Ref. Ares(2023)268631 - 13/01/2023

SUPER-G

SUSTAINABLE PERMANENT GRASSLAND

Deliverable 4.3

Citizen priorities and preferences for ecosystem services in relation to permanent grassland

This report only reflects the views of the author(s).
The Commission is not liable for any use that may be made of the information contained therein.
Project funded under the Horizon 2020 Research and Innovation Programme

Dissemination Level

PU	Public	**x**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Contact Details for WP 4

Name of Contact: Professor Lynn J. Frewer

Address: Schoool of Natural and Enviornemntal Sciences, Newcastle University, Newcastle Upon Tyne, NE1 7RU, UK.

Telephone (mobile) : +44 (0) 7553 152743

Author(s): Sophie Tindale, Mercy Ojo, Andy Shan Jin, Victoria Vicaro Modrono, Rosa Gallardo Cobos, Pedro Sanchez Zamora, Erik Hunter, Simona Miskolci, Martijn Sonnovelt, Paul Newell Price, Lynn J. Frewer.

Email:lynn.frewer@newcastle.ac.uk

The SUPER-*G* project (Grant Agreement No.: 774124) has received funding from the European union' Horizon 2020 Research and Innovation Programme. The views and opinions expressed in this report does not represent the official position of the European Commission and is entirely the responsibility of the authors.

Project Number: 774124-2

Project: SUPER-*G* – Developing SUstainable PERmanent Grassland systems and policies

Duration: 5 years

Start date of project: 1st June 2018

Project management: ADAS

Person in charge: Paul Newell Price

Deliverable: 4.2

Due date of deliverable: October 2021

Actual submission date: August 2022

Work package: WP4

Leader: Lynn Frewer

Person in charge: Lynn Frewer

Communication level: PU

Version: 1.1

Partners in the SUPER-*G* project are:

Organisation	Acronym	Country
University of Newcastle upon Tyne	UNEW	UK
RSK ADAS Limited	ADAS	UK
The University Court of The University of Aberdeen	UABDN	UK
Mendelova Univerzita V Brne	MENDU	CZ
Magyar Tudomanyos Akademia Okologiai Kutatokozpont	MTA ÖK	HU
Javna Ustanova Univerzitet Crne Gore Podgorica	UOM	ME
Sveriges lantbruksuniversitet	SLU	SE
Universita Degli Studi Di Torino	UNITO	IT
Stichting Wageningen Research	WR	NL
Eidgenoessische Technische Hochschule Zuerich	ETHZ	CH
Szkola Glowna Gospodarstwa Wiejskiego	UWA	PL
Georg-August-Universitat Gottingenstiftung Offentlichen Rechts	UGOE	DE
Agri-food & Biosciences Institute	AFBI	UK
Consulai, Consultoria Agroindustrial, Lda	CONSULAI	PT
Universidad De Cordoba	UCO	ES
Univerza V Ljubljani	UL	SI
Chambre Regionale D'agriculture De Normandie	CRAN	FR
Association Normande de la ferme expérimentale de La Blanche Maison	LBM	FR
The Northern Ireland Agricultural Research and Development Council	AgriSearch	UK
CRA GRAND EST	CRAGE	FR
Wageningen University	WU	NL
Forschungsinstitut fur Biologischen Lanbau Stiftung	FiBL	CH

Contents

Summary ***10***

Introduction ***12***

Phase 1: Qualitative exploration of citizen priorities and preferences for ES from PG ***13***

1. Introduction ***13***

2. Materials and methods ***15***

2.1. Study locations **15**

2.2. Focus group participants **16**

2.3. Focus group content **17**

2.4. Analysis of focus group content **18**

3. Results ***18***

3.1. Experiences of grasslands landscapes **18**

3.2. Benefits of grasslands (ES priorities) **22**

3.3. Problems and threats to grassland **27**

3.4. Management of grassland **32**

4. Discussion ***34***

4.1. Limitations **40**

4.2. Future research **40**

5. Conclusions ***41***

Phase 2: Quantitative exploration of the drivers of citizen attitudes towards and values associated with PG ***42***

6. Introduction ***42***

6.1. Research aims **42**

7. Methodology ***42***

7.1. Hypotheses and research model **42**

7.2. Sampling procedure and questionnaire development **43**

7.2.1. Participants and sampling procedure 43

7.2.2. Questionnaire development 44

7.2.3. The questionnaire 44

7.2. Analysis **49**

7.2.1. Descriptive Statistics 49

7.2.2. Principal Component Analysis (PCA) 49

7.2.3. Structural Equation Modelling (SEM) 49

7.3. Hypotheses testing **50**

8. Results ____ *51*
8.1. Basic Characteristics of sample population ____ 51
8.2. Measuring citizen's attitudes towards grasslands and meadows ____ 53
8.3. Measuring consumer's behavioural intention to buy sustainable PG products ____ 54
8.4. Citizen and consumer attitudes ____ 56
8.4.1. Factor analysis by Sub-scales- PCA results ____ 56
8.4.2. MANOVA (Multi Analysis of Variance) by Subscales ____ 58
8.4.2. Exploring the interactions between socio-economic variables ____ 70
8.4.3. Estimation of the structural Equation Modelling ____ 72
9. Discussion ____ *76*
9.1. Research limitations ____ 79
References ____ *80*
Appendix (Phase 1) ____ *93*
Appendix A ____ 93
Appendix B. ____ 93
Appendix (Phase 2) ____ *95*

Tables

Table 1. Focus group (FG) participants _____ 17
Table 2. Themes associated with experiences and descriptions of grassland, with example quotes from participants. (Participant references include an identifying number, country, and focus group type.) _____ 18
Table 3. Summary of perceptions relating to experiences of grassland landscapes in the five case study countries. _____ 22
Table 4. Ecosystem services and benefits of grassland mentioned by participants, with example quotes. _____ 25
Table 5. Problems with grassland identified by citizens, with example quotes. _____ 31
Table 6. Mechanisms perceived to improve grassland, with example quotes. _____ 32
Table 7. Survey question topics and associated constructs, together with their justification for inclusion and derivation. _____ 44
Table 8. Age demographics of the total number of participants in each country _____ 51
Table 9. Characteristics of participants by country, gender, where they live most of the time and educational levels. _____ 51
Table 10. Participants current employment situations, main reasons for visiting the countryside and the activities that best describes how they spend their time in the countryside (percentages) ____ 52
Table 11. Attitudes of citizens towards grasslands and meadows in the five EU Countries (mean values and standard errors in parenthesis) _____ 53
Table 12. Statements regarding Intention to visit meadows and grasslands (mean values and standard errors in parenthesis). _____ 53
Table 13. Statements regarding behavioural intention to buy products from sustainable PG (mean values and standard errors in parentheses). _____ 54
Table 14. Responses to benefits of maintaining PG and perceived risk of losing it (mean values and standard errors in parenthesis) _____ 55
Table 15. Behavioural intentions in both “citizen” and “consumer” models (mean values and standard errors in parenthesis)) _____ 56
Table 16. Item descriptions for citizen model. _____ 57
Table 17. Item description for consumer model. _____ 57
Table 18. MANOVA- Differences in Perceived Risk items (PR1, PR2, PR3, PR4) (Multivariate tests) of demographic groups _____ 58
Table 19. ANOVA- Differences in Perceived Risks levels based on Socio economic variables _____ 59
Table 20. MANOVA- Differences in Perceived Benefits (Multivariate tests) _____ 59
Table 21. ANOVA- Differences in demographics based on their (p-values) significance levels - ____ 59
Table 22. MANOVA- Differences in Attitudes to PG and Attitudes towards the management of the countryside (Multivariate tests) _____ 60
Table 23. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 60
Table 24. MANOVA- Differences in Trust (Multivariate tests) _____ 60
Table 25. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 61
Table 26. MANOVA- Differences in AES (Multivariate tests) _____ 61
Table 27. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects). _____ 61
Table 28. MANOVA- Differences in Behavioural Intentions (BI) linked to PG (Multivariate tests) __ 61

Table 29. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 62
Table 30. MANOVA- Differences in EIA (Multivariate tests)_____ 62
Table 31. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 62
Table 32. MANOVA- Differences in Local Place Identity, Productivist Attitude, Preference for labels (Multivariate tests) _____ 63
Table 33. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 63
Table 34. MANOVA- Differences in Behavioural intentions linked to consumer attitudes (Multivariate tests) _____ 63
Table 35. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 64
Table 36. MANOVA- Differences in Shopping habits meat (Multivariate tests)_____ 64
Table 37. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 64
Table 38. MANOVA- Differences in Shopping habits dairy (Multivariate tests)_____ 64
Table 39. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects) _____ 65
Table 40. Post hoc tests using Games Howell test- ANOVA table exploring between-group test of the five EU countries by subscales _____ 65
Table 41. Exploring actual mean differences (with actual mean values recorded) using post hoc test for five EU countries by subscales. _____ 67
Table 42. Countries versus other socio-economic variables _____ 70
Table 43. Countries versus Age of participants _____ 71
Table 44. Where participants live versus gender and educational levels_____ 71
Table 45. Where participants live versus Five EU countries_____ 71
Table 46. Standardised root mean square residual (SRMR) of the model across all countries _____ 72
Table 47. Partial Least Square Structural Equation Modelling - UK _____ 73
Table 48. Partial Least Square Structural Equation Modelling – Czech Republic _____ 73
Table 49. Partial Least Square Structural Equation Modelling - Switzerland _____ 74
Table 50. Partial Least Square Structural Equation Modelling - Sweden _____ 75
Table 51. Partial Least Square Structural Equation Modelling - Spain _____ 75

Figures

Figure 1. Map of biogeographical regions (BGRs) of Europe included in the study and case study regions_____ 16
Figure 2. Benefits of grassland as stated by participants (of all focus groups) interpreted though the ES framework (size of box equivalent to relative number of coded references within focus group transcripts (n) – size not exactly proportional). Black arrows refer to connections and logic described by participants. _____ 24
Figure 3. Perceived problems and threats to grassland landscapes, including links to drivers and to ecosystem services lost. Arrows represent logic described by participants. Presence of theme by country is indicated with country codes in brackets (CH= Switzerland, SP=Spain, UK=UK, CZ= Czech Republic, SE=Sweden). _____ 27
Figure 4. Approaches and techniques for improving grassland landscapes described by participants, ordered by relative number of times each theme was 'mentioned' (representing instances where phrases stated by participants were coded to the relevant theme (n)) in each focus group. _____ 32
Figure 5. Conceptual model and hypotheses testing. (A) drivers of citizen attitudes to PG (B) drivers of consumer attitudes to PG (Source: own elaboration) _____ 43
Figure 6. Percentage of participants who responded to how often they spend time in the countryside. _____ 52

Summary

European permanent grasslands (PG) are multifunctional landscapes that deliver an important mix of ecosystem services (ES). The effectiveness of future policies linked to landscape and agricultural practices requires consideration of citizen perceptions of, and priorities for, benefits (e.g. ecosystem services) demanded from PG. This research aimed to expand understanding of citizens' socio-cultural valuation of grassland landscapes, ecosystem service provision and management across Europe.

In the qualitative phase of the research, (conducted in 2020), three focus groups with residents of rural areas, urban areas, and young adults from rural areas (aged 18-26) (N=104), were run across five European countries (Spain, Sweden, UK, Switzerland and the Czech Republic). Overall, participants perceived grassland landscapes positively, describing connection through experience, emotions, environmental characteristics, activity, access, and cultural identity. Prioritisation of ecosystem services from grassland varied between countries, influenced by grassland system diversity and complex socio-cultural and socio-economic differences. Rural dwellers perceived more benefits from grasslands than urban dwellers. Perceptions of problems related to reduction, degradation and abandonment of grassland, and varied between the urban and rural groups. Consumer education about the value of grasslands was perceived as important in ensuring sustainable management and use of these landscapes. Citizens across different countries shared farming ideals relating to farming for biodiversity. These findings can provide evidence that policies surrounding landscape and agricultural practices align with societal perspectives and priorities, and can effectively deliver multifunctional, valued, sustainable grassland systems. It should be noted that the data for these focus groups were collected when some countries were in lock down or were experiencing travel restrictions related to the Covid 19 pandemic. All focus groups were conducted virtually. However, the authors do not consider that these restrictions influenced the result of the qualitative analysis, other than potentially increasing the perceived value of outdoor spaces.

In the quantitative phase of the research, a total of 3184 participants from five EU countries (UK, Czech Republic, Switzerland, Sweden and Spain) were quota sampled based on age, gender, socio-economic class. Participants were nationally representative of the population for each country, with approximately 620 citizens surveyed via a 30-minute, self-directed online questionnaire which was administered through a social research agency. Approximately half of respondents were rural, and half urban residents to enable comparisons between these groups. Data were collected in November 2021. The closed ended questions, which were 224 items consist of some demographic characteristics and some sets of 5-point Likert scale items. After the questionnaire had been designed, it was pre-tested in the form of a pilot survey to determine the length of time needed to complete it and to assess both the comprehension and wordings of the questions. Thus, to ensure the consistency in the measurements of constructs, the questionnaire was translated and back translated into the local languages of each country involved in the research. With the exception of items designed to assess affective responses the questionnaire included five-point Likert scales (1 = "strongly disagree" to 5 = "strongly agree"), which were used to measure: a) threats or risks to the countryside, b) personal benefits from the countryside, c) social trust, d) management of the environment, e) attitude to the environment (using the Environmental Attitude Inventory (EIA)) and f) consumer attitudes towards PG products. Likert scales were used to explore g) attitudes towards ES, and the overall behavioural intention of consumers to h) intention to buy products from PG and i) intention to spend time in grasslands and meadows. These were followed by questions relating to demographic characteristics. Two models were proposed, namely the "citizen" model, which was aimed at understanding citizen attitudes towards PG, and the "consumer" model which focused on consumer intentions to consume

the products of PG. Multivariate analysis (MANOVA) and Structural Equation Modelling (SEM) were applied to assess demographic differences and the predictive capacity of the constructs used in the model. The analysis suggests a good fit for the proposed citizen attitudes and consumer model. The primary purpose for citizens to visit PG landscapes was reported to be leisure activities, reflecting interest in cultural ES. The aesthetics of landscape were, however, more highly rated in the UK than in the other countries. In all countries, respondents indicated that PG "were easy to visit", although there is no data available to compare this to ease of visiting other rural landscapes (for example, mountains, forests, or coastal areas) and further research might assess this in association with perceptions of, and attitudes towards, other ES which alternative landscapes deliver. Most respondents reported appreciating the visual and aesthetic value of the countryside (e.g. in relation to trees and open landscape) although this appreciation may extend to the impacts other farming practices have on the landscape. Perceived threats to PG across all countries included the "bad behaviour of visitors", misuse of inputs such as pesticides, and farm succession. A question arises as to whether there is a tension arising between increased visitor numbers and the negative impacts on the countryside, including PG, which is attracting the visitors and driving efforts to conserve different categories of ES (e.g. "biodiversity" tourism). One issue is that the countryside is becoming increasingly valued in terms of cultural ES that it can deliver, which may be a policy "driver" over and above productivist (or "food production") policy drivers for some members of the public.

Despite evidence of consumer interest in sustainably produced foods, increased sustainability did not emerge as an important driver of consumer food purchases and choices in Spain and Sweden, although this is not the case for the other countries included in the research. A second issue is that various consumer trends (such as increased veganism, vegetarianism and "flexitarianism"), and research funding and policy changes that promote innovations focused on alternative animal proteins, (cultured meat, insect proteins, plant-based proteins) need to be accounted for when predicting future changes in PG-based agri-food systems in Europe and beyond.

It was concluded that the preservation of existing PG systems may be primarily dependent on policies that acknowledge the public's preference for the cultural ES that PG environments provide. This may change as there is increased awareness of the importance of biodiversity and ecosystems provided by PG. It should be noted that there may be competing societal priorities for land use which also deliver cultural, regulatory and provisioning ES, such as agroforestry, reafforestation and "rewilding". This prioritisation merits future research to enable comparisons across different landscapes and agricultural *systems* to occur. Specifically, future research should consider consumer demand for food, and citizen prioritisation of different ES, when considering PG as part of a broader system delivering multiple ES across landscapes that benefit society and the environment.

Key words: *Permanent grassland (PG), rural landscape, citizen perception; attitudes, consume perception, food; ecosystem services, socio-cultural values.*

Introduction

This report details the findings of task 4.3 (citizen priorities and preferences) of the Horizon 2020 SUPER-*G* project. The SUPER-*G* project investigates the maintenance and sustainable management of PG, and sets out to (i) increase understanding of the importance and functioning of permanent grassland (PG); (ii) benchmark PG performance across Europe; (iii) develop integrated approaches for sustainable PG management; and (iv) develop tools and policy mechanisms inclusive of stakeholder and citizen priorities.

The objective of this part of the SUPER-*G* project was aimed to explore citizen priorities and preferences for ecosystems services (ES) in relation to PG. The research was divided into two phases:

- *Phase 1*: Qualitative phase exploring issues relevant to societal preferences for ES from grassland using focus groups with urban and rural citizens.
- *Phase 2*: Quantitative phase building on the findings of phase 1, using a nationally representative survey, to understand the drivers of citizen attitudes towards, and values associated with PG, as well as their preferences for policies associated with the preservation and management of PG.

This report presents the results of the qualitative phase (the focus group research), how this initial phase informed the development of the quantitative phase, together with the main findings of the quantitative phase. The key results are presented, together with a discussion and conclusion of each phase, and the implications for policy.

Phase 1: Qualitative exploration of citizen priorities and preferences for ES from PG

1. Introduction

Grassland ecosystems are an important land use internationally, covering a third of the global land surface (Bengtsson et al., 2019; Egoh et al., 2016; Lemaire et al., 2011). In Europe, permanent grasslands (PG) cover approximately 40% of the total agricultural area (Faostat, 2020), and are defined as land used for five or more consecutive years to grow grass or herbaceous fodder, forage or energy purpose crops (EuroStat, 2019). PG are considered as multi-functional landscapes and deliver multiple ecosystem services (ES) including provisioning services (e.g. fodder production, human food production), regulating and maintenance services (e.g., habitat provision, erosion control, water flow regulation, carbon storage, maintenance of soil fertility), and cultural services (e.g., recreation, education, aesthetic value) (Bengtsson et al., 2019; Egoh et al., 2016). Recent research has focused on the supply of ES on permanent grasslands (Crouzat et al., 2015; Schirpke et al., 2016). However, the demand for the benefits provided from grasslands in relation to the socio-cultural valuation of ES has been understudied (Martín-López et al., 2019; Zhao et al., 2020). It is important to consider public perspectives about, and preferences for, ES delivered by landscapes if agri-environmental policy is to be societally acceptable (Seppelt et al., 2011). Previous polices relevant for grassland management have not fully considered demand for ES (Hunter *et al.,* 2019). If more holistic landscape policies are to be implemented across Europe, there needs to be a more coherent and transparent process that allows citizens' interests to be reflected in policy making (Bas-Defossez et al., 2018).

Citizens' perspectives on ES, and attitudes towards grassland in Europe, have been studied in the context of wider landscapes that include grassland elements (Konkoly-Gyuró, 2018; Pătru-Stupariu et al., 2016; Sottini et al., 2018; van Berkel and Verburg, 2014; Zoderer et al., 2016). Many studies have focused on mountain regions (Jaligot et al., 2019; Schmitt et al., 2021; Zoderer et al., 2019), or marginal or protected landscapes (Bernués et al., 2016; Kovács et al., 2015). Research has also focused on cultural ES delivery including recreation, landscape aesthetics and tourism (Howley, 2011; Howley et al., 2012; Junge et al., 2011; Junge et al., 2015; López-Santiago et al., 2014; Schirpke et al., 2016). Research has considered the quantitative, monetarised valuation of ES, including economic valuation (Richter et al., 2021), as well as willingness to pay (Bernués et al., 2014; Bernués et al., 2016; Oteros-Rozas et al., 2014; Rodríguez-Ortega et al., 2016; Scholte et al., 2015; Villamor et al., 2014). Qualitative approaches to understanding socio-cultural valuation of grassland are less frequent (Fagerholm, 2016), and are usually included in mixed methods approaches (Bernués et al., 2014; Oteros-Rozas et al., 2014). Socio-cultural perspectives can acknowledge the pluralistic values that people hold towards ES (Scholte et al., 2015; Wegner and Pascual, 2011). Value pluralism recognises that different and potentially conflicting values are associated with each-other in potentially complex ways and are non-reducible to each other (Arias-Arévalo et al., 2018; Arias-Arévalo et al., 2017; Gómez-Baggethun and Martín-López, 2015; Jacobs et al., 2016; Kenter, 2016; Pascual et al., 2017). Pluralistic approaches recognise that values go beyond the intrinsic-instrumental dichotomy that has often dominated management approaches, to acknowledge the importance of relational values (as defined by Chan et al. (2016:1462) as "preferences, principles, and virtues associated with relationships, both interpersonal and as articulated by policies and social norms"). A pluralistic understanding of values is growing in scholarship (e.g. Arias-Arévalo et al., 2018; Chan et al., 2016; Jacobs et al., 2016; Jones et al., 2016; Kenter, 2016; Pascual et al., 2017) and is a critical research priority toward the sustainable management of ecosystems (Arias-Arévalo et al., 2017; IPBES, 2022). A pluralistic approach is called for in order to explore in more detail the complex relationships between ecosystem function, management, governance, human wellbeing and quality of life, as well as exploring the drivers of problems associated with these (Martin-Lopez et al., 2019).

Many studies of perceptions of grassland landscapes contrast citizen perspectives with those held by other stakeholders, including farmers (Bernués et al., 2014; Bernués et al., 2016; Lamarque et al., 2011; López-Santiago et al., 2014; Schmitt et al., 2021), highlighting many potential conflicts in relation to prioritisation, and financial incentivisation of the production of certain ES through policy drivers. Socio-cultural approaches using qualitative methods to explore citizen perspectives have often focused on Alpine regions, e.g. Quétier et al. (2009) explored local descriptions of a mountain grassland area in the central French Alps in relation to socio-political discourses. Pachoud et al. (2020) assessed the perceptions of local stakeholders and tourists regarding summer farms (temporary units, where cattle are moved during summer to graze on Alpine pastures) in the Italian Alps. Research in other regions have focused on public perceptions of agricultural systems including grassland (e.g. agroforestry systems in the Spanish dehesa grassland (the dehesa is a multifunctional, agrosylvopastoral system and cultural landscape of southern and central Spain (Gaspar et al., 2016)). Schmitt et al. (2022) focused on plural valuation of grassland areas in Bavaria, Germany, using qualitative and quantitative methods to consider the spatial distribution of intrinsic, instrumental and relational values of grassland. They highlighted the significance of trade-offs between instrumentally valued grassland suitable for provisioning services, and intrinsically valued grasslands that are closely associated with relational values of care, as well as identifying synergies between different value judgements. The results have consequences for informing practical insights for prioritization of certain grassland management practices. Schmitt et al. (2022) demonstrated the importance of pluralistic valuation approaches to provide vital information for land use prioritisation and management advice.

Multiple factors have been found to affect people's perception of ES in grassland landscapes, including age, gender and education, as well as rural/ urban residency (Martín-López et al., 2012; Orenstein and Groner, 2014), and environmental interest (Schmitt et al., 2021). Social preferences for specific ES and ES bundles have been shown to vary across rural-urban gradients due to a complex set of factors including cultural traditions, individual needs, access to ES, and sources of household income (Martín-López et al., 2012). Such factors underpin different worldviews and different connections to ecosystem services. Rural populations have been shown to perceive more diversified ES, due to a closer connection to their own wellbeing, and urban populations less perception of ES essential to life due to a disconnection between human well-being and life-supporting environments, perceiving more value in ES associated with external factors such as recreation and aesthetics (Martin-Lopez et al., 2012). Recent research has found that hotspots of multifunctionality in peri-urban grassland landscapes occur where rural/ urban preferences overlap (Filyushkina et al., 2022). It is therefore important to understand the differences and similarities in urban/ rural perceptions of ES associated with grassland to better align policy and management efforts for landscape governance that can deliver multiple benefits.

Age has been shown to affect preferences for ES associated with lifestyle and education (e.g. Schirpke et al., 2016). Young rural residents are a stakeholder group key to the preservation of sustainable rural areas (Council of Europe, 2022), but can be vulnerable to poverty and/or disadvantage (European Commission, 2008). Aging populations (UNECE, 2017) and a structural decline in employment in agricultural industries in many areas of Europe lead to higher rates of out-migration of young people from rural areas, which has become a concern in relation to maintaining economic growth and equality of opportunity in rural areas as well as cultural ES (Augère-Granier, 2017; Pellaton et al., 2022). Recent policy within the EU (European Union Youth Strategy - 2019-2027), has emphasised the importance of youth engagement in the development of rural areas and the interconnected wellbeing of urban and rural people (European Union, 2022). The perceptions of rural youth are important to explore in light of goals focused on the sustainability of rural areas, and the need to engage rural youth in developing sustainable grassland systems and policies. Studying the perceptions of citizens in rural and urban areas as well as younger rural residents gives important insights into the variety of understanding and interpretations of the impacts of land management and governance, as well as the

level of social acceptability of environmental policy and decision-making across different contexts (Bennett, 2016).

This study aims to expand understanding of the perspectives of citizens about grassland landscapes, ES provision and management across Europe, between urban, rural, and rural youth populations, using a qualitative approach.

2. Materials and methods

2.1. Study locations

The research took place in five case study countries: Spain, UK, Sweden, Switzerland and Czech Republic, representing five biogeographic regions in Europe (Figure 1). Case study areas represented regions within each country containing a mix of grassland landscapes and incorporating urban centres. This regional scale was chosen in order that participants had a shared geographical frame of reference, and to enable comparison of the perceptions of rural and urban dwellers. The case study areas (see figure 1) are characterised as follows:

- The Spanish case study area, dehesa, is considered as a forest transformed into a land-use and management system based on the exploitation, mainly for livestock and also forestry, hunting and agriculture, of an area of grassland and Mediterranean scrub with scattered presence of trees.
- The UK study region spans several counties in northern England and is characterised by grazing livestock and mixed farming systems in lowland and upland areas, and some arable systems on the eastern plain. Livestock grazing farms in lowland areas are typified by improved and semi-improved grasslands, while upland areas, including the Lake District and North Pennines, have extensive areas of moorland used for rough grazing and some limited areas of species-rich grassland.
- The Swedish case study covers three boreal regions including the Boreal-Nemoral in the south dominated by arable farms, and the southern Boreal region and Boreal region where the majority of frequently renewed permanent grasslands are situated and boreal forests fill the landscape in relatively sparsely populated areas—most often adjacent to farms and close to the (west) coast (see Hunter et al., 2020).
- The Czech study region is botanically rich and diverse. It covered a wide variety of biotopes and species (such as herb-rich meadows of the White Carpathians or undulating cultivated steppe of the Bohemian-Moravian Highlands) with low hills and valleys and a wealth of woods and groves. The original virgin forest was transformed into cultural landscapes with the co-existence of nature protection interests and economic land use.
- The Swiss case study region, the Swiss Plateau, occupies about 30% of the national area. It is one of the three mountainous regions of Switzerland, along with the Jura and the Alps. It comprises the partly flat but largely hilly area between the Jura and the Alps and lies on average at an altitude of 400 to 600 m above sea level. Favoured by its basin location, it is by far the most densely populated region in the country. Grasslands in the area include extensive pasture/meadow, intensive pasture/meadow (grazed by animals) and intensive/extensive grassland (cut and not grazed by animals).

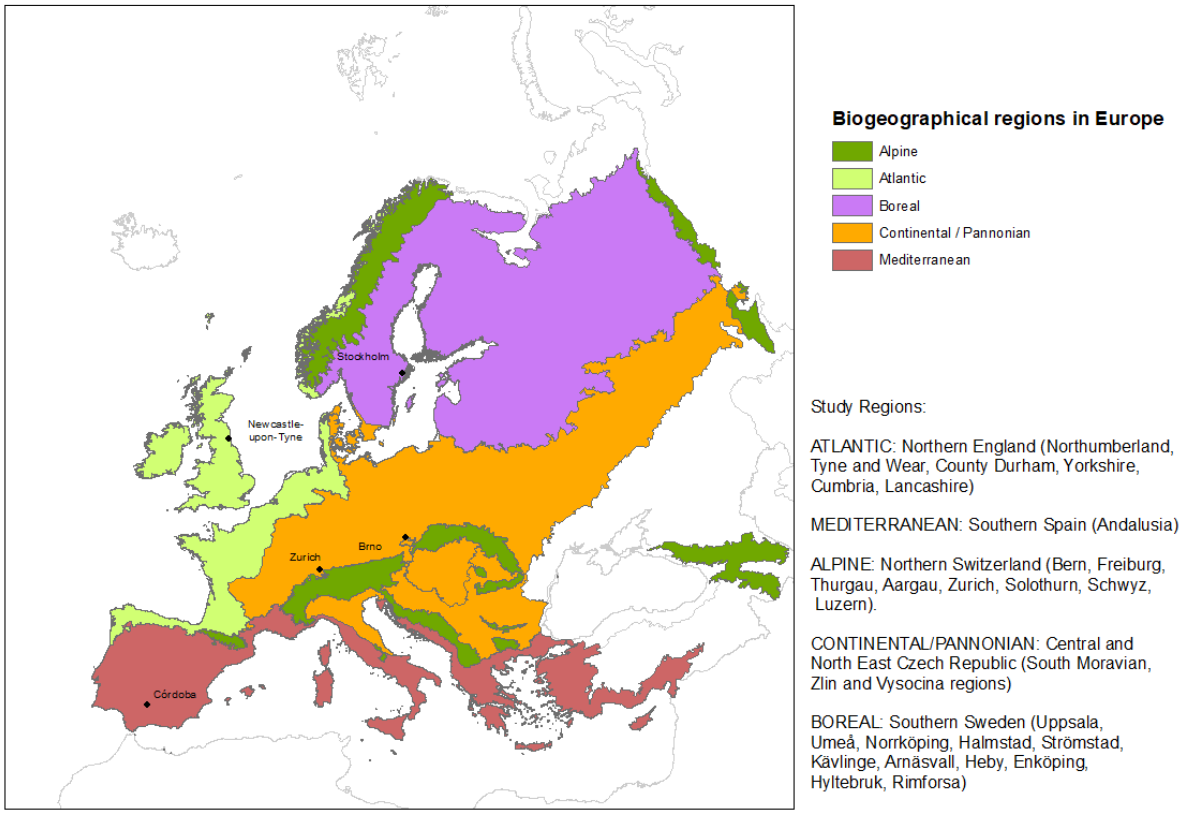


Figure 1. Map of biogeographical regions (BGRs) of Europe included in the study and case study regions

2.2. Focus group participants

Fifteen focus groups with citizens were conducted across five countries. The focus groups aimed to explore the variety of perceptions, opinions and attitudes of a purposive sample of citizens, highlighting contrasting views (Yin, 2009), as well as examining the joint construction of meaning (Bryman, 2016). Three focus groups were held in each country with residents of rural areas, residents of urban areas, and young adults from rural areas, aged between 18-26. These groups were chosen to contrast the views of people who may differ in their knowledge and experience of grasslands, potentially contrasting everyday experiences of living and working in the countryside (more likely linked to rural dwelling), with visiting for specific purposes (more likely linked to urban dwelling). Younger rural residents were a focus due to their importance for rural sustainability, and the risks associated with out-migration from rural areas (UNECE, 2017). The 18-26 participants in the mixed rural groups were evaluated as part of a mixed-age perspective due to the small numbers and collective influence of discussion in mixed groups.

A variety of recruitment strategies were employed, including using an external recruitment company for rural and urban residents (UK, Switzerland), and a combination of social media, email, and word of mouth (Sweden, Czech Republic and Spain). The focus groups contained a mix of gender, age and educational level. Sessions lasted between 1-2 hours and were conducted between June 2020 and January 2021. The focus groups were conducted online using video conferencing tools due to COVID-19-related restrictions on travel and face-to-face meetings in all case study countries at the time of data collection. This enabled participation from across a wider geographical region, and the utilisation of additional online functionality to aid facilitation of discussion. Each focus group was conducted in the language native to the location, recorded, transcribed and subsequently translated into English in order to enable standardised analysis. A total of 104 participants took part in focus groups (Table 1).

Table 1. Focus group (FG) participants

	Urban FGs	**Rural FGs**	**Rural youth FGs**	***Total***
Participants (n)	35	34	35	*104*
Female (n)	20	17	19	*56*
Male (n)	15	17	16	*48*
Age range	19-69+	21-70+	18-26	*18-70+*
18-25	5	4	34	*42*
26-34	6	6	1	*13*
35-44	7	7	0	*13*
45-54	10	6	0	*16*
55-64	5	8	0	*13*
65-74	2	3	0	*5*
Highest educational level				
Primary	0	1	1	2
Upper secondary	3	8	8	19
Tertiary undergraduate	13	12	6	31
Tertiary postgraduate	8	1	9	18

2.3. Focus group content

Focus group protocols and prompts (translated and back translated) were used to guide discussion around the values, opinions, and preferences of participants, covering topics such as: visits to the countryside and activities undertaken when visiting; likes and dislikes associated with grassland landscapes: benefits of grasslands; perceptions of problems in the countryside; perceptions of management approaches and opinions about who has responsibility for grassland landscapes; as well as views on food labels from sustainably farmed products from grassland (Table A.1). Each focus group used the same protocol, but facilitators allowed participants to lead the order and focus of the session.

Initially, participants were asked to talk about their experiences of visiting the "countryside". Subsequently the facilitators introduced discussion on grassland landscapes, using a short description and photographs of different types of grassland relevant to each country (see supplementary material 1). These images depicted examples of grassland in different farming systems to prompt memories, feelings, emotions and opinions about all types of "grassland". As focus groups were conducted in local languages, different terms were used to refer to grassland within the local context. All countries also used terms referring to grassland in general, as participants were unlikely to be able to easily distinguish PG from other types of grassland, including temporary grassland. Whilst most questions focused on perceptions of grassland, participants also answered with reference to the wider landscape or countryside.

During discussions about the benefits of grasslands, participants were first asked an open question about benefits provided by grasslands, where they provided answers without prompting. Subsequently, an image was shared depicting simple symbols representing a variety of different ES delivered by grassland (including provisioning, regulating, supporting and cultural). For practical reasons, only the term 'benefits' was used with participants to avoid confusion, as the term 'ecosystem services' is not often familiar to those outside of academia.

2.4. Analysis of focus group content

The translated transcripts were uploaded into qualitative data analysis software, NVivo 12 Pro (QSR International Pty Ltd, 2018) and coded thematically based on the key topics covered in the focus groups. Open coding of each transcript was applied to identify cross-cutting themes (Flick, 1998.; Strauss, 1987.). Coding was completed when no new themes emerged (Esterberg, 2002). Benefits and problems with grassland landscapes were interpreted using an ecosystem services typology (adapted from the Common International Classification of Ecosystem Services (CICES, 2021)). Not all statements made by the participants could be directly classified within this ES typology, as participants often described features that underpin multiple ES (e.g. biodiversity, which plays a variable role in the provision of ES (Mace et al., 2012; TEEB, 2011)). Classifications were made based on the key functions of grassland and link to grassland features as mentioned by the participants. The concept of ES disservices (defined as "the ecosystem generated functions, processes and attributes that result in perceived or actual negative impacts on human wellbeing"(Shackleton et al., 2016: 590) was used to capture the adverse impacts of loss or change to grasslands as described by participants. The concept of ES disservices is not included in current ES classifications such as CICES (Haines-Young and Potschin, 2018), but recent studies have called for the need for ecosystem disservices and ES to be considered equally to improve understanding of people's views and actions in relation to ecosystems (Blanco et al., 2019a; Guo et al., 2022). Therefore, this study used an adapted approach to ES classification in order to incorporate disservices. The relative importance of themes was analysed based on the proportional number of phrases coded to each theme. Ten percent of the sample coded was cross checked by an additional coder to ensure consistency.

