„BABEŞ-BOLYAI” UNIVERSITY
CLUJ-NAPOCA
FACULTY OF GEOGRAPHY

Zalău Municipality. The morphology and planning of the urban area

Ph.D. THESIS

-summary-

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Key words : morphology, planning, urban area, Zalău, Chorema.

Introduction

The present thesis represents a morphological and territorial planning study made on Zalău town. The aim of this study is to develop a territorial model of development for Zalău town taking nontheless into account the given teritorial morphology and indentifying the geomorphologic factors and the geomorphologic elements of favorability and restrictivness in the development of the urban area. The objectives of this morphology study and territorial planning are the following:

- ✓ Proving the correlation between the territorial morphology and the town spatial development;
- ✓ The territorial morphology reflexe in the urban development;
- ✓ The identification of the vulnerable areas from the buil up area of Zalău in the mass movements processes;
- ✓ The identification of the risk areas associated to the mass movements processes and elaboration of the risk map;
- ✓ SWOT of the Zalău urban area;
- ✓ The Chorematic model projection and the strategy establishmeent of the urban developmen;

Chapter 1 Methodologic and conceptual aspects

1.1 Territorial planning terminology

Coming up with a theory and practice of the spatial organization and planning could represent a good response to the space crisis of the comtemporan society and to the allarming relationship degradation between the human society and nature.

Through the territorial planning some so-called disfunctions are trying to be solved in the society's organization and functionality and as well the development of some technical actions for the geographic elements in order to augment the use of that space.

The organization refers to the planning activity and concerns the elaboration of a structured and applicable plan.

M. Spitzer (1995) quoted by J. Benedek (2004) mentions that the planning,"it represens the project, thinking into the future", being a rational, systematic operation, transposed into practice through the execution of some public work and through the control over some spatial phenomenon (settlemet's extension, industrialisation, environment pollution ecc).

1.2 Urban space planning concept

The urban space registers a significant number of population, brings important resources, a whole raft of economic and technological expansion and other different activities localized in the physical proximity that are interconnected.

Planning the urban space means finding the function mode at the territorial structure's level and the most favourable connection between these services. The planning of the urban space as a concept refers to the understanding of the territorial structure services function mode and as well to the discovery of the perfect solutions for the initial fixed purpose.

1.3 The objectives of the study

The city has became an important discussion theme for the modern society. The present study of the city aims to analize the dynamics, the functionality and to make rules that can prove the phenomenons and the processes that take place in an urban system.

The objective of our thesis is to propose a territorial development model of Zalău city taking into consideration the territorial morphology. The specific aims of the study are focused on the successive research stages, which start from the premise that the city functions as a system.

1.4 Methodology

The methodology of this study gathers observation methods as well as statistical and mathematical ones. We can mention the observation method, the bibliographical documentation and the cartographic method (GIS) (Donisă, 1978). The methodology hyphothesis are: the city's historic development, the development trend has overlaped the present days politics, there has not been a continous development; the relief had an important role, the city has developed longitudinally on the North-South direction according to the morphology of Zalău Valley and the restrictive character of the slope processes has limited the development on the Est-West direction;

Taking into consideration these elements, I have rigurously passed through all the three stages of the doccumentation and information activity, the outdoor research and other data and results interpretation activities.

Maps	Source of the data and methods
The map of the landslides	Observations and field cartography, ortophotograps cartography
The map of the landslides susceptibility	Factors that influence the landslides
The map of the landslides probability	The analysis of the coefficients using ArcGis 9.3
The map of the average susceptibility coefficient	Determining the probability,the semiquantitative method according to H.G. 447/2003
Map of active landslide classified on landslide susceptibility interval	Observations and ortophotograps caartography
Geodeclivity map	Topographic maps, cartographic method
Hypsometric map	Topographic maps, cartographic method
Map of slope orientation	Topographic maps, cartographic method
Map of land use	Data from Corine Land Cover project , cartographic method
The map of the territory evolution	Topographic maps, Shooting directory plan, Ortophotoplans, cartographic method
The map of the functional areas	Observations and field cartography, cartographic materials, cartographic method.
The landslide inventory	Observations and field cartography, GPS measurements, shooting directory plans, ortophotograps caartography
The density of buildings at the level of neighbourhood in Zalău	Satelite immages, spatial analysis, cartographic method.
The distribution of buildings in relation to the distance from the street network	Satelite immages, spatial analysis, cartographic method, buffer method
The position of buildings on slopes classes	Satelite immages, spatial analisys, cartographic method.
The distribution of buildings in Zalău as related to altitude at neighbourhood level.	Satelite immages, spatial analisys, cartographic method.

Chapter 2 Zalău municipality. Geographic and historic reperes

2.1 Locating and limits Zalău urban area

Zalău municipality is situated in the centre of Sălaj county, in the southern part of the Zalău Depression at the contact between Silvaniei Hills and the Meseş Mountains (Fig. 1), on the Cluj-Napoca - Satu Mare - Petea Vamă axis, represented by the roads DN 1F and E81.

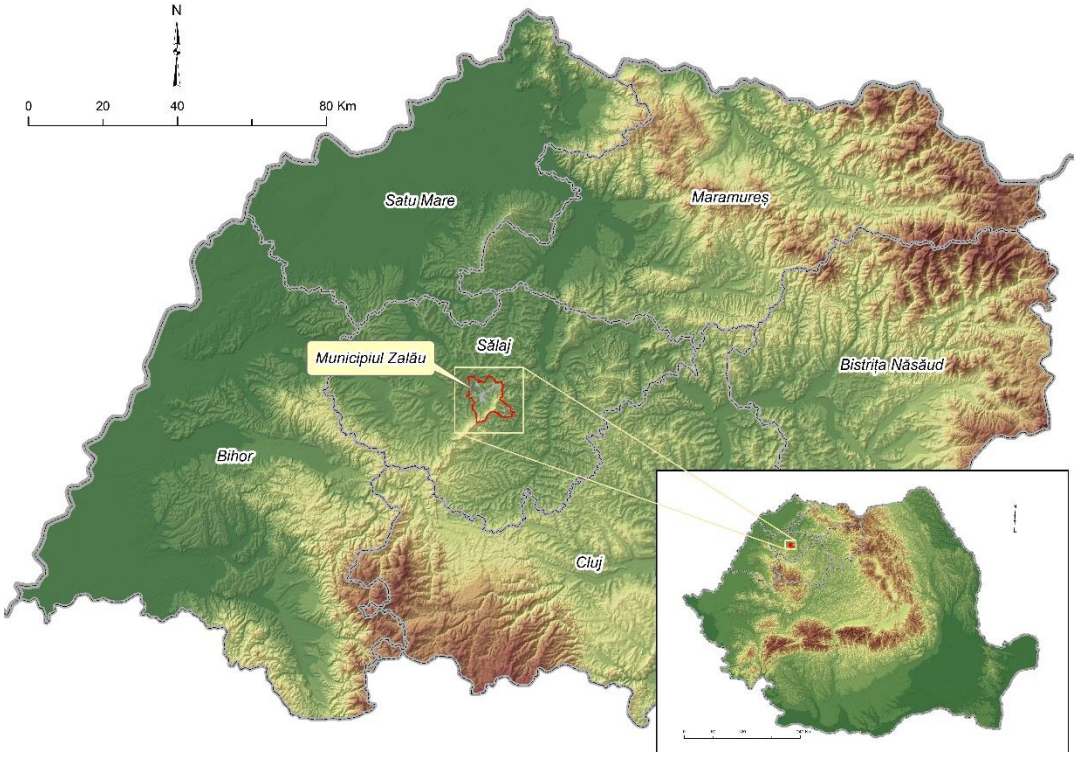


Fig.1 Geographical location of Zalău municipality

2.2 Area history

During its historical evolution, Zalău has transformed from a medieval village (from the second half of the 12th century until the 14th century) to a medieval fair (from 1370 until 1473), a town (from 1473 to 1979) and finally, a municipality (from 1979 until present). Zalău includes a central area with the historic centre around which neighbourhoods were built concentrically in the socialist era. A second circle of neighbourhoods with new buildings is located around it and another circle is located towards the exterior, including the outskirts: Ortelec and the area towards Aghireş.

2.3 Short history of the researches on the Zalau urban space

In order to get a clear picture of the analyzed territory it was necessary to consult several scientific papers with monographic: Petri Mór (1901-1906), D. Stoica și I. P. Lazăr (1908), L. Ghergariu (1926), T. Morariu și V. Sorocovschi (1972), Abrudan, I., (2004); geologic: E. Lobonțiu (1940), Ștefan Mateescu (1927), M. Paucă (1964), E. Nicorici (1973); O.Clichici (1973); hydrologic: V. Mihăilescu (1966), AL. Savu (1965), Mac, I și Gr., Nuna (1964); geomorphologic content: V. Mihăilescu (1935), AL. Savu (1963), Al. Savu și I .Mac (1972), I. Mac (1996), I. Mac și Maria Hosu (1999); of integrative Geography: C. C. Pop (2003), Gr. P. Pop (2005);

Chapter 3 Natural consequences of urban development Zalău space

3.1 The geologic support and its role in the urban development

The geological support of the municipality of Zalau belongs to the following geomorphological units: Western Hills, Meses Mountains, Simleu Depression and Zalău Depression.

The geological support of the municipality of Zalau reveals a series of superficial deposits from different geological periods, deposits involved in the urban development process. The geology of the space includes deposits from different periods: Paleozoic, Oligocene, Miocene, Pannonian, and Quaternary.

