

# Comparative study of land use in Zărnești (Romania) and Strășeni (Republic of Moldova) towns

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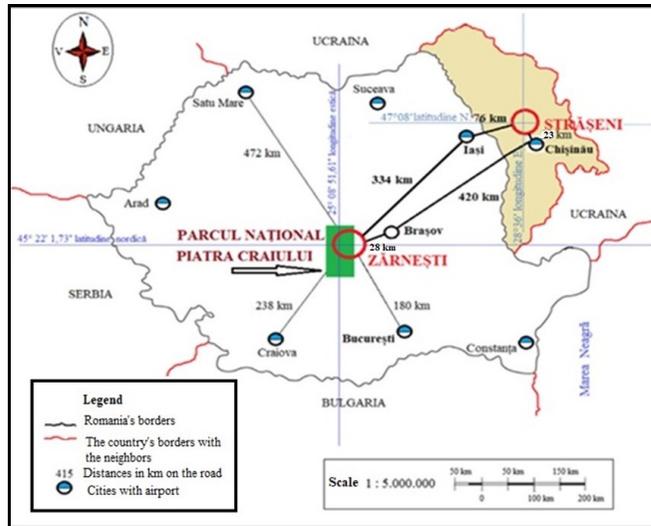
**ABSTRACT:** The efficient use of land remains a priority of states, regions, and territorial taxonomic rankings. The regional, economic and environmental development policies of the states suppose the efficient capitalization of natural, human, technical and technological resources and other resources in order to ensure their sustainability in time and space. In this context, through this study, the authors propose to elaborate an assessment of how the land fund was capitalized in the two cities located in the Republic of Moldova and Romania, close as demographic dimensions, but different as a way of managing this natural resource. The interest for the way of capitalization of space resources by these two administrative-territorial entities is part of the practical need to follow the changes of quantitative as well as qualitative nature of the land fund, as a result of the transformations made during the transition to market economy, that is carried out in both states. The present scientific approach is part of a doctoral study „Integration of small and medium-sized cities in the regional urban system. Comparative study of human geography, for example in the cities of Zărnești, Romania and Strășeni, Republic of Moldova”, through which the doctoral student aims to assess the degree of integration of small and medium-sized cities in the regional urban system, in the context of territorial decentralization, by applying regional development policies.

**KEY WORDS:** land fund, intravilan, extravilan, comparative method.

## 1. Introduction

Among the current common problems of human settlements both in Romania and in the Republic of Moldova is the efficient capitalization of the land fund, in the context of insufficient space that is increasingly felt in both states. The comparative study is part of a wider research of two cities located in 2 different states, but similar to the common interests and problems that they currently have, given their integration into the Romanian urban area and into the Republic of Moldova urban area. Even if these cities are close to the demographic dimension and geographical positioning towards large polarization centres such as Chișinău (in the case of the city of Strășeni, about 23 km away from the capital of the country) and Brașov (urban polarizing center for the city of Zărnești located at a distance of 28 km from the regional center) (Fig. 1). Even if these cities are

close in demographic size and geographical position to large polarization centers, such as Chişinău located at a distance of about 23 km from Străşeni and Braşov located at a distance of 28 km from Zărneşti (Fig. 1), they have many common features but they also have differences regarding the way of capitalizing the land fund, in the context of the analyzed issue.



**Figure 1** Geographical position of the cities of Străşeni (Moldova) and Zărneşti (România).  
Source: Map prepared by the authors based on Romania Map Contour Clip Art.