3. Results

3.1. Experiences of grasslands landscapes

When describing and discussing grassland landscapes, focus group participants discussed six key themes (Table 2), which represented elements of grassland perceived as relevant or significant for participants, and those which participants preferred or liked. The landscape qualities of grassland were often framed positively, and participants referred to extrinsic qualities including visual elements such as meadow flowers, views, colours and lack of buildings and people. Participants also referred to positive experiential qualities including openness, space, fresh air, wilderness, (pleasant) smells, biodiversity, beauty and aesthetics. Participants' showed preferences for intrinsic qualities of grassland landscapes, such as nature or natural aspects; a living landscape. They saw grassland as multifunctional; balanced; and part of an ecosystem. Grasslands themselves were also seen as offering balance in the landscape, and many participants shared a preference for a diverse, balanced and heterogeneous landscape in general. The diversity of grassland types was valued.

Table 2. Themes associated with experiences and descriptions of grassland, with example quotes from participants. (Participant references include an identifying number, country, and focus group type.)

Theme	*Topic*	*Example quote(s)*
Landscape quality	*Extrinsic qualities (e.g. varied, diversity, biodiversity, meadow flowers, beauty, fresh air)*	➢ *"[In grassland] I can actually enjoy those scents and I like meadow flowers, and I like to observe the life around me, moreover it's passable (accessible) and the views are better." (W7, Czech Republic, Urban)*
	Intrinsic qualities (e.g. natural, nature, balance)	➢ *"I love going to the countryside and visiting, above all, landscapes such as the dehesa, where you can see the breadth and balance of nature, animals, plants, and all the members of this ecosystem." (F1, Spain, Urban)*
Emotions, feelings and memories	*Positive feelings (e.g. relaxation, happiness, calm, freedom)*	➢ *"In spring, a diverse blooming meadow is a feeling of freedom for me." (F1, Switzerland, Rural Youth)*
	Home	➢ *"So for me, the meadow means home, because there were meadows around us, around my house, there are rarely forests in Pálava, […] I appreciate [meadows] more in the landscape, which is flatter, clearer,…. […] I like it very much." (W3, Czech Republic, Urban)*
	Sadness at loss of grassland	➢ *"The 5th [photograph] already, for me, is the biggest sorrow because those trees that you see there, are the ones that [show] that in their time that was a dehesa. It's a shame, but well, in those times there [was a need] to make farmland, which led to this disappearance. The truth is that it makes me sad." (M1, Spain, Rural)*
Cultural connection	*Rural past and heritage*	➢ *"I really like to walk or go hiking and I really like it when some cows, sheep graze in those meadows or pastures, it evokes the feeling of such a typical Czech landscape." (W5, Czech Rep, Urban)* ➢ *"I believe that in Spain and Andalusia [the dehesa] forms part of our natural heritage." (M4, Spain, Urban)*
	Love for landscape	➢ *"Truth is that I have been in love with the dehesa since I was a child" (F3, Spain, Rural)*
Livestock, animals and wildlife	*Presence of livestock*	➢ *"I love animals grazing. The most natural thing for animals is to be outside as much as possible. I like pastures." (P4, Sweden, Rural)* ➢ *"When you go to the dehesa, in a search of landscape, you go in search of animals; and it is one of the main attractions of the dehesa landscape. And then, in terms of the management and stability of the "dehesa" as a system" (M3, Spain, Rural Youth)*
	Connection to animals	➢ *"Meadows are also extremely important to create a connection between people and grazing animals. Without grasslands, there would be no cows in the meadows, and then most people would never see a cow, and I think just for the awareness of where our meat or milk comes from, it's very important that there's an encounter there with people, and not just between producers and animals. That everyone has the opportunity to walk up to a cow." (F4, Switzerland, Rural Youth)*
	Negative associations	➢ *"I will certainly be avoiding the livestock anyway. [I] wouldn't want to trespass and wouldn't want to get too close to them anyway." (F3, UK, Rural)*
Farming and agriculture	*Agricultural grassland*	➢ *"I prefer high grasslands in the mountains over the artificial meadows in the midlands, it's not really nature, it's more agriculture." (M1, Switzerland, Rural youth)*
	Productivity	➢ *"[I prefer] whichever of the pictures [of grassland] reflect a living countryside, both animal production and harvest" (P5, Sweden, Rural Youth)* ➢ *"I grew up in the countryside as well. Like most of the others, I enjoy the farming aspect of [grassland], and livestock in particular." (M2, UK, Rural Youth)*

Theme	*Topic*	*Example quote(s)*
Comparisons with other land areas	*Comparison to forests*	➢ *"We prefer to visit the forest, that is actually number one" (P2, Sweden, Urban)* ➢ *"The landscape I like is a type a bit close to the mountains; colder than elsewhere in the country, fewer fields, more forests.[…] I like that (apart from some complete extremes) you can escape into it in the heat and calm down, disappear into the forests" (M6, Czech Rep, Rural Youth)*
	Comparison to mountains	➢ *"The way [grassland] is in the mountains, I personally like best. What I like less is the way the grass is kept here in the lowlands, everything is green, lots of clover, almost no biodiversity in the meadows. This is much too useful and not beautiful enough." (F1, Switzerland, Rural)*
	Accessibility compared to other areas	➢ *"Thinking of accessibility, then I prefer meadows because croplands and cultivated land is probably off limit." (P3, Sweden, Urban)* ➢ *"The Lower Engadin is the most beautiful place for me, where you can move freely and walk a little on the meadow without getting into conflict" (M2, Switzerland, Rural)* ➢ *"It wouldn't matter so much to me if it was a field, or it was a forest. As long as it's still usable for the general public to walk through. Or, explore." (F2, UK, Urban)*

Predominantly positive emotions and feeling were expressed in association with spending time in grasslands, including: “peace”, “calm”, “happiness”, “escape”, “pleasantness”, “safety”, “freedom” and “relaxation”. Negative emotions were associated with the loss or degradation of the landscape. Participants expressed preferences for particular landscape types related to familiarity from childhood or a place where they “grew up”. A number of participants expressed a cultural connection to grassland landscapes through links to national identity and typical national landscapes, or to a rural past and heritage. Some participants used emotive language around love and pride for the landscape, linked to the cultural value of the landscape, particularly in reference to specific types of grassland (e.g. the silvopastoral system in Southern Spain - dehesa).

Participants mentioned the presence of livestock as a significant defining characteristic of grasslands. Some participants had positive feelings associated with seeing and being close to livestock, and grassland as a home for livestock. Although there were more positive comments associated with livestock than negative, some participants expressed fears in relation to getting close to livestock. Some participants mentioned the importance of the presence of livestock for creating a feeling of completeness or true identity in the landscape. The visibility of livestock to wider society was seen to help increase social connection to food production. Some participants described enjoyment when experiencing the presence of wildlife, including insects such as bees and butterflies, as well as birds in grassland environments.

Associations between farming, agriculture and production and grassland depended on the type of grassland and perspective of each individual and country. In some countries participants associated mountain grassland with “natural” grassland, in contrast to more agricultural grassland, which was associated with lowland areas. Mountain grassland was often preferred for its beauty and diversity. However, some participants valued the agricultural systems that produce grassland landscapes, whilst recognising their semi-natural characteristics. Productivity of grassland was also mentioned as an important value.

In areas where forests are a prevalent land use (Sweden and the Czech Republic) some participants showed a preference for spending time in forests. For example, in the Czech Republic this preference for forests was linked to childhood memories of “deep forests” (M6) in mountainous areas, in contrast to a lack of forests in more intensive agricultural areas (e.g. South Moravia). Forests were also linked to recreation and leisure in Czech Republic as activities are possible in every season (meadows and pastures become “inaccessible” in summer due to tall grass, grazing animals). Others stated that they preferred to visit the mountains, for the views, adventure or wilderness (e.g. in Switzerland). In some cases, participants expressed indifference as to whether land should be used for grassland or forest, and primarily valued the ability to access the land for general benefits from the countryside (e.g. in UK). Ease of access of grasslands was valued by a number of participants, particularly in comparison to croplands or (other) agricultural land.

The impression and identity of grassland landscapes varied across the five nations represented in this study (Table 3). These differences reflect the distinct cultures shaping grassland landscapes and their use and value in each country.

Table 3. Summary of perceptions relating to experiences of grassland landscapes in the five case study countries.

Country	Summary of perceptions of grassland landscapes
Spain	• Strong emphasis on the special cultural value of the dehesa linked to cultural heritage and ancestry, as well as traditional practices • Love and passion for the landscape • Strong value for livestock and productivity • The dehesa was seen as distinct from the general countryside
UK	• Emphasis on beauty, fresh air, openness and space • Grasslands were valued for their accessibility and for opportunity for recreation • Grassland landscapes facilitated feelings of relaxation and enjoyment • Wildlife watching, walking and exploring were important activities
Sweden	• Grassland was perceived to provide variety in the landscape – people preferred diverse landscapes. • Grazing was seen as good for a ”healthy countryside” • Comparisons were made to forest landscapes, which feature heavily in people’s recreation and were liked for that reason • Grasslands were valued for the chance to explore nature, for their beauty and relaxation • People valued the meadow flowers and bees
Czech Republic	• Meadows and pastures were frequently perceived as beautiful, green, peaceful, quiet and clean • Some people expressed pride in the landscape and local identity • Comparisons were made between grassland landscapes in Czech Republic, and alpine grassland, as well as forest land, which was valued for its familiarity and proximity
Switzerland	• Emphasis on the wilderness, freshness, beauty and flowers in alpine grasslands • Alpine grasslands were often preferred over lowland, or ‘artificial’ meadows • Alpine grasslands were seen to provide freedom from agricultural landscapes • More diverse grasslands were preferred

3.2. Benefits of grasslands (ES priorities)

Using the Common International Classification of Ecosystem Services (CICES) to code participants’ responses, 14 ES within three categories (cultural, provisioning, and regulation and maintenance) were mentioned when participants were prompted to discuss benefits. Figure 2 represents the connections participants made between the benefits and values of grassland (e.g. wildlife is supported, physical health, food production etc.) and the biophysical structures of the landscape and physical functions and ecosystem characteristics (e.g. grass, open landscape, views, meadow flowers, water retention etc.). Figure 2 demonstrates how these connections can be analysed through the lens of ES, demonstrating that there is an interconnectivity and plurality of ES provision, where citizens’ discourse on ecosystem features underpins multiple ES, which can be connected to multiple perceived benefits discussed by citizens. The ES labels did not always easily encompass the sentiments of

participants' comments, and boundaries should be seen as fluid between categories as well as between ecosystem features and benefits and values. Despite difficulties categorising some comments, participants' opinions on the benefits of grassland could most often be categorised as ES associated with providing habitats for wild plants and animals (Figure 2), followed by cultural ES of sport, recreation and leisure. Many benefits could also be associated with provisioning ES, particularly in relation to the supply of food from grassland and support for livestock. Other benefits were linked to aspects of regulating and maintenance ES. These were less often described, perhaps due to their lack of visibility. Cultural ES, other than leisure and recreation, were mentioned less frequently but could be categorised within several cultural ES labels. This represents the difficulty in untangling the plural value that participants held and the fluidity of the cultural ES categories (as defined by CICES). Participants talked about the importance of the benefits and values, both for society in general and personally (see Table 4). Often participants listed many benefits, with some stating that a combination of benefits was of significant value.

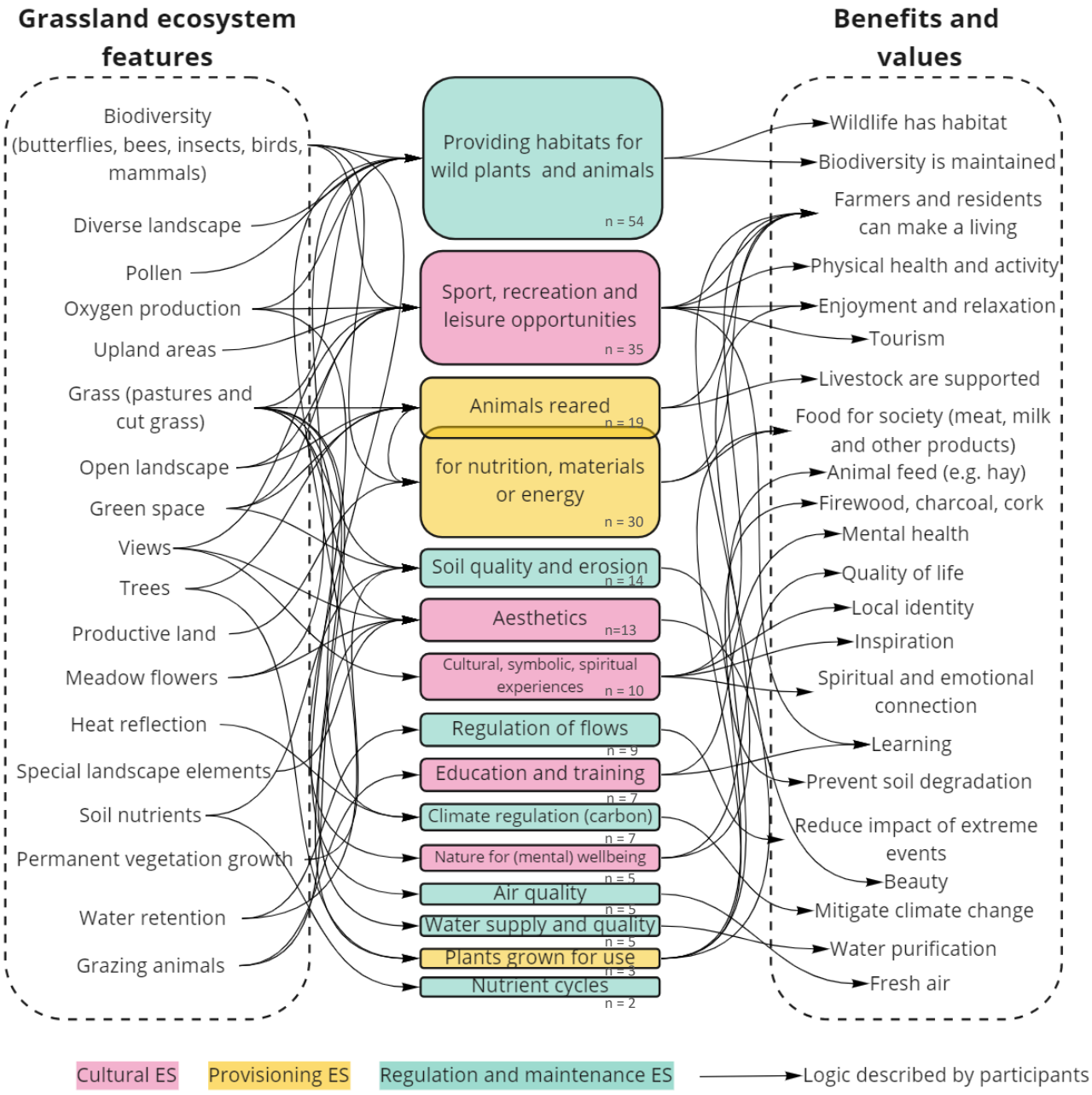


Figure 2. Benefits of grassland as stated by participants (of all focus groups) interpreted though the ES framework (size of box equivalent to relative number of coded references within focus group transcripts (n) – size not exactly proportional). Black arrows refer to connections and logic described by participants.

Table 4. Ecosystem services and benefits of grassland mentioned by participants, with example quotes.

Ecosystem service category	Example benefits and values from participants	Example quotes from participants
1. Habitats for wild plants and animals	Wildlife is supported	➢ *"[Grasslands are] a source of food for bees, which collect pollen from flowers there, it also serves as food for animals, which can also hide their young there." (M4, Czech Republic, Rural)* ➢ *"In the dehesa you can also enjoy certain species that are only seen in the dehesa at certain times of the year. […] The cranes come to the dehesa every year in winter. In other areas or landscapes, it is very difficult to see them." (Female 4, Spain, Rural Youth)*
	Biodiversity is maintained	➢ *"I think that [grassland] is especially important for the diversification and diversity of those animal and plant species. That, I think, is the most important thing." (W3, Czech Republic, Urban)*
2. Sport, leisure and recreation	Physical health and activity	➢ *"These areas [of grassland] make you more active, nature makes us more active." (P1, Sweden, Urban)*
	Enjoyment and relaxation	➢ *"People have more fun when they go picnicking on the green meadow and watch the cow graze. That's a recreational added value that you also get from the grasslands, because you can look there, which is of course also nice if you have a nice view" (F2, Switzerland, Rural)*
	Tourism	➢ *"It's quite nice to have natural meadows [...] and you have the bonds between recreational visitors [...] like campers [...] [which] brings in revenue to certain regions so that they can actually put more money into the landscape" (M1, UK, Rural)*
3. Livestock rearing	Food production	➢ *"I think it's very important that these lands exist in many different places so you can have local production. These dairy cows can contribute with local milk, local meat [...]. That is important for me" (P1, Sweden, Rural Youth)*
	Productive systems for livelihoods	➢ *"The breeding and rearing of animals [...] would be very important because the creation of employment has an impact on everyone" (M1, Spain, Rural Youth)*
	Support for livestock	➢ *"When the meadow is mown and the hay dries, it is a tasty animal feed. Pastures have their function in the name, they are important for animals that can graze here and are satisfied in nature." (W7, Czech Republic, Rural Youth)*
4. Cultural, symbolic and spiritual experiences.	Emotional connections, religious experiences, local identity and inspiration	➢ *"I still have a little bit of a bond with the religious, with the elements, so the green meadows and green pastures are still a distinctive part of my life," (M2, Switzerland, Urban)* ➢ *"I also think that (the dehesa's) social character has a lot of weight" (F1, Spain, Rural Youth)*
	Nature for wellbeing, including mental health benefits and quality of life	➢ *"I also find important the psychological, the recovery, the separation of cities and the natural, that this really has an effect on the quality of life" (M2, Switzerland, Urban)* ➢ *"Some of the students who have suffered from mental health issues, take them on trips to the countryside, do outdoor education...that is the benefit of grasslands". (M1, UK, Urban)*
5. Regulation and maintenance	Climate change mitigation	➢ *"So, when I think of a ley – [I] think wow, here's a lot of growth going on, soil sequestering a lot of carbon. So, I have a bit of a climate anxiety". (P4, Sweden, Rural)*

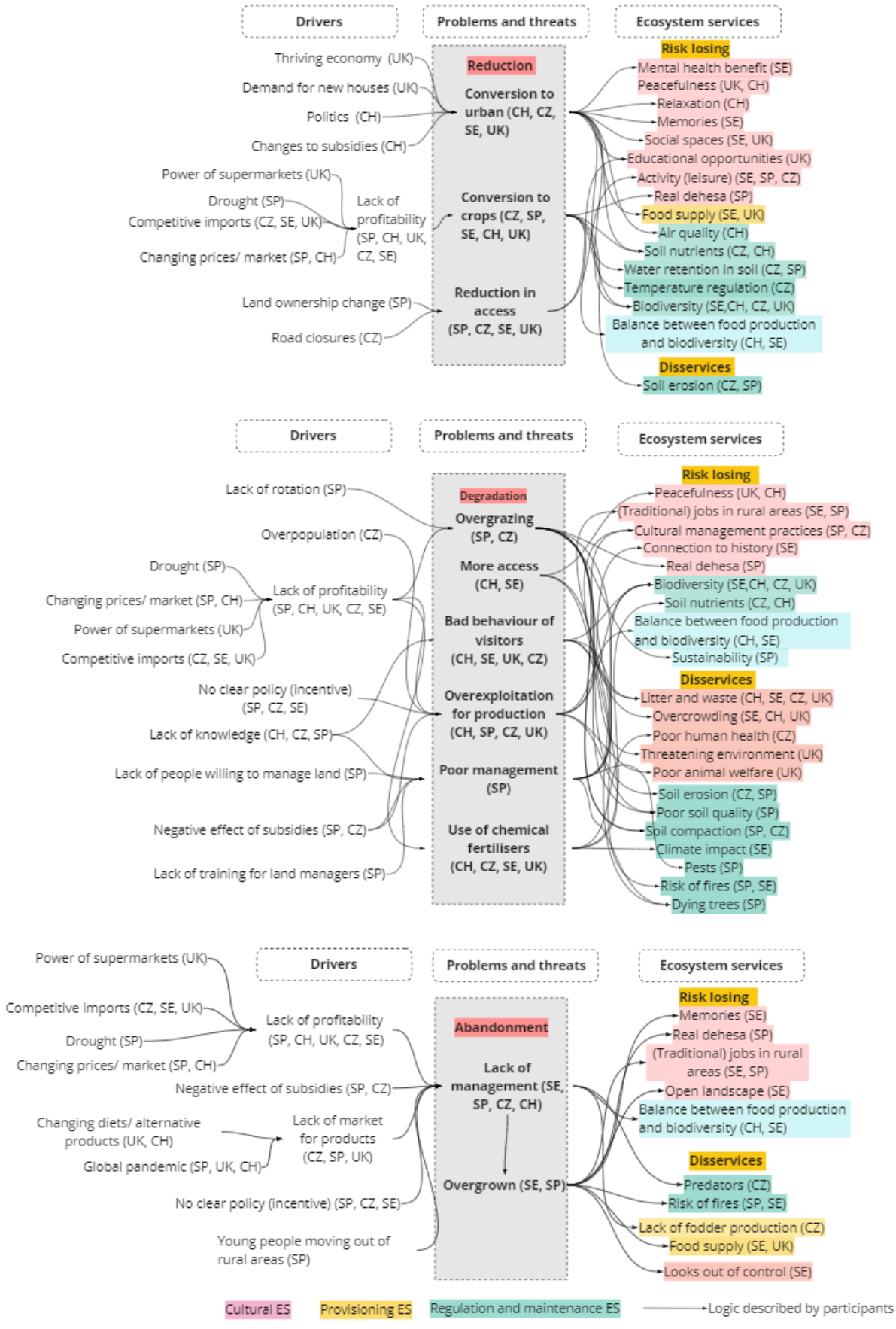
6. Multifunctionality	Regulating services underpin other benefits	➢ *"I also believe that biodiversity and soil protection are most important because without these two things we have neither food nor the possibility to use it for leisure." (F4, Switzerland, Rural)* ➢ *"It's a bit like choosing a favourite child because everything is important. […] if you can design the landscape in a meaningful way, that it is useful for humans from the point of view of food and does good for biodiversity, if it is also beautiful, but that follows automatically." (F1, Switzerland, Rural)*
	Multiple benefits	➢ *"I believe that multifunctionality is what characterises this ecosystem (dehesa) and what we all value" (M3, Spain, Rural Youth)* ➢ *"It's the whole that contributes with a lot of benefits when you talk about pastures. When you separate the parts, you lose a lot of the benefits." (P5, Sweden, Rural)*

Urban focus group participants mentioned the provisioning services of livestock systems in relation to food supply the most, and more often referred to biodiversity and support for wildlife, and recreation and leisure compared to the other focus group types (see Table B.1). Participants in rural and rural youth focus groups discussed a higher variety of benefits in general. There were also some differences in the benefits described by participants across countries (see Table B.2). In Spain and Sweden the most frequently described benefits were associated with livestock and the supply of food, and production value of the land. In Spain the provision of a home for livestock and the benefits of livestock rearing were significant, linked to the unique habitat of dehesa grassland for specialist livestock. In Switzerland and the Czech Republic, the most frequently named benefit was the provision of habitats for wild plants and animals. In the UK, the benefits were frequently associated with recreation and leisure. Such differences reflect the different experiences and preferences of participants in each country (see Table 4), and are likely to reflect the different cultural connections each country has with grassland, as well as the environmental characteristics of the regional grassland for each country.

3.3. Problems and threats to grassland

Problems and threats to grassland described by participants were classified into three themes: i) conversion of grassland to urban land use or cropland, or reduction of access to grassland; ii) degradation of grassland; and iii) abandonment of grassland (lack of management). Participants described the negative consequences of such problems and threats, often holding up valuable aspects of grassland systems that would be lost (or have been lost) should the threats and problems arise (or had already arisen in certain areas). These were classified into ES categories (Figure 4), also acknowledging the limitations of ES categories for capturing the diversity of values described. Many participants were concerned that biodiversity (because of habitat loss) would be lost if there was degradation of the land or conversion of the land away from grassland. Biodiversity was mentioned by participants in all five case study areas (see Figure 4) and reflects the perceived importance of grassland for habitat provision and the need for grassland to be present and well managed to provide valuable biodiversity. Participants also discussed the negative effects of problems and threats (disservices) that would arise (or had arisen) in grassland areas, which were also classified as part of data analysis in ES categories (Figure 4) as best as possible, given the connections already described (see Figure 2). Participants also described the drivers of the problems and threats to grassland, shown on Figure 4, connecting to specific problems and threats. Some drivers were described as resultant from wider, overarching drivers, which were different in different biogeographic regions. For example, the threat of the loss of grassland through conversion into cropland was described by a number of participants as being driven by a lack of profitability (of grassland) in all five case study countries (see Figure 4). However, in Spain (SP) this lack of profitability was described as driven by changing prices and markets alongside drought, whereas in the UK (UK) participants attributed it to competition from powerful supermarkets and competitive imports. Figure 4 therefore demonstrates the different perceptions people described of the wider economic, political and food systems associated with grassland across the different case study areas. Figure 4 also shows the variation is risks to ES and risk of disservices across case study countries.

Figure 3. Perceived problems and threats to grassland landscapes, including links to drivers and to ecosystem services lost. Arrows represent logic described by participants. Presence of theme by country is indicated with country codes in brackets (CH= Switzerland, SP=Spain, UK=UK, CZ= Czech Republic, SE=Sweden).


Drivers
Problems and threats
Ecosystem services
Thriving economy (UK)
Demand for new houses (UK)
Politics (CH)
Changes to subsidies (CH)
Power of supermarkets (UK)
Drought (SP)
Competitive imports (CZ, SE, UK)
Changing prices/ market (SP, CH)
Lack of profitability (SP, CH, UK, CZ, SE)
Land ownership change (SP)
Road closures (CZ)
Reduction
Conversion to urban (CH, CZ, SE, UK)
Conversion to crops (CZ, SP, SE, CH, UK)
Reduction in access (SP, CZ, SE, UK)
Risk losing
Mental health benefit (SE)
Peacefulness (UK, CH)
Relaxation (CH)
Memories (SE)
Social spaces (SE, UK)
Educational opportunities (UK)
Activity (leisure) (SE, SP, CZ)
Real dehesa (SP)
Food supply (SE, UK)
Air quality (CH)
Soil nutrients (CZ, CH)
Water retention in soil (CZ, SP)
Temperature regulation (CZ)
Biodiversity (SE,CH, CZ, UK)
Balance between food production and biodiversity (CH, SE)
Disservices
Soil erosion (CZ, SP)
Drivers
Problems and threats
Ecosystem services
Lack of rotation (SP)
Overpopulation (CZ)
Drought (SP)
Changing prices/ market (SP, CH)
Power of supermarkets (UK)
Competitive imports (CZ, SE, UK)
Lack of profitability (SP, CH, UK, CZ, SE)
No clear policy (incentive) (SP, CZ, SE)
Lack of knowledge (CH, CZ, SP)
Lack of people willing to manage land (SP)
Negative effect of subsidies (SP, CZ)
Lack of training for land managers (SP)
Degradation
Overgrazing (SP, CZ)
More access (CH, SE)
Bad behaviour of visitors (CH, SE, UK, CZ)
Overexploitation for production (CH, SP, CZ, UK)
Poor management (SP)
Use of chemical fertilisers (CH, CZ, SE, UK)
Risk losing
Peacefulness (UK, CH)
(Traditional) jobs in rural areas (SE, SP)
Cultural management practices (SP, CZ)
Connection to history (SE)
Real dehesa (SP)
Biodiversity (SE,CH, CZ, UK)
Soil nutrients (CZ, CH)
Balance between food production and biodiversity (CH, SE)
Sustainability (SP)
Disservices
Litter and waste (CH, SE, CZ, UK)
Overcrowding (SE, CH, UK)
Poor human health (CZ)
Threatening environment (UK)
Poor animal welfare (UK)
Soil erosion (CZ, SP)
Poor soil quality (SP)
Spil compaction (SP, CZ)
Climate impact (SE)
Pests (SP)
Risk of fires (SP, SE)
Dying trees (SP)
Power of supermarkets (UK)
Competitive imports (CZ, SE, UK)
Drought (SP)
Changing prices/ market (SP, CH)
Lack of profitability (SP, CH, UK, CZ, SE)
Negative effect of subsidies (SP, CZ)
Changing diets/ alternative products (UK, CH)
Global pandemic (SP, UK, CH)
Lack of market for products (CZ, SP, UK)
No clear policy (incentive) (SP, CZ, SE)
Young people moving out of rural areas (SP)
Drivers
Problems and threats
Ecosystem services
Abandonment
Lack of management (SE, SP, CZ, CH)
Overgrown (SE, SP)
Risk losing
Memories (SE)
Real dehesa (SP)
(Traditional) jobs in rural areas (SE, SP)
Open landscape (SE)
Balance between food production and biodiversity (CH, SE)
Disservices
Predators (CZ)
Risk of fires (SP, SE)
Lack of fodder production (CZ)
Food supply (SE, UK)
Looks out of control (SE)
Cultural ES
Provisioning ES
Regulation and maintenance ES
Logic described by participants

Conversion of grassland (to urban land use or cropland) was the most frequently discussed problem. Concerns related to conversion of grassland to urban land use (both residential and industrial). Narratives of personal loss were used to express sadness at past loss and potential future loss of grassland (Table 5). Drivers of conversion of grassland were seen to be associated with financial pressures on farmers to sell their land to developers, as well as the political will to build houses and a demand for affordable housing. Cropland was seen to produce less benefits than grassland, particularly in relation to biodiversity, and aesthetic value. Drivers of conversion to crops were associated with a lack of profitability of grassland. Some participants also expressed concerns that access to grasslands by the public may be lost in the future, driven by land ownership change and closure of access roads.

Degradation was often seen to be driven by bad behaviour of visitors to grassland, e.g. in relation to littering and anti-social behaviour (see Table 5). Many people drew on their own experiences of seeing bad behaviour and held the view that the public should have responsibility for looking after the environment. The trade-off between encouraging more accessibility of grassland areas with the potential for damage and degradation and the importance of maintaining a balance was discussed. Degradation was also related to overexploitation of the land, and particularly overgrazing, and poor management and use of chemical fertilisers and machinery. These were problems most often associated with ecosystem disservices. The disservices were sometimes complexly interlinked across ES categories, for example in the Czech Republic, respondents mentioned manufactured fertilisers (even though they are currently used very little on PG in the Czech Republic), which they associated with regulating and maintenance disservices such as soil degradation. They also associated this with the threat of having to use PG more intensively as was the case in the past (socialist agriculture), which is more closely linked to socio-cultural experiences and perceptions of agricultural and its function for society. Overgrazing and poor management were mainly discussed in Spain and the Czech Republic. Drivers included a lack of knowledge and training amongst landowners about appropriate management practices, issues with subsidies and policy, as well as a lack of profitability of the land. Some participants discussed the trade-off between profitability and conservation, implying that an imbalance between the two was a cause of degradation. Lack of profitability was a consistent driver mentioned by participants, including in relation to policy and financial instability, illustrating the connection made by participants between grassland and the economic viability of land management.

The threat of abandonment of grassland was described as an issue in most countries apart from the UK. It was linked to a lack of management of the land leading to, in some cases, overgrowing of vegetation. Negative feelings and consequences were associated with abandonment, as it was seen as representing loss of benefits, rather than a gain (Table 5). Drivers of abandonment of land were linked mainly to lack of profitability of land, lack of market for the products from grassland, and lack of policy incentives to maintain grassland. Low profitability and unclear policy were seen to lead to alternative land uses and poor land management.

Urban focus groups were concerned about conversion of grassland to urban land use, as well as littering and anti-social behaviour more often than other groups. Rural groups more frequently discussed overgrazing and pollution, and identified lack of training and knowledge of land managers, and lack of profitability as drivers of conversion of grassland to other land uses. Rural youth groups focused on conversion to crops, abandonment of grassland, and negative issues with tourists and visitors. Different issues were also reflected in each country. Participants in Switzerland and the UK discussed conversion to urban land most frequently, with the UK participants also focusing on the lack of profitability, visitors, and littering and anti-social behaviour. The Swiss participants focussed on overexploitation, reforestation, and tourism and visitors as the main issues affecting them. Participants in Spain brought up the issue of a lack of training and knowledge of farmers and land managers regarding management practices as a driver of problems, and overgrazing as a key issue of degradation. Swedish participants described abandonment of grassland the most frequently, together with overgrowing and conversion to urban use. In the Czech Republic, overgrazing and pollution,

particularly in relation to use of manufactured fertilisers, were mentioned more than other issues. Such differences reflect the combination of socio-economic, political and environmental issues affecting each country, relating to the implementation and uptake of agri-environment policies, access to grassland, and the wider influence of economic policies relating to food and housing.

Table 5. Problems with grassland identified by citizens, with example quotes.

Problem theme	Problem or driver	Example quotes
1. Reduction	Conversion to urban land use	➢ *"Well, where I live these areas are being built on. I live in the outskirts of Norrköping, and this area has grown very fast in recent years. […] It's very sad that there are almost no green areas left, apart from some parks in the city. There are so many new buildings and it's very sad." (P2, Sweden, Urban)* ➢ *"I think I would feel robbed if a lot of the landscapes started to change […] we've got some absolutely gorgeous countryside around us and [with] talks of the open cast mining, […] to lose that landscape, because it would be gone forever, will be criminal. You know, really would be criminal." (M2, UK, Rural)*
2. Degradation	Bad behaviour of visitors	➢ *"Like when I see that people have played with fire, burning the picnic table or they've barbequed, just leaving everything behind when they're done. People don't clean up after themselves and take care of nature as they should" (P5, Sweden, Urban)*
	More accessibility	➢ *"I would love [to] welcome more accessibility. It's just, it's the balance between having it right and then not damaging, and not having loads of people foot pathing through, causing disturbance." (M1, UK, Rural)*
	Conflict between productivity and conservation	➢ *"You also notice the conflict, because food production has to be economical somehow, but people want more biodiversity because it's nicer" (F3, Switzerland, Rural Youth)* ➢ *"With regard to repopulation [of trees in dehesa pastures], the farmer, the producer, the owner, would like to do it, but profitability is profitability and, this is not always in harmony with the function of conservation." (Male 1, Spain, Urban)*
	Buying power of supermarkets	➢ *"I don't believe there's any restrictions in place to sort of limit the big supermarkets buying power. That's probably the cause of some of the problem, because we have a little farm shop down the road from here […]. And all of the stuff is fresh. It's all really nice, but it's probably twice the price of ALDI or LIDL or TESCOS. Because they can afford to do it cheaper. So, it makes the competition totally unfair I think for those small providers." (M3, UK, Rural)*
3. Abandonment	Negative effect of loss	➢ *"In the 1700s my family moved there, and fought hard to open the landscapes, that in just a few decades have been overgrown again. Hundreds of years of work disappears in a few decades. It's tragic." (P5, Sweden, Rural)*
	Lack of profitability	➢ *"[Farmers] were already having problems getting their products out, and if they are not supported as they should, because the aid is not forthcoming, my fear is that, as they are not economically profitable, the producers will abandon this ecosystem and try to find other ways." (F2, Spain, Urban)*
	Lack of clear policy	➢ *"You don't need permission to let your farm get overgrown or enter into succession, but you need permission to grow forest. Makes you think about where you draw the line." (P4, Sweden, Rural)*

3.4. Management of grassland

Participants discussed many potential management approaches and techniques in relation to improving grassland landscapes , which were categorised into five themes, which relate to key social-psychological themes associated with behavioural change (education, rules, economics, tools and social pressure) (Lam et al., 2017), and a sixth relating to (participants' ideal) farming approaches (Figure 5). Figure 5 demonstrates the frequency that each theme (and corresponding sub-themes) was mentioned by participants, showing that education was the most frequently discussed and social pressure the least.

