Systemic Approach in the Study of Rural Complexity and Disparities

Cătălina ANCUȚA, PhD , Assoc. Prof.
Department of Geography
Faculty of Chemistry, Biology, Geography
West University of Timișoara, Romania

"Systems Approaches for sustainable agriculture – Part I" Brussels, 5-6 December 2016

Territorial System

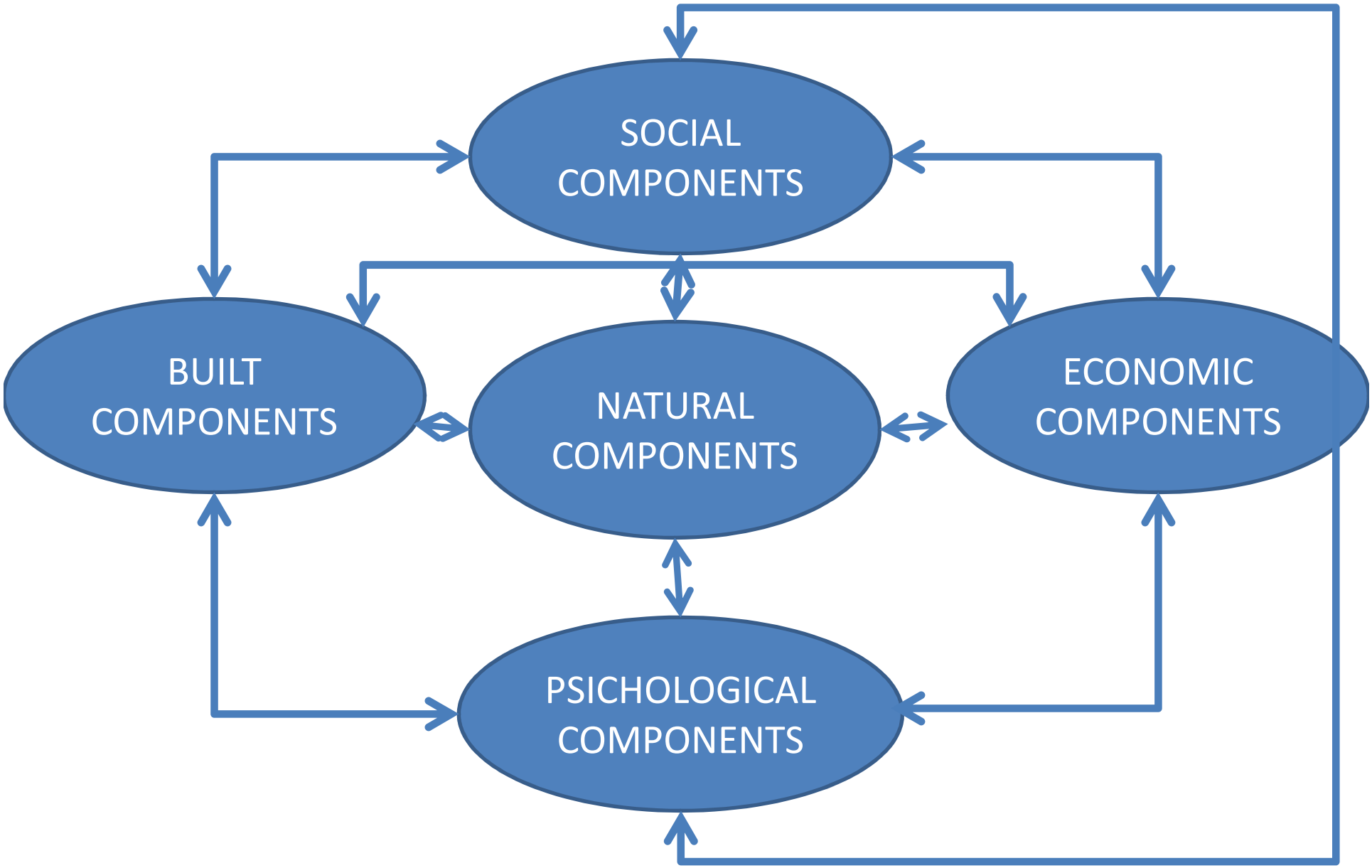
Geographers have had long ago the intuition of the need to study ensembles constituted of elements whose combination ensures a certain aspect of the whole.

After dedicated their study to *humanized region* (and the *genres de vie*) in the first part of the twentieth century, then to the *polarized region*, in the second half of the century, human geography recovers *the system*, as the most suitable grid to interpret the so complex reality called **territory**.

- **Definition**

The **territorial system** is a set of components which interact, determine and influence each other.

The **complexity** of the territorial system (cf. Ianoș, 2000)



Sets of components inside the territorial system

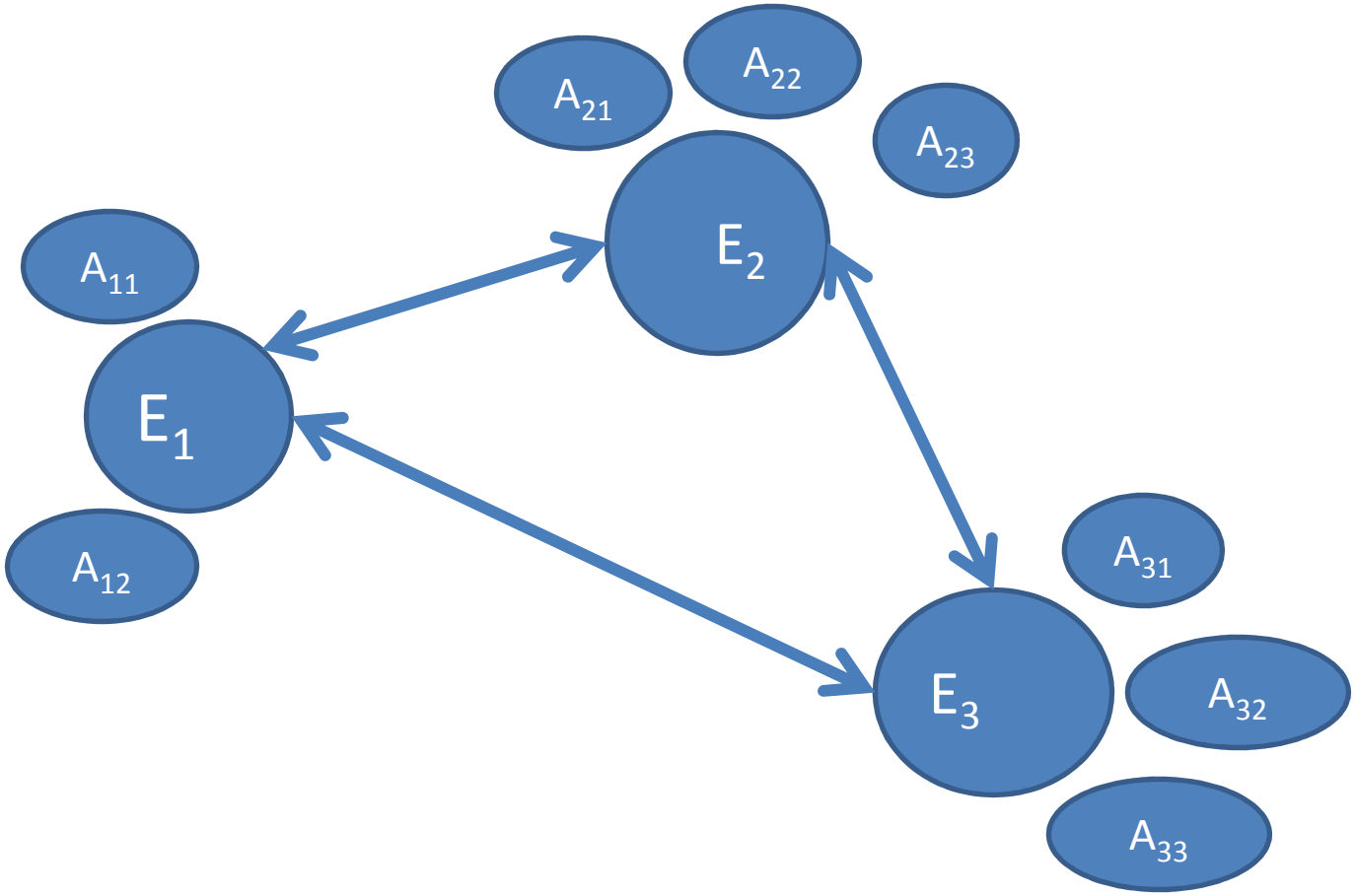
Natural system: relief, climate (temperatures, precipitations, early frost, late frost, winds regime etc.), hidrography (density, types, quality of water), vegetation, fauna, soils (agricultural potential), natural risks .

Social system: number of inhabitants, natural dynamic, territorial mobility, density, spatial concentration, demographic structures (labour resources)

Built system: housing (architecture, built density, confort of living), types of settlements and neighbourhood, territorial equipment, transport infrastructures, functional areas,.

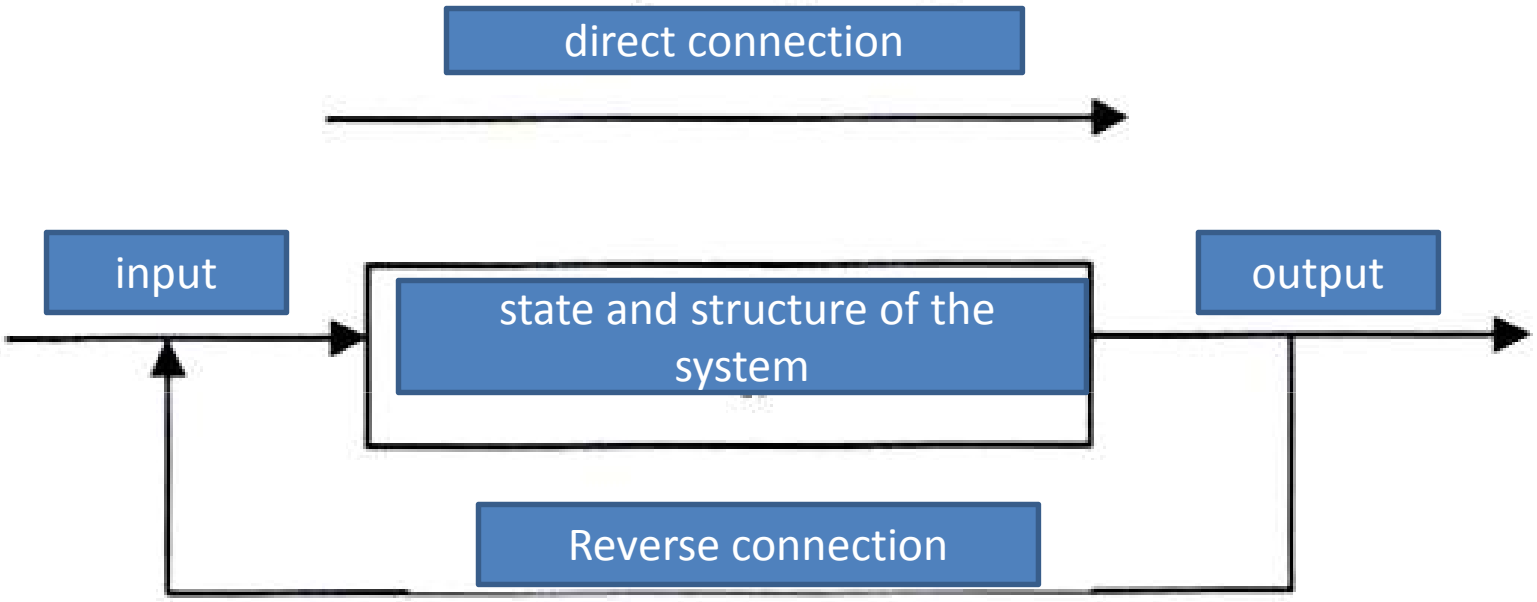
Economic system: economic activities, no of companies, companies density, SMS density, no of jobs, output, level of efficency, economic environment, economic tradition.

Psichological system: values, normes, rules, mentality, identity (resorts of behaviour), lows, preferences, expectations, attitudes, behaviour....

