

Tourists' Preferences for Alpine Pastures Maintenance

Abstract

Traditional extensive agriculture is the main factor of landscape management in the mountains: a large part of the Alps is modelled by agriculture. Interpreted as a multifunctional activity, including landscape modelling and maintenance, agriculture generates the conditions under which mountain pasture landscape is an economic resource potentially exploitable by tourism. The aim of this work is to draw the profiles of tourists of mountain pastures and to estimate their Willingness to Pay (WTP) for landscape pastures resilience. The innovation of this work lies in the use of a multivariate approach using Contingent Valuation Method (CVM), Multiple Correspondence Analysis (MCA) and Hierarchical Cluster Analysis (HCA). The analysis obtained three clusters that identify different tourists' profiles. The main result is the existence of a positive WTP for the permanence of pasture systems with an agricultural management. Policy guidelines have been proposed to institutions owning pastures and huts to manage these assets.

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1 Introduction

The evolution of the demand for agricultural products requires new services to be provided by the primary sector, which is typical of a multifunctional approach (Streifeneder et al. 2007, Lamarque & Lambin 2015, Torquati et al. 2017), from environmental services to biodiversity (Bernuès et al. 2015), from heritage to landscape conservation (Gios et al. 2006).

Interpreting agriculture as landscape construction, care for biodiversity and maintenance of traditions and knowledge requires the exploitation of these assets through tourism, sports and education that may enhance rural economies (Mazzocchi & Sali 2016, Van Der Ploeg et al. 2008). Thus, tourism has acquired a central position in the debate on the future of rural, upland and mountain economies across Europe, especially in the light of both the increasing recognition of these services and functions (Lee et al. 2010) and the demand for the natural environment and landscape (Castellani & Sala 2009, Europarc 1995). According to Lane (1994), rural areas are constantly evolving, and different forms of rural tourism have developed in several regions with different intensity. More in detail, *“Rural tourism is a complex multi-faceted activity: it is not just farm-based tourism. It includes farm-based holidays but also special-interest nature holidays and ecotourism, walking, climbing and riding holidays, adventure, sport and health tourism, hunting and angling, educational travel, arts and heritage tourism, and, in some areas, ethnic tourism.”* (Lane 1994, pp.9)

Since rural tourists' need to be in contact with nature is spreading (Strobl et al. 2015), a relaxing time to spend with family is more and more requested (Lane 1994), the search of a sustainable way to spend holidays is increasing (Millàn Vázquez De La Torre et al. 2013) and rural areas can take advantage of this market niche to generate additional income. Moreover, as rural areas often depend economically on the income generated by the primary sector, rural tourism allows to diversify the sources of income and to get more stable economic systems (Millàn Vázquez De La Torre et al. 2013).

One of the most important aspects in rural tourism is consumer demand (Bramwell, 1994), and it seems obvious that management decisions of rural areas should consider consumers' needs. According to Jindrová & Dömeová (2013), customer satisfaction is the basis for the growth of rural tourism in recent years, as tourism represent a new source of income and employment, promoting the economic revitalization of depressed rural areas (Molera&Pilar Albaladejo 2007, Sala & Castellani 2009). Among the most investigated aspects by research dealing with rural areas there are tourists' motivations and preferences for visiting rural places (Molera&Pilar Albaladejo 2007, Millàn Vázquez De La Torre et al. 2013, Bel et al. 2015). The motivations that drive tourists are mainly related to be in contact with nature, to enjoy landscape and fresh air (Hjalager et al. 2017) and to make outdoor activities (Hjalager et al. 2017, Millàn Vázquez De La Torre et al. 2013). In addition, the development of “active tourism” in rural areas, i.e. tourism linked to outdoor activities, took place mainly in protected areas or in destinations branded as unique (Bel et al. 2015). Billore (2018) highlights the importance and the rising consumption of cultural proposals in rural areas, often linked to the historical heritage and services of the territory. Other authors (Chrysocou et al. 2006, Devesa et al. 2010) stress the importance of gastronomy offers on the territory, together with hospitality and lodging availability that are important drivers of tourists' staying in rural contexts. Moreover, Bel et al. (2015) find that gastronomic tourism has been shown to attract higher-spending tourists and its link to local products and amenities should be fostered to develop rural tourism. The quality of services offered to tourists in rural areas is investigated by Chin & Lo (2017): their findings show that environmental factors are among the main concerns for visitors, and support from local communities serves as an additional advantage to attract tourists. That is, the development of the destination must be led by the aim of sustainable development and attentive conservation practices to protect the natural resources.

Mountain rural tourism can be considered a branch of rural tourism, according to the rurality characterising a part of mountain regions. Moreover, in these areas

agriculture generates the conditions under which mountain region can serve as an economic resource potentially exploitable by tourism. According to Soliva et al. (2008), low intensive farming systems generate extensive green areas, such as meadows and pastures.

Few studies focus on the relationship between the characteristics of tourists and their WTP for services, particularly in the mountains. In many cases a Contingent Valuation Method (CVM) approach is used, often applied to estimate the value visitors place on recreation by measuring visitor consumer surplus and WTP for non-consumptive uses, but also Conjoint Analysis (Marangon et al. 2013) and Choice Experiments method (Mazzocchi & Sali 2018, Goio & Gios 2012, Thiene & Scarpa 2008). As an example, Keske & Mayer (2014) tried to estimate the WTP of tourists for hypothetical fee increases at hiking trails located in a mountain area in Colorado State, USA, using a Contingent Valuation Method approach. Molina et al. (2016) propose an integrated evaluation of landscape value using both CVM and Geographical Information System, administering a questionnaire to tourists in a rural area of Spain. Marangon et al. (2013) develop a conjoint analysis on a mountain rural area called Natisone Valley, in Italy, to find that the main attributes influencing tourists staying in this area are the availability of information facilities (as guided tours) and transport means.

At the same time, several studies have attempted to define tourists' profiles using market segmentation techniques to define groups of tourists with similar preferences (Bel et al. 2015, Lima et al. 2012, Wedel & Kamakura 1998) and to improve the offer of mountain tourism. As an example, Strobl et al. (2015) investigate the ecotourism demand of mountain tourists, defined as responsible travel to natural areas that conserves the environment and improves the well-being of local people (The International Ecotourism Society 2006), interpreted as a specific segment of rural tourism. One of the main results is that mountain tourists show similarities in travel motives to eco-tourists, suggesting that they are sensitive to ecological concerns. Lima et al. (2012), identify different clusters of visitors, in a Portuguese mountain destination, according to the level and patterns of visitors' expenditure during the visit.

