Similarities and differences in the assessment of land-use associations by local people and experts

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Abstract

The continuous and unforeseeable mutations in relation to the use of land have led to different types of adjacencies between land uses. These often cause considerable nuisance which influences how people think about their environment. The aim of our study is to explore the similarities and differences in the assessment of land-use associations by local people and experts. We investigated the problems or nuisance (noise, insecurity, odor, waste disposal, unwanted animals, health risk, visual discomfort and unorganized trade) caused by the adjacency of residential to a range of six non-residential land uses (industry, commercial, transport infrastructure, landfill, medical and recreational). Face-to-face written surveys were conducted with local people from 33 settlements in Romania (52% urban areas) and an online survey was distributed to experts of different professional activities. A multiple correspondence analysis was carried out to explore similarities and differences in the assessment of land-use associations by the two groups of actors. The results showed (i)
differences, where local people positively assessed some land-use associations (industry vs. residential, commercial vs. residential and transport infrastructure vs. residential), while experts assessed them negatively; (ii) similarities, where both local people and experts had similar negative assessments on the same land-use association (landfill - residential), as well as (iii) similarities, where both groups had similar positive assessments on the same land-use associations (medical - residential and recreational - residential). Therefore, understanding the patterns in local people’s and experts’ assessment towards different adjacent land uses potentially causing nuisance could provide additional support for the complicated planning processes which are often overriding the public participation. This means that motivated and informed citizens along with experts’ evaluation should be part of the planning process in order to achieve effective land-use policies.

**Keywords**: land-use association, residential, adjacency, neighborhood, nuisance
1. Introduction

The location of non-residential land uses adjacent to residential areas has become problematic in many human settlements because of the diversified environmental and social impacts (Hersperger, 2006; Lejano and Smith, 2006). Consequently, the control of the problems triggered by adjacent land uses has become a common planning issue that can be dealt with in the context of experts’ technical expertise and public participation.

Environmental problems such as health risks, noise, odor, waste, insecurity as well as ecological and visual impacts have often been correlated with the association between residences and industrial facilities (Liu et al., 2012), commercial facilities (Coleman, 2006), transport facilities (Barros et al., 2013), landfills (Che et al., 2013), medical facilities (He et al., 2010) as well as recreational facilities (Lo and Jim, 2012).

Many regulations are applied to control land-use nuisance by authorizing, prohibiting, allowing, or excluding certain uses in order to decide on “the right location of land activities” (Makhzoumi and Pungetti, 1999). Land use regulations (such as environmental, safety, aesthetic regulations) are designed to minimize the nuisance caused by adjacent land uses (Fischel, 2004) and their effectiveness is widely accepted. The adjacency of several non-residential uses to residences is controlled under the laws of many countries. Here, land-use regulations refer to: (i) prohibiting certain land uses (e.g. any activities which generate problems such as: noise, vibrations as well as air, water and soil pollution, etc. are prohibited in the proximity of residential areas), (ii) enforcing minimum distances (e.g. a specific distance in meters from a hospital); (iii) obtaining a neighbors’ agreement (e.g. building adjacent to existing buildings or in their immediate vicinity requires the neighbors' agreement in case of a different use than the neighboring buildings); (iv) managing the limits of certain land uses (e.g. installation of noise absorbing panels along railways in residential areas) as well as (v) strict conditions on land uses that cause problems (e.g. non-residential activities
must obey to an operating schedule that does not interfere with the local residents’ resting schedule). However, there are many circumstances under which land-use regulations can be inadequate, failing to fulfill its designed purpose and even causing conflicts and environmental problems (Hersperger et al., 2015; Rotich, 2012).

Decisions regarding land-use regulations are based on the expert knowledge, and, occasionally, the involvement of the public. The public does not get involved mostly because opportunities for participation are not available or known (Hanssen and Falleth, 2014), but also due to personal reasons. For example, individuals might fear to become sidelined by the community whether their opinion differs from the collective one (Buchecker et al., 2003), they mistrust their conversational skills or knowledge about the issues under concern, they are not convinced that participation would contribute to important outcomes, or they are not interested in local landscape development (Höppner et al., 2007, 2008).

Public participation has many potential benefits. It could bring better informed and transparent decisions as well as service improvements (Lowndes et al., 2001), increased fairness and justice of the decision making process (Innes and Booher, 2004), and improved planning outcomes (Clifford, 2013). Furthermore, the public has a special knowledge which is practical, collective, derived from everyday life experience and cultural background, and is strongly related to the local landscape.