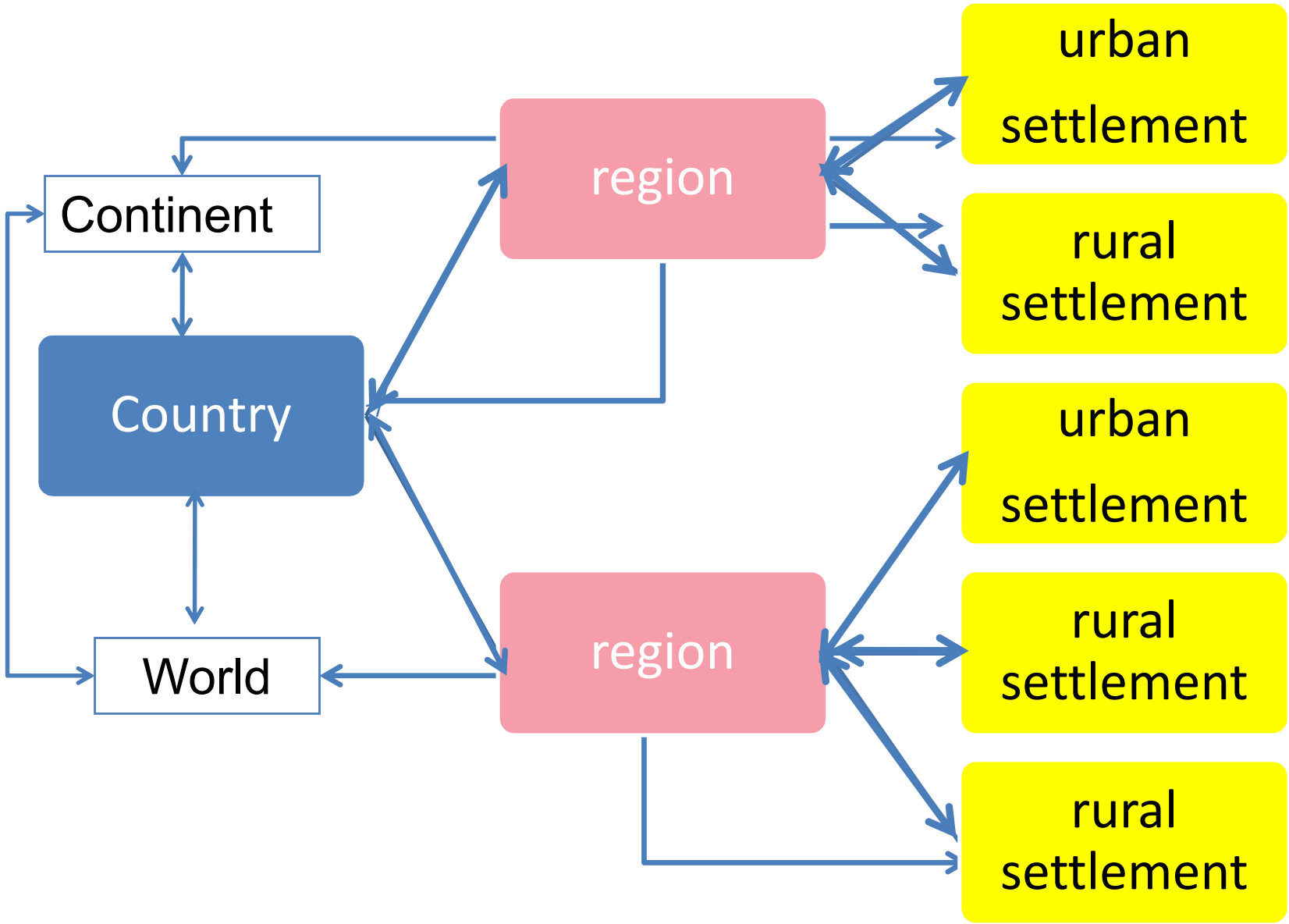


Relations between elements refers both to the **link between elements**, as well as to all aspects of system dynamics. The **dominant relationship** gives the function of the system (residential, agricultural, industrial, transport, tourism, complex, ecological)

The territorial systems is an open system

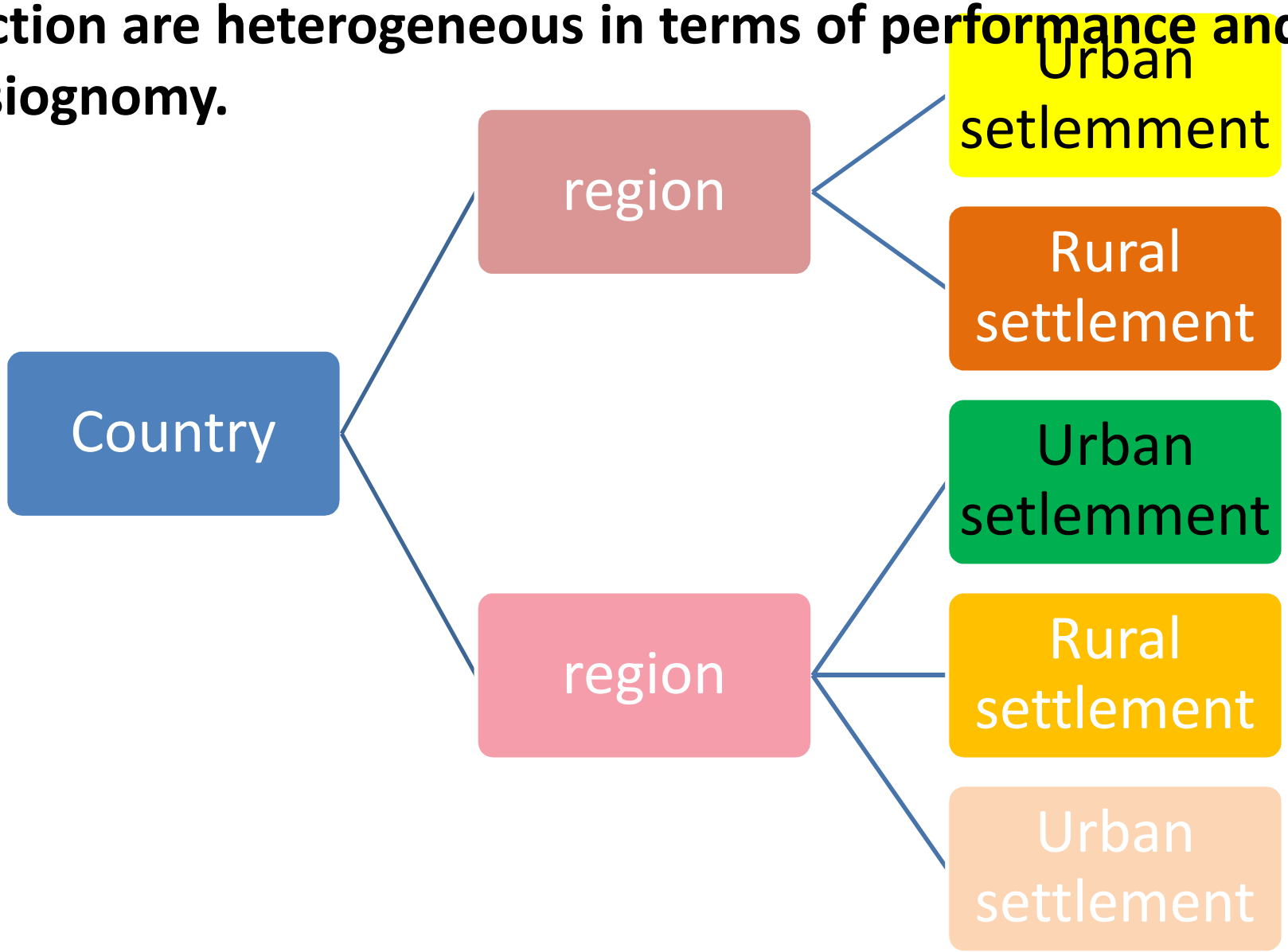


Territorial systems are embedded and integrated.

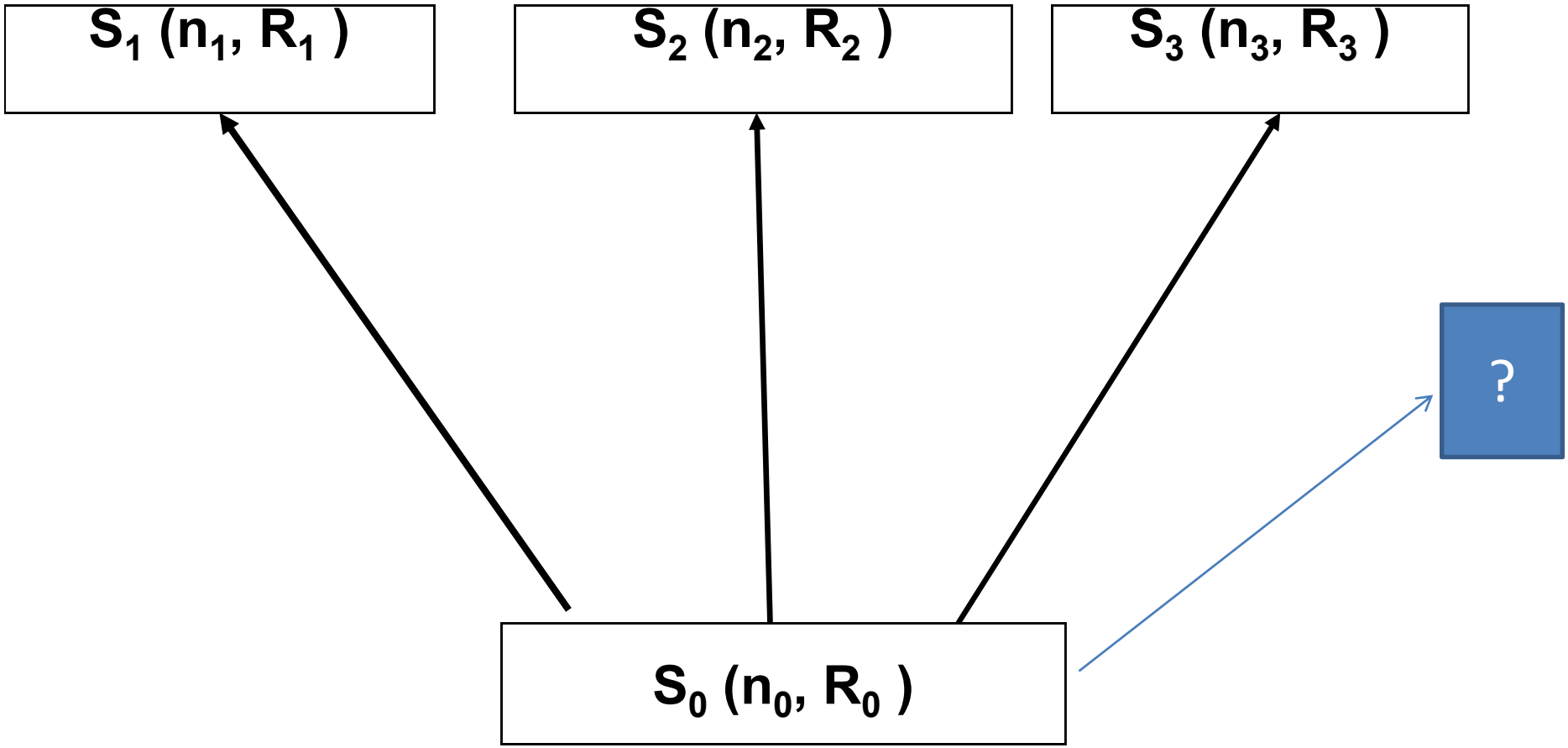


Systemic approach must look for and understand all these reciprocal influences.

Eequivalent territorial systems in terms of scale and main function are heterogeneous in terms of performance and phisiognomy.



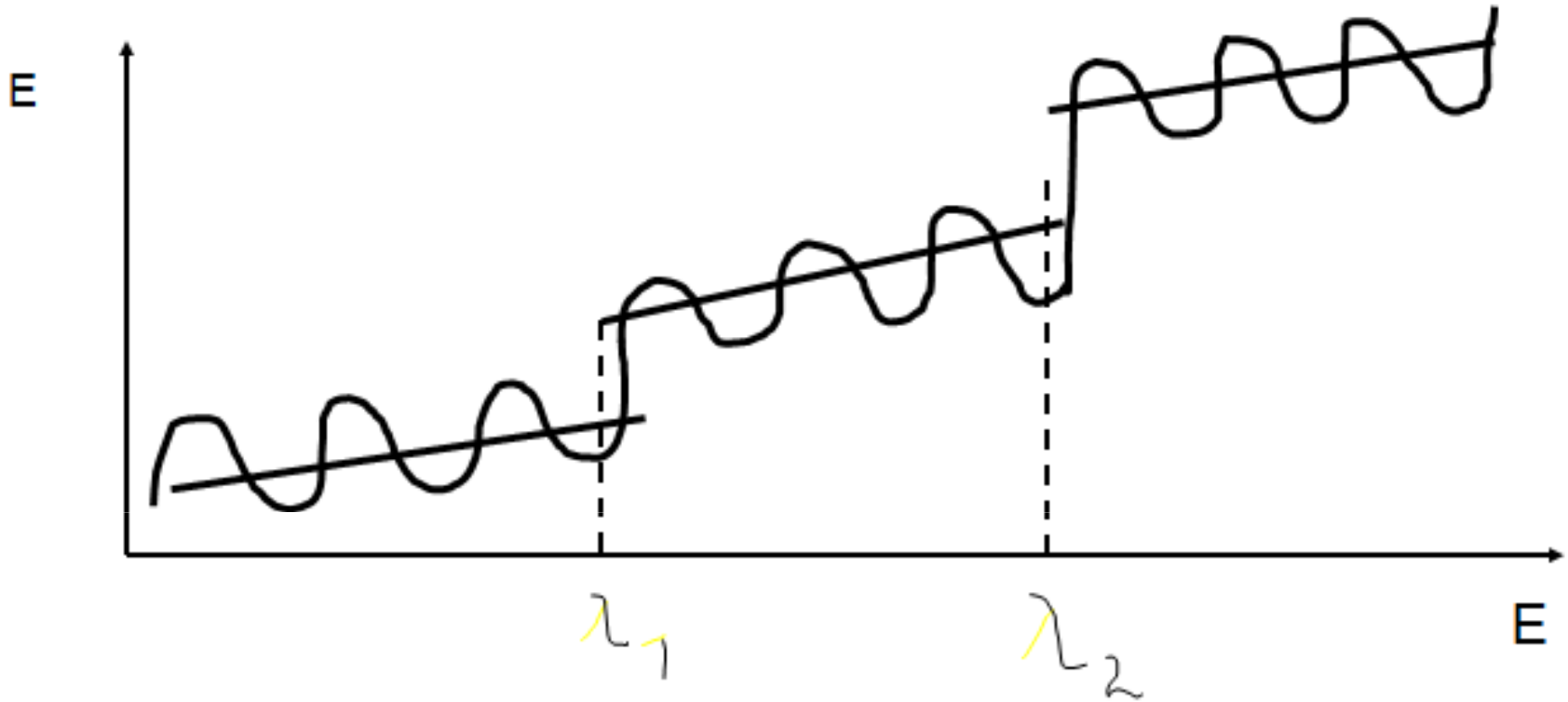
Territorial System – a dynamic system (cf. Ianoș, 2000)



The territorial system could follow different trajectories, according to the decision of valorizing in different ways and/or with different intenity the resources and opportunities.

