Residents' perception of landscape as a driver of rural economy: a case study

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Summary

To which extent landscape and its management represents an asset of local development in terms of welfare, population growth and employment creation, and a driver of regional economy is a relevant issue tackled by a growing body of literature building upon different methodological backgrounds. Analyses focusing on residents' perception towards landscape may shed light on the complex feedback effects between landscape, supply and demand of services, and local socio-economic benefits. In this paper we present some result from a survey targeting local residents in a rural case study area. The analysis aims to assess the residents' perception of advantages from typical landscape elements and highlight the connection between perceived advantages and landscape recreational attitude. Main results support the evidence that the perception of typical landscape elements is influenced by the respondent's place of living, whereas the perception of advantages is not: Advantages seem to be linked with other socio-economic attributes. In particular free time behaviour and the "use" of landscape seem to be an important element influencing the perception of advantages.

Keywords: Agriculture, competitiveness, rural development, Common Agricultural Policy, ecosystem services, fuzzy clustering
JEL Classification codes: Q15, Q18, Q57

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1. INTRODUCTION

Agricultural landscape is a complex socio-ecological system characterized by interwoven ecological, social, and economic systems. The European Landscape Convention (CE, 2000) attributes to landscape a socio-economic dimension going beyond the consideration of landscapes solely as part of physical space (such as a "natural" or "cultural" landscape). For instance, the Convention asserts that "[landscape constitutes a] resource favourable to economic activity and whose protection, management and planning can contribute to job creation" (CE, 2000). In this view, landscape functions are considered as factors of social well-being (Bell, 2001) and economic competitiveness (Schaller et al., 2014). Nevertheless, tangible and non-tangible feedbacks between biological, physical and human processes are part of "the landscape complex system" that hamper the possibility to assess systematically the relationships between landscape management and rural economy (Tress and Tress, 2001).

The ecosystem services framework constitutes a relevant background representing and analysing interactions between society, environment, and social welfare (MEA, 2005). It provides support for the protection of environment which is considered a source of welfare for a sustainable development. However, direct and indirect role of services provided by landscape are not always acknowledged by society. Therefore, a focus on residents' perception towards landscape can be considered the first analytical step for the decision making process concerning territorial development (Cantrill and Senecah, 2001). Indeed, landscape perception is relevant for understanding reasons underlying interests for specific services and attributed values, to promote commitment towards public goods, and enhance acceptability of land use policies (Blayac et al., 2014).

Landscape perception refers to the cognitive aspects of the reception of sensorial stimuli (e.g. visual) and an implicit categorization underlying people's interpretation of the environment and attachment of meaning to specific landscapes (Swanwick et al., 2009; Campos et al., 2012). Perception is often related to sense of place, and values of landscape and has been theorized focusing on different aspects of the perception process such as the ecological approach proposed by Gibson (1979). That approach introduces the concept of "affordance" in reference to the attributes provided by different landscape elements to the perceiver (e.g. economic, biological, livelihood attributes) (Soini et al., 2012), and opens the possibility to interpret sensorial stimuli in accordance to what the landscape means for an individual in utilitarian terms (Bell, 2001). Assessing residents' perception is thus relevant for the inclusion of values and perspectives attributed to specific landscape elements by the local population which is the conceptual basis upon which perception has been connected to the ecosystem services framework and/or the willingness to contribute to

landscape management (e.g. Campos et al., 2012; Muhamad et al., 2014), and the design of policies (Cantrill and Senecah, 2001).

Depending on individual interpretations and recognition of values, residents' perception towards landscape elements is typically heterogeneous (Bell, 2001; Soini et al., 2012). Differences are often explained and interpreted with socio-economic attributes such as age (e.g. Coeterier, 1996; Zube et al., 1983), education (e.g. Kent, 1993), environmental orientation (e.g. Kaltenborn and Bjerke, 2002), occupation (Rogge et al., 2007), place of residence (e.g. Brody et al., 2004), years of residency (e.g. Ryan et al., 1998), and correlated with different inclination to land-use changes, development, conservation, advocacy, protection, etc. (Soini et al., 2012). Very often, the target of residents' perception studies concerns the connection between perception and cultural services and landscape aesthetics or the perceived linkages between landscape elements and ecosystem services (e.g. Campos et al., 2012; Rogge et al., 2007). Yet, a direct assessment focusing the perceived advantages related to specific landscape elements has –to date- not been proposed. Even though attempts to quantify the impact of landscape on local economies do exist (e.g. Dissart and Vollet, 2011; Courtney et al., 2006; Villanueva et al., 2015), the assessment of the residents' perceived advantages arising from landscape elements can be a complementary approach shedding light on the impact of environmental assets on local development and competitiveness. Indeed, the perception of residents draws on local knowledge and non-tangible effects that are perceived by residents but that are very complex to consider in more standard economic analyses.

