Biological Conservation 321 (2026) 112006

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Exploring viewpoints on Mountain Hay Meadow conservation: A Q-methodology investigation from Austria

Julian Janisch [a,*], Katharina Gugerell [a,b], Thomas Thaler [a,c], Valentin Fiala [a,d]

[a] BOKU University, Institute of Landscape Planning, Department of Landscape Water & Infrastructure, Peter Jordan Str 65, A-1180, Vienna, Austria
[b] University of Johannesburg, Department of Geography & Environmental Management & Energy, Studies, Auckland Park, 2092, Johannesburg, South Africa
[c] IIASA International Institute for Applied Systems Analysis, Population and Just Societies Program, Schlossplatz 1, 2361, Laxenburg, Austria
[d] BOKU University, Institute for Development Research, Department Econ & Social Sci, Peter-Jordan-Straße 76/I, 1190, Vienna, Austria

ARTICLE INFO

Keywords:
Nature conservation
Semi-natural grassland
Landscape ecology
Landscape planning
High nature value farming

ABSTRACT

Mountain Hay Meadows (MHM) are semi-natural, biodiversity rich habitats, protected under the European Union's Habitats Directive. Despite national and international conservation efforts, the ecological state of MHM is poor across Europe and is expected to decline further in the future due to intensification or abandonment. The core question is which social, cultural, economic, and political development aspects might counteract these negative trends. Previous studies have focused primarily on individual, homogenous stakeholder groups or on isolated aspects that could be significant for the future of MHM. To gain a better understanding of how these aspects interact, we use q-methodology, which extracts amalgamated perspectives of a multi-stakeholder group in Austria. To gain a deeper understanding of diverse perspectives, Q-methodology was applied to systematically explore the views of multiple stakeholders in Austria. The results revealed three distinct viewpoints: (i) one emphasizes the pivotal role of economic viability and mirrors an anthropocentric position; (ii) one values MHM for their intrinsic qualities and adopts an ecocentric position; and (iii) one represents a more moderate stance between the other viewpoints, emphasizing the importance of local communities and traditional values. Hence, our findings show that for effective conservation, one-size-fits-all approaches, that are strongly economically oriented are insufficient as they might work only for a limited group. Hence more pluralistic, flexible conservation management approaches are required in which MHM are understood as both, biodiversity hotspots and as enacted agricultural landscapes.

1. Introduction

Like most of Europe's Grassland, Mountain Hay Meadows (MHM) are secondary habitats, formed over centuries by human interaction on sites unsuitable for crop farming. Their primary purpose was fodder production for livestock systems, including activities such as grazing, mowing and haymaking (Pärtel et al., 2015; Poschlod, 2015; Poschlod and WallisDeVries, 2002). These periodical disturbances enabled the emergence of a vast diversity of plant species and are now recognized as one of the most biodiversity-rich landscapes in Europe (Wilson et al., 2012). To conserve their high biodiversity value, continued low-intensity management practices are required (Babai and Molnár, 2014; Marini et al., 2007; Pavlů et al., 2011) to prevent the establishment of woody successional species (Baur et al., 2006; Valkó et al., 2012).

Not only are continued management practices instrumental to preserve biodiversity, but also to prevent changes in multiple ecosystem services (ESS) delivered by MHM (Schirpke et al., 2023, 2017). Those ESS include several provisioning and regulating ESS such as fodder production for animals, meat and dairy products, carbon storage or erosion prevention (Bengtsson et al., 2019). Moreover, MHM also deliver cultural ESS, such as the conservation of cultural landscapes, regional identity, culinary heritage and tourism recreation (Beltramo et al., 2024; Hølleland et al., 2017), which are particularly esteemed by mountain farmers themselves (Wezel et al., 2021). As MHM encompass a wide spectrum of ESS, they affect multiple societal groups from local to national scale (Schirpke et al., 2017). Given this multifunctionality, MHM, are recognized as habitats of community interest within the European Union (EU) as Habitat Type 6520. Despite the EU's general effort to preserve MHM, their current conservation status (CS) is considered bad throughout Europe, and current land use trends suggest

* Corresponding author at: Peter Jordan Str 65, A-1180, Vienna, Austria.
E-mail address: julian.janisch@boku.ac.at (J. Janisch).

https://doi.org/10.1016/j.biocon.2026.112006
Received 23 December 2025; Received in revised form 26 June 2026; Accepted 8 July 2026
Available online 16 July 2026
0006-3207/

that their extent and quality will further decline (EC, 2018).

The ongoing agricultural land use change within Europe suggests two trends for MHM: **i)** intensification, mainly manifested through increased management intensity (Schermer et al., 2016; van Vliet et al., 2015) and **ii)** disintensification, mainly through abandonment (Tasser et al., 2007) and only partly through decrease in land management intensity (van Vliet et al., 2015). These agricultural land use changes typically result in the intensification of fertile, accessible areas in the lowlands and the abandonment of marginal lands on higher elevation within the same region (Schirpke et al., 2023; Tasser et al., 2007; van Vliet et al., 2015). Abandonment of MHM heavily influences local site conditions through different mechanisms, including shading effects, soil temperature, moisture fluctuation, nutrient cycling and nutrient fixation (Niedrist et al., 2009; Pavlů et al., 2011; Shipley et al., 2024). Conversely, the intensification of MHM frequently necessitates the utilization of fertilizers, which enhances phytomass production, thereby enabling more frequent mowing and higher livestock densities (Shipley et al., 2024). Both trends are driven by a complex interplay of different aspects (Plieninger et al., 2016) such as site conditions (Niedrist et al., 2009; Tasser and Tappeiner, 2002), socio-economic factors (Schirpke et al., 2017; Tasser et al., 2007), farm- and farmer characteristics (Schermer et al., 2016), or labour- and agricultural markets (Schirpke et al., 2023). Although influencing factors are different depending on the local circumstances, they contribute to the overall decline of MHM, lower biodiversity and the loss of cultural landscape-elements, resulting in less heterogenous landscapes on a broader landscape scale (Tasser and Tappeiner, 2002). Klebl et al. (2023) illustrate this complex interplay in their review article on factors driving biodiversity-friendly agricultural management, emphasizing that policies must be locally adaptive if they are to meet the various driving factors (Klebl et al., 2023).

The necessity for local adaptability is exemplified by the case of Austria. Despite its modest size, challenges manifest in various forms, depending on the local context and the array of stakeholders involved in the management of MHM (Schirpke et al., 2021). To find solutions for these challenges, each local context and community encompasses different conservation priorities driven by underlying values (Cunningham et al., 2023; Hunter Jr et al., 2014), resulting in numerous positions on conservation. The question 'how to effectively conserve nature' has been discussed in conservation sciences for decades (Miller et al., 2011; Soulé, 1985) and yet remains conceptually ambiguous and open to multiple interpretations (Saltz and Cohen, 2023). Two distinct positions delineate the endpoints of the spectrum of conservation discourses: the "traditional conservation" approach, which adopts an ecocentric position and aims to preserve species diversity and natural habitats for their intrinsic values (Soulé, 1985; Taylor et al., 2020). And the "new conservation" approach, which represents the other end of the spectrum: a more anthropocentric position, which aims to achieve conservation through attaining economic and social benefits (Kareiva and Marvier, 2012; Matulis and Moyer, 2017). However, framing this debate in terms of only two distinct positions is problematic as this runs the risk of treating them as rigid and mutually exclusive (Hunter Jr et al., 2014). Taking up this criticism, the Future Conservation Survey introduced further positions as new dimensions in between the traditional- and the new conservationist (Sandbrook et al., 2019a). By doing so, they demonstrate that conservation rather unfolds within and expands beyond this continuum on a two-dimensional landscape (Hunter Jr et al., 2014). This perspective is further substantiated by the adjacent discourses on plural values which emphasize that human-nature relationships involve multiple, coexisting value dimensions (instrumental, intrinsic, and relational values), that rarely occur in isolation but are combined in different ways depending on context and actors involved (Pascual et al., 2023; Schmitt et al., 2022). Analyzing the complex interplays between conservation positions for a given target remains useful, however these positions should be understood as archetypes representing the extremes of a broader spectrum of conservation types, rather than as discrete categories. Although conservation types are predominantly used to delineate normative positions of conservationists, the concept is also applied in the context of farmers' values with regard towards biodiversity (Klebl et al., 2024, p. 20).

Responding to these emerging "realities" current conservation practice seeks to reconcile conflicting values through the adoption of inclusive approaches. When effectively implemented, inclusive approaches are widely regarded as an important pathway towards more equitable and legitimate conservation and are most commonly operationalized at the local scale through participatory processes that seek to incorporate diverse perspectives, knowledge systems, and human–nature worldviews (Chaplin-Kramer et al., 2023; Murali et al., 2026; Wang et al., 2026). However, many inclusive approaches in nature conservation rest on the assumption that broadening the range of participants will inherently lead to more inclusive and balanced outcomes (Matulis and Moyer, 2017). This perspective may overlook certain power asymmetries that exist within participatory processes. As a result, decision-making dynamics may become skewed, because "consensus"-oriented communicative approaches can be driven by the preferences of incumbent, resourceful and skilled actors, while less powerful voices remain marginalized (Cunningham et al., 2023; Tallis and Lubchenco, 2014). A prominent example for such a failure is documented by Corson et al. (2015), who illustrate this dynamic through the RIO + 20 Earth Summit. Although non-state actors were invited to participate and represent the interests of "civil society", they were pressured to sign a single representative statement. This resulted in a minimal-consensus outcome and a loss of genuine plural perspectives, despite their diversity.