3.2 The climatic regime

Climate, especially precipitation regime and air temperature, plays an important part in the evolution of certain natural processes, in the characteristics of the elements of the natural system and for the anthropic activity. By means of air temperature, wind, air pressure and humidity, climate contributes to the health condition of people and environment, increasing or diminishing pollution.

The average annual air temperature in Zalau for the studied period (1990-2012) is around 10°C. The hottest month is July (20,5°C) while the coldest is January (1,0°C). The amount of precipitation increases towards the mountainous frame, recording 637,65 mm/year in Zalau.

3.3 Hydrography and the hydrologic regime

The town of Zalău is situated in the Hydrographic Basin of Zalău Valley, being drained by Zalău River and its tributaries. The tributaries on the right of Zalău River are Morii Valley, Râpoasă Valley, Meseş Valley, Sărmaş Valley and Banchert Brook. The tributaries on the left of Zalău Valley are Miţei Valley, Panic Valley and Pietriş Brook. Among the water courses that cross the municipality of Zalău we mention Chichişa (Stâna) Valley and Ortelec Valley which are tributaries on the left of Agrij Valley. Ortelec Valley also has a tributary on the right, namely Rodina Valley.

3.4 The geomorphology of Zalău urban space

The relief of the municipality of Zalău presents a various typology, encountering sculptural, structural, fluvial relief and glacises.

The sculptural relief is encountered both on the main interfluves, Crasna - Zalău, Zalău - Maja, near the mountainous frame and on the secondary interfluves.

The structural relief appears on the right slope of Zalău Valley, but also on the slopes of the secondary valleys.

The fluvial relief developped in time by the deepening of the hydrographic network in the piedmontan deposits and overlaps the river meadow and the terraces of Zalău Valley.

The glacises develop under the petrographic steep of Malu Hill in the Northeastern extremity of Zalău and on the right slope of Zalău Valley, upstream of the town of Zalău.

3.5 Bio-pedo-geogpaphical features

The bio-pedo-geographical associations of Zalău are harmoniously integrated in the complex defined by the Silvano-Someşene Hills and Meseş Mountains. The vegetation, fauna and soils (Fig.14) reveal distinct features of the Zalău area as part of The land of Silvania.

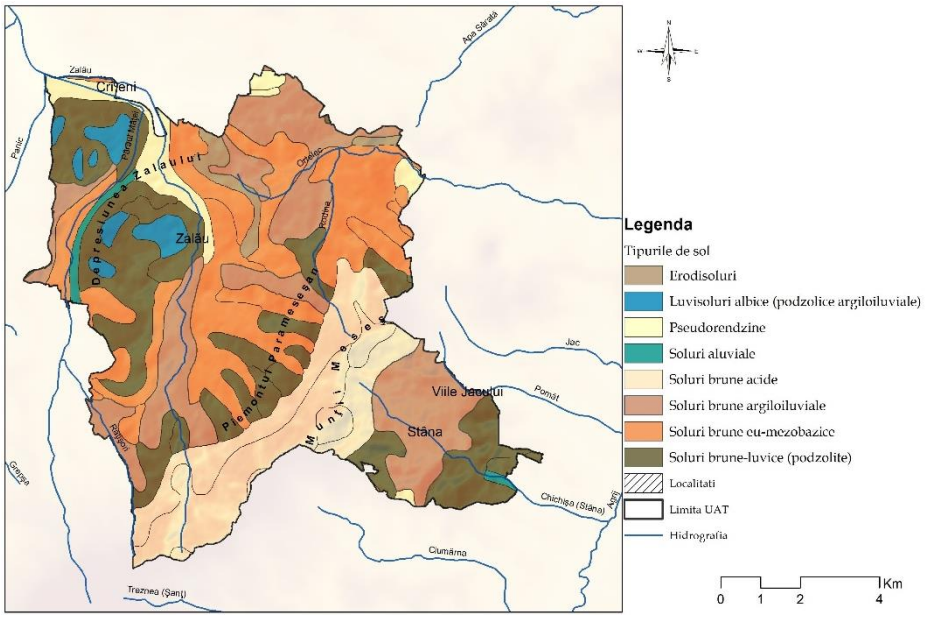


Fig.14 Soils map

Chapter 4. The morphology and morphodynamics of the urban space

4.1 The morphometry of the Zalău urban space

From the point of view of altimetry, the territory of Zalău marks the gradual transition from the river meadow to the mountainous level.

The altitude of the land increases gradually from North to South, Southeast, reaching its maximum (727 m) at the contact with Meseş Mountains. The minimum altitude (197 m) is recorded in the Northern and Northwestern part of the town (Fig. 15).

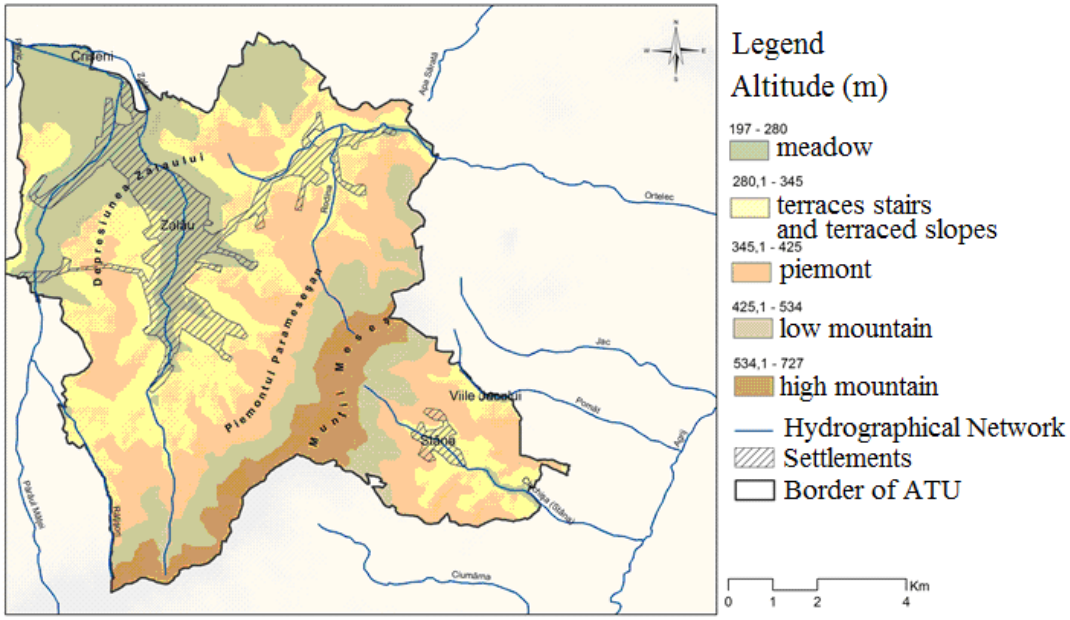


Fig.15 Hypsometric map

The 5.1° - 15° interval of the geodeclivity is clearly dominant, representing 70% of the area, while steeper slopes are present in the south and south-east of the city's administrative territory, representing about 8% of its surface (Fig. 17). Inside the built-up area the slope angle is included in the 0-5° interval, which is represented in approximately 30% of the territory, having favourable conditions for human activities and buildings.

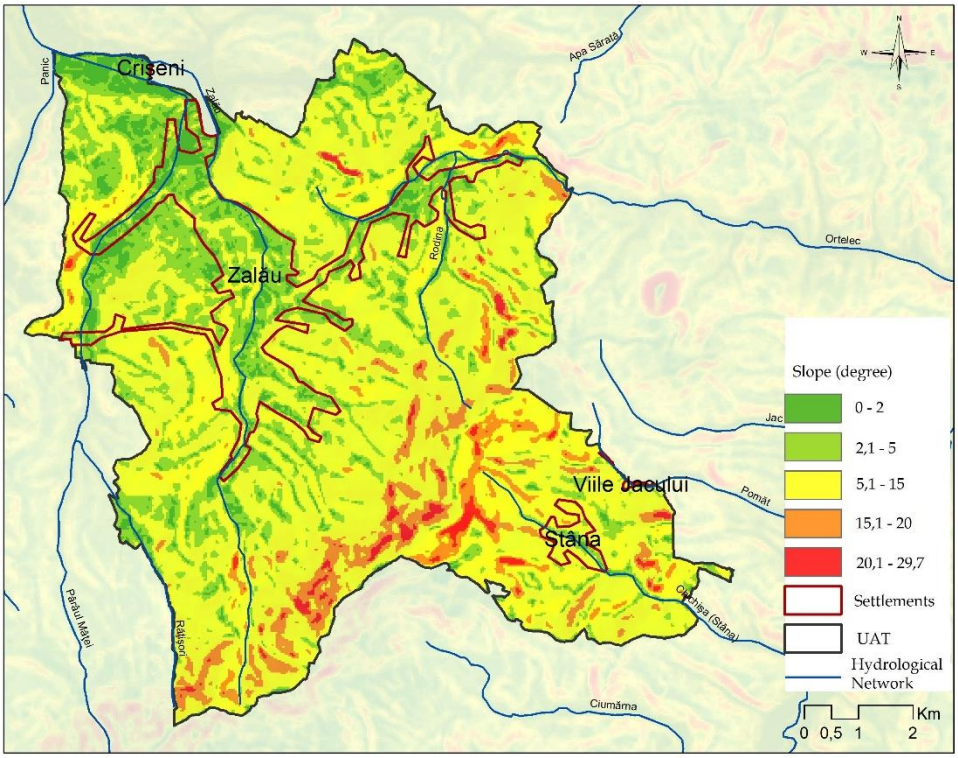


Fig.17 Map of geodeclivity

By analyzing the percentage of slope orientation in the studied area one can notice that most of the slope surfaces have Northern (17,5%), Northwestern (15,6%), Western (14,6%) and Northeastern (14%) orientation.