The objective of this work is the assessment of advantages arising from typical landscape elements in a rural case study area (CSA) as perceived by local residents and a first attempt to identify if different groups characterized by similar perceptions exist and the variables able to explain and characterize the different perceptions of advantages attached to the groups.

Our analysis builds on a residents' survey aiming at understanding how and to what extent local residents recognize the advantages provided by different landscape elements to local economic actors (agriculture, tourism, and local population). The survey focuses the perceived advantages attached to explicit landscape elements (including fauna and other natural resources and assets) and attitudes towards the recreational use of the landscape. Statistical analysis including multivariate techniques are employed for the data analysis. In particular classification techniques such hierarchical cluster analysis and fuzzy clustering are employed for the identification and characterization of different groups of respondents.

The paper is organised as follows: Section 2 provides a theoretical framework highlighting the connections between landscape, socio-economic benefits, and supply and demand of services; section 3 describes the methodological approach and the data collection; section 4 presents the results, and finally, discussion and conclusions are presented in the section 5.

2. THEORETICAL FRAMEWORK

To which extent landscape and its management represents an asset of local development in terms of welfare, population growth and employment creation, and a driver of regional economy is a relevant issue tackled by a growing body of literature building upon different methodological backgrounds (e.g. Courtney et al., 2006 and 2013; Vandermeulen et al., 2011; Dissart & Vollet, 2011; van Zanten et al., 2014; Schaller et al., 2014).

For instance, Dissart and Vollet (2011) discussed the concept of landscape as a basic activity in the framework of the economic base theory. The core of the discourse was based on three main issues: 1)

landscape may attract external income (e.g. tourism, second-home dwelling, etc.); 2) landscape features limit economic leakages offering internal goods and solutions that would have been spent elsewhere (import substitution effect); and 3) landscape may promote design and creation of new ideas and products that maybe exported or addressed for internal (latent) demand (innovation potential of landscape).

Similar concepts are devised by Freeman (2003) discussing the environmental effects on social welfare: a) effects that generate utility as a factor input in the production of marketed goods; b) effects as an input to household utility commodities; and c) effects that produce directly utility being an argument in the utility function of an individual.

Also, Courtney et al. (2006) drew upon the results of a survey on perception of local business operators concerning environmental quality to define the role of natural heritage on local economies and rural development. The work was aimed at assessing the additional economic value of the environment and called for a greater recognition of environmental effects on local economies.

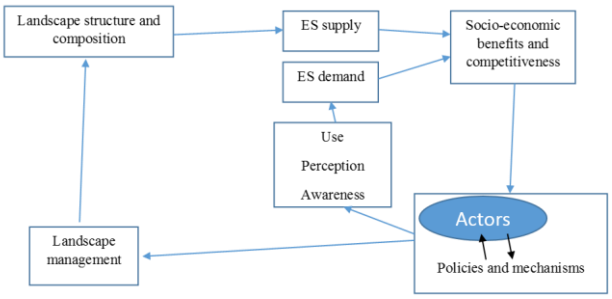
In addition, Vandermeulen et al. (2011) pointed out how standard evaluation of landscape-related investments may give a partial view of the problem if regional-level effects on competitiveness are not considered and warn against simplistic approaches that overlook indirect and feedback effects at landscape-level.

The above-mentioned studies points to the relevant role of feedback effects between environment and local economy that may reveal along long cause-effect chains. However, these cause-effect chains between the supply of goods and services from landscape and the development and competitiveness of rural regions still remain mostly unclear and difficult to understand. Moreover, direct and "marketable" effects related to private-type services are more evident and easy to assess and set-aside the relevance and impacts of public-type services on regional economies (Schaller et al., 2014; Targetti et al., 2014).

Nonetheless, the complex interactions between landscape, environment, and socio-economic features have been outlined in several socio-ecological frameworks (e.g. Dale and Beleyer, 2001; Eakin et al., 2011; van Zanten et al., 2014; Morrison, 2014).