Similar examples can be found in the context of the Common Agricultural Policy (CAP). The policy has been criticized for its limited adaptability, as it was designed at the European level without sufficient consideration of specific national contexts, leading to accusations that it represents a "one size fits all" approach. Under the reformed CAP, Member States are responsible for developing their own national strategies and are encouraged to adopt participatory processes involving a wide range of stakeholders (EIT Climate-KIC, 2022). The case of Italy illustrates that although the national strategy process was intended to be inclusive, the absence of clear structures and guidelines led to the overrepresentation of similar perspectives and the reinforcement of asymmetric power relations, as participation was dominated by interest groups (e.g., farmers' associations, unions, and industry representatives), thereby marginalizing less prominent voices (Henke et al., 2024). With regard to MHM, conservation strategies primarily address ecological challenges by employing disintensification of management as a key instrument (Cordier et al., 2025; Rouveyrol and Prima, 2024), while socio-economic challenges are largely approached through monetary support (Batáry et al., 2015). In practice, however, this approach proves ineffective: while disintensification may produce adequate outcomes on eutrophic soils, it can be detrimental on meso- to oligotrophic sites, where MHM-typical nitrophilous target species tend to decline or disappear (Mucina et al., 1993). Similarly, at the socio-economic level, subsidy-based compensation remains the dominant instrument (Batáry et al., 2015), yet structural issues fall beyond the scope of such financial measures, as monetary support alone does not ensure long-term management continuity. Taken together, these examples illustrate that current grassland conservation measures fall short on the differentiation across grassland types (Assandri et al., 2019), thereby overlooking the full range of ecological and socio-economic contexts. This highlights a broader challenge in conservation practice, where approaches intended to be inclusive do not always succeed in adequately representing the diversity of values, perspectives, and interests involved.

A promising approach to reconciling different positions within conservation while fostering genuine inclusivity is pluralism. Rather than orchestrating consensus among conflicting positions, as ostensibly inclusive approaches attempt to do, pluralism anticipates "many different conservations" and accepts that some positions are fundamentally irreconcilable. Instead of forcing convergence on a single ethic, it allows diverse actors to proceed in parallel and learn from each other's differences. Pluralism explicitly recognizes and addresses power asymmetries by requiring careful consideration of unequal access, resource distribution, and institutional rules within deliberative forums, thereby ensuring that underrepresented voices are meaningfully heard (Matulis and Moyer, 2017). The key distinction to unsuccessful inclusive approaches lies not necessarily in the absence of coordination, but in its nature: whereas these seek alignment through consensus, pluralism coordinates through structured disagreement, allowing conflicting perspectives to coexist and inform each other without requiring complete resolution. Common ground is not entirely, however. As Cortés-Capano et al. (2022) argue, common ground on the conceptual level – such as the conservation of MHM – can provide the basis for successful conservation, without assuming its specific implications will be identical across different contexts (Cortés-Capano et al., 2022). By acknowledging pluralism in perspectives, values and priorities, it builds upon knowledge coproduction through strong interdisciplinarity and well-designed, meaningful actor participation (Matulis and Moyer, 2017; Pascual et al., 2021). Furthermore, its effectiveness is strengthened when it accounts for the multifaceted interconnections among actors within a given social-ecological system, thereby enhancing its adaptive capacity (Gavin et al., 2018; Pascual et al., 2021).

Nonetheless, pluralistic approaches are not without limitations. While pluralism embraces conflict as productive, it requires substantial efforts: sustaining constructive disagreement demands considerable coordination and reconciliation, also bearing the risk that conflicts become personal or entrenched, potentially blocking progress (Gavin et al., 2018). Moreover, as pluralism recognizes that some perspectives are irreconcilable, prolonged conflicts may result in fragmentation, with the risk of diminishing the effectiveness of broader conservations efforts (Matulis and Moyer, 2017). It is important to note, that this critique applies mainly to top-down, institutionally imposed processes (e.g. international summits or EU-wide frameworks) rather than to locally negotiated, context-sensitive approaches, where some degree of alignment across actors remains both necessary and desirable.

In nature conservation practice, Agri-Environmental schemes (AES) are considered the most effective instrument for preserving MHM (Batáry et al., 2015; EU, 2018; MacDonald et al., 2000). Although they are overall beneficial for the conservation of semi-natural grasslands (Cordier et al., 2025), they run the risk of not addressing the high diversity of site specific management practices, which are necessary to preserve MHM (Arnold et al., 2025; Bonari et al., 2017; Marini et al., 2007; Niedrist et al., 2009; Pavlů et al., 2011). Moreover, they tend to insufficiently incorporate the heterogeneity of social contexts within which these management decisions are embedded (Babai et al., 2015). Recent research has generated promising insights for conservation solutions in semi-natural grasslands particularly by identifying key social-ecological challenges and outlining potential pathways forward such as adopting a landscape-scale perspective, strengthening the recognition of ecosystem services and improving policy alignment (Gorris et al., 2025). However, their research was limited to farmers and conservationists, thereby not covering the full spectrum of actors relevant for long-term and socially robust conservation strategies. The conservation of MHM is shaped by a diversity of stakeholders whose positions are embedded in distinct underlying values, views and priorities. Understanding how these values translate into diverging - sometimes even conflicting - conservation perspectives is therefore essential for developing strategies and actions that are both ecologically effective and socially legitimate (Cunningham et al., 2023). Yet, at the same time, grouping diverse habitats under the broad category of "semi-natural grassland" potentially overlooks the specific ecological and socio-economic challenges associated with distinct grassland types (Birge and Herzon, 2014; Leonhardt et al., 2022). For the present research, such a broad classification is therefore too coarse to meaningfully capture the habitat-specific conditions relevant to our question. Building on this, the presented study draws on context specific local knowledge from different stakeholder to deepen our understanding of the complex socio-ecological challenges surrounding MHM conservation using a pluralistic lens. This approach surfaces co-existing viewpoints and translates them into tangible, negotiable aspects for potential actions and context-specific decision making processes (Klebl et al., 2023).

This highlights the research gap: existing studies often overlook differences between grassland types and rely on narrow stakeholder samples, while also trying to apply generalized knowledge to specific systems. In contrast we emphasize the importance of context-specific knowledge for decision making in context specific systems. By focusing explicitly on MHM and including all relevant stakeholder groups, we address this gap and aim for a more holistic understanding of their conservation challenges.

Hence in this research we draw on specific system knowledge from different stakeholders, which helps to deepen the understanding of this complex problem through a pluralistic perspective. To do so, we employ Q methodology, an approach particularly suited for systematically eliciting and analyzing subjective viewpoints. Our main research question asks: "**What viewpoints do stakeholders have regarding what matters for the future of MHM?**". A follow up sub-question situates these finding within broader conservation debates "**In what ways do stakeholders' viewpoints on MHM conservation align with or diverge from normative values in conservation science, and how do they depict positions beyond binary perspectives?**". This allows us to discuss the findings in relation to normative positions in conservation science, highlighting the need to move beyond rigid binary classifications. The use of Q-methodology has proven valuable in conservation contexts (Leonhardt et al., 2022; Ober et al., 2025; Seghezzo et al., 2024), where competing or even conflicting perspectives coexist and comprehensive viewpoints are needed to adequately address complex challenges (Watts and Stenner, 2012a; Zabala et al., 2018). By applying this methodology, suppression of marginalized and less frequently mentioned viewpoints is avoided, leading to more legitimate and effective solutions to target the problem of declining MHM.

2. Methods

2.1. Study areas

Austria was selected as a case study region, as the high share of the alps and its long agricultural history serves as a representative and informative case for understanding MHM dynamics. Moreover, the presence of study sites within national administrative borders brings the advantage of operating within a consistent national agricultural regulatory framework and thus facilitates the analysis by reducing variability in regulatory and policy contexts. It also ensures that EU regulations, such as the Habitats Directive, are interpreted and implemented uniformly by a single national authority. The case study sites were chosen according to a best practice approach, thus only meadows in a favorable Degree of Conservation[1] were considered. Based on internet research, potential sites were selected and verified in the field through vegetation assessments. The selection of broad, representative cases was achieved through the selection of meadows located within and outside the Natura 2000 network. In the end three case study sites were selected: two in Carinthia and one in Tyrol (see Fig. 1). In order to compile a diverse set of stakeholders, participants were selected based on the potential influence on case study sites on the local level. As Austria is organized in a federal structure, stakeholders were selected from direct influence on the case studies (e.g. farmers) up to the highest federalistic level (e.g. national level).

[1] The Degree of Conservation assesses the quality of a habitat type on site level and is essential to determine the indicator "Structure and Function" as part of the overall Conservation Status.

