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ENVIRONMENTAL DEGRADATION IN RURAL AREAS WITH HIGH ANTHROPIC PRESSURE – IMPACT AND PLANNING MODELS

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Abstract: The environment in rural areas contains a great variety of resources. Anthropic transformations of the environment mainly seek to capitalize on these resources in order to ensure economic growth. In spite of the tendency in public policy at EU and national level to regard rural areas from an agricultural viewpoint, there are many rural areas which face specific anthropic transformations – this is the case of rural areas in mining regions or in metropolitan areas of important cities. The objective of this article is to comparatively assess the environmental impact caused by high anthropic pressure in a mining area in Romania (Motru-Rovinari) and an emergent structure (Bolintin-Vale – Mihăileşti area within the Bucharest metropolitan area), while also proposing alternative planning models to cope with these issues. The methodology used relies mainly on indicator analysis of the LAU 2 units in the two study areas, as well as GIS analysis involving CORINE Land Cover datasets and comparative mapping between the 1978 Topographical map of Romania and the 2005 satellite imagery. The planning models proposed cover approaches such as environmental rehabilitation, land use management and social entrepreneurship. The main challenge is represented by the need for a more integrated approach in the planning of rural areas.

Keywords: Land use management, environmental rehabilitation, mining in rural areas, emergent structures, environmental impact, sustainable rural development, CORINE Land Cover

1. INTRODUCTION

Environmental characteristics and their constraints on territorial systems can be regarded from two main points of view. On the one hand, the natural subsystem can either impose restrictions on a territory's development potential or favor certain activities (Iojă, 2008; Montz & Tobin, 2011), as environmental conditions can prove to have negative or positive effects on the quality of life (Ferrer-i-Carbonell & Gowdy, 2006). On the other hand, the anthropic pressures on natural systems, often caused by the desire to reduce the restrictive elements and capitalize on the favorable ones, are considered to be the driving forces of environmental dynamics (Petrişor et al., 2010). Anthropic interventions with a high ecological footprint can eventually lead to ecosystem collapse (Wackernagel & Rees, 1998), as primary eco-energies will be most reduced in quantity in the territories with the most profound anthropic transformations – like strongly urbanized spaces or intensive mining operations (Ianoş et al., 2011). The consequent loss in ecosystem resilience can lead to irreversible changes in the development possibilities which remain open to future generations (Arrow et al., 1995).

The environment in rural areas contains a variety of resources, with a great range of potential uses (van Leeuwen, 2010). These include resources for agricultural production, physical space for residential use, biological resources for biodiversity or ecosystem services like pollution assimilation and nutrient cycling (Hodge, 2001). Consequently, the evolution of anthropic processes in rural areas, strongly linked to the capitalization of these resources, has led to pressures reflected in environmental quality – soil erosion, air pollution, and degradation of water quality, loss in biodiversity or decline in landscape character (van Leeuwen, 2010).

Land use and land cover changes can be considered an important indicator of anthropic pressure (Popovici et al., 2013). Consequently, land

use, as "the spatial projection of the historical interaction between society and nature" (Ianoș et al., 2012b), can be analyzed to reveal the dimensions of the anthropic transformations suffered in recent years by rural areas. After 1990, political and socio-economic changes have had a strong impact on land use in Romania, with market forces having an increased influence in transforming rural landscapes (Popovici et al., 2013). With the transition from state ownership to private property, supported by Act no. 18/1991 which encouraged the excessive fragmentation of farmland (Bălteanu & Popovici, 2010; Grigorescu et al., 2012), spatial planning measures failed to control land use changes. This ultimately led to environmental impacts and the alteration of the social and economic structures of rural communities (Ianoș et al., 2012b).

In Romania, there is a tendency in public policies to view rural areas especially from an agricultural viewpoint (Sandu, 2005). While the environmental impact of agriculture, especially in its intensive forms, has become a major concern of the European Union's Common Agricultural Policy – CAP (Hodge, 2001; Piorr, 2003), the environmental impact of agricultural decline leading to land abandonment – with consequences reflected in biodiversity, landscape, soil quality and occurrence of natural hazards – tends to be less recognized in policy development (MacDonald et al., 2000). Moreover, despite the fact that less-favoured areas have been supported through the CAP in order to maintain sustainable agricultural activities, in spite of restrictive factors (Ruben et al., 2007), poor people living in these fragile environments often have to deal with poverty and resource degradation issues (Ruben & Pender, 2004).

For poor rural households, land is the most important available natural resource (Reardon & Vosti, 1995). However, as rural populations tend to be engaged increasingly in non-agricultural activities (Tacoli, 1998), the diversification of activities is often the result of anthropic processes with strong environmental impacts.