Van Zanten et al. (2014) analysed the causal connections between landscape management, local economy and mechanisms influencing and driving the agricultural landscape system. The authors complemented the widely adopted ecosystem services cascade (Haines-Young and Potschin, 2010), with elements specific to the analysis and evaluation of landscape. The distinction between service-demand and service-supply as the determinants of benefits and regional competitiveness outlined the pivotal role of the complex feedback between demand and supply of services as a driver of regional socio-economic benefits and addressed the potential impacts of a variety of economic actors on landscape management. At the same time, Scholte et al., (2015) showed how demand of services is mediated by the intertwined effect of use, perception, and information (awareness) of landscape services (Figure 1). In this framework, rural actors drive both the demand of services and –through land management- the supply of services. At the same time, ecosystem services have an impact on socio-economic benefits and local society. In addition, Blayac et al. (2014) stated the fundamental role of perception analyses as the first analytical step towards landscape management and decision-making, and how a more comprehensive view on less tangible effects of landscape investments may derive by analysing the perception of residents. In the context of rural areas, the design of the Common Agricultural Policy could take advantage of further insights on societal perception towards landscape to promote a balanced provision of private and public goods from rural areas (Howley et al., 2012).

Figure 1: Theoretical framework connecting landscape, regional economy and factors influencing the demand of landscape services (adapted from van Zanten et al., 2014 and Scholte et al., 2015).

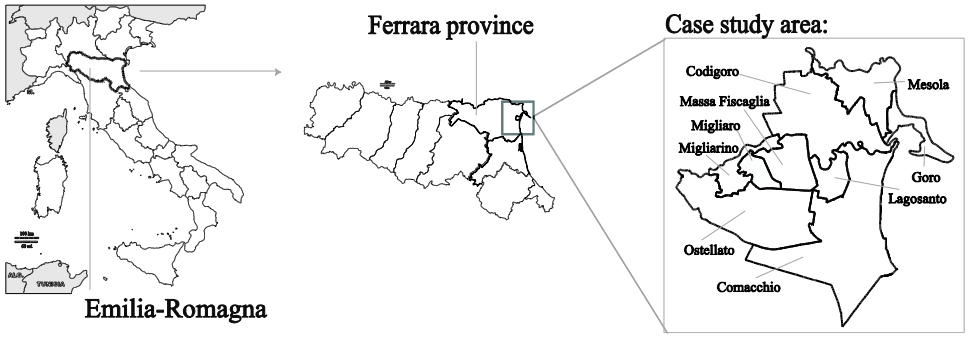


3. MATERIAL AND METHODS

3.1. Case study area description

The CSA is located in the lowlands on the southern side of the River Po Delta (Ferrara Province, Emilia Romagna Region, NE Italy; Figure 2). The area is characterised by an intensive agricultural production in the hinterland, an urbanised coastal area, and the presence of natural wetlands and cultural heritage features. The area is an UNESCO site (Ferrara, City of the Renaissance, and its Po Delta). The natural wetlands are mostly included in the Po Delta Natural Park (covering around 30% of the CSA), which is characterised by distinctive flora and fauna and water elements (e.g. canals, wetlands, etc.). A peculiarity of the CSA is the huge historical impact of human activities in shaping the territory: The CSA occupies former natural wetlands that were reclaimed in different stages during the 19th and 20th centuries for the improvement of agricultural production. The area is predominantly rural (EC, 2012). More than 50% of the CSA is devoted to agriculture, mainly cereals (rice 49%), industrial crops (17%) and vegetables (17%). Orchards and intensive livestock breeding are also noteworthy. Agriculture has traditionally played a significant role in the local economy and is currently facing a process of farm concentration, as the number of farms is decreasing and the UAA is mostly constant. Comacchio (22,000 inhabitants) is the largest urban centre of the CSA. In the last decades, tourism development and the demand of second homes on the sea has prompted the urbanization of the coastal strip and a slight population increase, whereas depopulation is affecting the hinterland (population increase: +2% on average in the CSA in 2002-2010, ISTAT data).

Figure 2: Map of the case study area highlighting the position of the surveyed municipalities in the Emilia Romagna Region (NUTS 2).



3.2. Survey method

Data were collected through an ad hoc surveys carried out in the CSA in 2013. The survey consisted of a phone-questionnaire targeting local residents between 18 and 70 years old. An overall 295 questionnaires were filled-in. The ten municipalities of the CSA were aggregated in three zones considering different geographical locations: Comacchio (Comacchio municipality), rural hinterland (Lagosanto, Jolanda di Savoia, Ostellato, Migliarino, Migliaro, Massa Fiscaglia), and Po Delta (Codigoro, Goro, Mesola). The three zones were employed as the first stratification level of the survey. The other two variables used to stratify the population were gender and age class.

The questionnaire was based on information about the case study character and features collected during an ad-hoc meeting with a local stakeholder board. The stakeholders pointed to the scarce acknowledgement by residents of the typical aspects of the territory such as the reclaimed lands and the different types of land management. An overview of the main typical aspects of the landscape was also devised during the meeting and the general orientation of the local population towards the territory.