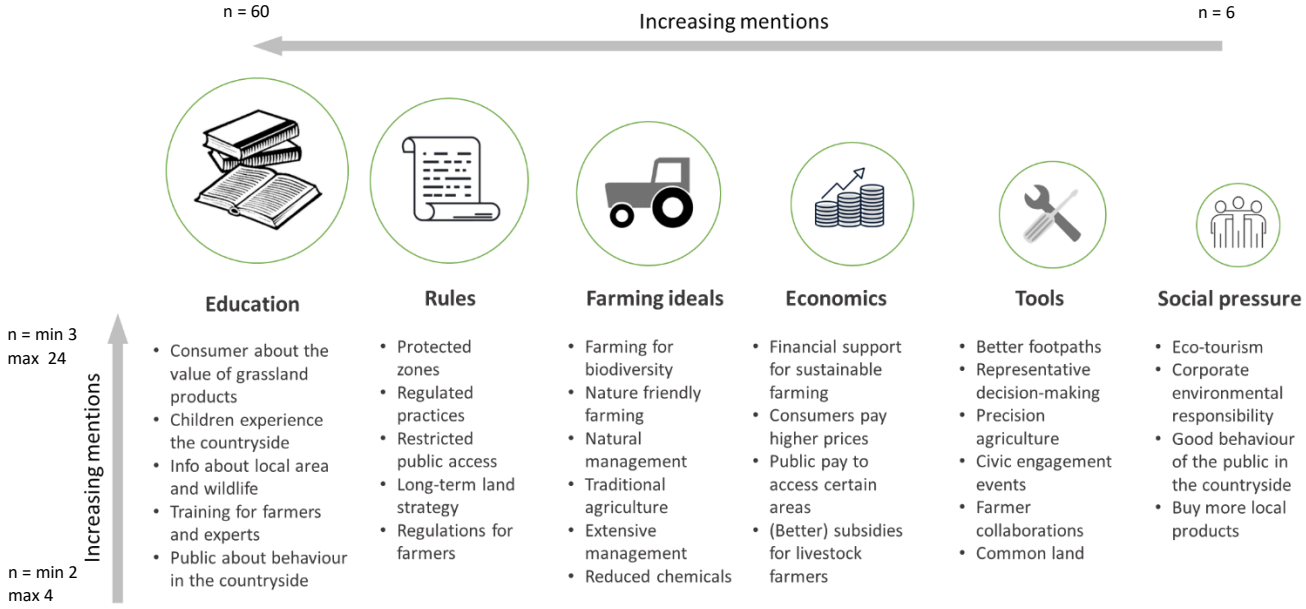


Figure 4. Approaches and techniques for improving grassland landscapes described by participants, ordered by relative number of times each theme was 'mentioned' (representing instances where phrases stated by participants were coded to the relevant theme (n)) in each focus group.

Table 6 gives examples of participants' discussion of each theme. Within the theme of education, education of consumers of grassland products regarding the value of grassland landscapes was the most frequently discussed. Participants assumed that more information provision through education would lead to decisions that favoured buying local products that were sustainably produced. Education was seen to be important via visits by the public to producers to learn about farming systems, or through adverts and marketing by supermarkets. Labels were recognised as important, but not the only necessary aspect of educating people about the value of products and sustainable systems. Information was thought to be needed to raise the profile of smaller producers as well as grass-fed meat. The trustworthiness of information was seen as important, and "greenwashing" was an issue. Education of children about the value of grassland and the countryside, was seen to influence more care for the countryside in the future and to encourage people to be more responsible consumers if the benefits of well managed countryside are embedded in societal knowledge (see Table 6).

Table 6. Mechanisms perceived to improve grassland, with example quotes.

Improvement theme	Mechanism	Example quotes
1. Education	Information provision	➢ *"Perhaps if we were conscious in the supermarket when it came to making decisions, we would make a different kind of decision." (M1, Spain, Rural Youth)* ➢ *"Veganism [is] obviously [a] big thing on the rise, and I think part of that is maybe., not in every case, but part of it could be, lack of education on how the meat and everything is actually produced and how it's sustainable." (M5, UK, Rural Youth)*
	Educating children	➢ *"When the children are shown, for example, the panels of honey, they are very impressed. They are natural products of the land, products that they see, that they learn, assimilate and integrate. Then, tomorrow, it will be easier to understand." (F4, Spain, Rural Youth)*
2. Rules and regulations	Land management policies	➢ *"Land owners should be limited by some regulations so that the landscape remains a landscape and then does not give the impression of a wasteland." (W5, Czech Rep, Urban)* ➢ *"I think there is a lack of regulation. It is true that strong regulation is needed, but more than input regulation, political regulation is needed." (M3, Spain, Rural)*
3. Farming ideals	Farming for biodiversity	➢ *"They should promote biodiversity. Farmers should manage their pastures and meadows with foresight and the knowledge that they will continue to be important in the future […] and maintain the diversity of plant and animal species" (W4, Czech Rep, Rural Youth)*
4. Economics	Support for farmers	➢ *"Those who cannot spend more will always go for the cheap and efficient in terms of production, but perhaps not in terms of environmental care. This is where there is room for a policy that remunerates unpaid farm services, which allows for efficiency and cheaper production for the consumer, without overexploiting the land." (M2, Spain, Rural Youth)*
5. Tools	Infrastructure and land ownership	➢ *"What we need is parking spots, public transit to natural areas, roads adapted to the sheer number of tourists that visit us, that go out in nature. The infrastructure around the flows." (P5, Sweden, Rural)* ➢ *"I think a first step is that there is more, not private land, but common land, so that the community can decide what is done there and what is allowed there." (M1, Switzerland, Rural)*
6. Social pressure	Corporate responsibility and eco-tourism	➢ *"I think every organization has to take a bit of responsibility I think. Take better responsibility" (M1, UK, Urban)* ➢ *"To reach the general public […]it may not necessarily be only with the sale of the products of the dehesa, but also with the enjoyment of the dehesa as an ecosystem, that is, all that is leisure associated with the dehesa" (F3, Spain, Urban).*

Rules and regulations were seen to be necessary to control the use and management of the landscape and limit activities of land users and managers. Some participants criticised existing regulations and policies, whilst most people referred to the need for more or stronger regulation of farming activities, or the need for improved planning and land management policy (Table 6). Linked to this was the idea that the multifunctionality of certain landscapes should be protected or recognised, assisted by landscape strategies together with long term planning to establish embedded sustainable practices.

Participants in all countries referred to the need for farming that improved biodiversity and wildlife (including farming for nature). Traditional farming, extensive farming, natural management, specific approaches such as rewilding and regenerative agriculture, and specific actions such as reduced chemicals and change in livestock numbers, were held as ideals for improving farming. Economic aspects were tied closely to wider issues including food supply, food prices, climate change mitigation, food sovereignty and farmer livelihoods, and sustainability, biodiversity and the supply of ES from farmed land. A number of participants criticised the current model of subsidy for farmers, linking poor subsidies to unaffordable food and poor management choices by farmers. Agri-environment schemes and the potential positive effect they can have was acknowledged, although the success of these schemes was thought to be under threat. The need for consumers to be willing to pay more for products in order to support better use and management of grasslands was also discussed, e.g. through creating stronger links to local, small-scale farmers, and education of consumers. Potential payment by visitors to areas of the countryside, as well as raising a levy for homeowners to maintain areas of the countryside, were discussed in the context of economic functioning.

Specific mechanisms and techniques that could be used to improve grassland landscapes were described. These were varied but often linked to the improvement of access for the public to grassland spaces, including footpaths and signposts, and general information about where to visit. Governance changes included reference to more public representation in land use decision-making, and more community engagement events in grassland spaces, communal land ownership, and collectives of producers to share resources. The need for changes in behaviour of the public, through encouragement of eco-tourism, and better behaviour in grasslands in relation to litter, was identified as an issue. Some participants referred to the need for industry to take more corporate environmental responsibility, including supermarkets.

4. Discussion

Using focus groups with citizens from urban and rural areas in five European countries, this study has explored a range of perceptions, opinions and attitudes regarding grassland landscapes, including the perceived benefits they provide, problems they face, and the way they should be managed. Using an ES adapted framework, the range and types of ES that citizens associate with grassland at a landscape scale has been inferred. The results of this exploratory study has informed research into citizen perceptions of grassland landscapes, including quantitative research at scale (Tindale et al., in preparation).

Many participants described “layers” of benefits from grassland, acknowledging that some benefits underpinned or resulted in others. This understanding of complexity is not always transferrable to an ES analysis where each service is delineated, particularly when analysing provisioning, regulating and maintenance, and cultural ES together. Figure 2 demonstrates the multiple connections identified between ecosystem features and perceived values and benefits, demonstrating that many aspects of grassland can be encompassed by each ES category and are often interconnected. Many comments by participants were difficult to classify and fitted into multiple ES categories. In particular, previous research indicates that cultural ecosystem services can be co-created, and result from a relationship between environment, culture, body and mind (Raymond et al., 2018). This combination emerged

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

from participants' descriptions of grasslands, linking activities, feelings, experiences, and descriptions of intrinsic and extrinsic characteristics of the landscape. The top-down ES classification may not always be suitable for the analysis of stakeholder perceptions due to the complexity of ecosystems, as well as the multiplicity of perceptions of agricultural systems (Bernués et al., 2016) and the pluralistic values that people hold.

Value perceptions can be understood as intrinsic, instrumental, and relational and can coexist in people's narratives about the importance of ecosystems (Arias-Arévalo et al., 2017). Many types of values existed for grassland and were held simultaneously by many participants. Such plural values have been shown to translate to spatial plurality of value when mapping value hotspots for grassland. Schmitt et al (2022) showed synergies between intrinsic values and relational values of care, and instrumental values and relational values of sense of place (Schmitt et al., 2022). As with a number of other studies (e.g. Arias-Arévalo et al., 2017; Klain et al., 2017; Topp et al., 2022) relational values were most often expressed by participants in this research, referring to mental health benefits, quality of life, local identity, inspiration, spiritual and emotional connections, beauty, recreation and physical health, enjoyment and relaxation. Such aspects reflect constituents of a "good life" (Díaz et al., 2015) attributed to relational value and begin to touch on embeddedness, collective meaning, flourishing, heritage, beauty, self-transformation, sense of place, spirituality, livelihoods, justice, conviviality, care, and kinship, which have been subject of previous studies of relational values of ecosystems (Admiraal et al., 2017; Arias-Arévalo et al., 2017; Cundill et al., 2017; Gould and Lincoln, 2017; Jackson and Palmer, 2014; Singh, 2015).

Alongside a significant consideration for relational values, citizens also emphasised intrinsic value of grassland proportionally more often than some other studies (Arias-Arévalo et al., 2017; Topp et al., 2022). In this research, intrinsic value (although often not described in isolation) relates to the biodiversity supported by the landscape, including the provision of a 'home' for livestock. This emphasis on biodiversity of grasslands was also found in a study of pluralistic values of grassland in Bavaria, Germany (Schmitt et al., 2022), and attributed to the high biodiversity of grassland compared to other agricultural land. Schmitt et al. (2022) also highlight that lines between value attributions are often blurred, and intrinsic values can also be seen as relational values, particularly when related to care and stewardship of the environment (Muradian and Pascual, 2018; O'Connor and Kenter, 2019). When referring to problems with grassland landscapes citizens often referred to loss of biodiversity as significant, linked to poor management and care, and degradation of the land. Functions of the landscape seen as important such as soil quality, water purification, oxygen production can be seen as intrinsic, but with underlying and implied links to instrumental and relational value, particularly functions that were expressed in relation to the protection of human wellbeing such as mitigation of climate change and reduction of the impact of extreme events. This emphasis on the intrinsic value of grassland, its relational significance and link to human wellbeing in light of management decisions, demonstrates the importance of considering pluralistic values for future management decisions.

Instrumental values were expressed in relation to farmers making a living from grassland, the production of food, animal feed and other products, as well as the tourism industry. According to definitions of instrumental values (Himes and Muraca, 2018), instrumental values are, in theory, substitutable by other ecosystems (e.g. other land uses that produce similar benefits). However due to the plurality of values people hold in relation to grasslands they are often inseparable from relational and/or intrinsic values. Many participants emphasised the characteristics of grasslands that facilitated the benefits and values they perceived. These were shared across all five case study areas and included the presence of livestock and wildlife; its beauty and natural qualities; its accessibility; its variety and diversity; the provision of balance in the landscape; and for providing relaxation, calmness and peacefulness. The combination of environment, experience, activity and positive emotion in descriptions exemplifies the connection felt between the environmental qualities of grassland and wellbeing, which also reflected relational values.

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

Nature connectedness is a concept used to describe an individual's relationship with nature (Mayer and Frantz, 2004). This study has shown that people feel a connectedness to nature in grassland landscapes, and that this connectedness operates at varying levels dependent on individuals and context. The nature connectedness felt within grasslands is important in terms of understanding the value of grassland in the rural landscape. Recent studies have shown causal links between nature connectedness and mental wellbeing (Pritchard et al., 2020), as well as pro-environmental behaviours (Richardson et al., 2020). Many participants valued heterogeneity within the landscape, and although grasslands were an important part of landscape diversity, some people also found value in other landscapes such as forests, particularly if these were more familiar to them. In some countries (e.g. Czech Republic) forests were perceived as more accessible, with paths and roads leading through them, compared to meadows and pastures which were seen as difficult to walk or ride through, particularly in summer. Balance is a characteristic of rural landscapes that is valued, and provided by grassland, but the influence of familiarity of specific landscapes is significant (Aretano et al., 2013; Hinds and Sparks, 2008; Kaplan and Kaplan, 1989).

Although some perceptions and values of grasslands were shared across geographies, there were distinct local variations associated with the local landscape type, as well as the culture and societal use of grasslands. Sense of place (Stedman, 2016) is a concept that can be included in assessments of cultural ES, however, is one of the most neglected ES in terms of research due to its complexity (Hausmann et al., 2016). Sense of place is used to describe the attachments and meanings that people or groups attribute to place (Tuan, 1977) where place attachment is a multi-dimensional construct that considers place identity, place affect, place social bonding, and place dependence (Lewicka, 2011; Ramkissoon et al., 2013; Ramkissoon et al., 2012; Trentelman, 2009), and place meaning represents the reasons for the connection to place (Gottwald et al., 2022).

Place attachment and place meaning have been found to be variously and differently connected to the physical environment, where place meanings act as a mediator between place attachment and the physical environment (Stedman, 2003). Strong attachments have been shown to be linked to proximity to dwelling, with closer places associated with stronger attachments (Gottwald et al., 2022). Place attachment is also strongest where social ties are strong, linked to family connections or cultural practices (Storie et al., 2019). Some participants spoke more passionately about grasslands when there was a connection to home, family, and a cultural identity in relation to grasslands. This, however, was not only linked to the current proximity of their dwelling to grasslands (e.g. urban or rural), but also where they had grown up or spent time in the past, and with significant people in their lives. Therefore, paying attention to people's past experiences, childhoods and social relationships in connection to place gives a deeper understanding of their connection and value. Grasslands are places that can facilitate such relational experiences that grow place attachment. Stronger place attachments may be linked to pro-environmental or pro-nature behaviours (Ramkissoon et al., 2013). Grassland has the potential for many and varied origins of place attachment through relationship, memory and experience as it is a multifunctional landscape facilitating farming, local economic activity through the sale of local food, and local recreational use due to its accessibility compared to other areas of the countryside (as recognised by many participants in this study). The variation in types of grassland and the cultural meaning across Europe is important to consider in relation to management policies, particularly through international legislation (such as within the EU). Flexibility in decisions about local management could offer a better sensitivity to the local variation in place attachment.

Place meaning is seen to be linked more closely and complexly to personal attributes, including environmental local knowledge (Gottwald et al., 2022), although this is debated (e.g. Lin and Lockwood, 2014). Some place meanings can be linked to cultural ES, however in this study, in line with (Gottwald et al., 2022), the ES concept did not fully reflect the relational values expressed by participants, such as well-being, memories, sense of home, or sense of connection to the local area and cultural meaning. Therefore there is agreement with the conclusions of Gottwald et al. (2022)

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

that 'deep meanings' relating to individual and subjective values (such as memories, for example) should be integrated into future studies using ES analysis, alongside an understanding of the creation of place attachment and place meaning through sense of place.

The results presented here suggest that citizens understand that grasslands are multifunctional. Not only do they express connections between multiple cultural ES and additional relational values (Plieninger et al., 2013) but also recognise the interconnectedness of all ES (which can be expressed as intrinsic, instrumental and relational values). As such, grassland benefits may be more effectively described as ES "bundles". Research into ES bundles have used the concept in relation to ES supply (Villamagna et al., 2013), but ES demand bundles are relevant for interpreting socio-cultural perceptions (Bernués et al., 2016; Martín-López et al., 2012). Distinction can be made between perceptions of the supply of ES from a landscape (e.g. what it currently offers: the focus of this research), and idealised visions of the ES a landscape can supply. Variation in current ES (benefits) described by citizens for grassland landscapes emerged between urban and rural residents, while younger rural residents held very similar views to all other rural residents. This lack of difference between rural residents of mixed ages and younger rural residents could be a signal that perceptions and values associated with grassland ecosystems are not simply linked to characteristics such as age, but more complexly linked to individual attributes, character traits, attitudes and preferences in relation to value expression (Gottwald et al., 2022). Links to individual attributes (such as underlying attitudes) could not be deciphered in this exploratory study and should be further investigated at greater scales.

Differences in perceptions between urban and rural residents indicates the influence of differences in individual attributes (e.g. on place meaning) and differential experience and access to grasslands (influencing place attachment). Urban residents 'bundled' fewer benefits than rural residents and younger rural residents, primarily highlighting the supply of food and other products from grassland, biodiversity, and recreation and leisure. Rural residents, including younger rural residents, 'bundled' more benefits, highlighting a range of services. Rural-urban differences have been found in relation to ES bundles in previous studies of social preferences for ES (Bernués et al., 2016; Martín-López et al., 2012). Preferences are likely to vary due to a complex set of factors, including individual needs, cultural traditions, access to ES, and sources of household income, which may vary across the urban-rural divide (Martín-López et al., 2012). The higher range of benefits described by rural residents in this study may be because their wellbeing, lives and livelihoods are more closely related to more ES (Martín-López et al., 2012). Urban residents echo the more generalised preference of humans for provisioning services (Hartter, 2010), as food production is a very tangible benefit of grasslands (instrumental value). This is counter to previous research that found that there was less emphasis by rural residents on food provision as an important ES across multiple ES types (Martín-López et al., 2012), demonstrating the perceived importance of grassland for food provision for urban residents.

Participants often discussed the provision of 'local' products as a benefit. Local origin of grassland products can be an influential factor on consumer behaviour, including purchase likelihood and willingness to pay for product from grass-fed animals (e.g. Stampa et al., 2020). The differences in ES demand bundles between urban-rural populations could be significant for the management of grassland. Where the perceptions of the supply of ES from grassland are mismatched, it may be beneficial to consider the socio-cultural values placed on grassland by different populations, to better engage those populations, as well as provide a rural landscape that works for all beneficiaries.

ES demand bundles also varied between countries, with participants in each case study area describing a different combination of benefits. Such differences may represent the characteristics of the grassland ecosystem, agricultural priorities within the region, the biophysical environment and culture. The consequence of understanding the ES demand bundles that emerge in different countries in relation to grassland could be important for the tailoring of policies influencing land use decision-

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

making. It is useful to better understand the spatial mismatches between ES supply bundles, driven by physical environmental characteristics combined with policies, economics and individual land-manager decisions, and ES demand bundles (perceptions of the supply of ES). Better understanding could help make better land-use decisions and policy, particularly in relation to how spatial mismatches are experienced by different groups (e.g. urban-rural populations) (Zoderer et al., 2019).

Problems and threats perceived by citizens to be associated with grasslands broadly match those categories identified by experts, including conversion, degradation and abandonment. The multifunctionality of grasslands is reflected in the range of ES that could be lost (or had been lost) as well as disservices that could arise (or had arisen) as a result of problems in grassland landscapes, including cultural, regulating and provisioning ES (see Figure 4). These also relate to losses of intrinsic, instrumental and relational values. More cultural ES (including relational values) were discussed compared to the other classifications, which may reflect the personal and experiential nature of loss or degradation of grassland, and reflect the process of heuristic reasoning where losses are weighed more highly than gains (Kahneman et al., 1982). Loss and degradation may reduce the nature connectedness that grasslands offer and reduce the opportunity for place attachment to grow (e.g. participants described losing memories (place identity), sense of safety (place affect) or traditional jobs (place dependence)). Different perceptions of grasslands that emerge through the discourse of loss or degradation, compared to benefit may be important for the communication of management decisions and mediation between groups when there is a conflict of interest associated with potential loss of grassland areas. Under some circumstances ecosystem disservices may influence people's actions in relation to management of ecosystems more than ES (Blanco et al., 2019a). Previous studies have shown that land management decisions can be driven by prevention of certain ecosystem disservices (e.g. diseases (Friess, 2016), poisonous plants and soil degradation (O'Farrell et al., 2007), dangerous falling trees (Conway and Yip, 2016), labour required to manage hedgerows (Blanco et al., 2019b)) despite decision-makers showing knowledge of and giving importance to ES during research interviews and surveys. Ecosystem disservices emphasised by citizens should also influence decision-making and may mean that more relational values become drivers of change.

Conversion of grassland to urban land use was identified as significant problem by participants (associated with financial pressures on farmers to sell their land to developers, as well as the political will to build houses and a demand for affordable housing). The prevalence of the problem as a threat to grassland is in line with other studies (see Pellaton et al., 2022). Urban dwellers discussed this issue as significant, perhaps because it is an easily observable land-use change, and was closely linked to negative emotions which can be a strong driver of opinion or perception. Moreover, loss of human-nature connectedness and relational values may be particularly significant if changes are rapid and extreme (Riechers et al., 2022), such as conversion of grassland. During focus group discussions, in some cases grassland was referred to more generally as "green space", and the issue of development of green space in the countryside may have represented a wider issue of environmental damage to participants. The urban focus group participants described grassland conversion to urban land use as a problem more frequently than both younger and mixed age rural groups in the context of personal experiences. Urban dwellers potentially have more awareness of urban expansion happening in their town or city. Rural focus group participants described issues of grassland degradation, particularly overgrazing, potentially because it was closer to their experience. Perceptions of issues are therefore likely to be linked to the individual experience of citizens, and the cultural and land-management history and context of the area.

Citizen's perceptions of the drivers of problems in grasslands were varied, but often converged around cross-cutting themes. For example, poor profitability of grassland production was seen to drive degradation and abandonment across all countries. This was linked to changing markets affecting imports, prices and powers of supermarkets. Other drivers of problems were perceived to be connected with political and economic contexts, such as lack of relevant policy, training, changing

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

subsidies, government agendas for housing, land ownership, and changing rural populations. Policies and markets were thought to be the most prominent indirect driver of change in landscapes including mountain areas, which contain grassland (Martín-López et al., 2019), and population growth and urbanisation as relevant drivers of European biodiversity decline (Fischer et al., 2018). Citizens' perceptions of grassland and ES delivery are connected to their perceptions and knowledge about the wider socio-economic system, indicating that citizens directly and indirectly connect grassland land use with wider socio-economic drivers of change.

Grasslands can be understood as social-ecological systems (Ostrom, 2009; Vanwindekens et al., 2013), in which resources, users, physical systems and governance systems interact in social, economic and political settings to give specific outcomes, an assertion supported here. The results show that perceptions of actors (e.g. citizens) within social-ecological systems can be usefully collated to highlight the most important relationships within systems (e.g. Vanwindekens et al., 2013). Where previous research has focused on farmers within grassland systems, a better understanding of the perceived dynamics of such systems amongst different groups, including citizens, may help to identify common ground when trade-offs and conflicts occur. This may be useful where institutional change is needed to create sustainable agri-food systems, including grasslands, across Europe.

Citizens' assessment of the management approaches needed to improve grasslands across all case study countries emphasised the need for education (e.g. Figure 4), for example in relation to the value of grassland products. Individuals can hold identities as both citizens and consumers, but there is often an assumption that, in their role as a consumer, an individual may have different priorities to that held in a citizen's role. Concepts such as the 'citizen-consumer' represent individuals who use particular values to make decisions about food purchases that go beyond individual concerns (MacRae et al., 2012). Participants in this study expressed a need to connect citizen and consumer identities in relation to grasslands, in ways that connect to trends in Europe and beyond in relation to sustainability and environmental concerns influencing food choices (Ehgartner, 2018; Hirth et al., 2021; Levidow, 2015). As yet, however, there are few tangible ways for consumers to make informed sustainable choices, with the exception of origin labels, organic labels and some trials of eco-labelling (Hartmann et al., 2021). Other studies identify evidence of confusion about products from grassland and terms used to label such products e.g. grass-fed (Stampa et al., 2020). Participants in this research identified issues with current food labelling, as well as difficulty in justifying spending more on sustainable grassland products. However, multiple social and environmental factors shape food choices and behaviours, over and above education and information provision (Monterrosa et al., 2020). Moreover, participants recognised the need to build place attachment, meaning, and nature connectedness to potentially influence a more deep-rooted cultural shift towards pro-environmental behaviour, including consumer choices (Richardson et al., 2020).

Citizens also recognised that the policy mix associated with grassland management is complex, and there are many relevant polices, sometimes with conflicting agendas (Hunter et al., 2020) and many potentially not known to all citizens. Rural dwellers, including younger rural dwellers, were more likely to describe issues with current policy such as the EU Common Agricultural Policy (CAP), and therefore emphasise the need for financial support for farmers. Even though many legislative policies protecting special landscapes and ensuring environmental standards already exist, citizens may have seen a need for stronger legislation and rules to improve accountability in decision-making, and ensure standards are met, demonstrating that more transparency is needed about the management of the countryside. In some countries, trust in government to develop or implement the right policy, or in farmers to make the right decisions was low, particularly where political or policy complexity was perceived to be high. Addressing issues of trust in decision-makers is key to engaging or communicating with citizens.

Solutions may also lie in finding common ground amongst stakeholders, including citizens, in relation to agricultural and environmental policy agendas and goals. Citizens highlighted farming ideals,

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

including farming for biodiversity, nature friendly farming, and using "natural" techniques to manage grassland. These goals were described across all five case study countries, suggesting that there are shared ideals amongst citizens for grassland farming. If the broader idealistic goals are agreed upon by farmers and citizens, and transparently communicated, there may be more coherence in delivery of ES that benefit more widely. This may be particularly relevant where values also align spatially in order that land-use and land-management changes can be made that are more likely to be publicly accepted (Schmitt et al., 2022). Difficulties often arise when goals between farmers and citizens are not aligned (Schmitt *et al*., 2020). Farming for biodiversity, particularly in grassland, is often desired by many farmers, but factors such as financial viability and risk-perception may affect farmers' ability to take up agri-environment schemes (e.g. Wezel et al., 2021). Goals therefore also need to be aligned with successful support for farmers and land managers, a consistent theme suggested by participants to improve grassland management. Improved communication of citizen priorities to farmers and land managers could legitimise change in the wider economic system, as well as initiate dialogues about mismatched policy goals and delivery mechanisms. Overall, citizens' opinions about management of grassland show potential for influence through soft policy instruments, where elements such as education, involvement, and shared ideals, rooted in an understanding of citizen's sense of place and place attachment for grassland, could be encouraged alongside harder policy instruments, to better align idealistic goals with practical reality for farmers.

4.1. Limitations

This research was an exploratory study, limited in size and scope. Thus no general conclusions for the continental scale could be made. The results therefore are indicative rather than representative of the social and demographic groups included. Based on this limitation, the results should be a starting point for further research.

The research was conducted during 2020 and 2021 when much of Europe was experiencing the COVID-19 pandemic. There were restrictions on travel and movement in many countries including within rural areas. The necessary online focus group methodology, needed to account for this context, may have limited some of the interactive elements of the focus group discussions. Participants' opinions about grassland landscapes were also potentially affected by the events and circumstances of that time. To take this into account, we included discussions of the effect of the pandemic on use and valuation of grasslands and the countryside in general. There were mixed results amongst participants depending on where they lived and in relation to the local pandemic restrictions. Some participants found the pandemic increased their valuation of local grassland and the countryside, as spaces for recreation, socialising, fresh air, and to escape from the "everyday", particularly for urban dwellers. Some rural dwellers felt worried at the increase in visitors to the countryside, and others happy with less visitors when restrictions on travel applied. Many participants commented on the emphasis on local food supply chains during the pandemic and discussed changes to their own food purchases as a result. Most participants were unsure if changes would be sustained after the pandemic, but the results indicated that there were significant effects on their experiences, understanding and valuation of the countryside.

4.2. Future research

This exploratory study has indicated that the heterogeneity of citizen perspectives on grassland could be further explored through large scale surveys in order to better connect perceptions with characteristics, personal attributes, and geographical variation. Future research could also explore further the cross-cultural issues of ES perceptions for grassland landscapes. Future research is needed into how to balance different stakeholders' perspectives, including citizens', in order that grassland can be managed in a way to balance ES delivery, acknowledge pluralistic values, and reduce conflict when changes occur.

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

5. Conclusions

This exploratory research has applied a qualitative approach to explore the perceptions of citizens to evaluate the ecosystem services and disserves delivered by PG in five European countries. The results indicate that citizens evaluate, and value, a range of ES provided, linked to multiple values, that can be held simultaneously. Plural valuation can help to identify values that are not yet integrated into management objectives and can help to create recommendations for environmental management as well as policy goals that take into account trade-offs and synergies (Arias-Arévalo et al. 2017; Schmitt et al., 2022). Differences were observed between urban and rural groups (mixed age and rural youth), and between different countries, suggesting that some national and local policy differentiation might be required to guide decision-making for grassland management, although this needs to be confirmed using larger, nationally representative samples.

The implications of this research are that as agricultural landscapes are continually contested areas, a better understanding of citizen perspectives may lead to better conceptualisation of how and when mismatches in (perceptions of) ES supply and demand (including relational values) occur. It may allow better communication between stakeholder groups, including citizens, farmers and policy makers, particularly if shared ideals or (social-ecological) systems understandings can be incorporated into deliberations or decision-making processes. Changing policy would also need to address people's interconnected identities as citizens and consumers, facilitating regionally-specific connection and attachment to grasslands through education, shared ideals, and discourses, emphasising the multiple values of grassland at a local and landscape scale, which may help improve pro-environmental behaviour, in order to facilitate transition to sustainable grassland systems.

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

Phase 2: Quantitative exploration of the drivers of citizen attitudes towards and values associated with PG

6. Introduction

Attitudes to landscapes are a 'deeply held mental stance' that connect to preferences for, and perceptions of, land or landscape, as well as the way that people attach meaning and value to it (Swanwick, 2009). Previous studies have explored citizen attitudes to grassland landscapes in relation to landscape preference, perceptions of cultural ES, and willingness to pay for ES, often in specific regions including mountain, and marginal or protected landscapes. Multiple factors have been found to affect people's perceptions and attitudes, including age, gender and education, as well as rural-urban residency (Martín-López et al., 2012) and environmental interest (Schmitt et al., 2022). However, there has been little consideration of the drivers that underpin positive or negative attitudes to PG across different socio-economic contexts, and climatic regions in Europe, including influences on behavioural intentions associated with PG. The aims of phase 2 were to build on the results of the focus group research in phase 1, as well as the relevant literature identified in the systematic review (SUPER-*G* 4.1a) to develop a quantitative instrument to assess attitudes to permanent grassland at scale across the 5 countries involved in the phase 1 research. For a detailed explanation of the research which identified key themes for inclusion in the report, please see the report for SUPER-*G* 4.1.a and the 4.3 phase 1 research (this report).

6.1. Research aims

The aim was to understand the drivers of citizen attitudes towards, and values associated with, PG in five European countries (Spain, UK, Switzerland, Czech Republic and Sweden), representing five biogeographic regions, in order to make comparisons between different geographical and demographic populations.

7. Methodology

The objectives of the study (as highlighted in the introduction section) were addressed using Structural Equation Modelling (SEM) to explore the drivers of citizens and consumer attitudes towards permanent grassland (PG). However, prior to carrying out SEM, the sample characteristics are first described followed by principal component analysis (PCA) which is used as a data reduction technique. Specifically, all the analytical techniques used and the results from the techniques help to understand and explore the drivers of citizens and consumer attitudes towards the management of PG. As such, comparisons were made between citizens in five EU countries in order to explore the differences in their attitudes towards PG and PG products across different socio-political and environmental contexts of Europe.

7.1. Hypotheses and research model

Nine hypotheses outlining the relationship between attitudes to PG, and behavioural intentions from both citizens and consumers were tested by applying PCA, followed by SEM based on a partial least squares approach (SEM-PLS). The research model in Figure 5 is presented followed by the proposed hypotheses.

