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Full Research Article

Benefits for the local society attached to rural landscape: An analysis of residents' perception of ecosystem services

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Abstract. Ecosystem services are the benefits for society deriving from ecosystems. The perception of ecosystem services by local residents is relevant to understand the extent to which such services contribute to society and regional development. The objective of this study is to assess the perception of ecosystem services associated to rural landscape by local residents and to use them to respond to two main questions: Are residents able to attribute flows of services from specific landscape elements to the different socioeconomic sectors? Are such perceptions affected by the different landscape features of the area of residency (e.g. rural vs. urban dwellers)? The analysis is carried out using data from a survey (n=295) in a rural area located in North Italy (Po Delta lowlands, Province of Ferrara). The results show that the urban population has a rather generic and positive consideration of ecosystem services associated to rural landscape elements and that perception is largely related to their recreational experience. The rural population has a more complex understanding of services and is more prone to acknowledge disservices associated to specific elements and/or specific socioeconomic sectors. Such differences are likely connected to a more direct experience and to the different spatial scales that affect the perception of ecosystem services. The results indicate that cultural services such as recreation and actions linked to the promotion of the territory are commonly acknowledged. On the other hand, initiatives to enhance the awareness of less visible services (e.g. regulation services) would be useful for improving the valorization of specific landscape elements.

Keywords. Sociocultural valuation, ecosystem disservices, social preference, values, Emilia-Romagna, agriculture.

JEL Codes. Q26, Q57.

1. Introduction

The extent to which landscape and its management impact on socio-economic benefits has been investigated in several studies, following a wide range of approaches (e.g.

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Courtney *et al*. 2013; Schaller *et al*. 2018). Evidence from several case studies supports the idea that landscapes play a relevant role on regional economic and social development and that rural landscape is a resource for the different sectors of the rural economy. For instance, impacts on local economies that can be directly or indirectly related to landscape can be summarized as: opportunities for employment (Dissart and Vollet, 2011), population growth and socio-cultural benefits (ENRD *et al*., 2010), tourism and recreation (Vanslembrouck *et al*., 2005; Vandermeulen *et al*., 2011), added-value for local products and estates, and attraction of investments and businesses (Cooper, Hart, and Baldock 2009). Nevertheless, disentangling the processes affecting the pathways between landscape and local economy is challenging in particular when pubic goods are included in the assessment (Schaller *et al*., 2018). For instance, Cooper, Hart, and Baldock (2009) reviewing the provision of public goods by agriculture reported several case studies with positive impacts of landscape on regional economies, but also underlined that the economic quantification of such impacts was a remarkable challenge. In a recent study carried out in Finland, Tienhaara *et al*., (2020) confirm a high consideration of landscape-related benefits by the society. Nevertheless, they reported a significant gap between citizens' willingness to pay and farmers' willingness to accept for such benefits. Such evidence supports the need of a more comprehensive evaluation of the impacts of landscape on local economies and a better understanding of what factors influence people perceptions of these impacts (Fieldsend, 2011).

In this context, the ecosystem services (ES) approach (MEA, 2005) provides an appropriate framework of anaysis that focuses on the broad range of socio-economic benefits linking ecosystems and the rural economy (Hein *et al*., 2006). Recently, van Zanten *et al*., (2014a) adapted the ES cascade (Haines-Young and Potschin, 2010) to connect agricultural landscapes with regional competitiveness and support the assessment of the complex range of benefits for society linked to agro-ecosystems. In the context of ES evaluation, three main methodological streams can be identified: ecological approaches focusing on the biophysical processes involved in service provision, economic valuations and sociocultural evaluations (de Groot *et al*., 2002; Ruiz-Frau *et al*., 2018). The latter is rooted in the research stream focused on the assessment of people perceptions to assess values and trade-offs between different bundles of ecosystem services and/or landscape elements (Martín-López *et al*., 2012). As such, the sociocultural approach entails a wide range of processes of value attribution that relate to intrinsic and relational values as well as mental, social, and health well-being (Chan *et al*., 2016; Kumar and Kumar, 2008). A common approach to study people perception is based on collecting information on the perception of ecosystem or landscape services from different groups of stakeholders or local residents through different techniques such as participatory methods (e.g. Brown and Raymond, 2014), or statistical surveys (e.g. Martín-López *et al*., 2012). The aim of these studies is generally to find which services are more demanded, the relevant spatial scale of analysis and determinants of values, and the trade-offs between different services and stakeholder groups. A range of works in different rural areas highlights some general trends or drivers of landscape perception from local dwellers. For instance, a general negative perception towards changes in traditional landscapes is very often reported (Van Zanten *et al*., 2014b). A relevant heterogeneity is also common in rural societies and spatial scales are considered as one of the most relevant aspect influencing such differences in landscape