The questionnaire includes different sections aimed at the collection of general socio-economic information (job, gender, age, etc.), the perception of advantages attached to different typical landscape elements and the relevance of landscape-related activities (recreational activities) for the respondents. The questionnaire starts with generic questions about gender and age of the respondent. Then, the interviewed is asked to indicate up to three typical elements of the landscape (open question format). The respondent is then asked to express his opinion about the advantages for agriculture, tourism and local population from 5 different landscape categories which were beforehand devised following the indications of the stakeholder group (water channels and ponds, waterfowls, woods wetlands and non-agricultural areas, paddy fields and related fauna, and protected areas). For each category, the respondent is asked to state if the category represents an advantage, a disadvantage, or neither of the two.

Subsequently, the questionnaire includes a self-assessment about a list of free-time activities related to landscape (walking, birdwatching, cycling, fishing and hunting, meals in agritourist structures, entrance to the Natural Park Centres). That section aims to assess whether the respondent spend or not part of his/her free time in the activities and the frequency.

Finally, the questionnaire concludes with more specific questions about place of living, education level, occupation, family type, years of residency, and income level.

3.3. Statistical analysis

The statistical analysis consisted of three phases: the first aimed at the identification of the most common typical elements and the identification of broad categories of landscape elements; the second phase aimed at the identification of groups of respondents defined by similar perception towards the advantages from the landscape elements; and the third phase aimed at identifying the connection between perception of advantages and recreational habits related to landscape elements.

Typical elements of the landscape as expressed by the respondents were recorded and analysed to get to a categorical classification. The classification was based on a textual analysis aimed at the identification of the most common words included in the database and at the identification of the main landscape categories perceived by the respondents. this analysis allowed to identify 8 main landscape categories (wetlands, agriculture, natural, sea-side, River Po, urban, plain-related elements, cultural heritage) in addition to the

category "absence of typical elements" and a further category of all the elements that were mentioned one time maximum and that could be not included in the above categories. A t- test was performed to identify statistical significance between zone of residence and the main typical element of the landscape mentioned by the respondents (i.e. the first out of three element mentioned in the questionnaire).

A factor analysis (principal component analysis, PCA) was performed on the perceived advantages attached to the five landscape categories by the respondents. The PCA is generally used to identify a smaller number of variables accounting for the larger part of the variance of the sample. In our case, the analysis aimed at the characterization of each respondent following his components' loadings which indicate the position of each case the PCA axes. Indeed, the coefficients can be considered a vector outlining the position of each case in a hyperspace defined by its perceived advantages. Advantages of that approach attains to the reduction of "noise" as the vectors of PCA loadings identify the position of each case in the hyperspace composed by the axes.

A hierarchical cluster analysis was then performed on the factor loadings (Euclidean distance, Ward agglomeration algorithm). The cluster analysis allowed to identify groups of respondents characterized by similar attitudes towards the perceived advantages (i.e. groups with similar factor loadings on the PCA axes). The clusters were subsequently identified by means of an inertia analysis which assesses the relative loss of inertia at different levels of the cluster classification. Where cluster inertia is the within-cluster sum-of-squares, and the relative loss is calculated as inertia (clusters n+1)/ inertia(cluster n). The inertia analysis suggests the optimal level of the classification in which the creation of a further group (i.e. clusters n+1) provides a lower loss of inertia in respect to the higher level (i.e. clusters n).

The groups of respondents identified by means of the above procedure were then analysed employing the socio-economic variables collected with the questionnaire. The analysis was aimed to identify significant differences between the clusters explaining the background of respondents with different perceptions towards the landscape, and to compare the results of the survey with the existing literature on residents' landscape perception.

Finally, a fuzzy clustering technique was applied on the frequency of recreational activities related to the landscape performed by the respondents. Fuzzy clustering is a multivariate statistical technique that defines the degree of membership of observations to a set of pre-defined clusters: the output is a new matrix in which a percentage of membership is attributed to each case (Kaufman & Rousseeuw 1990). Two levels of frequency were used as input for the fuzzy analysis: weekly or monthly frequency of the recreational activity vs. no free-time devoted to the recreational activity (frequency = never). The objective of that analysis was to identify groups with similar recreational habits and then assess the percentage of similarity between these groups and the clusters characterized by similar perceived advantages.

All statistical analyses were performed with the R statistical software (R Development Core Team, 2006).

4. RESULTS

As expected, the landscape element categories related to wetlands and agriculture were the most common elements that characterize the perception of typical landscape in the case study area (Table 1). Nonetheless, water-related elements (i.e. wetlands, sea-side and River Po) seem to dominate the perception of typical landscape accounting to almost 50% of mentions (44.7%), whereas cultural heritage is usually not included as a first-choice typical element of landscape. That result confirms the opinion expressed by the

local stakeholder laboratory concerning the attitude of the local population towards the landscape and supports the elaboration of the questionnaire based on the information provided by the stakeholders.