Although previous research addressed the topic of mountain tourists' profiles and their WTP for landscape conservation, services development and other characteristics, none of the published researches have focused on tourists' preferences for mountain pastures and landscape maintenance, nor any of them used the mixed approach of WTP elicitation and segmentation of tourists altogether. The aim of the paper is to analyse the characteristics of potential tourists of a mountain area, to estimate their sensitivity to the issues related to pastures and landscape conservation and to elicit their WTP for pastures maintenance. The results show three different clusters described by several variables linked to the main issue of mountain pastures resilience. Moreover, the results include the WTP for pastures maintenance of each cluster, allowing to draw some suggestions to public institutions to better manage their owned pastures properties and to efficiently target their investments.

The methodology includes three steps: WTP elicitation by using CVM, the Multiple Correspondence Analysis (MCA), and the Hierarchical Cluster Analysis (HCA).

Section two describes the methodology, the data and the modelling procedure. Section three presents the results, which are discussed in section four. Finally, section five illustrates the conclusions.

2 Methodology

2.1 Case study, data and questionnaire

The questionnaire was prepared using closed-ended questions to allow for an easier categorization. The first part of the questionnaire began with an introduction about mountain pastures and upland farms issues, followed by a description of the research aim. The introduction was focused on the description of pastures context in some Italian municipalities¹ of the Seriana, Brembana and Scalve

¹ The huts and pastures described in the questionnaire refer to the municipality of Valbondione, Gromo, Oltressenda Alta, Valnegrà, Veduggio and Colere

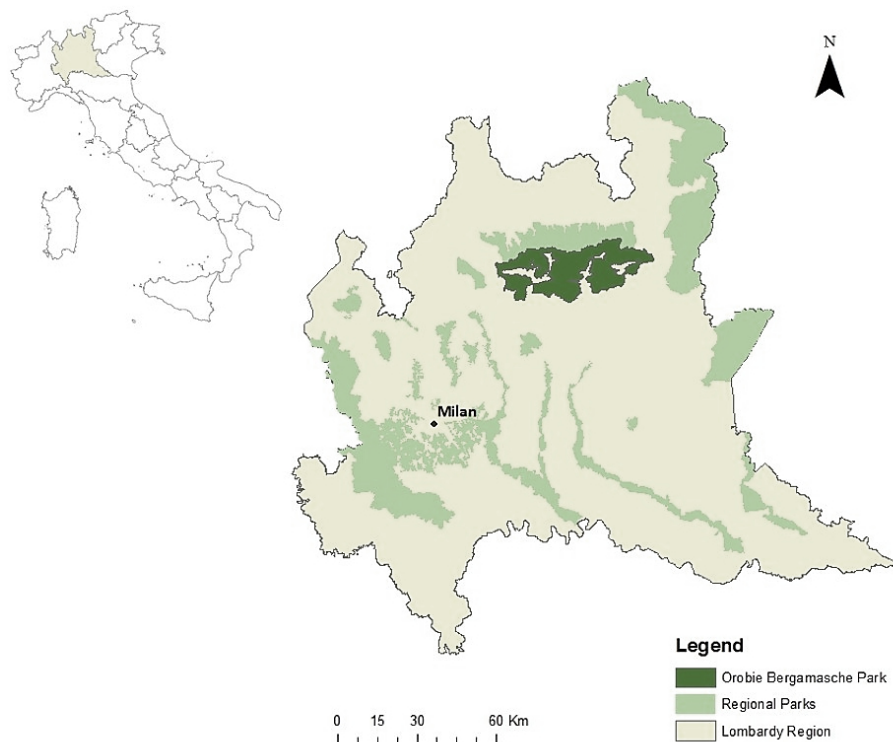


Figure 1: Orobic Bergamasche Regional Park, in Lombardy region.

Valley, located within the Regional Park of Orobic Bergamasche Alps, in the northern area of the Province of Bergamo, in Lombardy Region (Figure 1)

In the Park there are 118 mountain huts, the highest concentration is in the Brembana Valley. Seriana and Scalve Valleys show an average pastureland surface that is greater than that of the Val Brembana (Baronchelli 2016). The area is rich in endemic species and biodiversity characterized by open areas with herbaceous vegetation, such as grassland and dry meadows, in addition to rocky areas placed at higher altitudes. Since pastures property is public, local municipalities are interested in knowing public opinion about the use of these areas and the type of investment that they should do to keep them active, given both the difficulty for farming' activities and the related abandonment of huts. Many of the pastures are publicly owned and are rented to privates. In the first part of the questionnaire subjects were asked to express their opinion, on a scale from 1 to 5, about the importance of the environment, territory, accessibility and activity of pastures (Table 1).

In the second part of the questionnaire, WTP is made elicited using the double bounded CVM. The third part of the questionnaire addresses the personal characteristics of the respondents.

Using "Survey Monkey", an online platform for submitting surveys, the questionnaires have been distributed online. By publishing the link of the questionnaire on Facebook, followed by a description of various Facebook "groups", the sample was selected. The questionnaire has been spread in groups where users could potentially be interested in the topic of the research, such as the pages of the trekking lovers, of the Alpine Huts and mountaineers to reach tourists mainly coming from the Lombardy region. This procedure has been chosen to reasonably select subjects on the basis of a voluntary interest and not due to the insistence of an interviewer. The choice of on-line interviews has been made to have a large population sample who had never seen before the questionnaire or heard about it before, as at the contrary happens for the focus groups, to pose the proposed issue without influencing in any way the interviewed sample. In fact, the aim of the analysis was to collect data from a population of tourists without any contact before, to have a more direct responses, with no intermediation.

2.2 Conceptual framework and modelling

The methodological approach presents three steps: WTP elicitation (2.2.1), MCA (2.2.2), and HCA (2.2.3).

Table 1: Structure of the survey.

Question	Variables Name	Definition	Modality	Measure Unit
1	ACCOM	Presence of accommodations in the valley	Score	From 1 to 5
	ENV	Environment unpolluted		
	TOWN	Well preserved villages		
	MULT	Presence of multifunctional farms in the valley		
	INFR	Infrastructural equipment		
	EVE	Number of touristic events in the valley		
2	WATER	Importance of farms in water management	Score	From 1 to 5
	RISK	Agriculture importance in reduction of hydrogeological risk		
	EMPLOY	Job preservation by agriculture		
	BIOD	Biodiversity conservation by agriculture		
	HERIT	Heritage preservation by agriculture		
3	AGRICULTURE	Agro-productive orientation of pastures	Alternative (choice)	0: no 1: yes
	TOURISM	Touristic orientation of pastures		
	ACTUAL	Maintenance of actual situation of pastures		
4	PASTURE	Preference for pasture increase and forest decrease	Alternative	0: no 1: yes
	FOREST	Preference for pasture decrease and forest increase		
	ACTUAL	Preference for actual situation		
5	NONE	I would like no particular service in the pasture	Multiple (choice)	0: no 1: yes
	SELL	I would like agricultural products selling		
	RIST	I would like food service		
	BED	I would like accommodation service		
6	PATH	Preference for accessibility pasture by path	Alternative	0: no 1: yes
	ROAD	Preference for accessibility pasture by road		
	TRAIL	Preference for accessibility pasture by trail		
7	WTP	Willingness to pay for the permanence of pastures a)30, 60, 15; b) 50, 100, 20; c) 80, 150, 40; d) 100, 200, 50	Double bounded	€
8	INFO	Information degree about the issue of questionnaire	Score	From 1 to 5
9	INCOME	Family income per month	Quantitative	0-∞
10	AGE	Age	Quantitative	0-∞
11	FEM	Gender	Alternative	0: no 1: yes
12	FAM	Number of family components	Quantitative	0-∞
13	CHILD	Number of children under 18 years	Quantitative	0-∞
14	MIDDLE SCHOOL	Lower secondary school diploma	Alternative	0: no 1: yes
15	HIGHSCHOOL	High school diploma	Alternative	0: no 1: yes
16	DEGREE	Degree certificate	Alternative	0: no 1: yes