perception (Tempesta, 2010). Indeed, the mismatch between the biophysical scale of service provision and the institutional scales of benefit perception greatly influence people values and their interaction with the environment (Hein *et al*., 2006). Therefore, several studies have focused on different determinants of the attribution of benefits and the links between awareness and both the use of the landscape and the acknowledgment of ecosystem services. In general, it is underlined that: i) the same landscape can be perceived differently by different observers according to their interests and feelings and ii) these differences affect people attitude towards landscape. Therefore, evidence reported in literature is consistent with a bi-directional relationship between humans and landscape: on the one hand, landscape affects people values and on the other hand, values affect attitudes and intrinsic motivation of residents towards the environment (Eigenbrod, 2016). Even though it is commonly acknowledged that non-tangible or less visible ES are perceived by people (Bell, 2001), the assessment of ES perception and its usefulness for the evaluation of landscape effects on regional economies is still in its infancy. Less studied issues regards for instance i) the capacity of people to acknowledge the different flows of services to the different sectors of the local economy, and ii) the different perception of services and disservices of residents of areas featuring different landscape features (Adams *et al*., 2003; Zhang *et al*., 2007).

In this study, we present an analysis carried-out in a rural coastal region in North Italy (Po Delta lowlands, Emilia-Romagna). The objective is to assess the different perception of benefits associated to rural landscape in different groups of residents. The goal of the analysis is to respond to two main questions: Are residents able to identify different flows of services from landscape elements to the economic sectors? Are there gradients of benefit perception related to the different landscape features of the area of residency (e.g. rural vs. urban dwellers)?

Our work builds on a phone-questionnaire aimed at exploring the relations between the residents' perception of the benefits and disservices flow from specific landscape elements to agriculture, tourism and residents. In our approach, we employ the definition of landscape as a territory 'perceived by people' (Council of Europe, 2000). Therefore, the survey is concerned with the assessment of benefits from biophysical elements of the landscape (e.g. wetlands) and also from less-tangible elements directly related to rural landscape and its character (e.g. "wine roads" or "food festivals"). In that interpretation, landscape entails both "physically" determined elements and socio-cultural aspects that together drive and characterize the territory and its peculiarities (Eigenbrod, 2016). Such an approach is supported by recent literature that considers social values and perception studies complementary to the analyses focused on economic and ecological criteria (de Groot *et al*., 2002). Indeed, the relationship between people and ecosystems and therefore the generation of ES, includes intangible aspects linked to 'relational values', sense of place and belonging to a community (Chan *et al*., 2016; Diaz *et al*., 2015).

The remainder of the paper is organized as follows. Section 2 provides the description of the Po Delta area, the statistical sampling, the questionnaire and the methodological approach aimed at analyzing the database. Sections 3 presents the results of the data analysis showing the relations between perception of benefits and the variables describing the respondents' zone of residency. Section 4 discusses the results related to the differences between urban and rural people, the different scale of perception of ES and ecosystem dis-

services and the limitations of the study. Section 5 concludes highlighting the most salient issues and providing policy implications related to the study.

2. Methods

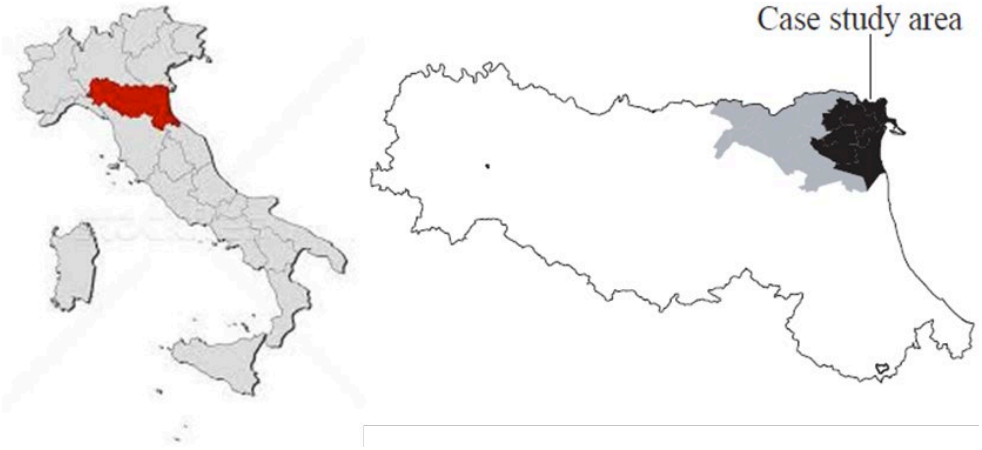
2.1 Description of the case study area.