Moreover, it seems clear that each respondent is more aware and tends to acknowledge as "typical" in his first choice the elements that characterize his place of living: sea, wetlands and urban areas are more commonly mentioned in the Comacchio area (and less agricultural, River Po, and plain-related elements); the River Po is more commonly mentioned in the Po Delta area (and less wetlands and urban elements); whereas agricultural landscape is more commonly mentioned in the rural hinterland (where sea elements are more rarely mentioned).

Table 1. Most common landscape element categories expressed in each resident first choice. Frequency and statistical significance in the three zones of the case study. * = p value < 0.05; ** = p value < 0.01; *** = p value < 0.001; ns = not significant.

Landscape element category	Global frequency (%)	Comacchio Frequency % (p; t.test)	Po Delta Frequency % (p; t.test)	Rural hinterland Frequency % (p; t.test)
Wetland elements	22.0	35.6*** (8.611953e-05; +3.93)	11.6** (0.006727186; -2.71)	21.2 ns
Agriculture-related elements	18.0	8.7*** (2.425823e-03; -3.03)	14.3 ns	27.7** (0.002685505; +3.00)
Natural elements	15.6	15.4 ns	18.1 ns	12.9 ns
Sea-side elements	15.6	26.0*** (7.142703e-04; +3.38)	8.6 ns	9.5* (0.044189510; -2.01)
River Po	7.1	0.0*** (1.437105e-04; -2.43)	15.1** (0.002463434; +3.03)	9.4 ns
Urban elements	5.4	9.61** (4.200313e-02; +2.03)	0.0** (0.006765492; -2.71)	7,0 ns
Plain-related elements	3.7	0.0** (1.509690e-02; -2.43)	3.8 ns	8.2 ns
Cultural heritage elements	3.4	1.0 ns	5.7 ns	3.5 ns
Other	3.1	1.9 ns	3.8 ns	3.5 ns
No typical elements	2.4	1.0 ns	1.0 ns	4.7 ns

In general, all the landscape elements included in the questionnaire were predominantly perceived as advantages by the residents (Table 2): paddy fields only were not considered an advantage by the majority of the respondents. Protected areas and water channels, in particular, were considered the most advantageous elements. Average results evidence that water channels and ponds are perceived as the most advantageous elements for the agricultural sector (92.9%), whereas the presence of protected areas are the most important for both the tourism sector and local population (91.9 and 81.7% respectively). On the contrary, natural/non cultivated areas are considered the most disadvantageous elements for agriculture (18.0%), and rice paddy fields with its related fauna are the most disadvantageous for tourism and local population in the residents' view (31.0 and 39.7% respectively).