2.2.1 The WTP elicitation

The CVM is the most widely used model for estimating non-market values, eliciting consumer preferences and WTP (Rathnayake 2016) for goods and services that are not directly traded in the market, such as landscapes value, ecosystems services, ecological functions, and so on. In few cases, CVM has been used to assess the permanence of mountain farms. In the present study, a CVM was used to elicit respondents' WTP for the conservation of mountain pastures and landscapes. The WTP was directly elicited from individual *i* after applying a contingent valuation questionnaire using the dichotomous choice model, generating a dichotomous answer ($y_i = 0$ if the individual answers no and $y_i = 1$ if the answer is yes) to a question about paying a previously determined amount s_i , which randomly varies across individuals (Lopez 2012). We have obtained four groups of individuals according to the four amounts of money proposed: the yes-yes, the yes-no, the no-yes, the no-no groups (Table 3). In fact, if individuals answered "yes" to the first question, then they were asked about their WTP for a higher amount. If they answered "no" to the first question, a lower amount is offered. So, in the second question, the amount asked depends on the answer to the first question. This method, called "double bounded" model, allows to obtain two answers per each respondent, introducing the identification of two limits, lower and upper, in which the individual WTP is located. To determine the average WTP of the survey sample,

different models were examined to identify the best fitting model, using the Likelihood Ratio Test (LRT). The differences between the log-likelihood in the different models correspond to the ratio between the likelihoods. Covariates are respondents' age (AGE), gender (FEM), number of family members (FAM), number of children per family (CHILD), the respondents' school level (MED, HIGH, DEGR), the family income per month (INCOME), and the best combinations between them. The introduction of covariates leads to an improvement of the basic model without covariates, tested through the likelihood ratio test (LRT), leading to the best fitting model that is the one with two covariates, Model 10. Model 10 estimates an average WTP value of 56.34 € and includes two individual-specific variables: „INCOME“ and „FAM“ (Table 2).

Thus, in the MCA analysis, the average WTP value resulted from the WTP assessment has been used to find the individual WTP per respondent.

The average WTP of Model 10, that is 56.39€, was used to calculate the individual WTP per respondent. The individual WTP was calculated as follows:

$$WTP = \beta_0 + \beta_1 * x_1 + \beta_2 * x_2 \tag{1}$$

where x_1 is the variable INCOME, x_2 is the variable FAM, and β is the β coefficient of the model, β_{x_1} is the β coefficient of the variable INCOME in the model, and β_{x_2} is the β coefficient of the variable FAM.

Table 2: WTP models.

	Model 1 (nocov)	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
n° observations	401.00	370.00	370.00	367.00	367.00	370.00	370.00	370.00	370.00	367.00	365.00
β coeff	53.78	55.89	56.33	57.88	55.88	59.59	56.45	52.42	32.92	35.17	34.31
AGE		0.01									
FEM			-0.25								
FAM				-0.43						-0.99	-0.86
CHILD					0.83						-0.15
SCHOOL -med						-13.86					
SCHOOL -high							-0.54				
SCHOOL -degr								12.86			
INCOME									0.01	0.01	0.01
WTP	53.78	56.20	56.20	56.47	56.24	56.15	56.20	56.20	56.08	56.39	56.14
Log likelihood	-545.57	-507.20	-507.20	-502.59	-502.71	-506.08	-507.19	-506.10	-502.78	-497.79	-494.56
Δ Log likelihoodmod 1		76.74	76.74	85.96	85.72	78.98	76.76	78.94	85.58	95.56	102.02
Δ Log likelihoodmod 10/4										9.60	
Δ Log likelihoodmod 11/10											6.46

2.2.2 The MCA

As an extension of Correspondence Analysis with more than two variables and a generalization of the principal component analysis with categorical instead of quantitative variables (Abdi & Valentin 2007), MCA searches for the relationships pattern of several categorical variables that reveal concealed patterning in complex datasets. MCA enables the representation and modelling of complex datasets as clouds of points in a multidimensional Euclidean space; the results are therefore interpreted based on the relative positions of the points and their distributions along the dimensions, and more category frequencies show similar distributions the closer they are represented in space (Greenacre & Hastie 1997, Johnson & Wichern 2007). The variables used to perform MCA were selected from the variables included in the questionnaire to maximize the explained variance while retaining the main relevant issues evaluated in the survey. Variables with low component loadings were sequentially excluded from the analysis. A solution with seven variables was selected as a fair compromise between the readability of the results and the maximization of the explained variance based on the first two axes.

2.2.3 Hierarchical Cluster analysis

Cluster analysis following MCA is often used to classify individuals into homogeneous groups; in this case, the clusters are derived from the MCA dimension object scores, which are based on the quantification of the qualitative variables that define the individual profile. Hierarchical classification was performed using Ward's aggregation, a hierarchical classification algorithm. Ward's minimum variance criterion minimizes the total within-cluster variance, while maximizing the variance between classes, and groups are formed to minimize the pooled within-group sum of squares. These inertias are calculated from the coordinates of the elements on the factorial plane of the MCA. HCA is performed using the principal components of the factorial analysis, and the hierarchy is represented using a dendrogram. The vertical axis of the dendrogram represents the distance or dissimilarity between clusters, and the horizontal axis represents the objects and clusters.

3 Results

3.1 Descriptive statistics of the sample

Respondents are 37 years old on average (Table 3) and equally distributed between males and females.

The average number of children and young people under 18 years of age (CHILD) per family is less than 1 because the sample includes a wide age range from 18 to 72 years; therefore, young people without children or younger brothers or sisters and other elderly people with adult children were also included. The median household income is approximately 1,950 €, precisely the central range of the incomes proposed in the questionnaire.

In terms of education, most of the sample has a high school diploma (45%), while the remaining individuals comprise people with a low school level (22%) and those with a higher school level, i.e., a degree (27%).