The case study area (CSA) is in the Po River Delta (Ferrara Province, Emilia Romagna administrative Region, North Italy; table 1; Figure 1). The area is predominantly plain with intensive agricultural activities, an urbanized coastal area and the relevant presence of landscape elements dominated by water (overall 153 Km^2 of the CSA features water elements such as wetlands, ponds and water channels). Population is slightly decreasing in the inner part of the area (-6%) whereas the trend is opposite in the urban centers on the coast (+7% between 1980 and 2000; data: National Institute of Statistics [ISTAT]). 55% of the CSA is under agricultural management with rice as a typical product of the area (namely the PGI: "*Riso del Delta del Po*"). Agriculture has traditionally an important impact on the local economy, but farm structure is rapidly changing: in the decade 2000-2010, almost 1/3 (28%, ISTAT, 2010) of farms has ceased activity, whereas utilized agricultural area has been stable (-1%, ISTAT, 2010). That trend of farm concentration is similar to other parts of the EU (Piorr, 2003). On the contrary, the tourism sector has developed significantly (mainly on the seaside) since the last decades of the 20th Century. A peculiarity of the CSA is the historical impact of reclamation activities that transformed a wetland-dominated landscape in an agriculture-dominated area (wetlands area is currently c.a. 25% of the original). Around 30% of the CSA is currently included in the Po Delta Natural Park and the whole area is part of the UNESCO site "Ferrara, City of the Renaissance, and its Po Delta". The main criticalities of the CSA are connected to water regula-

Table 1. General features of the case study area (data: National Institute of Statistics).

Area (km^2)	957
Altitude (m a.s.l.)	(–3, +8)
Topography	Plain
Protected areas/Total area (%)	29
UAA/Total area (%)	55
Main agricultural systems	Cereals, horticulture industrial crops
Population (inhabitants)	67,988
Population density (inhabitants/km^2)	71
Population trend (% last ten years)	–6 (average; +7 in the coastal strip)
Employed population/Total population (%)	49
Jobs in tertiary sector/Total jobs (%)	47
Jobs in industry/Total jobs (%)	35
Jobs in agriculture and forestry/Total jobs (%)	18

Figure 1. Location of the case study area: Po River Delta, Ferrara Province, Emilia-Romagna.



tion (part of the CSA is under the sea level) and the growing anthropic impact on the coastal area. In particular, issues related to agricultural activities and the related pollution is relevant also for the tourism (eutrophication of the Adriatic Sea), whereas the concentration of human settlements on the coast and the summer season tourism has significant effects on availability of water resources for agricultural production and the salinization of groundwater.

2.2 Survey description and data analysis.

In 2013, a phone survey was carried out in the CSA. The survey (295 questionnaires) targeted local residents of the ten municipalities of the CSA that were aggregated in three zones according to the main landscape characteristics:

- *Comacchio* (Comacchio municipality) located by the coast is the main urban center (c.a. one third of the population of the CSA lives in Comacchio) with relevant tourism activities and historical heritage features;
- *Po Delta* (Codigoro, Goro, Mesola municipalities) located in the Delta where the River Po dominates the landscape.
- *Rural wetlands* (Lagosanto, Jolanda di Savoia, Ostellato, Migliarino, Migliaro, Massa Fiscaglia municipalities) located in the hinterlands and with a rural-dominated 'landscape where rice paddy fields and protected areas such as wetlands characterize the territory;

The three zones of residency, together with gender and age classes were employed as stratification levels in the survey (table 2).

The questionnaire aimed at collecting information about the perception of benefits from a list of elements typical of the CSA including tangible components of the landscape (e.g. wetlands) and other less tangible elements that were strictly connected to the charac-

Table 2. Demographic features of the CSA (ISTAT, 2013) and sample description according to the three stratification levels: residency area, gender and age class. Response rate of the survey was 41%.