The task of bringing together both local and expert knowledge represents a significant challenge because sometimes local knowledge is marginalized as being too subjective or based on speculative information, whereas experts knowledge as being overconfident or ignorant to local issues (Failing et al., 2007; NRC, 1996).

Differences in local and expert knowledge may lead to contradictory assessments. These differences are often driven by distinct values, attitudes, as well as different cultural and social backgrounds of local people and experts, including gender, age and level of
education (Renn, 2008; Renn and Rohrmann, 2000). A plethora of case studies revealed situations when local people have more negative perception than experts, for example on the importance of urban derelict land (Hofmann et al., 2012), or on hazardous facilities (Sjöberg, 1999) as well as cases when local people are more positive in perception than experts, for example on electric technologies (Slovic, 1987). The conditions in which we would expect agreement refer to the public get aware of the technical knowledge in order to understand the real issues. Local people and experts can also agree on a negative or a positive assessment. Literature has shown cases of both locals and experts negative assessments toward past landscape changes (Ruskule et al., 2013) and cases where both groups share similar assessments toward the impacts of oil and gas production industry (Wright et al., 2000). The conditions in which we would expect agreement refer to a consensus among experts and public regarding the assessment of the problems caused by adjacent land uses.

Several European policies encourage public involvement in decision making along with experts’ assessments (e.g. Public Participation Directive (2003/35/EC), Environmental Assessment Directives: Environmental Impact Assessment - EIA (2011/92/EU) and Strategic Environmental Assessment - SEA (2001/42/EC), Water Framework Directive (2000/60/EC)). These aim to integrate expert evaluation and public consultation to increase awareness towards the real problems and commonly accepted decisions.

Public participation of local inhabitants in planning processes is still underdeveloped in Eastern European Countries, and specifically in Romania. Here, usually local people do not participate in the preparation or approval of land-use plans. Instead, plans are prepared by experts usually, sometime from a remote workplace. These experts develop the plans based on their attitudes regarding problematic and un-problematic land-use associations, e.g. the adjacency of non-residential uses to residences. The attitudes of the local people about these issues are largely unknown and neither enter the planning process directly nor indirectly
(Tudor et al., 2014). Although there are sufficient requirements for public participation procedure, local people’s passivity and apathy about local issues still favor top-down decisions.

Romania has many land-use regulations (Table 1). In recent years, the implementation of such regulations has been neglected and resulted in a significant increase in problematic land-use associations. Thus, the number of disputes, even among land uses with a low potential for conflict (e.g. cemeteries, gas stations, recreational areas) has increased (Ioja et al., 2014; Tudor et al., 2013). As Romania further integrates into the EU the public’s values are expected to become more important and determinant for land use plans. In order to better anticipate potential future changes in this regard we are interested in the current assessment of local people and experts. Thus, the aim of this study is to explore similarities and differences between local people’s and experts’ assessments of close proximities of non-residential and residential land uses for an Eastern European country with a communist past and strong preference for economic development. A multiple correspondence analysis was carried out to identify such similarities and differences. We hypothesize that currently in the study area local people tend to assess land-use associations less problematic than experts.

Table 1: Romanian land-use regulations in various legislative areas and their current level of implementation