4.2 Contemporary geomorphological processes

The slope processes include a different range of processes among which the most frequent and intense are land movements (landslides, landfalls) and erosion (torrential erosion, surface erosion, depth erosion and regressive erosion).

The Municipality of Zalău includes areas affected by landslides but also areas prone to landslide initiation. The cause leading to landslide activation in Zalău Municipality is related both to natural conditions and anthropic activities. Thus, one of the areas affected by landslides is the neighbourhood Porolissum. The landslide causing factors in this area are represented by water accumulation in the clay strata as well as the clay exploitation performed by SC Cemacon SA. Although a variety of measures have been undertaken over the years, including giving up the

water pipe of the water distributor SC Publiserv SA, the building of taluses by Cemacon, these were not able to prevent a landslide affecting 10 Ha. This landslide caused damages to the road (Porolissum Street) connecting Zalău and Ortelec (DJ 191C) and the water tanks used for supplying the neighbourhoods Brădet and Stadion (foto. 2).

Foto.2 Landslides in Ortelec area

Using the method described in the H.G. 447/2003 and the factorial coefficients, the average susceptibility coefficient was calculated for the area of Zalău municipality:

K(a) – lithologic coefficient, K(b) – geomorphologic coefficient, K(c) – structural coefficient, K(d) – hydrologic and climatic coefficient, K(e) – hydrogeologic coefficient, K(f) – seismic coefficient, K(g) – sylvic coefficient, K(h) – anthropic coefficient.

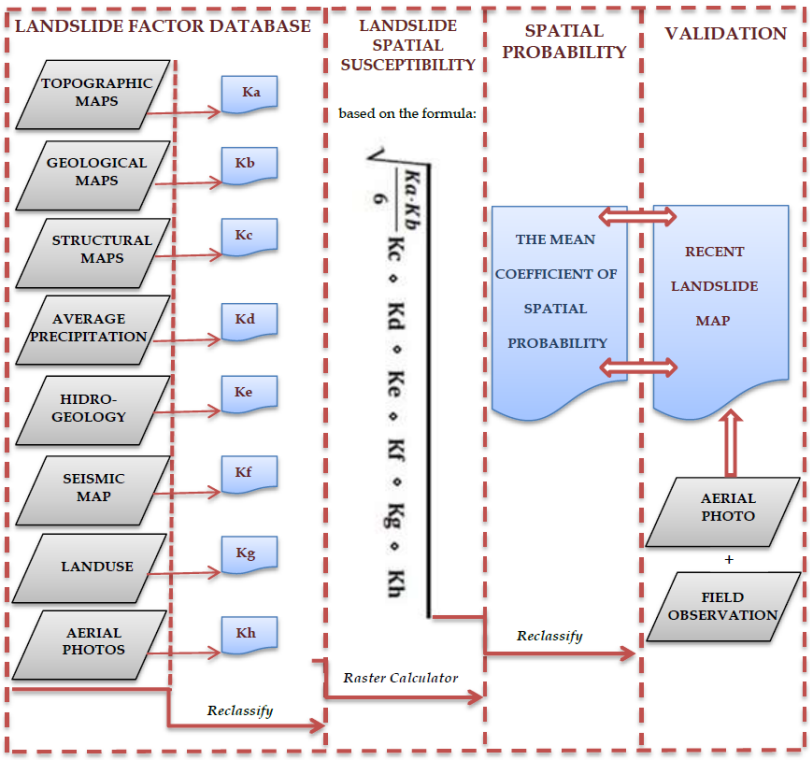


Fig.21 Model schematics for landslide susceptibility assessment

After analysing each factorial coefficient (fig. 4), by using ArcGis 9.3, they were combined in order to generate the average hazard coefficient using the expression:

$$K(m)=\sqrt{\frac{K(a)\times K(b)}{6}\times[K(c)+K(d)+K(e)+K(f)+K(g)+K(h)]}$$

In which:

K(m) – average susceptibility coefficient

Depending on the values of the average hazard coefficient, the probability of landslide occurrence was determined (fig. 6) through reclassification, the study area being described as having:

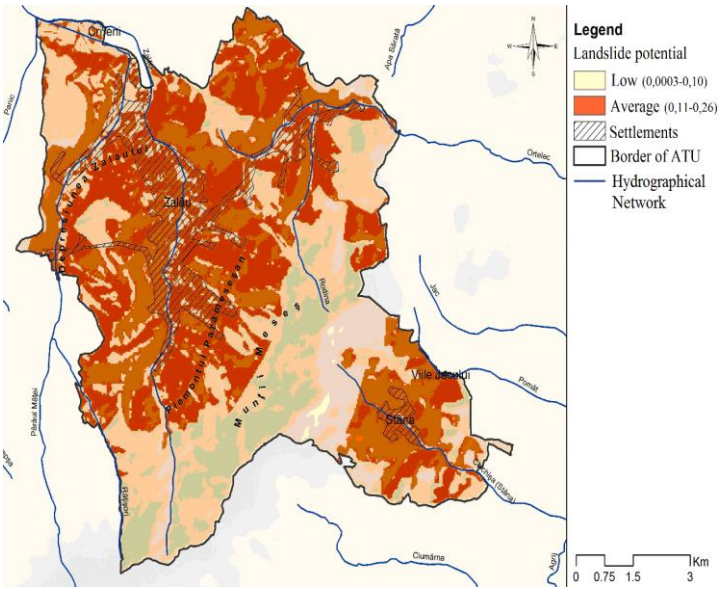


Fig.6 Probability of landslide occurrence

- A low probability of landslide occurrence when the average landslide susceptibility coefficient has the values between K(m) = 0.01 – 0.10;
- A medium probability of landslide occurrence when the average landslide susceptibility coefficient has the values between K(m) = 0.11 – 0.26.

After applying the landslide susceptibility model described in the legislative methodology H.G. 447/2003, an average value of the hazard coefficient was determined ranging between a minimum of 0.0003 and a maximum of 0.260.

In order to determine the success rate of the landslide susceptibility model, according to the H.G. 447/2003 methodology, the total area of landslides was compared for each probability class (Fig. 28). Thus, the medium susceptibility class is validated by 79.09% of the mapped landslides, while only 22% are located in the low susceptibility class. The susceptibility analysis is considered to be successful as less than 25% of the landslide area is located outside the class of highest susceptibility.

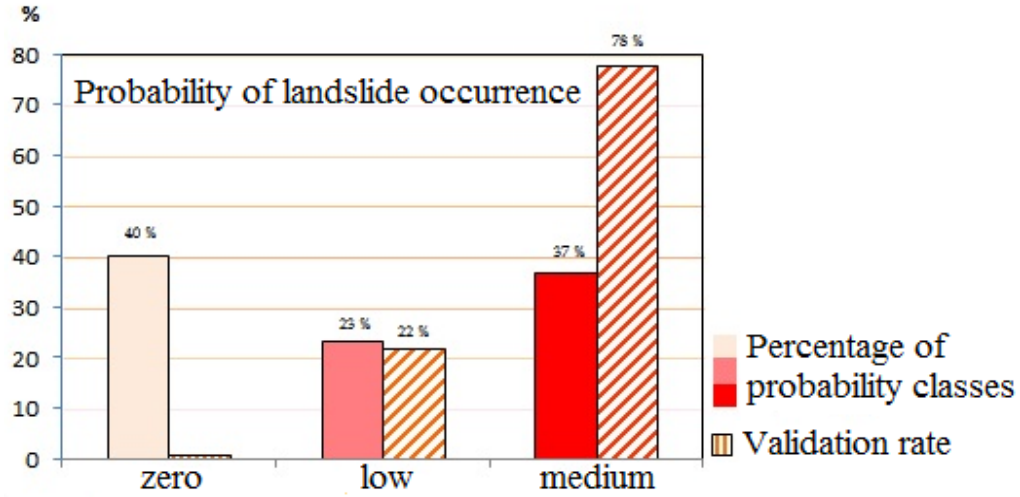
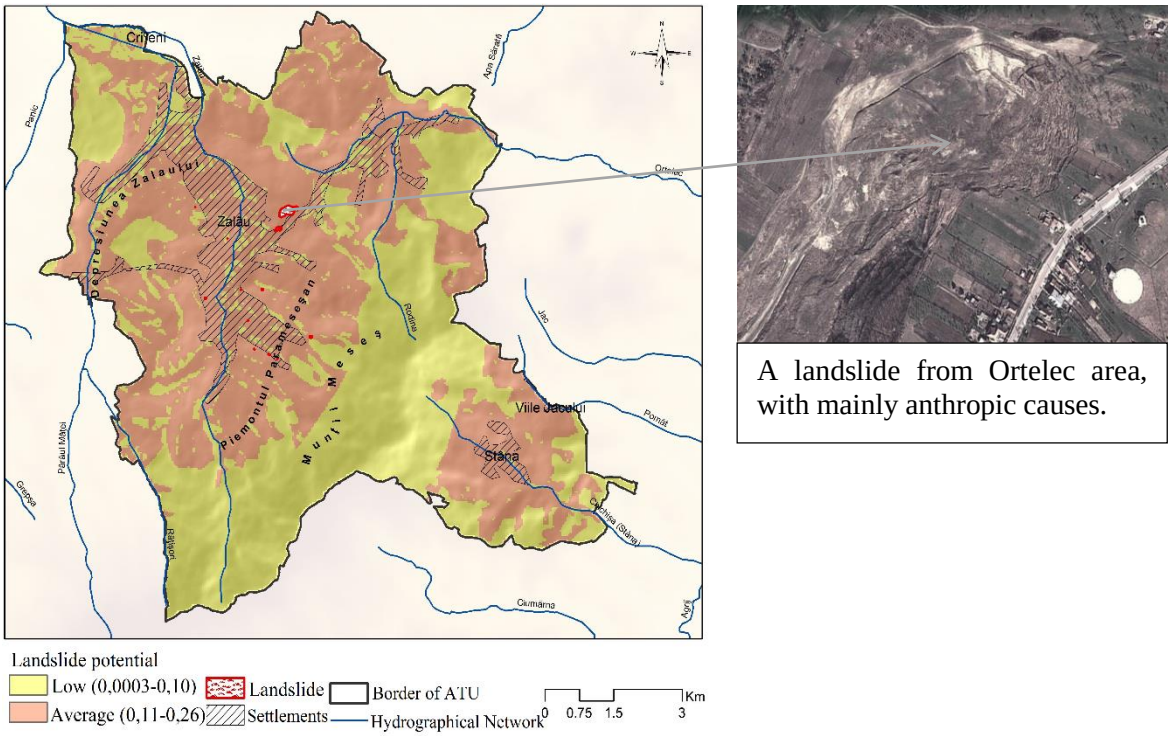