	Area	Inhabitants (>18 years) of the CSA	Share of inhabitants per area	Gender		Age class (years)		
				FF	MM	18 - 30	30 - 50	50 – 70
ISTAT, 2013	Comacchio	19,485	32%	51%	49%	13%	36%	51%
	Po Delta	20,635	34%	52%	48%	12%	28%	61%
	Rural wetlands	21,016	34%	52%	48%	11%	33%	56%
Sample	Comacchio		35%	48%	52%	22%	47%	31%
	Po Delta		29%	55%	45%	20%	44%	36%
	Rural wetlands		36%	51%	49%	23%	46%	31%

terisation and promotion of the rural territory (e.g. PGIs and PDOs, wine and typical food roads, etc.). According to the information collected during a local focus group (composed by 15 representatives of relevant local stakeholder groups such as agriculture and tourism associations, local government and land planning agencies, the Po Delta Natural Park, researchers, and the president of the Local Action Group) carried in 2012, the list of elements selected for the survey included nine items that together were considered to contribute to the overall perception of typical landscape: "water channels" (channels and ponds), "waterfowls" (flamingos being the most typical wader in the CSA), "wetlands" (wetlands and natural areas), "rice paddy fields" (paddy fields and related fauna), "protected areas", "bicycle paths", "wine roads" (wine and typical food roads), "local food festivals", and "local food products" (local PGIs and PDOs). The interviewees were asked to state their perception of the benefits flow from the landscape elements to specific sectors of the local economy (agriculture and tourism) and to residents. In particular, the respondent was asked to state for each of the three socio-economic sectors if the element represented a benefit, a disservice or if it was indifferent[1]. The questionnaire also included a self-assessment question to characterize the respondents' place of living: As the most typical landscape feature of the CSA was related to water, the interviewee was asked to specify if his dwelling area was characterized by water-related elements, rural elements (but not water), or if he/she was living in or close to a urban center. Additionally, the job sector of the respondent was recorded to test for potential effects on benefit perceptions related to employment in the specific sectors included in the survey (agriculture and tourism sectors).

The respondents' perception of benefits was categorised as *homogenous* if the same perception (benefit, disservice or indifference) was attributed to agriculture, tourism and residents, or *heterogeneous* if the interviewee was able to acknowledge a differentiated perception (i.e. benefit for one sector and disservices or indifference for the others). A multiple correspondence analysis (Husson *et al.*, 2020) was employed to assess the relationships between the categorical variables (perception of landscape element benefits, zone of residency and place of living). The variable scores on the axes of the multiple correspondence analysis were also analysed through hierarchical cluster analysis (Kaufman and Rous-

[1] Benefits and disservices were translated from the Italian "*vantaggio*" and "*svantaggio*" respectively.

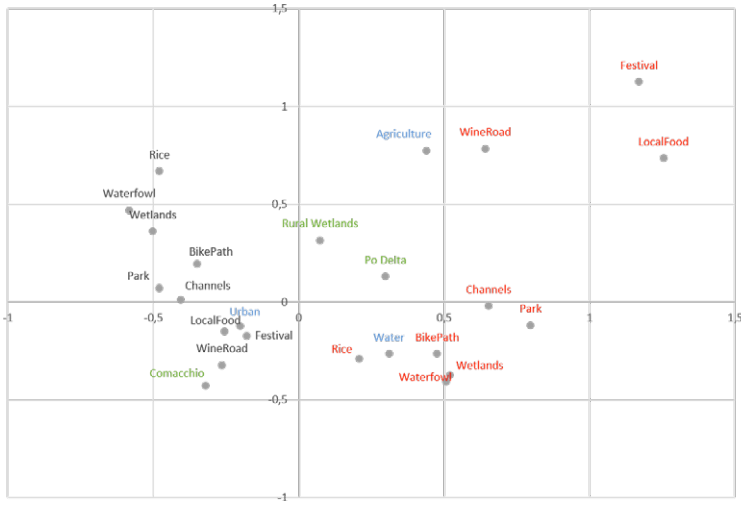
seeuw, 1990) for the identification of the associations between the variable categories. The perception differences were further analysed with cross tabulation to test whether significant differences were linked with general features of the dwelling area (i.e. coast vs. rural wetlands vs. Delta) or to more micro-scale proximity to specific landscape elements (i.e. water vs. urban vs. rural elements). To this aim, the Chi-squared test was performed to evaluate the frequency of heterogeneous perceptions attached to the landscape elements and their correlation with the variables "place of living" and "zone of residence". Data analysis was performed with the R statistical software (R Core Team, 2018).

3. Results

In general, the largest part of the sample (82%) considered the different landscape elements or initiatives of local promotion linked to the territory as a benefit for at least one socio-economic sector (agriculture and/or tourism and/or residents). The perception of benefits was homogenous in 62% of cases (i.e. the attribution of benefit, disservice or indifference from a specific landscape element did not differ between the three socio-economic sectors), whereas a heterogeneous perception was outlined in the remaining 38% of cases. The most positive elements were those linked with the promotion and characterization of the territory. In particular, "local food festivals" and "local food products" were considered on average the most positive elements (between 92% and 96% of the sample attributed benefits from these elements to agriculture, tourism and residents). "Local products" was also perceived as the most positive for the agricultural sector (96%), whereas the highest perception of benefits for tourism and residents (97% and 96% respectively) was attributed to "bicycle paths". On the other hand, "rice paddy fields" were the element with the lowest perception of benefits (53% on average of acknowledged benefits) and in particular the least positive element of the landscape for tourism and residents (48% and 41% of acknowledged benefits respectively).