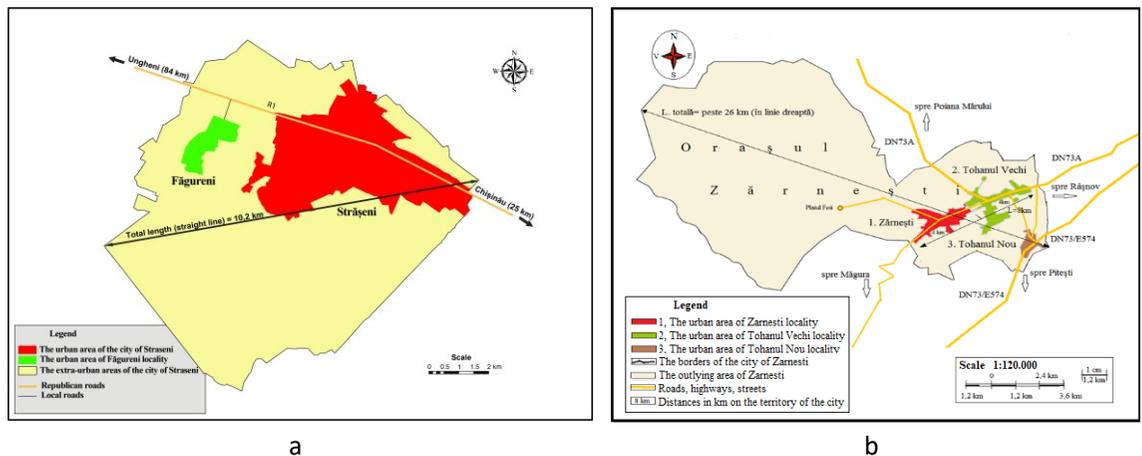
The city of Străşeni, with a population of 19228 inhabitants (01.01.2019), is among the middle-sized cities in the Republic of Moldova, being the third largest city in the Center Development Region and the 8<sup>th</sup> among the 66 cities in the Republic of Moldova, having in 2016 the status of municipality. It is located in the central part of the country at a distance of 23 km from Chişinău, in the NW direction, located on the banks of the river Bâc, in the Codri region of Moldova (Fig. 1). The total area of the city is 60.82 km<sup>2</sup>, of which the built-up area is about 12.28 km<sup>2</sup> (20.2%) and 48.52 km<sup>2</sup> (79.8%) are the lands out of the city (the data of the City Hall of Străşeni, 2020). The relief has a fairly high degree of fragmentation, consisting of hills, slopes, valleys and plains. In the composition of the city is included Făgureni locality at a distance of 5 km, of which the built-up area is about 1.14 km<sup>2</sup> (0.18%).

The city of Străşeni has a more compact settlement, having constraints in the horizontal extension both of natural-geographical order and of the limited surface dimensions. Even if the surface of the suburbs is 3.5 times larger than that of the built-up area, the space deficit is felt more and more acutely due to the high demand for the extension of the residential area, industrial area, and the area of social endowments of public spaces in the context of the attractiveness of the city located in the polarization zone of the capital, adjusted by the requirements of sustainable territorial development (Fig. 2).

Zărneşti is a medium-sized town (22000 inhabitants, 01.01.2019) and is located in the central part of Romania, 28 km away from Braşov, being drained by the Bârsa and Turcu rivers. The total area of the city is 204.75 km<sup>2</sup>, of which about 24.12 km<sup>2</sup> (12%) is the urban area and 180.63 km<sup>2</sup> is extra-urban land. The natural reserve of Piatra Craiului National Park is located within the city. The area of Zărneşti represents 3.78% of the area of Braşov County. The town consists of the village: Tohanul Vechi, which formed the basis of the formation of the city, the first documentary dating being in 1288, Zărneşti documentary attested in 1367 and Tohanul Nou a locality that appeared

much later in the 18th century (1769) (Lepădatu, 1998, Vlad, 2004, 2011). The village has a picturesque location, being surrounded by forests and the Pietra Craiului Mountains. The development strategy of the city foresees its extension along the highway and the river Bârsa where there is undeveloped land suitable for the extension of the town.

Zărnești has a surface area of 3.4 times larger than that of Strășeni, the larger territorial dimension being due to the geographical positioning and the evolution of these two human settlements over time. Thus, the town of Zărnești is located in 3 large districts: Zărnești, Tohanul Vechi with the city itself and Tohanul Nou at a distance of about 5 km. (Fig. 2). The extra-urban area represents 88% of the total surface of Zărnești town, being more than 7 times higher than that of the town and having a radial evolution along the highways and the rivers Bârsa and Tohanița. The urban area extended mostly in the 20<sup>th</sup> century, with prospects for horizontal and vertical expansion (Fig. 2) (Vlad, 2004, 2011).



**Figure 2** The urban and extra-urban areas of the cities of Strășeni (a) and Zărnești (b).

Source: Map prepared by the authors based on the data of the City Hall of Strășeni and Zărnești.