<table>
<thead>
<tr>
<th>Legislative area</th>
<th>Regulations for the protection and preservation of landscape resources</th>
<th>Instruments</th>
<th>Current level of implementation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial and urban planning</td>
<td>Interdictions and restrictions; enforcing conditions for the management of land uses (e.g. distance between different land uses, buildings height regime, the location of infrastructures which generate nuisance).</td>
<td>Urban regulations</td>
<td>Medium</td>
</tr>
<tr>
<td>Construction</td>
<td>Interdictions and restrictions for construction; Procedures for obtaining a neighbors' agreement.</td>
<td>Building permits</td>
<td>Medium</td>
</tr>
<tr>
<td>Forest</td>
<td>Interdictions and restrictions;</td>
<td>Permits</td>
<td>Medium-High</td>
</tr>
</tbody>
</table>
enforcing conditions for managing land uses at forest margins.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Legal Instruments</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Interdictions and restrictions; changing agricultural areas to built areas.</td>
<td>Agro-pastoral permits</td>
<td>Medium</td>
</tr>
<tr>
<td>Environmental protection and conservation</td>
<td>Interdictions and restrictions; land uses, especially in protected areas and areas of high environmental risk such as polluting factories, or areas predisposed to natural hazards (e.g. a flood, an earthquake)</td>
<td>Following the Environmental Impact Assessment procedures, environmental agreements and authorizations</td>
<td>Low</td>
</tr>
<tr>
<td>Cultural heritage</td>
<td>Minimum distances from the cultural heritage resources; Interdictions and restrictions within and in the proximity of cultural heritage resources.</td>
<td>Permits</td>
<td>Low</td>
</tr>
<tr>
<td>Water management</td>
<td>Interdictions and restrictions for the location of some land uses close to open waters</td>
<td>Water management permits and authorizations</td>
<td>Medium</td>
</tr>
<tr>
<td>Transport infrastructure</td>
<td>Interdictions for construction in the safety area of road infrastructures.</td>
<td>Permits from the authorities managing the transport infrastructure</td>
<td>Medium</td>
</tr>
<tr>
<td>Hygiene and public Health</td>
<td>Minimum distances between conflicting land uses (e.g. residential areas - industry, farming, cemeteries)</td>
<td>Permits</td>
<td>Low</td>
</tr>
<tr>
<td>Security</td>
<td>Interdictions and restrictions for the location of some land uses close to national security objectives (e.g. military infrastructure, special transportation areas)</td>
<td>Permits</td>
<td>High</td>
</tr>
</tbody>
</table>

*High: the legal instruments are properly implemented and succeed to harmonize the adjacent land-uses. Medium: the legal instruments are sometimes properly implemented and sometimes inadequately. Low: although the legal instruments exist they have not been implemented through an enforceable institutional control.

2. Method

2.1. Data collection

The data on the assessment of problems induced by the close proximity of different land uses by local people and experts was collected through two different types of surveys. To explore assessments with regards to adjacent non-residential and residential uses, we administrated face-to-face surveys on paper in December 2011 and June 2012 with local
people, while for experts, we distributed an online survey during February 2012 and May 2014.

We chose face-to-face surveys on paper to evaluate people’s assessment because many respondents were from rural areas and there local people have more willingness to cooperate in face-to-face surveys. Although web-based surveys have lower response rates (Brown and Kyttä, 2014; Shih and Fan, 2008), we chose this approach to explore expert assessment because it is more flexible regarding their work schedules, and makes it possible to return to specific questions at any time. Information gathered from these two types of surveys can be combined since its reliability is considered to be almost the same (Revilla and Saris, 2013).

The analysis focuses on the problems of six non-residential land uses (industrial, commercial, transport infrastructure, landfill, medical and recreational) located in the neighborhood of residences. We analyzed these land-use associations as they were frequently reported as problematic for Romania (e.g. Niculita et al. (2011), Onose et al. (2011)) and worldwide (e.g. Saint et al. (2009), Lecourt and Faburel (2008)). We excluded from statistical analyses the association between residences and places of worship and the association between residences and abandoned land because of incomplete and inexistent responses from both local people and experts. We used the concept of neighboring or adjacent lands following Taleai et al. (2007) definition: “any parcels that are adjacent to or directly opposite or diagonal to the subject parcel”. For each association of land-uses we asked the following multiple choice question: ‘Which of these problems do you associate with areas where residential areas are close to industrial / commercial / transport infrastructure / landfill / medical / recreational areas?’ . The respondents could answer the questions by choosing any (including none) of the following problems: noise, insecurity, odor, waste disposal, unwanted animals, health risk, visual discomfort and unorganized trade (Table 2). For data analysis,
each problem was considered as a binary question (e.g. ‘Do you consider noise to be a characteristic problem for a neighborhood where industrial areas and residential areas are close to each other? Yes/No’). Thus, the multiple choice question therefore becomes 8 binary questions. In the data table the choice/ non-choice of each problem was binary coded, so that each problem was represented as a column consisting of yes and no. The surveys ended with questions on participants’ social profile (i.e. age, gender, current profession, place of residence).