The results of the multiple correspondence analysis (figure 2 and Appendix A) show the variable categories linked to a heterogeneous perception (e.g. benefit for one sector and disservices or indifference for the others or vice versa) grouped on the positive side of axis 1. The categories linked to no differences between sectors concerning the perception of benefits are clustered on the negative side of axis 1. The second axis of the multiple correspondence analysis indicates a gradient between the perception towards elements related to initiatives of local landscape promotion and variables linked to more tangible elements of the landscape like "wetlands", "waterfowls" and "bicycle paths". The multiple correspondence analysis also shows a relation between the category "Comacchio" in the variable "zone of residence" and the category "urban" in the variable "place of living" and the categories linked to a homogenous perception of benefits for all the sectors (left-hand side of fig. 2) and particularly to the variables of local promotion. On the contrary, the categories linked to a differentiated perception of benefits for agriculture, tourism and residents are more related with the categories "Po Delta" and "rural wetlands" and the categories "water" and "agriculture". Figure 2 shows a close relation between living closer to water-related elements (category "water") and a higher perception of differentiated benefits from landscape elements such as "wetlands", "waterfowl" and "rice paddy fields". Similarly, living close to an agricultural area (category "agriculture") is linked to a more differentiated

Figure 2. biplot of the multiple correspondence analysis showing the relation between residents' perception of benefits from the landscape elements and the variables "place of living" and "zone of residence". Landscape variable categories identifying a heterogenous perception are reported in red; categories linked to homogenous perception are reported in black. In blue are reported the categories for the variable "place of living" (close to agricultural areas, water-related elements, urbanized area) and in green the categories for the variable "zone of residence" (Comacchio, rural wetlands, Po Delta). Cfr. to table 3 for the acronyms of the variable categories.



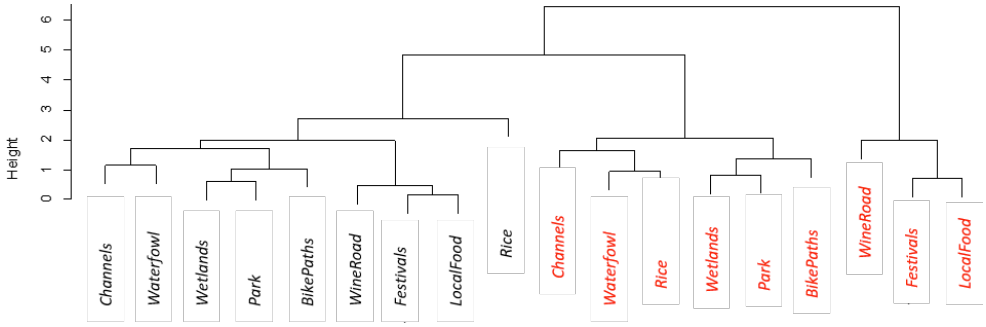
Variable name	Acronyms
Zone of residence	Comacchio
	Po Delta
	Rural wetlands
Place of living	Agriculture
	Urban
	Water
Water channels	Channels
Waterfowl	Waterfowl
Wetlands	Wetlands
Rice paddy fields	Rice
Protected areas	Park
Bicycle paths	BikePaths
Wine roads	WineRoad
Local food festivals	Festivals
Local food products	LocalFood

perception of benefits from "wine roads" and elements of landscape promotion like "local products" and "local food festivals".

The presence of these associations between variables in the dataset is confirmed by the hierarchical cluster analysis (figure 3) performed on the scores of the first five axes (overall, 54% of variance explained by the five axes of the multiple correspondence analysis). The cluster analysis clearly shows the presence of two separate groups in the dataset: a sub-group highlighting a differentiated perception of benefits between the economic sectors and a sub-group with a more positive perception towards the landscape elements.