All the possible scenarios should be examined in order to secure both efficient functioning of the system and its sustainability.

The evolution of the territorial system



Some inputs succeed to determine the placement of the system on upper pathways, characterized by higher levels of performance with regard to valorising of resources, quality of life and sustainability.
The points where the paths were change are named bifurcation points (cf. The bifurcation theory of Ilia Progogine).
The identification of these bifurcation points is very useful, in order to understand why they appeared, in relation with what elements of the system or outside it
and **to become capable to create such a favorable context in the future.**

Systemic Aprroach

- "The systemic approach differs from **reductionism**, by obliging to the consideration of complexity, keeping the ensemble of relations and elements. (...)
- It differs from **determinism**: not nature (or something else) commands; there is a set of relationships.
- We find engines, brakes, shifting speed etc : but not a primary cause or a last resort.
- It avoids putting excessive emphasis on genesis, which is often just another way to return to singularity (**excepţionalism –** n.n.) (...), by forcing to **the definition of the present state of the system** and of the residuals, it brings us to the situation to state equally historical relativity, and also changing and processes, laws, and operating models. " (Brunet, 1979, p. 406).

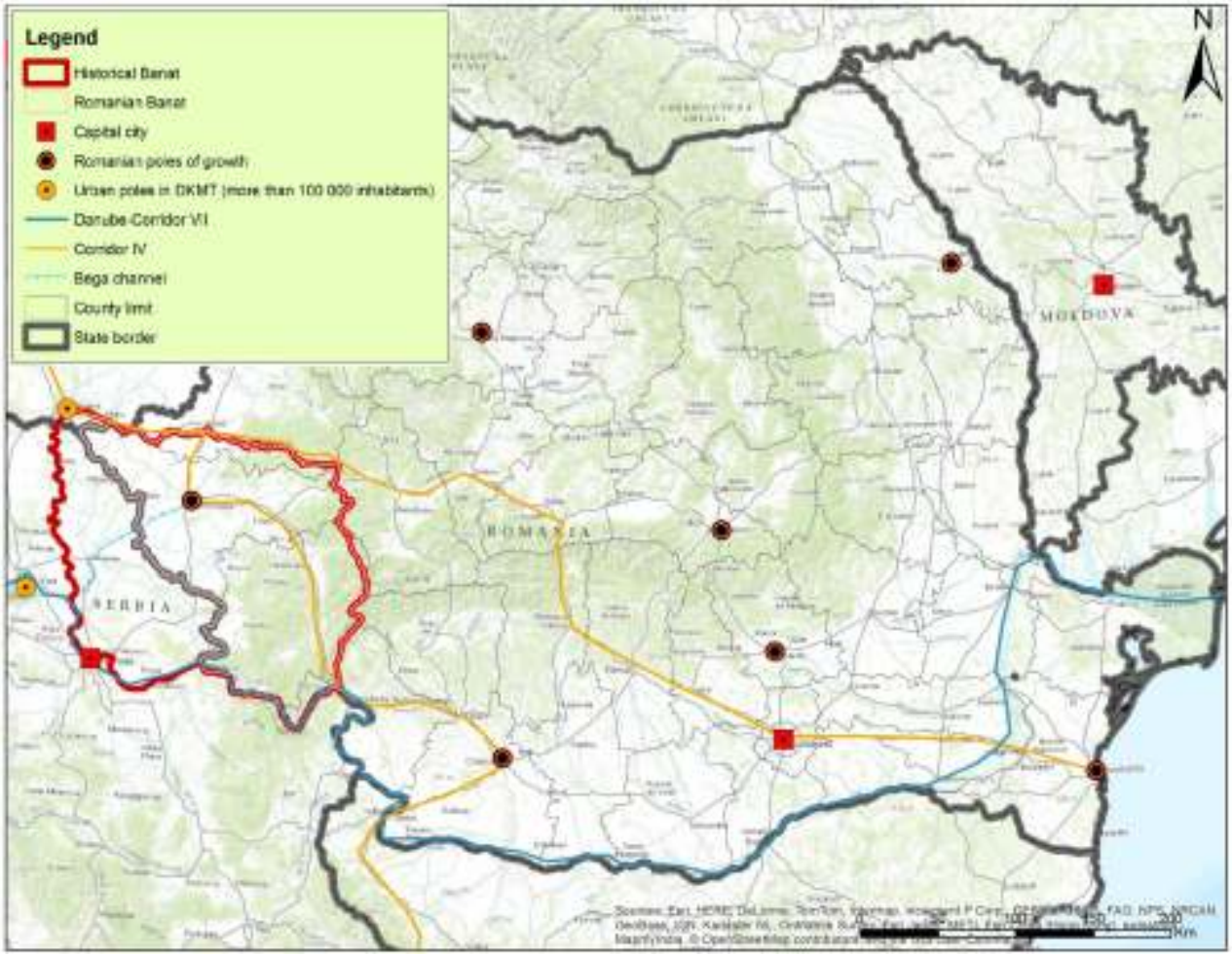
THE USE OF STSTEMIC APPROACH IN THE STUDY OF RURAL SPACE

1. Territorial disparities in Romanian Banat

2. Vulnerability and resilience in the rural space of Banat (Romania) in the post-communist period: an analysis of the factors determining differences in local development outcomes

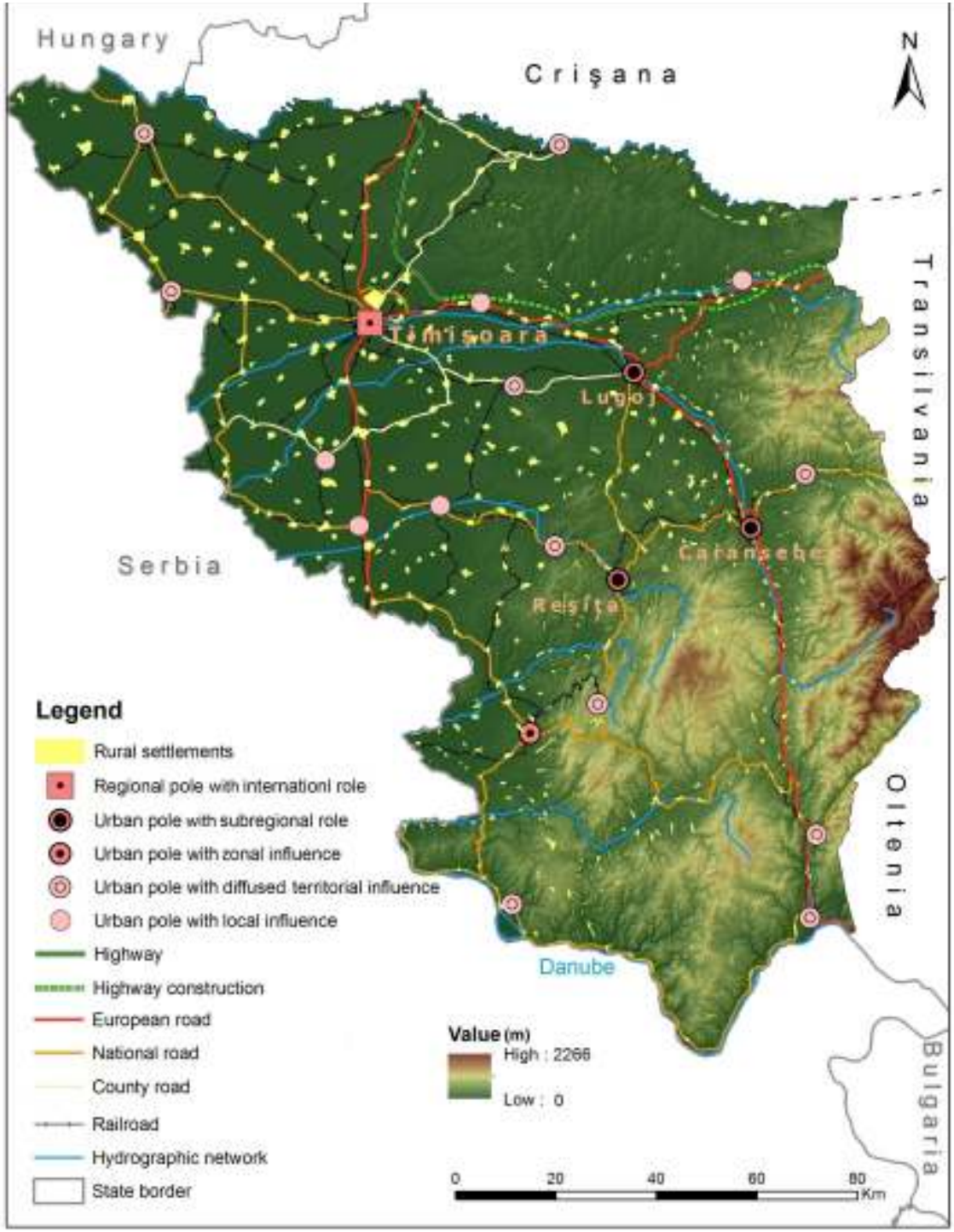
Banat region – some highlights

Banat region – some highlights



Banat, a historical and cultural region, today a cross-border region, which covers territory in three countries: Romania (with app. 19,000 sq. km.), Serbia (with 9276 sq. km.), Hungary (with 284 sq. km.). Formerly included in the Habsburg Empire (1718 - 1869) and the Austro-Hungarian Empire (1869-1918), which led to its multiethnic and multicultural character.

8% of the country;
5% of the population;
one of the most developed regions (cf. regional statistics indicators - turnover, investment).


Hungary
Crişana
N
Transilvania
Timişoara
Lugoj
Caransebes
Reşiţa
Serbia
Oltenia
Danube
Bulgaria
Legend
Rural settlements
Regional pole with internationl role
Urban pole with subregional role
Urban pole with zonal influence
Urban pole with diffused territorial influence
Urban pole with local influence
Highway
Highway construction
European road
National road
County road
Railroad
Hydrographic network
State border
Value (m)
High : 2266
Low : 0
0
20
40
60
80
Km

1st example of the use of systemic approach: Territorial disparities in Romanian Banat

(communication done at the 2nd Serbian Geographers Congress, 10 – 11 decembrie 2010, Novi Sad)

(for detailed study, see: ANCUȚA, Cătălina (2010), Territorial disparities in the Romanain Banat: ssessment, dynamic and impact on the territorial system, in Journal of Urban and Regional Analysis, vol. II, no. 2, pp.45-62)

Set of components	Analyzed indicators
Natural components	physiological density (inhabitants/agricultural hectares)
Social components	unemployment (SOM), percent of employees in the active population (SAL), percent of old population (over 60 years of age/total population) (BAT), the intensity of depopulation (DEP);
Built components	built surface (sq m per inhabitant) (SUP) number of telephones at 1000 persons (TEL).
Economic components	turnover/capita (AFA), SMSs density
Psichological components	Entrepreneurial behaviour – measured through the *density of SMSs* Attitude towards the education – *measured through the percent age of high school graduates in the over 12 years of age population (LIC)*

- The choice of indicators has been done in relation with the concepts of territorial system, of development and also in relation with the statistical offer.
- *The evaluation of territorial disparities has started from the differenciation between: elementary disparities and global (territorial) disparities.*
- *Elementary disparities are* spatial diferentiation of the **components**, structure or different processes of the territorial system. They are revealed through the analysis of values of every indicator.
- *Teritorial (global) disparities which are* differences of the performance of the **subsystems of the territorial system. They are revealed through the analysis of a complex indicator.**