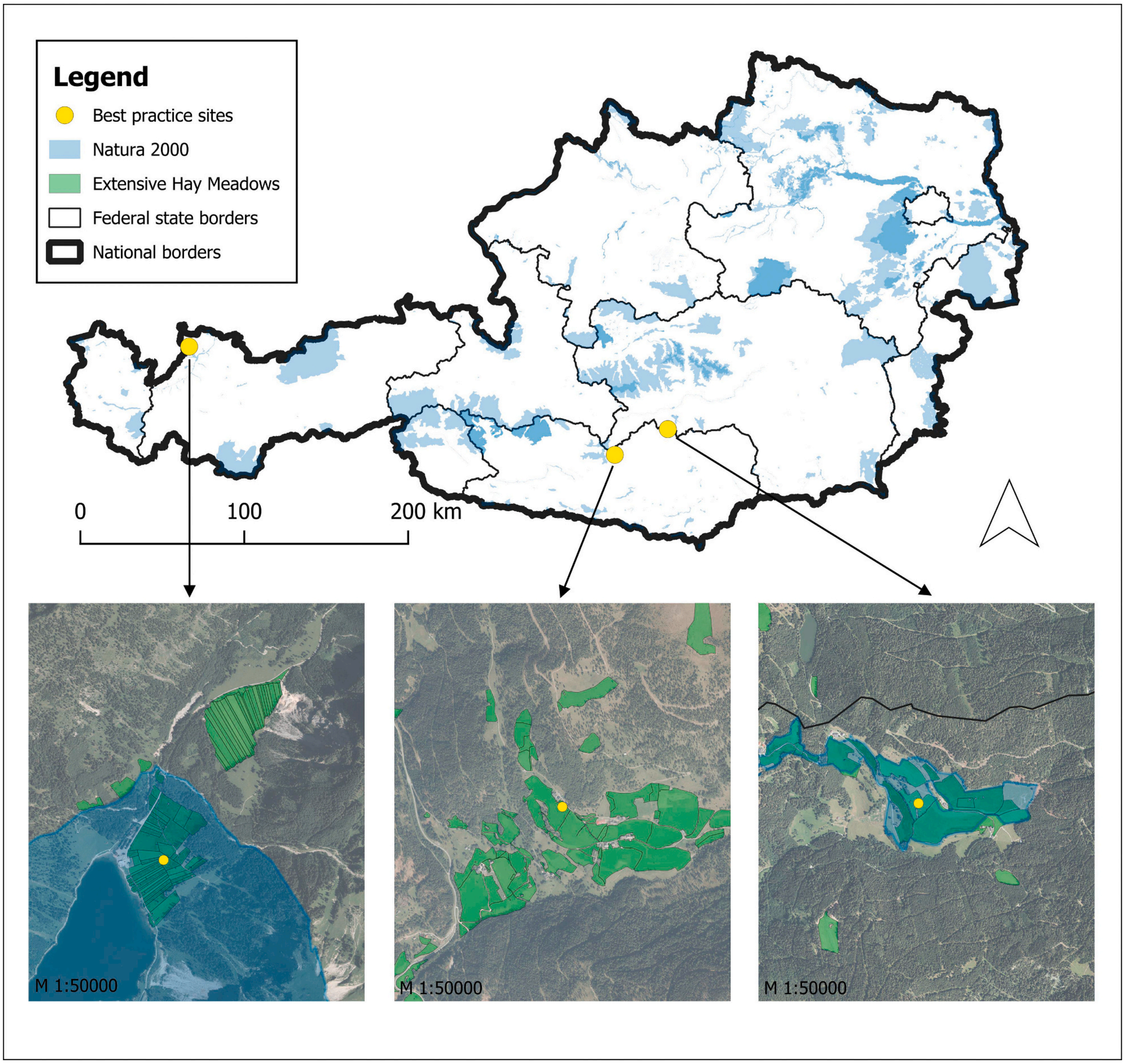

Fig. 1. Overview case study sites. A: Vilsalpsee in Tyrol, study site within established Natura 2000 area; B: Nockberge in Carinthia, study sites outside Natura 2000 area; C: Ingolsthal in Carinthia, study sites within established Natura 2000 area.

2.2. Research design

In this research Q-method is used to examine different viewpoints of stakeholders on the conservation of MHM. The Q-method provides a foundation for a systematic study of viewpoints (Exel and Graaf, 2005), which has proven especially helpful when stakeholder perspectives are very diverse, like in conservation related topics (Seghezzo et al., 2024; Watts and Stenner, 2012a). The Q sort consists of a set of selected statements (Q-set) extracted from a collated concourse, which covers ideally the discourse on a topic. Participants (P-set) sort the predefined statements into a grid that represents a normal distribution, ranging from strong agreement (+6) to disagreement (−6). After sorting the statements, participants are invited to explain their sorted statements, with a particular focus on the edges which usually provides informative responses.

2.2.1. Development of Q-set

The concourse was developed based on academic literature to compile an evidence-based set of potential influencing factors for extensive grassland management (Watts and Stenner, 2005). As a starting point the review paper of Klebl et al. (2023) was used. It offers a comprehensive selection of 150 peer-reviewed articles addressing a broad range of factors influencing biodiversity-friendly farming. These articles address various societal, cultural and ecological aspects of farming, which are of great significance for understanding the dynamics of MHM. The retrieved articles establish a robust foundation for a comprehensive concourse on the future of MHM. To complement this review, we used the search string “hay meadow” AND “mountain” on scopus resulting in a total of 110 articles. Duplicates and articles before 2010 were removed, and 49 articles remained. In total, the articles from the literature review by Klebl et al. (2023) and the search string amounted to 199 articles. All articles were read by at least one researcher from the team: text-segments were inductively derived following the q-question “What matters for the future of mountain hay meadows?”, resulting in a total of 500 text segments, which were further categorized following the typology of Klebl et al. (2023) (see A.1). This typology consists of nine thematic groups (policy, economy, society and culture, nature and region, farm characteristics, information, individual skills, environmental perception, social positioning) each containing several potential influencing factors. The typology was developed through a systematic literature review and expert consultation, synthesizing factors identified across empirical studies on biodiversity-friendly and nature-positive land management into a structured analytical framework. The influences captured within these categories span from the micro- (manager) to the macro (society) level, together constituting a holistic set of factors shaping biodiversity-friendly management of agricultural land. In two half-day workshops with the research team, similar text segments were clustered and duplicates removed, resulting in 113 segments. In a last condensation step, text segments were further synthesized to reach 49, which was a suitable number for the method in terms of thematic depth and time constraints. A complete description of statements can be found in ANNEX1 (A.1).

2.2.2. *Development of P-set*

To capture a wide range of perspectives, not just those of farmers, stakeholder mapping was carried out according to Reed et al. (2009). Stakeholders are defined as actors who have an interest in and an influence over one or more of the major functions of MHM that are connected to their ecosystem services: agriculture and food production (mainly provisioning services), nature conservation (mainly regulating) or tourism and recreation (mainly cultural) (see Reid et al., 2005). Based on their interests and possible power to influence, stakeholders can play roles in these three sectors as well as in policymaking in general. Stakeholders are not restricted to actors with direct contact with the case study sites, but can also be situated at higher levels. Consequently, we distinguish between stakeholders on the local, regional, federal state, and national level.

Following, the stakeholder mapping included identifying stakeholders, characterizing their interests in meadows, and assessing their ability to influence them, as well as the relationships between stakeholders. The author team conducted these steps based on available literature and expert knowledge. Preliminary results from each step were shared with key stakeholders in the case study region to collect feedback. Based on this feedback, the findings were refined and a final stakeholder map was created. The goal was to include stakeholders from various levels with interests and influences in different sectors in the P-Set. Potential participants were selected from the map and contacted. In total 37 participants were recruited. Table 1 provides an overview of the participants' characteristics.

Table 1
P-set characteristics. *The sum of percentages in the interest and role category can exceed 100%, because participants could choose multiple answers when they had multiple interests or take over multiple roles. **The sum of percentages in Active involvement in MHM management does not reach 100%, because some participants refused to answer this question.

P-set characteristics	
Number of participants	37
Level	
Site level	27%
Regional level	29%
Federal state level	27%
National level	17%
Interests*	
Agriculture	53%
Nature conservation	58%
Tourism	32%
Other	24%
Active involvement in MHM management**	
Actively involved	45%
Not actively involved	50%
Role*	
Farmer	45%
Full-time	*18%*
Part-time	*26%*
Farmer association	26%
Nature conservation_(NGO)	26%
Nature conservation_(agency)	13%
Hunting association	26%
Nature park management	24%
Touristic business/ association	18%
Local government	11%
Federal state or national government (agriculture, environment or economy)	18%
Male	68%
Female	32%

2.2.3. *Data collection*

Data collection was conducted between September and December 2024. The selected participants were contacted via phone or e-mail and depending on the technical infrastructure, data collection was conducted online or in person. Online surveys were carried out with the online tool Mural (e.g. www.mural.com) and a Zoom session in parallel. Informed consent and GDPR-standards (General Data Protection Regulation (EU) 2016/679) (GDPR, 2016) were implemented. The introduction (topic, method) was followed by reading the statements and piling them into three decks (agree, neutral, disagree), which supports the sorting exercise (Willig et al., 2008). Based on the question "What matters for the future of mountain hay meadows?" they sorted the decks into the grid (Fig. 2). The participants re-ranked the statements until they were satisfied with their sort. The end of the sorting process concluded with a short conversation, during which the participants are explained their sort, with a specific focus on both margins of the grid and their responses were noted.

2.2.4. *Analysis and interpretation*

For the analysis we used the package qmethod (Zabala, 2014) in R. In a first step Q-sorts were intercorrelated to reflect the relationship of each configuration (Q-sort) with every other, resulting in values ranging from −1.0 to +1.0 (Watts and Stenner, 2005). To identify statistically significant similarities, a principal component analysis (PCA) was performed. The number of factors extracted was based on the following criteria (Brown, 1980; Watts and Stenner, 2012b):

i) Kaiser-Guttmann criterion (eigenvalue less than 1.00 are removed because they would account for less variance than a single Q sort)
ii) significant factor loading >0.30 (with 49 statements, the factor loading is significant at $p < 0.05$ if its absolute value is at least $1.96\,\frac{1}{\sqrt{49}} \approx 0.28$)
iii) Humphrey's rule (cross product of its two highest loadings exceeds twice the standard error)
iv) Number of loading Q-sort >6
v) Explanatory variance of all factors >35% (low explained variance is acceptable in Q method, because the aim is not to maximise variance explained, but to identify distinct and interpretable viewpoints)
vi) Se score < 0.20

The final number of extracted factors represent distinct viewpoints across the Q-sets. The expressed factor loadings indicate to which extent single Q-sorts are associated with each extracted factor. For clearer and more interpretable results varimax rotation was applied to the extracted factors. In a next step the matrix of factor loadings was analyzed using automatic "flagging" to identify the most representative Q-sorts for each factor. The automatic flagging is based on two criteria: a) significant loading for a p-value <0.05 (loadings must exceed $1.96(SE_r) = 0.28$) and b) the square loading for a factor should be higher than the sum of the square loadings for all other factors (Zabala, 2014). Based on the z-scores, distinguishing and consensus statements for each factor were identified (Watts and Stenner, 2012b). In addition, crib sheets were used to support the analysis of the Q-method results by systematically