The relations between "place of living" and "zone of residence" and the landscape elements evidenced in the multiple correspondence analysis are tested through the Chi squared test (table 3, cfr. Appendix for further details and Pearson residuals). Heterogeneous perceptions of benefits are significantly different in the three zones of residence for the elements "water channels" and "protected areas". Similarly, living close to specific landscape elements outlines significant differences for "water channels" and "protected areas" but also for "wetlands" and "local food festivals". In particular, living close to water elements and to rural areas is significantly related with a heterogeneous benefit perception of benefits for the different socio-economic sectors, whereas living in urban areas and in the municipality of Comacchio is related with a lower frequency of perceiving differentiated benefits for agriculture, tourism and residents. The job sector of the respondent does not record significant effects on the benefit perception (Appendix C). The only exception

Figure 3. Hierarchical cluster analysis performed on the first 5 axes of the multiple correspondence analysis (overall 54% of variance explained). The dendrogram shows the similarity between the variable categories (acronyms are presented in figure 2). Labels identifying a heterogeneous perception of benefits between agricultural and tourism sectors, and residents are reported in red; categories linked to a homogenous perception are reported in black.



regards wetlands that are more frequently considered a disservices for the agricultural sector by the respondents working in the agro-food sector (with $p < 0.05$).

The influence of living close to specific landscape elements is further described in figures 4 and 5. On the one hand, cases living in urban centers have a higher frequency of perceiving benefits from the landscape and the perception of benefits is less differentiated between the different economic sectors. On the other hand, living close to water or rural elements has an impact on the perception of benefits from water-related landscape. More specifically, cases living close to rural elements have a higher perception of disservices from water channels and waterfowl and generally a higher perception of ben-

Table 3. relation between place of living, zone of residence and the frequency of differentiated perceptions of benefits from the landscape elements for agriculture, tourism and residents in the sample. Chi-square test and p-values (* = < 0.05; **= < 0.01; ns= not significant) of differences (cfr. Appendix B for Pearson residuals).

	Place of living	Zone of residence
Water channels	* X-squared = 7.0743, p-value = 0.0291	* X-squared = 7.2596, p-value = 0.02652
Waterfowl	NS X-squared = 0.38567, p-value = 0.8246	NS X-squared = 1.3773, p-value = 0.5022
Wetlands	** X-squared = 10.89, p-value = 0.004318	NS X-squared = 0.91837, p-value = 0.6318
Rice paddy fields	NS X-squared = 1.2321, p-value = 0.5401	NS X-squared = 2.7338, p-value = 0.2549
Protected areas	≈* X-squared = 5.4052, p-value = 0.06703	* X-squared = 6.6451, p-value = 0.03606
Bicycle paths	NS X-squared = 0.28116, p-value = 0.8689	NS X-squared = 1.0128, p-value = 0.6027
Wine roads	NS X-squared = 0.91085, p-value = 0.6342	NS X-squared = 3.8925, p-value = 0.1428
Local food festivals	≈* X-squared = 4.98, p-value = 0.08291	NS X-squared = 1.9833, p-value = 0.371
Local products	NS X-squared = 2.1278, p-value = 0.3451	NS X-squared = 1.0804, p-value = 0.5826

Figure 4. perceived benefits from water channels and waterfowls, and wetlands and protected areas. Results are presented as gap (%) from total average for cases living close to urban areas, water elements, and rural elements (but not water elements).