Most respondents assign maximum importance (level 5) to the presence of an uncontaminated environment (55.24%) and well-preserved historic villages (56%) in the municipalities hosting the mountain pastures. The accommodations and infrastructure of the municipality of the valley showed the highest importance for, respectively, 35.43% and 40.33% of the sample, similar to the presence of multifunctional farms (40.33%).

Concerning the second question, which is related to the importance of farms performing various functions, biodiversity and heritage conservation and enhancement of employment have the highest score (level 5) for 41% of the sample. The variables related to risk management and water are evaluated by 50% of the population, revealing medium importance (3 and 4 level). Question 4 provides an interpretation of what consumers would like to observe in upland farms and pastures. Indeed, the potential economic orientation of the economic activity in the pastures was important; 60.7% of the respondents prefer an agricultural-production orientation of mountain farms, and 33.3% of the respondents prefer a tourism orientation. Associated with this question is Question 6, which asked respondents to explain their

preference for the accessibility typology. The group is divided in half between individuals who selected accessibility via footpath, 47.40%, and those who selected accessibility via trail, 47.6%. Interestingly, only 5% of the sample select accessibility via paved road, suggesting a good sensibility for environmental issues. To further examine the importance of the typology of pasture activities, respondents were asked to express their personal preferences for some

potential services offered by upland farms (multiple choice): 74.1% of the respondents choose “sale of self-production”, while 65.3% of the respondents would like to eat on the farm, including restaurant service, and 52.6% of the respondents want to spend the night on a farm structure (such as Alpine Huts). Only 4.5% of the respondents did not want any service in the pastures.

Table 3: Descriptive statistics of the variables.

Variables	Average	Min	Max	Standard Deviation
ACCOM	3.97	1.00	5.00	0.96
ENV	4.39	1.00	5.00	0.81
TOWN	4.43	1.00	5.00	0.75
MULT	4.07	1.00	5.00	0.96
EVENTS	3.95	1.00	5.00	1.00
INFRASTR	4.10	1.00	5.00	0.91
WATER	3.72	1.00	5.00	1.31
RISK	3.93	1.00	5.00	1.31
EMPLOY	4.09	1.00	5.00	1.23
BIOD	4.05	1.00	5.00	1.30
HERIT	4.12	1.00	5.00	1.22
AGRICULTURE	0.61	0.00	1.00	0.49
TOURISM	0.33	0.00	1.00	0.46
ACTUAL	0.06	0.00	1.00	0.23
PASTURE	0.43	0.00	1.00	0.49
FOREST	0.21	0.00	1.00	0.40
ACTUAL	0.36	0.00	1.00	0.47
NONE	0.04	0.00	1.00	0.20
SALE	0.69	0.00	1.00	0.46
FOOD	0.61	0.00	1.00	0.49
BED	0.49	0.00	1.00	0.50
TRAIL	0.48	0.00	1.00	0.50
ROAD	0.05	0.00	1.00	0.21
PATH	0.47	0.00	1.00	0.50
INFO	2.74	1.00	5.00	1.34
AGE	37.10	14.00	72.00	17.67
FEM	0.52	0.00	1.00	0.50
FAM	3.17	0.00	20.00	1.82
CHILD	0.44	0.00	4.00	0.75
MIDDLE SCHOOL				0.41
HIGHSCHOOL				0.49
DEGREE				0.44
INCOME	1965.00	350.00	4500.00	1148.01
WTP	51.21	32.65	78.45	20.17

3.2 MCA results

Variables in Table 4 have been used to perform the MCA analysis. Although MCA was primarily selected to generate a reference system on which to project the hierarchical clustering, observing the arrangement of modalities along the axis generated from the MCA provides interesting insights regarding the associations of respondent's preferences. To implement the MCA, 7 variables were selected from the dataset: three questions directly concerning opinions about issues related to pastures, two questions regarding opinions on valley municipalities, one variable regarding the respondents' education level and one variable concerning the reclassification in two categorical classes of the WTP, a low class, including WTP<49.3, and a high class, including WTP >49.3, where 49.3 was the median value.

The results of the MCA are shown in figure 2.

The first two components accounted for 77.30% of the explained variance: 56.19% on the first component and 21.11% for the second component. The variables that mostly contributed to the construction of the first axis in terms of quality were the "economic orientation of pastures" (Q3); the "infrastructure equipment" (INFR), and the "accessibility" (Q6). Moreover, "pastures management" (Q4) shows a relevant contribution to the first component construction (Table 5). The "accessibility" (Q6) is the most important variable for building the second component, together with "economic orientation of pastures" (Q3), "pastures management" (Q4) and "educational degree" (SCHOOL). Modality "well preserved villages" (TOWN 1) is excluded from the analysis and only used for illustrative purposes.

Table 4: MCA variables and their descriptions.

Variable Name	Modalities	Definition
TOWN	TOWN 1 TOWN 2 TOWN 3	low importance medium importance high importance
INFR	INFR 1 INFR 2 INFR 3	low importance medium importance high importance
Q3	AGRICULTURE TOURISM ACTUAL	agro-productive orientation touristic orientation maintenance of actual situation
Q4	PASTURE FOREST ACTUAL PASTURE	pasture increase and forest decrease pasture decrease and forest increase actual situation
Q6	PATH ROAD TRAIL	by path by road by trail
SCHOOL	MIDDLE SCHOOL HIGH SCHOOL DEGREE	lower secondary school diploma high school diploma degree certificate
WTP	WTP LOW WTP HIGH	30, 60, 15; 50, 100, 20; 80, 150, 40; 100, 200, 50

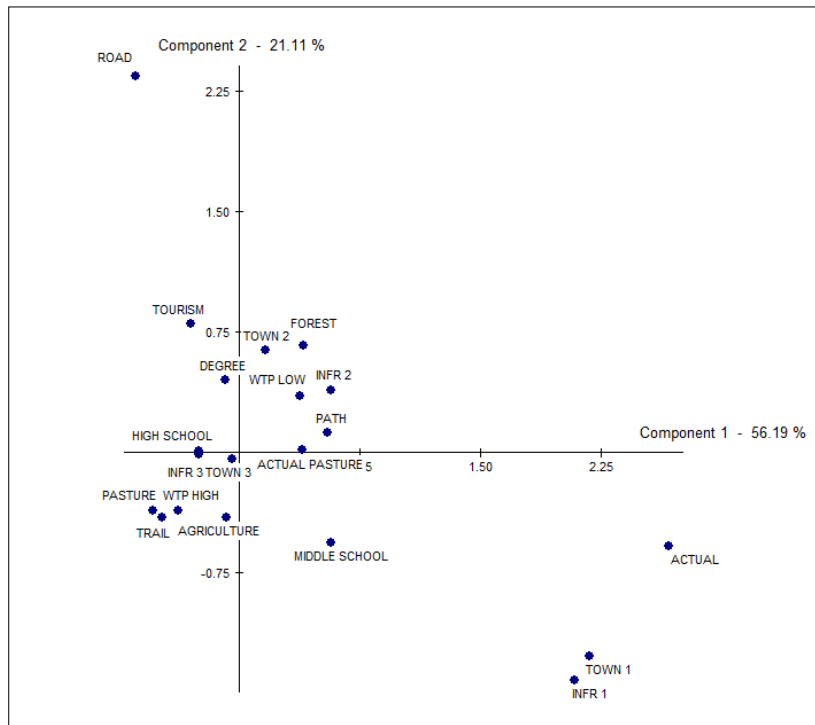


Figure 2: MCA variables divided by the two axes.