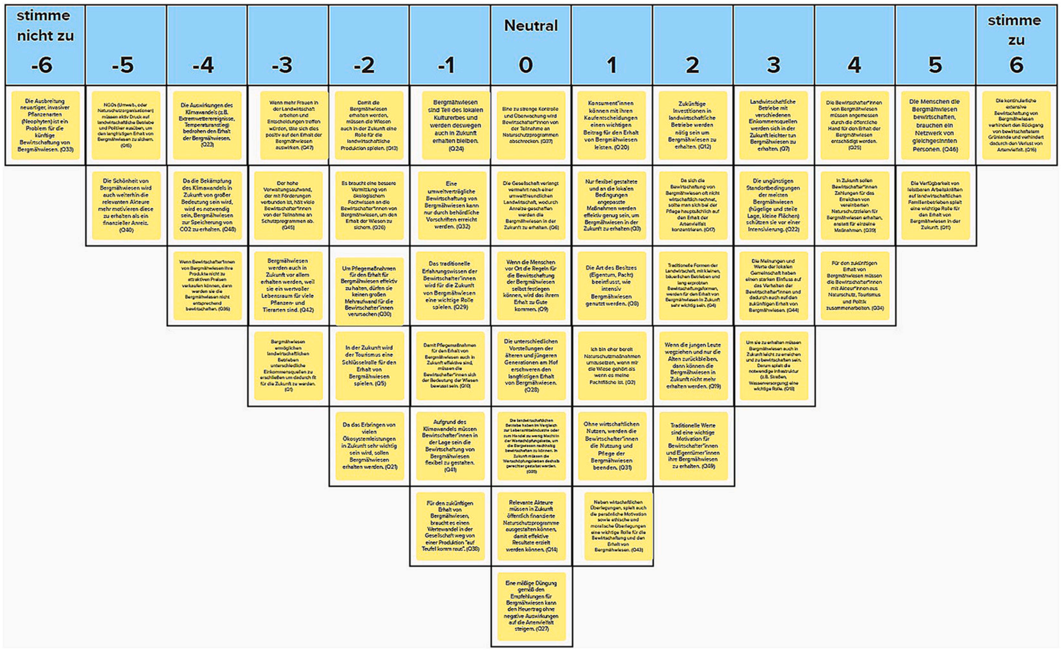

Fig. 2. Q-grid Example of sorted statements conducted in online format.

ordering and comparing statements based on their z-scores, both within each factor and across factors. Additionally, we used bootstrapping to improve validity and robustness. Bootstrapping repeatedly draws resamples of the original Q-sorts (with replacement) and runs the full Q analysis on each resample, then aggregates those iterations to obtain bootstrap estimates (e.g. means and standard errors) for statements' z-scores and factor loadings (Zabala and Pascual, 2016). Bootstrapping was performed with the R-package 'qmethod' with 5000 repetitions.

3. Results

In the statistical analysis, we identified three distinct factors (i.e. viewpoints) explaining 38.39% of the variance. Compliance with the criteria outlined in Section 2.2.4 (see Table 2), along with only minor deviations between original and bootstrapped results (see A.2), confirmed the extraction of three factors. Of the 37 samples, 28 loaded significantly on one of the three extracted factors, each with a standard error < 0.20. Table 3 provides an overview of z-scores for each statement, within the different Viewpoints. As indicated in the method section, higher number indicating agreement and lower number disagreement. In the following section each Viewpoint is described based on the ranking of the statements (e.g. crib sheet analysis).

Table 2
Characteristics of the three extracted factors with regard to selected quality criteria.

Characteristics	Factor 1	Factor 2	Factor 3	
Number of loaded Factor	12	7	9	
Eigenvalue	5.96	4.28	3.97	
Explained variance (%)	16.10	11.57	10.72	38.39
Reliability	0.98	0.97	0.97	
Standard error of factor scores	0.14	0.19	0.16	

3.1. Viewpoint 1: flowers are nice, but the economy is brutal

Viewpoint 1 (V1) strongly emphasizes the role of economic viability for the future of MHM. Economic stability of farms (#31/+6)[2] and the threat of outmigration of younger generations (#19/+5) are considered pivotal aspects for the continued management of the meadows. To ensure economic viability two aspects play an important role. First, MHM and its derived products (#35/+3), must remain an integral part of the agricultural production (#13/+2, higher than in any other viewpoint). Second, subsidies and compensation schemes are needed to ensure that farmers and managers of MHM are adequately compensated for their efforts to preserve biodiversity (#25/+5). Moreover, local residents should be empowered to shape rules and decisions for the management of MHM (#9/+4). V1 emphasizes that too strict controls will lower the willingness of farmers and managers to participate in conservation actions and programs (#37 + 4) while active pressure from NGOs on farmers and political actors is considered detrimental (#15/−5). The strong economic aspects are contrasted by a broad rejection of intangible and ecological characteristics of MHM: the viewpoint disregards biodiversity values (#42/−4; #17/−4) as well as the general appeal and beauty as motives to maintain MHM (#40/−4). The role of MHM as part of the local cultural heritage is disregarded too (#24/−5).

3.2. Viewpoint 2: the intrinsic value of the meadows

Viewpoint 2 (V2) has a strong focus on the intrinsic value of the meadows and argues that MHM will be conserved for their biodiversity richness (#42/+4), aesthetic value (#40/+3, higher than in any other V) and their role as ESS supplier (#21/+4). Besides that, this viewpoint emphasizes the importance of the intrinsic motivations and ethical considerations of managers (#43/+6). Traditional small-scale agriculture and its traditional management practices (#4/+5), paired with the availability of affordable labour on family farms (#11/+4, higher than in other V) are considered as important aspects for future conservation. V2 also points out that the management of MHM must remain flexible in

[2] In the following, the numbers in brackets refer to (#Statement/factor array).

Table 3
Overview viewpoints and statements.

Nr	Statement wording	Factor 1	Factor 2	Factor 3
1	MHM offers farmers opportunities for income differentiation	−2	−1	−4
2	owning land increases willingness to adopt conservation measures	−2	−5	1
3	**preservation measures need to be flexible to be adapted to local contexts**	**4**	**2**	**3**
4	traditional small-scale agriculture and envolved practices are important for future MHM preservation	2	5	4
5	in the future tourism will play a key role for the preservation of MHM	−3	−4	3
6	increasing societal demonds for environmental friendly agriculture promotes MHM preservation	−3	−2	1
7	agricultural holdings with a variety of income sources will find it easier to preserve MHM	0	−2	0
8	the type of ownership (owning, renting) influences how intensively MHM are used	−3	−4	−1
9	empowering local residents to shape rules and decisions for MHM management	4	−2	−2
10	managers need to be aware of the importance of MHM to implement protection measures effectively	−1	2	5
11	Family farms play an important role in the preservation of MHM	3	4	1
12	economic investments in agricultural holdings will be necessary to preserve MHM	1	−2	0
13	to preserve MHM, they must be a part of agricultural production	2	−1	−3
14	relevant stakeholders must be able to shape the design of public conservation programs for MHM	1	−3	0
15	**active pressure from NGOs on farmers and political actors is needed**	**−5**	**−5**	**−3**
16	extensive management prevents the decline MHM and the loss of biodiversity	0	3	3
17	Due to its unprofitability, the maintenance of MHM should focus on biodiversity preservation	−4	−1	2
18	**infrastructure to easily access and manage MHM plays a key role in whether their management is maintained**	**1**	**1**	**0**
19	if young people migrate out of the region, it will no longer be possible to preserve MHM	5	2	0
20	consumers can contribute to the preservation of MHM through their purchasing decisions	3	3	−3
21	Because ecosystem services will be of great importance, MHM will be preserved	2	4	2
22	**unfavorable conditions regarding location prevent MHM from intensification**	**1**	**1**	**2**
23	the impacts of climate change threaten the preservation of MHM	0	1	−4
24	MHM will be preserved because they are part of the local cultural heritage	−5	2	−2
25	Managers of MHM must be adequately compensated by the public sector for their preservation efforts	5	−1	6
26	Better expert knowledge transfer on ecological aspects of MHM to managers is important	−2	−1	1
27	Moderate fertilizer input according to the recommendations for MHM can increase yield without negative effects on biodiversity	−2	0	−1
28	difference viewpoints between older and younger generations on farms make it harder to preserve MHM	−1	−3	−2
29	traditional experienced-based knowledge of managers is important for the future of MHM	−1	3	2
30	**effective preservation measures must not cause major additional efforts for managers**	**2**	**0**	**0**
31	without economic benefits, managers will stop managing MHM	6	−4	−1
32	**environmentally friendly management of MHM can only be achieved through official regulations**	**−6**	**−6**	**−5**
33	invasive plant species are a problem for the future management of MHM	−1	0	−3
34	managers of MHM must collaborate with stakeholders from nature conservation, tourism and politics	−1	1	5
35	agricultural holdings have too little power in the value chain to manage MHM adequately	3	1	0
36	If products of MHM cannot be sold to attractive prices managers will not preserve MHM	2	0	−2
37	too strict controls will inhibit managers participation in conservation programs	4	2	−2
38	**a general change of values in society away from "productivity at all costs" is needed**	**1**	**0**	**1**
39	managers should receive payments for achieving agreed nature conservation goals on their MHM	3	−2	1
40	the "beauty" of MHM will motivate relevant stakeholders to preserve them more than financial incentives	−4	3	−5
41	due to climate change, the management measures of MHM must be flexible	1	5	−1
42	MHM will be mainly preserved, because they are a biodiversity-rich habitat	−4	4	−1
43	intrinsic motivation of managers and owners and ethical considerations ore important for the preservation of MHM	0	6	4
44	moral values of the local community have a strong influence on the behavior of MHM managers	−2	−3	2
45	**high administrative effort can discourage managers from participating in conservation programs**	**0**	**0**	**−1**
46	people who maintain mountain hay meadows need a peer network of like-minded people	0	−3	4
47	more women as agricultural decision makers, would have positive impact on the preservation of MHM	−3	−1	−4
48	Because of climate change mitigation, it will be necessary to preserve MHM as a CO_2 sink	0	0	−6
49	traditional values are an important motivation for managers and owners to preserve MHM	−1	1	3

Statements shown in bold indicate alignment between the factors.

order to adapt to an environment that is increasingly changing due to climate change (#41/+5).