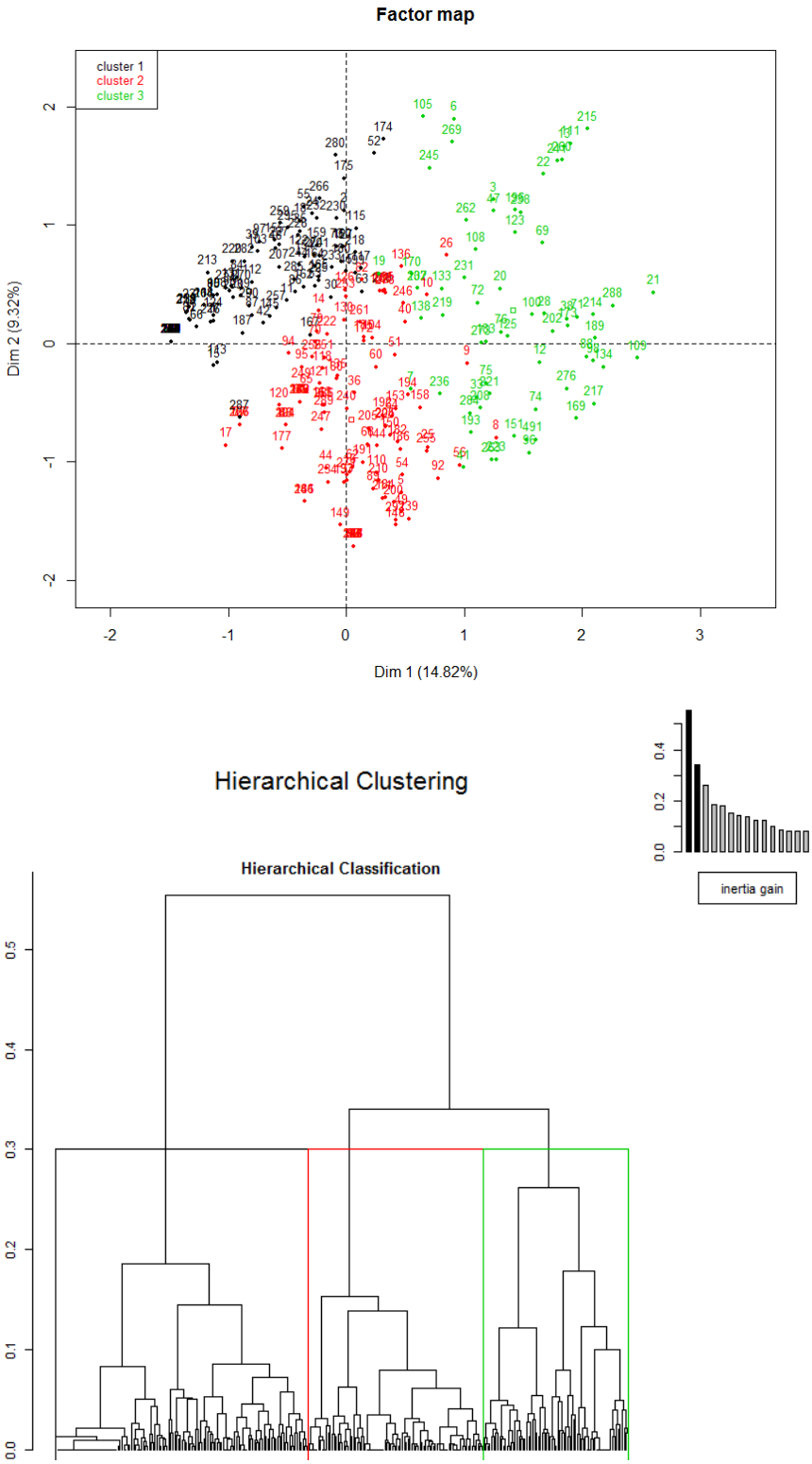
Table 2. Residents' perception of advantages/disadvantages from the landscape elements. Overall results and specific results for agriculture, tourism sectors and residents. Highest values row-wise are in bold, lowest values in italic

		Water channels and ponds	Waterfowls	Woods, hedges, wetlands and non-agricultural areas	Paddy-fields and related fauna	Protected areas
Overall	Advantage	80.5%	71.6%	68.8%	48.9%	80.9%

	Disadvantage	8.7%	8.7%	15.7%	28.8%	5.2%
	Indifferent	7.1%	10.7%	9.8%	13.6%	6.3%
	Don't know/no answer	3.7%	8.9%	5.6%	8.7%	7.6%
Agriculture	Advantage	92.9%	50.5%	58.6%	64.4%	69.2%
	Disadvantage	2.7%	16.9%	18.0%	15.6%	8.1%
	Indifferent	3.1%	16.3%	13.6%	10.5%	10.2%
	Don't know/no answer	1.4%	16.3%	9.8%	9.5%	12.5%
Tourism	Advantage	76.3%	88.1%	78.0%	43.7%	91.9%
	Disadvantage	9.5%	3.1%	12.5%	30.8%	2.0%
	Indifferent	6.8%	4.1%	5.8%	15.6%	2.4%
	Don't know/no answer	7.5%	4.7%	3.7%	9.8%	3.7%
Residents	Advantage	72.2%	76.3%	69.8%	38.6%	81.7%
	Disadvantage	13.9%	6.1%	16.6%	40.0%	5.4%
	Indifferent	11.5%	11.9%	10.2%	14.6%	6.4%
	Don't know/no answer	2.4%	5.8%	3.4%	6.8%	6.4%

The hierarchical cluster analysis (Euclidean distance, Ward agglomeration method) performed on the factor analysis (PCA) scores (loadings considered on 23 axes) evidences three groups (cluster segmentation by inertia analysis): cluster 1 (n= 119; 40%), cluster 2 (n = 110; 37%), and cluster 3 (n = 66; 22%) (Figure 3)

Figure 3: perceived advantages from landscape elements: Factor map of cases on the first 2 axes and dendrogram of cluster analysis.



Cases generally perceiving advantages from all the landscape elements are included in cluster 1 (around 2/5 of sample; Table 3). Cases included in the cluster 2 (around 2/5 of sample) express general advantages from the landscape elements (and in particular from natural/non cultivated areas) except from paddy fields and related fauna (only 23% perceives advantages from paddy fields in this cluster). Cases in the cluster 3 (around 1/5 of sample) are generally less inclined to perceive advantages from the landscape elements (in particular from paddy fields and natural/non cultivated areas). Perceived advantages from paddy

fields area not very different in the clusters 2 and 3. On the contrary, opinions about natural/non cultivated areas were widely diverging in the clusters 2 and 3.