Table 2 Definitions of the problems potentially associated with residences adjacent to non-residential land uses

<table>
<thead>
<tr>
<th>Noise</th>
<th>– each of the 6 land uses is a potential source of noise because of daily production activities or generated traffic flow;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecurity</td>
<td>– refers to threats to people’s feelings of security associated with some land uses which are attractive to beggars and homeless people (i.e. commercial, recreational, transport);</td>
</tr>
<tr>
<td>Odor</td>
<td>– refers to unpleasant smells derived from potential unorganized waste deposits or from operational activities of some land uses;</td>
</tr>
<tr>
<td>Waste disposal</td>
<td>– refers to the risks related to waste accumulation due to poor waste management practices associated with some land-uses;</td>
</tr>
<tr>
<td>Unwanted animals</td>
<td>– refers to stray animals attracted by waste feed which can represent a threat to human security (i.e. stray dogs);</td>
</tr>
<tr>
<td>Health risk</td>
<td>– refers to threats to human health due to potential pollution generated by some land uses (i.e. industry, transport, public services);</td>
</tr>
<tr>
<td>Visual discomfort</td>
<td>– refers to the dislike caused by unmaintained and esthetically disturbing land uses.</td>
</tr>
<tr>
<td>Unorganized trade</td>
<td>– refers to the illegal sale of merchandise close to the land uses which attract many people (i.e. commercial, transport, recreational etc.)</td>
</tr>
</tbody>
</table>

For the local people’s assessment, we conducted face-to-face surveys on paper with 235 randomly selected participants within the population of 33 settlements in Romania,
located in 14 counties. We asked local people the outlined questions and filled in their answers. Our survey site was located in the downtown area of the selected settlements. The respondents were randomly selected from the people that passed through the area. The first respondent was randomly selected and then after answering to all questions the next individual who passed close to the interviewers was approached. To achieve a representative sample of local people we selected and questioned them on work days and weekends. Local people were selected from both urban and rural areas so as to ensure that they have dealt in their everyday life with various types which emerge from the selected land-use associations (i.e. different types of industry close to residential area).

For the experts’ assessment, the online survey was circulated through emails to national universities and research centers staff and during conferences or other scientific events. From the 172 experts that agreed to participate in our survey 97 experts were randomly selected and invited to fill in the online survey.

We combined both samples as experts’ assessments might be biased by their professional experience, while local people’ assessments might be biased by their emotional and personal relationship with the selected land-use associations. We also examined local people and experts assessments, as both assessments should contribute to the preparation of land use plans.

Table 3 shows for each land-use association, the number of responses which were used for the analysis. The number differs because some respondents decided not to answer the questions for all the neighboring land-uses (Table 3).

The general response rate referent to people and experts answering all questions for all six non-residential land uses located in the neighborhood of residences was 89.75%, (96% for local people, respectively 83.5% for experts).
Table 3 The total number of responses used in the analysis

<table>
<thead>
<tr>
<th>Land-use associations</th>
<th>Face-to-face surveys on paper – local people’s assessment</th>
<th>Response rate – local people</th>
<th>Online survey – experts’ assessment</th>
<th>Response rate - experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry - residential</td>
<td>N=235</td>
<td>100%</td>
<td>N=97</td>
<td>100%</td>
</tr>
<tr>
<td>Commercial - residential</td>
<td>N=235</td>
<td>100%</td>
<td>N=80</td>
<td>82%</td>
</tr>
<tr>
<td>Transport infrastructure - residential</td>
<td>N=235</td>
<td>100%</td>
<td>N=79</td>
<td>81%</td>
</tr>
<tr>
<td>Landfill - residential</td>
<td>N=227</td>
<td>97%</td>
<td>N=74</td>
<td>76%</td>
</tr>
<tr>
<td>Medical - residential</td>
<td>N=235</td>
<td>100%</td>
<td>N=84</td>
<td>87%</td>
</tr>
<tr>
<td>Recreational - residential</td>
<td>N=185</td>
<td>79%</td>
<td>N=73</td>
<td>75%</td>
</tr>
</tbody>
</table>

2.2. Multiple correspondence analysis (MCA) for similarities and differences in the assessment of land-use associations by both local people and experts

We used MCA to explore the relationships among 8 categorical variables entered in the analysis as binary variables (yes/no). MCA is an extension of correspondence analysis whose aim is to graphically illustrate the relationships among multiple categorical variables (Everitt and Hothorn, 2011). MCA uses the chi-square distance as a measure of association between the multiple variables and this “helps to ensure that larger observed proportions do not dominate the distance calculations relative to smaller proportions” (Nagpaul, 1999; Sourial et al., 2010). The analysis proved to be useful for the analysis of the relationships among binary variable, i.e. the relationships among the social demand for ecosystem services (García-Nieto et al., 2013), the relationships among the colonists’ livelihood strategies (St-Laurent et al., 2013), the relationship between mould contamination and dwellings characteristics (Moularat et al., 2011), as well as the associations among frailty domains (Sourial et al., 2010). It produces plots which display the rows and columns as points. In the
plots, the problems which are closer together are similar to each other, meaning that they were often selected by the same individuals (Agresti, 2002).