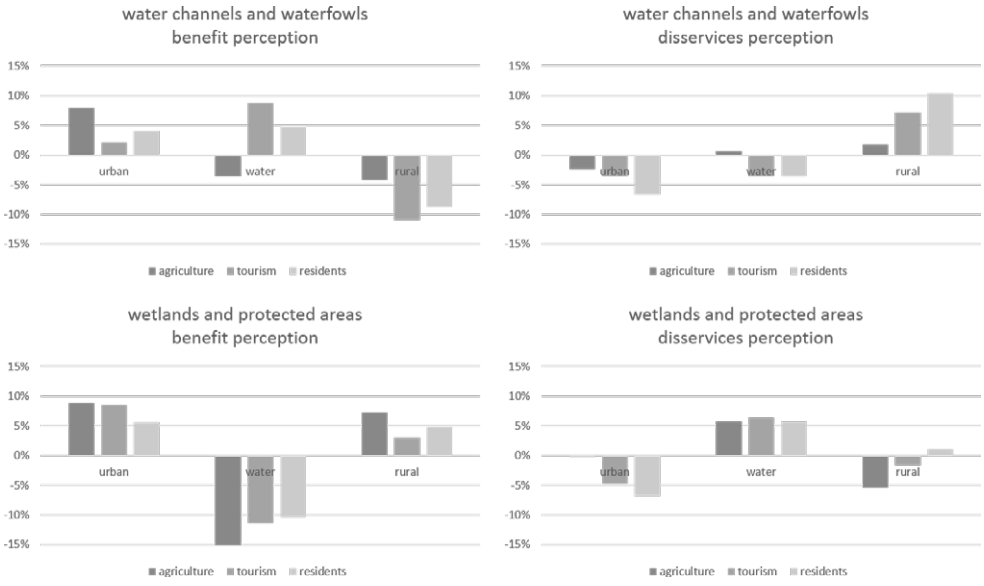
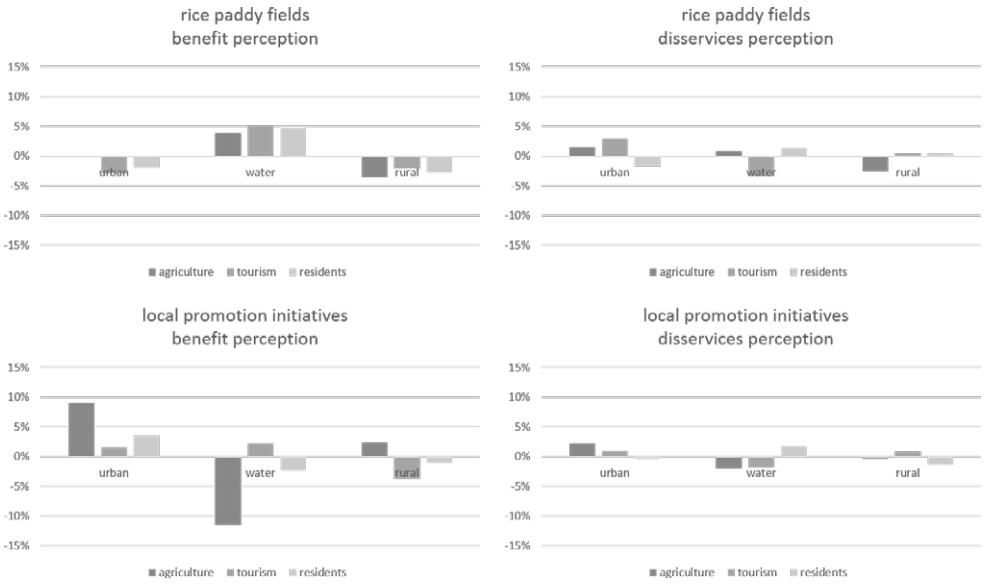


Figure 5. perceived benefits from rice paddy fields and local promotion initiatives. Results are presented as gap (%) from total average for cases living close to urban areas, water elements and rural elements.



efits from elements such as wetlands and protected areas. On the contrary, cases living by water elements have a higher perception of benefits in particular for tourism and residents from elements such as water channels and waterfowl and a higher perception of disservices from wetlands and protected areas. Cases linked to water elements have also a slightly higher perception of benefits from paddy fields in comparison to the average, but a lower tendency to consider the local promotion initiatives as a benefit in particular for the agricultural and tourism sectors.

4. Discussion

The survey outlines that a large share of the respondents associate ecosystem services to specific local landscape elements. Moreover, the majority of the sample does not perceive differences in the flow of benefits to the different sectors of the local society. However, a relevant portion of the population (almost 40%) shows a more nuanced awareness concerning the capacity of the territory to deliver benefits to residents, tourism or agriculture. Such perception also outlines contrasts in some cases. For instance, rice paddy fields are very often considered as a benefit for the agricultural sector only and a disservice for residents and tourism activities. On the contrary, most of the population acknowledges that the elements linked to the promotion and characterization of the territory are positive. As expected, such elements are perceived as the most advantageous for tourism and for residents. Even though many of the considered elements of local promotion were clearly linked to food production, the perception of benefits for agriculture is rather low. That result may be linked to the peculiarity of the CSA where multifunctional forms of agricultural production are less developed than in other areas. A further element of interpretation concerns a diffused perception in the CSA of agriculture as an artificial activity linked to reclamation and not as part of the authentic traditions of the region.

Our evidence supports the presence of differences between urban-dominated areas and rural areas. Namely, rural dwellers evidenced a more articulated perception of the territory, whereas urban people had the tendency to attribute a more positive meaning to the landscape. An explanation could be that rural people have the tendency to weigh services with disservices from specific landscape elements and are more able to discern a differentiated attribution of benefits between the different economic sectors. Also, micro-scale effects were relevant for the perception of disservices: closeness to water elements increased the perception of disservices from swamp-related areas such as wetlands and protected areas (indeed the areas of the natural park are strictly connected to wetlands), whereas in more agriculture-related areas the perception towards waterfowl and water channels was less positive. A potential explanation of that evidence may relate to the different awareness of rural people about the role and the functions of the territory. For instance, living close to specific elements increases the perception of disservices from these elements (e.g. mosquitos, fog, etc. in the case of wetlands). On the other hand, people living in urban areas may attribute a higher value to the recreational function and cultural meanings attached to specific landscape elements, whereas the perception of disservices may be less important. The impacts of micro-scale effects that is evidenced in this work could entail the need to consider with more attention the attitudes of the portion of the population living in rural areas or in more direct relation with specific elements of the landscape. The micro-scale effect on