For this viewpoint, ownership does not impact the willingness to implement conservation measures (#2/−5) or the management intensity (#8/−4) of MHM. While traditional farming practices and the delivery of biodiversity and ESS values are important, adequate compensation by the public sector for these services is scoring low, compared to other viewpoints (#25/−1, lower than in any other V). This may be linked to the fact that V2 does not view economic viability as an essential aspect for the future of MHM (#31/−4). For this viewpoint, alternative, partly non-agricultural uses of MHM play only a relatively minor role in its conservation. Neither more involvement of practitioners in the subsidy development (#14/−3), nor a diversification of income (#7/−2) or tourism (#5/−4) are seen as crucial factors for the conservation of MHM in the future.

3.3. Viewpoint 3: sustaining MHM through community and collaboration

Like Viewpoint 2 (V2), Viewpoint 3 (V3) appreciates traditional farming systems and management practices (#4/+4) and the role of intrinsic motivation and ethical considerations of managers (#34/+5) for the future of MHM. On the other hand, like V1, V3 approves of adequate compensation for the efforts required to maintain and preserve MHM (#25/+6). Ensuring future conservation requires the managers awareness of their value and the importance of conservation (#10/+5). Embeddedness in peer-networks (#46/+4), local community (#44/+2, higher than in other V), and collaboration with different actors and stakeholders (e.g. from nature conservation, tourism, or politics) (#34/+5) are considered further important notions, that clearly distinguishes this viewpoint from the previous ones.

MHM themselves are not regarded as economically viable for agricultural production (#13/ -3) or an option for income differentiation (#1/−4). Consequently, management could focus on subsidized conservation activities (#17/+2, higher than in other V; #25/+6). Facing economic hardship, tourism is considered one opportunity to support and sustain conservation activities (#5/+3; higher than in other V). The role of climate change is downplayed in several aspects: the impacts of climate change threaten their conservation (#23/−4, lower than in any other V), their role as potential climate sinks (#48/−6), and the role of invasive species (#33/−3) play only a minor role for the future of MHM. So does the beauty and overall aesthetic appeal of MHM to support their conservation (#40/−5).

3.4. Consensus statements

The analysis shows a total of eight consensus statements (#3, #15, #18, #22, #30, #3, #2, #38, #45). All three viewpoints acknowledge the importance of flexible and locally adapted protection and maintenance measures (#3, +4, +2, +4). This statement is complementary with the collective disagreement of statement number 32 and 15, stressing that environmental-friendly management of MHM can only be achieved through regulatory measures (#32, −6, −6, −5) and active pressure from NGOs on managers and politicians is needed for their long term conservation (#15, −5, −5, −3). These three consensus statements emphasize the important role of autonomy in decision-making as one participant stated in the post-sort questions: "*Too much authority is disadvantageous, it doesn't help much! In Europe, there are simply too many regulations in general*" (Q27). In the same vein, administrative burdens can lower the participation in conservation schemes (#45, 0, 0, −1) was also agreed across viewpoints, receiving a neutral ranking.

Furthermore, all viewpoints emphasize the importance of ESS delivered by MHM (#21, +2, +4, +2) and that unfavorable site locations are a 'natural prevention' of intensification (#22, +1, +1, +2). Another commonality across the viewpoints is the importance of infrastructure (#18, +1, +1, 0). The viewpoints also collectively disagree that older and younger generations have different ideas about MHM management disadvantaging their conservation (#28, −1, −3, −2).

4. Discussion

4.1. Views about the future of MHM

Our study investigates the viewpoints of a broad spectrum of stakeholders in Austria about the future of MHM to better understand the dynamics and perspectives related to conservation issues. Our results reveal three distinct viewpoints on what matters for the future of MHM: Economic viability through the market and subsidies (V1), the intrinsic value of MHM (V2) and MHM as part of the local development and community (V3).

4.2. Discussion of viewpoints through the lens of normative values in conservation science

The two viewpoints identified in this study – an economic- centered viewpoint (V1) and nature/biodiversity centered viewpoint (V2) – resemble long standing debates in conservation science regarding normative positions. Specifically, they reflect multiple values from the ecocentric position of the "Traditional Conservationist" (TC) (V2) (Soulé, 1985; Taylor et al., 2020) and the anthropocentric position of the "New Conservationist" (NC) (V1) (Kareiva and Marvier, 2012; Matulis and Moyer, 2017). However, this parallel should be treated with some caution: a closer examination of the results suggests that the boundaries between these normative archetypes are less clear-cut in practice than conservation theory implies. This aligns with research on plural values, demonstrating that human-nature relationships are shaped by co-existing values weighted differently across actors and contexts, rather than mutually exclusive positions (Pascual et al., 2023; Schmitt et al., 2022). Hence, the findings encourage a critical reflection on rigid conceptualizations: stakeholders positions appear to be structured less by overarching conservation theories than by the specific ecological and socio-economic realities conditioning these habitats. Klebl et al. (2024) likewise identified such contrasting positions among farmers regarding biodiversity management on their land.

V1 reflects values of the NC position by placing strong emphasis on economic viability and managing the meadows not for their intrinsic ecological value, but rather for their utilitarian benefits (Kareiva and Marvier, 2012). This viewpoint advocates a win–win situation in which people benefit economically from the meadows, while simultaneously conserve them (Sandbrook et al., 2019b). As described in Klebl et al. (2024) farmers with an anthropocentric position value biodiversity for its capacity to deliver specific services. Interestingly, despite V1 aligning with a considerable number of anthropocentric values, the delivery of ESS by MHM is not prioritized. One possible explanation is that V1 does not perceive the ESS provided by MHM as offering financial or any other utilitarian benefits. Another value pointing towards the NC position is an aversion to strict controls and regulations. From the NC perspective, traditional conservation is criticized for establishing protected areas, as these are seen as potentially undermining fairness among the people involved and serve only an elite group (Miller et al., 2011). Although strict regulations are not synonymous with protected areas, the aversion to such measures can be interpreted as reflecting concerns about the loss of autonomy and experiences of unfair treatment. Accordingly, V1 prioritizes instrumental values, but this does not imply the absence of intrinsic or relational considerations, which may still be present but subordinated to economic concerns (Pascual et al., 2023). This prioritization can be understood as precaution in light of rising socio-economic pressures on marginal agricultural areas in Europe, which increase their vulnerability and contribute to land abandonment (Tasser et al., 2007). As V1 seeks recognition within an agricultural productionist framework, the perspective can be further explained by the perceived obligation to meet the agricultural production requirements imposed on MHM (Klebl et al., 2024).

V2 on the other hand, places more emphasis on the intrinsic value of the meadows and thus reflects multiple values of the TC. This viewpoint foregrounds intrinsic and relational values, such as stewardship and moral responsibility towards nature (Pascual et al., 2023; Schmitt et al., 2022). Thus, V2 assigns low importance to economic viability of MHM. This aligns with the TC position, which is critical of market-based solutions for conservation of habitats. These concern stems from the consideration that such approaches risk "selling out nature" by neglecting species deemed economically insignificant (Sandbrook et al., 2019b; Taylor et al., 2020). Given that MHM are managed and used by small farms often located in marginal agricultural areas, this position may also reflect concerns about being treated unfairly due to their limited ability to compete in increasingly unregulated markets (Daugbjerg and Swinbank, 2016; Meert et al., 2005). Against the TC position V2 aligns with V1 on the aversion of strict controls and regulation. However, other than V1, V2 does not see empowering local residents to shape rules and decisions as a potential answer to this. In contrast to the perceived obligation of V1 to contribute to the agricultural production chain, V2 expresses a perceived obligation towards societal responsibility regarding MHM. This responsibility is reflected in the view that conserving MHM is essential for preserving biodiversity, maintaining open landscapes, and safeguarding the inherent beauty of the meadows. Rather than stressing how MHM are actually used, V2 emphasizes which values they represent and what they are recognized for (Wezel et al., 2021).

V3 adopts a more moderate stance, drawing on multiple values from both, the TC and the NC positions. This viewpoint emphasizes that the conservation of MHM can be achieved by building strong networks, giving voice to those affected by conservation goals and measures, and the strengthening of traditional values and structures. In doing so, V3 reflects a plural-values perspective, integrating instrumental, intrinsic, and relational dimensions and thereby aligning with calls to move beyond one-dimensional valuation approaches in conservation (Schmitt et al., 2022). Although V3 also recognizes the intrinsic values of MHM, it does not rely on these alone. Rather than focusing solely on either use or protection, V3 frames MHM as a social–ecological system (Schirpke et al., 2017), where public subsidies and tourism can help address the specific economic challenges these habitats face (Gorris et al., 2025).

4.3. Multiple viewpoints and the role of pluralism in MHM conservation

Describing the different viewpoints on the conservation of MHM through the conceptual lens of normative conservation science positions elucidates the high potential for conflict. Simultaneously, it highlights overlaps in perspectives: the presence of consensus statements across viewpoints and the intermediate position of V3 demonstrate that the boundaries between these positions are fluid rather than clearly defined (Sandbrook et al., 2019a). This finding aligns with the literature on plural values, which emphasizes the interplay of multiple values that co-occur within the same individuals or stakeholder groups, albeit with different weightings (Chapman and Deplazes Zemp, 2024). Although the overarching goal is shared across viewpoints, conservation strategies differ depending on which values or priorities are assigned to the conservation target. This is particularly evident in Agri environmental schemes (AES), which are widely regarded as a key instrument for protecting MHM (Batáry et al., 2015; Rouveyrol and Prima, 2024). Yet they have been criticized for their limited flexibility and for being insufficiently tailored to the specific conditions of marginal grassland systems (Cordier et al., 2025; Rouveyrol and Prima, 2024).