All 8 questions used in MCA (Q) had an equal number of categories, i.e. yes or no (K = 16). We interpreted only the first plane, since after the second dimension the eigenvalues decrease regularly with small differences. Furthermore, the average value of the modified rate of the first dimension for all cases was .964, which determined our choice to interpret only the first component (Le Roux and Rouanet, 2010). MCA was computed using R software (Version 3.0.2 for Windows) package FactoMineR (Husson et al., 2011).

Applying MCA to explore the similarities and differences in the assessments of local people and experts has helped to identify which land-use associations are tolerated or not and in turn has shown the significant role that people and experts collaboration play towards the goal of efficient land-use planning.

3. Results

3.1. Informant characteristics

Over half of local people (52%) were from urban areas with the remainder from rural areas. The gender composition of the participants in all cases was slightly more toward females (57%), which fits national demography data (51% females) (NIS, 2011). For the educational level, most of the respondents have higher education (40%) or graduated high schools (38%) which is representative for the study region (Voicu and Vasile, 2010).

Within the experts group 53% respondents were males and 47% females. This demographic gender imbalance compared to local people is the effect of gender bias in education. Most of experts are from public funded higher education or research institutions (82%), followed by private funded (15%) and non-governmental institutions (3%). Experts were of different professional activities (geographers, environmental professionals, planners,
architects, biologists, engineers, etc.). They were from 14 urban areas located in 12 counties in Romania, from which 5 are the same counties as local people’ residence areas, 5 are neighboring counties and 2 are far-distance counties.

3.2. Local people’s vs. Experts’ assessment

We identified three patterns regarding similarities and differences in local people’s and experts’ assessments: (i) dissimilar assessments of problems characteristic of the adjacency of residential uses to three non-residential uses, specifically, industry, commercial and transport infrastructure; (ii) similar negative assessments regarding problems related to residential uses and landfills and (iii) similar positive assessments regarding problems related to the neighboring of residential and the two non-residential uses, specifically medical and recreational (Table 4).

Table 4 Summary of local people’s and experts’ assessments of land-use associations

<table>
<thead>
<tr>
<th>Associations of land uses</th>
<th>Local people</th>
<th>Experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>industry - residential</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>commercial - residential</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>transport infrastructure - residential</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>landfill - residential</td>
<td>-,+</td>
<td>-</td>
</tr>
<tr>
<td>medical - residential</td>
<td>+</td>
<td>+,-</td>
</tr>
<tr>
<td>recreational - residential</td>
<td>+</td>
<td>+,-</td>
</tr>
</tbody>
</table>

+ positive assessments; - negative assessments; -,+ both positive and negative assessments

The graphical results of the MCA for local people’s and experts’ assessments are shown in Fig. 1a-1l. Significant associations of problems, for both local people and experts, are shown in red. The separation of problems with the yes category and no category on opposite sides of the first dimension shows that the most important difference in the sample is between being and not being concerned about the problems generated by certain adjacent land uses.
The results show that local people have a more positive attitude regarding the problems generated by potentially harmful land uses, specifically industry, commercial and transport infrastructure, in the neighborhood of residential uses. In the graphs of local people’s assessments (Fig. 1a, 1c, 1e) the problems to which they attributed the no category are very close to each other. Significant associations among the problems could not be established, as the frequencies of the problems with the yes category are very small and have too much influence on the contribution to the construction of the components (Table 5). The graphs of experts’ assessments (Fig. 1b, 1d, 1f) show the opposite situation, with the problems to which they attributed the no category being far apart. The greatest contributions belong to the problems with no category: no.odor (11.7-12.4%), no.noise (10.9-11.9%) and no.visual discomfort (9.9-11.7%) (Table 5).