Fig.28 Percentage of each landslide susceptibility class and of the mapped landslides (1-zero, 2-low, 3-medium)

Six areas with *active landslides* can be identified in Zalău, determining a risk situation for the built-up area: the left slope of the Meseş Valley (Brădet and Stadion neighbourhoods), the street area Gh. Lazăr (Central Park – Cemetery - Courthouse), Ortelec area (water tanks – clay quarry), Park of the People area, Traian-Vişinilor area, Dumbrava II area. All these territories are included in the medium susceptibility area (fig. 29).



A landslide from Ortelec area, with mainly anthropic causes.

Fig.29 Map of active landslides, classified on landslide susceptibility intervals

4.3 The morphology of the territory and the typology of the Zalau urban space

The development of Zalău was strongly influenced by the geomorphological factor, the settlement having a greater extension in the areas of morphohydrographic convergences. In this way resulted a longitudinal shape with a few branches (Porolissum Street, Crasnei Street). The aggregate texture is a linear-tentacular one, but in small areas one can identify a rectangular texture. (Nicoară, 1999).

New urban spaces were gradually added to the hearth of Zalău without being able to avoid the alienation from the center. Nowadays the built-up area of the town is made of 11 neighbourhoods and 11 residential areas which have appeared since 1990 until present by means of building individual houses, duplexes and blocks of flats..

In order to obtain concrete data related to the number of homes situated in each neighborhood and their density as reported to surface (Table 16) we used the functions *Zonal Statistic*, *Intersect* in the program ArcMap 10.1.

Table 16. The density of homes at the level of neighborhoods in Zalău

Neighborhoods	**No. on map**	**Supraf. (ha)**	**No. homes**	**Dens. homes (home/ha)**
Între Văi	1	69	30	0,43
Valea Miții	2	290	293	1,01
Cartierul Dumbrava Nord	3	105	222	2,11
Dealul Morii	4	53	208	3,92
Cartierul Dumbrava	5	75	720	9,60
Cartierul S. Bărnuțiu	6	92	228	2,48
Cartierul Pacii	7	28	148	5,29
Cartierul Traian	8	41	451	11,00
Centru	9	56	309	5,52
Grădina Dochiei	10	68	547	8,04
Cartierul Stadion	11	80	688	8,60
Cartierul Brădet	12	62	456	7,06
Coada Lacului	13	23	76	3,30
Sub Brădet	14	28	97	3,46
Sub Dombalja	15	38	171	4,50
Merilor	16	51	296	5,80
Morii	17	25	115	4,60
Cartierul Porolissum	18	137	592	4,32

Sărmaș	20	67	290	4,33
Grădina Onului	20	26	125	4,81
Cartierul Ortelec	21	138	606	4,39
Cartierul Meseș	22	82	402	5,48

Highlighting the position of the town buildings in relation to the street network was possible by using the function *multiple ring buffer* with distances of 25, 50, 75, 100 200 and 500 meters from the digitalized street network (Fig. 31).

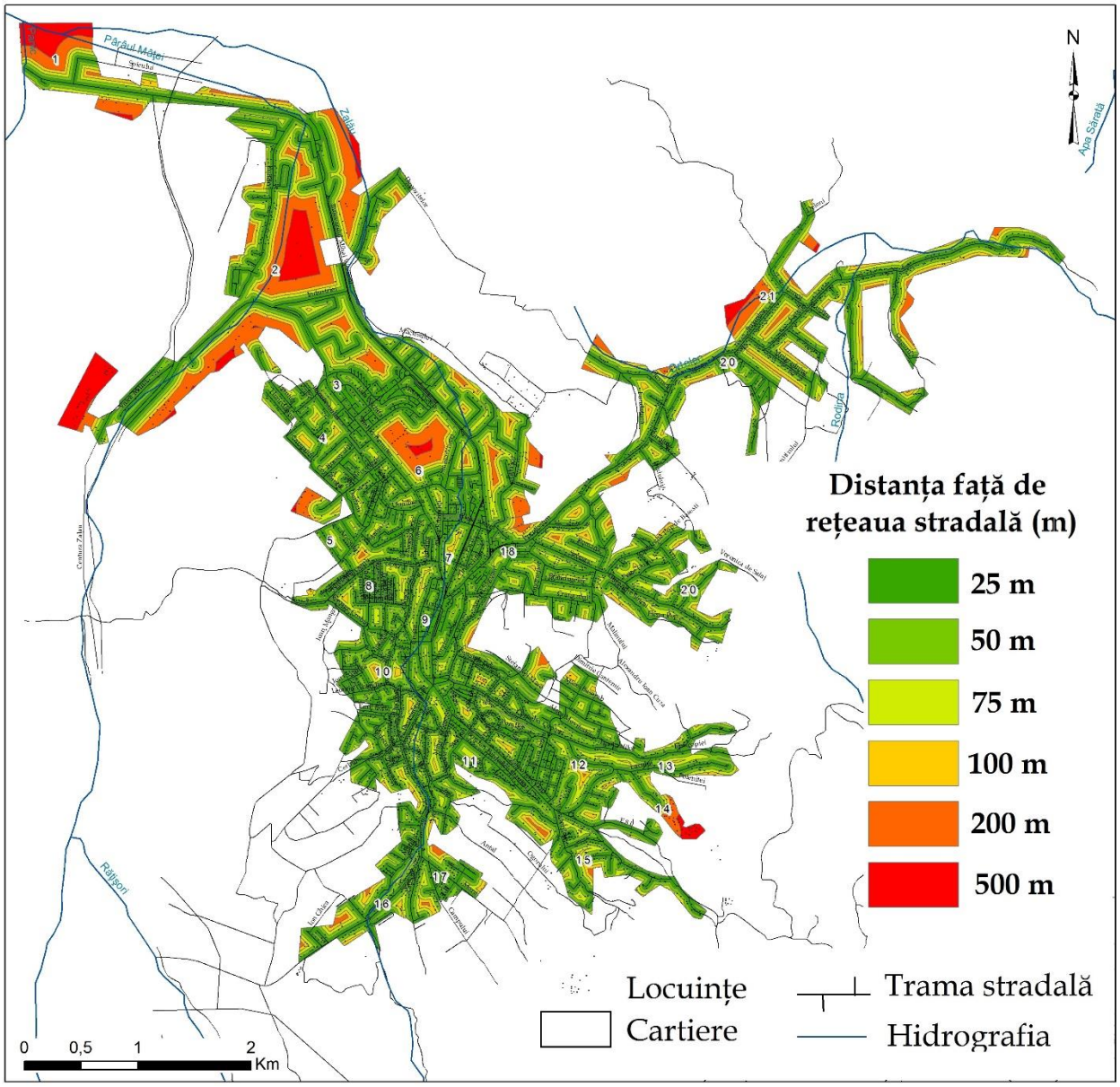


Fig. 31 The distribution of homes in relation to the distance from the street network

Highlighting the positions of homes according to slope classes was accomplished by means of the functions *Zonal Statistic and Intersect* in the program ArcMap 10.1. It was accomplished an analysis of the distribution of homes on slope classes at the neighborhood level. (Fig. 32).