the perception of landscape elements was however not confirmed in the case of rice paddy fields. Indeed, the generalized low perception of benefits from those areas was not linked to spatial effects. Such result is likely related with the less positive perception of paddy fields in the urban population. The scarce association of ES to those elements of the territory can be related to three main factors related to cultural and regulation services: i) recreational activities that can be attached to paddy fields are limited in comparison to the other landscape features included in the survey, ii) traditional elements of the territory are perceived more positively by people (Van Zanten *et al*., 2014) and rice paddy fields are more linked to the reclamation activities carried out in the CSA and iii) awareness of regulation services such as the potential of paddy fields in protecting the territory from flood events is often inadequate in local populations (Adams *et al*., 2003).

The results point to considerable differences in comparison to other studies on ES perception. For instance, Muhamad *et al*., (2014) report a direct relation between ES perception and proximity to the ecosystem elements providing the services. The analysis carried out in our CSA seems to indicate, though, that people living close to specific elements of the landscape ponder disservices and services. That points to a different spatial scale between ES and ecosystem disservices: while ES perception covers a wider spatial scale, the perception of disservices is more localized. On the other hand, that result could be interpreted according to a common finding concerning the relation between people and the environment. Indeed, a consistent body of literature (e.g. Brody *et al*., 2004) outlines a higher knowledge of people in relation to their proximity to specific landscape elements. In our CSA, living closer to specific landscape elements was confirmed to be related with the capacity to attribute services or disservices to specific socioeconomic sectors and thus to a higher knowledge. However, further research would be required to disentangle the cause-effect mechanisms between perception of disservices, spatial scales and awareness of ES.

Various limitations apply to this study. The specificities of the case study limit to some extent the potential for generalization of the results and the nature of the elaborations carried out which remain rather explorative and descriptive. Nonetheless, this work suggests the need of in-depth analyses focusing more on the perception of disservices. Even though the qualification of benefits and disservices was carried out using rather simple scales and constructs that do not allow more precise quantifications of the relationships among variables, our results support the idea of peculiar attitudes of rural residents driven by disservices rather than by services. This might also be driven by a better knowledge of the related ecosystem services, that tend to suggest that benefits are something "given" because are part of normal rural life, while disservices are more evident as they provide disutility either related to agricultural production or to quality of life. This asymmetry certainly deserves further investigation.

5. Conclusions

In this study, we analyzed residents' perception of ES associated with rural landscape in a CSA featuring relevant anthropic pressure and historical heritage features. The objectives were to assess whether residents were able to identify different flows of services from landscape elements to the different economic sectors and whether such a perception was mediated by different landscape features of the area of residency.

The work confirms the complex relation between landscape elements, awareness and perception of people that is reported in a range of other studies. In our work, we found that living closer to specific elements have a significant impact on the perception of services and also on the capacity to discern between benefit for residents, agriculture and tourism. The results also corroborate the idea that urban population has a rather generic understanding of ecosystem services produced by landscape elements and tends to see them in a rather indistinct way, largely related to their recreational experience. Rural population has a much more complex understanding of benefits and disservices, likely connected to direct experience and/or knowledge of the investigated landscape elements. That effect is probably associated to the different perception scale between services such as recreation (perceived at a wider range) and disservices (perceived more in proximity of specific landscape elements).

Our results attain to the specificity of the CSA, but they support the idea that the different scale of perception between services and disservices is a topic that deserves further research. In particular, regional assessments (including monetary evaluation such as the willingness to pay) should consider with more attention the role of disservices and the spatial heterogeneity of people perception that can entail micro-scale effects. These results can also support a better design of policies related to landscape valorization. The results clearly hint at the usefulness of different communication strategies to inform residents about landscape, building on their different experience. Also, levers for value creation maybe different and relate to valorization of different landscape elements depending on the target beneficiary/user.

An aspect of our results concerns the rather negative perception of rice paddy fields that is not related to proximity to specific elements. Even though rice is a feature of the territory and a traditional product, the residents' perception in the CSA is the least positive. That evidence is in contrast with the general positive results for traditional rural elements that are reported in the literature. Such a result is likely related to the low multifunctional value attached to paddy fields but also to the historical background of the CSA where agriculture is more connected to the reclamation of the territory and less to the traditions of the region. This however may hint at further reflections about the discrepancy between historically relevant features and the ability to actually valorize them, as well as among the different understanding of these historical features between residents and non-residents. Clearly, where these discrepancies do exist, it can be a key priority issue to address in actions for landscape valorization.

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