The viewpoints diverge notably in how subsidies such as AES are perceived. According to the ranking of the statements, for V1 – reflecting more NC aligned values - subsidies are valued primarily for their utilitarian benefits. V2, which is more closely aligned with TC values, perceives subsidies as carrying a risk of commodifying nature. V3 occupies a distinct position in relation to both the TC and NC positions, acknowledging the importance of economic compensation - not as a source of economic benefit per se, but as a means of maintaining the traditional values linked to MHM. Translating these viewpoints into conservation practice, the findings suggest that value orientations differ not only between grassland types but also within MHM themselves, resulting in diverse and sometimes conflicting value configurations (Chapman and Deplazes Zemp, 2024). Although economic viability is undoubtedly a major challenge in the conservation of MHM (Gorris et al., 2025), the identified viewpoints clearly demonstrate that financial support alone is not a silver bullet for conserving MHM. AES are neither a universal solution applicable across all contexts nor automatically effective. Even among those who respond positively to such measures, AES must be carefully framed to resonate with the specific values and motivations of the individuals and communities involved. Only under such conditions can ecologically effective actions gain social acceptance and be successfully implemented (Batáry et al., 2015). Moreover the results indicate that the intrinsic value of these meadows, beyond their measurable outputs, plays a crucial role in fostering motivation for conservation (Pecher et al., 2017; Wezel et al., 2021). Schermer et al. (2016) argue that traditional extensive farming practices, such as those applied to MHM, must be considered as socially and culturally desirable in order to support the continuation of these management practices. Regarding the positions of V2 and V3 we argue that conservation measures are more likely to accommodate the plural values held by stakeholders when they recognize key cultural, aesthetic, and identity-related aspects (Plieninger et al., 2026). As proposed in Gorris et al. (2025), strengthening public awareness of semi-natural grasslands as providers of diverse ESS can help anchor these cultural and social dimensions more firmly within public discourse. In turn, this may increase political willingness to maintain the low intensity farming practices required for their conservation and could motivate both farmers and non-farmers to participate more actively in the conservation and restoration of semi-natural grasslands.

In the case of MHM, sustainable management does not mean choosing between biodiversity conservation and agricultural production. Rather, it necessitates a delicate balance between agricultural production, biodiversity conservation and maintenance of key ESS, including cultural ones (Arnold et al., 2025). It is therefore essential that these viewpoints are considered in combination and not as mutually exclusive. The results of this study illustrate that, in the case of MHM, a single conceptualization of a conservation strategy would very likely result in the exclusion of certain viewpoints. We therefore argue that the conservation of MHM should be conceptualized through a pluralistic approach in order to achieve broad social acceptance and consequently promote its effectiveness (Pascual et al., 2021). Adopting such an approach requires acknowledging that, in any given situation, multiple actors hold diverse, competing and even conflicting perspectives and objectives. Overlooking these differing perceptions and its resulting needs, risks undermining or eroding the effectiveness of conservation initiatives (Gavin et al., 2018). Pluralism in the conservation of MHM should therefore be grounded in the shared goal of conserving MHM, without assuming that the specific pathways to achieve this goal are identical across all contexts. The viewpoints presented in this study illustrate distinct interpretations of this shared foundation (Saltz and Cohen, 2023), with differing priorities among coexisting values (Pascual et al., 2023). Applying pluralism in MHM conservation, implies that policy design should follow a process- and actor-oriented approach that emphasizes local adaptation, collaborative stakeholder engagement, and the co-production of knowledge. Such an approach requires tailoring strategies to the specific socio-ecological context of each landscape region. One way to operationalize this is through a portfolio approach, which combines multiple, complementary conservation strategies rather than relying on a single intervention, thereby increasing the capacity to accommodate diverse value priorities (Brister et al., 2026). Support for such approaches can be provided through participatory dialogue and engagement formats (Jones et al., 2024), such as workshops, focus groups and surveys, which support locally relevant values and integrate them meaningfully into conservation strategies (Klebl et al., 2024). Our research results emphasize that farm managers, in particular, perceived Natura 2000 designations negatively, as they were implemented through a straightforward top-down approach with only very modest consultation or involvement of those directly affected. Developing conservation strategies for MHM using pluralistic approaches require substantial resources, as it involves communication, trust-building, and coordination among stakeholders (Gavin et al., 2018). However, based on our results, we propose pluralism and pluralistic strategies and measures in the conservation of MHM as a necessary way forward to reconcile multiple actor objectives and identify locally adapted and socially acceptable solutions. It enables more equitable and context-sensitive conservation and provides a pathway for translating theoretical viewpoints into actionable knowledge and strategies on the ground.

5. Conclusion

This study explored diverse viewpoints on the future of MHM among a diverse range of stakeholders and identified three distinct viewpoints. The results highlight the strong heterogeneity of perspectives and values demonstrating that conservation strategies must address multiple and sometimes competing or even conflicting needs and interests. By including stakeholders beyond farmers and focusing specifically on MHM as an example of marginalized grasslands this study provides insights into the specific social-ecological context of MHM.

Two of the three Viewpoints align with multiple values associated with the Traditional and New Conservationist positions respectively, while the third occupies an intermediate position. However, the Viewpoints should not be understood as discrete categories, as each represents a combination of coexisting values that are prioritized differently across actors and contexts. Together, these Viewpoints reveal that MHM are seen neither solely as biodiversity hotspots nor solely as agricultural production sites, but as multifunctional systems shaped by ecological, cultural, and socio-economic factors. Conservation must therefore recognize this multifunctionality and the diverse, context-dependent roles MHM play locally. Current conservation practice often strives for single solutions, which risks excluding alternative perspectives and might lack or reduce the necessary social legitimacy. A pluralistic approach rooted in meaningful participation, communication, and engagement, is essential to match the diverse social-ecological contexts of MHM (Gavin et al., 2018). Integrating MHM into broader conservation discourses is crucial as these species-rich extensively managed meadows play a vital role in both biodiversity conservation and the maintenance of cultural landscapes. Pluralism can enhance the effectiveness and acceptance of policy instruments such as the Habitats Directive and Agri-Environmental Schemes, and will be particularly essential in the context of the forthcoming Nature Restoration Law, which further strengthens the protection and restoration of semi-natural grassland such as MHM.

CRediT authorship contribution statement

Julian Janisch: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Katharina Gugerell:** Writing – review & editing, Supervision, Project administration, Methodology, Funding acquisition, Conceptualization. **Thomas Thaler:** Writing – review & editing, Methodology. **Valentin Fiala:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization.

Ethics declaration

In accordance with ethical guidelines and good scientific practice, we obtained consent from each of our interviewee in the following way: We informed about confidential data usage and purpose of the interview in an information and consent form before the interview which was signed by all interviewees. All collected data was anonymized to ensure privacy. The original data is stored on a secured server provided by BOKU University.

Declaration of competing interest

The authors report there are no competing interests to declare.

Acknowledgments

This research was part of the biodiversa+ Project ALPMEMA and funded in whole by the Austrian Science Fund (FWF) [l 6387-B]. For open access purposes, the author has applied a CC BY public copyright license to any author accepted manuscript version arising from this submission. We thank all stakeholders who participated in the interviews for their time and input.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.biocon.2026.112006.

Data availability

Data will be made available on request.

References

Arnold, I., Marchand, G., Hayoz-Andrey, A., Serres-Hänni, A., Arlettaz, R., Humbert, J.-Y., 2025. Relaxation of management intensity promotes butterfly communities in mountain grasslands. Biol. Conserv. 304. https://doi.org/10.1016/j.biocon.2025.111027.

Assandri, G., Bogliani, G., Pedrini, P., Brambilla, M., 2019. Toward the next common agricultural policy reform: determinants of avian communities in hay meadows reveal current policy's inadequacy for biodiversity conservation in grassland ecosystems. J. Appl. Ecol. 56, 604–617. https://doi.org/10.1111/1365-2664.13332.

Babai, D., Molnár, Z., 2014. Small-scale traditional management of highly species-rich grasslands in the Carpathians. Agric. Ecosyst. Environ. 182, 123–130. https://doi.org/10.1016/j.agee.2013.08.018.

Babai, D., Tóth, A., Szentirmai, I., Biró, M., Máté, A., Demeter, L., Szépligeti, M., Varga, A., Molnár, Á., Kun, R., Molnár, Z., 2015. Do conservation and agri-environmental regulations effectively support traditional small-scale farming in East-Central European cultural landscapes? Biodivers. Conserv. 24, 3305–3327. https://doi.org/10.1007/s10531-015-0971-z.

Batáry, P., Dicks, L.V., Kleijn, D., Sutherland, W.J., 2015. The role of agri-environment schemes in conservation and environmental management. Conserv. Biol. 29, 1006–1016. https://doi.org/10.1111/cobi.12536.

Baur, B., Cremene, C., Groza, G., Rakosy, L., Schileyko, A., Baur, A., Stoll, P., Erhardt, A., 2006. Effects of abandonment of subalpine hay meadows on plant and invertebrate diversity in Transylvania, Romania. Biol. Conserv. 132, 261–273. https://doi.org/10.1016/j.biocon.2006.04.018.

Beltramo, R., Bonadonna, A., Duglio, S., Peira, G., Vesce, E., 2024. Local food heritage in a mountain tourism destination: evidence from the Alagna Walser Green Paradise project. Br. Food J. 126, 309–326. https://doi.org/10.1108/BFJ-12-2022-1136.

Bengtsson, J., Bullock, J., Egoh, B., Everson, C., Everson, T., O'Connor, T., O'Farrell, P., Smith, H., Lindborg, R., 2019. Grasslands-more important for ecosystem services than you might think. Ecosphere 10. https://doi.org/10.1002/ecs2.2582.