In this study, the authors aim at evaluating the land use in these two cities situated in Romania and the Republic of Moldova, close by the number of their population, but different by the way of managing this natural resource which is the surface fund.

The main objectives are:

- comparative analysis of the way of land fund capitalization in the perimeter of Zărnești and Strășeni towns;
- evaluation of the normative-legislative framework regarding the surface fund;
- identification of solutions for efficient land use in the context of regional and sustainable development;
- analysis of the experience gained by local authorities in both cities and the sharing of best practices etc.

## 2. Methods

In order to objectively evaluate the way of using the land fund, traditional methods of assessing territorial transformations in time and space were used, having as reference these two similar cities as demographic size. The database included information on the quantitative and qualitative

evolution of the surface fund in the year 2018 using the hierarchical classification system of the land categories in the Republic of Moldova and Romania. Statistical, mathematical, cartographic, comparative, GIS systems have been used. The maps were made in Microsoft Paint. The comparison method was widely used in assessing land use in time and space for these two cities under analysis, trying to track the efficiency of land use in the context of sustainable development. In the comparative study, we started from several premises:

- the land fund is valued differently in both cities, preserving the imprint of the socialist past that these localities had;
- strategic urban development plans do not fully reflect the requirements of sustainable development (Socio-Economic Development Strategy of Strășeni municipality for the period 2019-2025, Romania's National Strategy for Sustainable Development, 2008).
- the European legislation implemented by Romania over 10 years of presence within the EU is felt in the urban development of small and medium-sized towns in the context of territorial decentralization, the experience of the Romanian cities could serve as an example of good practices for Moldova;
- there are reservations about planning, monitoring and implementing investment projects regarding the compliance with environmental and land law;
- land management is limited by the land cadastre and legal framework in the field.

A large amount of information was collected from specialized institutions of both countries, such as the National Bureau of Statistics, the Land Cadastre of the Republic of Moldova, the Central Development Agency, the Town Halls of Zărnești and Strășeni etc.

### 3. Results and discussion

Land resources are the main natural wealth, the rational use of which depends to a large extent on the economic development of territorial entities, as well as on the degree of population satisfaction for a certain territory in the context of the decision to settle for living. The efficient use of land remains a priority of states, regions, and territorial communities of different taxonomic rank. The regional, economic and environmental development policies of the states require efficient capitalization of natural, human, technical and technological resources and other resources in order to ensure spatial and temporal sustainability.

Thus, if we refer to the normative-legislative framework regarding the management of the financial fund, we find that it is guided by several organic laws and governmental decisions, such as, for Moldova: Moldovan Land Code, no. 828-XII of 25.12.1991, Government Decision no. 1170 of 25.10.2016 for the approval of the Regulation on the way of transmission, change of destination and land exchange, Soil law, GD no. 559 from 24.04.2019 regarding the approval of the Land Cadastre according to the situation on 01.01.2019, the Law no. 91-XVI/5.04.2007 on the public property land and its delimitation, the Law on Agricultural Land Lease no. 198 of 15.05.2003 etc. (The land cadastre of the Municipality of Strășeni, 2019, Regulation on the mode of transmission, change of destination and exchange of land, 2016). In Romania, the normative-legislative framework also includes a series of normative acts aimed at establishing the land use framework: Land Fund Law no. 18/1991 - amendments (Law 231/2018), Environmental Protection Law no. 137/1995, LAW no. 17 of March 7, 2014, updated in 2016 on some measures to regulate the sale and purchase of agricultural land located outside the city etc.

Land use is a way of using a land surface according to its natural conditions and the possibilities of making it worthwhile. The main categories of land use are: agricultural land (arable land, grassland, vineyards and orchards), forestry, water-covered "water mirror" plots, construction land, infrastructure and lands with other utility (Lepădatu, 1998; Land Fund Law 18/1991\_231/2018). Field studies include interdisciplinary information, being at the confluence of several sciences, such as geography of human settlements, geography of agriculture, topography, land law etc.

Regarding the distribution and dynamics of the land fund in the perimeter of the analysed cities, we find both essential similarities and differences due to a number of objective and subjective factors. The different way of recording the used land categories makes difficult to compare these two cities; however, some conclusions can be drawn from the analysis of statistical data (Prohnițchi, 2010; Land Cadastre of the Republic of Moldova, Cadastre Service of Strășeni and Zărnești town halls) (Tables 1, 2).