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

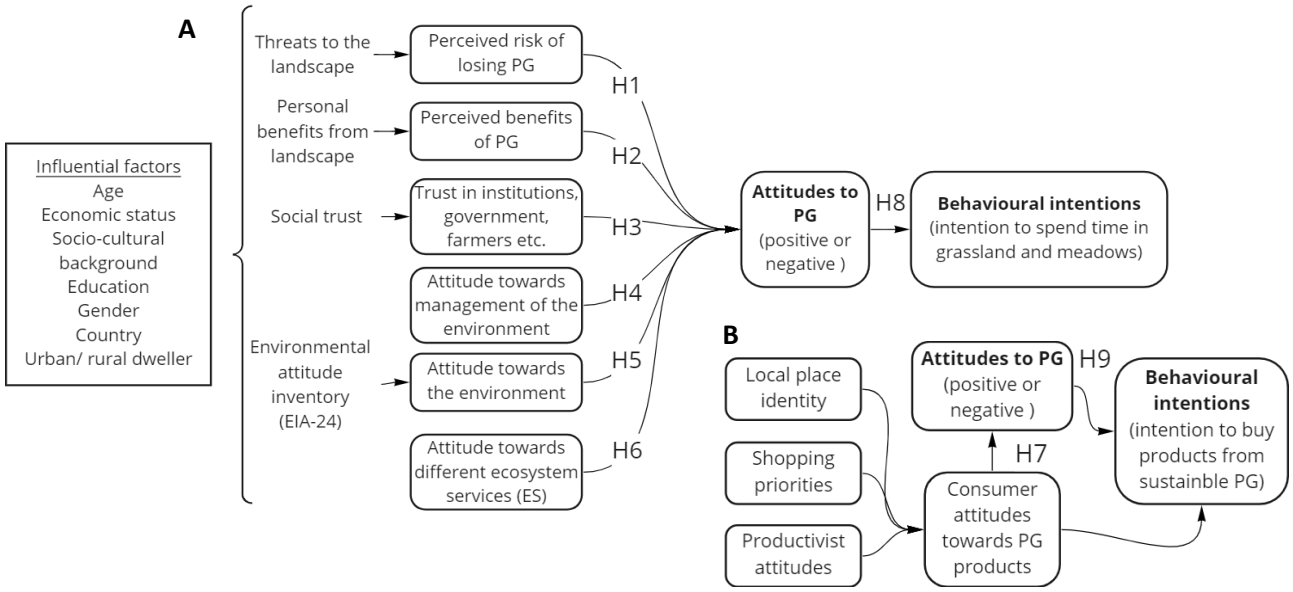


Figure 5. Conceptual model and hypotheses testing. (A) drivers of citizen attitudes to PG (B) drivers of consumer attitudes to PG (Source: own elaboration)

H_1: Perceived risk of losing PG will influence the attitudes of consumers and citizens towards PG.
H_2: More perceived benefits of PG will positively influence the attitudes of consumers and citizens towards PG.
H_3: Increased trust in institutions and government will positively influence attitudes to PG.
H_4: More positive attitudes towards the management of the environment will positively influence attitudes to PG.
H_5: More positive attitudes to the environment will positively influence attitudes to PG.
H_6: More positive attitudes towards different ecosystem services (ES) will positively influence attitudes to PG.
H_7: More positive consumer attitudes towards PG products will positively influence their attitudes towards PG.
H_8: A positive attitude towards PG will lead to a positive behavioural intention to buy products from sustainable PG.
H_9: A positive attitude towards PG will lead to a positive behavioural intention to spend time in grasslands and meadows.

Citizens' attitudes towards the environment, preferences for management of the countryside, trust in institutions, government, and farmers were also explored in relation to attitudes to PG and behavioural intention to spend time in grasslands (see figure 5a). In a second step, constructs encapsulating local place identity, shopping priorities, productivist attitudes and preferences for labels were assessed to measure consumer attitudes towards PG products and their behavioural intention to buy products from sustainable PG (see figure 5b).

7.2. Sampling procedure and questionnaire development

7.2.1. Participants and sampling procedure

Newcastle University's Faculty of Science, Agriculture and Engineering's ethics committee identified the research as meeting the criteria for ethical approval (20-TIN-29, 21/08/2020). A total of 3192

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

participants from 5 countries within the European region, selected to cover the different biogeographic zones included in the SUPER-*G* project (Czech Republic, Spain, Sweden, Switzerland and the UK) were quota sampled to be nationally representative for each country, on sex, age (categorised as 18-30, 31-40, 41-50, 51-60, 61-70, 71 and older) education level (highest level of education completed) and socio-economic classification. Participants were drawn from an existing panel of a social research agency. Data were collected, using on-line survey methodology which had been designed by the authors of this report. Information about the research was provided to potential participants in the opening statement of the survey, which explained the voluntariness of participation, anonymity of respondents, the purpose of the research, methods employed and funding. Completion of the questionnaire having received the above information was taken as informed consent. An anonymised data set was returned to the researchers following internal data checks.

7.2.2. Questionnaire development

A total of 3184 participants from five EU countries (UK, Czech Republic, Switzerland, Sweden and Spain) were quota sampled based on age, gender, socio-economic class and rural versus urban residency. Participants were nationally representative of the population for each country, with *c*. 620 citizens per country surveyed via a 30-minute, self-directed online questionnaire that was administered through a social research agency (Qualitrics). Data were collected in November 2021.

7.2.3. The questionnaire

The results of the exploratory study, (described in section 1 of this report, and in Tindale et al, submitted) together with information from the existing theoretical literature, informed the development of the questionnaire. The questions and associated constructs, together with their justification for inclusion and derivation, are summarised in Table 7. The closed-ended questions (224 items) consist of demographic characteristics and 5-point Likert scale items to measure perceptions and attitudes. After the questionnaire had been designed, it was pre-tested in the form of a pilot survey to determine the length of time needed to complete it and to assess both the comprehension and wordings of the questions. Thus, to ensure the consistency in the measurements of constructs, the questionnaire was translated and back-translated (Brislin, 1970) into local languages of each country involved in the study[1]. Except for affect measures (variables measuring positive or negative attitudes towards PG), the questionnaire included five-point Likert scales (1 = “strongly disagree” to 5 = “strongly agree”), which were used to measure: a) threats or risks to the countryside, b) personal benefits from the countryside, c) social trust, d) management of the environment, e) attitude to the environment (using the Environmental Attitude Inventory (EIA) (Milfont and Duckitt, 2010)), and f) consumer attitudes towards PG products. Likert scales using priority measures were used to explore g) attitudes towards ES, and the overall behavioural intention of consumers to h) buy products from PG and i) spend time in grasslands and meadows. These are followed by questions relating to demographic characteristics.

Table 7. Survey question topics and associated constructs, together with their justification for inclusion and derivation.

[1] See annexe for the items highlighted in the questionnaire and the associated response scales (5-point Likert scales)

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

Topic	Link to conceptual model	Question(s)	Explanation or Rationale	Examples studies or focus group findings
Socio-economic factors	Influential factors	Age; gender; rural-urban dwelling; level of education; profession	Many previous studies have identified socio-economic factors as influential on landscape preferences and ES preferences.	(Howley, 2011; Howley et al., 2012; Oteros-Rozas et al., 2014; Pietrzyk-Kaszyńska et al., 2012; Plieninger et al., 2004; Rodríguez-Ortega et al., 2016; Van den Berg and Koole, 2006) Focus group findings showed differences between urban and rural dwellers.
	Exposure to the countryside	Frequency of visits; reason for visiting the countryside; activities;	To gain an understanding of the main ways that people use the countryside and how that might inform their attitudes and preferences.	(Bernués et al., 2014; Domingues and Gonçalves, 2020) Focus group findings showed the reasons for visiting the countryside and activities informed their experiences and preferences.
General environmental attitudes	Attitude towards the environment	24 questions from the Environmental Attitude Inventory (EIA-24)	The EIA is an established scale measuring environmental attitudes. It has been widely applied and shown to help understand human environmental behaviour. The EIA-24 (shorter version) was used to maintain participants concentration and likelihood of survey completion.	Milfont and Duckitt, (2010)
Attitude to agriculture	Productivist attitudes	Attitudes to food production and self-sufficiency, and agricultural policies and premiums.	Using validated indicators from previous studies that indicate productivist attitudes. More often applied to understanding farmer behaviour but relevant for perceptions of citizens about the purpose of farming.	(Howley et al., 2012; Rodríguez-Ortega et al., 2016)

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

Opinions about the countryside	Local embedded identity	Agreements with statements relating to specialness of local area, sense of history, connection to animals, spirituality and local food preference.	This reflects the connection people have with their local landscape and its cultural identity.	During focus groups some participants expressed strong connections and sense of identity in their local landscape, which were expressed through love for the landscape.
	Attitude towards different ES	Opinions about the importance of ES for the function of the countryside including, human food crops, livestock for food/ products, raw materials, wild plants for food, pollination, habitat provision, renewable energy generation, reduced flood/ drought risk, clean water, reducing greenhouse gases, improve air quality, employment, leisure, history and culture, physical well-being, education, research, spirituality.	Aim to identify the most important benefits that citizens perceive from the countryside.	(Buchel and Frantzeskaki, 2015; Cebrián-Piqueras et al., 2020; La Notte et al., 2017)
	Perceived benefits of maintaining PG	Important factors about the countryside when visiting including, security, feelings of stimulation, feelings of self-direction and landscape preferences.	These are aspects that previous studies have identified as affecting people's landscape preferences - we can transform these into the benefits of maintaining PG	(Bacher et al., 2016; Cebrián-Piqueras et al., 2020; Ren, 2019) These aspects match well to the aspects that people mentioned feeling or liking when they visited the countryside during focus group discussions.
Attitude to PG	Attitude to PG	Scales of attitudes including unpleasant/pleasant, bad/good, worthless/ valuable, ugly/ beautiful, boring/ interesting, not enjoyable to spend time in/ enjoyable to spend time in.	To ascertain the affective response of participants to grassland and meadows (aimed to gain their initial reaction to the grasslands and meadows in their minds rather than specifying types of grassland)	
Behavioural intention to visit	Intention to visit	Intention to spend time in grassland and meadows, including planning, considering and	Items designed to measure intention to spend time in grassland and meadows, plus barriers to access.	Question structure followed (Clark et al., 2019)

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

grassland and meadows		avoiding spending time. Also financial ability to visit and ease of access / knowledge about how to visit.		
Threats and impacts	Perceived risk of losing PG	Perceptions of threats to the countryside including multiple aspects of reduction of PG or conversion of land and degradation of landscapes. The drivers of threats were also presented including climate change, changing demand for food, agri-food policy, food prices, farming profitability, farm management.	Aimed to understand citizens' perceptions of the threats to the countryside	Emerged from focus group discussions
Trust	Trust in institutions, government and farmers	Trust in ability of different institutions and groups to manage the countryside effectively, and trust in motivation of different groups to manage the countryside effectively.	Levels of trust have been shown to be closely associated with environmental attitudes.	(Meyer and Liebe, 2010)
Attitude towards management of the countryside	Attitude towards management of the environment	Important aspects for managing the countryside well, including specific focus of education, types of support for farmers, aims of agriculture, use of rules, regulation and financial tools, support for the public use of the countryside, democratisation of decision making.	Understanding the opinion of citizens about the mechanisms that are important for good management could indicate underlying values.	Important aspects of managing the countryside emerged from the focus group discussions. They were interpreted in 6 categories - 5 based on the RESET Mindset model of factors that affect behaviour change (van Woerkum et al., 1999)
Shopping priorities	Shopping priorities	Establishing purchasing of meat and/or dairy products or neither, and if purchasing, which attributes of products are important (e.g. quality, price,	Understanding purchasing priorities to identify links between underlying value and attitudes as well as identifying barriers to purchasing sustainably produced foods.	Focus groups showed that people are considering the type and accessibility of products - not always their sustainability or origin

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

		origin, freshness, grass-fed, organic, familiarity etc)		
Behavioural intention to buy sustainably produced grassland products	Intention to buy products from sustainable PG	Exploring opinions about ease of identification and purchase of sustainably produced food, intention to buy, increase or reduce, or avoid purchase of sustainably produced food.	Discerns the intention to buy sustainably produced food or to avoid or reduce it.	Focus groups showed that purchasing intentions for sustainably produced food may exist in some circumstances and for some food more than others, but there are many barriers to acting on intentions and many factors that affect intentions in different groups.

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 774124

7.2. Analysis

7.2.1. Descriptive Statistics

The descriptive statistics of the demographic characteristics of the sample population was explored using SPSS (IBM SPSS Statistics version 27). Participants responses between countries were compared using one-way ANOVA. This helps to obtain a picture of respondents' attitudes towards permanent grassland (PG) between countries enabling identification, comparison and explanation of the differences between the understudied countries. All tests were carried out at 5 percent level of significance with the null hypothesis that there were no significant differences between countries. We followed the PCA as described in 1.3.2 below with some series of MANOVA tests in order to determine the relationship between the combined items identified in the PCA. A series of one-way ANOVA was conducted as a follow-up test to the MANOVA, and this helps to tell if there are any differences between the socio-economic groups with respect to the PCA items.

7.2.2. Principal Component Analysis (PCA)

While descriptive statistics provided a general overview of the responses, the PCA aggregated the attitudinal questions into meaningful components, thereby allowing the general structures in respondents' answers to be identified. PCA was therefore conducted in order to aggregate the items (survey questions) into constructs, and identify the underlying structure. Factor analysis (PCA) was conducted using SPSS, allowing for identification of constructs for subsequent analysis. The dimensions developed from the grouping procedure maximises the association between input variables while reducing the multidimensionality of the initial data matrix.

Thus, PCA is a statistical procedure that applies an orthogonal transformation in order to convert a set of observations which might be possibly correlated variables into linearly uncorrelated variables called principal components. This reduces the potential problem of multicollinearity between answers to related questions. In PCA algorithm, the number of principal components has been determined based on a rule of thumb proposed by Kaiser (1960). According to that rule, a component will be retained if its eigen value is greater than unity. In PCA analysis, prior to the principal components (PCs) retention, several tests' statistics are performed to assess the suitability of the representative data. These tests include Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and range from 0 to 1 with > 0.50 considered as suitable for PCA. The Bartlett's test of Sphericity should be the level of significance with 'p' values less than 0.5 ($p < 0.5$) for PCA. Scree plot, which is another method of PC's retention, explores the graphical interpolation method in decreasing order of eigenvalue with a line to determine the point at which the significant breakpoint exists (Cattell, 1966; Ledesma and Valero-Mora, 2007)

Varimax orthogonal rotation method, which maximizes high item loadings and minimizes low item loadings thus providing more meaningful data interpretation in a simplified way (Williams et al., 2010), was also applied. Lastly, we assessed the face validity of the factors by evaluating the items that had loaded onto each factor and each factor or component was then assigned a descriptive summary name, which were very useful in exploring the SEM phase of the analysis.

7.2.3. Structural Equation Modelling (SEM)

Partial Least Square (PLS) Structural Equation Modelling was applied as an appropriate method, because it allows the estimation of relatively complex models (Ali et al., 2018) and the assessment of the results' predictive quality (Sarstedt et al., 2017). This approach is considered to be particularly useful when the focus is on estimating a structural model that helps to explain a target construct (Richter et al., 2015). In general, the SEM estimation, which is facilitated by the Smart PLS software, follows a 2-step approach, and this encapsulates the examination of the measurement models (distinguished by formative and reflective (outer) measurement models) and the structural (inner)

model. The measurement models must meet the required criteria in order to be fit for the assessment of the structural model. Following Hair et al. (2017) formative measurement models are evaluated based on convergent validity and indicator collinearity. Hair et al. (2019) note that the assessment of the reflective measurement models follows a four-step approach, and this includes: assessing indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. Different criteria were used to ensure the reliability and validity of the measurement models, and this includes internal consistency reliability with Cronbach's alpha greater than 0.6 and composite reliability greater than 0.7.

Loadings showing less than 0.4 were deleted. Loadings between 0.4 and 0.6 were also removed if this increased the composite reliability of constructs to an acceptable level (0.7 and above); if it increased the values of Average Variance Extracted (AVE) to a value above 0.5; and third if it improved the discriminant validity. The discriminant validity encapsulates an indicator's outer loadings on a construct (which must be higher than its outer loadings with other constructs); Fornell-Larcker Criterion (that is the square root of the AVE of each construct must be higher than its highest correlation with any other construct); and heterotrait-monotrait ratio (HTMT- must be less than 0.9) (Hair et al., 2017).

The framework developed was assessed using a standardised root mean square residual (SRMR), which has a strict criterion of a value smaller than 0.08 for ensuring model fit (Henseler et al., 2014). Collinearity between constructs was tested to ensure the results are below the threshold of 3; i.e., multicollinearity does not bias the results of the structural relations (Hair et al., 2019). The coefficient of determination using the R^2 values as well as the predictive relevance using Stone-Geiser's Q^2 values (Hair et al., 2017; Rigdon, 2012) were also used. The demographic attributes were added to the model as control variables for all other constructs, which consequently helps to test the robustness of the modelling results.

Both the structural equation modelling and factor analysis methods were employed to test hypotheses (cf. subsection 2.2.4) and the reliability of the measurements and research models.

7.3. Hypotheses testing

The hypotheses were tested by applying structural equation modelling based on the partial least squares approach (SEM-PLS). In contrast to covariance-based approaches such as LISREL, SEM-PLS is a variance-based approach to structural equation models. Considering the data in terms of its constructs and hypotheses, the application of SEM-PLS is appropriate, because it does not make assumptions regarding the distribution of the data, and it allows the assessment of smaller samples and complex models (Hair et al., 2011). Thus, to evaluate the quality of the measurement model, a two-step analysis was conducted separately for the consumers model (on food choices linked to PG production systems) and citizens (general attitudes to PG). Separate models were created for consumers' behavioural intentions to buy products produced using PG production systems, and citizens' behavioural intentions regarding PG. Separate measurement models were created to describe the relationship between the exogeneous (outer) latent and endogenous (inner) latent variables included in the analysis.

Tests of significance and overall model fit statistics were generated for each path within the model and based on the hypothesis, the model was built simultaneously by adding in the latent variables (Schaak and Mußhoff, 2018). An empirical equation model was developed in order to test whether the hypothesised theoretical model was consistent with the identified constructs or items. Thus, the model includes exogeneous latent variables (such as perceived risk, perceived benefits, increased trust, attitudes to ecosystem services, environmental management, attitudes towards PG products) and the endogenous latent variables of intention to spend time in grasslands/meadows and intention to buy products from sustainable PG. The model hypotheses are therefore tested by examining the sign, size, and statistical significance of the unstandardised structural coefficients (Sidali et al., 2015).

8. Results

Results from the descriptive, exploratory and SEM are organised as follows. Section 8.1 shows the demographic distributions of the respondents. This is followed by assessing the reliability and validity of the survey items using PCA in section 8.2. The items retained in the PCA were subjected to a structural equation modelling to explore the attitudes of citizens and consumers to PG and PG products respectively.

8.1. Basic characteristics of sample population

Overall, the sample of respondents consisted of 51% male and 49% female respondents, with mean age between 43 and 48 years (mean 45.67; SD = 1.63). The sample sizes were 632, 649, 638, 643 and 633 for UK, Czech Republic, Switzerland, Sweden, and Spain respectively, resulting in 3184 responses as seen in Tables 8 and 9.

Table 8. Age demographics of the total number of participants in each country

Countries	Number of Observations N	Age Mean (Standard Deviation)
UK	632	46
Czech Rep	649	46
Switzerland	638	45
Sweden	643	48
Spain	622	43
Total	3 184	46 (1.63)

Table 9. Characteristics of participants by country, gender, where they live most of the time and educational levels.

Countries	Gender (%)		Urban/Rural residence (%)		Educational levels (%)			
	Male	Female	Village	City/ town	Secondary Education or less	Upper Secondary education	Undergraduate degree or diplomas	Postgraduate degree or qualification
UK	48	52	49	51	20	38	33	9
Czech Rep	50	50	50	50	9	70	19	2
Switzerland	45	55	45	55	7	51	20	23
Sweden	57	43	48	52	21	34	32	13
Spain	57	43	46	54	35	27	29	9
Average	51	49	48	52	18	44	27	11

The sample populations in UK, Czech Republic, Switzerland and Sweden had the highest proportion of respondents in the Upper Secondary Education category while it was Secondary education or less for respondents in Spain. In addition, most respondents indicated that they were *currently working* and few respondents fell into the category of *students* or *not currently working*.

The percentage of respondents who indicated that they live in the city/ town was 52% while it was 48% for respondents who indicated they live in a village (in the countryside). Most respondents in

Czech Republic (48%), Switzerland (46%), Sweden (39%) and the UK (38%) indicated that they spend most of their time in the countryside as they either live or work there, while only 18% of respondents lived or worked in the countryside in Spain. This is supported by the highest proportion of respondents in the *never*[2] (visiting the countryside) category in Spain compared to other countries (cf figure 6). However, the proportion of respondents that visited the countryside *more than once a month* (32%) and *several times a year* (22%) categories appeared to be highest in Spain. This shows that most respondents in Spain did not live or work in the countryside, but they visited the countryside more often.

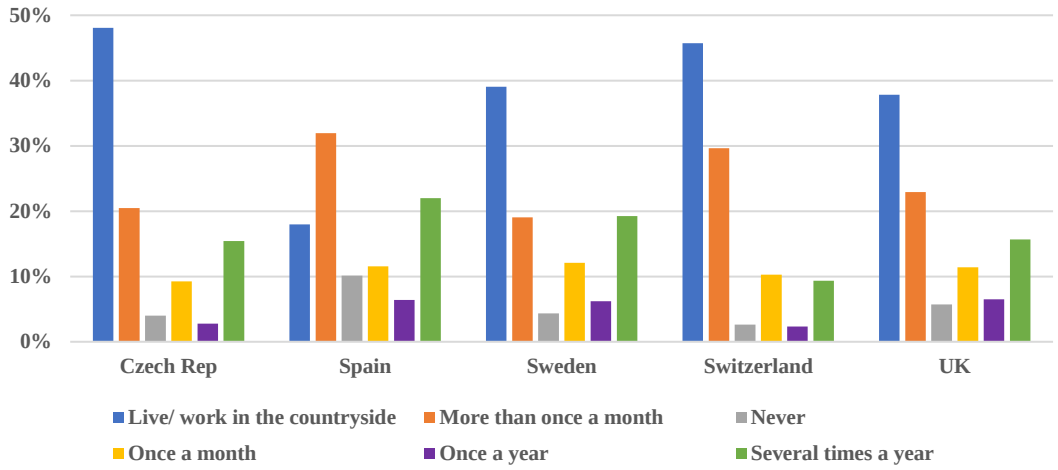


Figure 6. Percentage of participants who responded to how often they spend time in the countryside.

When asked about the main reasons for visiting the countryside, the highest proportion of residents across the five countries indicated that they visited the countryside for recreation and leisure but the activities that best described how they spend the majority of their time differed for each country. Over 60% of the respondents in Czech Republic (63%), Switzerland (66%) and Spain (63%) indicated that their preferred activity was cycling while it was hiking/rambling/walking for most of UK (61%) and Swedish (52%) respondents (Table 10).

Table 10. Participants employment situations, main reasons for visiting the countryside and the activities that best described how they spend their time in the countryside (percentages)

Self-reported practices	UK	Czech Republic	Switzerland	Sweden	Spain
Participants current employment situation*					
Working (employed and/or self-employed)	62	63	66	59	62
Retired	17	21	19	25	8
Student	5	6	6	7	9
Not currently working (never worked)	4	6	6	7	9
Not currently working (had a job in the past- excluding retired)	15	10	9	9	20
Participants main reasons for visiting the countryside*					
Visit family or friends	33	44	43	49	37
For work	10	17	24	15	8
Recreation and Leisure	79	49	63	58	74
Other	11	27	20	20	11
Activities best describing how they spend the majority of their time in the countryside*					
Walking the dog	34	38	22	26	29
Hiking/rambling/walking	61	16	13	52	13
Cycling	20	63	66	19	63
Running	16	30	33	18	15

[2] Never category is classified as the respondents who indicated that they never spend time in the countryside

Self-reported practices	UK	Czech Republic	Switzerland	Sweden	Spain
Hunting or shooting	1	13	35	5	16
Foraging	7	2	7	38	3
Photography	24	7	14	23	16
Art or Craft	6	28	29	6	26
Horse riding	3	7	10	6	3
Wildlife watching	30	3	7	14	5
Motor Biking or touring	3	48	16	3	24
Angling	4	4	10	15	3
Sailing, rowing or water sports	4	7	11	4	5
Working or education including agriculture	5	2	10	10	3
Other	10	18	8	23	6

*Participants could select multiple responses for these questions.

8.2. Measuring citizen's attitudes towards grasslands and meadows

The mean scores relating to the six attitudinal questions (Table 11) averaged 3 or more which corresponds to the positive side of each scale for all the five EU countries investigated. In terms of the beauty of the countryside, the respondents in UK rated grasslands and meadows more favourably than respondents from the other four countries. Overall, it can be inferred that the majority of the respondents viewed grasslands and meadows as pleasant, good, valuable, interesting, beautiful and enjoyable.

Table 11. Attitudes of citizens towards grasslands and meadows in the five EU Countries (mean values and standard errors in parenthesis)

[3]Grasslands and meadows are…	UK n= 632	Czech Republic n=649	Switzerland n=638	Sweden n=643	Spain n=622	Overall n=3184
Unpleasant=1/Pleasant=5	4.26 (0.93)	4.34 (0.89)	3.92 (0.94)	4.28 (0.92)	4.13 (0.86)	4.18 (0.92)
Bad=1/Good=5	4.23 (1.04)	4.24 (1.04)	3.99 (1.07)	4.22 (1.08)	4.18 (0.96)	4.17 (1.04)
Worthless=1/Valuable=5	4.19 (1.06)	4.21 (1.12)	4.04 (1.15)	4.31(1.05)	4.24 (0.94)	4.21 (1.07)
Boring=1/Interesting=5	4.06 (1.09)	4.09 (1.21)	3.92 (1.19)	4.20 (1.12)	3.98(1.05)	4.05 (1.14)
Ugly=1/beautiful=5	4.13 (1.09)	3.95 (1.19)	3.72(1.16)	3.89(1.12)	3.81(1.11)	3.91(1.14)
Not enjoyable=1/Enjoyable=5	4.16 (0.98)	4.02(1.15)	3.89(1.10)	4.03(1.08)	3.97(1.00)	4.01(1.07)

When asked about their intention to visit meadows and grasslands, the majority of the respondents indicated that they intend to spend time in grassland, and they perceived it as easy to visit. The majority of respondents indicated that they were less likely to visit towns (Table 12).

Table 12. Statements regarding Intention to visit meadows and grasslands, using a five-point Likert scale: 1 = "strongly disagree" to 5 = "strongly agree" (mean values and standard errors in parenthesis).

Intention to visit- Citizen	UK n= 632	Czech Republic n=649	Switzerland n=638	Sweden n=643	Spain n=622	p values
I intend to spend time in grassland and meadows	3.85 (0.94)	3.58 (0.98)	3.56 (0.99)	3.43 (0.96)	3.53 (1.04)	P<0.001
I intend to avoid grassland and meadows	2.11 (1.22)	3.62 (1.01)	3.72 (0.94)	3.68 (1.00)	3.71 (1.02)	P<0.001
I would consider spending time in grassland and meadows	4.36 (0.82)	2.56 (1.10)	2.68 (1.24)	2.34 (1.13)	2.72 (1.17)	P<0.05
I plan to spend less time in grassland and meadows	2.36 (1.24)	2.15 (1.18)	2.35 (1.35)	1.94 (1.14)	3.98 (1.23)	P<0.05

[3] All the categories are significant at p<0.00 and p<0.05 showing that there are significant differences between the five countries. Responses are based on 1 to 5 Likert scale showing mean rank 1 to 5 and Standard Deviation (SD) in parentheses.

Intention to visit- Citizen	UK n= 632	Czech Republic n=649	Switzerland n=638	Sweden n=643	Spain n=622	p values
It is easy for me to visit grassland and meadows	3.89 (1.02)	3.92 (0.96)	3.89 (1.09)	3.91 (1.03)	3.65 (1.08)	P<0.05
I cannot financially afford to visit grassland and meadows	2.23 (1.26)	2.15 (1.18)	2.22 (1.31)	1.87 (1.18)	2.43 (1.24)	P<0.05
I intend to support policies that conserve meadows and pastures	3.96 (1.01)	4.15 (0.91)	4.09 (1.06)	4.15 (1.05)	3.80 (1.08)	P<0.001
I know where to go to visit grassland and meadows	3.84 (0.94)	3.61 (0.97)	3.55 (1.08)	3.82 (1.00)	3.80 (0.96)	P<0.001
I intend to support government policies that help farmers manage meadows and pastures sustainably	3.84 (0.92)	3.73 (0.98)	3.59 (1.07)	3.84 (0.98)	3.83 (1.04)	P<0.001
I would rather visit other parts of the countryside than grassland and meadows	2.98 (0.10)	2.95 (1.04)	2.10 (1.13)	2.96 (1.03)	3.34 (1.03)	P<0.05
I would rather visit towns than grasslands and meadows	2.45 (1.01)	2.28 (1.12)	2.65 (1.25)	2.80 (1.03)	2.74 (1.21)	P<0.001

8.3. Measuring consumer's behavioural intention to buy sustainable PG products

In terms of sustainably produced food, Table 13 shows that respondents from Spain and Sweden find it easy to identify sustainably produced food. However, they expressed the view that it is not a priority for them. In addition, apart from in Switzerland, respondents expressed a higher intention to increase their consumption of foods that are sustainably produced, as indicated in their responses as regards *not avoiding foods that are sustainably produced* as most of these statements received average scores at the lower end of the Likert scale (less than 3).

Table 13. Statements regarding behavioural intention to buy products from sustainable PG, using a five-point Likert scale: 1 = "strongly disagree" to 5 = "strongly agree" (mean values and standard errors in parentheses).

Behavioural intention to purchase - Consumer	UK n= 632	Czech Republic n=649	Switzerland n=638	Sweden n=643	Spain n=622	p values
It is easy for me to identify sustainably produced food	3.20 (1.11)	2.86 (0.99)	3.39 (1.19)	3.84 (1.00)	3.98 (0.91)	P<0.05
It is easy for me to buy sustainably produced food	3.33 (1.04)	2.94 (1.00)	3.34 (0.96)	2.39 (1.31)	2.92 (1.35)	P<0.05
Sustainable production of food is not a priority for me	2.98 (1.20)	3.07 (1.03)	3.51 (0.94)	3.72 (1.03)	3.89 (0.97)	P<0.001
I intend to buy foods that are sustainably produced	3.59 (0.99)	3.33 (0.95)	2.89 (1.22)	2.13 (1.29)	2.59 (1.34)	P<0.001
I plan to reduce my consumption of foods that are sustainably produced	2.83 (1.25)	2.69 (1.00)	3.61 (1.01)	2.91 (1.10)	3.12 (1.12)	P<0.05
I intend to increase my consumption of foods that are sustainably produced	3.62 (0.97)	3.26 (0.94)	2.65 (1.21)	3.09 (1.05)	3.30 (1.08)	P<0.01
I avoid purchasing foods that are sustainably produced	2.59 (1.25)	2.53 (1.07)	3.67 (1.02)	2.68 (1.25)	2.87 (1.21)	P<0.01

Table 14 presents the percentage of "strongly agree" + "somewhat agree" responses to items relating to benefits of maintaining PG and the perceived risk of losing it. In general, most respondents from all the countries included in the research indicated that they perceived it to be important to (experience and observe) trees as a benefit when visiting the countryside. This was followed by a sense of feelings of happiness, peacefulness, appreciating the presence of meadows and pasture, and open landscape. However, the most likely perceived "risk" (threats and problems) was attributed to the behaviour of visitors, misuse of chemical fertilisers, and successional issues (lack of young farmers taking over farms). Conversion of pasture or meadows to forest or woodland, and too many livestock causing

damage to the land were not perceived to be a significant threat to PG, by the majority of the respondents, but it was unclear whether these practices were generally unacceptable, and a comparative analysis is warranted in future research. This is reflected in the low percentages of their somewhat agree or agree responses (Table 14). Although the level of agreement differed between countries investigated, the greatest concern in terms of perceived risk was common across the five countries.

Table 14. Responses to benefits of maintaining PG and perceived risks causing problems in the countryside (mean values)

Items- Benefit item (When visiting the countryside, it is important that…) Risk item (…. cause problems in the countryside)	Countries (Percentage of respondents)					p-values
Benefits of maintaining PG (security, feeling of stimulation, feeling of self-direction, and landscape preferences)	UK	Czech Republic	Switzerland	Sweden	Spain	
I don't feel threatened	80	75	65	67	69	0.00
The landscape feels familiar	55	71	68	41	72	0.00
I feel protected from hazards	66	61	65	58	62	0.14
There is plenty to discover	82	81	77	76	83	0.00
The landscape is fascinating	84	86	80	80	86	0.00
The landscape makes the region special	79	77	75	71	83	0.02
The landscape enables me to do whatever I like	59	65	57	55	54	0.00
I feel free from demands and expectations	75	67	63	69	75	0.47
I feel far away from my obligations	74	65	63	74	70	0.78
I feel happy	87	83	84	81	83	0.00
There is a sense of peacefulness	86	72	80	79	86	0.00
There are trees	87	88	81	82	87	0.00
The landscape is open	77	84	70	62	83	0.50
The landscape is well maintained	61	67	60	54	76	0.00
There are no buildings or human constructions	60	44	52	33	74	0.00
There are agricultural crops	56	67	62	52	71	0.00
There are meadows and pastures	78	82	75	70	79	0.00
The landscape is varied	79	82	74	77	80	0.27
The landscape is colourful	76	84	71	60	81	0.00
The landscape looks traditional	68	70	53	44	74	0.04
Perceived risk (threats and impacts)						
Conversion to urban land use	60	50	45	57	44	0.00
Conversion of pasture or meadows to cropland	46	40	37	41	41	0.04
Conversion of pasture or meadows to forest or woodland	32	28	34	36	46	0.00
Abandonment of land by farmers	45	37	39	46	40	0.00
Too many livestock causing damage to the land	46	22	46	28	33	0.00
Increased number of visitors (tourism)	60	43	45	43	50	0.00
Bad behaviour of visitors	74	71	63	67	65	0.00
Poor farming practices	60	56	43	47	56	0.00
Misuse of chemical fertilisers	70	64	61	64	63	0.02
Effects of climate change	64	53	59	60	62	0.00
Changing diets (e.g., eating more/fewer animal products)	44	33	49	37	48	0.22
Changing demand for food	53	41	48	41	50	0.83
Farmers unable to make a living from the land	58	45	55	60	58	0.04
Lack of young farmers taking over farming	64	70	62	67	72	0.00
Changes to the market prices of farm products from the countryside	59	61	54	51	67	0.00

Note: Results are presented in the table for 'strongly agree' and 'somewhat agree' responses. P-values are computed for between countries and comparison is between columns at $p < 0.05$

8.4. Citizen and consumer attitudes

Responses in Table 15 are based on a 1 to 5 Likert scale showing the mean rank and standard deviation (SD) in parentheses. Affective responses were also rated using a 5-point Likert Scale anchored by 1- negative attitudinal factor to 5- positive attitudinal factor.