Birge, T., Herzon, I., 2014. Motivations and experiences in managing rare semi-natural biotopes: a case from Finland. Land Use Policy 41, 128–137. https://doi.org/10.1016/j.landusepol.2014.05.004.

Bonari, G., Fajmon, K., Malenovsky, I., Zeleny, D., Holusa, J., Jongepierová, I., Kocárek, P., Konvicka, O., Uricár, J., Chytry, M., 2017. Management of semi-natural grasslands benefiting both plant and insect diversity: the importance of heterogeneity and tradition. Agric. Ecosyst. Environ. 246, 243–252. https://doi.org/10.1016/j.agee.2017.06.010.

Brister, E., Rohwer, Y., Weber, M., 2026. Value pluralism supports portfolio approaches in conservation. Ambio. https://doi.org/10.1007/s13280-026-02368-0.

Brown, S.R., 1980. Political Subjectivity: Applications of Q Methodology in Political Science.

Chaplin-Kramer, R., Neugarten, R.A., Sharp, R.P., Collins, P.M., Polasky, S., Hole, D., Schuster, R., Strimas-Mackey, M., Mulligan, M., Brandon, C., Diaz, S., Fluet-Chouinard, E., Gorenflo, L.J., Johnson, J.A., Kennedy, C.M., Keys, P.W., Longley-Wood, K., McIntyre, P.B., Noon, M., Pascual, U., Reidy Liermann, C., Roehrdanz, P. R., Schmidt-Traub, G., Shaw, M.R., Spalding, M., Turner, W.R., van Soesbergen, A., Watson, R.A., 2023. Mapping the planet's critical natural assets. Nat. Ecol. Evol. 7, 51–61. https://doi.org/10.1038/s41559-022-01934-5.

Chapman, M., Deplazes Zemp, A., 2024. Moving beyond stewardship to partnership with nature: how Swiss alpine farmers' relationships to nature and relational values are co-constituted. Ecosyst. People 20. https://doi.org/10.1080/26395916.2024.2374757.

Cordier, E., Rouxhet, S., Mahy, G., Piqueray, J., 2025. The impact of activities within an agri-environment scheme on the habitat condition of hay meadows and its alignment with Natura 2000 objectives. J. Nat. Conserv. 84. https://doi.org/10.1016/j.jnc.2025.126834.

Corson, C., Brady, B., Zuber, A., Lord, J., Kim, A., 2015. The right to resist: disciplining civil society at Rio+20. J. Peasant Stud. 42, 859–878. https://doi.org/10.1080/03066150.2014.992884.

Cortés-Capano, G., Hausmann, A., Di Minin, E., Kortetmäki, T., 2022. Ethics in biodiversity conservation: the meaning and importance of pluralism. Biol. Conserv. 275, 109759. https://doi.org/10.1016/j.biocon.2022.109759.

Cunningham, C.A., Crick, H.Q.P., Morecroft, M.D., Thomas, C.D., Beale, C.M., 2023. Reconciling diverse viewpoints within systematic conservation planning. People Nat. 5, 621–632. https://doi.org/10.1002/pan3.10449.