**Table 1** Land repartition of land categories, 2018, %.

<i>Categories of lands</i>	<b>Zărnești</b>	<b>Strășeni</b>
1. <i>Land with agricultural use</i>	29.1	30.8
2. <i>Land with a forestry destination</i>	64.0	40.4
3. <i>Land permanently under water</i>	1.5	1.0
4. <i>Lands in the city</i>		
4.1. <i>Roads, streets and markets, buildings and courtyards</i> 4.2. <i>Residential area, industrial area, recreation</i>	4.5	20.5
5. <i>Reserve fund lands</i>	0.7	0.1
6. <i>Other land / land with special purpose</i>	0.2	7.1
<b>Total</b>	100	100

Source: Land cadastre of the Republic of Moldova, data from the Town Hall of Zărnești and Strășeni.

The system of classification and management of land is different in Romania and Moldova, for Romania the hierarchical classification system of land categories is valid. In this sense, we tried to use the classification system for the city of Strășeni, based on the data from the city hall of Strășeni, to ensure the comparative study (Table 2).

Thus, the biggest differences in the capitalization of the built-up area are registered for the category of communication and transport routes in the city of Strășeni, the areas destined for this category exceed more than 4 times the same area in Zărnești. The explanation would consist partially in the position of the town Strășeni in relation to the international highway R1 that passes through the town, but also the inefficiency in their construction, as a legacy from the Soviet period. While the local authorities in the city of Zărnești have taken into account that in the near future the urban land will be expanded by other 930 ha, those from Strășeni pursue the goal of developing the city vertically (Socio-Economic Development Strategy of Strășeni municipality for the period 2019-2025).

Analyzing the category of agricultural land, we find that they occupy important out-of-town areas, accounting for 30.8% for Strășeni and 29.1% for Zărnești (Table 1). Lands with agricultural destination in the city of Strășeni, according to the form of ownership, constitute 93% private property and 7% public property. As far as their structure is concerned, 42.8% are arable land, 33.9% multiannual plantations, 9.6% pastures and 14.1% plots. The latter category is quite large

due to abandonment by private owners and their degradation over time. The agricultural land in Strășeni municipality has a 55 point average credit rating at an average of 63 points for the Republic of Moldova. The land quality is quite low, with about 40% eroded land, of which 7.9% are heavily eroded. The Strășeni City Development Strategy envisages attracting financial sources from the inside and outside for land recultivation, increasing afforestation and other agro-technical and agroecological measures (Government Decision no. 409 of 04.06.2014 on the approval of the National Strategy for agricultural and rural development for the years 2014-2020).

**Table 2.** Hierarchical classification system for land in the towns Zărnești and Strășeni, 2018

Functional Areas	Zărnești		Strășeni	
	S (ha)	% of total built-up area	S (ha)	% of total built-up area
Industrial units and warehouses	282.55	19.6	181.62	13.5
Housing and complementary functions	439.8	30.5	341.76	25.5
Institutions and services of public interest	27.2	1.9	51.23	3.8
Agrozootechnical units	12.9	0.9	-	-
Communication and transport routes:	68.5	4.7	254.99	19.0
Roads	46.2	3.2	29.26	2.2
Railways	22.3	1.5	18.71	1.4
Free lands	420.95	29.1	351.64	26.2
Waters	20.05	1.4	13.12	1.0
Protection of technical and public buildings	32.65	2.3	31.87	2.4
Communal household, cemeteries	9.16	0.6	9.85	0.7
Green spaces, sports, recreation	61.9	4.3	58.24	4.3
Total built-up area	1444.16	100	1342.29	100

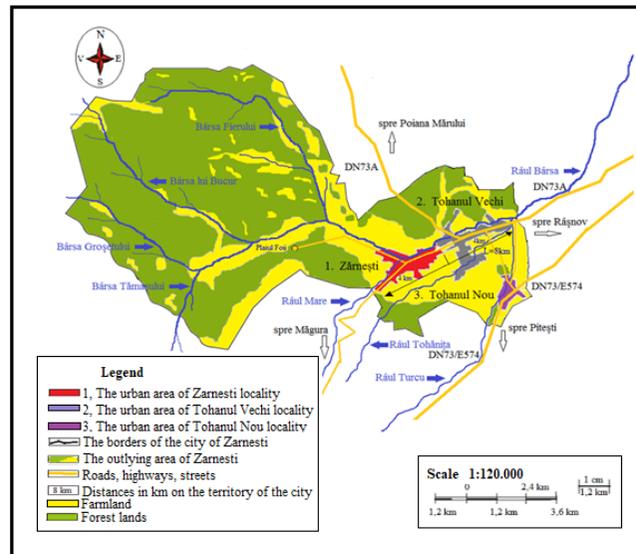
Source: Data from Zărnești and Strășeni town halls