Table 15. Behavioural intentions in both "citizen" and "consumer" models (mean values and standard errors in parenthesis)

Overall Construct	UK n= 632	Czech Republic n=649	Switzerland n=638	Sweden n=643	Spain n=622
Citizens					
Affective responses (Attitude to PG)	4.17 (0.41)	4.14 (0.49)	3.91 (0.57)	4.15 (0.48)	4.05 (0.47)
Behavioural Intentions linked to PG- intention to visit	3.22 (1.25)	3.16 (1.17)	3.21 (1.17)	3.05 (1.29)	3.18 (1.06)
Perceived benefits of maintaining PG	4.07 (0.56)	4.06 (0.50)	3.91 (0.62)	3.90 (0.65)	4.17 (0.56)
Perceived risk of losing PG	3.62 (0.79)	3.14 (0.89)	3.42 (0.84)	3.50 (0.86)	3.49 (0.97)
Attitudes towards the management of the countryside	4.06 (0.52)	3.85 (0.61)	3.77 (0.70)	3.86 (0.72)	4.21 (0.54)
Attitudes to different ES linked to PG	3.89 (0.77)	3.95 (0.72)	3.81 (0.81)	3.88 (0.83)	4.18 (0.63)
Attitude towards the environment	3.13 (1.24)	3.02 (1.25)	3.13 (1.16)	3.04 (1.37)	3.11 (1.34)
Trust in institutions, government and policy, farmers etc.	3.15 (0.94)	2.78 (0.83)	3.22 (0.73)	2.96 (0.79)	3.02 (0.88)
Overall by country	3.69 (0.79)	3.54 (0.80)	3.57 (0.80)	3.56 (0.86)	3.69 (0.80)
Consumer					
Behavioural intentions linked to consumer attitudes	3.16 (0.86)	2.96 (0.75)	3.29 (0.89)	2.97 (1.08)	3.25 (0.94)
Labelling	3.93 (0.64)	3.55 (0.72)	3.48 (1.19)	3.82 (0.75)	4.14 (0.59)
Shopping priorities (meat products)	3.42 (0.72)	3.33 (0.75)	3.14 (0.89)	3.34 (0.72)	3.66 (0.67)
Shopping priorities (dairy products)	3.44 (0.69)	3.20 (0.69)	3.21 (0.81)	3.40 (0.71)	3.56 (0.59)
Local embedded identity	3.92 (0.60)	3.80 (0.67)	3.64 (0.78)	3.89 (0.71)	3.98 (0.58)
Productivist attitudes (Attitudes to Agriculture)	3.55 (0.68)	3.72 (0.71)	3.71 (0.63)	3.67 (0.71)	3.83 (0.72)
Overall by country	3.57 (0.71)	3.37 (0.72)	3.35 (0.91)	3.48 (0.79)	3.72 (0.67)

The analysis of the affective responses showed that, on average, citizens have a very positive general attitude towards PG with mean 4.08 and SD 0.48, thus indicating that only 27.2% of the respondents had either negative or neutral attitudes to PG. The highest levels of positive affect and behavioural intention linked to PG were associated with UK respondents. The most positive attitudes to different ES linked to PG, perceived benefits of maintaining the PG, attitudes towards the management of the countryside as well as the highest values for productivist attitudes, labelling, local embedded identity, shopping priorities for meat and dairy products were all associated with Spanish respondents. Citizens and consumers attitudes varied by country (see overall country row in Table 15). Repeated-measures ANOVA using a Greenhouse-Geisser correction and Huynh-Feldt corrections indicates that the mean levels differed significantly between countries which is [$F(30.45, 24248.48) = 24.65$, $p < 0.001$] for consumers and [$F(12.14, 9662.16) = 25.36$, $p < 0.001$] for citizens.

8.4.1. Factor analysis by Sub-scales- PCA results

The PCA grouped items on attitudes (towards the management of the environment, towards different ecosystem services, behavioural intention, perceived risk, perceived benefits, trust, productivist attitudes, labelling, shopping priorities and labelling) into factors based on similar identities or concerns and were given descriptive names based on how they are represented in the variables included in the hypotheses and research model (Table 16 and 17).

As shown in tables *9**a** to 9**o*** in the appendix section, the exploratory factor analysis (PCA) has KMO (Kaiser-Meyer oikin measure of sampling adequacy) values ranging from 0.538 to 0.936, which were greater than 0.5, indicating that the application of PCA was appropriate. The Barlett's test of sphericity also provided values of 0.000 which indicates the suitability and significance of the data re: PCA, (Tables 9a to 9o). Cronbach's alpha values were above the generally accepted 0.7 for all factors, indicating good internal scale reliability, with the exception of the three items measuring behavioural intentions linked to consumer attitudes, which are 0.601, 0.602 and 0.652 respectively. In addition, the third component or factor of the EIA items was 0.636. However, it is accepted that psychological variables with reliability scores ranging from 0.5 to 0.6 minimum are acceptable levels for psychological scales (Kline, 2016).

The Kaiser' criterion with an eigenvalue greater than one (Kaiser, 1960) and Cattell scree test work together to extract the principal components that were retained for further analysis. Varimax orthogonal rotation method was used for the PCA to develop principal component metrics that were uncorrelated to provide more meaningful interpretation of data. 136 items out of a total of 157 Likert scale items were finally retained for the SEM-PLS analysis. The components extracted by PCA using the 136 items are itemised below. Further details can be found in the appendix section (tables 9a to 9o).

Table 16. Item descriptions for citizen model.

Construct- Citizens	Items/ factors	Item description
Perceived Risk	PR	All items measuring PR
	PR1	Negative effects of behaviour on environment
	PR2	Land use change
	PR3	Economics of farming
	PR4	Changing demand for food production
Perceived benefit	PB	All items measuring PB
	PB1	Landscape preference - emotional
	PB2	Landscape preference – land use and management
Trust- Ability/Motivation	TA	Trust in ability and motivation
	TA1	Trust in industry, business and third sector's ability to manage the countryside
	TA2	Trust in farmers and government's ability to manage the countryside
	TM1	Trust in all actor's motivation to manage the countryside
Management of the Countryside	MC1	Management of the countryside
Environmental Services	ES	All items measuring ES
	ES1	Environmental quality provision and regulation
	ES2	Social and cultural services
	ES3	Producing food, energy and other products
Attitudes to PG	APG1	Attitudes to grassland
Behavioural Intentions	BI	All items measuring BI
	BI1	Positive behaviours towards grassland
	BI2	No preference for grassland environments
EIA	EIA	All items measuring EIA
	E1A1	Human use of the environment
	EIA2	Environmental value and enjoyment
	EIA3	Active environmental protection

Table 17. Item description for consumer model.

Construct- Consumers	Items/ Factors	Item description
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food
	IB2	Intention to buy sustainably produced food
	IB3	Avoidance of sustainably produced food
Local Place Identity/PA	LPI	Local place identity
	PA	Productivist attitudes
Attitudes to PG Consumer	APG1	Attitude to grassland
Shopping Habits (Meat)	SHM1	Production process and product value - meat
	SHM2	Taste and freshness of product - meat

Construct- Consumers	Items/ Factors	Item description
	SHM3	Purchase accessibility of product - meat
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy
	SHD2	Purchase accessibility and quality of product - dairy
Preferences for Labelling	PL1	Preference for product label
Consumer attitudes towards PG products	APGproducts	PA productivist attitudes Shopping habits local place identity

8.4.2. MANOVA (Multi Analysis of Variance) by Subscales

Age has a statistically significant relationship with the combined dependent variables of perceived risk (Table 18); PR1 (negative effects of behaviour on environment), PR2 (land use change), PR3 (economics of farming) and PR4 (changing demand for production). Thus, there was a significant difference between the age groups (under 30, 31-40, 41-50, 51-60, 61-70, 71 and older). This shows the wilks' Lambda test, which is flexible to normality assumption, to be = .941, F (20, 10527) = 9.704, p= 0.000. This suggests that between age categories of participants, there was a difference when the dependent variables were explored together in a multivariate way. This interpretation is applicable also to education, country and urban versus rural dwellers as they were all statistically significant, thus showing there were significant effects of age, education, country, urban/rural dwellers on perceived risk combined. However, in terms of Gender, the p value is more than 0.05 (p= 0.928) which shows that a significant difference does not exist between male and females in terms of the perceived risk items.

Table 18. MANOVA- Differences in Perceived Risk items (PR1, PR2, PR3, PR4) (Multivariate tests) of demographic groups

Socio-economic variables	Value	F	df	P-value
Age	0.941	9.704	20, 10527	0.000
Gender	1.000	.219	4, 3176	0.928
Education	0.972	7.642	12, 8422	0.000
Country	0.915	17.831	16, 9721	0.000
Urban/rural dweller	0.986	11.466	4, 3185	0.000

MANOVA was conducted to determine the relationship between the combined items of perceived risk and the main effects of some socio-economic variables. Following the PCA (exploratory factor analysis) in tables 9a to 9o, the mean values of the Likert scale responses represented in each component were calculated to obtain the mean of each subscale. Taking PR1, for example, which includes items such as misuse of chemical fertilisers (Q19_9), poor farming practices (Q19_8), bad behaviour of visitors (Q19_7), effects of climate change (Q19_10) and increased number of visitors (Q19_6), the mean scores of all these items are computed together and a variable (PR1) on the continuous data was derived. This process is repeated for all other items defining the subscales and it is done by using the transform function in SPSS. The normality of the data was checked prior to the analysis, together with identification of outliers using the Mahalanobis test. The data was not normally distributed; hence Games Howell's post hoc test was applied, which is flexible to any normality assumption, because it is designed for assumption violations (Games and Howell, 1976).

A series of one-way ANOVAs on each of the dependent variables was then conducted as a follow-up test to the MANOVA. To test for difference in perceived risk between PR groups. Hence, the relationship between Perceived Risks and socio demographic variable levels was further analysed using ANOVA in order to explore whether there were any statistical differences between the groups as this helps to determine the source of the differences. Thus, a separate ANOVA was conducted for

each dependent variable (PR1, PR2, PR3, PR4) with each ANOVA evaluated at an alpha level 0.05. Hence, with separate ANOVAs being conducted on the dependent variable individually for age, then gender, followed by education, then country, and lastly urban/rural dwellers, the results show that somewhere among the socioeconomic variables being explored there is at least one significant difference between them as seen across all four PR groups. Only significant (p) values of all socio-economic variables are recorded on a single table for simplicity.

All the p-values were statistically significant for age, education, and country irrespective of perceived risk levels. However, the p-values for gender showed that there were no statistically significant differences between males and females regarding all the levels of perceived risks items. Table 19 also indicates that statistically significant differences exist between participants who resided in urban and rural areas regarding how they perceive risk with respect to land use change and changing demand for production.

Table 19. ANOVA- Differences in Perceived Risks levels based on Socio economic variables

Item	Age	Gender	Education	Country	Urban/rural dwellers
PR1	0.000	0.434	0.000	0.000	0.244
PR2	0.006	0.976	0.000	0.000	0.000
PR3	0.000	0.907	0.000	0.002	0.393
PR4	0.000	0.646	0.000	0.000	0.000

Table 20 explores the relationship between combined items of perceived benefits; PB1 (landscape preference- emotional) and PB2 (landscape preference- land use and management) and socio-economic variables (age, gender, education, country, urban/rural dwellers). The MANOVA was conducted to test the hypothesis that there would be one or more mean differences between the socio-economic variables and levels of perceived benefits (PB1 and PB2). The results show that participants' perceived benefits were significantly dependent on age, gender, education, country, and whether they dwell in urban or rural areas.

Table 20. MANOVA- Differences in Perceived Benefits (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.976	7.829	10, 6352	0.000
Gender	0.991	13.875	2, 3178	0.000
Education	0.989	5.958	6, 6370	0.000
Country	0.931	28.885	8, 6368	0.000
Urban/rural dweller	0.997	4.982	2, 3187	0.007

However, the results of the separate ANOVAs on each item of the perceived benefits items (Table 21) shows that there was a significant effect between male and female as well as urban and rural dwellers with respect to their emotional preference for landscape (PB1). Conversely, there was no significant effect of preference for landscape in terms of land use and management (PB2) on gender as well as urban/rural dwellers. The significance values of age, education and country in both PB1 and PB2 shows the significant effect of these three socio-economic variables on participants emotional preference for landscape and their preference for landscape land use and management.

Table 21. ANOVA- Differences in demographics based on their (p-values) significance levels -

Item	Age	Gender	Education	Country	Urban/rural dwellers
PB1	0.000	0.000	0.007	0.000	0.002
PB2	0.000	0.232	0.000	0.000	0.075

Each of the items, "attitudes to permanent grassland" and "attitudes towards the management of the countryside", had one component each. At least two components are needed to conduct MANOVA, hence the reason for combining these two items as dependent variable items.

Table 22 shows that there were significant effects of all demographic variables on combined effects of participants attitudes to PG and their attitudes towards the management of the countryside.

Table 22. MANOVA- Differences in Attitudes to PG and Attitudes towards the management of the countryside (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.956	14.360	10, 6352	0.000
Gender	0.997	4.762	2, 3178	0.000
Education	0.994	3.147	6, 6370	0.004
Country	0.928	30.462	8, 6368	0.000
Urban/rural dweller	0.991	15.173	2, 3187	0.000

Age, gender, country and rural/urban dwellers had statistically significant effects on both attitudes to PG and attitudes to the management of the countryside, while education had a statistically significant effect only on attitudes to PG as it was not significant in relation to attitudes towards the management of the countryside (Table 23).

Table 23. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
Attitudes to PG	0.000	0.019	0.008	0.000	0.000
Attitudes towards the management of the countryside	0.000	0.006	0.096	0.000	0.039

Table 24 summarises the results of a multivariate analysis which shows "sig." values of 0.000, which means $p < .05$. There were statistically significant differences in the combined items of trust (TR1; trust in industry, business and third sector – ability to manage the countryside; TR2; trust in farmers and government- ability to manage the countryside; TR3; trust in all actors - motivation to manage the countryside) based on age, gender, education, country, and whether or not participants live in urban or rural areas.

Table 24. MANOVA- Differences in Trust (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.928	16.070	15, 8765	0.000
Gender	0.998	2.046	3, 3177	0.000
Education	0.988	4.380	9, 7749	0.000
Country	0.874	36.640	12, 8422	0.000

Urban/rural dweller	0.988	12.922	3, 3186	0.000

However, the exploration of each item of the dependent variable on the ANOVA table in Table 25 showed that gender had a significant effect on only TR2, trust in farmers and government and not in TR1 (trust in industry, business and third sector) and TR3 (trust in all actors). Age, education, country, and urban/rural dwellers had significant effects on each of the trust subscales (TR1, TR2 and TR3).

Table 25. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
TR1	0.000	0.191	0.000	0.000	0.000
TR2	0.000	0.045	0.004	0.000	0.001
TR3	0.000	0.839	0.000	0.000	0.000

There were significant differences of the combined effect of AES (Attitudes towards different ES linked to PG), which were AES1 (Environmental quality provision and regulation), AES2 (Social and cultural impact) and AES3 (Producing food, energy and other products), based on all the demographic variables as seen in Table 26, while Table 27 explains how the dependent variables differ for the independent variables.

Table 26. MANOVA- Differences in AES (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.911	20.144	15, 8765	0.000
Gender	0.991	9.499	3, 3177	0.000
Education	0.974	9.290	9, 7749	0.000
Country	0.886	32.930	12, 8421	0.000
Urban/rural dweller	0.991	10.104	3, 3186	0.000

The ANOVA results in Table 27 shows that all the socio-economic variables had a significant effect on each component of AES except for urban/rural dwellers and gender, which were not significant on AES2 and AES3 respectively.

Table 27. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects).

Item	Age	Gender	Education	Country	Urban/rural dwellers
AES1	0.000	0.000	0.016	0.000	0.000
AES2	0.000	0.006	0.000	0.000	0.270
AES3	0.000	0.406	0.000	0.000	0.047

We can conclude there were statistically significant differences in the combined items of behavioural intentions linked to PG (BI1; positive behaviours towards grassland; BI2; no preference for grassland) based on age, gender, education, country, and whether or not participants live in urban or rural areas (Table 28).

Table 28. MANOVA- Differences in Behavioural Intentions (BI) linked to PG (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.907	31.599	10, 6352	0.000

Gender	0.998	3.922	2, 3178	0.020
Education	0.978	11.921	6, 6370	0.000
Country	0.972	11.257	8, 6368	0.000
Urban/rural dweller	0.962	63.141	2, 3187	0.000

Table 29 shows that age, gender, education, country, urban/rural dwellers had significant effects on separate subscales of BI1 and BI2, except gender and education which did not have any significant effects in relation to participants positive behaviour towards grassland.

Table 29. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
BI1	0.000	0.913	0.433	0.000	0.000
BI2	0.000	0.006	0.000	0.000	0.000

A multivariate test shows "sig." values of 0.000 (Table 30) indicating that there were statistically significant differences in all combined items of Environmental attitude Inventory EIA (EIA1: Human use of the environment; EIA2: Environmental value and enjoyment; EIA3: Active environmental protection) based on the socio-economic variables explored.

Table 30. MANOVA- Differences in EIA (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.935	14.512	15, 8765	0.000
Gender	0.984	17.658	3, 3177	0.000
Education	0.968	11.515	9, 7749	0.000
Country	0.939	16.982	12, 9545	0.000
Urban/rural dweller	0.987	14.106	3, 3186	0.000

All the socio-economic variables had a significant effect on the separate component of EIA1, EIA2 and EIA3, except gender, where males and females did not differ in reporting how active they are in protecting the environment (Table 31).

Table 31. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
EIA1	0.000	0.000	0.000	0.059	0.000
EIA2	0.000	0.000	0.000	0.000	0.006
EIA3	0.000	0.452	0.000	0.000	0.000

We can conclude from Table 32 that there were statistically significant differences in participants local place identity, productivist attitude and preference for labels based on their age, gender, education, country and whether they were urban or rural dwellers.

Table 32. MANOVA- Differences in Local Place Identity, Productivist Attitude, Preference for labels (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.940	13.265	15, 8765	0.000
Gender	0.991	9.789	3, 3177	0.000
Education	0.985	5.381	9, 7749	0.000
Country	0.856	42.577	12, 9545	0.000
Urban/rural dweller	0.992	8.704	3, 3186	0.000

Table 33, on the other hand, shows that the socio-economic variables had a statistically significant effect on local place identity, productivist attitude and preference for labels, except gender, which was not statistically significant in the case of productivist attitudes. This shows that males and females do not differ in their productivist attitudes.

Table 33. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
Local Place identity	0.000	0.009	0.030	0.000	0.000
Productivist Attitude	0.000	0.811	0.001	0.000	0.002
Preference for labels	0.000	0.000	0.000	0.000	0.027

Based on the identified socio-economic variables (age, gender, education, country, urban/rural dwellers), there were statistical differences in consumers behavioural intentions to buy PG products (Table 34: BIC1, BIC2 and BIC3, which are labelled as "identify but don't prioritise sustainably produced food", "intention to buy sustainably produced food" and "avoidance of sustainably produced food" respectively).

Table 34. MANOVA- Differences in Behavioural intentions linked to consumer attitudes (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.964	7.749	15, 8765	0.000
Gender	0.992	8.677	3, 3177	0.000
Education	0.980	7.201	9, 7749	0.000
Country	0.614	142.186	12, 8421	0.000
Urban/rural dweller	0.996	4.744	3, 3186	0.003

Age, gender, education, country, urban/rural dwellers also had statistically significant effects on consumers who "don't prioritise sustainably produced food", on those who have the "intention to buy sustainably produced food" as well as those who "avoid buying sustainably produced food". However, education level and urban or rural dwelling had no influence on whether consumers bought sustainably produced food (Table 35).

Table 35. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
BIC1	0.000	0.011	0.000	0.000	0.002
BIC2	0.000	0.000	0.983	0.000	0.149
BIC3	0.000	0.058	0.000	0.000	0.007

People's shopping habits for meat (SHM) were significantly dependent on their age, education, country, whether or not they live in rural or urban areas, but not on their gender (Table 36). Thus, there were statistically significant differences in consumers shopping habits based on their age, education, country, and whether they were urban or rural dwellers.

Table 36. MANOVA- Differences in Shopping habits meat (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.979	4.546	15, 8765	0.000
Gender	0.999	1.587	3, 3177	0.190
Education	0.970	10.930	9, 7749	0.000
Country	0.421	271.178	12, 8422	0.000
Urban/rural dweller	0.997	3.336	3, 3186	0.019

Age, education and country had a statistically significant effect on whether "meat production process and product value" (SHM1), "taste and freshness of meat product" (SHM2) and "meat purchase accessibility" (SHM3) were important considerations (Table 37). Gender did not affect the three constructs predicting meat shopping habits. In the case of urban *versus* rural dwellers, the only significant value among the components was "meat production process and product value" and this indicated that living in urban/rural areas had a statistically significant effect on participants' shopping habits in terms of "meat production process and product value".

Table 37. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
SHM1	0.000	0.565	0.049	0.000	0.051
SHM2	0.000	0.206	0.000	0.000	0.088
SHM3	0.039	0.620	0.000	0.000	0.984

We can conclude from Table 38 (significance at the 0.05 level) that consumers' shopping habits for dairy (SHD) in terms of "production process and product values" (SHD1) and "purchase accessibility" and "quality of product" (SHD2) were significantly dependent on their age, gender, education, country, and whether they were urban or rural dwellers.

Table 38. MANOVA- Differences in Shopping habits dairy (Multivariate tests)

Variable	Value	F	df	P-value
Age	0.967	10.699	10, 6352	0.000
Gender	0.996	6.514	2, 3178	0.002
Education	0.995	2.541	6, 6368	0.019

Country	0.943	23.763	8, 6368	0.000
Urban/rural dweller	0.997	4.793	2, 3187	0.008

To determine the nature of the effect, Table 39 shows a univariate ANOVA summary table for each aspect of dairy product shopping habits (SHD1 and SHD2). The values of p ($p < 0.05$) indicate that age, gender and country had a statistically significant effect on both SHD1 and SHD2, while education and urban/rural dwellers had a statistically significant effect on SHD1 (dairy production process and product values) and SHD2 (dairy purchase accessibility and product quality) respectively.

Table 39. ANOVA- Differences in demographics based on their (p-values) significance levels - (Tests of between-subjects effects)

Item	Age	Gender	Education	Country	Urban/rural dwellers
SHD1	0.000	0.000	0.294	0.000	0.003
SHD2	0.000	0.002	0.013	0.000	0.076

In summary, all the ANOVA tables explored above showed age and country as consistently being significant across all the subscales, whereas the other socio-economic variables such as gender, country, rural versus urban dwellers were found to be insignificant with respect to at least one of the subscales. To this regard, a series of post-hoc analysis was performed specifically by country in order to examine the mean difference comparisons across the subscales as seen in Table 40.

Table 40. Post hoc tests using Games Howell test- ANOVA table exploring between-group test of the five EU countries by subscales

ANOVA test of between groups (five EU countries) by Subscales*	Sum of squares	Mean Squares	F	Sig.
PR1; Negative effects of behaviour on environment	29.08	7.27	10.38	<.001
PR2; Land use change	74.98	18.76	23.48	<.001
PR3; Economics of farming	10.65	2.66	4.28	.002
PR4; Changing demand for production	64.88	16.22	27.55	<.001
PB1; Landscape preference - emotional	25.20	6.30	13.54	<.001
PB2; Landscape preference – land use and management	84.43	21.11	44.34	<.001
AttitudesPG; Attitudes to grassland	29.34	7.34	9.80	<.001
Trust1; Trust in industry, business and third sector – ability to manage the countryside	158.75	39.69	57.15	<.001
Trust2; Trust in farmers and government - ability to manage the countryside	25.51	6.38	9.38	<.001
Trust3; Trust in all actors – motivation to manage the countryside	146.56	36.64	52.08	<.001
Attitudes Countryside; Management of the countryside	85.56	21.39	48.46	<.001
AES1; Environmental quality provision and regulation	20.43	5.11	10.78	<.001
AES2; Social and cultural impact	124.69	31.17	58.54	<.001
AES3; Producing food, energy and other products	108.15	27.04	39.44	<.001

ANOVA test of between groups (five EU countries) by Subscales*	Sum of squares	Mean Squares	F	Sig.
BehInt1; Positive behaviours towards grassland	18.09	4.52	9.17	<.001
BehInt2; No preference for grassland	45.63	11.41	13.35	<.001
EIA1; Human use of the environment	6.05	1.51	2.27	0.051
EIA2; Environmental value and enjoyment	44.49	11.12	23.32	<.001
EIA3; Active environmental protection	46.73	11.68	17.65	<.001
LPIdentity; Local Place identity	44.77	11.19	20.25	<.001
BehaviouralInt1; Identify but don't prioritise sustainably produced food	453.06	113.27	154.18	<.001
BehaviouralInt2; Intention to buy sustainably produced food	416.34	104.09	116.68	<.001
BehaviouralInt3; Avoidance of sustainably produced food	429.66	107.42	116.37	<.001
ProdAttitude; Productivist attitude	26.10	6.53	13.70	<.001
Shopping HabitsMeat1; Production process and product value - meat	66.87	16.72	15.15	<.001
Shopping HabitsMeat2; Taste and freshness of product - meat	2008.70	502.17	449.43	<.001
Shopping HabitsMeat3; Purchase accessibility - meat	42.51	10.63	10.34	<.001
Shopping HabitsDairy1; Production process and product value - dairy	97.67	24.42	18.53	<.001
Shopping HabitsDairy2; Purchase accessibility and quality of product - dairy	45.64	11.41	10.26	<.001
PrefLabel; Preference for a product label	189.87	47.47	98.20	<.001

*Degree of freedom equals 4 across all subscales; PR1 to PR4 = perceived risk of losing PG; PB1 to PB2 = perceived benefits of maintaining PG; TR1 to TR3 = Trust; AES1 to AES3 = Attitudes towards different ES linked to PG; BehInt1 to BehInt2 = Behavioural Intentions linked to PG; EIA1 to EIA3 = Attitude towards the environment --> Environmental attitude inventory (EIA-24); BehavioralInt1 to BehaviouralInt3 = Behavioural intentions linked to consumer attitudes-Intentions to buy products from sustainably managed grassland. ShoppingHabitsMeat 1 to 3 = Shopping habits (meat products); ShoppingHabitsDairy 1 to 2 = Shopping habits (dairy products).

Where the ANOVA post hoc tests were significant (Table 40), there was a significant difference between at least one of the five European countries and the others in terms of attitudes. Thus, to determine where any differences lie between the groups after significant ANOVAs, post hoc multiple comparison tests were conducted (Table 41) using the Games Howell test to explore the mean differences on all subscales (Sauder and DeMars, 2019).

Table 41. Exploring actual mean differences (with actual mean values recorded) using a post hoc test for five European countries by subscales.

ANOVA tests exploring actual mean values on all subscales by country*	Switzerland	Sweden	Spain	Czech Republic	UK
PR1; Negative effects of behaviour on environment	3.57a	3.64a	3.65a	3.66a	3.86b
PR2; Land use change	3.09a	3.42b	3.15a	3.21a	3.49b
PR3; Economics of farming	3.63a	3.77c	3.75bc	3.65ab	3.74abc
PR4; Changing demand for production	3.42bc	3.18a	3.34b	3.09a	3.46c
PB1; Landscape preference - emotional	3.99a	4.05ab	4.23c	4.10b	4.20c
PB2; Landscape preference – land use and management	3.70b	3.55a	4.04d	3.86c	3.82c
AttitudesPG; Attitudes to grassland	3.91a	4.15b	4.05b	4.14b	4.17b
Trust1; Trust in industry, business and third sector – ability to manage the countryside	3.18d	2.78b	3.01c	2.57a	3.10cd
Trust2; Trust in farmers and government - ability to manage the countryside	3.28c	3.25bc	3.04a	3.14ab	3.23bc
Trust3; Trust in all actors – motivation to manage the countryside	3.31d	2.87b	3.22cd	2.75a	3.18c
Attitudes Countryside; Management of the countryside	3.74a	3.86b	4.20d	3.87b	4.06c
AES1; Environmental quality provision and regulation	4.03a	4.14b	4.26c	4.21bc	4.13b
AES2; Social and cultural impact	3.61a	3.62a	4.16c	3.75b	3.80b
AES3; Producing food, energy and other products	3.42b	3.39b	3.76d	3.62c	3.23a
BehInt1; Positive behaviours towards grassland	3.73b	3.81b	3.72b	3.77b	3.58a
BehInt2; No preference for grassland	2.65b	2.57a	2.83c	2.46ab	2.60b
EIA1; Human use of the environment	2.57a	2.45a	2.46a	2.51a	2.51a
EIA2; Environmental value and enjoyment	3.91a	4.22c	4.17bc	3.97a	4.11b
EIA3; Active environmental protection	3.11b	2.83a	2.91a	2.83a	3.09b
LPIdentity; Local Place identity	3.64a	3.89b	3.98c	3.80bc	3.93c
BehaviouralInt1; Identify but don't prioritise sustainably produced food	3.45a	3.78b	3.93c	2.96d	3.09e
BehaviouralInt2; Intention to buy sustainably produced food	2.77a	2.61b	2.94c	3.30d	3.61e
BehaviouralInt3; Avoidance of sustainably produced food	3.63d	2.79b	3.04c	2.62a	2.71ab
ProdAttitude; Productivist attitude	3.71b	3.68b	3.84c	3.72b	3.55a
Shopping HabitsMeat1; Production process and product value - meat	3.31ab	3.36ab	3.67c	3.24a	3.40b
Shopping HabitsMeat2; Taste and freshness of product - meat	1.94a	3.74b	4.02c	4.02c	3.85b
Shopping HabitsMeat3; Purchase accessibility - meat	3.23b	3.08a	3.45c	3.25b	3.25b

ANOVA tests exploring actual mean values on all subscales by country*	Switzerland	Sweden	Spain	Czech Republic	UK
Shopping HabitsDairy1; Production process and product value - dairy	3.18a	3.43b	3.56b	3.08a	3.40b
Shopping HabitsDairy2; Purchase accessibility and quality of product - dairy	3.18a	3.33b	3.52c	3.39bc	3.47bc
PrefLabel; Preference for a product label	3.48a	3.82b	4.14d	3.55a	3.93c

*Subset for alpha equals 0.05 across all subscales, thus the mean difference is significant at the 0.05 level; [a] Group differs statistically significant from type (in row) where b, c, d or e is indicated; PR1 to PR4 = perceived risk of losing PG; PB1 to PB2 = perceived benefits of maintaining PG; TR1 to TR3 = Trust; AES1 to AES3 = Attitudes towards different ES linked to PG; BehInt1 to BehInt2 = Behavioural Intentions linked to PG; EIA1 to EIA3 = Attitude towards the environment --> Environmental attitude inventory (EIA-24); BehavioralInt1 to BehaviouralInt3 = Behavioural intentions linked to consumer attitudes-Intentions to buy products from sustainably managed grassland. ShoppingHabitsMeat 1 to 3 = Shopping habits (meat products); ShoppingHabitsDairy 1 to 2 = Shopping habits (dairy products).

In terms of the perceived risk items, UK participants differed significantly from other countries based on how they perceive risk to have negative effects of behaviour on the environment (PR1; Table 41). The UK had the highest numerical mean value for perceived risk (3.86) compared to other countries (Switzerland, Sweden, Spain and Czech Republic). In terms of perceived risks associated with land use change (PR2), the UK (3.39) had a significantly higher value compared to the Czech Republic, Spain and Switzerland. In terms of perceived risks associated with the economics of farming (PR3), Swedish participants differed significantly from those in the Czech Republic and Switzerland with the highest mean value of 3.77, while in terms of changing demand for production (PR4), UK participants had a significantly higher mean value compared to the Czech Republic, Spain and Sweden (3.46). UK participants report statistically significant higher levels of PR1, PR2 and PR4, while PR3 is higher in the case of Sweden.

In terms of the perceived benefit items (PB1 and PB2), Spanish participants differed significantly from Czech Republic, Sweden and Switzerland with Spanish participants experiencing the highest level (mean value of 4.23) in terms of their landscape preference - emotional (PB1) while the highest level is 4.04 for Spanish participants with statistically significant differences occurring between citizens in Spain, Sweden, Switzerland and Czech Republic for landscape preference - land use management (PB2). In relation to the attitudes to grassland item, the results show that statistically significant differences existed between Switzerland and the other countries, with no statistically significant difference between these countries (Sweden, Spain, Czech Republic and UK). For the three levels of trust, trust in industry, business and third sector – ability to manage the countryside (trust 1), trust in farmers and government - ability to manage the countryside (trust 2) and trust in all actors – motivation to manage the countryside (trust 3), Switzerland, Sweden, Spain and the Czech Republic differed significantly in terms of tr1, Switzerland, Spain and the Czech Republic differed significantly in terms of tr2 while in terms of tr3, Switzerland, Sweden, Czech Republic and the UK differed significantly between these groups. Switzerland had the highest mean values in terms of the three levels of trust compared with the other countries, meaning that Swiss participants trust in industry, farmers and actors to manage their countryside.

The attitudes towards the management of the countryside item shows that significant differences existed between Switzerland, Sweden, Spain and UK participants with Spain having the highest numerical mean value (4.20) which shows that Spanish citizens had the most positive attitude towards the management of the countryside. The AES items, which encapsulate environmental quality and regulation (AES1), Social and cultural impact (AES2) and producing food energy and other products (AES3) show statistically significant differences between countries, with significant differences existing between Switzerland, Sweden and Spain for AES1; Sweden, Spain and Czech Republic for AES2; and Spain, Czech Republic and UK for AES3. Spain consistently had the highest numerical mean value across all 3 items (AES1, AES2, AES3), which were 4.26, 4.16 and 3.76 respectively.

In terms of behaviours towards grassland (BehInt1 and BehInt2), UK participants differed significantly from other countries, showing that they report positive behaviour towards grassland (BEh1) while Spain (highest mean value 2.83) was significantly different from other countries. Regarding Human use of the environment (EIA1), there was no significant differences between the countries whereas significant differences existed in terms of “environmental value and enjoyment” (EIA2) and “active environmental protection” (EIA3). Sweden was significantly different from Czech Republic, UK and Switzerland in terms of EIA2, while Switzerland was significantly different from Sweden, Spain and the Czech Republic in terms of EIA3. Sweden had the highest numerical mean value for EIA2 (4.22) while

Switzerland had the highest value for EIA3 (3.11). For behavioural intention to prioritise and purchase sustainably produced food (BehaviouralInt1, BehaviouralInt2, BehaviouralInt3), the results show that statistically significant differences existed between the countries in terms of identifying, but not prioritising, sustainably produced food and intention to buy sustainably produced food, whereas in terms of avoiding sustainably produced food, statistical differences existed between Switzerland, Sweden, Spain and the Czech Republic. In terms of 'productivitist attitude', there were statistically significant differences between Spain, Czech Republic and the UK, while in terms of preference for a product label, Spain differed significantly from other countries with the highest mean value of 4.14.

In relation to shopping habits for meat (Shopping HabitsMeat1 – "production process and product value"; Shopping HabitsMeat2 – "taste and freshness of product"; and Shopping HabitsMeat3 – "purchase accessibility") and dairy (Shopping HabitsDairy1 – "production process and product value"; Shopping HabitsDairy2 – "purchase accessibility and quality of products"), statistical differences existed between Spain, Czech Republic and UK participants, with Spain having the highest mean value for Shopping HabitsMeat1 while Spain and the Czech Republic mean values = 4.02) differed significantly from the UK, Sweden and Switzerland, indicating that they had a high preference for the taste and freshness of meat products. However, in terms of purchase accessibility, Spain was significantly different from other countries. For Shopping HabitsDairy1, Spain was significantly different from the Czech Republic and Switzerland, while in terms of Shopping HabitsDairy2, the attitude of Spanish participants were significantly different from those in Switzerland and Sweden. Across the 'Shopping Habits' items, compared with the other countries, Spain consistently had the highest numerical mean values. Overall, the results show that statistically significant differences existed between the country groups.

8.4.2. Exploring the interactions between socio-economic variables

Table 42 shows the interactions between countries, gender, where participants live and their educational levels. In terms of gender, there were no statistically significant differences between male and female citizens in the UK and Czech Republic, whereas statistically significant differences existed between male and female citizens in Switzerland, Sweden and Spain.

Table 42. Countries versus other socio-economic variables

Countries	Gender (%)		Where they live (%)		Educational levels (%)			
	Male	Female	Village	City	Secondary Education or less	Upper Secondary education	Undergraduate degree or diplomas	Postgraduate degree or qualification
UK	48a	52a	49a	51a	20a,b,c	38c	33b	9a,c
Czech Rep	50a	50a	50a	50a	9a	70b	19a	2c
Switzerland	45a	55b	45a	55a	7a	51b	20c	23d
Sweden	57a	43b	48a	52a	21a	34b	32a	13a
Spain	57a	43b	46a	54a	35a	27b	29c	9b,c

Each subscript letter denotes a subset of the (gender for example) categories whose column proportions do not differ significantly from each other at the .05 level using chi square test

With reference to where participants live, there were no statistically significant differences between rural and urban dwelling participants. In terms of education levels, the level of education differed between country groups and the highest percentage fell within the upper secondary education category.

