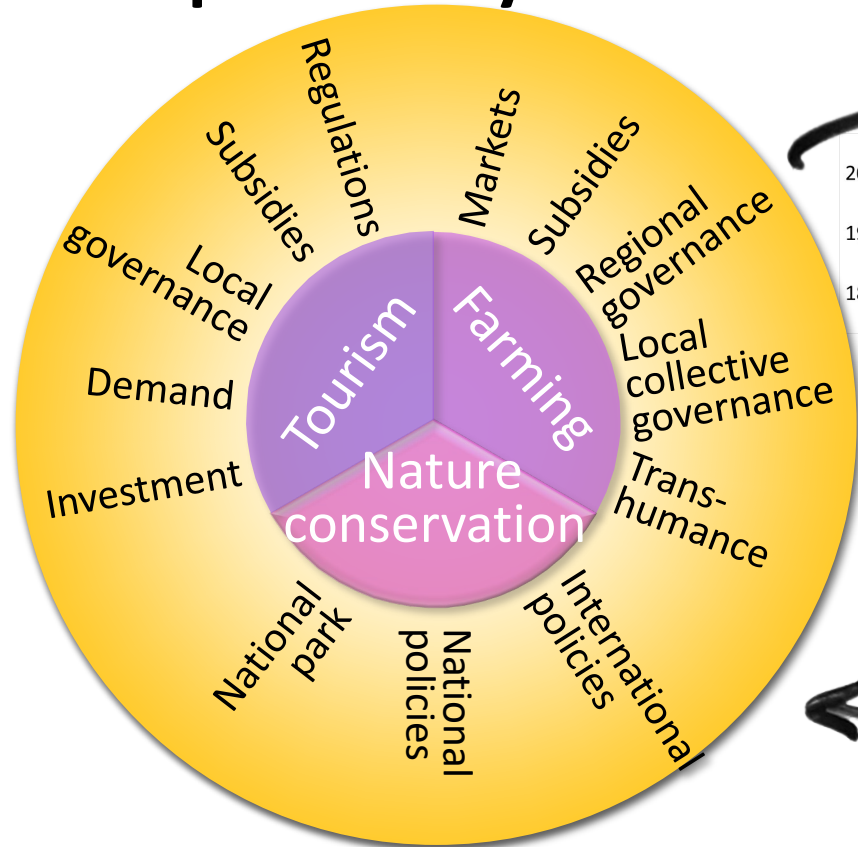


Please come and find out more in session B8 on Wednesday!

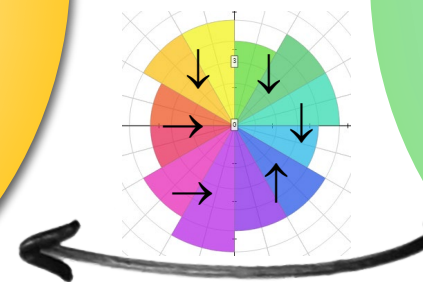
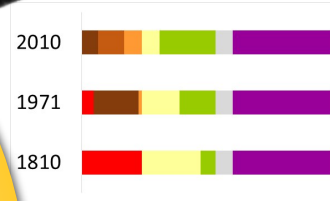
Enora Bruley & Sandra Lavorel - A participatory approach for linking visions of a desirable future with ecosystem services demand for mountain social-ecological system adaptation to global change.