Daugbjerg, C., Swinbank, A., 2016. Three decades of policy layering and politically sustainable reform in the European Union's agricultural policy. Governance 29, 265–280. https://doi.org/10.1111/gove.12171.
EC, 2018. Artikel 17 Habitat Report Austria - Habitat code 6520. https://nature-art17.eionet.europa.eu/article17/habitat/summary/?period=5&subject=6520.
EIT Climate-KIC, 2022. Co-creation for Policy – Participatory Methodologies to Structure Multi-stakeholder Policymaking Processes. Publications Office of the European Union. https://doi.org/10.2760/211431.
EU, 2018. "Farming for Natura 2000" Guidance on How to Support Natura 2000 Farming Systems to Achieve Conservation Objectives, Based on Member States Good Practice Experiences. https://doi.org/10.2779/85823.
Exel, J., Graaf, G., 2005. Q Methodology: A Sneak Preview.
Gavin, M.C., McCarter, J., Berkes, F., Mead, A.T.P., Sterling, E.J., Tang, R., Turner, N.J., 2018. Effective biodiversity conservation requires dynamic, pluralistic, partnership-based approaches. Sustainability 10. https://doi.org/10.3390/su10061846.
GDPR, 2016. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/ EC (General Data Protection Regulation). Off. J. L 119, 1–88, 4.5.2016.
Gorris, P., Bodin, Ö., Giralt, D., Hass, A.L., Reitalu, T., Cabodevilla, X., Hannappel, I., Helm, A., Prangel, E., Westphal, C., 2025. Social-ecological perspective on European semi-natural grassland conservation and restoration: key challenges and future pathways. Biol. Conserv. 304, 111038. https://doi.org/10.1016/j.biocon.2025.111038.
Henke, R., Pomponi, T., Vassallo, M., Mazzocchi, G., Monteleone, A., Sorrentino, A., 2024. The new CAP and the participative method in decision- making: a textual analysis of the Italian case. JCMS J. Common Mark. Stud. 63. https://doi.org/10.1111/jcms.13703.
Hølleland, H., Skrede, J., Holmgaard, S.B., 2017. Cultural heritage and ecosystem services: a literature review. Conserv. Manag. Archaeol. Sites 19, 210–237. https://doi.org/10.1080/13505033.2017.1342069.
Hunter Jr., M.L., Redford, K.H., Lindenmayer, D.B., 2014. The complementary niches of anthropocentric and biocentric conservationists. Conserv. Biol. 28, 641–645. https://doi.org/10.1111/cobi.12296.
Jones, S., Syder, A., Blencowe, A., Constant, N., 2024. Participatory Approaches to Conservation With Local Communities and Indigenous Peoples: An Open Access Toolkit. Royal Society for the Protection of Birds Centre for Conservation Science, Cambridge, UK.
Kareiva, P., Marvier, M., 2012. What is conservation science? BioScience 62, 962–969. https://doi.org/10.1525/bio.2012.62.11.5.
Klebl, F., Feindt, P., Piorr, A., 2023. Farmers' behavioural determinants of on-farm biodiversity management in Europe: a systematic review. Agric. Hum. Values 41, 1–31. https://doi.org/10.1007/s10460-023-10505-8.
Klebl, F., Parisi, A., Häfner, K., Adler, A., Barreiro, S., Bodea, V., Brönnimann, V., Vries, R., Santos, A., Hood, A., Melts, I., Popa, R., Vajna, F., Velado Alonso, E., Kernecker, M., 2024. How values and perceptions shape farmers' biodiversity management: insights from ten European countries. Biol. Conserv. 291, 110496. https://doi.org/10.1016/j.biocon.2024.110496.
Leonhardt, H., Braito, M., Uehleke, R., 2022. Combining the best of two methodological worlds? Integrating Q methodology-based farmer archetypes in a quantitative model of agri-environmental scheme uptake. Agric. Hum. Values 39, 217–232. https://doi.org/10.1007/s10460-021-10242-w.
MacDonald, D., Crabtree, J.R., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Lazpita, J., Gibon, A., 2000. Agricultural abandonment in mountain areas of Europe: environmental consequences and policy response. J. Environ. Manag. 59. https://doi.org/10.1006/jema.1999.0335.
Marini, L., Scotton, M., Klimek, S., Isselstein, J., Pecile, A., 2007. Effects of local factors on plant species richness and composition of Alpine meadows. Agric. Ecosyst. Environ. 281–288. https://doi.org/10.1016/j.agee.2006.07.015.
Matulis, B.S., Moyer, J.R., 2017. Beyond inclusive conservation: the value of pluralism, the need for agonism, and the case for social instrumentalism. Conserv. Lett. 10, 279–287. https://doi.org/10.1111/conl.12281.
Meert, H., Van Huylenbroeck, G., Vernimmen, T., Bourgeois, M., van Hecke, E., 2005. Farm household survival strategies and diversification on marginal farms. J. Rural. Stud. 21, 81–97. https://doi.org/10.1016/j.jrurstud.2004.08.007.
Miller, T.R., Minteer, B.A., Malan, L.-C., 2011. The new conservation debate: the view from practical ethics. Biol. Conserv. 144, 948–957. https://doi.org/10.1016/j.biocon.2010.04.001.
Mucina, L., Grabherr, G., Ellmauer, T. (Eds.), 1993. Die Pflanzengesellschaften Österreichs : T. 1 : Anthropogene Vegetation. Gustav Fischer Verlag, Jena.
Murali, R., Anderson, C.B., Muraca, B., Arias-Arévalo, P., Gould, R.K., Lenzi, D., Zent, E., Athayde, S., Kenter, J., Raymond, C.M., Vatn, A., 2026. Navigating diverse human–nature worldviews for more inclusive conservation. Conserv. Biol. 40, e70144. https://doi.org/10.1111/cobi.70144.
Niedrist, G., Tasser, E., Lüth, C., Dalla Via, J., Tappeiner, U., 2009. Plant diversity declines with recent land use changes in European Alps. Plant Ecol. 202, 195–210. https://doi.org/10.1007/s11258-008-9487-x.
Ober, C., Canessa, C., Frick, F., Sauer, J., 2025. The role of behavioural factors in accepting agri-environmental contracts – evidence from a Q-method and thematic analysis in Germany. Ecol. Econ. 231. https://doi.org/10.1016/j.ecolecon.2025.108544.
Pärtel, M., Bruun, H., Sammul, M., 2015. Biodiversity in Temperate European Grasslands: Origin and Conservation.
Pascual, U., Adams, W.M., Díaz, S., Lele, S., Mace, G.M., Turnhout, E., 2021. Biodiversity and the challenge of pluralism. Nat. Sustainability 4, 567–572. https://doi.org/10.1038/s41893-021-00694-7.
Pascual, U., Balvanera, P., Anderson, C., Chaplin-Kramer, R., Christie, M., Gonzalez-Jimenez, D., Martin, A., Raymond, C., Termansen, M., Vatn, A., Athayde, S., Baptiste, B., Barton, D., Jacobs, S., Kelemen, E., Kumar, R., Lazos, E., Mwampamba, T., Nakangu, B., Zent, E., 2023. Diverse values of nature for sustainability. Nature 620, 1–11. https://doi.org/10.1038/s41586-023-06406-9.
Pavlů, L., Pavlů, V., Gaisler, J., Hejcman, M., Mikulka, J., 2011. Effect of long-term cutting versus abandonment on the vegetation of a mountain hay meadow (Polygono-Trisetion) in Central Europe. Flora 206, 1020–1029. https://doi.org/10.1016/j.flora.2011.07.008.
Pecher, C., Bacher, M., Tasser, E., Tappeiner, U., 2017. Agricultural landscapes between intensification and abandonment: the expectations of the public in a Central-Alpine cross-border region. Landsc. Res. 43, 1–15. https://doi.org/10.1080/01426397.2017.1315062.
Plieninger, T., Draux, H., Fagerholm, N., Bieling, C., Bürgi, M., Kizos, T., Kuemmerle, T., Primdahl, J., Verburg, P.H., 2016. The driving forces of landscape change in Europe: a systematic review of the evidence. Land Use Policy 57, 204–214. https://doi.org/10.1016/j.landusepol.2016.04.040.
Plieninger, T., Jay, M., Hartel, T., 2026. Future-proofing Natura 2000 through a biocultural approach. Conserv. Lett. 19, e70038. https://doi.org/10.1111/con4.70038.
Poschlod, P., 2015, 1958- [VerfasserIn] Geschichte der Kulturlandschaft : Entstehungsursachen und Steuerungsfaktoren der Entwicklung der Kulturlandschaft, Lebensraum- und Artenvielfalt in Mitteleuropa, Lebensraumvielfalt. Ulmer, Stuttgart.
Poschlod, P., WallisDeVries, M.F., 2002. The historical and socioeconomic perspective of calcareous grasslands—lessons from the distant and recent past. Biol. Conserv. 104, 361–376. https://doi.org/10.1016/S0006-3207(01)00201-4.
Reed, M.S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C.H., Stringer, L.C., 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. J. Environ. Manage. 90, 1933–1949. https://doi.org/10.1016/j.jenvman.2009.01.001.
Reid, W., Mooney, H., Cropper, A., Capistrano, D., Carpenter, S., Chopra, K., Dasgupta, P., Dietz, T., Duraiappah, A., Hassan, R., Kasperson, R., Leemans, R., May, R., Mcmichael, A., Pingali, P., Samper, C., Scholes, R., Watson, R., Zakri, A.H., Zurek, M., 2005. Millenium Ecosystem Assessment Synthesis Report.
Rouveyrol, P., Prima, M.-C., 2024. Do agri-environmental schemes target effectively species, habitats and pressures in French Natura 2000 network? Agric. Ecosyst. Environ. 373, 109114. https://doi.org/10.1016/j.agee.2024.109114.
Saltz, D., Cohen, S., 2023. Naturalness and principle pluralism in conservation. Conserv. Biol. 37. https://doi.org/10.1111/cobi.14137.
Sandbrook, C., Fisher, J., Holmes, G., Luque-Lora, R., Keane, A., Ingle, R., Calcade, S., Carter, M., 2019b. The Group and Organisation Future of Conservation Survey [WWW Document]. www.futureconservation.org. URL. https://www.futureconservation.org/about-the-debate. (Accessed 17 December 2025).
Sandbrook, Chris, Fisher, J.A., Holmes, G., Luque-Lora, R., Keane, A., 2019a. The global conservation movement is diverse but not divided. Nat. Sustainability 2, 316–323. https://doi.org/10.1038/s41893-019-0267-5.
Schermer, M., Darnhofer, I., Daugstad, K., Gabillet, M., Lavorel, S., Steinbacher, M., 2016. Institutional impacts on the resilience of mountain grasslands: an analysis based on three European case studies. Land Use Policy 52, 382–391. https://doi.org/10.1016/j.landusepol.2015.12.009.
Schirpke, U., Kohler, M., Leitinger, G., Fontana, V., Tasser, E., Tappeiner, U., 2017. Future impacts of changing land-use and climate on ecosystem services of mountain grassland and their resilience. Ecosyst. Serv. 26, 79–94. https://doi.org/10.1016/j.ecoser.2017.06.008.
Schirpke, U., Tasser, E., Borsky, S., Braun, M., Eitzinger, J., Gaube, V., Getzner, M., Glatzel, S., Gschwantner, T., Kirchner, M., Leitinger, G., Mehdi-Schulz, B., Mitter, H., Scheifinger, H., Thaler, S., Thom, D., Thaler, T., 2023. Past and future impacts of land-use changes on ecosystem services in Austria. J. Environ. Manag. 345, 118728. https://doi.org/10.1016/j.jenvman.2023.118728.
Schirpke, U., Tasser, E., Leitinger, G., Tappeiner, U., 2021. Using the ecosystem services concept to assess transformation of agricultural landscapes in the European Alps. Land 11, 49. https://doi.org/10.3390/land11010049.
Schmitt, T., Riebl, R., Martín-López, B., Haensel, M., Koellner, T., 2022. Plural valuation in space: mapping values of grasslands and their ecosystem services. Ecosyst. People 18, 258–274. https://doi.org/10.1080/26395916.2022.2065361.
Seghezzo, L., Sneegas, G., Jepson, W., Brannstrom, C., Beckner, S., Lee, K., 2024. The use and potential of Q method in environmental planning and management. J. Environ. Plan. Manag. 67, 2721–2747. https://doi.org/10.1080/09640568.2023.2207727.
Shipley, J.R., Frei, E.R., Bergamini, A., Boch, S., Schulz, T., Ginzler, C., Barandun, M., Bebi, P., Bolliger, J., Bollmann, K., Delpouve, N., Gossner, M.M., Graham, C., Krumm, F., Marty, M., Pichon, N., Rigling, A., Rixen, C., 2024. Agricultural practices and biodiversity: conservation policies for semi-natural grasslands in Europe. Curr. Biol. 34, R753–R761. https://doi.org/10.1016/j.cub.2024.06.062.
Soulé, M.E., 1985. What is conservation biology?: a new synthetic discipline addresses the dynamics and problems of perturbed species, communities, and ecosystems. BioScience 35, 727–734. https://doi.org/10.2307/1310054.
Tallis, H., Lubchenco, J., 2014. Working together: a call for inclusive conservation. Nature 515, 27–28. https://doi.org/10.1038/515027a.
Tasser, E., Tappeiner, U., 2002. Impact of land use change on mountain vegetation. Appl. Veg. Sci. 5, 173–184. https://doi.org/10.1111/j.1654-109X.2002.tb00547.x.
Tasser, E., Walde, J., Tappeiner, U., Teutsch, A., Noggler, W., 2007. Land-use changes and natural reforestation in the Eastern Central Alps. Agric. Ecosyst. Environ. 118, 115–129. https://doi.org/10.1016/j.agee.2006.05.004.

Taylor, B., Chapron, G., Kopnina, H., Orlikowska, E., Gray, J., Piccolo, J.J., 2020. The need for ecocentrism in biodiversity conservation. Conserv. Biol. 34, 1089–1096. https://doi.org/10.1111/cobi.13541.

Valkó, O., Török, P., Matus, G., Tóthmérész, B., 2012. Is regular mowing the most appropriate and cost-effective management maintaining diversity and biomass of target forbs in mountain hay meadows? Flora 207, 303–309. https://doi.org/10.1016/j.flora.2012.02.003.

van Vliet, J., de Groot, H.L.F., Rietveld, P., Verburg, P.H., 2015. Manifestations and underlying drivers of agricultural land use change in Europe. Landsc. Urban Plan. 133, 24–36. https://doi.org/10.1016/j.landurbplan.2014.09.001.

Wang, C., Yu, C., Liu, Y., Wu, X., Wang, K., 2026. Understanding the environmentalist's paradox from the perspective of nature's contribution to people. Environ. Impact Assess. Rev. 121, 108562. https://doi.org/10.1016/j.eiar.2026.108562.

Watts, S., Stenner, P., 2012b. Doing Q Methodological Research: Theory, Method and Interpretation. SAGE Publications Ltd, 1 Oliver's Yard, 55 City Road, London EC1Y 1SP United Kingdom. https://doi.org/10.4135/9781446251911.

Watts, S., Stenner, P., 2005. Doing Q methodology: theory, method and interpretation. Qual. Res. Psychol. 2, 67–91. https://doi.org/10.1191/1478088705qp022oa.

Watts, S., Stenner, P., 2012a. Doing Q Methodological Research: Theory, Method and Interpretation.

Wezel, A., Stöckli, S., Tasser, E., Nitsch, H., Vincent, A., 2021. Good pastures, good meadows: mountain farmers' assessment, perceptions on ecosystem services, and proposals for biodiversity management. Sustainability 13. https://doi.org/10.3390/su13105609.

Willig, C., Stainton-Rogers, W., Stenner, P., Watts, S., 2008. Q methodology. In: The SAGE Handbook of Qualitative Research in Psychology.

Wilson, J.B., Peet, R.K., Dengler, J., Pärtel, M., 2012. Plant species richness: the world records. J. Veg. Sci. 23, 796–802. https://doi.org/10.1111/j.1654-1103.2012.01400.x.

Zabala, A., 2014. qmethod: a package to explore human perspectives using Q methodology. R J. 6. https://doi.org/10.32614/RJ-2014-032.

Zabala, A., Pascual, U., 2016. Bootstrapping Q methodology to improve the understanding of human perspectives. PLoS One 11, e0148087. https://doi.org/10.1371/journal.pone.0148087.

Zabala, A., Sandbrook, C., Mukherjee, N., 2018. When and how to use Q methodology to understand perspectives in conservation research. Conserv. Biol. 32, 1185–1194. https://doi.org/10.1111/cobi.13123.