Table 5: Contribution of the variables to the MCA first and second components.

Variable Name	Modalities	Components 1 (%)	Components 2 (%)	Total (%)
TOWN	TOWN 1	-	-	3.0
	TOWN 2	0.2	2.6	
	TOWN 3	0.1	0.1	
	TOWN tot	0.3	2.7	
INFR	INFR 1	12.6	6.7	28.7
	INFR 2	4.1	2.1	
	INFR 3	3.2	0.0	
	INFR tot	19.9	8.8	
Q3	ACTUAL	27.1	1.5	55.6
	AGRICULTURE	0.2	8.6	
	TOURISM	2.1	17.1	
	Q3 tot	29.4	26.2	
Q4	FOREST	2.4	7.5	26.1
	PASTURE	8.2	4.3	
	ACTUAL PASTURE	3.9	0.0	
	Q4 tot	14.4	11.7	
Q6	PATH	9.9	0.6	48.4
	TRAIL	7.3	5.9	
	ROAD	1.5	23.2	
	Q6 tot	18.7	29.7	
SCHOOL	MIDDLE SCHOOL	5.6	6.2	18.5
	HIGH SCHOOL	1.9	0.0	
	DEGREE	0.1	4.7	
	SCHOOL tot	7.6	10.9	
WTP	WTP HIGH	4.9	4.9	19.6
	WTP LOW	4.7	5.1	
	WTP tot	9.6	10.0	

The first component derived from the MCA illustrates two opposing concepts of pasture in terms of function and desirable evolutions.

The negative semi axis emphasizes the role of pastures as areas of grazing and agriculture and is associated with trails and a strong consideration for the importance of necessary infrastructures for the municipalities of the valleys. This semi axis also shows high values of WTP for the maintenance of pastures and upland farms and an average level of education (HIGH SCHOOL). The positive axis represents modalities that reveal a more detached vision of pastures and upland farms, requiring the maintenance of the current state of pastures and a reduction of areas in favour of the expansion of wooded lands. The same semi axis also shows a reluctance to pay for the maintenance of pastures (WTP LOW) and little regard for infrastructures in mountain municipalities. A low level of education is located on the positive semi axis.

The second component also illustrates two opposed concepts of pastures. The positive semi axis concerns the preference for management based on tourism, a road connection on paved roads and the increase of woods and forests over pastures. Remarkably, low values of WTP are located on the same axis. Conversely, the opposing semi axis considers a preference for the management of pastures based on agriculture, a road connection based on trails and an increase of pastures over woods. The calculated WTP associated with the positive side of the second component is high.

The second axis also distinguishes respondents according to their education level, where the positive semi axis includes respondents with university degrees and the negative semi axis accounts for respondents with low education levels.

3.3 Clusters analysis results

To define the profiles of rural mountain tourists based on the results from the MCA, a cluster analysis has been performed. Clustering identifies the best solution as a classification of the respondents into three clusters (Table 6).

Table 6: Characterization of clusters by variables.

Cluster	Variable	V. Test	X ²
1	Q4	5,99	41,33
	Q6	5,91	40,41
	Q3	5,52	35,75
	WTP	5,21	28,48
	INFR	5,02	13,36
2	Q3	7,2	57,66
	Q6	6,43	47
	Q4	5,6	36,67
	WTP	4,24	19,34
	SCHOOL	3,52	16,87
	INFR	2,66	11,08
3	Q3	11,19	131,84
	INFR	8,3	74,93
	SCHOOL	5,87	39,91
	TOWN	3,6	17,47
	WTP	3,21	11,61
	Q6	2,93	12,77
	Q4	2,78	11,84

As shown in table 6, the variables that mostly contributed in the cluster formation are “economic orientation of pastures” (Q3), “pastures management” (Q4), and “accessibility” (Q6). The “Q” variables show adequate results in the V-Test and X² (Di Franco 2006).

More weighted variables are directly associated with the individual’s idea of pastures and the future desirable development of these lands (“economic orientation of pastures” (Q3), “pastures management” (Q4), and “accessibility” (Q6)), which are better represented in the clustering output. Particularly, these questions refer to the preferred “economic orientation of pastures” (Q3), hypothetical “accessibility” to the upland farms favoured by tourists (Q6) and preferred options with respect to an environment characterized by pastures and meadows rather than forests (Q4). Conversely, the level of education and opinions on valley services are generally of less significance.

A clusters description is presented in table 7. The value “% CLU/MOD” represents the ratio between

cluster and modality in percentage, while “%MOD/CLU” represents the ratio between modality and cluster in percentage, and “Global” represents how much each modality has been selected by the sample.

The first cluster is the most numerous, with 190 respondents and 51.77% of the sample; the second cluster represents 35.15% of the sample (129 persons), and the third cluster represents 13.08% of the total sample (48 respondents).

Table 7: Cluster description.

Modalities	Variable	V. test	% CLU/MOD	% MOD/CLU	% Global
Cluster 1					51,77
PASTURE	Q4	9,15	79,35	64,74	42,23
TRAIL	Q6	8,75	76,02	68,42	46,59
AGRICULTURE	Q3	8,26	69,23	80,53	60,22
WTP HIGH	WTP 2	7,68	71,98	68,95	49,59
INFR3	INFR	5,03	59,01	87,89	77,11
HIGH SCHOOL	SCHOOL	2,74	59,88	52,63	45,5
Cluster 2					35,15
TOURISM	Q3	9,11	67,2	65,12	34,06
ROAD	Q6	6,19	100	15,5	5,45
FOREST	Q4	5,41	62,03	37,98	21,53
WTP LOW	WTP 2	5,4	48,65	69,77	50,41
DEGREE	SCHOOL	4,16	51,85	43,41	29,43
Cluster 3					13,08
ACTUAL	Q3	9,4	100	43,75	5,72
INFR1	INFR	6,76	87,5	29,17	4,36
MIDDLE SCHOOL	SCHOOL	6,13	33,7	64,58	25,07
PATH	Q6	3,6	19,89	72,92	47,96
WTP LOW	WTP 2	3,56	19,46	75	50,41
ACTUAL PASTURE	Q4	2,88	20,3	56,25	36,24