Algorithm of the analysis of territorial disparities

- analysis of **individual indicators**, in order to determine their "weight" in the global disparities, their convergence or divergence in the period 1992-2002 and to evaluate their role in increasing or decreasing global disparities; The indictors were analysed for two moments:
- **1992** (just after the change of the political regime) and **2002** (after 10 years of economical and political transistion);
- analysis of the **complex indicator** which will render evident the *two fundamental types of areas* in relation with the norm: *favourized areas* (above regional average) and *defavourized areas* (below the regional average);

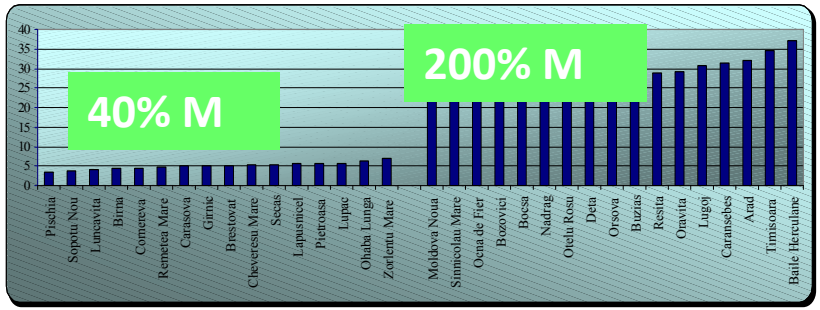
- The indicators were analysed in terms of dispersion: the lowest and the highest 10% of the values and the respectives values of the average reported to the regional average (M);

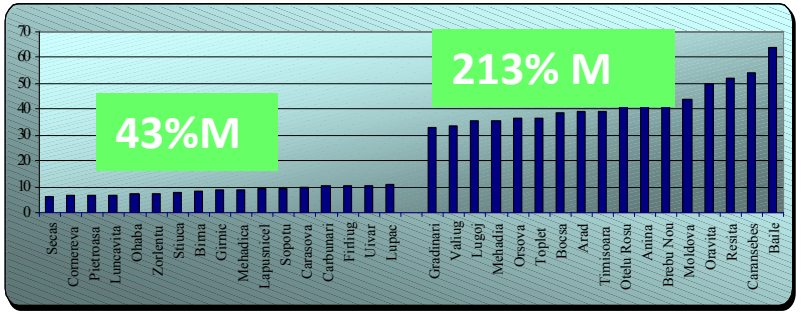
- dynamic mapping of the indicator (1992; 2002);

- **SWOT analysis** of the areas makes possible the establishing of spatial tipology, which will reveal the state of the system; (strengths and weaknesses of inside the system; opportunities and threats of outside the system;

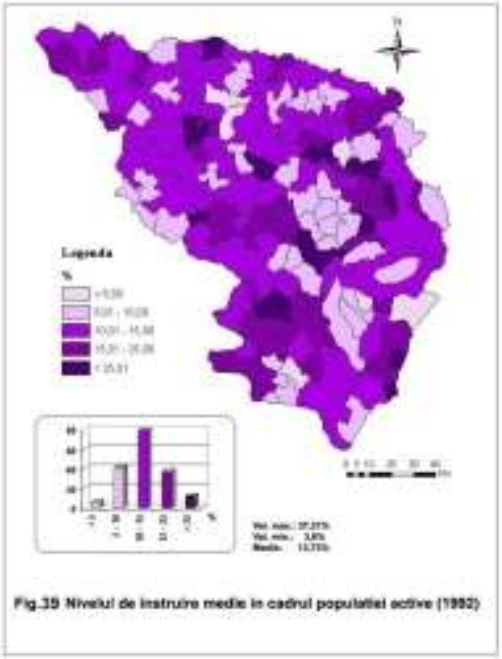
- establishing of the **regional model**.

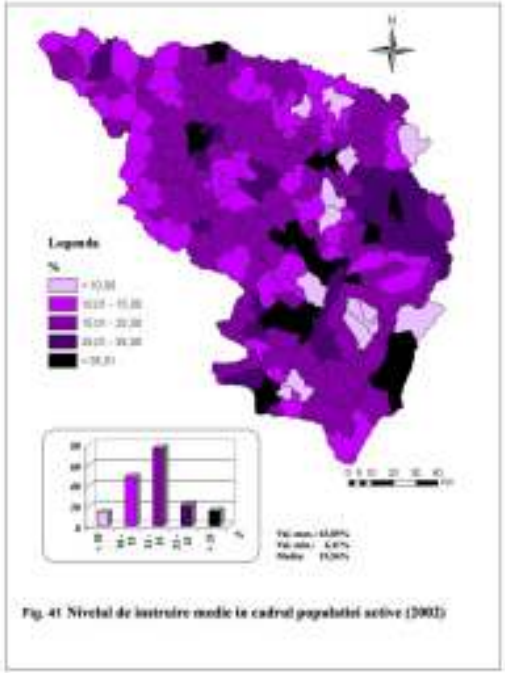
Example of analysis of <u>elementary</u> indicators:
Level of instruction: percent of high school graduates in the over 12 years of age populaion





1992



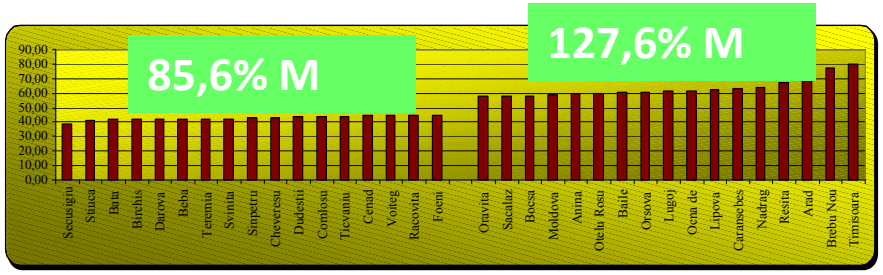


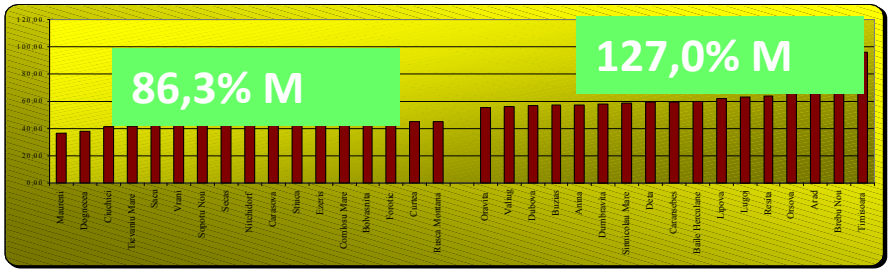
2002

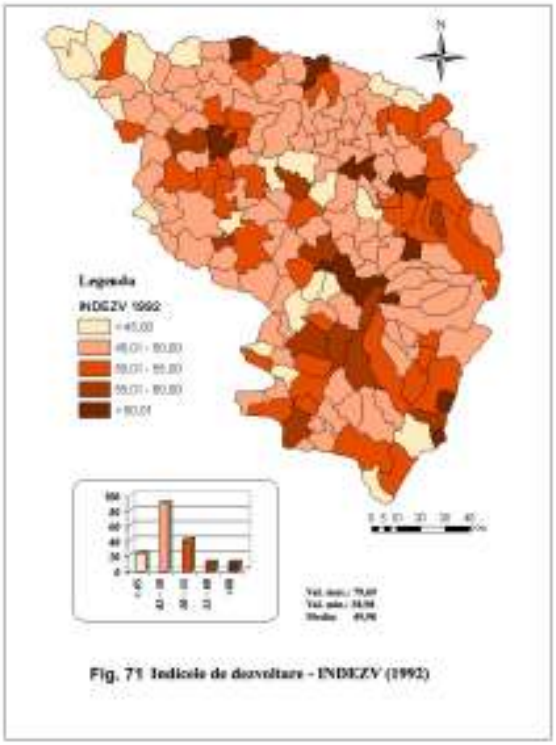
The analysis of complex indicator:

The complex indicator

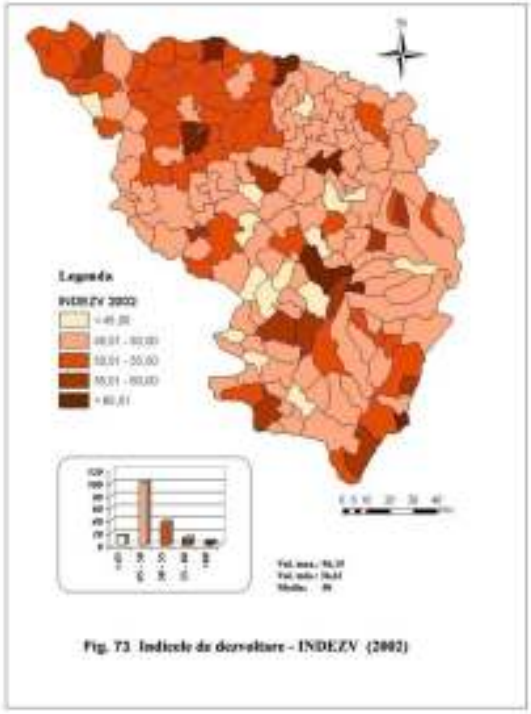
INDEZV : 50+14(AFA+SUP+LIC+TEL+DEF+SAL-DEP-AGR-BAT-SOM)/10







1992



2002

The statistical values if the INDEZV 2002 indicator have imposed 4 classes of values for which the following qualitative correspondence can be established:

INDEZV 2002 value class	Level of development in comparison with regional average
< 45	very weak
45,01 - 50,00	weak
50,01 - 55,00	average
55,01 - 60,00	good
> 60	very good

- *favourized* areas (F), with INDEZV superior to the regional average
- *defavourized* areas (D), with INDEZV inferior to the regional average.