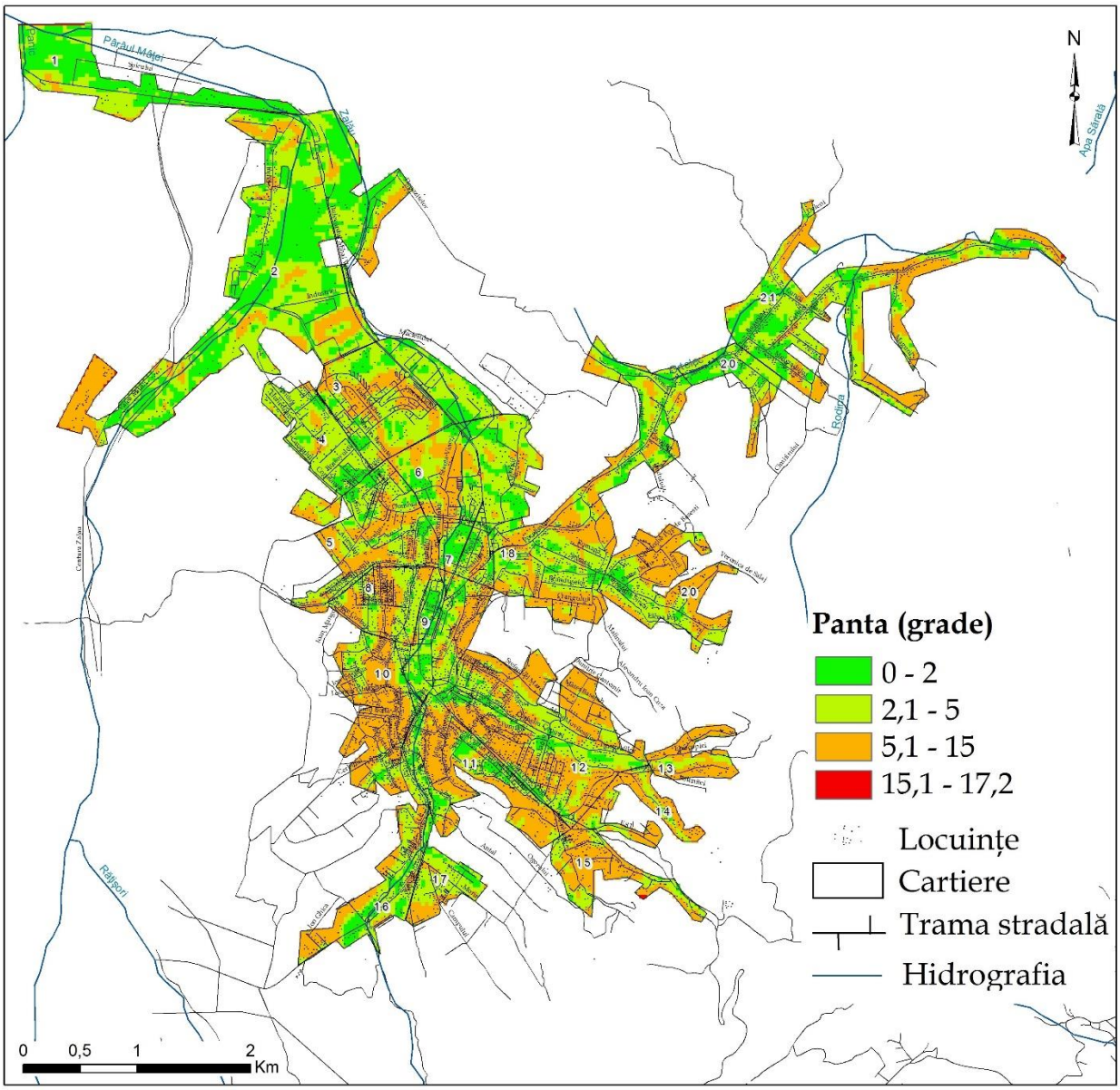


Fig. 32 The position of homes on slope classes

Highlighting the positions of homes according to altitude and geomorphological level was accomplished by the analysis of minimum, maximum and average altitude at the neighborhood level. (Table19).

Table 19. The distribution of homes in Zalău as related to altitude at neighborhood level

Neighborhood	No. map	Alt. minimum	Alt. average	Alt. maximum
Cartier Brădet	1	271	301,8152	351
Cartier Traian	2	260	292,6031	336
Centru	3	255	269,522	296
Merilor	4	271	290,7817	331
Morii	5	271	289,1568	312
Sub Dombalja	6	304	346,6247	414
Sub Brădet	7	310	341,5769	379
Cascadei	8	313	347,4206	394
Sărmaș	9	270	303,5024	382
Cartier Porolissum	10	253	297,9335	340
Grădina Onului	11	309	323,8524	389
Cartier Ortelec	12	272	307,4756	354
Între Văi	13	197	203,6744	214
Valea Miții	14	206	227,6454	294
Cartier Dumbrava Nord	15	227	250,9572	292
Cartier Păcii	16	250	258,3195	277
Cartier S. Bărnuțiu	17	234	255,5835	287
Dealul Morii	18	251	284,1753	327
Cartier Dumbrava	19	252	295,0954	347
Grădina Dochiei	20	262	291,1607	333
Cartier Stadion	21	260	290,2203	331

Based on data of the living and communication infrastructure we analized the repartition of homes at the neighborhood level according to the potential of apparition of landslides. This potential was obtained by applying the methodology described in the G.D. 447/2003.

By the visual and statistical analysis of the average values of the probabilty of apparition of landslides at neighborhood level one can notice that the greatest number of homes are situated in the areas characterized by an average potential of aparition of landslides. (Fig. 34).

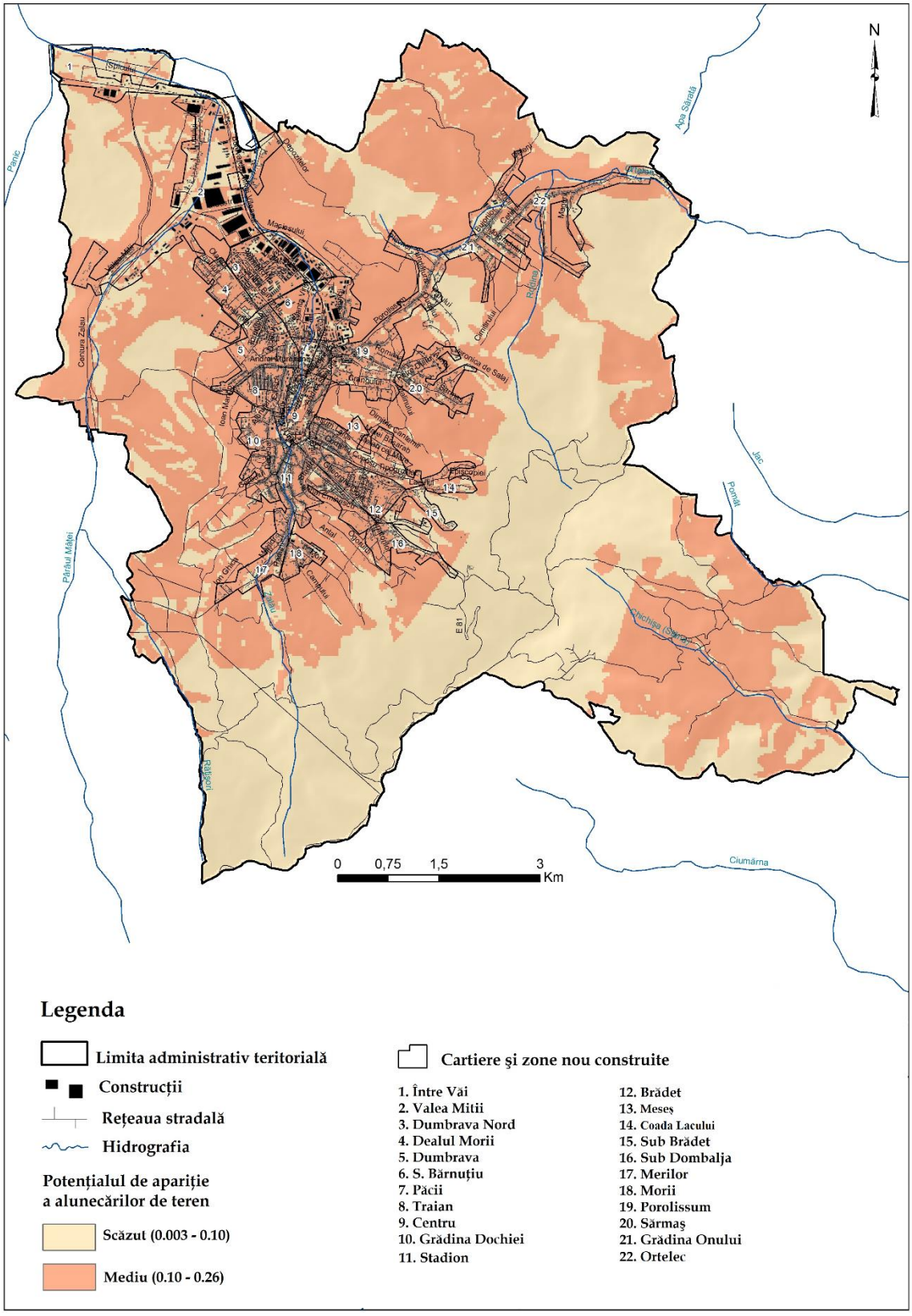


Fig. 34 The distribution of homes in Zalău according to the potential of apparition of landslides

Chapter 5 The dynamics of urbanization and associated risks

5.1 The numerical evolution of the urban population

The period we follow the numerical evolution of the population is 1977-2012. In the last 20 years the population decreased with 6,48 %, from 68404 inhabitants in 1992 to 63970 inhabitants in 2012, leading to a decreasing evolution of the population of the town, with a slight increase between 2002-2012 (Table 21).

Table 21.The numerical evolution of the urban population of the Municipality of Zalău between 1977-2012

Year	1977	1992	2002	2012
No. population	31923	68404	62927	63970

The natural growth is decreasing in the referred to period, from a natural growth of 596 persons in 1992, to a natural growth of 273 persons in 2012, but in spite of this it remains positive.