Considering the age of the participants, there was an even distribution between age categories in the UK, Czech Republic and Switzerland. However, in Sweden and Spain there was some skew towards younger age categories, with the "61-70" and "71 and older" categories having lower representation (Table 43).

Table 43. Countries versus Age of participants

Countries	Age categories of participants (%)					
	Under 30	31-40	41-50	51-60	61-70	71 and Older
UK	21a	20a	19a	18a	13a	9a
Czech Rep	19a	19a	22a	19a	15a	6a
Switzerland	22a	21a	20a	16a	13a	8a
Sweden	20a	19a	17a	20a,b	15a,b	10b
Spain	20a,b	23b	27b	20b	8a,c	2c

Each subscript letter denotes a subset of the age categories whose column proportions do not differ significantly from each other at the .05 level using chi-square test

Where the participants lived had no impact on whether they were male or female or whether they had a lower or higher level of education (Table 44). There was also an even distribution of rural and urban participants between the five European countries.

Table 44. Where participants live versus gender and educational levels

Where participants lived	Gender (%)		Educational levels (%)			
	Male	Female	Secondary Education or less	Upper Secondary education	Undergraduate degree or diplomas	Postgraduate degree or qualification
Village/ the countryside	52a	48a	22a	52a	20b	7b
In a city/ town/ suburbs	51a	49a	15a	37a	33b	15b

Each subscript letter denotes a subset of the gender and educational level categories whose column proportions do not differ significantly from each other at the .05 level using chi square test

Table 45. Where participants lived versus five European countries

Where participants lived	Five EU Countries (%)					
	UK	Czech Rep	Switzerland	Sweden	Spain	Total
Village/ the countryside	21a	21a	19a	20a	19a	100
In a city/ town/ suburbs	19a	19a	21a	20a	20a	100

Each subscript letter denotes a subset of the five EU countries categories whose column proportions do not differ significantly from each other at the .05 level using chi square test

8.4.3. Estimation of the structural Equation Modelling

The structural Equation Modelling was estimated in two stages. The measurement model for each individual construct was assessed in the first stage leading up to the estimation of the structural model in the second stage.

8.4.3.1. Evaluating the measurement models across all countries

The measurement model has a unidimensional construct measurement, such that each observed variable is related to a single latent variable (Anderson and Gerbing, 1988). Thus, the analysis of one factor-models were conducted for each construct separately. These showed that the metric invariance across countries could be assumed. However, by means of second-generation criteria, the analysis assessed whether variables in the model exceeded or were very close to the minimal threshold indicated in the literature (Homburg and Giering, 1996). The second-generation criteria include indicator and construct reliability, as well as the extracted variance. Indicator reliability above or close to the threshold of 0.40 and values for composite reliability above the critical limit of 0.60 appeared to be reliable. Tables 2a, b to 6a, b in the Appendix summarise the results of the tests across the 2 models (see figure 1 for consumer and citizen models) for each of the five countries explored.

The criteria for evaluating the reliability and validity of measurement models were met for all countries. The values of Cronbach's alpha ranged from 0.720 and 0.924 and the values for composite reliability ranged from 0.842 to 0.964. Average Variance Extracted (AVE) was used to assess convergent validity and the minimum requirement is 50%. Some of the AVE estimates did not meet the 50% cut off, with the lowest being 41%. However, AVE estimates of 0.4 (40%) are acceptable if composite reliability is higher than 0.6 (Fornell and Larcker, 1981). To assess discriminant validity, the heterotrait-monotrait (HTMT) ratio of the correlations was used. As shown in tables 10a, b to 14a, b in the Appendix, each of the tested latent constructs satisfied this criterion. The HTMT ratio should not exceed 0.85 (if the constructs are not similar) or 0.90 (if the constructs are similar) (see Henseler et al., 2015). HTMT estimates were below the 0.85 threshold and taken together, the results of all the criteria supported the discriminant validity of the constructs in the data set. With the exception of the citizen model in Switzerland, which has the exact value of the 0.08 threshold, all other estimated models had values of SRMR smaller than 0.08 across all countries, which is a criterion for model fit (Table 46).

Table 46. Standardised root mean square residual (SRMR) of the model across all countries

	UK	Czech Republic	Switzerland	Sweden	Spain
SRMR	0.078- citizen 0.074- consumer	0.067- citizen 0.079- consumer	0.081- citizen 0.058- consumer	0.062- citizen 0.075- consumer	0.069- citizen 0.065- consumer

The evaluation of the measurement model revealed satisfactory results, allowing the second step in evaluating SEM-PLS, the assessment of the structural model. Following Hair et al. (2019), the assessment included the coefficient of determination (R^2), Stone-Geisser's Q^2, the model's out-of-sample predictive power, and the statistical significance and relevance of the path coefficients. However, in a first instance, we checked for multicollinearity using the variation inflation factor (VIF), before assessing the structural model. This was important to ensure that our results were valid.

8.4.3.2. Assessing the structural models across all countries

To test the assumed relations between the latent constructs of our conceptual model, we applied a non-parametric bootstrapping procedure (cases differ by country and 500 subsamples) to assess the significance of the path coefficients as presented in Table 47. Standardised values of path coefficient β, their respective t- values, which must be greater than 1.96 (two-tailed tests, significance level = 5%), and p values < 0.05 represented a significant correlation between two variables. The structural results are presented separately for each country.

For the UK, where 632 cases were returned, the results indicated that six hypotheses from the citizen models were supported, and one rejected in relation to trust ($\beta = 0.274$, $p > 0.05$). This suggests that increased trust has no direct effect on citizens more positive attitudes towards PG. However, the attitude of citizens towards PG was significantly predicted by perceived benefits, perceived risk, management of the environment, attitudes to the environment and positive attitudes towards different ES. Hypothesis 9 was supported across all applications showing that citizens' positive attitude towards PG has a direct impact on their behavioural intention to spend time in grassland and meadows.

The structural results of the consumer model indicated that one hypothesis was supported (H7) and a second was rejected (H8). Consumer attitudes towards PG products positively and significantly influence their attitudes towards PG ($\beta = 0.457$, $p < 0.05$) but this does not have an impact on their intention to buy products from sustainable PG ($\beta = 0.252$, $p > 0.05$).

Table 47. Partial Least Square Structural Equation Modelling - UK

UK citizen's Model

Hypothesis	SPC (β)	P-Values	t-statistics	95% CI	Supported
H1. Perceived risk of losing PG > Attitude to PG	0.290	0.000	7.587	0.209, 0.359	Yes
H2. More perceived benefits > Attitude to PG	0.172	0.000	4.125	0.079, 0.245	Yes
H3. Increased trust > Attitude to PG	0.274	0.264	1.118	-0.308, 0.342	No
H4. Management of the environment >Attitude to PG	0.425	0.000	11.390	0.358, 0.502	Yes
H5. Attitudes to the environment (EIA) > Attitudes to PG	0.126	0.001	3.365	0.044, 0.192	Yes
H6. Positive attitudes towards different ES > Attitudes to PG	0.365	0.000	8.222	0.288, 0.458	Yes
H9. A positive attitude towards PG > behavioural intention to spend time in grasslands and meadows	0.565	0.000	19.525	0.506, 0.613	Yes

UK Consumer Model

H7. More positive consumer attitudes towards PG products > attitudes towards PG	0.457	0.000	14.005	0.387, 0.512	Yes
H8. A positive attitude towards PG > positive behavioural intention to buy products from sustainable PG.	0.252	0.077	1.724	-0.319, 0.363	No

SPC stands for Standard Path Coefficient. The last column shows whether the hypothesis is supported by the significance values (Yes/No).

Table 48 shows the results of the hypotheses from the Czech Republic participants (n=649 cases). As for the UK, all the hypotheses in the citizen model were supported except H_3 (trust). This indicates that the attitudes of citizens to PG were impacted by their perceived risk of losing PG, their perceived benefits associated with PG, perceived efficacy of management of the environment, attitudes to the environment and positive attitudes towards PG, which is also influenced by their behavioural intention to spend time in grassland and meadows. Thus, attitudes to PG were significantly related to six factors. For the consumer model, the two hypotheses were supported, showing that consumer attitudes towards PG products positively influenced their attitudes to PG and that a positive attitude towards PG led to a positive behavioural intention to buy products from sustainable PG.

Table 48. Partial Least Square Structural Equation Modelling – Czech Republic

Czech Republic Citizens Model

Hypothesis	SPC (β)	P-Values	t-statistics	95% CI	Supported
H1. Perceived risk of losing PG > Attitude to PG	0.263	0.000	8.601	0.214, 0.340	Yes
H2. More perceived benefits > Attitude to PG	0.230	0.000	4.556	0.132, 0.325	Yes
H3. Increased trust > Attitude to PG	-0.216	0.295	1.049	-0.276, 0.298	No

H4. Management of the environment >Attitude to PG	0.366	0.000	10.322	0.300, 0.438	Yes
H5. Attitudes to the environment (EIA) > Attitudes to PG	0.093	0.016	2.427	0.023, 0.170	Yes
H6. Positive attitudes towards different ES > Attitudes to PG	0.318	0.000	7.107	0.222, 0.399	Yes
H9. A positive attitude towards PG > behavioural intention to spend time in grasslands and meadows	0.476	0.000	13.226	0.406, 0.554	Yes

Czech Republic Consumer Model

H7. More positive consumer attitudes towards PG products > attitudes towards PG	0.462	0.000	14.546	0.403, 0.529	Yes
H8. A positive attitude towards PG > positive behavioural intention to buy products from sustainable PG.	0.255	0.000	6.845	0.194, 0.337	Yes

SPC stands for Standard Path Coefficient. The last column shows whether the hypothesis is supported by the significance values (Yes/No).

The results from the 638 cases in Switzerland sample are presented in Table 49. The results indicated that all the nine hypotheses were all positive and highly significant (p<0.000). This shows that perceived risk of losing PG, perceived benefits, increased trust, management of the environment, attitudes to the environment and positive attitudes towards ES all had a positive and significant impact on Swiss citizens' attitudes to PG, while their attitudes to PG were also impacted by their behavioural intention to spend time in grasslands and meadows. Consumer attitudes towards PG products positively affects their attitudes towards PG, which in turn also has a positive impact on their behavioural intention to buy sustainable PG products.

Table 49. Partial Least Square Structural Equation Modelling - Switzerland

Switzerland Citizens Model

Hypothesis	SPC (β)	P-Values	t-statistics	95% CI	Supported
H1. Perceived risk of losing PG > Attitude to PG	0.279	0.000	6.553	0.231, 0.359	Yes
H2. More perceived benefits > Attitude to PG	0.431	0.000	12.197	0.371, 0.503	Yes
H3. Increased trust > Attitude to PG	0.256	0.000	6.117	0.215, 0.328	Yes
H4. Management of the environment >Attitude to PG	0.359	0.000	11.018	0.308, 0.432	Yes
H5. Attitudes to the environment (EIA) > Attitudes to PG	0.327	0.000	9.785	0.266, 0.402	Yes
H6. Positive attitudes towards different ES > Attitudes to PG	0.502	0.000	13.910	0.437, 0.580	Yes
H9. A positive attitude towards PG > behavioural intention to spend time in grasslands and meadows	0.467	0.000	6.861	0.410, 0.535	Yes

Switzerland Consumer

H7. More positive consumer attitudes towards PG products > attitudes towards PG	0.416	0.000	12.717	0.361, 0.489	Yes
H8. A positive attitude towards PG > positive behavioural intention to buy products from sustainable PG.	0.218	0.000	7.280	0.172, 0.290	Yes

SPC stands for Standard Path Coefficient. The last column shows whether the hypothesis is supported by the significance values (Yes/No).

The analysis of the Swedish sample (643 cases) indicated that eight out of nine hypotheses were supported (Table 50). There was no significant relationship between trust and attitudes to PG, although attitudes towards PG were significantly motivated by perceived risks and benefits of PG, management of the environment, attitudes to the environment, and positive attitudes towards ecosystems services, whereas behavioural intention to spend time in grasslands was driven by their

positive attitudes towards PG. The two hypotheses in the consumer model were supported, indicating that consumer attitudes towards PG products significantly influences their attitudes towards PG. Their attitudes towards PG also significantly influencing behavioural intention to buy products from sustainable PG.

Table 50. Partial Least Square Structural Equation Modelling - Sweden

Sweden Citizens Model

Hypothesis	SPC (β)	P-Values	t-statistics	95% CI	Supported
H1. Perceived risk of losing PG > Attitude to PG	0.332	0.000	10.437	0.278, 0.400	Yes
H2. More perceived benefits > Attitude to PG	0.364	0.000	10.206	0.303, 0.440	Yes
H3. Increased trust > Attitude to PG	-0.253	0.322	0.991	-0.325, 0.339	No
H4. Management of the environment >Attitude to PG	0.447	0.000	14.074	0.391, 0.519	Yes
H5. Attitudes to the environment (EIA) > Attitudes to PG	0.437	0.000	13.250	0.368, 0.502	Yes
H6. Positive attitudes towards different ES > Attitudes to PG	0.512	0.000	15.545	0.451, 0.575	Yes
H9. A positive attitude towards PG > behavioural intention to spend time in grasslands and meadows	0.555	0.000	17.746	0.491, 0.611	Yes

Sweden Consumer Model

H7. More positive consumer attitudes towards PG products > attitudes towards PG	0.459	0.000	14.579	0.402, 0.531	Yes
H8. A positive attitude towards PG > positive behavioural intention to buy products from sustainable PG.	0.288	0.000	8.542	0.232, 0.369	Yes

SPC stands for Standard Path Coefficient. The last column shows whether the hypothesis is supported by the significance values (Yes/No

The structural results for Spanish respondents (622 cases) are presented in Table 51. The results indicate that all hypotheses were supported. This shows that attitudes to PG were significantly and positively affected by all the determinants identified in the hypotheses. This shows that there is a strong relationship between attitudes to PG and the associated variables.

Table 51. Partial Least Square Structural Equation Modelling - Spain

Spain Citizens Model

Hypothesis	SPC (β)	P-Values	t-statistics	95% CI	Supported
H1. Perceived risk of losing PG > Attitude to PG	0.271	0.000	9.116	0.226, 0.347	Yes
H2. More perceived benefits > Attitude to PG	0.481	0.000	14.390	0.421, 0.551	Yes
H3. Increased trust > Attitude to PG	0.271	0.000	9.812	0.237, 0.339	Yes
H4. Management of the environment >Attitude to PG	0.422	0.000	12.713	0.365, 0.494	Yes
H5. Attitudes to the environment (EIA) > Attitudes to PG	0.322	0.000	8.773	0.258, 0.407	Yes
H6. Positive attitudes towards different ES > Attitudes to PG	0.531	0.000	15.948	0.469, 0.596	Yes
H9. A positive attitude towards PG > behavioural intention to spend time in grasslands and meadows	0.555	0.000	19.638	0.502, 0.610	Yes

Spain Consumer Model

H7. More positive consumer attitudes towards PG products > attitudes towards PG	0.497	0.000	16.033	0.445, 0.568	Yes
H8. A positive attitude towards PG > positive behavioural intention to buy products from sustainable PG.	0.324	0.000	9.133	0.269, 0.400	Yes

SPC stands for Standard Path Coefficient. The last column shows whether the hypothesis is supported by the significance values (Yes/No)

In summary, across all (five) countries, hypothesis 3 ("increased trust in institutions and government will positively influence attitudes to PG") was rejected in UK, Czech Republic and Sweden, but accepted in Switzerland and Spain. Apart from the UK, hypotheses 9 ("a positive attitude towards PG will lead to a positive behavioural intention to spend time in grasslands and meadows") was supported in all countries. All hypotheses were supported in Switzerland and Spain.

9. Discussion

There was a good distribution of age, gender and educational levels across the sample in each country included in the survey, in line with national quota sampling requirements for these demographic categories. Rural dwelling populations were oversampled in each country to allow meaningful comparison between urban and rural dwelling participants (approximately 50% in each category for each country). It is interesting to note that the self-reported alignment with the statement about visiting the countryside does not align with these figures, for example in Spain (18% reporting they live or work in the countryside) suggesting differences in perceptions of rural residency to those derived from statistical records. The proportion of participants indicating that they intend to visit the countryside varied between countries, (although "never" responses were 10% or less for all countries), but the majority of respondents across the sample who did not live or work in the countryside indicated that they intended to visit more than once a month. The primary purpose for visiting was reported to be leisure activities, which reflects interest in cultural ES. The aesthetics of landscape, as a reason for visiting, were more highly rated in the UK than in the other countries. In all countries, respondents indicated that PG "were easy to visit", although there is no data available to compare this to ease of visiting other rural landscapes (for example, mountains, forests) and further research might assess this in association with perceptions of, and attitudes towards, other ES that alternative landscapes deliver. Most respondents reported appreciating the visual and aesthetic value of the countryside (e.g. in relation to trees and open landscape) although this appreciation may extend to the impacts that other farming practices have on the landscape, rather than be focused on PG alone (e.g. agroforestry trees and woodland, see Gaspar et al., 2016; Lopez-Rodriguez and Hernandez-Jimenez, 2022). Perceived threats to PG across all countries included the "bad behaviour of visitors", misuse of inputs such as pesticides, and farm succession. The countryside is becoming increasingly valued in terms of the cultural ES that it can deliver (e.g. see McGinlay et al., 2018), although at the same time there is increasing recognition of the value of other, non-cultural ES (e.g. see Nowak-Olejnik et al., 2020). A question arises as to whether there is a tension between increased visitor numbers and the negative impacts on the countryside, including PG, which is attracting the visitors and driving efforts to conserve different categories of ES (e.g. "biodiversity" tourism). One outcome may be increased "regulation" and restriction of public access to the countryside, which in turn could potentially reduce the public support of policies that are intended to promote PG.

The reduced use of inputs such as pesticides continues to be a public priority, including within the context of PG (see also Remoundou et al., 2015). This is in line with measures to reduce pesticide usage, such as the Sustainable Use Directive (European Union, 2019). More difficult to address from a policy perspective is the issue of farmer succession, which is widely recognised as a problem within Europe (Bertolozzi-Caredio et al., 2020; Zagata and Sutherland, 2015). It is not at present clear if, and how the issue of land abandonment links into public perceptions of "rewilding" and how this trend is regarded in managed landscapes (Navarro and Pereira, 2012; Pettorelli et al., 2018). Overall, participants had a generally positive attitude towards PG, and the ES that are delivered, although differences in the type of ES delivered varied between countries. For example, in the UK in particular, respondents were positive towards PG in general, whereas in Spain they tended to be positive towards the foods produced, for example within the Spanish dehesa. The PCA indicated that the different subscales appeared reliable, with good face validity and internal consistency, and that the constructs were valid for inclusion in further analysis.

Despite consumer interest in sustainably produced foods (Li and Kallas, 2021), the issue of sustainability did not emerge as an important driver of consumer intention to purchase foods produced using PG in Spain and Sweden, although this is not the case for the other countries included in the survey. It is not, however, clear if respondents were distinguishing between "organic" production and "extensive, grassland production" for meat and dairy products when considering the issue of sustainability. Other factors, such as perceived length of the supply chain, and indeed the delivery of other "non-productivist" ES, may contribute to the concept of sustainability for some participants, and this may represent a valuable topic for future research**.**

The analysis provides a detailed breakdown of differences in attitude and perception across age, gender, education, country and urban/rural residency. A few key findings will be described. Most prominent among statistical non-significance differences was gender, which did not significantly differentiate perceived risk associated with losing, or threats to, PG. Although gender is often assumed to be a predictor of perceived risk, with women perceiving higher risk to be associated with a range of issues (see Finucane et al., 2013), risk perception has infrequently been explored in relation to perceived threats associated with loss of landscapes and other ES. This was true of all of the "perceived risk" constructs: PR1 (misuse of the countryside); PR2 (land use change); PR3 (threats to the economics of farming); and PR4 (threats from changing demand for production). Similarly AES3 (attitudes towards producing food, energy and other products, positive behaviours towards grassland and perceived benefits, trust in industry, business and the third sector and in all stakeholders), positive environmentalist action, productivist attitude and many of the predictors of shopping habits did not significantly differ according to gender. Lack of gender related difference in attitudes may indicate that co-production policy practices on one hand, and marketing of pasture produced foods on the other, may be less sensitive to gender differences in perspectives compared to some other areas, for example in the area of technology applied to food production (see Frewer et al., 2013). Given the prevalence of significant demographic differences for other demographic indicators, more nuanced approaches may be required in relation to, for example, age or in relation to specific cultural or biogeographic factors, given that many differences were observed between countries.

When considering the consumer model, it is important to acknowledge that attitude has been shown to be a reliable predictor of behavioural intention regarding food choices (e.g. Dowd and Burke, 2013). Attitude incorporates global and abstract evaluations of risks and benefits and can be differentiated from intentions which appear to be based primarily on concrete and tangible benefits (Poínhos et al., 2014; Williams et al., 2012). The research reported here suggests that more positive consumer attitudes towards PG products results in positive attitudes towards PG, which in turn result in increased positive intention to buy the products from sustainable PG production systems.

A positive attitude towards PG increased behavioural intention to buy products from sustainable PG, which suggests that targeted or differentiated marketing strategies, linked to effective traceability and information provision systems, are needed, as PG production represents a "credence factor" associated with a product, which cannot be directly observed by the purchaser or consumer (Fernqvist and Ekelund, 2014; van Rijswijk and Frewer, 2012). Note that the integrated "Attitudes to PG products" construct predicts both attitudes to PG and behavioural intention to buy products produced using PG production systems. Exceptionally, in the UK, this does not have an impact on consumers intention to buy products produced from sustainable PG. This may be, in part, due to reduced marketing of these products in the UK, and so there is less consumer recognition of these foods as contributing to sustainable food production practices. While "mountain foods" are broadly recognised as traditionally produced foods across Europe, there is less evidence that this is the case in the UK. While the label "pasture produced" or "pasture fed" may be included as a product label in UK supermarkets, research is needed to determine more about how this is recognised and interpreted.

It should also be noted that these data were collected prior to the outbreak of war in Ukraine and the impacts on food security. It is yet to be seen if the food system shock this has created, including both increases in food insecurity and inflation linked to cost of living, reduces the importance of sustainable production on consumer decision-making, as improved food production and perceived value for money will be a priority for many consumers.

The data set offers further opportunities for additional analysis, in accordance with open science and open data source principles. First, the predictive capacity of various subscales within the constructs might usefully be further explored. Within the citizen model, for example, it may be useful to further analyse the different sub-constructs in relation to attitudes to PG and the ES it delivers, as well as the self-reported PG countryside leisure activities. Similarly, assessing the relationship between productivist attitudes and self-reported countryside use, might deliver information relevant to understanding attitudes to different types of ES perceived to be relevant in PG landscapes.

Country national differences in attitudes were significant across the sample and means comparisons are provided. The complexity of individual differences and the significant differences between countries suggest that, as citizen and consumer priorities differ between countries, national policy development may better accommodate these differences. For EU countries, pan-European policy needs to be flexible at the national level to ensure that citizen preferences (which may also differ in accordance with the biogeographic zones) can influence policy development and implementation (see also SUPER-*G* report 4.1c).

Regarding the predictors of citizens attitudes to PG, most hypotheses were supported in all countries included in the analysis. Those respondents who expressed concern about PG, or perceived benefits associated with it, were most likely to express positive attitudes towards PG. This primarily related to the cultural and aesthetic ES that were perceived to be delivered by PG. Interestingly, those who perceived that the countryside was well managed also had more positive attitudes towards PG, suggesting PG was seen as a positive outcome of good countryside management. However, the issue of whether PG is perceived to have positive impacts on the sustainability of the environment may be more of a contested issue. First, it is not clear whether PG is perceived to contribute to all ES. For example, ES related to regulatory or maintenance services. From the qualitative phase of the research, there is evidence that people recognise the contribution that PG makes to a range of ES, but that those affording opportunities for leisure and provisioning appear to be more broadly recognised by the public, and preferred, over regulatory and maintenance services. The qualitative research indicated that there was some recognition on the part of participants that PG provides habitats for a range of animals and plants, when classified based on an adapted Common International Classification of Ecosystem Services (CICES). This may be because such services are less “visible” or observable to most members of the public or be a consequence of lesser citizen knowledge and involvement in how non-cultural and provisioning ES operationalise generally, and within PG specifically (see also Leroy et al, 2018; Zoderer et al, 2019). To some extent, this has been clarified by the analysis of attitudes towards different ES which has been found to predict attitudes towards PG - the more important people perceive the delivery of ES to be in general, the more positive they are towards PG, reflecting the interrelationship between positivity towards ES and pro-environmental attitudes.

While there was generally consistency between countries concerning the predictive capacity of the model, there were exceptions to this. For example, increased trust did not predict attitudes in the Czech Republic, Sweden and the UK, although the hypothesis was supported in Spain and Switzerland. The construct was included, comprised of trust in ability of different institutions and groups to manage the countryside effectively, and trust in motivation of different groups to manage the countryside effectively. Levels of trust have been shown to be closely associated with environmental attitudes (Meyer and Liebe, 2010), and the issue of trust emerged as a potential issue within the focus

group research. However, this may reflect a disconnect in the three countries where the relationship did not hold, and potentially an underlying distrust of those with responsibility for countryside management and how this relates to the ideal state of PG systems. One can hold a positive attitude towards the environment, as well as PG, but at the same time distrust those with responsibility to manage it. This may explain the differences In Switzerland, where there is a less centralised government and may be increased trust in local management practices. In Spain, this might reflect a different history of democracy and community participation in local decision-making.

In all countries, attitudes towards PG predicted behavioural intention to use them in relation to ES. The behavioural intention measure is an indicator of positivity towards PG in rural landscapes. However, it is possible to appreciate PG (and the various ES which it delivers) while not expressly intending to visit PG as such. The behavioural intention measure therefore represents a validation of the attitudinal measure, but the attitudinal measure may be a better indicator of people's perceptions and attitudes towards PG. In addition, those people who actually use PG for cultural ES may have more positive attitudes towards it as a consequence of these visits.

While it is recognised that consumption practices may influence the entirety of the food system (e.g. Soper, 2004; Spaargaren and Oosterveer, 2010), it is also recognised that the relationship between individuals' views as citizens and their behaviour as consumers may not be strong (e.g. Klintman and Boström, 2015; Verbeke et al., 2010). Linking the two quantities models ("citizen "and consumer" models) might provide further insights into consumer attitudes and behaviours, and will be considered in future analysis although is beyond the scope of the current report. For example, having higher productivist values may predict greater positive evaluation of production related ES, but more negative perceptions of other ES (e.g. regulatory), which some PG types deliver.

It is currently recognised that citizen participation in policy development is required if polices are to be successful adopted. These results suggest that the countryside is becoming increasingly valued by the public and consumers of its food products in terms of the different ES that it can deliver, and that these priorities should be included in the policy development process.

9.1. Research limitations

This research was conducted in the context of permanent grassland (PG) and the production systems that it supports. However, there are many competing food production systems that have capacity to potentially deliver a range of ES. Examples include that of agroforestry (which can include PG), as well as returning land to forest, or rewilding, which may be perceived as less or more preferable to the conservation of PG. In addition, in terms of "provisioning" ES, various consumer trends (such as increased veganism, vegetarianism and "flexitarianism"), and innovations which are focused on developing alternative animal proteins, such as cultured meat, insect proteins, and novel plant-based proteins) need to be addressed as demand-led drivers of change when predicting future changes in PG systems in Europe and beyond, and the development of associated policies.

The preservation of existing PG systems may be dependent on policies that acknowledge the public's preference for the cultural ES that such environments provide. These preferences may change with time as there is increased awareness of the importance of biodiversity and ecosystems provided by PG, although there may be competing societal priorities for land use which also deliver cultural, regulatory and provisioning ES, such as agroforestry, reafforestation and "rewilding". This prioritisation may be a useful focus of future research and would enable comparisons across different landscapes and agricultural systems to occur. Specifically, future research should consider consumer demand for food, together with citizen prioritisation of different ES and cultural heritage, when considering PG as part of a broader system delivering multiple ES .

References

Admiraal, J.F., Van Den Born, R.J.G., Beringer, A., Bonaiuto, F., Cicero, L., HiedanpÄÄ, J., Knights, P., Knippenberg, L.W.J., Molinario, E., Musters, C.J.M., Naukkarinen, O., Polajnar, K., Popa, F., Smrekar, A., Soininen, T., Porras-Gomez, C., Soethe, N., Vivero-Pol, J.-L., De Groot, W.T., 2017. Motivations for committed nature conservation action in Europe. Environmental Conservation 44, 148-157.

Ali, F., Rasoolimanesh, S.M., Sarstedt, M., Ringle, C., 2018. An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. International Journal of Contemporary Hospitality Management 30.

Anderson, J.C., Gerbing, D.W., 1988. Structural equation modeling in practice: A review and recommended two-step approach. Psychological bulletin 103, 411.

Aretano, R., Petrosillo, I., Zaccarelli, N., Semeraro, T., Zurlini, G., 2013. People perception of landscape change effects on ecosystem services in small Mediterranean islands: A combination of subjective and objective assessments. Landscape and Urban Planning 112, 63-73.

Arias-Arévalo, P., Gómez-Baggethun, E., Martín-López, B., Rincón, M., 2018. Widening the Evaluative Space for Ecosystem Services: A Taxonomy of Plural Values and Valuation Methods. Environmental Values- Forthcoming 27, 29-53.

Arias-Arévalo, P., Martín-López, B., Gómez-Baggethun, E., 2017. Exploring intrinsic, instrumental, and relational values for sustainable management of social-ecological systems. Ecology and Society 22.

Augère-Granier, M.-L., 2017. Rural poverty in the European Union. European Parliament Briefing, March 2017. European Parliamentary Research Service. https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/599333/EPRS_BRI(2017)599333_EN.pdf.

Bacher, M., Walde, J., Pecher, C., Tasser, E., Tappeiner, U., 2016. Are interest groups different in the factors determining landscape preferences? Landscape Online 47, 1-18.

Bas-Defossez, F., Allen, B., Weigelt, J., Marechal, A., Meredith, S., Lorant, A., 2018. Feeding Europe: Agriculture, and sustainable food systems. Policy Paper produced for the IEEP Think2030 conference, October 2018, Brussels.

Bengtsson, J., Bullock, J.M., Egoh, B., Everson, C., Everson, T., O'Connor, T., O'Farrell, P.J., Smith, H.G., Lindborg, R., 2019. Grasslands—more important for ecosystem services than you might think. Ecosphere 10, e02582.

Bennett, N.J., 2016. Using perceptions as evidence to improve conservation and environmental management. Conservation biology : the journal of the Society for Conservation Biology 30, 582-592.

Bernués, A., Rodríguez-Ortega, T., Ripoll-Bosch, R., Alfnes, F., 2014. Socio-Cultural and Economic Valuation of Ecosystem Services Provided by Mediterranean Mountain Agroecosystems. PLOS ONE 9, e102479.

Bernués, A., Tello-García, E., Rodríguez-Ortega, T., Ripoll-Bosch, R., Casasús, I., 2016. Agricultural practices, ecosystem services and sustainability in High Nature Value farmland: Unraveling the perceptions of farmers and nonfarmers. Land Use Policy 59, 130-142.

Bertolozzi-Caredio, D., Bardaji, I., Coopmans, I., Soriano, B., Garrido, A., 2020. Key steps and dynamics of family farm succession in marginal extensive livestock farming. Journal of Rural Studies 76, 131-141.

Blanco, J., Dendoncker, N., Barnaud, C., Sirami, C., 2019a. Ecosystem disservices matter: Towards their systematic integration within ecosystem service research and policy. Ecosystem Services 36, 100913.

Blanco, J., Sourdril, A., Deconchat, M., Ladet, S., Andrieu, E., 2019b. Social drivers of rural forest dynamics: A multi-scale approach combining ethnography, geomatic and mental model analysis. Landscape and Urban Planning 188, 132-142.

Brislin, R.W., 1970. Back-Translation for Cross-Cultural Research. Journal of Cross-Cultural Psychology 1, 185-216.

Bryman, A., 2016. Social research methods. Oxford university press.

Buchel, S., Frantzeskaki, N., 2015. Citizens' voice: A case study about perceived ecosystem services by urban park users in Rotterdam, the Netherlands. Ecosystem Services 12, 169-177.

Cattell, R.B., 1966. The screen test for the number of factors. Multivariate Behavioural Research 1, 245–276.

Cebrián-Piqueras, M.A., Filyushkina, A., Johnson, D.N., Lo, V.B., López-Rodríguez, M.D., March, H., Oteros-Rozas, E., Peppler-Lisbach, C., Quintas-Soriano, C., Raymond, C.M., Ruiz-Mallén, I., van Riper, C.J., Zinngrebe, Y., Plieninger, T., 2020. Scientific and local ecological knowledge, shaping perceptions towards protected areas and related ecosystem services. Landscape Ecology 35, 2549-2567.

Chan, K., Balvanera, P., Benessaiah, K., Chapman, M., Diaz, S., Gómez-Baggethun, E., Gould, R., Hannahs, N., Jax, K., Klain, S., Luck, G., Martín-López, B., Muraca, B., Norton, B., Ott, K., Pascual, U., Satterfield, T., Tadaki, M., Taggart, J., Turner, N., 2016. Why Protect Nature? Rethinking Values and the Environment. Proceedings of the National Academy of Sciences 113, 1462–1465.

CICES, 2021. CICES: Towards a common classification of ecosystem services.

Clark, B., Panzone, L., Stewart, G., Kyriazakis, I., Niemi, J., Latvala, T., Tranter, R., Jones, P., Frewer, L., 2019. Consumer attitudes towards production diseases in intensive production systems. PLOS ONE 14, e0210432.

Conway, T.M., Yip, V., 2016. Assessing residents' reactions to urban forest disservices: A case study of a major storm event. Landscape and Urban Planning 153, 1-10.

Council of Europe, 2022. The future of youth in rural areas: responsibilities of local and regional authorities, 42nd Session of Congress of Local and Regional Authorities. Report CG(2022)42-15final, 24 March 2022, https://rm.coe.int/cg-2022-42-15-en-the-future-of-youth-in-rural-areas-responsibilities-o/1680a5b14d.

Crouzat, E., Mouchet, M., Turkelboom, F., Byczek, C., Meersmans, J., Berger, F., Verkerk, P.J., Lavorel, S., 2015. Assessing bundles of ecosystem services from regional to landscape scale: insights from the F rench A lps. Journal of Applied Ecology 52, 1145-1155.

Cundill, G., Bezerra, J.C., De Vos, A., Ntingana, N., 2017. Beyond benefit sharing: Place attachment and the importance of access to protected areas for surrounding communities. Ecosystem Services 28, 140-148.

Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Larigauderie, A., Adhikari, J.R., Arico, S., Báldi, A., Bartuska, A., Baste, I.A., Bilgin, A., Brondizio, E., Chan, K.M.A., Figueroa, V.E., Duraiappah, A., Fischer, M., Hill, R., Koetz, T., Leadley, P., Lyver, P., Mace, G.M., Martin-Lopez, B., Okumura, M., Pacheco, D., Pascual, U., Pérez, E.S., Reyers, B., Roth, E., Saito, O., Scholes, R.J., Sharma, N., Tallis, H., Thaman, R., Watson, R., Yahara, T., Hamid, Z.A., Akosim, C., Al-Hafedh, Y., Allahverdiyev, R., Amankwah, E., Asah, S.T., Asfaw, Z., Bartus, G., Brooks, L.A., Caillaux, J., Dalle, G., Darnaedi, D., Driver, A., Erpul, G., Escobar-Eyzaguirre, P., Failler, P., Fouda, A.M.M., Fu, B., Gundimeda, H., Hashimoto, S., Homer, F., Lavorel, S., Lichtenstein, G., Mala, W.A., Mandivenyi, W., Matczak, P., Mbizvo, C., Mehrdadi, M., Metzger, J.P., Mikissa, J.B., Moller, H., Mooney, H.A., Mumby, P., Nagendra, H., Nesshover, C., Oteng-Yeboah, A.A., Pataki, G., Roué, M., Rubis, J., Schultz, M., Smith, P., Sumaila, R., Takeuchi, K., Thomas, S., Verma, M., Yeo-Chang, Y., Zlatanova, D., 2015. The IPBES Conceptual Framework — connecting nature and people. Current Opinion in Environmental Sustainability 14, 1-16.

Domingues, R.B., Gonçalves, G., 2020. Assessing environmental attitudes in Portugal using a new short version of the Environmental Attitudes Inventory. Current Psychology 39, 629-639.

Dowd, K., Burke, K.J., 2013. The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods. Appetite 69, 137-144.

Egoh, B.N., Bengtsson, J., Lindborg, R., Bullock, J.M., Dixon, A.P., Rouget, M., 2016. The importance of grasslands in providing ecosystem services: opportunities for poverty alleviation, Routledge handbook of ecosystem services. Routledge, pp. 421-441.

Ehgartner, U., 2018. Discourses of the food retail industry: Changing understandings of 'the consumer' and strategies for sustainability. Sustainable Production and Consumption 16, 154-161.

Esterberg, G., 2002. Qualitative methods in social research. . McGraw-Hill Boston.

European Commission, 2008. Poverty and Social Exclusion in Rural Areas, Final Study Report, Directorate-General for Employment, Social Affairs and Equal Opportunities Unit E2, .

European Union, 2019. DIRECTIVE 2009/128/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides, in: The European Parliament and the Council of the European Union (Ed.), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02009L0128-20091125&from=EN.

European Union, 2022. EU Youth Strategy, https://youth.europa.eu/strategy_en [Accessed 20.10.22].

EuroStat, 2019. Permanent grassland, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Permanent_grassland

Faostat, 2020. Land use indicators. Land under permanent meadows and pastures, in: 2018., D.f. (Ed.).

Fernqvist, F., Ekelund, L., 2014. Credence and the effect on consumer liking of food – A review. Food Quality and Preference 32, 340-353.

Filyushkina, A., Komossa, F., Metzger, M.J., Verburg, P.H., 2022. Multifunctionality of a peri-urban landscape: exploring the diversity of residents' perceptions and preferences. Ecosystems and People 18, 583-597.

Finucane, M.L., Slovic, P., Mertz, C.K., Flynn, J., Satterfield, T., 2013. Gender, Race and Perceived Risk: The 'White-Male'Effect, The Feeling of Risk. Routledge, pp. 125-139.

Fischer, M., Rounsevell, M., Rando, A.T.-M., Mader, A., Church, A., Elbakidze, M., Elias, V., Hahn, T., Harrison, P.A., Hauck, J., 2018. The regional assessment report on biodiversity and ecosystem services for Europe and Central Asia: Summary for policymakers. IPBES Secretariat.

Flick, U., 1998. An Introduction to Qualitative Research. Sage, London.

Fornell, C., Larcker, D.F., 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. Sage Publications Sage CA: Los Angeles, CA.

Frewer, L.J., van der Lans, I.A., Fischer, A.R.H., Reinders, M.J., Menozzi, D., Zhang, X., van den Berg, I., Zimmermann, K.L., 2013. Public perceptions of agri-food applications of genetic modification – A systematic review and meta-analysis. Trends in Food Science & Technology 30, 142-152.

Friess, D.A., 2016. Ecosystem services and disservices of mangrove forests: insights from historical colonial observations. Forests 7, 183.

Gaspar, P., Escribano, M., Mesias, F.J., 2016. A qualitative approach to study social perceptions and public policies in dehesa agroforestry systems. Land Use Policy 58, 427-436.

Gómez-Baggethun, E., Martín-López, B., 2015. Ecological economics perspectives on ecosystem services valuation., in: Martínez-Alier, J., Muradian, R. (Eds.), Handbook of ecological economics. Edward Elgar, Cheltenham, UK, pp. 260-282.

Gottwald, S., Albert, C., Fagerholm, N., 2022. Combining sense of place theory with the ecosystem services concept: empirical insights and reflections from a participatory mapping study. Landscape Ecology 37, 633-655.

Gould, R.K., Lincoln, N.K., 2017. Expanding the suite of Cultural Ecosystem Services to include ingenuity, perspective, and life teaching. Ecosystem Services 25, 117-127.

Guo, R.-Z., Song, Y.-B., Dong, M., 2022. Progress and Prospects of Ecosystem Disservices: An Updated Literature Review. Sustainability 14, 10396.

Haines-Young, R., Potschin, M., 2018. Common International Classification of Ecosystem Services (CICES) V5.1 Guidance on the Application of the Revised Structure. Fabis Consulting Ltd., Nottingham, UK. .

Hair, J., Risher, J., Sarstedt, M., Ringle, C., 2019. When to use and how to report the results of PLS-SEM. European Business Review 31, 2-24.

Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2017. A primer on partial least squares structural equation modeling (PLS-SEM). Sage, Thousand Oaks, CA.

Hartmann, C., Lazzarini, G., Funk, A., Siegrist, M., 2021. Measuring consumers' knowledge of the environmental impact of foods. Appetite 167, 105622.

Hartter, J., 2010. Resource use and ecosystem services in a forest park landscape. Society and Natural Resources 23, 207-223.

Hausmann, A., Slotow, R., Burns, J.K., Di Minin, E., 2016. The ecosystem service of sense of place: benefits for human well-being and biodiversity conservation. Environmental conservation 43, 117-127.

Henseler, J., Dijkstra, T.K., Sarstedt, M., Ringle, C.M., Diamantopoulos, A., Straub, D.W., Ketchen, D.J., Hair, J.F., Hult, G.T.M., Calantone, R.J., 2014. Common Beliefs and Reality About PLS:Comments on Rönkkö and Evermann (2013). Organizational Research Methods 17, 182-209.

Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science 43, 115-135.

Himes, A., Muraca, B., 2018. Relational values: the key to pluralistic valuation of ecosystem services. Current Opinion in Environmental Sustainability 35, 1-7.

Hinds, J., Sparks, P., 2008. Engaging with the natural environment: The role of affective connection and identity. Journal of environmental psychology 28, 109-120.

Hirth, S., Bürstmayr, T., Strüver, A., 2021. Discourses of sustainability and imperial modes of food provision: agri-food-businesses and consumers in Germany. Agriculture and Human Values.

Homburg, C., Giering, A., 1996. Konzeptualisierung und Operationalisierung komplexer Konstrukte : Ein Leitfaden für die Marketingforschung.

Howley, P., 2011. Landscape aesthetics: Assessing the general publics' preferences towards rural landscapes. Ecological Economics 72, 161-169.

Howley, P., Donoghue, C.O., Hynes, S., 2012. Exploring public preferences for traditional farming landscapes. Landscape and Urban Planning 104, 66-74.

Hunter, E., Quatrini, S., Lieberher, E., Tindale, S., Sanchez Zamora, P., Gallardo Cobos, R., Miskolci, S., Johansson, C., Nybom, J., Cano Vergara, B., Elliot, J., Newell Price, P., Frewer, L., 2020. The effectiveness of policies promoting sustainable permanent grasslands across five European countries (representing five biogeographic regions): Mapping, understanding, and key stakeholder perceptions. . Newcastle University, 2020. WP4, Deliverable 4.1c, SUPER-G (Sustainable Permanent Grassland Systems and Policies), EC Project Number 774124-2.

IPBES, 2022. Summary for policymakers of the methodological assessment of the diverse values and valuation of nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (1.1). IPBES Plenary at its ninth session (IPBES 9), Bonn. Zenodo. https://doi.org/10.5281/zenodo.7075892.

Jackson, S., Palmer, L.R., 2014. Reconceptualizing ecosystem services: Possibilities for cultivating and valuing the ethics and practices of care. Progress in Human Geography 39, 122-145.

Jacobs, S., Dendoncker, N., Martín-López, B., Barton, D.N., Gomez-Baggethun, E., Boeraeve, F., McGrath, F.L., Vierikko, K., Geneletti, D., Sevecke, Katharina J., Pipart, N., Primmer, E., Mederly, P., Schmidt, S., Aragão, A., Baral, H., Bark, Rosalind H., Briceno, T., Brogna, D., Cabral, P., De Vreese, R., Liquete, C., Mueller, H., Peh, K.S.H., Phelan, A., Rincón, Alexander R., Rogers, S.H., Turkelboom, F., Van Reeth, W., van Zanten, B.T., Wam, H.K., Washbourne, C.-L., 2016. A new valuation school:

Integrating diverse values of nature in resource and land use decisions. Ecosystem Services 22, 213-220.

Jaligot, R., Hasler, S., Chenal, J., 2019. National assessment of cultural ecosystem services: Participatory mapping in Switzerland. Ambio 48, 1219-1233.

Jones, N.A., Shaw, S., Ross, H., Witt, K., Pinner, B., 2016. The study of human values in understanding and managing social-ecological systems. Ecology and Society 21.

Junge, X., Lindemann-Matthies, P., Hunziker, M., Schüpbach, B., 2011. Aesthetic preferences of non-farmers and farmers for different land-use types and proportions of ecological compensation areas in the Swiss lowlands. Biological Conservation 144, 1430-1440.

Junge, X., Schüpbach, B., Walter, T., Schmid, B., Lindemann-Matthies, P., 2015. Aesthetic quality of agricultural landscape elements in different seasonal stages in Switzerland. Landscape and Urban Planning 133, 67-77.

Kahneman, D., Slovic, S.P., Slovic, P., Tversky, A., 1982. Judgment under uncertainty: Heuristics and biases. Cambridge university press.

Kaiser, H.F., 1960. The Application of Electronic Computers to Factor Analysis. Educational and Psychological Measurement 20, 141-151.

Kaplan, R., Kaplan, S., 1989. The experience of nature: A psychological perspective. Cambridge university press.

Kenter, J.O., 2016. Editorial: Shared, plural and cultural values. Ecosystem Services 21, 175-183.

Klain, S.C., Olmsted, P., Chan, K.M., Satterfield, T., 2017. Relational values resonate broadly and differently than intrinsic or instrumental values, or the New Ecological Paradigm. PloS one 12, e0183962.

Kline, R.B., 2016. Principles and practice of structural equation modeling. Guilford publications.

Klintman, M., Boström, M., 2015. Citizen-Consumers, pp. 309-319.

Konkoly-Gyuró, É., 2018. Conceptualisation and perception of the landscape and its changes in a transboundary area. A case study of the Southern German-French borderland. Land Use Policy 79, 556-574.

Kovács, E., Kelemen, E., Kalóczkai, Á., Margóczi, K., Pataki, G., Gébert, J., Málovics, G., Balázs, B., Roboz, Á., Krasznai Kovács, E., Mihók, B., 2015. Understanding the links between ecosystem service trade-offs and conflicts in protected areas. Ecosystem Services 12, 117-127.

La Notte, A., D'Amato, D., Mäkinen, H., Paracchini, M.L., Liquete, C., Egoh, B., Geneletti, D., Crossman, N.D., 2017. Ecosystem services classification: A systems ecology perspective of the cascade framework. Ecological Indicators 74, 392-402.

Lam, T.J.G.M., Jansen, J., Wessels, R., 2017. The RESET Mindset Model applied on decreasing antibiotic usage in dairy cattle in the Netherlands. Ir Vet J 70.

Lamarque, P., Tappeiner, U., Turner, C., Steinbacher, M., Bardgett, R.D., Szukics, U., Schermer, M., Lavorel, S., 2011. Stakeholder perceptions of grassland ecosystem services in relation to knowledge on soil fertility and biodiversity. Regional Environmental Change 11, 791-804.

Ledesma, R.D., Valero-Mora, P., 2007. Determining the number of factors to retain in EFA: An easy-to-use computer program for carrying out parallel analysis. Practical assessment, research, and evaluation 12, 2.

Lemaire, G., Hodgson, J., Chabbi, A., 2011. Grassland productivity and ecosystem services. CABI, Wallingford, UK.

Levidow, L., 2015. European transitions towards a corporate-environmental food regime: Agroecological incorporation or contestation? Journal of Rural Studies 40, 76-89.

Lewicka, M., 2011. Place attachment: How far have we come in the last 40 years? Journal of environmental psychology 31, 207-230.

Li, S., Kallas, Z., 2021. Meta-analysis of consumers' willingness to pay for sustainable food products. Appetite 163, 105239.

Lin, C.-C., Lockwood, M., 2014. Forms and sources of place attachment: Evidence from two protected areas. Geoforum 53, 74-81.

Lopez-Rodriguez, A., Hernandez-Jimenez, V., 2022. Sustainable Forest, Beautiful Forest, Well-Managed Forest: Attitudes towards Land Management and Their Influence on the Perception of a Mediterranean Agroforestry Landscape. Land 11, 1260.

López-Santiago, C.A., Oteros-Rozas, E., Martín-López, B., Plieninger, T., González Martín, E., González, J.A., 2014. Using visual stimuli to explore the social perceptions of ecosystem services in cultural landscapes: the case of transhumance in Mediterranean Spain. Ecology and Society 19.

Mace, G.M., Norris, K., Fitter, A.H., 2012. Biodiversity and ecosystem services: a multilayered relationship. Trends Ecol Evol 27, 19-26.

MacRae, R., Szabo, M., Anderson, K., Louden, F., Trillo, S., 2012. Empowering the citizen-consumer: Re-regulating consumer information to support the transition to sustainable and health promoting food systems in Canada. Sustainability 4, 2146-2175.

Martín-López, B., Iniesta-Arandia, I., García-Llorente, M., Palomo, I., Casado-Arzuaga, I., Amo, D.G.D., Gómez-Baggethun, E., Oteros-Rozas, E., Palacios-Agundez, I., Willaarts, B., González, J.A., Santos-Martín, F., Onaindia, M., López-Santiago, C., Montes, C., 2012. Uncovering Ecosystem Service Bundles through Social Preferences. PLOS ONE 7, e38970.

Martin-Lopez, B., Leister, I., Lorenzo Cruz, P., Palomo, I., Grêt-Regamey, A., Harrison, P.A., Lavorel, S., Locatelli, B., Luque, S., Walz, A., 2019. Nature's contributions to people in mountains: A review. PloS one 14, e0217847.

Martín-López, B., Leister, I., Lorenzo Cruz, P., Palomo, I., Grêt-Regamey, A., Harrison, P.A., Lavorel, S., Locatelli, B., Luque, S., Walz, A., 2019. Nature's contributions to people in mountains: A review. PLoS One 14, e0217847.

Mayer, F.S., Frantz, C.M., 2004. The connectedness to nature scale: A measure of individuals' feeling in community with nature. Journal of environmental psychology 24, 503-515.

McGinlay, J., Parsons, D.J., Morris, J., Graves, A., Hubatova, M., Bradbury, R.B., Bullock, J.M., 2018. Leisure activities and social factors influence the generation of cultural ecosystem service benefits. Ecosystem Services 31, 468-480.

Meyer, R., Liebe, U., 2010. Are the affluent prepared to pay for the planet? Explaining willingness to pay for public and quasi-private environmental goods in Switzerland. Popul Environ 32, 42-65.

Milfont, T.L., Duckitt, J., 2010. The Environmental Attitudes Inventory: A valid and reliable measure to assess the structure of environmental attitudes. Journal of Environmental Psychology 30, 80-94.

Monterrosa, E.C., Frongillo, E.A., Drewnowski, A., de Pee, S., Vandevijvere, S., 2020. Sociocultural Influences on Food Choices and Implications for Sustainable Healthy Diets. Food and Nutrition Bulletin 41, 59S-73S.

Muradian, R., Pascual, U., 2018. A typology of elementary forms of human-nature relations: a contribution to the valuation debate. Current Opinion in Environmental Sustainability 35, 8-14.

Navarro, L.M., Pereira, H.M., 2012. Rewilding Abandoned Landscapes in Europe. Ecosystems 15, 900-912.

Nowak-Olejnik, A., Mocior, E., Hibner, J., Tokarczyk, N., 2020. Human perceptions of cultural ecosystem services of semi-natural grasslands: The influence of plant communities. Ecosystem Services 46, 101208.

O'Connor, S., Kenter, J.O., 2019. Making intrinsic values work; integrating intrinsic values of the more-than-human world through the Life Framework of Values. Sustainability Science 14, 1247-1265.

O'Farrell, P., Donaldson, J., Hoffman, M., 2007. The influence of ecosystem goods and services on livestock management practices on the Bokkeveld plateau, South Africa. Agriculture, Ecosystems & Environment 122, 312-324.

Orenstein, D., Groner, E., 2014. In the eye of the stakeholder: Changes in perceptions of ecosystem services across an international border. Ecosystem Services 8.

Ostrom, E., 2009. A general framework for analyzing sustainability of social-ecological systems. Science 325, 419-422.

Oteros-Rozas, E., Martín-López, B., González, J.A., Plieninger, T., López, C.A., Montes, C., 2014. Socio-cultural valuation of ecosystem services in a transhumance social-ecological network. Regional Environmental Change 14, 1269-1289.

Pachoud, C., Da Re, R., Ramanzin, M., Bovolenta, S., Gianelle, D., Sturaro, E., 2020. Tourists and Local Stakeholders' Perception of Ecosystem Services Provided by Summer Farms in the Eastern Italian Alps. Sustainability 12, 1095.

Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., Watson, R.T., Başak Dessane, E., Islar, M., Kelemen, E., Maris, V., Quaas, M., Subramanian, S.M., Wittmer, H., Adlan, A., Ahn, S., Al-Hafedh, Y.S., Amankwah, E., Asah, S.T., Berry, P., Bilgin, A., Breslow, S.J., Bullock, C., Cáceres, D., Daly-Hassen, H., Figueroa, E., Golden, C.D., Gómez-Baggethun, E., González-Jiménez, D., Houdet, J., Keune, H., Kumar, R., Ma, K., May, P.H., Mead, A., O'Farrell, P., Pandit, R., Pengue, W., Pichis-Madruga, R., Popa, F., Preston, S., Pacheco-Balanza, D., Saarikoski, H., Strassburg, B.B., van den Belt,

M., Verma, M., Wickson, F., Yagi, N., 2017. Valuing nature's contributions to people: the IPBES approach. Current Opinion in Environmental Sustainability 26-27, 7-16.

Pătru-Stupariu, I., Tudor, C.A., Stupariu, M.S., Buttler, A., Peringer, A., 2016. Landscape persistence and stakeholder perspectives: The case of Romania's Carpathians. Applied Geography 69, 87-98.

Pellaton, R., Lellei-Kovács, E., Báldi, A., 2022. Cultural ecosystem services in European grasslands: A systematic review of threats. Ambio 51, 2462-2477.

Pettorelli, N., Barlow, J., Stephens, P., Durant, S., Connor, B., Schulte to Buehne, H., Sandom, C., Wentworth, J., du Toit, J., 2018. Making rewilding fit for policy. Journal of Applied Ecology 55.

Pietrzyk-Kaszyńska, A., Cent, J., Grodzińska-Jurczak, M., Szymańska, M., 2012. Factors influencing perception of protected areas-The case of Natura 2000 in Polish Carpathian communities. Journal for Nature Conservation 20, 284-292.

Plieninger, T., Dijks, S., Oteros-Rozas, E., Bieling, C., 2013. Assessing, mapping, and quantifying cultural ecosystem services at community level. Land Use Policy 33, 118-129.

Plieninger, T., Modolell y Mainou, J., Konold, W., 2004. Land manager attitudes toward management, regeneration, and conservation of Spanish holm oak savannas (dehesas). Landscape and Urban Planning 66, 185-198.

Poínhos, R., van der Lans, I.A., Rankin, A., Fischer, A.R., Bunting, B., Kuznesof, S., Stewart-Knox, B., Frewer, L.J., 2014. Psychological determinants of consumer acceptance of personalised nutrition in 9 European countries. PLoS One 9, e110614.

Pritchard, A., Richardson, M., Sheffield, D., McEwan, K., 2020. The relationship between nature connectedness and eudaimonic well-being: A meta-analysis. Journal of Happiness Studies 21, 1145-1167.

QSR International Pty Ltd, 2018. NVivo (Version 12), https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home.

Quétier, F., Rivoal, F., Marty, P., Chazal, J., Thuiller, W., Lavorel, S., 2009. Social representations of an alpine grassland landscape and socio-political discourses on rural development. Regional Environmental Change 10, 119-130.

Ramkissoon, H., Graham Smith, L.D., Weiler, B., 2013. Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach. Tourism Management 36, 552-566.

Ramkissoon, H., Weiler, B., Smith, L.D.G., 2012. Place attachment and pro-environmental behaviour in national parks: The development of a conceptual framework. Journal of Sustainable Tourism 20, 257-276.

Raymond, C.M., Giusti, M., Barthel, S., 2018. An embodied perspective on the co-production of cultural ecosystem services: toward embodied ecosystems. Journal of Environmental Planning and Management 61, 778-799.

Remoundou, K., Brennan, M., Sacchettini, G., Panzone, L., Butler-Ellis, M.C., Capri, E., Charistou, A., Chaideftou, E., Gerritsen-Ebben, M.G., Machera, K., Spanoghe, P., Glass, R., Marchis, A., Doanngoc,

K., Hart, A., Frewer, L.J., 2015. Perceptions of pesticides exposure risks by operators, workers, residents and bystanders in Greece, Italy and the UK. Sci Total Environ 505, 1082-1092.

Ren, X., 2019. Consensus in factors affecting landscape preference: A case study based on a cross-cultural comparison. Journal of Environmental Management 252, 109622.

Richardson, M., Passmore, H.A., Barbett, L., Lumber, R., Thomas, R., Hunt, A., 2020. The green care code: How nature connectedness and simple activities help explain pro-nature conservation behaviours. People and Nature 2, 821-839.

Richter, F., Jan, P., El Benni, N., Lüscher, A., Buchmann, N., Klaus, V.H., 2021. A guide to assess and value ecosystem services of grasslands. Ecosystem Services 52, 101376.

Richter, N., Cepeda-Carrion, G., Roldán, J., Ringle, C., 2015. European management research using Partial Least Squares Structural Equation Modeling (PLS-SEM). European Management Journal 33.

Riechers, M., Martín-López, B., Fischer, J., 2022. Human–nature connectedness and other relational values are negatively affected by landscape simplification: insights from Lower Saxony, Germany. Sustainability Science 17, 865-877.

Rigdon, E.E., 2012. Rethinking Partial Least Squares Path Modeling: In Praise of Simple Methods. Long Range Planning 45, 341-358.

Rodríguez-Ortega, T., Bernués, A., Alfnes, F., 2016. Psychographic profile affects willingness to pay for ecosystem services provided by Mediterranean high nature value farmland. Ecological Economics 128, 232-245.

Sarstedt, M., Ringle, C.M., Hair, J.F., 2017. Partial least squares structural equation modeling, in: Homburg, C., Klarmann, M., Vomberg, A. (Eds.), Handbook of market research. Springer., Cham, pp. 1–40.

Schaak, H., Mußhoff, O., 2018. Understanding the adoption of grazing practices in German dairy farming. Agricultural Systems 165, 230-239.

Schirpke, U., Timmermann, F., Tappeiner, U., Tasser, E., 2016. Cultural ecosystem services of mountain regions: Modelling the aesthetic value. Ecological Indicators 69, 78-90.

Schmitt, T.M., Martín-López, B., Kaim, A., Früh-Müller, A., Koellner, T., 2021. Ecosystem services from (pre-)Alpine grasslands: Matches and mismatches between citizens' perceived suitability and farmers' management considerations. Ecosystem Services 49, 101284.

Schmitt, T.M., Riebl, R., Martín-López, B., Hänsel, M., Koellner, T., 2022. Plural valuation in space: mapping values of grasslands and their ecosystem services. Ecosystems and People 18, 258-274.

Scholte, S.S.K., van Teeffelen, A.J.A., Verburg, P.H., 2015. Integrating socio-cultural perspectives into ecosystem service valuation: A review of concepts and methods. Ecological Economics 114, 67-78.

Seppelt, R., Dormann, C.F., Eppink, F.V., Lautenbach, S., Schmidt, S., 2011. A quantitative review of ecosystem service studies: approaches, shortcomings and the road ahead. Journal of Applied Ecology 48, 630-636.

Shackleton, C.M., Ruwanza, S., Sinasson Sanni, G.K., Bennett, S., De Lacy, P., Modipa, R., Mtati, N., Sachikonye, M., Thondhlana, G., 2016. Unpacking Pandora's Box: Understanding and Categorising

Ecosystem Disservices for Environmental Management and Human Wellbeing. Ecosystems 19, 587-600.

Sidali, K.L., Kastenholz, E., Bianchi, R., 2015. Food tourism, niche markets and products in rural tourism: Combining the intimacy model and the experience economy as a rural development strategy. Journal of Sustainable Tourism 23, 1179-1197.

Singh, N.M., 2015. Payments for ecosystem services and the gift paradigm: Sharing the burden and joy of environmental care. Ecological Economics 117, 53-61.

Soper, K., 2004. Rethinking the "good life": the consumer as citizen. Capitalism Nature Socialism 15, 111-116.

Sottini, V.A., Bernetti, I., Pecchi, M., Cipollaro, M., 2018. Visual perception of the rural landscape: a study case in Val di Chiana aretina, Tuscany (Italy). Aestimum, 5+.

Spaargaren, G., Oosterveer, P., 2010. Citizen-Consumers as Agents of Change in Globalizing Modernity: The Case of Sustainable Consumption. Sustainability 2, 1887-1908.

Stampa, E., Schipmann-Schwarze, C., Hamm, U., 2020. Consumer perceptions, preferences, and behavior regarding pasture-raised livestock products: A review. Food Quality and Preference 82, 103872.

Stedman, R.C., 2003. Is it really just a social construction?: The contribution of the physical environment to sense of place. Society &Natural Resources 16, 671-685.

Stedman, R.C., 2016. Subjectivity and social-ecological systems: a rigidity trap (and sense of place as a way out). Sustainability Science 11, 891-901.

Storie, J.T., Uusna, E., Eglāja, Z., Laur, T., Külvik, M., Suškevičs, M., Bell, S., 2019. Place Attachment and Its Consequence for Landscape-Scale Management and Readiness to Participate: Social Network Complexity in the Post-Soviet Rural Context of Latvia and Estonia. Land 8, 125.

Strauss, A., 1987. Qualitative analysis for social scientists. . Cambridge University Press.

Swanwick, C., 2009. Society's attitudes to and preferences for land and landscape. Land Use Policy 26, S62-S75.

TEEB, 2011. The economics of ecosystems and biodiversity in national and international policy making. Ten Brink, P. (Ed). Routledge.

Topp, E.N., Loos, J., Martín-López, B., 2022. Decision-making for nature's contributions to people in the Cape Floristic Region: the role of values, rules and knowledge. Sustainability Science 17, 739-760.

Trentelman, C.K., 2009. Place attachment and community attachment: A primer grounded in the lived experience of a community sociologist. Society and natural resources 22, 191-210.

Tuan, Y.-F., 1977. Space and place: The perspective of experience. U of Minnesota Press.

UNECE, 2017. Older persons in rural and remote areas, United Nations Economic Commission for Europe (UNECE) Policy Brief on Ageing No. 18, https://unece.org/DAM/pau/age/Policy_briefs/ECE-WG1-25-E.pdf.

van Berkel, D.B., Verburg, P.H., 2014. Spatial quantification and valuation of cultural ecosystem services in an agricultural landscape. Ecological Indicators 37, 163-174.

Van den Berg, A.E., Koole, S.L., 2006. New wilderness in the Netherlands: An investigation of visual preferences for nature development landscapes. Landscape and Urban Planning 78, 362-372.

van Rijswijk, W., Frewer, L., 2012. Consumer needs and requirements for food and ingredient traceability information. International Journal of Consumer Studies - Int J Consum Stud 36, 282-290.

van Woerkum, C., Kuiper, D., Bos, E., 1999. Communication and Innovation, an introduction (in Dutch). Samsom, Alphen aan de Rijn, the Netherlands.

Vanwindekens, F.M., Stilmant, D., Baret, P.V., 2013. Development of a broadened cognitive mapping approach for analysing systems of practices in social–ecological systems. Ecological Modelling 250, 352-362.

Verbeke, W., Pérez-Cueto, F.J., Barcellos, M.D., Krystallis, A., Grunert, K.G., 2010. European citizen and consumer attitudes and preferences regarding beef and pork. Meat Sci 84, 284-292.

Villamagna, A.M., Angermeier, P.L., Bennett, E.M., 2013. Capacity, pressure, demand, and flow: A conceptual framework for analyzing ecosystem service provision and delivery. Ecological Complexity 15, 114-121.

Villamor, G.B., Palomo, I., Santiago, C.A.L., Oteros-Rozas, E., Hill, J., 2014. Assessing stakeholders' perceptions and values towards social-ecological systems using participatory methods. Ecological Processes 3, 22.

Wegner, G., Pascual, U., 2011. Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. Global Environmental Change 21, 492-504.

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, 5609.

Williams, B., Brown, T., Onsman, A., 2010. Exploratory factor analysis: A five-step guide for novices. Australasian Journal of Paramedicine 8, 1-13.

Williams, L.K., Thornton, L., Crawford, D., 2012. Optimising women's diets. An examination of factors that promote healthy eating and reduce the likelihood of unhealthy eating. Appetite 59, 41-46.

Yin, R.K., 2009. Case study research: Design and methods. sage.

Zagata, L., Sutherland, L.-A., 2015. Deconstructing the 'young farmer problem in Europe': Towards a research agenda. Journal of Rural Studies 38, 39-51.

Zhao, Y., Liu, Z., Wu, J., 2020. Grassland ecosystem services: a systematic review of research advances and future directions. Landscape Ecology 35, 793-814.

Zoderer, B.M., Stanghellini, P.S.L., Tasser, E., Walde, J., Wieser, H., Tappeiner, U., 2016. Exploring socio-cultural values of ecosystem service categories in the Central Alps: the influence of socio-demographic factors and landscape type. Regional environmental change 16, 2033-2044.

Zoderer, B.M., Tasser, E., Carver, S., Tappeiner, U., 2019. Stakeholder perspectives on ecosystem service supply and ecosystem service demand bundles. Ecosystem Services 37, 100938.

Appendix (Phase 1)

Appendix A

Table A.1. *Themes and prompts used to guide focus group discussions*

Theme	Prompts
Visiting the countryside	• Do you visit the countryside often, where do you go, how often?
Value of grassland	• Which types of landscape (that you see in the photos) do you prefer? Or not prefer? • What do you enjoy or value personally about these types of landscapes?
Benefits and services	• What benefits do you think grassland landscape provide? • Which benefits do you think are most important? • If grassland/ pasture/ fields weren't there, what do you think might happen? • What if grassland was converted to forested land/ wild land/ other land use?
Problems and improvements	• What would you want to improve about the grassland landscapes (in this area or areas you visit)?
Management and responsibility	• Do you know who makes decisions about grassland management? • Are there other people that should be involved in making decisions? Why?
Labelling	• If we were to label products from well managed grasslands with lots of benefits what type of information would be important to your purchase decision?

Appendix B.

Table B.1*. ES themes mentioned by focus group participants, by focus group type (percentage of total number of phrases coded).*

	Urban	Rural	Rural Youth	Total
Cultural				
Aesthetics	4%	6%	4%	5%
Cultural, symbolic, spiritual	4%	11%	6%	7%
Education and training	2%	5%	4%	4%
Mental health and wellbeing	9%	6%	3%	5%
Recreation, leisure and health	19%	17%	12%	15%
Provisioning				
Animals reared in housing and-or grazed outdoors	4%	11%	13%	10%
Animals reared for nutrition, materials or energy	26%	12%	11%	15%
Plants grown for nutrition or energy	0%	0%	1%	1%
Regulation and maintenance				
Air quality	2%	0%	1%	1%

	Urban	Rural	Rural Youth	Total
Climate regulation (carbon storage and temperature)	2%	2%	7%	5%
Nutrient cycles	0%	2%	1%	1%
Providing habitats for wild plants and animals	24%	23%	19%	21%
Regulation of baseline flows and extreme events	4%	2%	4%	4%
Soil quality	0%	5%	8%	6%
Water supply and quality	2%	2%	3%	2%
Total	100%	100%	100%	100%

Table B.2. *ES themes mentioned by focus group participants, by country (percentage of total number of phrases coded).*

	Spain	UK	Switzerland	Czech Republic	Sweden	Total
Cultural						
Aesthetics	0%	9%	3%	4%	9%	5%
Cultural, symbolic, spiritual	9%	0%	10%	3%	9%	7%
Education and training	3%	5%	4%	4%	2%	4%
Mental health and wellbeing	6%	5%	7%	3%	6%	5%
Recreation, leisure and health	18%	27%	14%	9%	15%	15%
Provisioning						
Animals reared in housing and-or grazed outdoors	15%	5%	6%	17%	6%	10%
Animals reared for nutrition, materials or energy	21%	9%	10%	5%	31%	15%
Plants grown for nutrition or energy	0%	5%	0%	1%	0%	1%
Regulation and maintenance						
Air quality	0%	0%	3%	1%	0%	1%
Climate regulation (carbon storage)	3%	14%	1%	5%	6%	5%
Nutrient cycles	3%	0%	0%	3%	0%	1%
Providing habitats for wild plants and animals	12%	18%	32%	20%	17%	21%
Regulation of baseline flows and extreme events	0%	5%	1%	9%	0%	4%
Soil quality	6%	0%	4%	12%	0%	6%
Water supply and quality	3%	0%	3%	4%	0%	2%
Total	100%	100%	100%	100%	100%	100%

Appendix (Phase 2)

Citizens attitudes to PG

Table 1a: Exploratory factor analysis table by subscales- **Perceived risk**

Items	1	2	3	4
	Negative effects of behaviour on environment	Land use change	Economics of farming	Changing demand for production
Perceived risk of losing PG				
Q19_9. Misuse of chemical fertilisers	0.832			
Q19_8. Poor farming practices	0.800			
Q19_7. Bad behaviour of visitors	0.753			
Q19_10. Effects of Climate change	0.638			
Q19_6. Increased number of visitors (tourism)	0.554			
Q19_1. Conversion to urban land use		0.786		
Q19_2. Conversion of pasture or meadows to cropland		0.717		
Q19_4. Abandonment of land by farmers		0.659		
Q19_14. Lack of young farmers taking over farming			0.808	
Q19_15. Changes to the market prices of farm products from the countryside			0.735	
Q19_13. Farmers unable to make a living from the land			0.606	
Q19_11. Changing diets (e.g., eating animal products)				0.823
Q19_12. Changing demand for food				0.786
Q19_5. Too many livestock causing damage to the land				0.604
Eigen Values	4.86	1.40	1.33	1.21
% of variance	34.70	9.98	9.52	8.68
Cronbach's alpha	0.818	0.655	0.726	0.637

Q19_3 (conversion to pasture or meadows to forest or woodland) cross loaded (factor loadings 0.401) with component 3, hence Q19_3 is deleted. 4 components are extracted, and this accounts for 62.87% of the variance. KMO and Barlett's test is 0.861 with sig value 0.000. indicating that there was sufficient correlation in the data to proceed with factor analysis. 14 out of 15 items were extracted

Table 1b: Exploratory factor analysis table by subscales- **Perceived benefits**

Items	1	2
	Landscape preference - emotional	Landscape preference – land use and management
Perceived benefits of maintaining PG- When visiting the countryside, it is important that …		
Q15_10. I feel happy	0.737	
Q15_1. I don't feel threatened	0.700	
Q16_1. There is sense of peacefulness	0.694	
Q15_5. That the landscape is fascinating	0.676	
Q15_8. I feel free from demands and expectations	0.668	
Q15_4. There is plenty to discover	0.666	
Q15_3. I feel protected from hazards	0.628	
Q16_6. There are agricultural crops		0.766
Q16_10. The landscape looks traditional		0.731

Items	1	2
	Landscape preference - emotional	Landscape preference – land use and management
Q16_4. The landscape is well maintained		0.723
Q16_7. There are meadows and pasture		0.652
Q16_5. There are no buildings or human constructions		0.550
Q15_7. The landscape enables me to do whatever I like		0.447
Eigen Values	5.65	1.20
% of variance	43.45	9.20
Cronbach's alpha	0.850	0.788

2 components are extracted, and this accounts for 54.65% of the variance.
KMO and Bartlett's test is 0.908 with sig value 0.000. 13 out of 20 items were extracted
Items not extracted include: The landscape feels familiar, the landscape makes the region special, I feel far from my obligations, there are trees, the landscape is open, the landscape is varied, the landscape is colourful.