Table 3. Perceived advantages in the three resident clusters: average results.

	Water channels and ponds	Waterfowls	Woods, hedges, wetlands and non-agricultural areas	Paddy-fields and related fauna	Protected areas
Cluster 1	84,9%	81,8%	77,0%	90,8%	85,2%
Cluster 2	83,3%	77,9%	91,8%	23,0%	84,5%
Cluster 3	71,7%	42,9%	18,7%	16,7%	67,2%

In Table 4 is reported landscape categories expressed by the residents which are significantly diverging between the 3 clusters of respondents. Agricultural elements are more commonly mentioned in the cluster 3 and less in the cluster 1, whereas the elements related to the River Po are less common in the cluster 2 (Table 5).

Table 4. significant differences in the landscape element categories as perceived by the residents in the three clusters.

Landscape element category	Global frequency (%)	Cluster 1 Frequency % (p; t.test)	Cluster 2 Frequency % (p; t.test)	Cluster 3 Frequency % (p; t.test)
Agriculture-related elements	18.0	11.76* (p=0.031; t.test= -2.16)	18.2 ns	28.8* (p = 0.019; t.test +2.34)
River Po	7.1	9.2 ns	2.7* (p = 0.034; t.test -2.11)	ns

Main socioeconomic features (chi-squared test) of the respondent clusters are reported in the following Table 5. While males are mainly included in the clusters 1 and 2, females are more balanced distributed across the three clusters. Young people is more present in the cluster 1, middle-aged persons are more present in the cluster 2. Again, the cluster 3 do not show particular distribution concerning age, even though a slightly biased distribution towards old people can be noticed. Respondents included in the cluster 1 seem more linked to high incomes, whereas in the cluster 2 middle/low incomes are more present. In relation to income level, no specific tendency is evident in the cluster 3. Concerning the perception of advantages, no significant differences between the clusters result in relation to the three zones of residence (Comacchio, Po Delta, rural hinterland) and the place of living (urban centre, close to water, agricultural area).

Table 5. Socio-demographic profile of the residents' cluster.

	Cluster 1	Cluster 2	Cluster 3	Chi square test	
n	119	110	66		
%	40.3%	37.3%	22.4%		
Gender				**	X-squared = 12.2013, df = 2, p-value = 0.002241
F	31.8%	39.1%	29.1%		
M	49.3%	35.4%	15.3%		
Age				*	X-squared = 9.9211. df = 4. p-value = 0.04178
class1 (18-34)	45.3%	25.0%	29.7%		
class2 (35-54)	14.5%	55.5%	30.0%		
class3 (55-70)	28.8%	33.3%	37.9%		
Income				*	X-squared = 21.8023. df = 10. p-value = 0.01614
< €14000	32.7%	45.5%	21.8%		
€14000 - €28000	41.2%	47.1%	11.8%		
€28000 - €42000	27.8%	52.8%	19.4%		
>€42000	57.1%	21.4%	21.4%		
Place of living				ns	X-squared = 5.1714. df = 4. p-value = 0.2702
urban centre	40.3%	39.8%	19.9%		
close to water areas	43.6%	25.5%	30.9%		
agricultural (not close to water areas)	36.7%	40.8%	22.4%		
Zone				ns	X-squared = 5.1897. df = 4. p-value = 0.2684
Comacchio	33.7%	44.2%	22.1%		
Po Delta	46.5%	29.1%	24.4%		
Rural hinterland	41.9%	37.1%	21.0%		

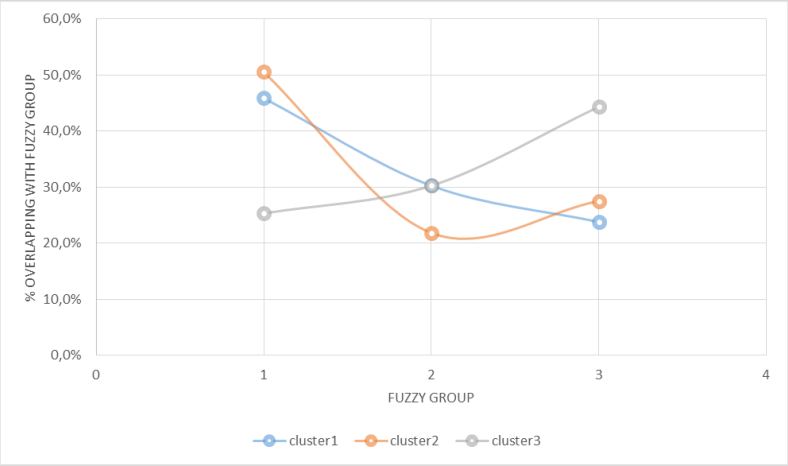
Analysis of the answers related to free-time activities reveals how the fuzzy groups 1 and 3 are clearly related to residents stating to employ their free time in leisure activities related to landscape and residents not interested in landscape recreational activities respectively (Table 6). The fuzzy group 2 is more specifically linked with cases reporting purchase of meals in agritourist structures but not visiting Delta Park Centres.