The migration balance of the municipality of Zalau records negative values. Annually the municipality loses by migration over 500 inhabitants.

The percentage of women in the population of Zalau shows a descending trend from 49,85% in 1992 to 48,85% in 2012, while the percentage of men shows an ascending trend from 50,14% in 1992 to 51,14% in 2012.

The age structure show a reduction of the younger population (0-19 years), from 39,35% of the whole population in 1992, to 31% in 2002.

The ethnical structure shows slight changes in 2002: Romanians represent 80.89%, Hungarians represent 17.5%, Romany grew to 1.36%, while Germans decreased to only 0.07%

The religious structure is diversified at the Municipality level, the greatest percentage being held by Orthodox Christians, both in 1992 (72,75%), and in 2002 (73,30%).

5.2 The evolution in space of the town of Zalău

The evolution tendency of the built area is related to the growing tendency of the number of inhabitants (Vâtca, 2013). According to PUG 2006-2007, the surface of the built up area is 2587,25 ha as compared to 1787,69 ha. Zalău developped in a “constrained morphological space” where

three morphohydrographical convergences can be identifyed, between which linking sectors are interposed (Mac, 1996).

The gradual expansion of Zalau by various buildings lead to a continuous transformation of the natural look of the present urban territory (Fig.40).

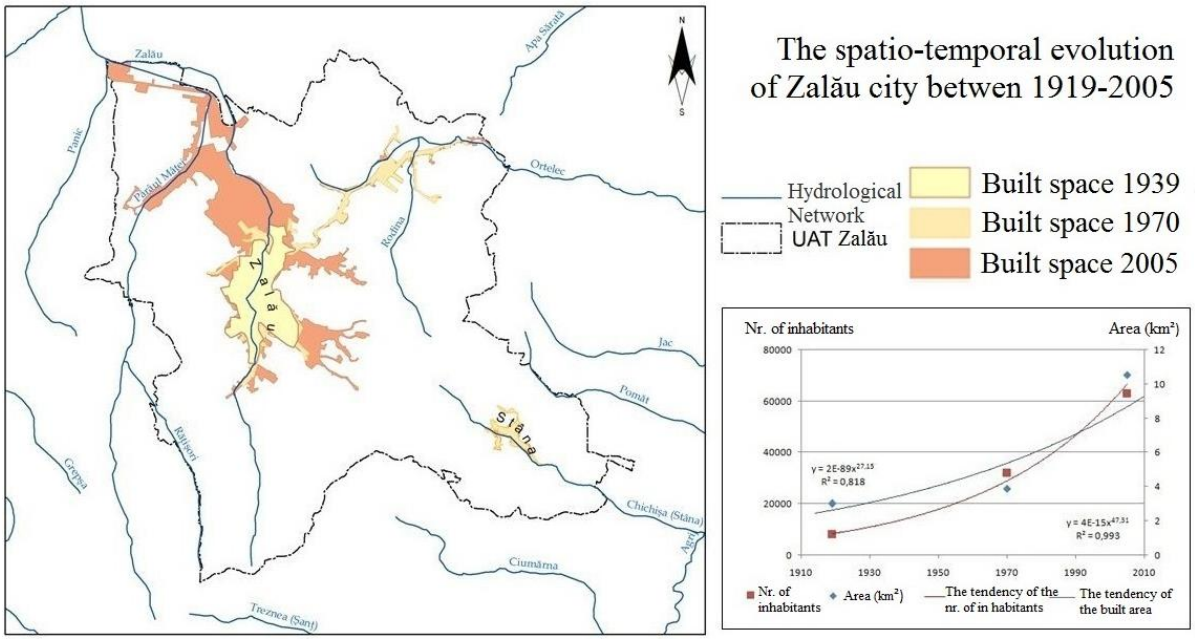


Fig.40 Spatial and temporal evolution of Zalău in the interval 1919-2005. (Vâtcă şi colab., 2013)

5.3 The technical equipment of the town

The drinking water supply network and sewerage network have not been extended on the entire area of the municipality of Zalău.. The new residential areas Sărmaş, Coada Lacului, parts of the neighborhoods Brădet, Stadion, Meseş do not benefit of these utilities, having a more difficult access.

The main source of drinking water supply of the municipality of Zalău is Vârşolţ Reservoir on Crasna River, where there is a centralized system of drinking water supply, sewerage and storm sewer networks in divider system and a mechanical-biological treatment plant.

The distribution network of SDFEE Zalău provides the needed electricity.

The marsh gas supply of the town is provided by the only supplier SC Eon Gaz SA.

The Municipality of Zalău has a centralized system for the production of termic energy needed for home heating and the preparation of hot water. This system, by the instrumentality of SC Electric Plant SA Zalău also ensures the necessary termic energy for the industrial consumers.

5.4 The functional zoning of the urban space

The longitudinal development of Zalău is the shape imposed by the relief. The downtown remained isolated from the rest of the town, which developed towards North.

The central zone of the Municipality of Zalău has 93,64 ha, meaning 5,24 % of the built-up area (PUG 2006-2007), representing a multifunctional territorial unit.

Foto. 8 The central zone of the Municipality of Zalau

The residential zone is one of the largest zones, having an area of 470,59 ha, meaning 26,32 % (PUG 2006-2007).

The industrial zone has 223,13 ha, meaning 12,42 %.

The green areas zone (park, forest) has 53,14 ha, meaning 2,97% from Zalău Municipality.

The area with special destination and territory equipment (transport, technico-edilitary buildings) had 279,8 ha, meaning 15,66 %.

The area of the village household (unproductive terrains, rivers, cemeteries) had 83,5 ha, meaning 4,67 % from the build up area in town.

5.5 Urban development associated risks

Among the urban development associated risks in the Zalău municipality, the geomorphological and the flooding risks are noticeable (Fig. 43).

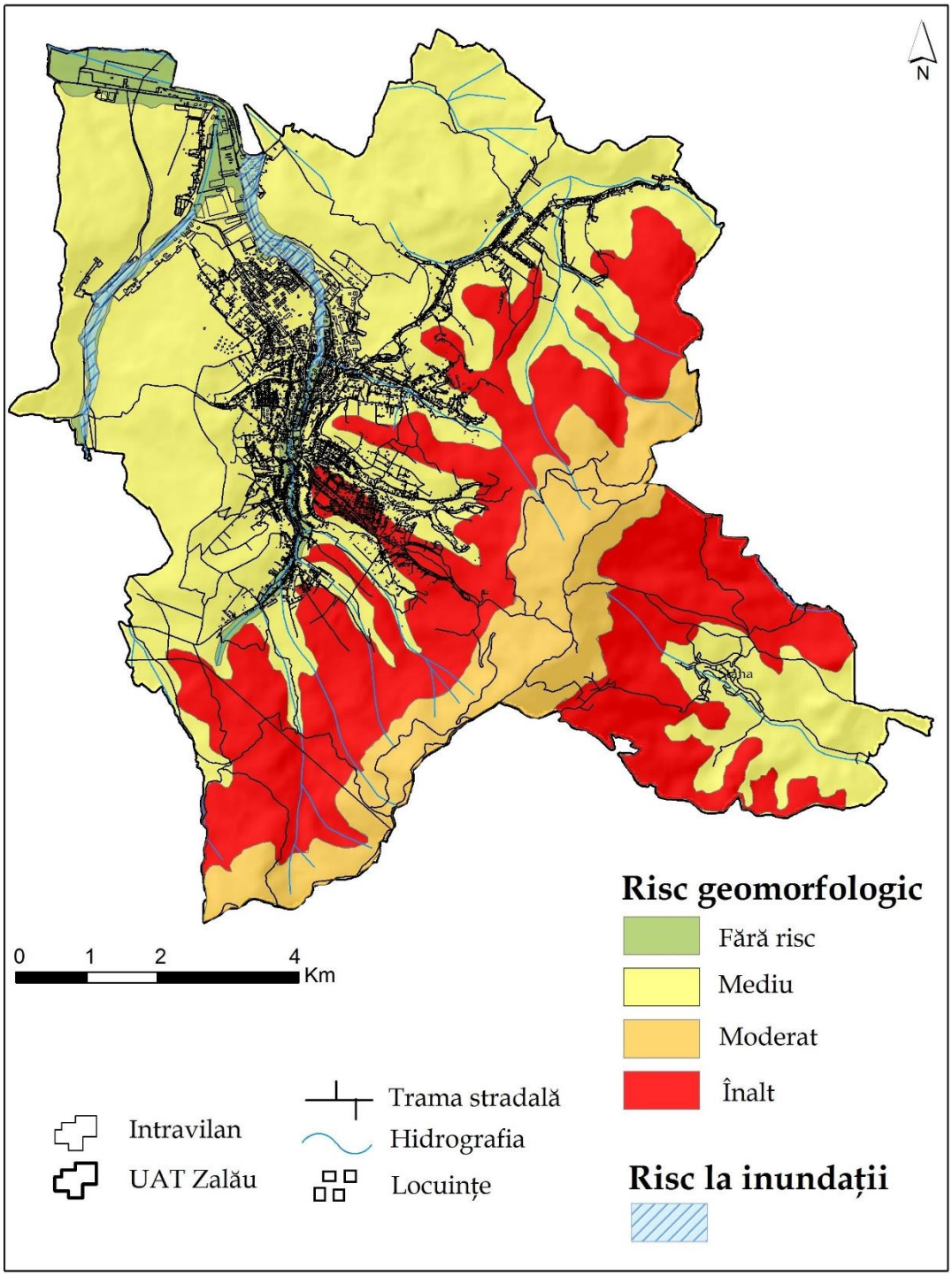


Fig.43 The geomorphological and the flooding risks

Chapter 6 Territorial planning in Zalău

6.1 Local politics regarding urban planning

The activity domains cover the following sectors: transport and communication infrastructure development, establish the efficient land use, environment rehabilitation, urban revitalization.