![Figure 1a MCA for local people’s assessment of problems for the adjacency of industrial to residential uses in plane 1-2. Figure 1b MCA for experts’ assessment of problems for the adjacency of industrial to residential uses in plane 1-2.](image-url)
Figure 1c MCA for local people’s assessment of problems for the adjacency of commercial to residential uses in plane 1-2. Figure 1d MCA for experts’ assessment of problems for the adjacency of commercial to residential uses in plane 1-2.

Figure 1e MCA for local people’s assessment of problems for the adjacency of transport to residential uses in plane 1-2. Figure 1f MCA for experts’ assessment of problems for the adjacency of transport to residential uses in plane 1-2.
Table 5 Response frequencies (in %) and contributions (in %) of the 16 categories to the construction of the components in the MCA

<table>
<thead>
<tr>
<th>Category</th>
<th>Local people’s assessment</th>
<th>Experts’ assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>industry - residential</td>
<td>commercial - residential</td>
</tr>
<tr>
<td>yes.noise</td>
<td>27.2</td>
<td>9.1</td>
</tr>
<tr>
<td>no.noise</td>
<td>72.8</td>
<td>3.4</td>
</tr>
<tr>
<td>yes.insecurity</td>
<td>16.2</td>
<td>10.5</td>
</tr>
<tr>
<td>no.insecurity</td>
<td>83.8</td>
<td>2.0</td>
</tr>
<tr>
<td>yes.odor</td>
<td>19.6</td>
<td>10.1</td>
</tr>
<tr>
<td>no.odor</td>
<td>80.4</td>
<td>2.5</td>
</tr>
<tr>
<td>yes.waste</td>
<td>15.7</td>
<td>10.5</td>
</tr>
<tr>
<td>no.waste</td>
<td>84.3</td>
<td>2.0</td>
</tr>
<tr>
<td>yes.health risk</td>
<td>10.2</td>
<td>11.2</td>
</tr>
<tr>
<td>no.health risk</td>
<td>89.8</td>
<td>1.3</td>
</tr>
<tr>
<td>yes.animals</td>
<td>3.8</td>
<td>12.0</td>
</tr>
<tr>
<td>no.animals</td>
<td>96.2</td>
<td>0.5</td>
</tr>
<tr>
<td>yes.trade</td>
<td>0.9</td>
<td>12.4</td>
</tr>
<tr>
<td>no.trade</td>
<td>99.1</td>
<td>0.1</td>
</tr>
<tr>
<td>yes.visual discomfort</td>
<td>11.5</td>
<td>11.1</td>
</tr>
<tr>
<td>no.visual discomfort</td>
<td>88.5</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Similarities were apparent in the negative assessment of the neighboring of landfills and residential uses. The red color in Fig. 1g indicates which groups of problems (both yes-perceived problems and no-perceived problems) are significantly related to the local people’s assessment. Nine categories account for 85% of the variance ($\lambda_1 = .436$) of this component. Thus, two groups of local people can be identified: the first group is concerned about some problems and the second is not concerned about any problems. To each yes-perceived problem characterizing the proximity of landfills to residential areas corresponds to a no-perceived problem, with the exception of yes.waste disposal.

The graph of experts’ assessments (Fig. 1h) shows their negative attitude towards landfills in the neighborhood of residential areas, as the problems to which they attributed the category
yes are very close to each other and have high frequencies. As a consequence, significant associations of problems could not be established, because of the strong influence of the categories to the construction of the components.

![Figure 1g MCA for local people’s assessment of problems for the adjacency of landfill to residential uses in plane 1-2. Red color shows the significant categories (most contributing to the first dimension).](image)

![Figure 1h MCA for experts’ assessment of problems for the adjacency of landfill to residential uses in plane 1-2.](image)

Similarities were apparent in the positive assessment of the adjacency of medical and residential uses as well as recreational and residential uses. Regarding the former, local people are not concerned about any problems. The problems to which they attributed the no category are very close (Fig. 1i) with high frequencies. In this context, significant associations of problems could not be established. In the graph of experts’ assessments (Fig. 1j), significant associations of problems can be identified. Altogether, the significant associations of problems account for 61% of the variance of the first dimension ($\lambda_1 = .477$). The oppositions on the first dimension show two distinct groups of experts: the first
associates no problems with this adjacency of land uses (the positive side of the first dimension) while the second associates problems with this neighboring of land-uses (the negative side of the first dimension).