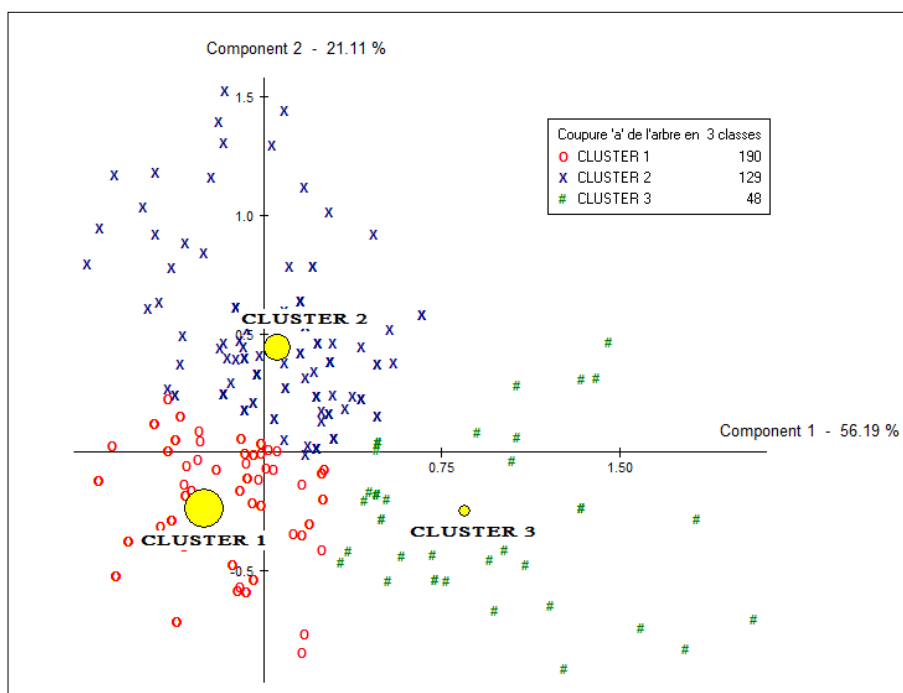


Figure 3: Cluster partitioning

The description of the clusters (Figure 3) is presented in the following paragraphs.

3.3.1 Agricultural cluster

The first cluster is named “*Agricultural cluster*”: it includes respondents with a strong preference for the agricultural aspects of pastures and upland farms. Individuals in this group opt for a pasture increase and a subsequent decrease of the woods, only associating these areas with trails and preferring a management model of upland farms based on agriculture rather than on tourism. Furthermore, this cluster is the only one in which respondents declare a high WTP value. This feature delineates individuals who are sensitive to the issues addressed by the survey, i.e., the survival of the high-altitude pastures and farms, since this group combines a high WTP value with the agricultural orientation of the upland farms. However, they emphasize the preference for good infrastructures to reach the mountain villages to which the pastures and their valleys belong, to avoid the isolation of mountain communities and improve the infrastructural network considered essential. These individuals usually frequent mountains and have a good knowledge of grazing abandonment process; they are persuaded that agriculture may be a tool for allowing the economic subsistence of pastures and the only way to conserve mountain Alpine landscape. This cluster includes people with a medium level of education, that is high school diploma. In this cluster people are willing to pay for the maintenance of mountains with agricultural features, pastures connected by trails and presence of infrastructures in the municipalities of the valleys.

3.3.2 Reconversion cluster

Both the second and the third cluster include respondents who are not willing to pay for the conservation of pastures and upland farms but differ in opinions concerning the desirable typology and evolution of them.

The second cluster is called the “*Reconversion cluster*”. This group includes respondents who envision the best management model of upland farms and pastures for tourism, providing paved roads for pastures to improve an easy accessibility. They do not mind maintaining the historical hiking trails, but they seem to be more interested in

reaching pastures by car, not just by walking. They are not interested in grazing as agricultural activity or landscape maintenance, as they prefer the decreasing of pastures in favour of woods. These respondents seem to love tourist activities in the environment, such as open-air activities and sports, recreational activities and so on; nevertheless, these activities are not necessarily associated with agriculture, but more nature-touristic-oriented. Indeed, respondents included in the second cluster show a low WTP value and although they declare to know the mountain abandonment issue, their revitalization of pastures idea is more and more linked to tourism rather than an agriculture. Finally, they understand Alpine pastures as a mountain place, as a tourist area is a similar other mountain tourist area, as for example a ski resort area or a mountain historic town. They frequent pastures and grazing but do not think they should have to pay to conserve them, and they do not believe agriculture is the best choice for mountain development. These individuals agree with the complete reconversion of the pasture structures in tourist areas, where possible, and are not interested in any agricultural activities. The education level among the members of cluster 2 is generally high, as the degree.

3.3.3 Changeless cluster

The third cluster is called the “*Changeless cluster*”. It is the less numerous among the three, with 48 respondents, the 13.08% of the sample. This cluster is constituted by people who are satisfied with the current management of pastures and upland farms, and individuals who do not consider infrastructure to be indispensable for the municipalities of the valley. These individuals show a low education level. Although they declare to prefer actual pasture management, so they like pastures and meadows landscape, they are not willing to pay for the maintenance of traditional extensive agriculture and are not interested in changing policy.

They usually go to the mountain huts, but they want to conserve the current situation, also reaching pastures and huts only with pedestrian paths. Again, in choosing the actual context of “pastures management” (Q3) they declare to prefer a context in which, according to the questionnaire choice “*the pasture is left to the progressive abandonment*,”

with the advancement of the wood, reduction of the pasture and with degradation of the mountain real estate." These people want to maintain and preserve pasture system without any personal economic investment, that is impossible in the actual situation.

4 Discussion

According to the results it is possible to point out some considerations about landscape management in the mountains and possible institutional actions implications.

First, most of the respondents prefers agricultural landscapes rather than forestry landscapes in the mountains (clusters 1 and 3). In fact, despite a low WTP, members of cluster 3 wish for the maintenance of pasture systems and the grazing landscapes. That is, both Cluster 1 "*Agricultural cluster*" and Cluster 3 "*Changeless cluster*" express a pasture landscape conservation preference. In mountain areas traditional extensive agriculture substantially contribute to landscape management (Mazzocchi & Sali 2016): this result confirm findings from previous research in rural areas, since the main motivations of rural tourists are the contact with nature and the possibility to experience outdoor activities (Bel et al. 2015, Millán Vázquez De La Torre et al. 2013). Moreover, traditional agriculture contribution to landscape can influence tourists' preferences for a destination (Soliva et al. 2008): this is confirmed by the fact that the majority of respondents, included in cluster 1, are willing to pay for the maintenance of pastures and grazing and they preferred an agricultural management of the pasture system. As for the "*Changeless cluster*", Bel et al. (2015) in their work on rural France in which they propose a segmentation study based on tourists' rural activities, define a "Passive" cluster similar to our "Changeless cluster", with visitors who are not interested in changing conditions, showing a stable preference behaviour.