Table 1c: Attitudes to PG

Items	1
	Attitudes to grassland
Attitudes to PG- Grasslands and meadows are…	
Q17d_1. Boring /Interesting	0.856
Q17e_1. Not enjoyable to spend time in / Enjoyable to spend time in	0.842
Q17c_1. Worthless / Valuable	0.830
Q17f_1. Ugly / Beautiful	0.820
Q17b_1. Bad / Good	0.785
Q17a_1. Unpleasant / Pleasant	0.762
Eigen Values	4.00
% of variance	66.67
Cronbach's alpha	0.900

Attitudes to PG extracted one factor/component which accounts for 66.67% of the variance.
KMO and Barlett's test is 0.892 with sig value 0.000. the solution cannot be rotated because it extracted only one component hence the table shows the loadings of the component matrix and not the rotated one

Table 1d: Trust- done separately for Q20/Q21

Items	1	2
	Trust in industry, business and third sector – ability to manage the countryside	Trust in farmers and government - ability to manage the countryside
Trust- Q20		
Q20_6. Supermarkets and other food retailers are able to manage the countryside effectively	0.836	
Q20_7. Other industry and private businesses are able to manage the countryside effectively	0.819	
Q20_5. Charities are able to manage the countryside effectively	0.747	
Q20_8. Different organisations and groups are able to work together to manage the countryside effectively	0.656	
Q20_4. The public is able to manage the countryside effectively	0.591	
Q20_2. The local administration/ local government is able to manage the countryside effectively		0.800
Q20_3. Farmers and landowners are able to manage the countryside effectively		0.743
Q20_1. The national government is able to manage the countryside effectively		0.660
Eigen Values	3.82	1.04
% of variance	37.76	23.01
Cronbach's alpha	0.821	0.696

Two components are extracted- accounts for 60.76% of the variance.

KMO and Barlett's test is 0.818 with 0.000 sig value. All 8 items were extracted

Table 1e: Trust- redone separately for Q20 versus Q21

Items	1
	Trust in all actors – motivation to manage the countryside
Trust- Q21	
Q21_7. I trust that other industry and private businesses are motivated to manage the countryside effectively	0.807
Q21_6. I trust that supermarkets and other food retailers are motivated to manage the countryside effectively	0.806
Q21_5. I trust that charities are motivated to manage the countryside effectively	0.755
Q21_1. I trust that the national government is motivated to manage the countryside effectively	0.750
Q21_8. I trust that different organisations and groups are motivated to work together to manage the countryside effectively	0.749
Q21_4. I trust that the public is motivated to manage the countryside effectively	0.702
Q21_2. I trust that the local administration/local government is motivated to manage the countryside effectively	0.691
Eigen Values	3.82
% of variance	37.76
Cronbach's alpha	0.872

One component extracted- accounts for 56.63% of the variance.
KMO and Barlett's test is 0.848 with 0.000 sig value. One item deleted (Q21_3- I trust that farmers and landowners are motivated to manage the countryside effectively) due to low communality (0.242)

Table 1f: Attitudes towards the management of the countryside

Items	1
	Management of the countryside
Attitude towards the management of the countryside	
Q22_3. Supporting farmers to engage in environmental protection	0.804
Q22_2. More opportunities for school children to visit the countryside	0.779
Q22_7. Financial support for farmers who carry out sustainable practices	0.768
Q22_4. Supporting farmers to use traditional farming practices	0.748
Q22_1. Educating the public about the local environment	0.736
Q22_5. Rewilding parts of the countryside	0.709
Q22_10. Improvements in visitor support including footpaths and amenities	0.604
Q22_9. Inclusion of public opinion in decision about the countryside	0.558
Eigen Values	4.13
% of variance	51.56
Cronbach's alpha	0.861

One component extracted and account for 51.56% of the variance. KMO and Barlett's test is 0.893 with 0.000 sig value. 8 out of 10 items were extracted. 2 items not included due to low loadings. Q22_6. Use stronger regulations to protect the countryside and Q22_8. Supporting farmers to use innovative technology to improve the efficiency of farming.

Table 1g: Attitudes towards different ES linked to PG

Items	1	2	3
	Environmental quality provision and regulation	Social and cultural impact	Producing food, energy and other products
Attitudes towards different ES linked to PG			
Q14b_3. Providing an environment for many different types of plants	0.820		
Q14b_1. Pollination of fruit trees and flowers (by insects and animals)	0.805		

Q14b_2. Providing a home for many different types of animals	0.794		
Q14c_3. Plants in the countryside helping to improve the air quality	0.741		
Q14c_1. Providing clean water for human use	0.690		
Q14b_5. Managing land to reduce risks of flooding or drought	0.638		
Q14a_5. Providing wild plants that can be harvested for human food	0.504		
Q14d_4. Providing opportunities for education		0.792	
Q14d_5. Providing opportunities for research		0.723	
Q14d_7. The spiritual aspects of nature		0.688	
Q14d_1. Helping people identify with history or culture		0.673	
Q14c_4. Providing employment for people		0.595	
Q14c_5. Providing spaces for leisure		0.588	
Q14a_3. Raising livestock that provide non-food products (e.g., wool,			0.820
Q14a_2. Raising livestock that provide human food (e.g., meat/ milk)			0.797
Q14a_4. Providing raw materials for products or energy			0.685
Eigen Values	6.43	1.80	1.31
% of variance	40.15	11.26	8.21
Cronbach's alpha	0.876	0.827	0.738

Three components are extracted- accounts for 59.62% of the variance.
KMO and Barlett's test is 0.916 with 0.000 sig value. 16 out of 22 items were extracted. Providing human food, providing renewable energy (e.g. wind, solar, geothermal, hydro), Managing land to reduce greenhouse gas emissions, Improving human mental health, Providing opportunities to improve physical well-being, the beauty of nature.

Table 1h: Behavioural intentions linked to PG

Items	1	2
	Positive behaviours towards grassland	No preference for grassland
Behavioural intentions		
Q18_8. I intend to support policies that conserve meadows and pastures	0.762	
Q18_9. I intend to support government policies that help farmers manage meadows and pastures sustainably	0.732	
Q18_1. I intend to spend time in grasslands and meadows	0.716	
Q18_7. I know where to go to visit grassland and meadows	0.671	
Q18_5. It is easy for me to visit grassland and meadows	0.654	
Q18_2. I intend to avoid grassland and meadows	0.490	
Q18_11. I would rather visit towns than grasslands and meadows		0.812
Q18_4. I plan to spend less time in grassland and meadows		0.787
Q18_10. I would rather visit other parts of the countryside than grassland and meadows		0.780
Eigen Values	3.01	1.76
% of variance	33.48	19.53
Cronbach's alpha	0.754	0.722

Two components are extracted- accounts for 53.01% of the variance.
KMO and Barlett's test is 0.736 with 0.000 sig value. 9 out of 11 items were extracted. Q18_3. I would consider spending time in grassland and meadows, Q18_6. I cannot financially afford to visit grassland and meadows

Table 1i: Attitude towards the environment --> Environmental attitude inventory (EIA-24)

Items	1	2	3	4

	Human use of the environment	Environmental value and enjoyment	Active environmental protection	Reproductive choice
Q11a_2. Protecting peoples' jobs is more important than protecting the environment.	0.712			
Q11b_7. Human beings were created or evolved to dominate the rest of nature	0.689			
Q11a_7. I do not believe that the environment has been severely abused by humans.	0.609			
Q11b_2. Modern science will solve our environmental problems	0.604			
Q11b_5. Whenever possible I try to save natural resources		0.743		
Q11a_1. I really like going on trips into the countryside, for example to forests or fields.		0.701		
Q11a_12. Governments should control the rate at which raw materials are used to ensure that they last as long as possible.		0.670		
Q11b_9. Humans are severely abusing the environment.		0.634		
Q11b 8. Protecting the environment is more important than protecting peoples' jobs.			0.679	
Q11b 11. Families should be encouraged to limit themselves to two children or less.			0.661	
Q11b_4. I would like to join and actively participate in an environmentalist group			0.617	
Q11a_6. A married couple should have as many children as they wish, as long as they can adequately provide for them				0.990
Eigen Values	3.	2.32	1.29	1.06
% of variance	19.36	9.31	5.17	4.24
Cronbach's alpha	0.729	0.796	0.636	*

Four components are extracted- accounts for 55.40% of the variance. KMO and Bartlett's test is 0.791 with 0.000 sig value.
* Cronbach's alpha cannot be calculated for scales with only 1 item.

Table 1j: Local place identity --> Q13 items- unvalidated scales

Items	1
	Local place identity
Q13_3. I feel a sense of connection to animals when I visit the countryside	0.784
Q13_2. I feel a sense of history when I am in the countryside in my region	0.771
Q13_1. There is something special about the countryside in my region	0.756
Q13_4. I feel a sense of spirituality when I visit the countryside in my region	0.728
Q13_5. I prefer to buy food products that I know have been produced in my local region	0.621
Eigen Values	2.67
% of variance	53.94
Cronbach's alpha	0.782

One component is extracted, all items included- accounts for 53.94% of the variance.
KMO and Bartlett's test is 0.805 with 0.000 sig value.

Consumers behavioural intention to buy PG products

Table 1k: Behavioural intentions linked to consumer attitudes

Items	1	2	3
	Identify but don't prioritise sustainably produced food	Intention to buy sustainably produced food	Avoidance of sustainably produced food
Intentions to buy products from sustainably managed grassland			
Q28_1. It is easy for me to identify sustainably produced food	0.818		
Q28_3. Sustainable production of food is not a priority for me	0.791		
Q28_6. I intend to increase my consumption of foods that are sustainably produced		0.865	
Q28_4. I intend to buy foods that are sustainably produced		0.806	
Q28_7. I avoid purchasing foods that are sustainably produced			0.921
Q28_5. I plan to reduce my consumption of foods that are sustainably produced			0.714
Eigen Values	2.01	1.47	1.10
% of variance	33.57	24.50	18.29
Cronbach's alpha	0.601	0.602	0.652

Three components are extracted- accounts for 76.36% of the variance.
KMO and Barlett's test is 0.538 with 0.000 sig value. 6 out of 7 items were extracted. Q28_2. It is easy for me to buy sustainably produced food- not extracted.

Table 1l: Productivist attitudes Q12 items- unvalidated scales

Items	1
	Productivist attitude
Q12_5. I believe that it is important that my country is self-sufficient when it comes to producing food	0.719
Q12_3. Agricultural premiums must be given to farmers according to their production level	0.718
Q12_2. Agricultural policies and premiums to farmers need to be maintained because agriculture is a strategic sector	0.706
Q12_1. I believe producing high quality food is the most important function of agriculture in my country	0.685
Q12_4. I believe that more of our land should be used for producing food	0.665
Eigen Values	2.44
% of variance	48.83
Cronbach's alpha	0.782

One component is extracted, all items included- accounts for 48.83% of the variance.
KMO and Bartlett's test is 0.736 with 0.000 sig value.

Table 1m: Shopping habits (meat products)

Items	1	2	3
	Production process and product value - meat	Taste and freshness of product - meat	Purchase accessibility - meat
Shopping habits- meat products (Q24)			
Q24_11. Organic	0.931		
Q24_14. Food miles	0.899		
Q24_15. Carbon footprint	0.886		
Q24_13. Outdoor reared/free range	0.854		
Q24_12. Pasture-fed	0.815		
Q24_8. Sustainable packaging	0.792		
Q24_10. Locally produced	0.772		
Q24_7. Fairtrade or producer/farmer fairly paid	0.712		
Q24_5. Animal welfare	0.710		
Q24_9. Healthy eating	0.576		
Q24_3. Processing	0.542		
Q24_2. Nutrition	0.504		
Q24_1. Quality/taste		0.878	
Q24_18. Freshness		0.630	
Q24_6. Special offers			0.938
Q24_4. Price			0.788
Q24_17. Convenience of use/preparation			0.702
Q24_16. Familiarity or brand			0.589
Eigen Values	11.25	1.11	
% of variance	66.19	6.54	
Cronbach's alpha	0.960	0.822	0.851

3 components are extracted, and this accounts for 73.81% of the variance.
KMO and Barlett's test is 0.963 with sig value 0.000. 18 out of 18 items were extracted- all extracted.

Table 1n: Shopping habits (dairy products)

Items	1	2
	Production process and product value - dairy	Purchase accessibility and quality of product - dairy
Shopping habits- dairy products (Q25)		
Q25_11. Organic dairy products	0.974	
Q25_15. Carbon footprint	0.936	
Q25_14. Food miles	0.931	
Q25_13. Outdoor reared/free range	0.872	
Q25_8. Sustainable packaging	0.852	
Q25_12. Pasture-fed	0.845	
Q25_10. Locally produced	0.781	
Q25_7. Fairtrade or producer/farmer fairly paid	0.709	
Q25_5. Animal welfare	0.695	
Q25_9. Healthy eating	0.637	

Items	1	2
	Production process and product value - dairy	Purchase accessibility and quality of product - dairy
Q25_3. Processing	0.567	
Q25_4. Price		0.965
Q25_6. Special offers		0.826
Q25_1. Quality/taste		0.725
Q25_18. Freshness		0.724
Q25_17. Convenience of use/preparation		0.664
Q25_16. Familiarity or brand		0.491
Eigen Values	11.25	1.11
% of variance	66.19	6.54
Cronbach's alpha	0.967	0.899

2 components are extracted, and this accounts for 72.73% of the variance.
KMO and Barlett's test is 0.966 with sig value 0.000. 17 out of 18 items were extracted.
Nutrition cross loaded and deleted

Table 1o: Preferences for a Label

Items	1
	Preference for a product label
Labelling	
Q27_2. Ethical methods of production	0.841
Q27_3. Sustainable methods of production	0.836
Q27_5. Animal welfare	0.786
Q27_6. Health and nutrition	0.750
Q27_1. Local product	0.749
Q27_7. Food safety	0.735
Q27_8. Benefits for producers	0.717
Q27_4. Carbon footprint from supply and distribution	0.614
Q27_9. Link or QR code to a website for more information	0.611
Eigen Values	4.95
% of variance	55.04
Cronbach's alpha	0.856

One component extracted and account for 55.04% of the variance.
KMO and Barlett's test is 0.909 with 0.000 sig value. All items extracted

Table 2- Indicator reliability and convergent validity measurement using AVE (Average Variance Extracted), CR (construct reliability and validity) respectively and HTMT (discriminant validity)- UK Countries

Table 2a: Evaluating the measurement models- Construct reliability and validity

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Perceived Risk	PR	All items measuring PR	0.862	0.884	0.413
	PR1	Negative effects of behaviour on environment	0.813	0.870	0.578
	PR2	Land use change	0.616	0.792	0.563
	PR3	Economics of farming	0.814	0.889	0.729
	PR4	Changing demand for food production	0.684	0.784	0.575
Perceived benefit	PB	All items measuring PB	0.878	0.897	0.407
	PB1	Landscape preference - emotional	0.841	0.880	0.515
	PB2	Landscape preference – land use and management	0.794	0.846	0.482
Trust- Ability/Motivation	TA	Trust in ability and motivation	0.893	0.625	0.449
Management of the Countryside	MC1	Management of the countryside	0.882	0.906	0.549
Environmental Services	ES	All items measuring ES	0.879	0.895	0.410
	ES1	Environmental quality provision and regulation	0.880	0.907	0.588
	ES2	Social and cultural services	0.821	0.869	0.530
	ES3	Producing food, energy and other products	0.733	0.839	0.635
Attitudes to PG	APG1	Attitudes to grassland	0.912	0.932	0.694
Behavioural Intentions	BI	All items measuring BI	0.660	0.713	0.464
	BI1	Positive behaviours towards grassland	0.664	0.776	0.508
	BI2	No preference for grassland environments	0.753	0.858	0.668
EIA	EIA	All items measuring EIA	0.529	0.620	0.475
	E1A1	Human use of the environment	0.679	0.797	0.506
	EIA2	Environmental value and enjoyment	0.724	0.827	0.544
	EIA3	Active environmental protection	0.590	0.620	0.410

Construct- Consumers	Items/ Factors	Item description	Cronbach's alpha	CR	AVE
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food	0.651	0.060	0.498
	IB2	Intention to buy sustainably produced food			
	IB3	Avoidance of sustainably produced food			
Local Place Identity/PA	LPI	Local place identity	0.818	0.872	0.580
	PA	Productivist attitudes	0.714	0.771	0.420
Attitudes to PG Consumer	APG1	Attitude to grassland	0.912	0.932	0.694
Shopping Habits (Meat)	SHM1	Production process and product value - meat	0.969	0.971	0.652
	SHM2	Taste and freshness of product - meat			
	SHM3	Purchase accessibility of product - meat			
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy	0.971	0.974	0.687
	SHD2	Purchase accessibility and quality of product - dairy			
Preferences for Labelling	PL1	Preference for product label	0.882	0.906	0.551
Consumer attitudes towards PG products		PA productivist attitudes, Shopping habits local place identity	0.906	0.910	0.410

Note: Average Variance Extracted (AVE) is higher than 0.5 but 0.4 is accepted- Fornell and Larcker states that if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981).

Table 2b Evaluating the measurement models- Discriminant validity

Heterotrait-Monotrait Ratio

Construct- Citizens	Attitudes to different ES	Behavioural intention to spend time in grassland	EIA (Attitudes towards the environment)	Management of the countryside	PB	PR	Trust	Attitudes to the Env
Attitudes to different ES								
Behavioural Intentions to spend time in grassland	0.633							
EIA (Attitudes towards the environment)	0.645	0.765						
Management of the countryside	0.661	0.691	0.664					
PB (Perceived Benefit)	0.672	0.667	0.535	0.658				
PR (Perceived Risk)	0.457	0.486	0.589	0.579	0.411			
Trust	0.305	0.366	0.425	0.255	0.297	0.249		
Attitudes to the Env	0.565	0.642	0.459	0.452	0.489	0.304	0.122	

HTMT- impact of the constructs on the attitudes to PG- direct effect

Construct- Consumers	Labelling	Local place Identity	Attitudes to PG	Shopping Habits (dairy)	Shopping Habits (meat)	Productivities Attitudes
Labelling						
Local Place	0.641					
Attitudes to PG	0.448	0.452				
Shopping Habits (dairy)	0.471	0.319	0.202			
Shopping Habits (meat)	0.232	0.133	0.105	0.448		
Productivities Attitudes	0.486	0.430	0.272	0.323	0.301	

Table 3 Indicator reliability and convergent validity measurement using AVE (Average Variance Extracted), CR (construct reliability and validity) respectively and HTMT (discriminant validity)- Czech Republic

Table 3a: Evaluating the measurement models- Construct reliability and validity

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Perceived Risk	PR	All items measuring PR	0.801	0.841	0.411
	PR1	Negative effects of behaviour on environment			
	PR2	Land use change			
	PR3	Economics of farming			
	PR4	Changing demand for food production			
Perceived benefit	PB	All items measuring PB	0.797	0.860	0.553
	PB1	Landscape preference - emotional			
	PB2	Landscape preference – land use and management			
Trust- Ability/Motivation	TA	All items measuring trust	0.867	0.704	0.402
	TA1	Trust in industry, business and third sector – ability to manage the countryside			
	TA2	Trust in farmers and government - ability to manage the countryside			

	TM1	Trust in all actors – motivation to manage the countryside			
Management of the Countryside	MC1	Management of the countryside	0.878	0.908	0.623
Environmental Services	ES	All items measuring ES	0.826	0.868	0.490
	ES1	Environmental quality provision and regulation			
	ES2	Social and cultural services			
	ES3	Producing food, energy and other products			
Attitudes to PG	APG1	Attitudes to grassland	0.894	0.918	0.652
Behavioural Intentions	BI	All items measuring BI	0.738	0.773	0.433
	BI1	Positive behaviours towards grassland			
	BI2	No preference for grassland environments			
EIA	EIA	All items measuring EIA	0.523	0.621	0.415
	E1A1	Human use of the environment			
	EIA2	Environmental value and enjoyment			
	EIA3	Active environmental protection			

Construct-Consumers	Items/ Factors	Item description	Cronbach's alpha	CR	AVE
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food	0.608	0.621	0.424
	IB2	Intention to buy sustainably produced food			
	IB3	Avoidance of sustainably produced food			
Local Place Identity/PA	LPI	Local place identity	0.773	0.855	0.597
	PA	Productivist attitudes	0.647	0.803	0.577
Attitudes to PG Consumer	APG1	Attitude to grassland	0.894	0.918	0.652
Shopping Habits (Meat)	SHM1	Production process and product value - meat	0.949	0.957	0.711
	SHM2	Taste and freshness of product - meat			
	SHM3	Purchase accessibility of product - meat			
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy	0.953	0.960	0.686
	SHD2	Purchase accessibility and quality of product - dairy			
Preferences for Labelling	PL1	Preference for product label	0.873	0.864	0.563
Consumer attitudes towards PG products		PA productivist attitudes, Shopping habits local place identity	0.880	0.896	0.430

Note: Average Variance Extracted (AVE) is higher than 0.5 but 0.4 is accepted- Fornell and Larcker states that if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell and Larcker, 1981).

Table 3b Evaluating the measurement models- Discriminant validity

HTMT- impact of the constructs on the attitudes to PG- direct effect

Construct- Citizens	Attitude to PG	EIA	Management of the countryside	Perceived benefit	Perceived Risk	Trust	Different ES
Attitude to PG							
EIA	0.613						
Management of the countryside	0.398	0.758					
Perceived benefit)	0.567	0.790	0.590				
Perceived Risk	0.268	0.612	0.521	0.367			
Trust	0.116	0.423	0.278	0.196	0.238		
Different ES	0.573	0.807	0.613	0.752	0.335	0.286	

Construct- Consumers	Attitude to PG	Shopping habits Dairy	Label	Local Place Identity	Shopping habits Meat	Productivist attitudes
Attitude to PG						
Shopping habits Dairy	0.270					
Label	0.418	0.495				
Local Place Identity	0.465	0.324	0.618			
Shopping habits Meat	0.230	0.395	0.324	0.271		
Productivist attitudes	0.338	0.326	0.442	0.584	0.317	

Table 4- Indicator reliability and convergent validity measurement using AVE (Average Variance Extracted), CR (construct reliability and validity) respectively and HTMT (discriminant validity)- Switzerland

Table 4a: Evaluating the measurement models- Construct reliability and validity

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Perceived Risk	PR	All items measuring PR	0.802	0.806	0.431
	PR1	Negative effects of behaviour on environment			
	PR2	Land use change			
	PR3	Economics of farming			
	PR4	Changing demand for food production			
Perceived benefit	PB	All items measuring PB	0.724	0.819	0.477
	PB1	Landscape preference - emotional			
	PB2	Landscape preference – land use and management			
Trust- Ability/Motivation	TA	All items measuring trust	0.896	0.899	0.450
	TA1	Trust in industry, business and third sector – ability to manage the countryside			
	TA2	Trust in farmers and government - ability to manage the countryside			
	TM1	Trust in all actors – motivation to manage the countryside			
Management of the Countryside	MC1	Management of the countryside	0.793	0.851	0.493
Environmental Services	ES	All items measuring ES	0.723	0.807	0.410
	ES1	Environmental quality provision and regulation			
	ES2	Social and cultural services			
	ES3	Producing food, energy and other products			
Attitudes to PG	APG1	Attitudes to grassland	0.889	0.915	0.642
Behavioural Intentions	BI	All items measuring BI	0.738	0.773	0.433
	BI1	Positive behaviours towards grassland			

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
	BI2	No preference for grassland environments			
EIA	EIA	All items measuring EIA	0.687	0.602	0.401
	E1A1	Human use of the environment			
	EIA2	Environmental value and enjoyment			
	EIA3	Active environmental protection			

Construct- Consumers	Items/ Factors	Item description	Cronbach's alpha	CR	AVE
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food	0.643	0.755	0.418
	IB2	Intention to buy sustainably produced food			
	IB3	Avoidance of sustainably produced food			
Local Place Identity/PA	LPI	Local place identity	0.689	0.806	0.512
	PA	Productivist attitudes	0.742	0.853	0.659
Attitudes to PG Consumer	APG1	Attitude to grassland	0.889	0.915	0.643
Shopping Habits (Meat)	SHM1	Production process and product value - meat	0.882	0.919	0.740
	SHM2	Taste and freshness of product - meat			
	SHM3	Purchase accessibility of product - meat			
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy	0.875	0.941	0.889
	SHD2	Purchase accessibility and quality of product - dairy			
Preferences for Labelling	PL1	Preference for product label	0.844	0.881	0.553
Consumer attitudes towards PG products		PA productivist attitudes, Shopping habits local place identity	0.872	0.890	0.410

Note: Average Variance Extracted (AVE) is higher than 0.5 but 0.4 is accepted- Fornell and Larcker states that if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981).

Table 4b Evaluating the measurement models- Discriminant validity

HTMT- impact of the constructs on the attitudes to PG- direct effect

Construct- Citizens	Attitude to PG	EIA	Different ES	Management of the countryside	Perceived benefit)	Perceived Risk	Trust
Attitude to PG							
EIA	0.537						
Different ES	0.605	0.778					
Management of the countryside	0.403	0.712	0.588				
Perceived benefit)	0.526	0.685	0.701	0.706			
Perceived Risk	0.242	0.677	0.405	0.560	0.420		
Trust	0.199	0.640	0.385	0.609	0.408	0.507	

Construct- Consumers	Attitude to PG	Local Place Identity	Productivist attitudes	Shopping habits Dairy	Label	Shopping habits Meat
Attitude to PG						
Local Place Identity	0.422					
Productivist attitudes	0.437	0.726				
Shopping habits Dairy	0.202	0.378	0.342			
Label	0.308	0.556	0.529	0.476		
Shopping habits Meat	0.195	0.327	0.306	0.165	0.359	

Table 5- Indicator reliability and convergent validity measurement using AVE (Average Variance Extracted), CR (construct reliability and validity) respectively and HTMT (discriminant validity)- Sweden

Table 5a Evaluating the measurement models- Construct reliability and validity

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Perceived Risk	PR	All items measuring PR	0.775	0.819	0.410
	PR1	Negative effects of behaviour on environment			
	PR2	Land use change			
	PR3	Economics of farming			
	PR4	Changing demand for food production			
Perceived benefit	PB	All items measuring PB	0.679	0.788	0.431
	PB1	Landscape preference - emotional			
	PB2	Landscape preference – land use and management			
Trust- Ability/Motivation	TA	All items measuring trust	0.879	0.640	0.434
	TA1	Trust in industry, business and third sector – ability to manage the countryside			
	TA2	Trust in farmers and government - ability to manage the countryside			
	TM1	Trust in all actors – motivation to manage the countryside			
Management of the Countryside	MC1	Management of the countryside	0.841	0.884	0.564
Environmental Services	ES	All items measuring ES	0.745	0.815	0.418
	ES1	Environmental quality provision and regulation			
	ES2	Social and cultural services			
	ES3	Producing food, energy and other products			
Attitudes to PG	APG1	Attitudes to grassland	0.904	0.926	0.675
Behavioural Intentions	BI	All items measuring BI	0.738	0.608	0.486
	BI1	Positive behaviours towards grassland			
	BI2	No preference for grassland environments			
EIA	EIA	All items measuring EIA	0.696	0.612	0.474
	E1A1	Human use of the environment			
	EIA2	Environmental value and enjoyment			
	EIA3	Active environmental protection			

Construct- Consumers	Items/ Factors	Item description	Cronbach's alpha	CR	AVE
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food	0.626	0.619	0.474
	IB2	Intention to buy sustainably produced food			
	IB3	Avoidance of sustainably produced food			
Local Place Identity/PA	LPI	Local place identity	0.787	0.862	0.610
	PA	Productivist attitudes	0.782	0.774	0.535
Attitudes to PG Consumer	APG1	Attitude to grassland	0.904	0.926	0.675
Shopping Habits (Meat)	SHM1	Production process and product value - meat	0.849	0.782	0.440
	SHM2	Taste and freshness of product - meat			
	SHM3	Purchase accessibility of product - meat			
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy	0.730	0.758	0.527
	SHD2	Purchase accessibility and quality of product - dairy			
Preferences for Labelling	PL1	Preference for product label	0.880	0.907	0.583
Consumer attitudes towards PG products		PA productivist attitudes, Shopping habits local place identity	0.855	0.865	0.430

Note: Average Variance Extracted (AVE) is higher than 0.5 but 0.4 is accepted- Fornell and Larcker states that if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981).

Table 5b Evaluating the measurement models- Discriminant validity

HTMT- impact of the constructs on the attitudes to PG- direct effect

Construct- Citizens	Attitude to PG	EIA	Different ES	Perceived benefit)	Perceived Risk	Trust	Management of the countryside
Attitude to PG							
EIA	0.610						
Different ES	0.599	0.790					
Perceived benefit)	0.414	0.596	0.601				
Perceived Risk	0.317	0.630	0.453	0.417			
Trust	0.140	0.314	0.287	0.300	0.204		
Management of the countryside	0.489	0.689	0.623	0.488	0.609	0.240	

Construct- Consumers	Attitude to PG	Local Place Identity	Productivist attitudes	Shopping habits Dairy	Label	Shopping habits Meat
Attitude to PG						
Local Place Identity	0.488					
Productivist attitudes	0.371	0.530				
Shopping habits Dairy	0.201	0.277	0.154			
Label	0.380	0.489	0.441	0.355		
Shopping habits Meat	0.074	0.162	0.288	0.256	0.211	

Table 6- Indicator reliability and convergent validity measurement using AVE (Average Variance Extracted), CR (construct reliability and validity) respectively and HTMT (discriminant validity)- Spain

Table 6a Evaluating the measurement models- Construct reliability and validity

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Perceived Risk	PR	All items measuring PR	0.798	0.804	0.435
	PR1	Negative effects of behaviour on environment			
	PR2	Land use change			
	PR3	Economics of farming			
	PR4	Changing demand for food production			
Perceived benefit	PB	All items measuring PB	0.735	0.826	0.491
	PB1	Landscape preference - emotional			
	PB2	Landscape preference – land use and management			
Trust- Ability/Motivation	TA	All items measuring trust	0.876	0.876	0.405
	TA1	Trust in industry, business and third sector – ability to manage the countryside			
	TA2	Trust in farmers and government - ability to manage the countryside			
	TM1	Trust in all actors – motivation to manage the countryside			
Management of the Countryside	MC1	Management of the countryside	0.923	0.940	0.722
Environmental Services	ES	All items measuring ES	0.828	0.872	0.500
	ES1	Environmental quality provision and regulation			
	ES2	Social and cultural services			
	ES3	Producing food, energy and other products			

Construct- Citizens	Items/ factors	Item description	Cronbach's alpha	CR	AVE
Attitudes to PG	APG1	Attitudes to grassland	0.896	0.919	0.655
Behavioural Intentions	BI	All items measuring BI	0.721	0.732	0.466
	BI1	Positive behaviours towards grassland			
	BI2	No preference for grassland environments			
EIA	EIA	All items measuring EIA	0.729	0.602	0.433
	E1A1	Human use of the environment			
	EIA2	Environmental value and enjoyment			
	EIA3	Active environmental protection			

Construct- Consumers	Items/ Factors	Item description	Cronbach's alpha	CR	AVE
Intentions to buy products from sustainably managed grassland	IB1	Identify but don't prioritise sustainably produced food	0.660	0.642	0.410
	IB2	Intention to buy sustainably produced food			
	IB3	Avoidance of sustainably produced food			
Local Place Identity/PA	LPI	Local place identity	0.831	0.888	0.664
	PA	Productivist attitudes	0.647	0.798	0.573
Attitudes to PG Consumer	APG1	Attitude to grassland	0.896	0.920	0.657
Shopping Habits (Meat)	SHM1	Production process and product value - meat	0.849	0.893	0.625
	SHM2	Taste and freshness of product - meat			
	SHM3	Purchase accessibility of product - meat			
Shopping Habits (Dairy)	SHD1	Production process and product value - dairy	0.709	0.873	0.774
	SHD2	Purchase accessibility and quality of product - dairy			
Preferences for Labelling	PL1	Preference for product label	0.895	0.920	0.657
Consumer attitudes towards PG products		PA productivist attitudes, Shopping habits local place identity	0.872	0.892	0.420

Note: Average Variance Extracted (AVE) is higher than 0.5 but 0.4 is accepted- Fornell and Larcker states that if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981).

Table 6b Evaluating the measurement models- Discriminant validity

HTMT- impact of the constructs on the attitudes to PG- direct effect

Construct- Citizens	Attitude to PG	EIA	Different ES	Perceived benefit)	Perceived Risk	Trust	Management of the countryside
Attitude to PG							
EIA	0.610						
Different ES	0.599	0.790					
Perceived benefit)	0.414	0.596	0.601				
Perceived Risk	0.317	0.630	0.453	0.417			
Trust	0.140	0.314	0.287	0.300	0.204		
Management of the countryside	0.489	0.689	0.623	0.488	0.609	0.240	

Construct- Consumers	Attitude to PG	Local Place Identity	Productivist attitudes	Shopping habits Dairy	Label	Shopping habits Meat
Attitude to PG						
Local Place Identity	0.500					
Productivist attitudes	0.429	0.667				
Shopping habits Dairy	0.285	0.378	0.388			
Label	0.454	0.626	0.577	0.415		
Shopping habits Meat	0.246	0.251	0.325	0.306	0.328	