In the specific case of coal exploitation, the anthropic pressure on the environment is reflected by processes such as ground stripping, soil erosion or surface subsidence (Liao et al., 2013). Other environmental impacts include reduced vegetation-covered areas (Cuculici et al., 2011), increased background radiation (Cosma et al., 2009), low stability of rock dumps, due to water from rain infiltration (Lazăr & Faur, 2011), or the profound artificial appearance of local geomorphologic systems (Titu & Balazsi, 2007). Open-pit coal mining determines a restrained capacity of agriculture in villages with this kind of function (Braghină et al., 2008), often leading to development conflicts (Spasic et al., 2007) and a sense of social injustice due to the environmental harm suffered by the local population (Morrice & Colagiuri, 2013).

Rural spaces under the influence of large cities represent another specific category. As territorial emergent structures which exert a high pressure on the environment (Ianoș et al., 2012a), the ecosystems of these rural regions are transformed by two main anthropic processes, the demand for resources and the generation of urban waste (Tacoli, 1998), often influenced by population redistribution through internal migration (Bilsborrow, 1992). As geographical spaces which experience dynamic patterns of land use change (Niță, 2012a), the management of the environment in periurban areas becomes a complex task (Allen, 2003) as the administrative system does not overlap emergent structures (Peptenatu et al., 2012). While the specific environmental impacts of urban sprawl in metropolitan areas in Romania have been studied recently (Grigorescu et al., 2012; Cocheci, 2014), a great focus has been put on land use conflicts due to urbanization (Ianoș et al., 2012b, Iojă et al., 2014).

As in the case of coal extraction, the environmental impact on agricultural areas is also significant in the case of urbanization, with high-quality soils increasingly under the pressure of land demands of growing cities (Szilassi et al., 2010; Curran-Cournane et al., 2014) or subject to the incoherent management of metropolitan waste (Ianoș et al., 2012c). Derogatory planning forcing the on-paper conversion of good quality agricultural land to unproductive land in order to allow different residential projects (Tudor et al., 2014) has also been a risk for valuable lands near sprawling cities. With a visible ethics of space deficit reflected in the pressure exerted on suburban areas (Ianoș et al., 2010), it becomes clear that new planning models are necessary in order to cope with the rising environmental concerns in emergent rural areas.

Rural development, often regarded as a multisectoral task implying both agricultural development and equitably distributed social development (Gsanger, 1994), is considered essential for the environment and quality of life (Rusali, 2013). In post-communist countries, in spite of the importance of agriculture and the high level of rurality, the on-going restructuring of rural economies has received little attention (Chaplin et al., 2007). The second pillar of the EU's CAP has tried to support rural regions in Europe that are lagging behind through different rural development measures (Dwyer et al., 2007; Shucksmith et al.,

2009). Nevertheless, new planning models and instruments are needed, with the CAP considered to be insufficient for tackling structural problems which confront rural areas in new member states (Gorton et al., 2009).

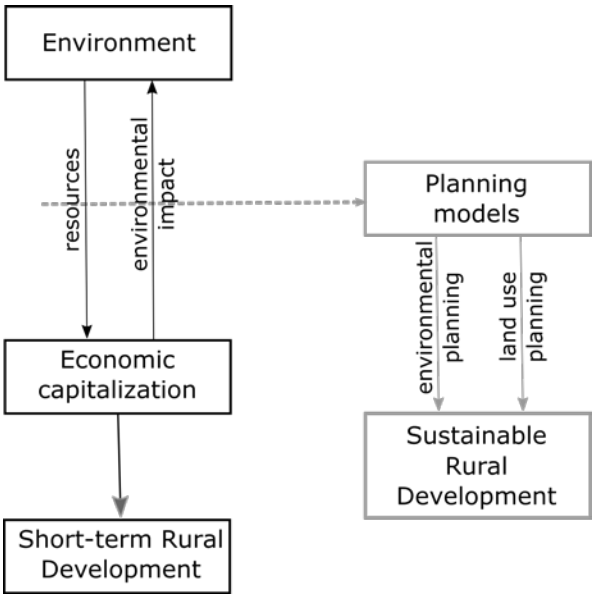

Figure 1. Conceptual model (authors' contribution)

Traditionally, as seen in figure 1, economic activities on which rural development relies are dependent upon the resources of the natural environment – the harvesting of these resources (mineral resources, land, biological resources) is often done through anthropic transformations of the natural environment which negatively affect its quality. However, if we consider that the environment should be the foundation of any sustainable development model (Dawe & Ryan, 2003), there is a necessity to improve environmental and land use management planning in order to achieve sustainable urban development in strongly anthropized rural areas.

In the Netherlands, for example, there is a Spatial Planning and Environmental Policy established since 1992 which aims to find a balance between economic activities, residential use and environmental functions (van Bommel et al., 2011). In Romania, however, the resolution of conflicts is more difficult because of structural problems such as the poor implementation of land use and environmental regulations or weak support for conservation (Tudor et al., 2014).