Second, the pasture system represents a landscape conservation instrument, and it can assume an economic value as estimated by the WTP

of a sample of regular/potential visitors of the mountains. Moreover, since the portion of the sample showing a high WTP prefers pastures to other landscapes, it should be recommended to make investments to maintain the pastureland and its economy. According to Chin & Lo (2017) natural resources should be conserved to maintain their quality and sustainability over time and the tourism stakeholders, as local communities, public bodies, private enterprises should be working together to environment conservation and to foster an efficient use of natural resources, as pastures and meadows. In addition, our results suggest the existence of different typology of tourists, expressed by the diversity in visitors' motivations between the first (*Agricultural cluster*) and the second cluster (*Reconversion cluster*).

The employment of these resources could lead to an increasing in tourism attractivity of a place, but it is necessary to maintain a balance in the tourists' services an environmental conservation (Chin et al. 2017). Therefore, the indication for public institutions is that the policies should deal with investments that promote tourism in the pasture system and support the extensive agricultural activity of traditional grazing, as suggested from our results on tourists' WTP.

Finally, the demand for agricultural landscapes and nature is increasing among urban population (Van Der Ploeg et al. 2008, Mazzocchi et al. 2014) and ignoring the potentiality of nonmarket goods and functions in policy design can result in substantial losses to society in general (Bateman et al. 2013).

5 Conclusions

The present study proposes an experimental method to support the decision-making process of the local authorities for investing public resources in landscape management. The innovation of this work is the segmentation of tourists' sample obtained using MCA and HCA approach, including in each tourist's profile the WTP for the permanence of

pasture system and landscape. Since the analysis outlines the profile of tourists, it may contribute to a marketing project aimed to communicate and advertise the grazing system and landscape, taking advantage of the demand for tourism in the most efficient way. Moreover, useful guidelines for public policies can be drawn based on these results to invest public resources in the aspects of the good best evaluated by tourists. Here, we assessed the preferred options for the management of alpine pastures and landscapes in the Alpine area of Regional Park of Orobie Bergamasche, namely the conversion of huts in multifunctional places, the provision of services required by tourists and the preferred access mode. These aspects and the corresponding levels of WTP might improve the level of provision of public goods and services and allocate more efficiently public resources. In this case study, results suggest that public municipalities should invest in the maintenance and in the renovation of pasture system, considering implementing tourists' services. This methodology is particularly interesting as it may provide support to the management policies of the mountain landscape and the grazing system everywhere, being replicable in any context. Further researches could be focus on the impact of some typologies of agricultural productive activities on tourism sector, for example the role of typical mountain products in supporting mountain agriculture and tourism economy.

References

- Abdi, H. & Valentin, D. 2007. Multiple Correspondence Analysis. In N. Salkind (Ed.), *Encyclopedia of measurement and statistics*, (651-657). Thousand Oaks, CA: Sage. DOI: 10.4135/9781412952644.n299
- Baronchelli, C. 2016. L'alpeggio come elemento strategico del territorio montano? Un'indagine attraverso Choice Model Approach nel comprensorio delle Orobie Bergamasche. *Tesi di Laurea*, Università della Montagna, Edolo. <http://www.unimontagna.it/web/uploads/2016/03/Baronchelli-Corinne-PROTETTO.pdf> (Date: 05/12/2018)
- Bateman, I. J.; Harwood, A. R.; Mace, G. M.; Watson, R. T.; Abson, D. J.; Andrews, B.; Binner, A.; [...], & Termansen M. 2013. Bringing ecosystem services into economic decision-making: land use in the United Kingdom. *Science*, 5, 341(6141), 45-50. DOI: 10.1126/science.1234379.
- Bel, F.; Lacroix, A.; Lyser, S.; Rambonilaza, T. & Turpin, N. 2015. Domestic demand for tourism in rural areas: Insights from summer stays in three French regions, *MPRA* 66255. DOI:10.1016/j.tourman.2014.07.020
- Bernuès, A.; Rodriguez Ortega, T.; Alfnes, F.; Clemetsen, M.; Eik, L.O. 2015. Quantifying the multifunctionality of fjord and mountain agriculture by means of sociocultural and economic valuation of ecosystem services. *Land Use Policy*, 48, 170-178. DOI:10.1016/j.landusepol.2015.05.022
- Bramwell, B. 1994. Rural tourism and sustainable rural tourism. *Journal of Sustainable Tourism*, 2, 1-6. DOI:10.1080/09669589409510679
- Castellani, V., & Sala, S. 2009. *Sustainable tourism as a factor of local development*. Trento: Tangram.
- Chin, C.H. & Lo, M.C. 2017. Rural tourism quality of services: fundamental contributive factors from tourists' perceptions. *Asia Pacific Journal of Tourism Research*, 1-15. DOI:10.1080/10941665.2016.1276465
- Chrysochou, P.; Gidarakou, I.; Kokkali, P. & Koutsouris, A. 2006. Rural tourism and local development: The case of the Northern Mt Pelion, Greece. *University of Aarhus*, selected works. <https://works.bepress.com/chrysochou/13/> (Date: 05/12/2018)