The sustainable development strategy of the Zalău municipality has to include a set of measures along with the necessary investments that will be made on a certain pre-established time interval, namely 2014-2020.

6.2 Regional and national politics regarding urban planning

The law no. 350 on the 6th of July 2001 regarding territorial planning and urbanism stipulates the following types of territorial planning documentation as having an organizational character for the areas: NTPP (National Territorial Planning Plan), ZTPP (Zonal Territorial Planning Plan), RTPP (Regional Territorial Planning Plan) or DTPP (Departmental Territorial Planning Plan).

6.3 The functional areas of the Zalău municipality

The main functional areas that compose the Zalău municipality built-up area consist of: the center area with complex functions and of interest for the public, the residential area, the industrial and agricultural areas, leisure activities areas, areas with special destinations, transport and public works reserved spaces, communal household areas (Fig. 44).

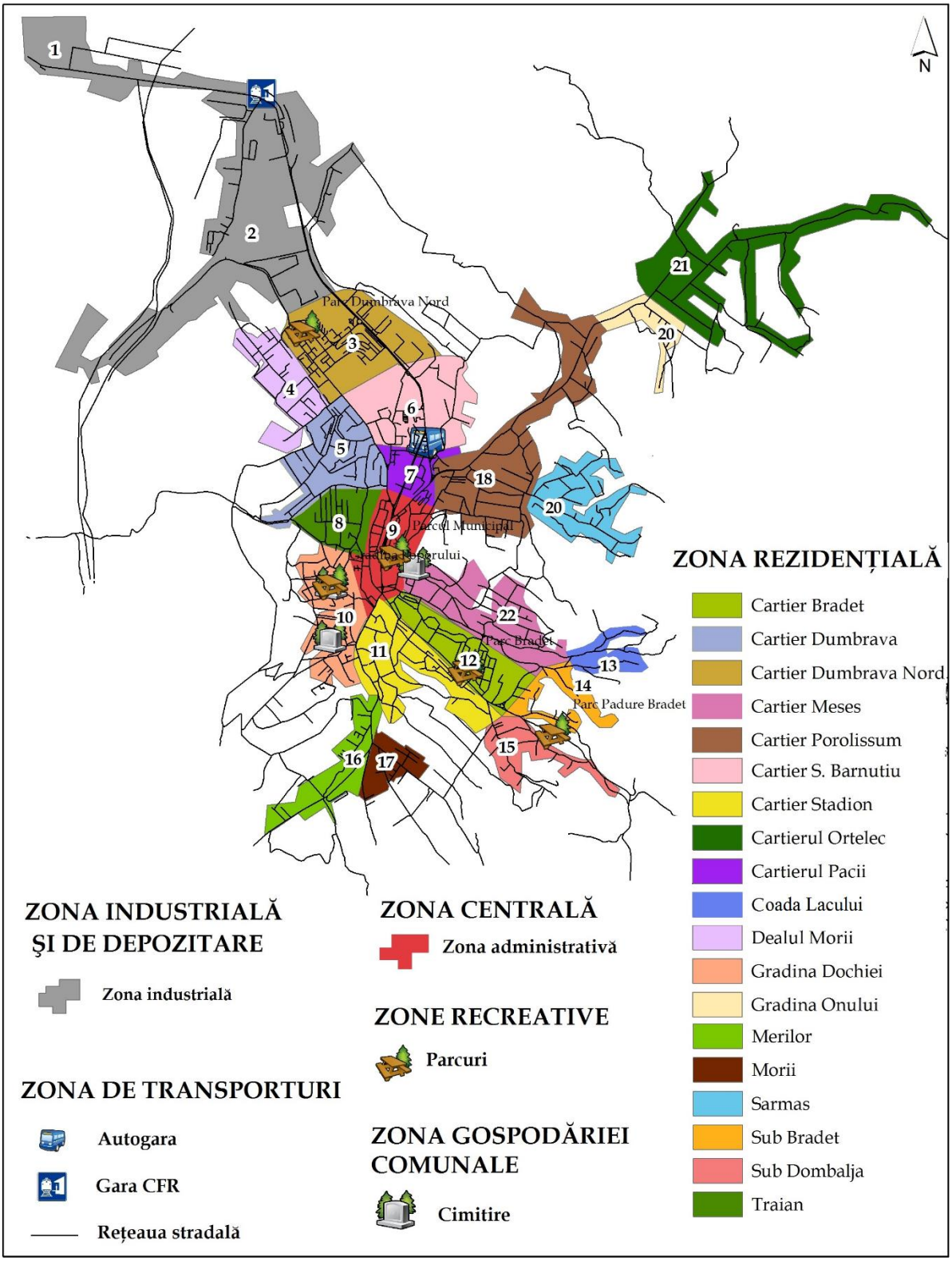


Fig.44 Functional zones of Zalău

6.4 Transport and urban traffic infrastructure

The Zalău municipality is connected to its surrounding via the following public roads network: the national roads and the comunal road DC 73. The most important is DN 1F (the national road) that crosses the Zalău municipality on a South-East going North-West direction along the Zalău Valley, connecting the city with Cluj-Napoca and Satu-Mare. The city is set along the DN 1H (national road), establishing the connection between the Eastern and Western parts of the Sălaj department, namely with Jibou and Şimleul Silvaniei towns. Zalău is situated along the SW-NE direction of the DJ I91C (departmental road) with the communes Crasna and Meseşenii de Jos, Mirşid and Creaca. South of DJ I08 R (departmental road) the Agrij commune is located and connected through the mentioned road at SE of DC 73 (communal road), hence the connection with the Stâna village is created, a village belonging to the municipality. Zalău is crossed by the railway CF 412, connecting Carei-Sărmăşag-Zalău Nord-Jibou, being situated at 88 km away from Carei and 23 km of Jibou. The municipality is located 159 km away from Cluj-Napoca, 81 km of Baia Mare and 124 km of Satu Mare, important cities in the nearby.

According to the PUG (Urbanistic General Plan), at the level of the Zalău municipality, the main traffic network is composed of the following streets:

In the center area: Boulevard M. Viteazul, 22 Decembrie 1989 Street, Gh. Doja Street, L. Rebreanu Street;

Brădet Neighbourhood: C. Coposu Street, A. Iancu Street, Pictor I. Sima Street;

Stadium Neighbourhood: Stadion Street, M. Eminescu Street, B. Petriceicu Haşdeu Street;

Traian Neighbourhood: Traian Street, Cloşca Street, Crişan Street, A. Mureşanu Street;

Dumbrava Neighbourhood: Voievod Gelu Street, Lt. Col. Pretorian Street, V. Deleu Street;

Porolissum Neighbourhood: T. Vladimirescu Street, Horea Street, Gh. Lazăr Street, A. Şaguna Street;

The industrial area: Fabricii Street, Depozitelor Street.

The urban traffic in Zalău municipality is intense on the main terraces at the peak hours between 7,00-9,00, namely 13,00-17,00, sometimes traffic jams being registered.

On the Zalău municipality area there are 21 main and secondary transport lines for buses and minibuses.

In the Zalău municipality there are 3349 parking places out of which 1923 are being taxed, 887 residence parking spots and 33 free of charge, 431 residence parking places that are actually

hired to the car owners in the vicinity via a public auction and 75 underground paying parking places.

6.5 Environment protection and conservation

The River Zalău from a biological point of view qualifies in the Ist quality group for its course upper of the Zalău municipality. From a microbiological perspective it qualifies in the IInd quality group in its course upwards the Zalău city.

The main air sources polluters are the main economical units, out of which stands out the electrical power plant S.C. Uzina Electrică.

The waste deposit of the Zalău municipality, situated in the administrative territory of the Crişeni commune is inadequately placed and the quantity it can store is surpassed. The rudimentary exploitation of the deposit leads to a negative impact on the main environmental factors: air, water, soil.

Chapter 7 Regional development chorema

7.1 SWOT of the Zalău urban area

Strengths	**Weaknesess**
- The presence of varied relief forms (terraces, depressions, hills, mountains) that are harmoniously structured hence assuring geoecological and landscape diversity. - Located in the central area of the department with polarizing features. - Intense commuting on axes that give vitality to the system. - Equipping the main intersections with modern traffic lights and traffic signs.	- There are some areas submitted to risks (landslides, flooding). - Deficitary management of the water resources. - The inexistence of a selective management system of the recyclable waste. - Numeric growth of groups displaying problems of social integration (the Rroms) - Abandoning of the works for the road diverting the traffic from inside the Zalău municipality;
Oportunities	**Risks**

- Attracting European and governmental funds for sustainable development of the region. - Partnerships between the local authorities, the economical agents and NGOs. -Appearance of new professions and job opportunities. - Rehabilitating the central area by creating a walking area.	- Reducing the efficiency of some investments for equipping the territory. - Diminishing of the green areas while favoring the placement of economical and public objectives. - Migration of the highly qualified work force towards other regions or countries. - Accentuated crowding due to the lack of alternatives when it comes to detour routes.