While the EU level context proposes agri-environmental measures to encourage the environmental performance of farmers in agriculture (Piorr, 2003), non-agricultural activities in areas where agriculture has become unprofitable are less supported by policy (Ruben & Pender, 2004).

The objective of this paper is thus to comparatively assess the environmental impacts of anthropic processes in two mainly rural areas in Romania – both highly anthropized and similar in size, but different in social and economic structure – and identify alternative planning models for solving environmental issues and promoting ~~a~~ sustainable rural development. The proposed planning models rely on principles such as collaborative design in solving environmental conflicts (Selin & Chevez, 1995), multilevel governance tackling institutional incompatibility issues (Cent et al., 2014) and correct land management through the implementation of adequate environmental policies (Ianoş et al., 2012b).

2. STUDY AREAS

The study areas have been selected in the southern part of Romania (Fig. 2).

The first study area was selected in Gorj county, within the Motru-Rovinari coal basin, a critical environmental region in the South-West of Romania (Cuculici et al., 2011), considered to be "the greatest anthropic interference in the national territory" (Braghină et al., 2008, p. 9). Romania's South West Region is known for its intensive land cover changes in the last 25 years (Petrişor et al., 2010). This status can be mainly explained by the critical land use changes in the Motru-Rovinari area – namely the expansion of degraded areas against other land use categories due to coal mining after 1955 (Braghină et al., 2008; Cuculici et al., 2011).

Lignite is being mined mostly in open-pit quarries in three main basins – Motru, Jilţ, Rovinari. The extraction has extended over a surface area of 12 499 ha since 1955, of which 10 457 ha have been developed on agricultural areas and 199 ha on forest areas (Braghină et al., 2008). In this process, 62 % of the original morphology has been transformed in the Motru basin (Titu & Balazsi, 2007). The restructuring of the mining industry after 1990 caused the closure of some open pits, leading to negative impacts on the landscape and a large area of unproductive land which needs to be reintegrated into the agricultural system (Braghină et al., 2008).

The detailed study area includes six LAU2 units – the communes of Cîlnic, Drăgoteşti, Fărcăşeşti, Mătăsari, Negomir and Urdari, located between the towns of Motru (to the west) and Rovinari (to the east) and comprising most of the coal extraction areas in the Jilţ and Rovinari basins. The first study area (Fig. 2) is of 31 147 ha in surface extent and it has a population of 19 545 people (2011 census data).