Social-economic-political system

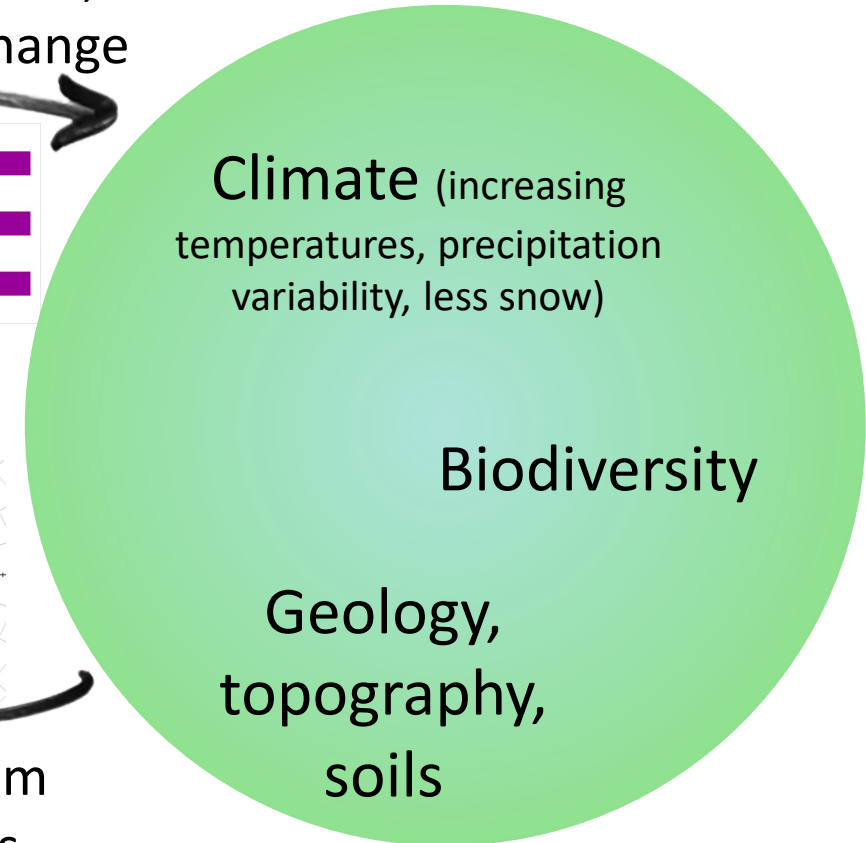


Management,
Land-use change



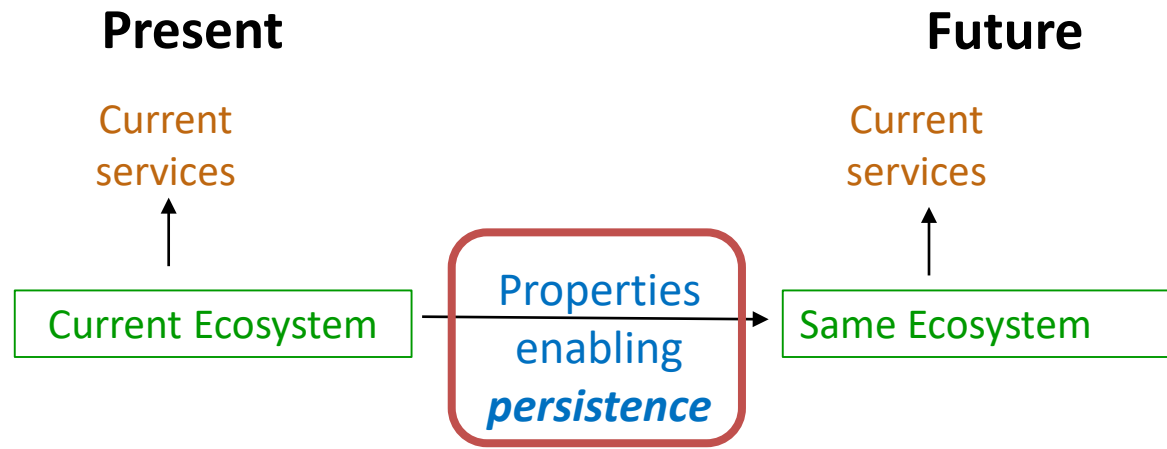
Ecosystem
services

Ecological system



Adaptation
services

Properties
enabling
resilience



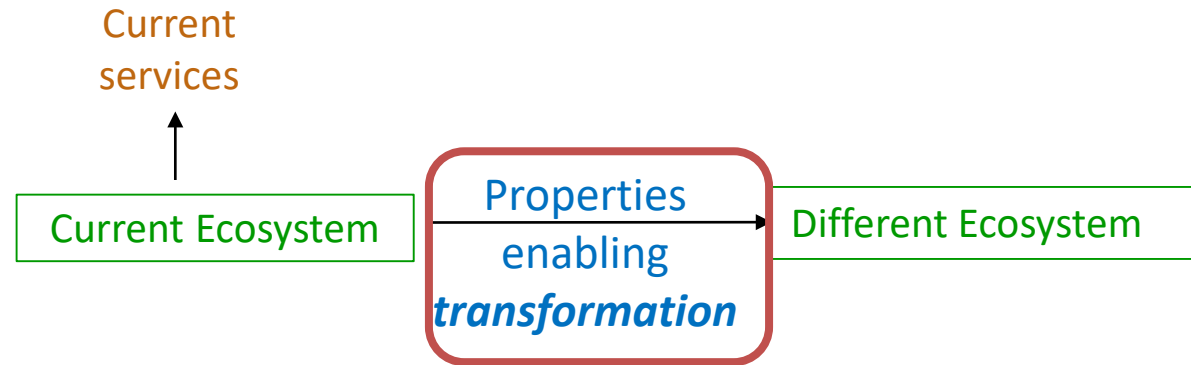
- Ecological properties conferring ecological resilience:
 - Physiological, morphological demographic, behavioural
 - Diversity:
 - Variety of responses to climate and other disturbances
 - Species regeneration strategies
 - Compensatory responses across species / species groups
 - Spatial heterogeneity
 - Modularity
 - Connectivity:
 - Facilitates recovery after climate extremes
 - Recolonisation across landscapes



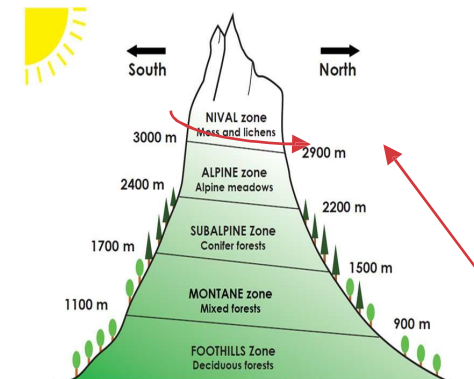
Different types of adaptation services

Present

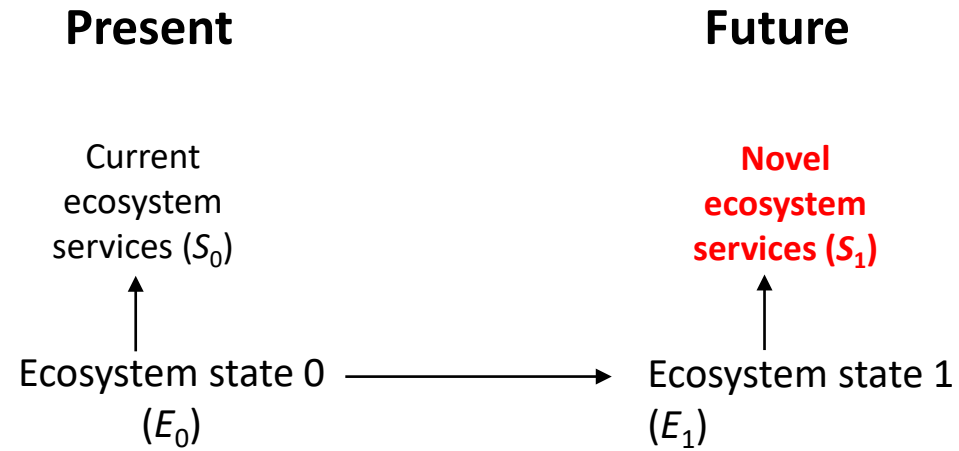
Future



- Ecological properties supporting transformation:
 - Evolutionary processes – ‘evo-services’
 - Diversity:
 - Regional diversity
 - Rare species with different ecologies
 - Connectivity:
 - Migration across landscapes



Novel services from transformed ecosystems



New crops: vegetables, berries, hops...

Emerging forms of tourism:

- Heat escape; health tourism
- Science-based tourism
- Contemplation and spiritual values