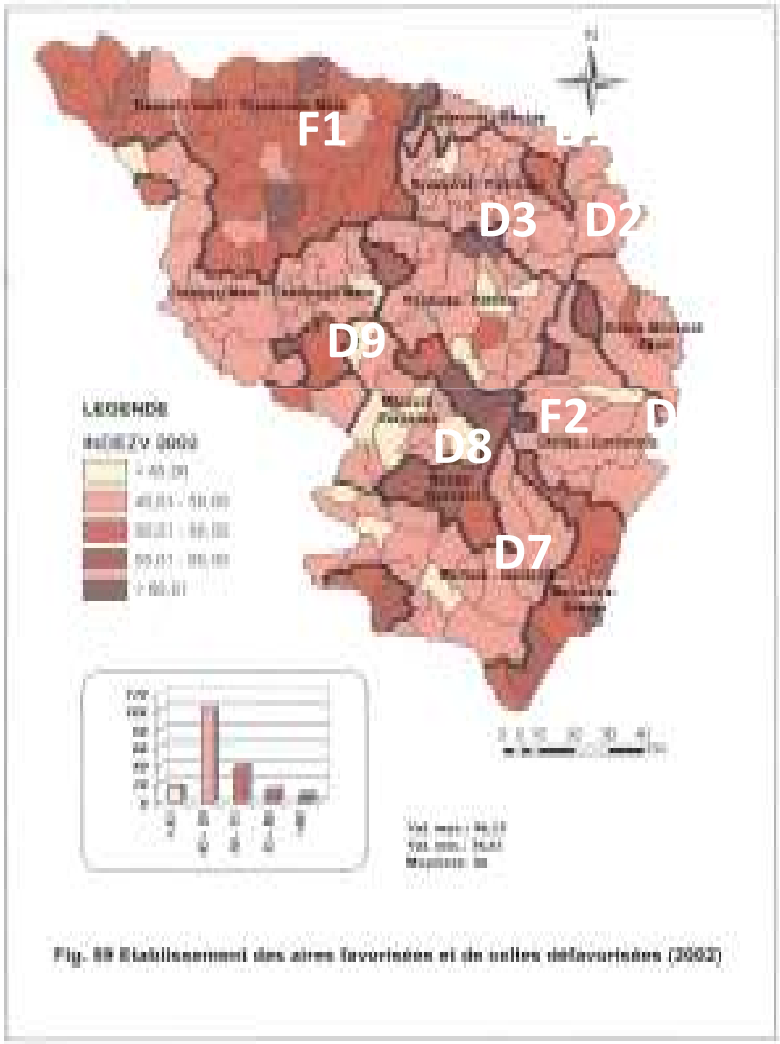


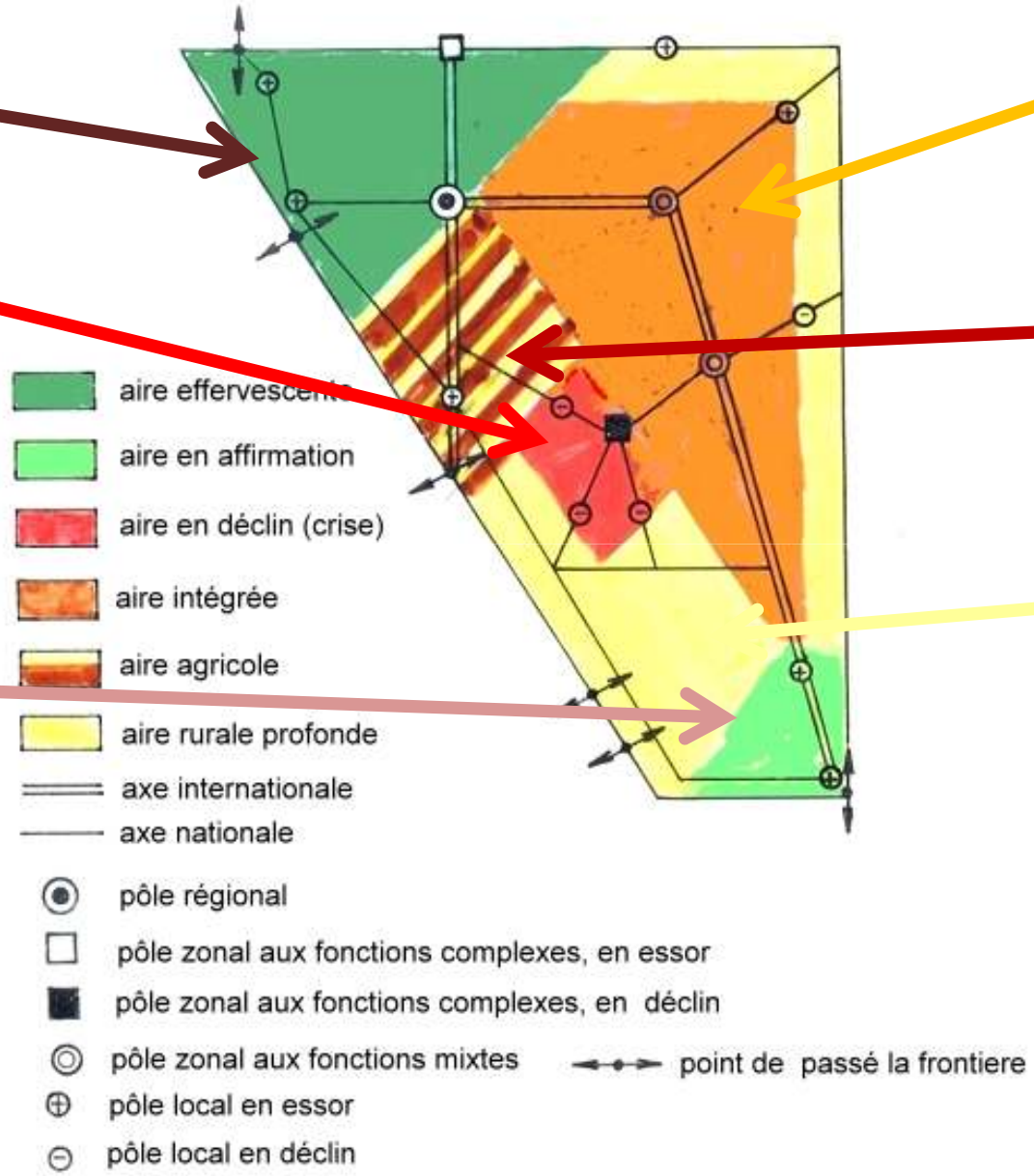
Fig. 89 Etablissement des aires favorisées et de celles défavorisées (2002)

Territorial model of the Romanian Banat Region

effervescent area

area in crisis

area in emergenece



integrated rural area

agricultural area

profound rural area

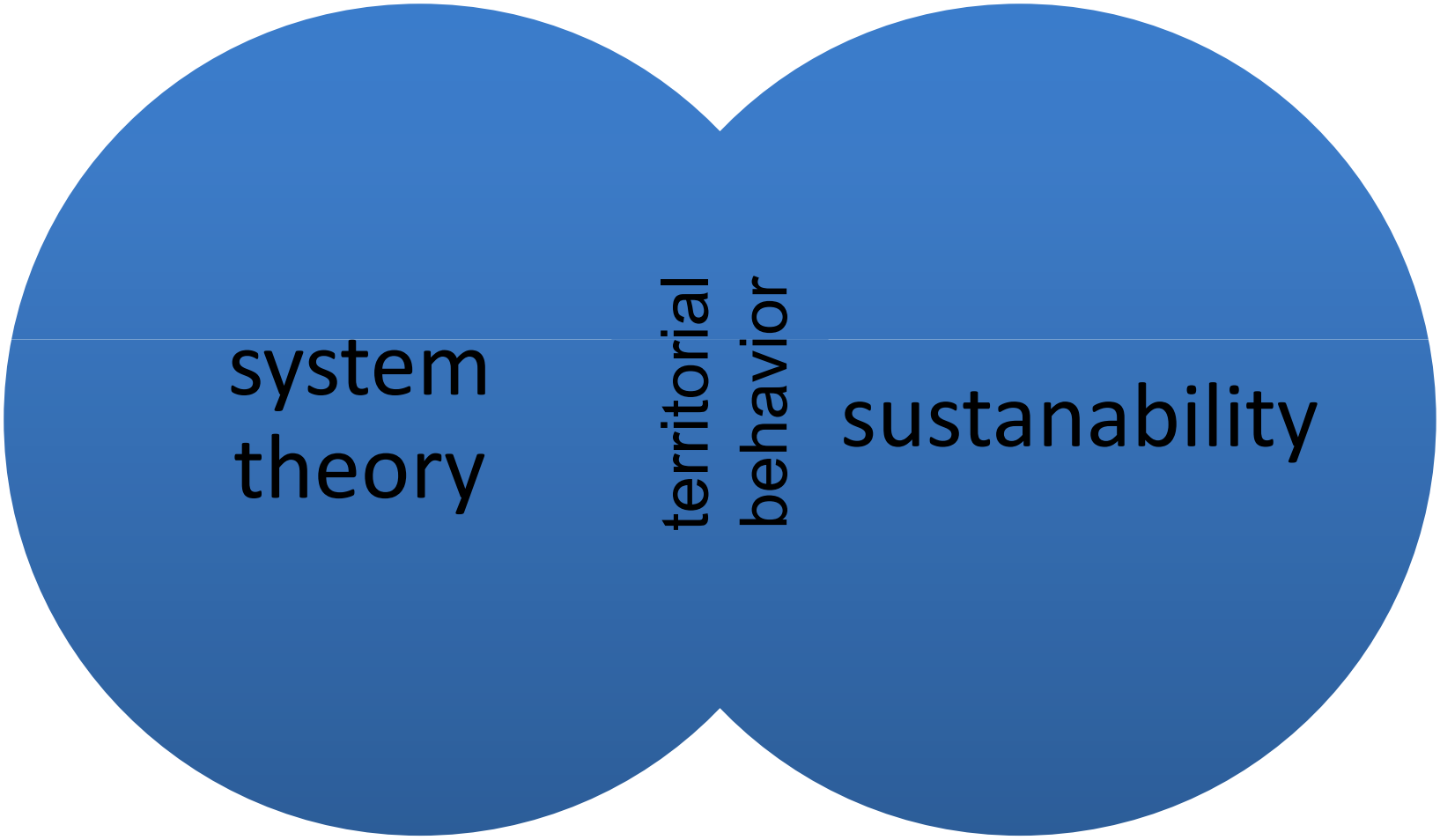
2nd example of the use of the systemic approach

Vulnerability and resilience in the rural space of Banat (Romania) in the post-communist period: an analysis of the factors determining differences in local development outcomes

Communication done at the 22nd Annual Colloquium Commission on the Sustainability of Rural Systems International Geographical Union Bucharest and Sibiu, Romania 24 August - 3 September 2014

For the whole study, see: Ancuța, Cătălina etal. (2015): *Evaluation of the sustainable development of rural settlements. Case study: rural settlements from Romanian Banat*, in Carpathian Journal of Earth and Environmental Science, vol. 10, pp. 67-80.

Conceptual frame



Conceptual frame

- **Vulnerability**

- '80 (ecology): vulnerability to natural risks and hazards (Timmerman, 1981, UNDRO, 1982)
- ’90: *vulnerability of social groups* to social,economic and political conditions (Liverman, 1989; Adger, 1999);
- 2000: weak capacity of a social-ecological system to respond to disturbances which affect its integrity;
- extent to which a SE system can be affected by the impact of a disruptive element / pressure factor;
- vulnerability of communities, vulnearbily of regions.

Conceptual frame

- **Resilience**

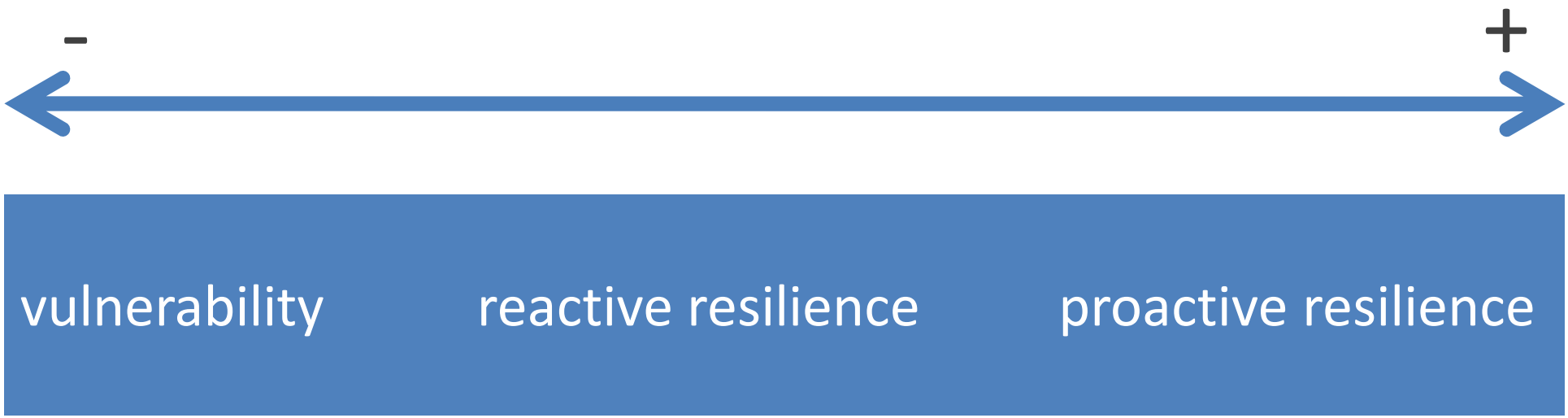
- **R of ecological systems:** the ability of the system to maintain its structure and patterns of behaviour in the face of disturbance (Holling, 1986, cf. Skerratt, 2013);

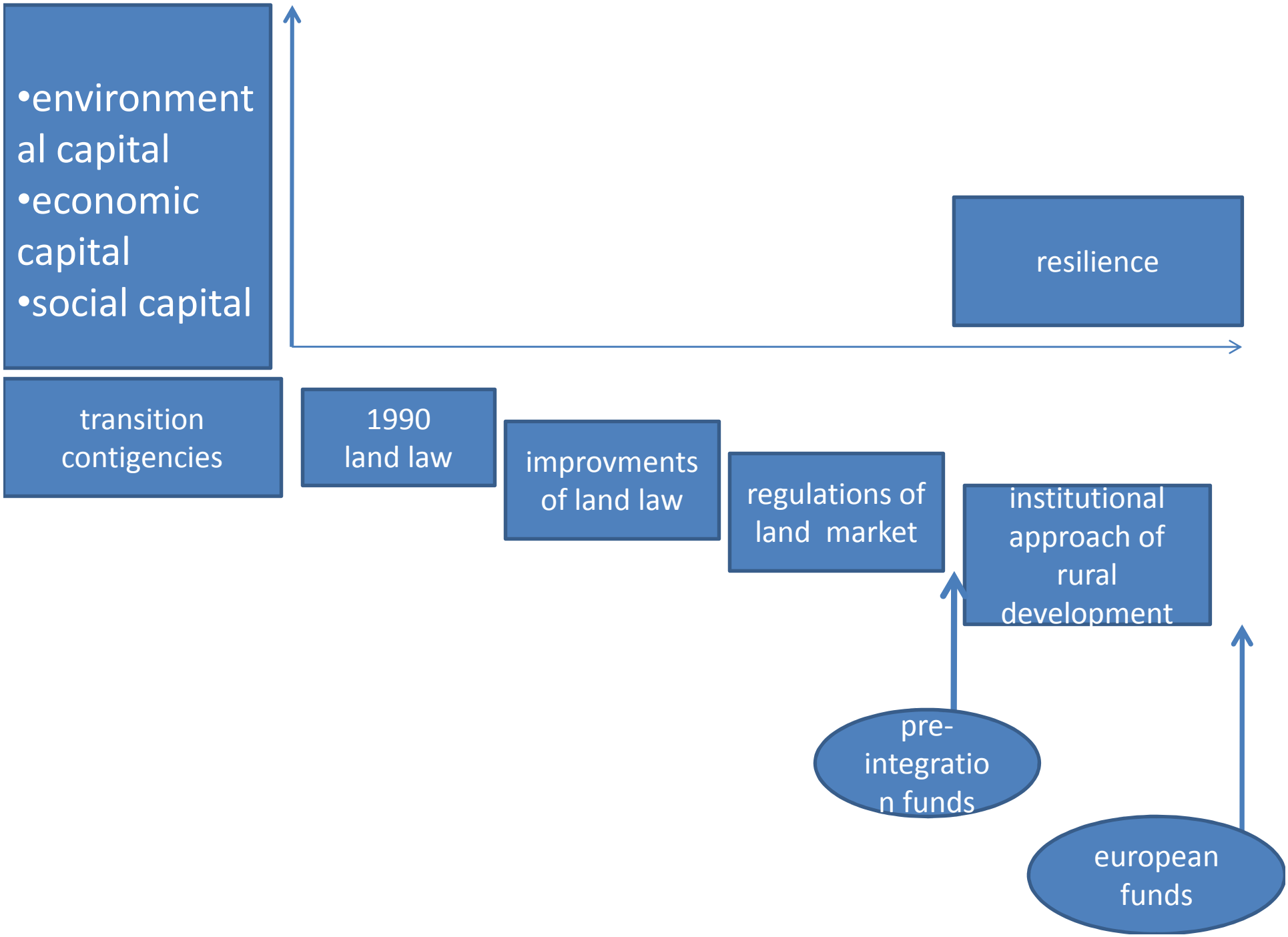
- **R of social-ecological systems:** the ability of communities to withstand external shocks (Adger 2000).