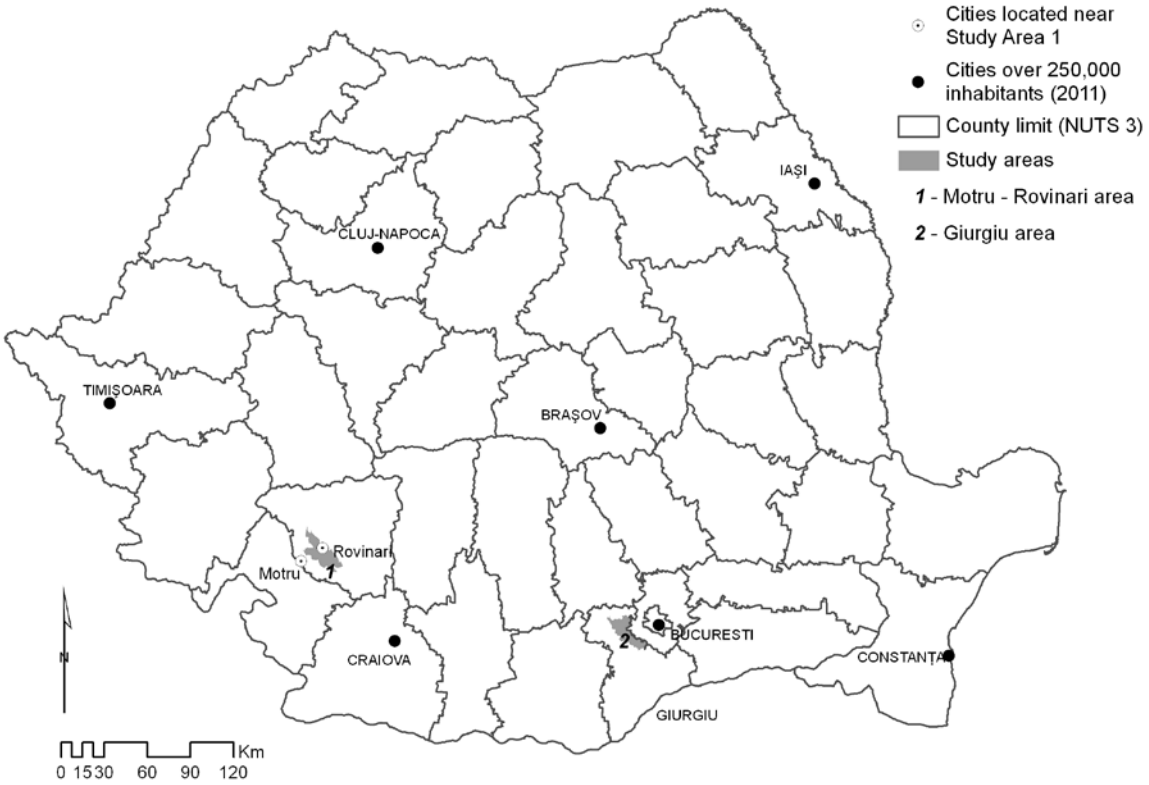

Figure 2. Study areas

The second study area is located in Giurgiu county and it is part of the Bucharest Metropolitan Area. Containing 98 LAU2 units within 5 counties (Niţă, 2012a), the Bucharest Metropolitan Area is characterized by extended demographic pressure often reflected in conflicts due its attraction for real estate development (Ianoş et al., 2012b) and the area's administrative heterogeneity (Iojă et al., 2014). While the metropolitan area of Bucharest is characterized by a higher degree of rurality compared to other metropolitan areas at international level (Niţă, 2012b), it tends to borrow more and more characteristics of urban settlements (Pintilii, 2008).

The detailed study area includes six LAU2 units from Giurgiu county (Fig. 2), located to the south-west of Bucharest – the communes of Bolintin-Deal, Buturugeni, Grădinari and Ogrezeni and the small towns of Bolintin-Vale and Mihăileşti. Since the latter retain a large proportion of their original rural character (Niţă, 2012b), it is possible to consider them as part of Bucharest's rural hinterland for the purposes of this study. The profile of the two towns is mainly agricultural, with both towns having potential for the future development of logistic parks and residential areas (Grigorescu, 2010). The second study area (Fig. 2) has a surface of 25 367 ha and a population of 39 336 people (2011 census data).

All urban settlements tend to exercise pressure on surrounding rural lands, rendering land use change absolutely inevitable (Sidaway & Symes, 1984). Despite a lower degree of urbanization within the analyzed area (compared to other parts of the metropolitan area located in Ilfov county), significant environmental impacts are still registered due to the development of new residential areas lacking water, sewage or central heating systems (Grigorescu, 2010; Niţă, 2012b, Pătroescu et al., 2012).

3. METHODOLOGY

Indicators are considered to be an important instrument in analyzing environmental impacts (Iojă et al., 2014). For the comparative analysis of the two study areas, national census data from the years 1992 and 2011, as well as land use, social and economic data from the National Institute of Statistics (INSSE) for the years 1992 and 2012 / 2013 were used. Four indicators were constructed – demographical evolution (% - 1992-2011), evolution of number of dwellings (% - 1992-2011), surface of degraded lands (% of total surface – 2012), evolution of the average number of employees (% - 1992-2013). Moreover, data on the lengths of thermal energy and sewage networks was gathered

in order to identify the settlements which do not benefit from these public utilities. All these indicators where then assessed from an environmental point of view, using as comparison the overall values at national level.

Furthermore, a comparison of CORINE Land Cover Data for the years 1990 and 2006 (cell size: 100 x 100 m) was conducted in order to identify patterns in land use change. Following the method of Petrişor et al. (2012), where three main types of changes were identified (urbanization; abandonment or development of agriculture; deforestation or reforestation), the focus here was to determine the extension of anthropic surfaces, both in the form of urbanized areas or open-pit mining areas. The Markov Model was used for analysis (Pătru-Stupariu, 2011), with six main classes being used: (1) urbanized land, (2) agriculture, (3) forests, (4) humid areas, (5) waters and (6) degraded land. Landscape indicators focusing on natural and agricultural surfaces (Piorr, 2003) were calculated for both study areas. In order to have an overall view of the anthropic processes in the two rural areas for the past 35 years, the topographical maps of Romania (1970-1978) were compared with recent satellite imagery to highlight the areas that suffered the most anthropic transformations.

Additional elements used referred to different environmental data gathered from the reports of the county-level Environmental Protection Agency and from a literature review regarding the two study areas.

4. RESULTS AND DISCUSSIONS

Important differences in population dynamics were identified in the two study areas (Table 1). While in the Motru-Rovinari Area the overall population decline between 1992 and 2011 is of 17.83 % (with the highest decline in the commune of Mătăsari – 30.43 %), in the Giurgiu area the population has risen by 2.60 %. The communes in the Giurgiu area suffered a decline of population considerably less than the overall national decline of 11.79 %, the rise in population being important in the small towns of Mihăileşti (7.93 %) and Bolintin-Vale (11.99 %).

The evolution in the number of dwellings was under the overall national value of 14.55 % in all of the LAU 2 units in the first area of study except Drăgoteşti (18.52 %), with the whole area having a rise in number of dwellings of only 7.49 %. On the other hand, the overall rise in the Giurgiu area was over 21 %, with Bolintin-Vale, Mihăileşti, Bolintin-Deal, Buturugeni and Grădinari all registering values above 20 %.