7.2 The development strategy of the Zalău urban areas

The development strategy of the Zalău urban municipality has focused on defining the strategic development landmarks valid for a longer period, with a specific accentuation on measures that have to be taken in a very short time (till 2015) nonetheless. In this relatively short amount of time, the forecast for major development domains will be made, investments and fund attraction serving the final purpose, that of improving life quality in the Zalău municipality.

The strategic objectives include:

- Improvement of the public infrastructure as a support for social development and the increase of life expectancy and environmental standards

- Increasing the access to public and sanitary quality services at acceptable fees and reducing the environmental impact by integrated waste management systems' development.

- Sustainable urban development

- Implementing the adequate infrastructure for preventing natural risk in the areas displaying the highest risks.

7.3 The Chorema model

The hydrographic network has modelled the underground leading to the general relief configuration nowadays. This influenced the positioning of the urban precincts, the communication routes and the economic activities organization.

The development axes coincide with the communication axes (Fig. 45). The North-South main development axis is superposed on the main communication route and represents the

strongest territorial axis, while the proximity area is becoming more and more of an attractive space.

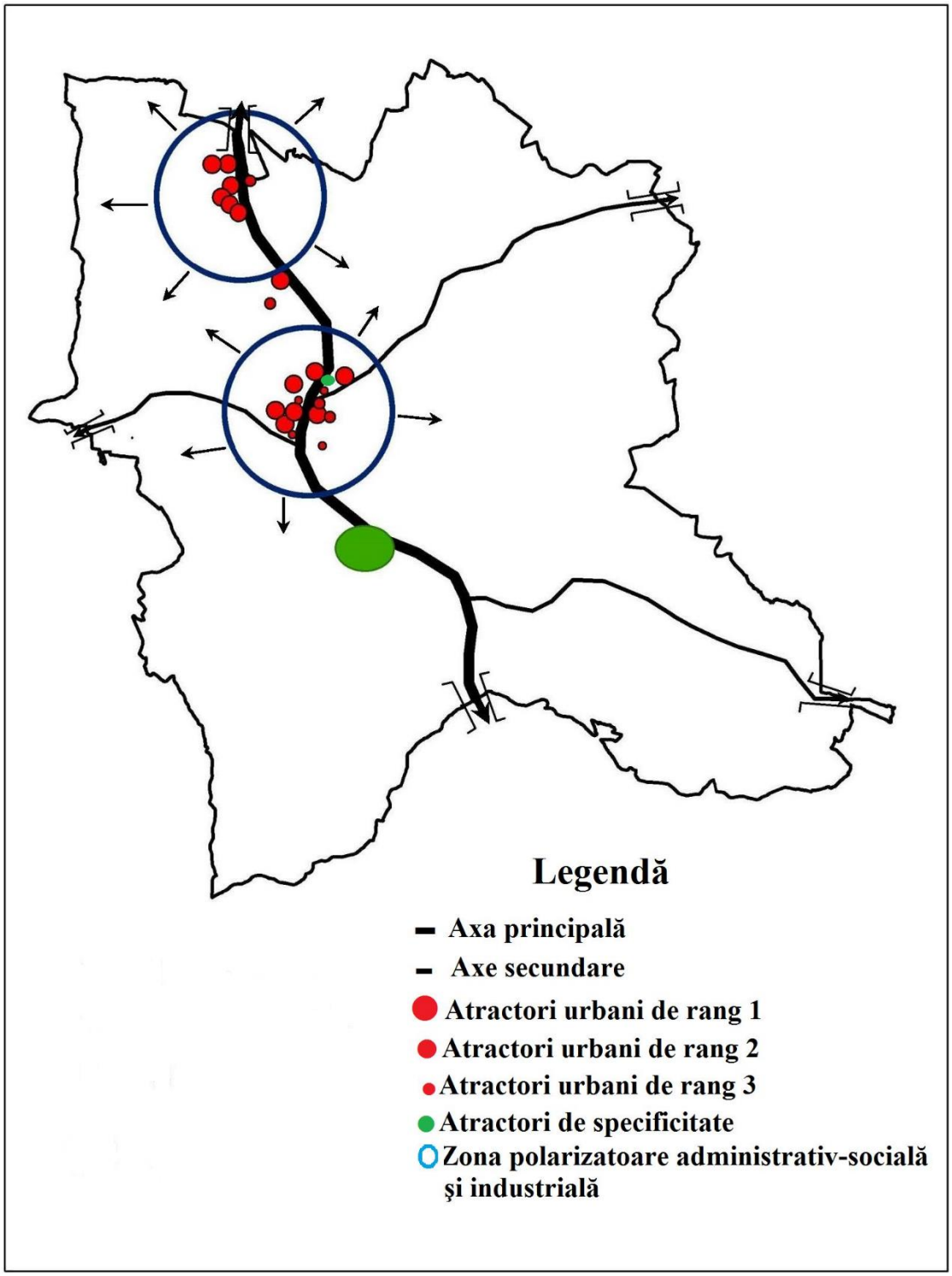


Fig.45 The Chorema of Zalău Municipality

Conclusions

The relief constitutes a geographical element playing an important role in the defining of the Zalău municipality evolution, the city having impregnated a predominant development in longitude, being extended towards the North. The development of the urban precincts along the circulation axes direction has led to a series of agglomerations on at the river confluences.

The Zalău municipality has to deal with four categories of geomorphologic risk out of which the areas with a medium landslide probability have the highest percentage of 79,09 %. Flood risk exists for the central area and in the superior sector of the Miții Valley.

Taking into consideration the important role the relief plays in the city's expansion, Zalău municipality should carefully plan the future development plans.

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Annex

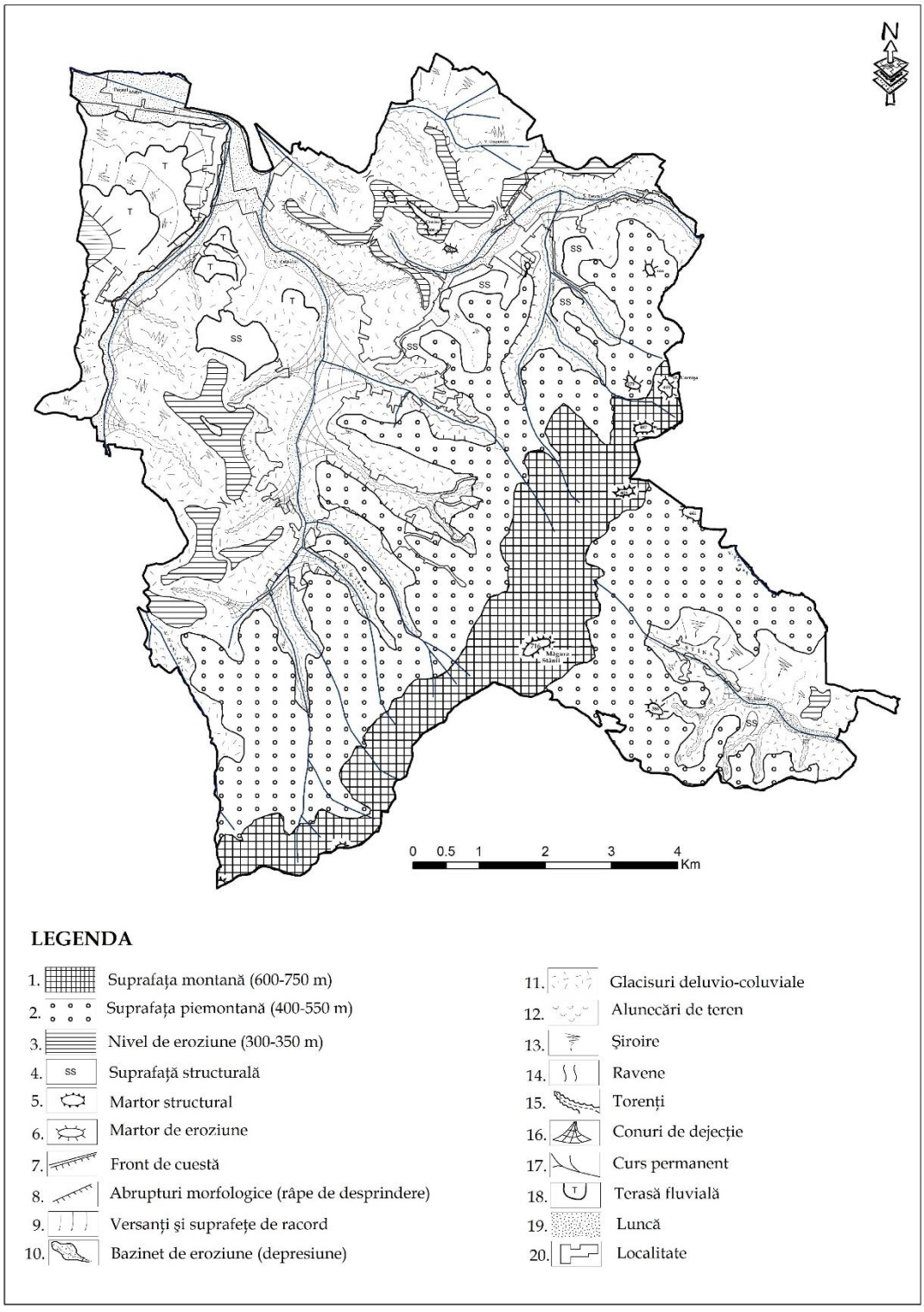

Fig. 45 Geomorphologic map