Conceptual frame

- *reactive* resilience (*adapt, modify* their characteristics or behaviour) (Maguire and Cartwright, 2008, idem);

- *pro-active resilience (anticipate changes; influence changes*, sustain and renew the commuity, develop new trajectories) (Magis, 2010,ibidem).




•environmental capital
•economic capital
•social capital
resilience
transition contigencies
1990 land law
improvments of land law
regulations of land market
institutional approach of rural development
pre-integration funds
european funds

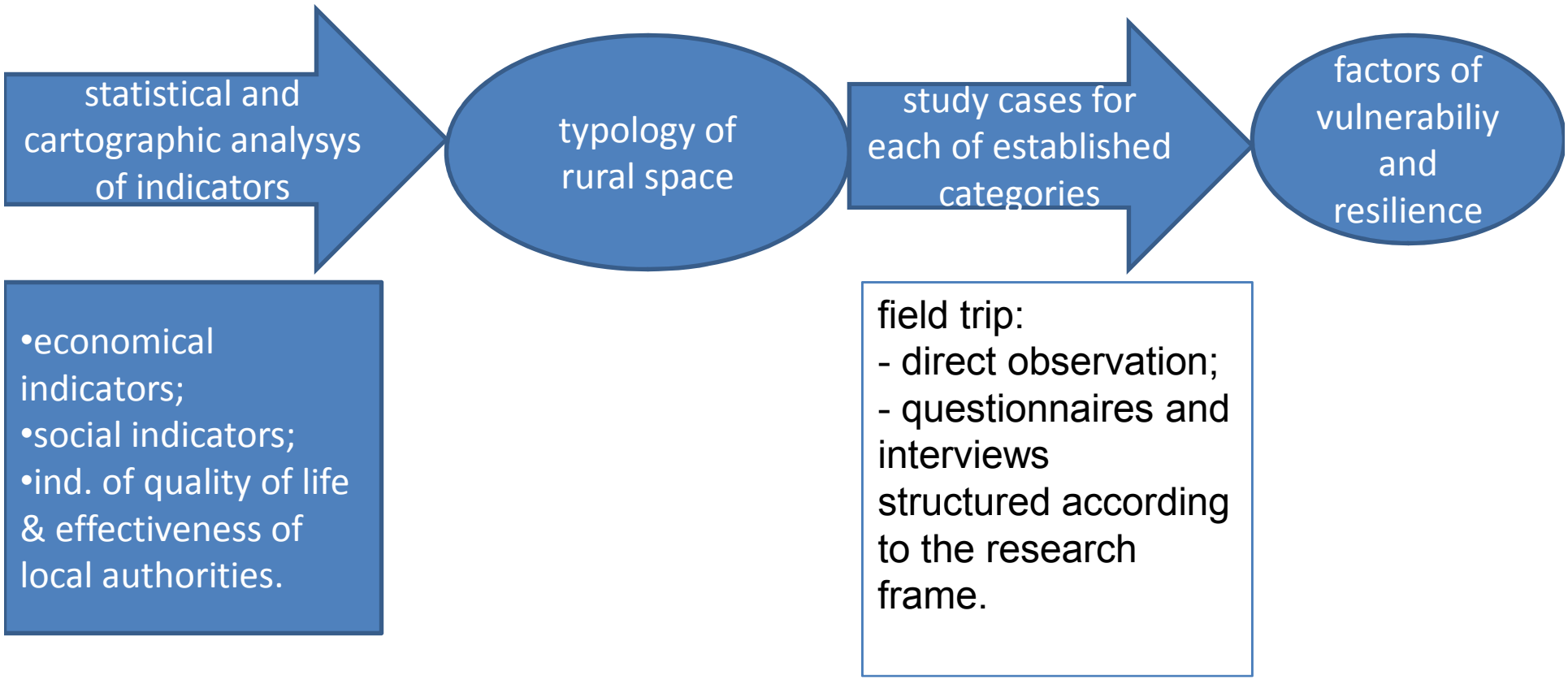
Objectives of the study

- establishing a typology of rural communes according to their behavior after 1989, in a context of transition from communist regime to democracy and open market;

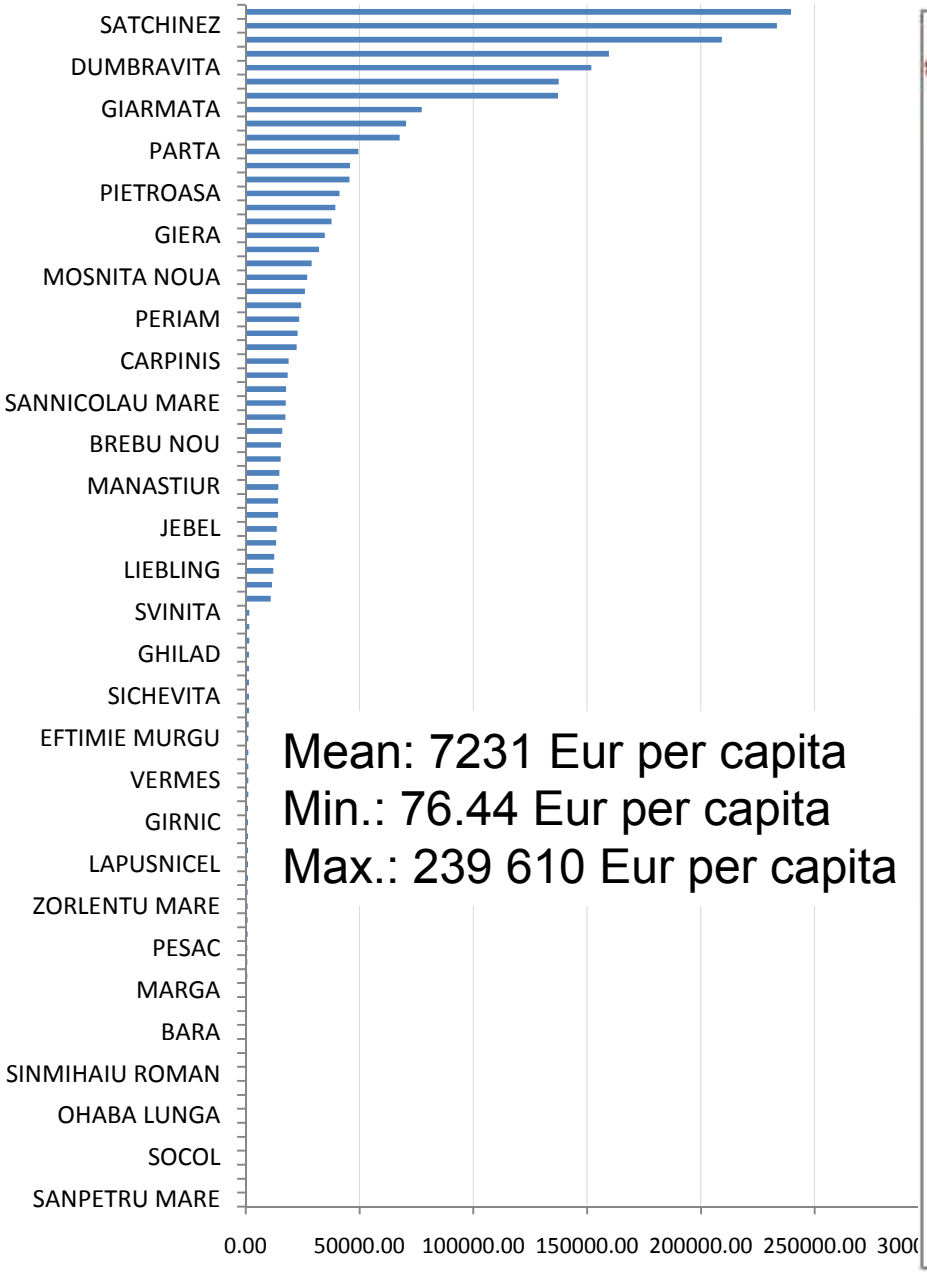
- identifying the specific factors responsible for the trajectory of each category of rural communes.

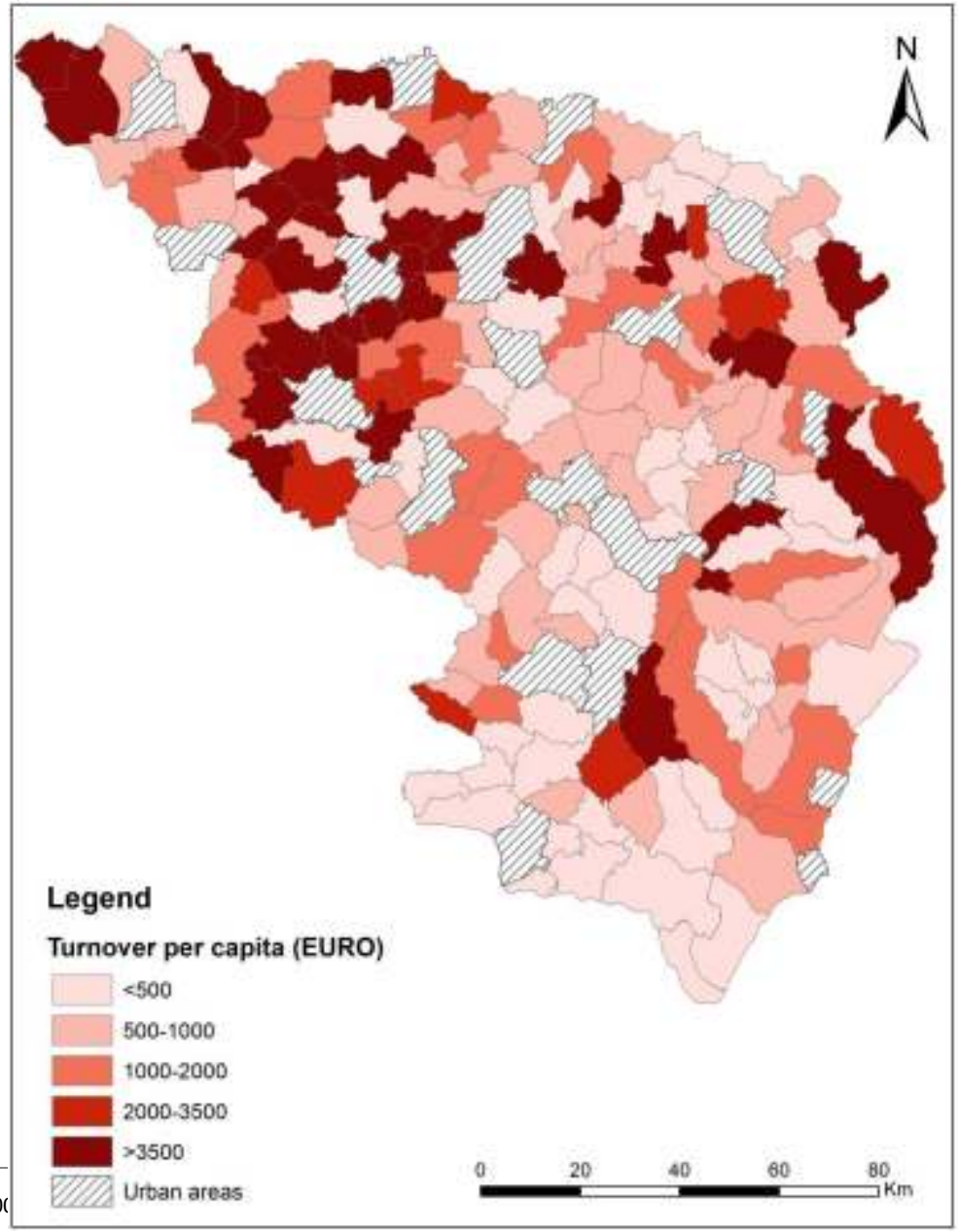
Methodology

- the approach of resilience/vulnerability is possible when evaluating the changes occured in the system (Wilson, 2012), i.e of the *level of performance of the system*;