Table 1. Indicator analysis

LAU 2 unit	**Population evol. (%)**	**Dwellings evol. (%)**	**Degraded terrains (%)**	**Employees evol. (%)**
Câlnic	-11.84	5.00	30.81	-53.08
Drăgoteşti	-6.11	18.52	5.39	-71.96
Fărcăşeşti	-20.11	-4.53	7.85	-47.49
Mătăsari	-30.43	10.13	42.51	-64.64
Negomir	-13.00	7.51	18.91	5.60
Urdari	-7.13	12.23	10.65	-61.01
TOTAL Motru-Rovinari area	**-17.83**	**7.49**	**19.74**	**-60.27**
Bolintin-Vale	11.99	24.27	0.25	-24.24
Mihăileşti	7.93	23.41	0.58	38.96
Bolintin-Deal	-5.46	21.64	0.59	119.03
Buturugeni	-6.83	20.93	3.10	7.95
Grădinari	-4.36	25.21	2.03	-44.06
Ogrezeni	-3.29	10.58	0.05	-67.06
TOTAL Giurgiu area	**2.60**	**21.44**	**1.08**	**-2.76**
Overall Romania	**-11.79**	**14.55**	**2.10**	**-35.48**

These basic demographic indicators can be regarded from two points of view. On the one hand, demographic pressure tends to be higher in the Bolintin-Vale – Mihăileşti area, as pointed out by the rise in the number of dwellings over the past two decades, with its specific environmental impacts. On the other hand, the decline in the Motru-Rovinari area can contribute to the degradation of land in the area, as the remaining agricultural land is abandoned with fewer people capable of working it.

The analysed area in the Motru-Rovinari basin registered a total surface of degraded terrain of 6147 ha – almost 20 % of its total surface compared to the average at national level of only 2.10 %. The analysed area comprises 1.23 % of all degraded terrain in Romania on only 0.13 % of its surface. It is thus clear that the degradation of land represents the main effect of anthropic transformation processes in the Motru-Rovinari area. In the Giurgiu area, the surface of degraded terrain accounted for only 1.08 % of the entire study area.

The average number of employees has recorded an overall decline of 60.27 % in the Gorj area between 1992 and 2013 (national level decline: 35.48 %) – the decline was over 50 % in Câlnic,

Drăgoteşti, Mătăsari and Urdari, as only the commune of Negomir registered positive values (5.60 %). On the other hand, the Giurgiu area was considerably above the national level, with an overall decline of only 2.76 %, however values varied greatly from a decline of 67.06 % in Ogrezeni to a rise of 119.03 % in Bolintin-Deal. The economic decline in the Motru-Rovinari study area sustains the initial claim in our conceptual model that economic growth based exclusively on the capitalization of natural resources, without taking into account the long-term environmental impacts, can only be for short-term.

None of the communes in the Gorj study area benefit from thermal energy, although Mătăsari had households connected to a central thermal energy system until 2005. Mătăsari is also the only commune benefitting from the existence of a sewage network. On the other hand, despite the important residential development showcased by the evolution in the number of dwellings, Bolintin-Vale is the only LAU 2 unit in the second study area to benefit from the existence of a centralized thermal energy system and sewage network. Consequently, as the rise in the number of dwellings is not sustained by an adequate infrastructure, we can conclude that the anthropic pressure in the Bolintin-Vale – Mihăileşti area is characterized by specific environmental impacts of new residential areas: consumption of space and resources, increased quantity of domestic waste, increased volume of waste water for which no adequate sewage and treatment facilities exist and lower air quality due to the fact that most dwellings rely on individual heating systems (based on wood, gas or coal).

The analysis conducted on the CORINE Land Cover data (Fig. 3) highlighted once again the degraded land issue in the Motru-Rovinari area, with an extension of degraded land between 1990 and 2006 of 1 688 ha. As such, there was a rise in the degraded land surface of 48.05 % between 1990 and 2006. While it is true that some of this rise is caused by the extension of open pits, the comparison between the CORINE Land Cover data and the 2005 satellite image of the area showcased the fact that agricultural abandonment is also a factor which contributes to land degradation in this area.

The results of the CORINE Land Cover analysis in the second study area did not reveal any extension of built area surfaces, with the very high binary change index (0.99), implying that no significant land cover changes have happened in this area.