- Costa, P. S.; Correia Santos, N.; Pedro Cunha, P.; Jorge Cotter, J.; Sousa, N. 2013. The Use of Multiple Correspondence Analysis to Explore Associations between Categories of Qualitative Variables in Healthy Ageing. *Journal of Aging Research*. DOI:10.1155/2013/302163
- Devesa, M.; Laguna, M. & Palacios, A. 2010. The role of motivations in tourism satisfaction: empirical evidence in rural tourism. *Tourism Management*, 31, 547-552. DOI: 10.1016/j.tourman.2009.06.006
- Di Franco, G. (2006). Corrispondenze multiple e altre tecniche multivariate per variabili categoriali. Milan: *Franco Angeli*.
- Europarc Federation 1995. European Charter for sustainable tourism in protected areas. <http://www.europarc.org/wp-content/uploads/2015/05/2010-European-Charter-for-Sustainable-Tourism-in-Protected-Areas.pdf> (Date: 05/12/2018)
- Frochot, I. 2005. A benefit segmentation of tourists in rural areas: a Scottish perspective. *Tourism Management*, 26, 345-356. DOI:10.1016/j.tourman.2003.11.016
- Garrod, B.; Wornell, R. & Youell, R. 2006. Re-conceptualizing rural resources as countryside capital: the case of rural tourism. *Journal of Rural Studies*, 22, 117-128. DOI:10.1016/j.jrurstud.2005.08.001
- Gios, G.; Goio, I.; Notaro, S. & Raffaelli, R. 2006. The Value of Natural Resources for Tourism: a Case Study of the Italian Alps. *International Journal of Tourism Research*, 8, 77-85. DOI: 10.1002/jtr.552
- Goio, I. & Gios, G. 2012. Landscape - Recreational Value: A Resource for Local Development. First Results from a Survey in a Small Mountain Valley (Sinello Valley, Vallarsa, Northern Italy), *Landscape Research*, 37 (3), 351-364. DOI: 10.1080/01426397.2011.588789
- Greenacre, M. & Hastie, T. 1987. The geometric interpretation of correspondence analysis, *Journal of the American Statistical Association*, 82, 437-447. DOI:10.1080/01621459.1987.10478446
- Hjalager, A. M.; Kwiatkowski, G. & Østervig Larsen, M. 2017. Innovation gaps in Scandinavian rural tourism, *Scandinavian Journal of Hospitality and Tourism*, 1-17. DOI: 10.1080/15022250.2017.1287002
- Husson, F.; Josse, J. & Pagès, J. 2010. Principal component methods – hierarchical clustering - partitional clustering: why would we need to choose for visualizing data? *Journal of Aging Research*, 12, 1-12.
- Jindrová, A. & Dömeová, L. 2013. Rural tourism services utilization in the Czech Republic. *Scientia Agriculturae Bohemica*, 44, 256-263. DOI:10.7160/sab.2013.440410
- Johnson, R. A. & Wichern, D. W. 2007. *Applied Multivariate Correspondence Analysis*. Upper Saddle River, NJ: Prentice Hall.
- Keske, C. M. H. & Mayer, A. 2014. Visitor Willingness to Pay U.S. Forest Service Recreation Fees in New West Rural Mountain Economies. *Economic Development Quarterly*, 28(1), 87-100. DOI:10.1177/0891242413506744
- Lamarque, P. & Lambin, E. F. 2015. The effectiveness of market-based instruments to foster the conservation of extensive land use: the case of Geographical Indications in the French Alps. *Land Use Policy*, 42, 706-717. DOI:10.1016/j.landusepol.2014.10.009
- Lane B. 1994. What is rural tourism? *Journal of Sustainable Tourism*, 2, 7-21. DOI:10.1080/09669589409510680

- Lee C., K.; Lee, J.H.; Kim, T., K. & Mjelde, J.W. 2010. Preferences and willingness to pay for bird-watching tour and interpretive services using a choice experiment. *Journal of Sustainable Tourism*, 18, 695-708. DOI:10.1080/09669581003602333
- Lima, L.; Eusébio, C. & Kastenholz, E. 2012. Expenditure-Based Segmentation of a Mountain Destination Tourist Market, *Journal of Travel & Tourism Marketing*, 29,7, 695-713. DOI: 10.1080/10548408.2012.720155
- Lopez Feldman, A. 2012. *Introduction to contingent valuation using Stata*. Centro de Investigacion y Docencia Economicas. https://mpra.ub.uni-muenchen.de/41018/2/intro_CV.pdf (Date: 05/12/2018)
- Marangon, F.; Troiano, S.; Tempesta, T. & Vecchiato, D. 2013. Consumer Behaviour in Rural Tourism. Conjoint analysis of Choice Attributes in the Italian-Slovenian cross-boundary area. *Pagri*, 3, 77-90.
- Mazzocchi, C. & Sali, G. 2018. Assessing the value of pastoral farming in the Alps using choice experiments: evidence for public policies and management, *Journal of Environmental Planning and Management*, 1-14. DOI:10.1080/09640568.2018.1430557
- Mazzocchi, C. & Sali, G. 2016. Sustainability and Competitiveness of Agriculture in Mountain Areas: A Willingness to Pay (WTP) Approach. *Sustainability*, 8, 343-355. DOI: 10.3390/su8040343
- Mazzocchi, C.; Sali, G. & Corsi, S. 2014. Agricultural fragility in periurban area: a tool for territorial governance. *Scienze Regionali*, 13, 3, 51-72. DOI: 10.3280/SCRE2014-003003
- MillánVázquez de la Torre, G.; Arjona Fuentes, J. M. & Amador Hidalgo, L. 2013. Rural Tourism in Natural Parks in Andalusia: An Analysis of the Demand of the Tourist Consumer. *International Journal of Humanities and Social Science*, 3(1), 52-59.
- Molera, L. & Pilar Albaladejo, I. 2007. Profiling segments of rural tourists of South-Eastern Spain. *Tourism management*, 28, 757-767. DOI:10.1016/j.tourman.2006.05.006
- Molina, J.R.; Rodríguez y Silva, F. & Angel Herrera, M. 2016. Integrating economic landscape valuation into Mediterranean territorial planning. *Environmental Science & Policy* 56, 120-128. DOI: 10.1016/j.envsci.2015.11.010
- Rathnayake, M. W. R. 2016. Pricing the enjoyment of elephant watching at the Minneriya national park in Sri Lanka: an analysis using CVM. *Tourism Management Perspectives*, 18, 26-33. DOI: 10.1016/j.tmp.2016.01.002
- Soliva, R.; Ronningen, K.; Bella, I.; Bezak, P.; Cooper, T.; Egil Flo, B.; Marty, P. & Potter, C. (2008). Envisioning upland futures: stakeholders' responses to scenarios for European mountain landscapes. *Journal of Rural Studies*, 24, 56-71. DOI: 10.1016/j.jrurstud.2007.04.001
- Streifeneder; T., Tappeiner, U.; Ruffini, F. V.; Tappeiner, G. & Hoffmann, C. 2007. Selected Aspects of Agro-structural Change within the Alps. *Journal of Alpine Research*, 95, 1-13. DOI: 10.4000/rga.295
- Strobl, A.; Teichmann, K. & Peters, M. 2015. Do mountain tourists demand ecotourism? Examining moderating influences in an Alpine tourism context. *Tourism*, 63, 383-398.
- The International Ecotourism Society (TIES) 2006. TIES Global Ecotourism Fact Sheet. Washington, DC: The International Ecotourism Society (TIES).
- Thiene, M. & Scarpa, R. 2008. Hiking in the Alps: Exploring Substitution Patterns of Hiking Destinations, *Tourism Economics* (14) 2, 263-282. DOI:10.5367/000000008784460445

Torquati, B.; Tempesta, T.; Vecchiato, D.; Venanzi, S. & Paffarini, C. 2017. The Value of Traditional Rural Landscape and Nature Protected Areas in Tourism Demand: A Study on Agritourists' Preferences. *Landscape Online*, 53, 1-19. DOI: 10.3097/LO.201753

Van der Ploeg, J. D.; Van der Broekhuizen, R.; Brunori, G.; Sonnino, R.; Knickel, K.; Tisenkopfs, T. & Oostindie, H. 2008. Towards a framework for understanding regional rural development. In Van der Ploeg, J.D. & Marsden, T., *Unfolding Webs: The Dynamics of Regional Rural Development*. Assen: Royan van Gorcum.

Wedel, M. & Kamakura, W. 1998. Market segmentation: Conceptual and methodological foundations. Boston: Kluwer Academic Publishers.