Table 6. profile of the fuzzy groups concerning a list free-time activities. Statistical significance (frequencies = weekly or monthly vs. never).

		Free-time activities					
		walking	birdwatching	cycling	fishing	meals in agritourist structure	visiting the Delta Park Centre
fuzzy group 1	weekly or monthly	p= 6.277902e-06 ***	p = 6.203453e-06 ***	p = 0.0009912122 ***	p = 0.03431034 *	p = 2.683193e-05 ***	p = 1.495858e-84 ***
	never						
fuzzy group 2	weekly or monthly	ns	ns	ns	ns	p = 2.274161e-23 ***	
	never						p = 1.672390e-23 ***
fuzzy group 3	weekly or monthly						
	never	p= 1.417618e-06 ***	p = 7.518879e-05 ***	p = 0.0001360667 ***	p = 0.01640256 *	p = 1.015116e-46 ***	p = 2.556591e-26 ***

In general, cases in the clusters 1 and show a similar free time behaviour which denotes the tendency to spend their free-time in landscape related activities. Indeed, a higher overlapping can be noticed between the fuzzy group 1 and the clusters 1 and 2 (Figure 4). On the contrary, cases belonging to the cluster 3 are mainly overlapping with the 3rd fuzzy group denoting a scarce interest towards activities in the landscape. Moreover, cluster 2 shows the lowest belonging percentage to the fuzzy group 2 denoting a higher inclination to visiting the Delta Park Centres and lower interest for meals in agritourist structures.

Figure 4: Average overlapping of the respondents' clusters (grouping cases with similar perception of advantages from landscape elements) with the fuzzy groups (indicating groups of respondents with similar attitude towards landscape related activities).



5. DISCUSSION AND CONCLUSIONS

Similarly to a consistent body of literature (e.g. Brody et al., 2004), our results support the evidence that the perception of typical landscape elements is influenced by the place of living. For instance in our CSA, dwellers of the coastal zone are more inclined to consider the sea as a typical element, whereas people living in the Po Delta area are more inclined to include the River Po as a typical element.

Cases belonging to the cluster 3 denote a lower inclination to perceive advantages from landscape elements and in particular from categories including still water. That may be in part explained by the higher relevance of agricultural elements that results for the respondents of cluster 3. Indeed, the contrast between reclaimed lands considered as productive and "positive", and wetlands and marshes considered as areas with a "negative" meaning was also outlined by the stakeholders during the experts' laboratory. Nevertheless, our results evidence that the contrast exists only for a minor part of the population. In fact, the major part of the sample (i.e. clusters 1 an2) expressed a positive view concerning the advantages for society from the landscape elements.

On the other hand, the perception of advantages is not matching with the place of living and seems to be linked with other socio-economic attributes. In particular, free time behaviour and the "use" of landscape seem to be an important element influencing the perception of advantages: The recreational attitudes of the fuzzy group 1 overlap with the clusters 1 and 2 which are also more inclined to acknowledge the advantages, whereas cases characterized by a lower appreciation of advantages from landscape and in particular from still water-related elements (cluster 3) are less inclined to spend their free-time in landscape-related activities.

Nonetheless, and even though the protected areas are commonly considered an advantage, individuals appreciating in particular the natural/non cultivated elements (cluster 2) have a higher inclination to appreciate and spend free-time in visiting the Natural Park Centre (low overlapping between cluster 2 and the fuzzy group 2).

The connection between the perception of advantages and the tendency to recreational "use" of the landscape may hinder the evaluation of advantages from landscape based on the opinions of the population. The perception of advantages is seemingly biased by the tendency to use the landscape for recreational purposes and may not account of other advantages for other economic sectors like the agriculture. That issue deserves further analysis targeting the perception of advantages and the variables affecting it.

Even though the results attains to a specific case study characterized by specific attributes, the evaluation of advantages from typical landscape elements has shown interesting features. Perception of the population is heterogeneous, and the role played by cultural and social background in determining perception seem confirmed. Also, a link between preferences and behaviour, and perception seem to exist. That could to support the idea to include perception as one relevant driving factor of demand of ecosystem services from landscape.

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