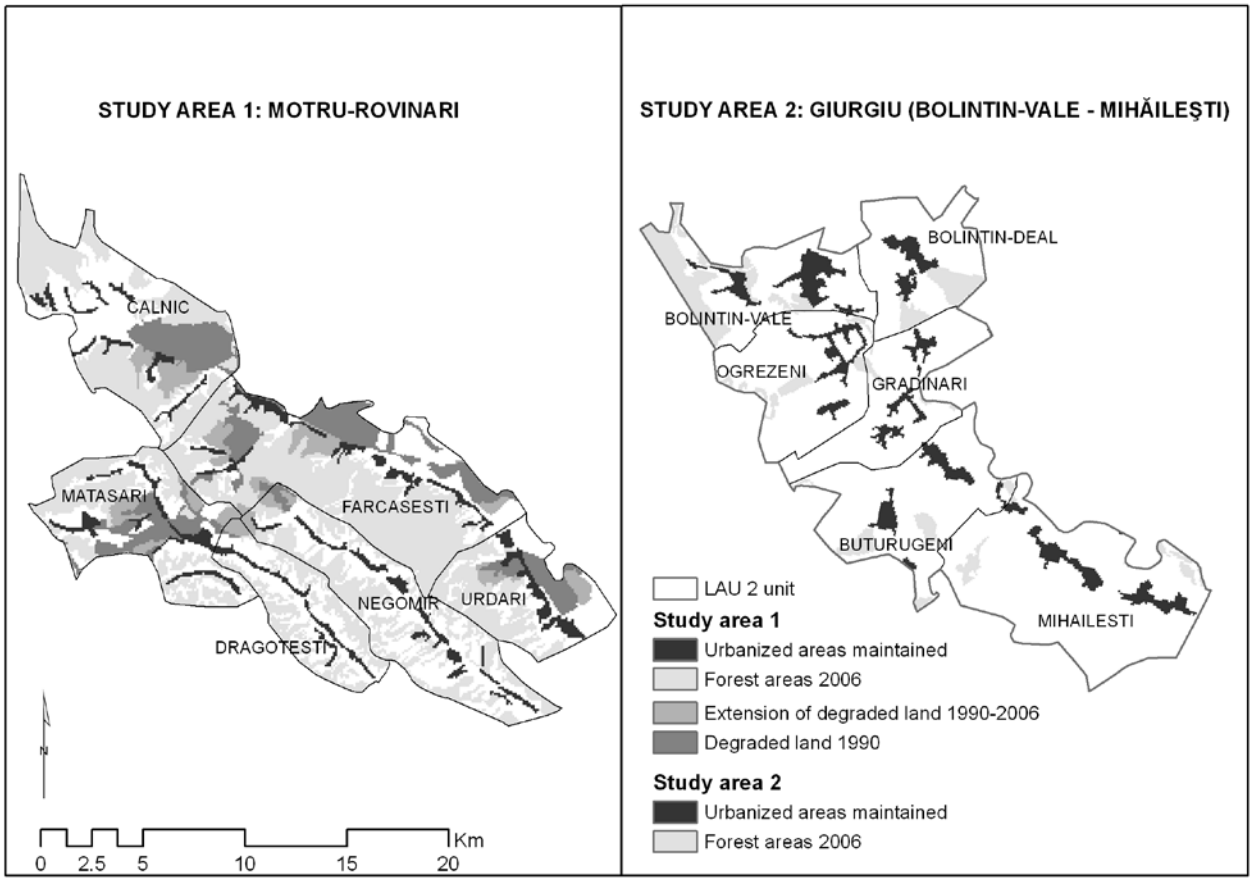

Figure 3. CORINE Land Cover Analysis 1990-2006

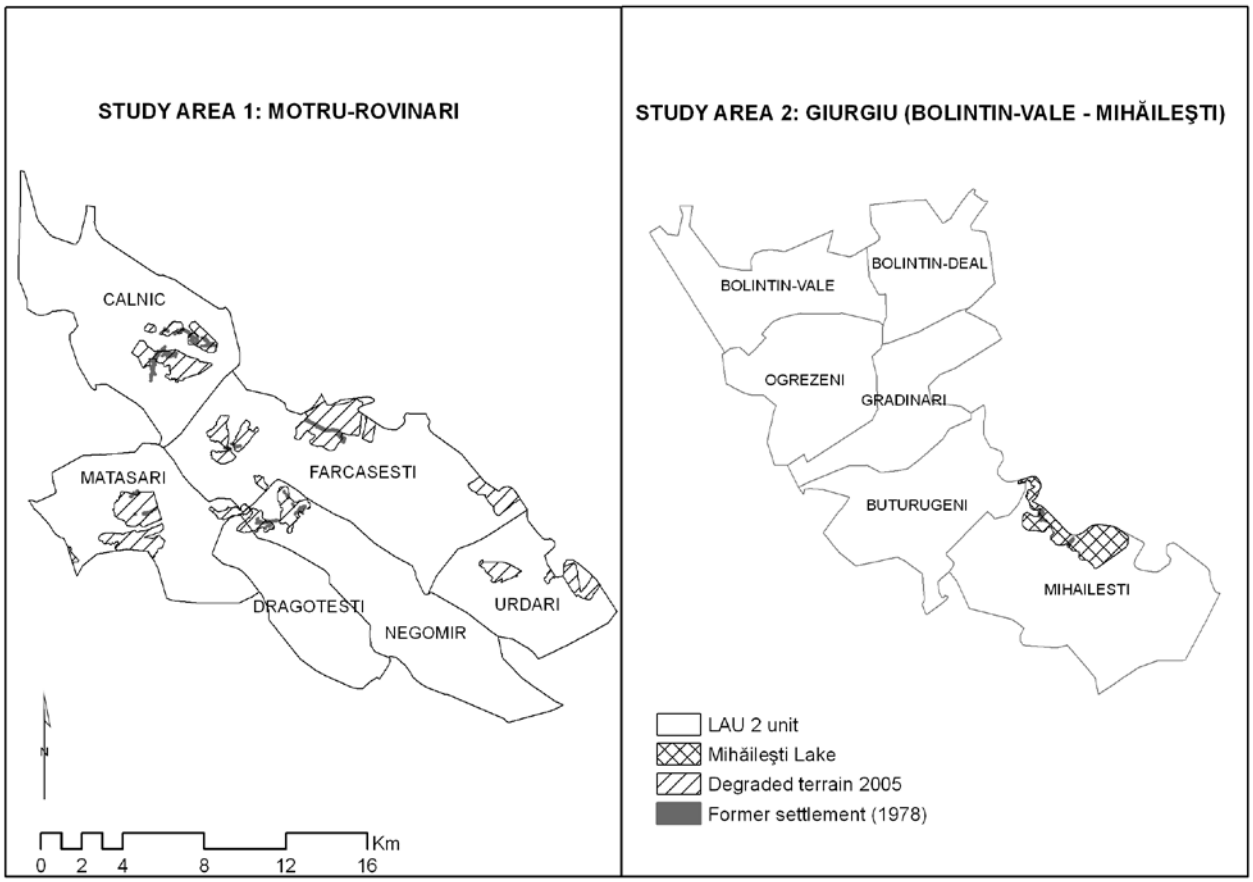

Figure 4. Settlements affected by severe anthropic transformation processes

However, this can be explained by the fact that the rise in the number of dwellings between 1992 (census data) and 2006 (INSSE data) is considerably lower than the rise between 2006 and 2011 (census data), which is no longer reflected in the CORINE Land Cover dataset (Table 2).

Table 2. Dwellings evolution – Study area 2

LAU 2 unit	Dwellings evolution (1992-2006) - %	Dwellings evolution (1992-2011) - %
Bolintin-Vale	13.12	24.27
Mihăileşti	12.09	23.41
Bolintin-Deal	6.67	21.64
Buturugeni	2.92	20.93
Grădinari	8.59	25.21
Ogrezeni	3.49	10.58
TOTAL Giurgiu area	**8.92**	**21.44**

The naturality index (Pătru-Stupariu, 2011) in the Gorj area was considerably higher (0.45) than in the Giurgiu area (0.16), a fact which is explained by the extensive surface still occupied by forests in the first study area. Consequently, while the intensity of the anthropic processes is higher in the Motru-Rovinari area, and reflected by environmental impacts such as low air quality (Fărcăşeşti – high values of morbidity through respiratory diseases) and intense land degradation through landslides (Yearly report on environmental status, Agency for Environmental Protection Gorj, 2010), a large surface of the Bolintin-Vale – Mihăileşti area (75.21%) is occupied by agricultural land, which explains the low naturality index.