Figure 1i MCA for people’s assessment of problems for the adjacency of medical and residential uses in plane 1-2. Red color shows the significant categories (most contributing to the first dimension).

Figure 1j MCA for experts’ assessment of problems for the adjacency of medical to residential uses in plane 1-2.

Regarding the adjacency of recreational and residential uses, local people are not concerned with any problems, since those to which they attributed the no category are very close to each other and have high frequencies (Fig. 1k). In the graph of experts’ assessment the first dimension highlights 8 categories with a contribution of 68% to the dimension’s variance ($\lambda_1 = .447$). In this context two groups of experts can be distinguished: the first group considers problems to be characteristic of this association while the second group was less concerned.
Figure 1k MCA for people’s assessment of problems for the adjacency of recreational to residential uses in plane 1-2. Red color shows the significant categories (most contributing to the first dimension). Figure 1l MCA for experts’ assessment of problems for the adjacency of recreational to residential uses in plane 1-2.

4. Discussion and conclusions

Local people positively assessed the neighboring of residential with 3 non-residential uses (i.e. industry, commercial, and transport infrastructure), while experts assessed them negatively. The reasons for local people’ positive assessments might be attributed to their low awareness about the problems related to combining residential areas with non-residential land uses. Locals are not aware of the problems because they usually lack the technical expertise and see the economic gains of such land-use associations more strongly than their environmental threats (NRC, 1996), due to more emphasis on hedonistic and materialistic values (Renn, 2008). Moreover, the concern about inconspicuous environmental threats is of lower priority for the local community, especially in the case of Romania, where the community is facing financial and economic challenges (Sova et al., 2014). This finding is in
contrast with what happens today in Western European countries, where people put more emphasis on environmental benefits than economic returns (Renn and Rohrmann, 2000).

Local people lack awareness also due to their limited involvement into the decisions about their local landscape. Romania does not have well established participatory approaches such as many Western European countries: i.e. Netherlands, where the public is involved from the early stages of a planning process to define problems and alternatives (Enserink and Monnikhof, 2003); Switzerland, where people represent a key element in land use planning as they have the right to challenge the binding land-use plans (von der Dunk et al., 2011); and Germany, where people participate both formally and informally to achieve an efficient land-use planning (Knapp and Coors, 2007). In Romania, local people do not usually participate because of the artifacts of communist past where no public manifestation were allowed (Stringer et al., 2009) or due to the fear that their opinions could have negative impact on their own well-being. Furthermore, most of the local people do not trust in public authorities and do not perceive their power to influence the decision-making process (Petrisor, 2010). The decision-making processes in Romania is mostly top-down (Tudor et al., 2014) and public consultation and participation is formally applied, which undermine the participatory approach.

Experts are generally more negative in their assessment about the problems caused by close proximity of the three non-residential (i.e. industry, commercial, and transport infrastructure) and residential land uses. The reason for the negative perception might be the fact that they have dealt more with the environmental threats (most of the experts work in an academic setting or are engineers), or they have been exposed to the negative impacts of the land-use associations in their professional experience (Renn, 2008) as, most of the experts have a professional seniority of more than 10 years. Cognition about the negative impacts associated with such adjacent land uses and the potential accidents that might occur could
also influence their negative assessments. Experts negative assessment for the selected land-use associations might also be a consequence of their environmental ethics (Johnson and Scicchitano, 2012) as well as awareness on landscape issues (Nita et al., 2015).

Our findings show that both local people and experts positively assessed the neighboring of residential and medical and recreation uses. Recent studies of perceptions of medical and recreational uses such as hospitals and urban parks have shown that these are generally positively considered in Northern and Western Europe because of their functionality (Gesler et al., 2004) and the benefits which they can offer (Breuste, 2003; Degenhardt and Buchecker, 2012).

The only land-use association which is negatively assessed by both experts and local people is the proximity of landfill to residential areas. Recent studies have revealed the impact of landfill problems on adjacent residential areas (Che et al., 2013; Owusu et al., 2012), and even their effects long after their closing (Ham et al., 2013). These problems are odor, noise, littering from waste transportation, contamination of groundwater, as well as health risks and insects. The negative assessment of the closeness of landfill to residential areas by both local people and experts can be a consequence of their negative personal experiences or direct exposure as well as inefficient zoning rules (or the inefficient implementation of these rules) leading to issues that generate negative impacts. In Romania, landfills have a high impact mainly due to their poor management (Matache et al., 2003). There are many cases where landfills have exhausted their storage capacity and it is very difficult to manage their limits so as not to create impacts (MDRAP, 2003).