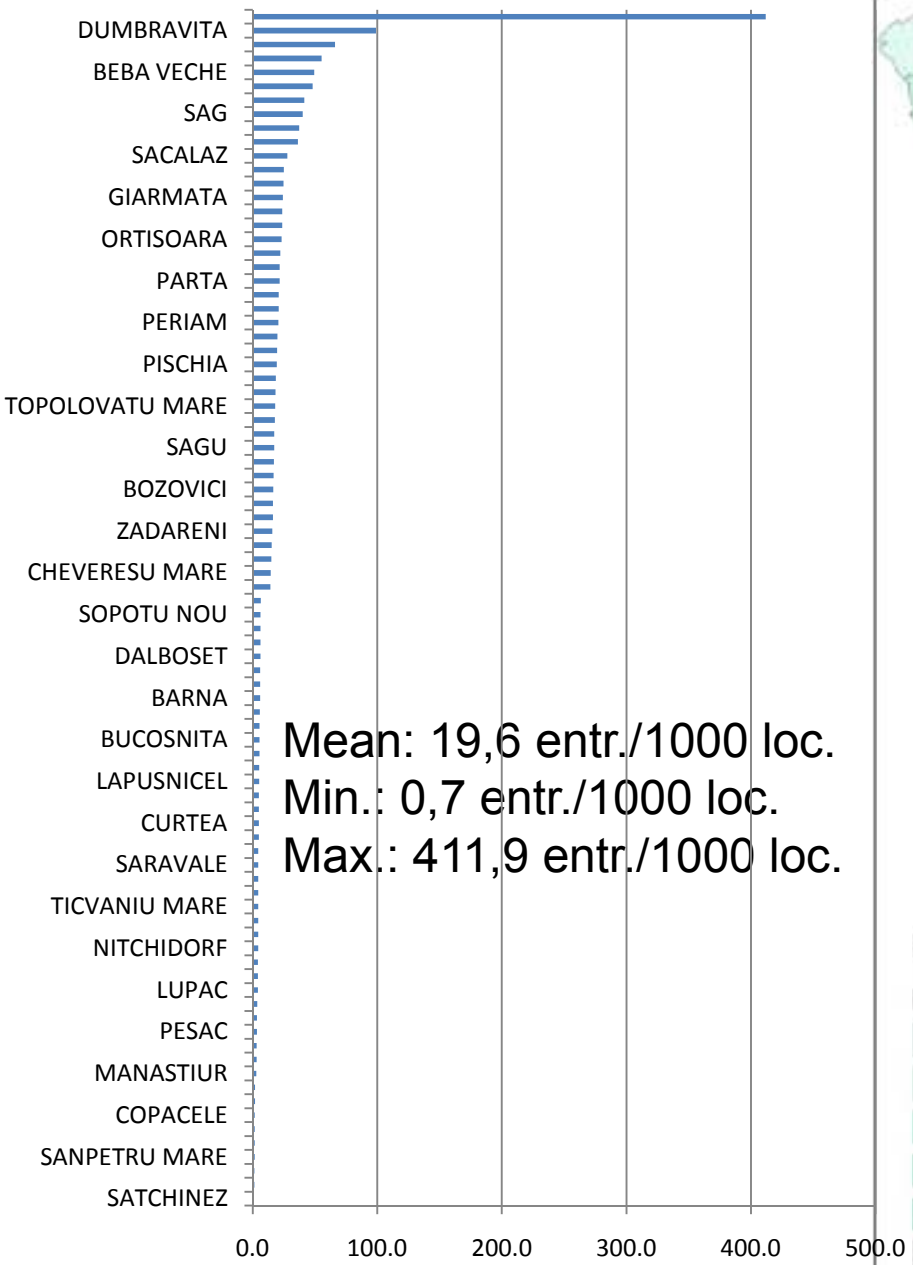


TURNOVER PER CAPITA

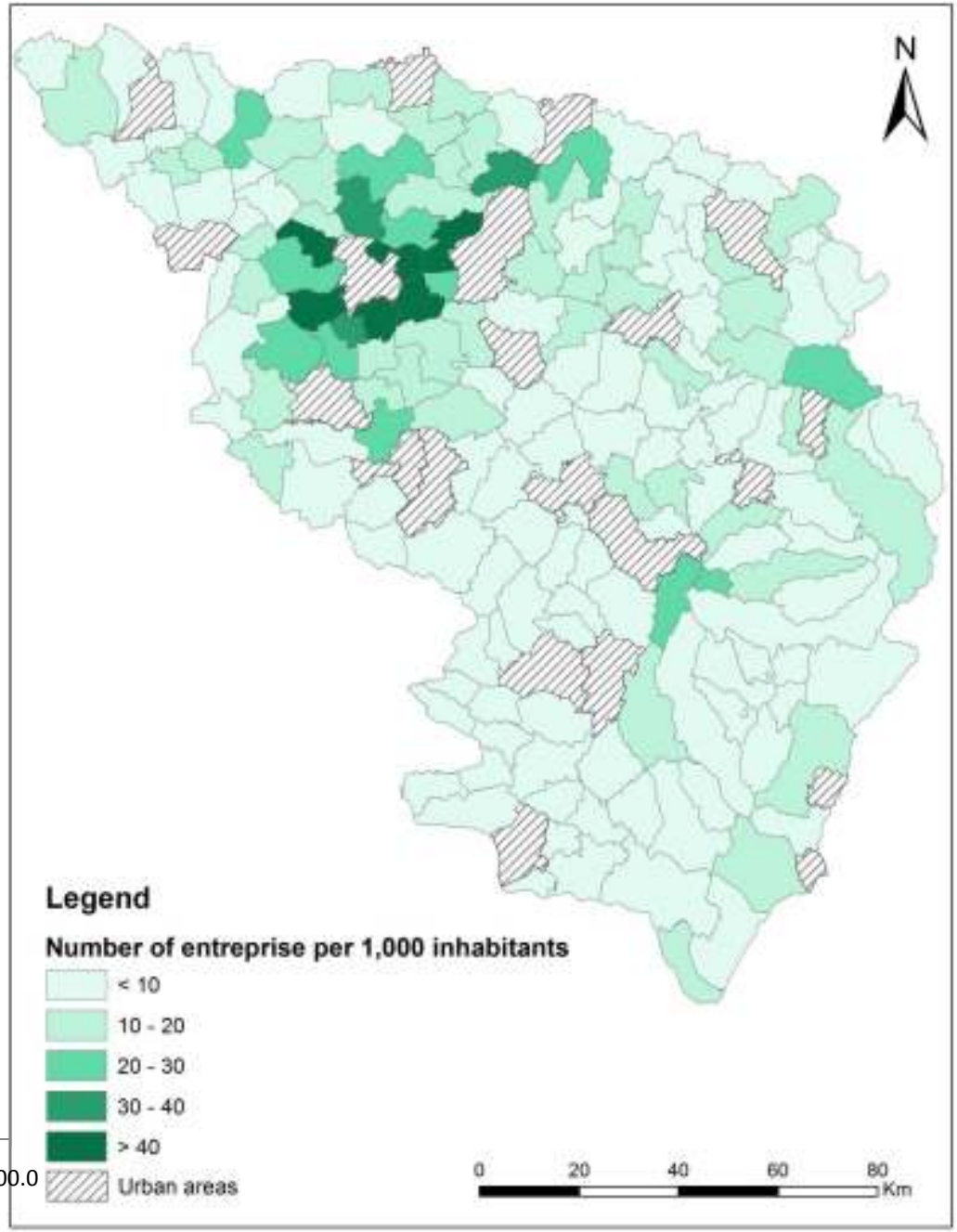




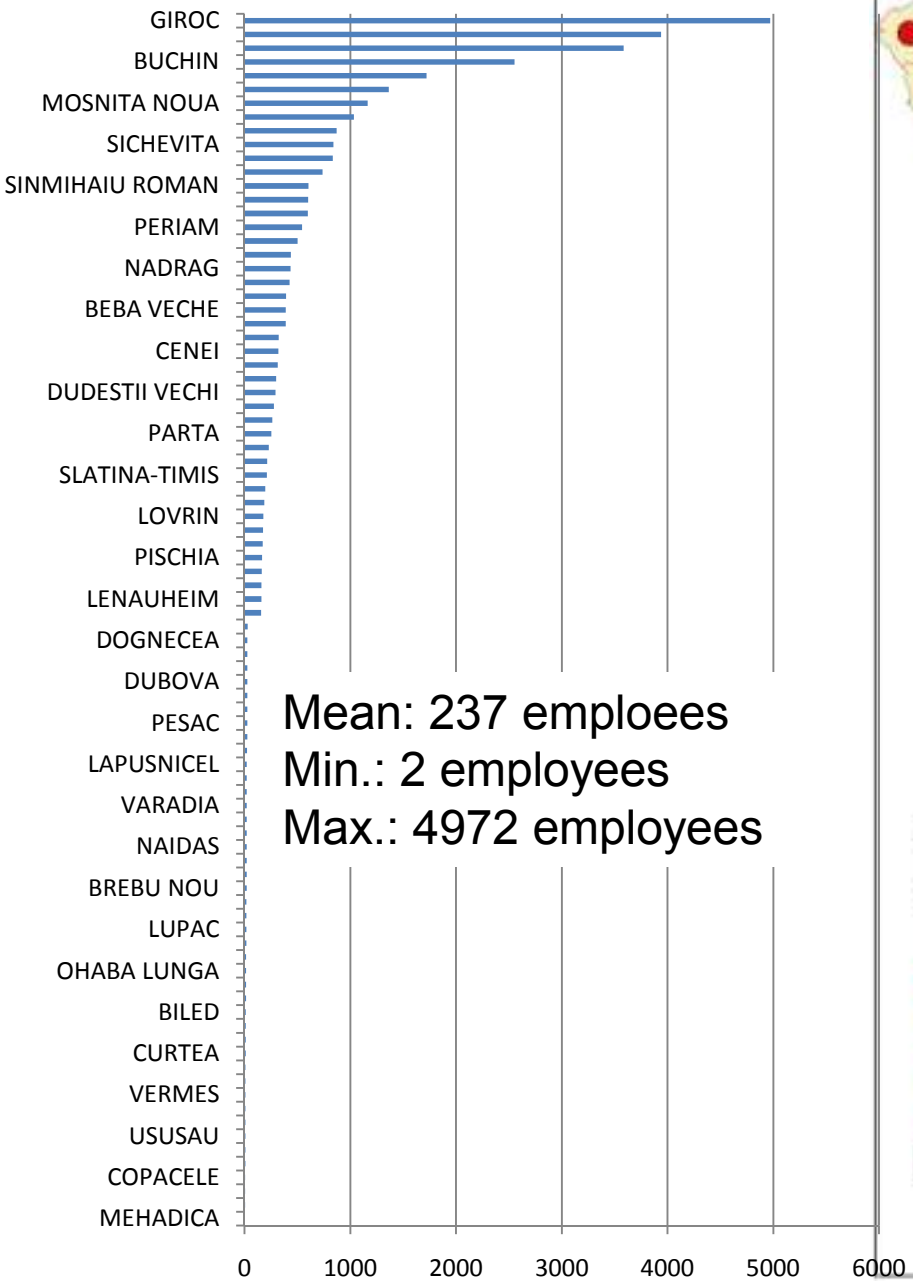
NUMBER OF ENTREPRISES PER 1000 INHABITANTS