Some of the anthropic processes in the two rural areas had direct impacts not only on the environmental quality in their respective areas, but also on the rural society as a whole. The comparison between the 1978 topographic map of Romania and the 2005 satellite image (Fig. 4) reflected the disappearance of some settlements. For example, in the Motru-Rovinari area, the population of the villages of Găleşoaia, Stejerei, Bohorel was relocated elsewhere in order to extend the mining pits, while parts of the villages Timişeni, Brădet, Negomir and Fărcăşeşti-Moşneni suffered the same fate. On the other hand, the construction of the Mihăileşti artificial lake in the 1980s also led to the resettlement of parts of Drăgănescu village and of the town of Mihăileşti.

Overall, the two rural areas are characterized by different environmental impacts caused by high anthropic pressures. In the case of the rural area between the towns of Motru and Rovinari, these impacts are mainly related to mining activities and land degradation, being reflected in air and soil quality, population health or landscape degradation. Erosion, water stagnation and subsidence phenomena are all effects caused by the anthropic transformations in the Motru-Rovinari area (Braghină et al., 2011). As far as the Bolintin-Vale – Mihăileşti area is concerned, the anthropic pressure is lower as the main environmental impacts are related to the extension of built residential areas. However, in both cases the environmental impacts are reflected directly in land use issues and need planning models focused on land use management in order to alleviate the anthropic pressure.

Planning norms and policies can be seen as an instrument for improving environmental quality in a given territory (Douglas, 2013). Consequently, territorial management systems are needed to cope with the issues resulting from high anthropic transformations such as open pit mining (Braghină et al., 2011).