Agriculture has an important share in the economy of Zărnești. Of the total of 20475 ha of administrative land, the area of agricultural land is 5971 ha, which represents about 30%. From this area, 1291 hectares are arable land, 3462 ha are pastures and 1192 ha are meadows (Fig. 3).

The soil in the perimeter of Zărnești is superior to that from Strășeni. Zărnești soil can be grouped into fertile and very fertile soils, those from slightly corrugated meadows and terraces, and „poorer soils in nutrients, those from the slopes whose slopes are under 14-15°, and are used for the cultivation of fodder plants, as well as fruit plantations etc." (Chiriță, 1955).

Although the general trend for both cities is to constrain agricultural land, in both situations agro-hydro-melioration measures are required to increase their profitability. The ecological redevelopment of degraded land as well as land consolidation are essential issues in the prospective use of agricultural land, a situation that is valid for both cities, but especially for Strășeni (Bejan, 2010; Pătruț, 2017).

Another important category of the land fund that ensures the ecological stability of land, as well as the recreational patrimony of population, is wooded land. They occupy important areas in both cities, accounting for 40.4% of the land area in Strășeni and 64.0% in Zărnești (Table 1). At the same time, common for both cities is that there is no cadastre of green spaces and their management is within the competence of several structures, while at the same time lacking a clear monitoring and management mechanism for green spaces.



**Figure 3** Map of land use in the perimeter of Zărnești.

*Source:* Elaborated by the authors on the basis of Pătruț (2017) and data from the Town Hall of Zărnești. *Map contour source:* Google Maps, 2019.

Aquatic areas have a similar share for both cities, about 1.5%. The problems faced by the authorities in both cities are the lack of financial resources for the maintenance of aquatic basins that are in the city's perimeters, the lack of passports of aquatic basins and programs to strengthen the banks of the rivers Bâc, in the case of Strășeni, and Bârsa, Turcu, Tohanița in the case of the Zărnești town.

An important issue concerning the capitalization of the surface fund is the horizontal and vertical expansion of cities. In both cities, there are possibilities for territorial expansion, but the growing shortage of land for the expansion of the residential area (especially for Strășeni), as well as the natural-geographical constraints will make the price of land increase further and the housing shortage will determine the development of multi-level built-up areas, by taking into account the seismicity of the territory.

It is necessary to monitor the maintenance of the land use according to the legislation in force, given the general tendency of influence and pressure to change their destination, especially in the Republic of Moldova (Prohnițchi, 2010).

#### 4. Conclusion

By analysing the problems of the land fund in the towns of Zărnești and Strășeni, we can mention some proposals and observations that could improve the state of things starting from the discovered reality:

1. It is necessary to identify the possibilities and to support the process of consolidation of the clay soil land in both cities, due to their excessive fragmentation. Many small lands are „scattered” and the lack of agricultural machinery leads to expensive agricultural works, thus, encouraging subsistence agriculture.

2. Supporting investment projects in relation to the vertical growth of the city, taking into account the space shortage, valid for both cities, provided that the architectural plans are kept, taking into account the seismicity of the area;

3. Due to the geographical location of the localities on relief forms with a high degree of fragmentation, reduced credit worthiness in the case of Strășeni, the territory has small areas of agricultural land that cannot be properly exploited;

4. Agricultural production in the two cities only partially meets urban requirements, although there are much greater possibilities; urban demand and the local agri-food market would be met by regional producers and distributors, which would reduce their dependence on imports under the conditions of agricultural sector improvement.

5. Due to the geographical location of the localities in regions with a high degree of fragmentation and the relief forms in the area, the territory has small areas of agricultural land that cannot be properly exploited (especially in the town of Zărnești).

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