Differences exist in the sample of local people among those that are more concerned than the others that are less concerned. On the one hand, the local people who are more concerned about the location of non-residential land uses next to residences are over 65 years old (for the adjacency of commercial and medical uses to residences), with a tertiary
education (for the adjacency of industrial, transport infrastructure and recreational uses to residences), and employed in security-related jobs (for the adjacency of landfill and recreational uses to residences). These socio-demographic characteristics associated with concerned people are positively correlated to the yes perceived problems on the positive side of the first dimension. Siegrist et al. (2005) found that senior people perceive higher risks as they may feel vulnerable to the technological impacts since life-threatening risks are positively related with age. Moreover, people employed in security-related jobs tend to be more concerned as they could have coped with the impacts of such non-residential land-uses. Our findings that people with a high level of education are more concerned is confirmed by other studies where a higher education level was found to be positively related to environmental concerns (Ostman and Parker, 1987). On the other hand, young local people are not concerned of the environmental problems generated by certain adjacent land-uses. Studies have found that younger people perceive fewer technological risks than the older people as they could be more familiar with the technologies (Siegrist et al., 2005) or believe they have more control over their impacts.

MCA has proved useful in identifying the similarities and differences in the assessments of land-use associations by local people and experts. However, the dispersion of yes and no-perceived problems in the graphs 1a, 1c, 1e, 1i and 1k shows a concentration of no-perceived problems in the bottom part and a relatively wide distribution of yes-perceived problems in the top part. This is related to the uneven distribution between answers for yes-perceived problems and no-perceived problems. This has prevented us to detect specific patterns inside the groups of respondents who are concerned and those who are not concerned about the problems of the selected adjacent land-uses.

The Romanian territorial planning system enforces regulations to control the problems caused by adjacent land uses but can become more effective in practice (Munteanu and
Servillo, 2013). The location of non-residential uses in the neighborhood of residences should be regulated following the expertise of environmental institutions as well as citizens' demands. This is not easy to achieve in a system which is still characterized by the difficulties of aligning the regulations to the current political situation, not only because of strong clientelism relations between private and political actors but also because of contradictory planning strategies (Munteanu and Servillo, 2013; Puscasu, 2009).

Neither assessment is right or wrong. The difference between local people and experts assessments can be challenging when only certain perspectives are included in the decision making process while the remaining different are ignored. If people’s positive assessments were taken into account into the formulation of land-use plans, then, these would become less strict because would allow land-use associations that the experts would not allow because they are potentially harmful. In order to avoid this, the experts should educate the locals in the course of participation to raise their awareness about the problems of combining non-residential land uses with residential ones and make them share the local knowledge which can be an important indicator for community’s issues, can help in policies design, identify priority areas for monitoring, as well as qualitatively validate the scientific assumptions and predictions (Taylor and de Loë, 2012).

An expert-centred planning or people-centred planning is not preferable, as both experts and people should collaborate in order to provide good informed decisions (Fischer, 2009). An active interaction between people and experts can establish mutual trust encouraging joint agreements and facilitate collaborative planning. Romania does not have yet a collaborative planning and the transition to such planning can lead to chaos in planning “because there is less a culture of communication and more a culture of execution” (Puscasu, 2009). However, there are efforts to empower people to participate into local decisions
(Nichersu and Iacoboaea, 2011) and suitable conditions to advance toward an efficient collaborative planning.

Examining together both knowledge shows how important is getting people aware of the environmental impacts of adjacent land uses. Experts’ knowledge is important for their expertise and awareness of specific land-use issues, while local people’ knowledge provide useful information on local history and spatial characteristics, thus, experts’ knowledge should be always strengthened with information from locals for a comprehensive understanding of land-use issues (Tibby et al., 2008). The decisions made taking into account both people and experts’ knowledge are more likely to achieve the best uses of land.

Exploring the similarities and differences in the assessments of local people and experts is useful to identify which land-uses associations are tolerated or not and thus to highlight the potential nuisances that characterize the neighborhood between non-residential uses and residences. This represents essential information for understanding acceptance or rejection of certain adjacent land-uses and might contribute to the formulation of effective land-use policies where both local and expert knowledge is appreciated.
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