Current institutions often fail to establish incentives for land use development that reflects public demands and assures compatibility between adjacent uses (Hodge, 2001). Consequently, the building of new institutional arrangements must have the local population at the center of the proposed governance models – there is an urgent "need to address the issues of empowerment and aspiration in rural areas" (Shucksmith et al., 2009).

In disadvantaged areas, such as the Motru-Rovinari area, population can be regarded as the only resource capable of leading to economic revitalization (Ianoş et al., 2010). As such, social development needs to be at the center of development strategies in rural areas, while proposed planning models need to be based on cooperation and the shift from isolated projects to integrated programs (Gsanger, 1994).

In the case of the Motru-Rovinari area, the unsustainability of having the rural economy rely exclusively on mining activities is evident from the analyzed data regarding the decline in the number of employees. Environmental rehabilitation strategies represent a „classical" planning approach in areas greatly affected by environmental degradation, as they integrate environmental issues – the decontamination of the areas – and economic issues – planning the re-use of degraded areas. Land reclamation and surface vegetation recovery (Liao et al, 2013) are, in this case, only a part of more complex environmental reconstruction activities, often focusing also on the recovery of some local resources (Braghină et al., 2008).

Planning models based on environmental rehabilitation can often prove to be costly, long-term solutions. However, these planning models will work very well when combined with financial mechanisms that fund not only the environmental decontamination activities, but also offer incentives for developing new economic activities on the newly reclaimed land. As such, planning models based on environmental rehabilitation can respond not only to environmental degradation issues, but also to problems posed by the limited development options in a mono-industrial area.

When the lack of funds or technical expertise hinders the development of environmental rehabilitation strategies, planning models based on social responsibility can become an option, with the focus being either on social entrepreneurship (Fayolle & Matlay, 2010) or on community co-production interventions (Farmer et al., 2012). While these models do not directly address environmental issues, they represent an alternative solution for assuring the provision of different social services, thus contributing to the social development of rural areas.

On the other hand, the Bolintin-Vale – Mihăileşti area has a more privileged situation, as the towns and communes here still have a considerable amount of land resource that can be used in order to steer the development towards a more sustainable pathway. As opposed to other areas around Bucharest, in Ilfov county, where the consumption of land for residential developments has caused a great loss of agricultural land and more severe environmental impacts (Grigorescu et al., 2012; Pătroescu et al., 2012), the Bolintin-Vale – Mihăileşti area can be still characterized as having a more controlled form of residential development. It is necessary to ensure that this development remains controlled and it is only done in conjunction with the development of adequate infrastructure (water and sewage networks, efficient heating systems) and social services (education, health, culture) through coherent land use planning measures.

In all of the above mentioned cases, it is necessary to ensure public participation and enable the cooperation of interested stakeholders in order to avoid potential land use conflicts when implementing land use management measures.

5. CONCLUSIONS

The integrated development of rural areas has often been neglected in Romania, with the only

major aid coming from the National Programme for Rural Development, where, under the LEADER initiative (2007-2013), rural LAU 2 units and towns of under 10 000 inhabitants could create cooperation structures (Local Action Groups) and access funds for other domains besides agriculture. However, specific rural areas with high anthropic pressures have not been included in special development programs, in spite of the fact that industrial restructuring, on the one hand, and land privatization and development of large cities, on the other hand, have led to many rural territories having similar characteristics to the two study areas presented in this article. These two processes also need different types of planning measures, as areas which face industrial restructuring are characterized by negative demographic trends and population ageing, while the urbanization of rural areas around large cities is often associated with an important rise in population and number of dwellings.

In this context, environmental degradation, especially in former industrial areas facing acute economic decline, is insufficiently tackled by efficient policies at local, regional and national level. Furthermore, the lack of correlation between planning law and environmental law becomes evident when discussing such issues, as environmental planning often excludes land use management elements and viceversa.

Consequently, there is a need for integrated planning models that combine environmental planning and land use planning, while also taking into account social and economic aspects. While this paper has presented some solutions that can be provided for tackling the environmental impact issues discussed, it is necessary to go beyond a theoretical planning framework and identify financial mechanisms and governance models that can work in rural areas with intense anthropic pressures.

One such model could be the Community-Led Local Development instrument proposed by the European Commission for the 2014-2020 programming period. Seen as a continuation of the Local Action Groups from the previous programming period, this instrument can be an opportunity for rural areas facing the same issues to cooperate and design integrated development strategies that take into account all of the above mentioned elements.

While the evaluation of environmental degradation in this paper was based mainly on land cover changes compared with the evolution of socio-economic indicators, the study could be enriched in the future through an energy assessment approach. This could prove useful especially in the case of the first study area, where the energy resulted from the use of the mined coal can be compared with the energy consumed in exploitation along with the primary eco-energies (Ianoş et al., 2011) lost in the anthropic transformation processes.

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