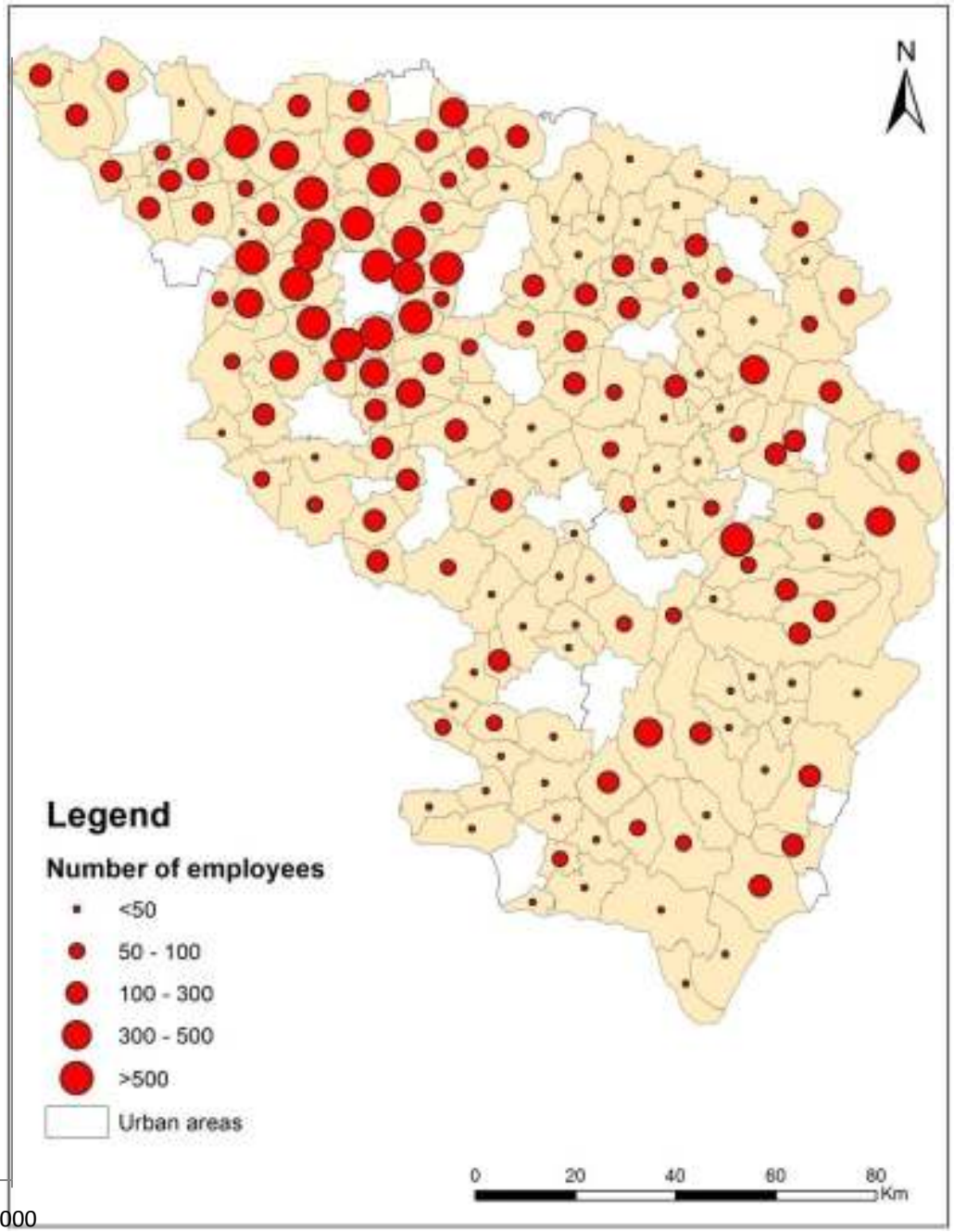
Mean: 19,6 entr./1000 loc.
Min.: 0,7 entr./1000 loc.
Max.: 411,9 entr./1000 loc.



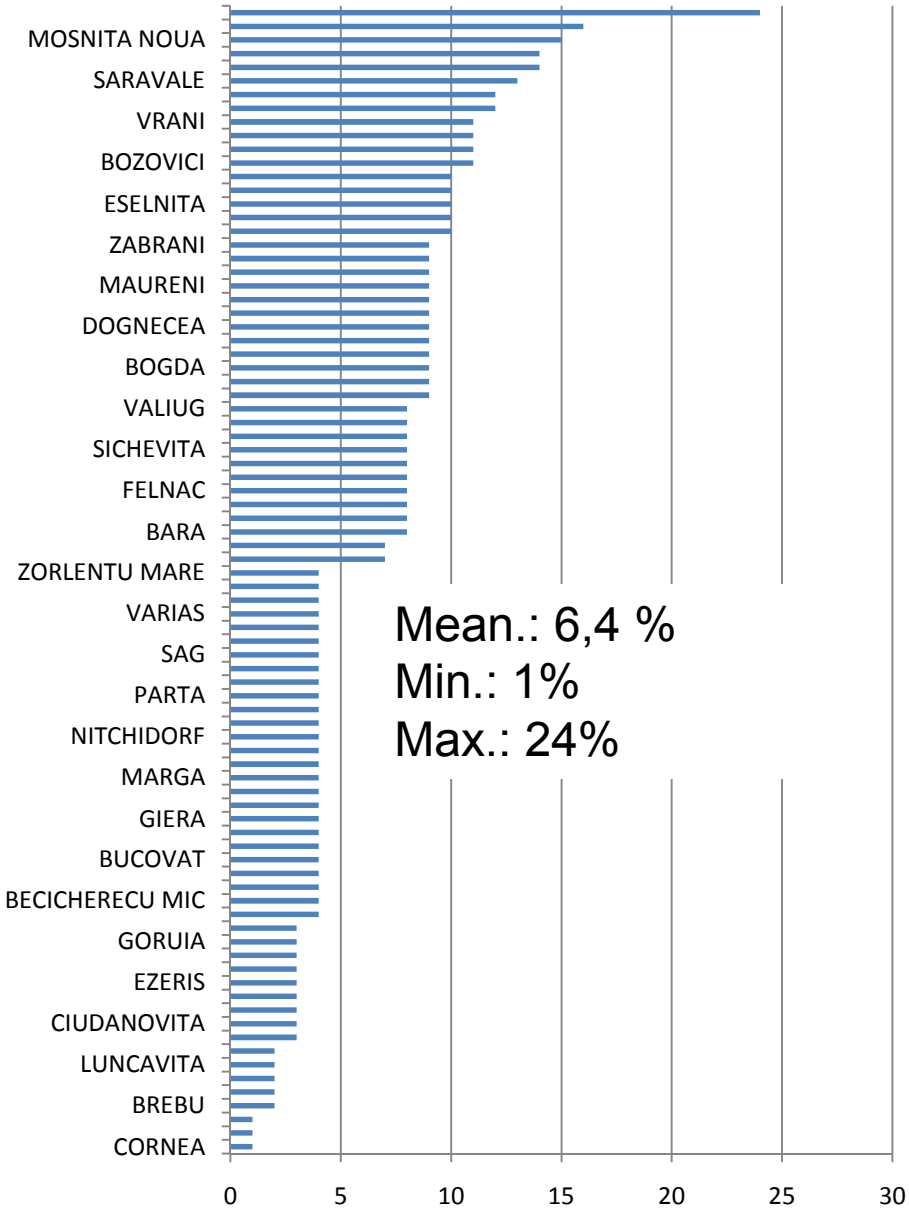
NUMBER OF EMPLOYEES

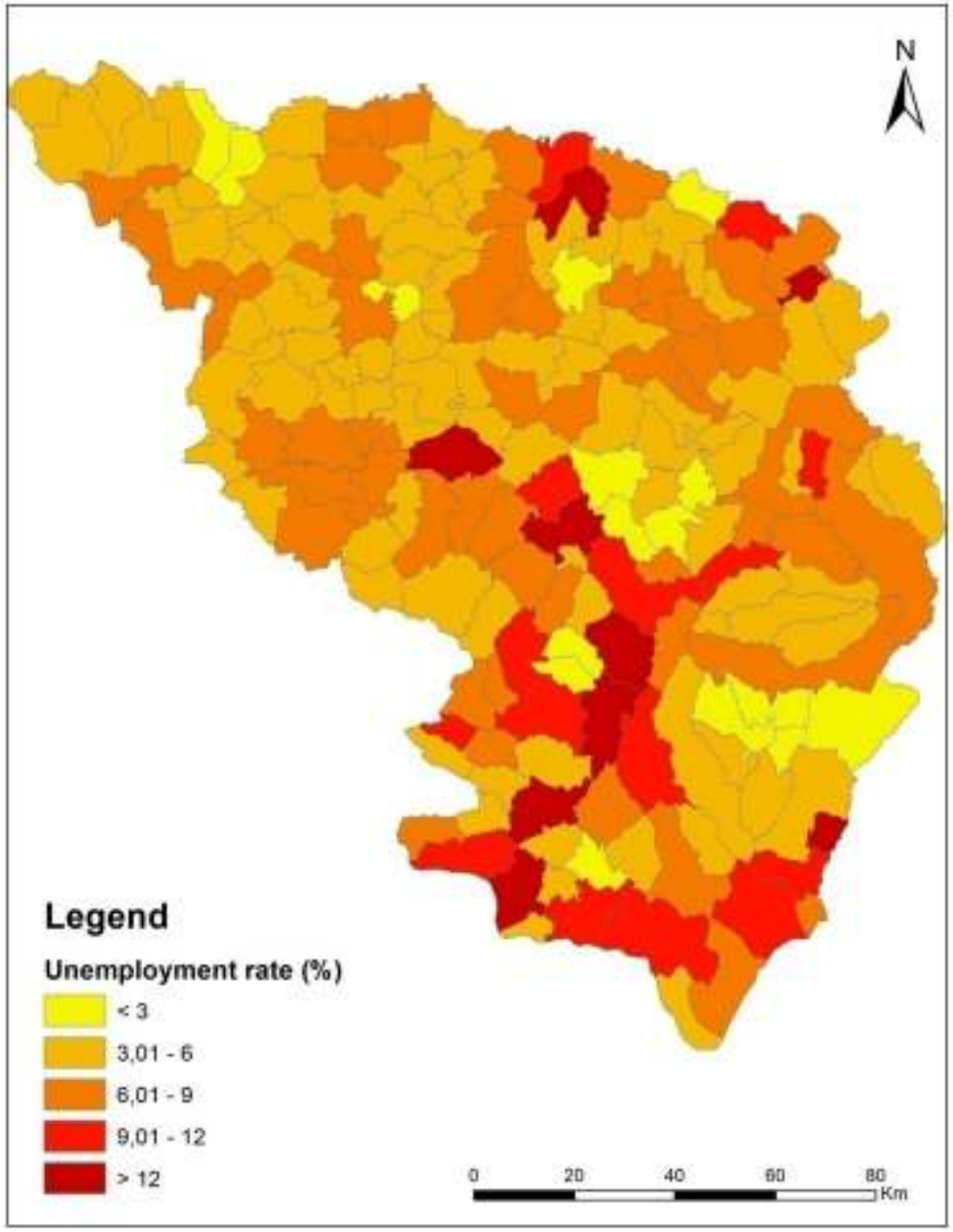


Mean: 237 emploees
Min.: 2 employees
Max.: 4972 employees

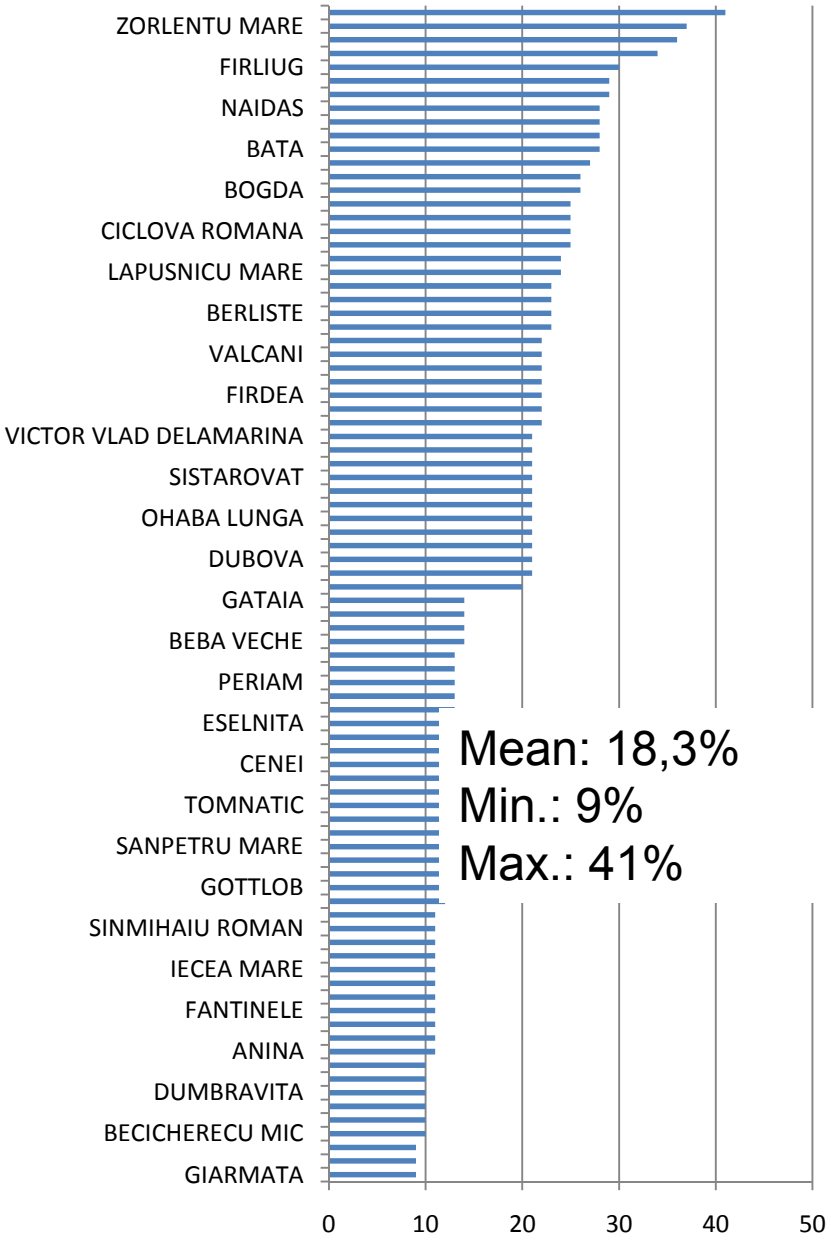


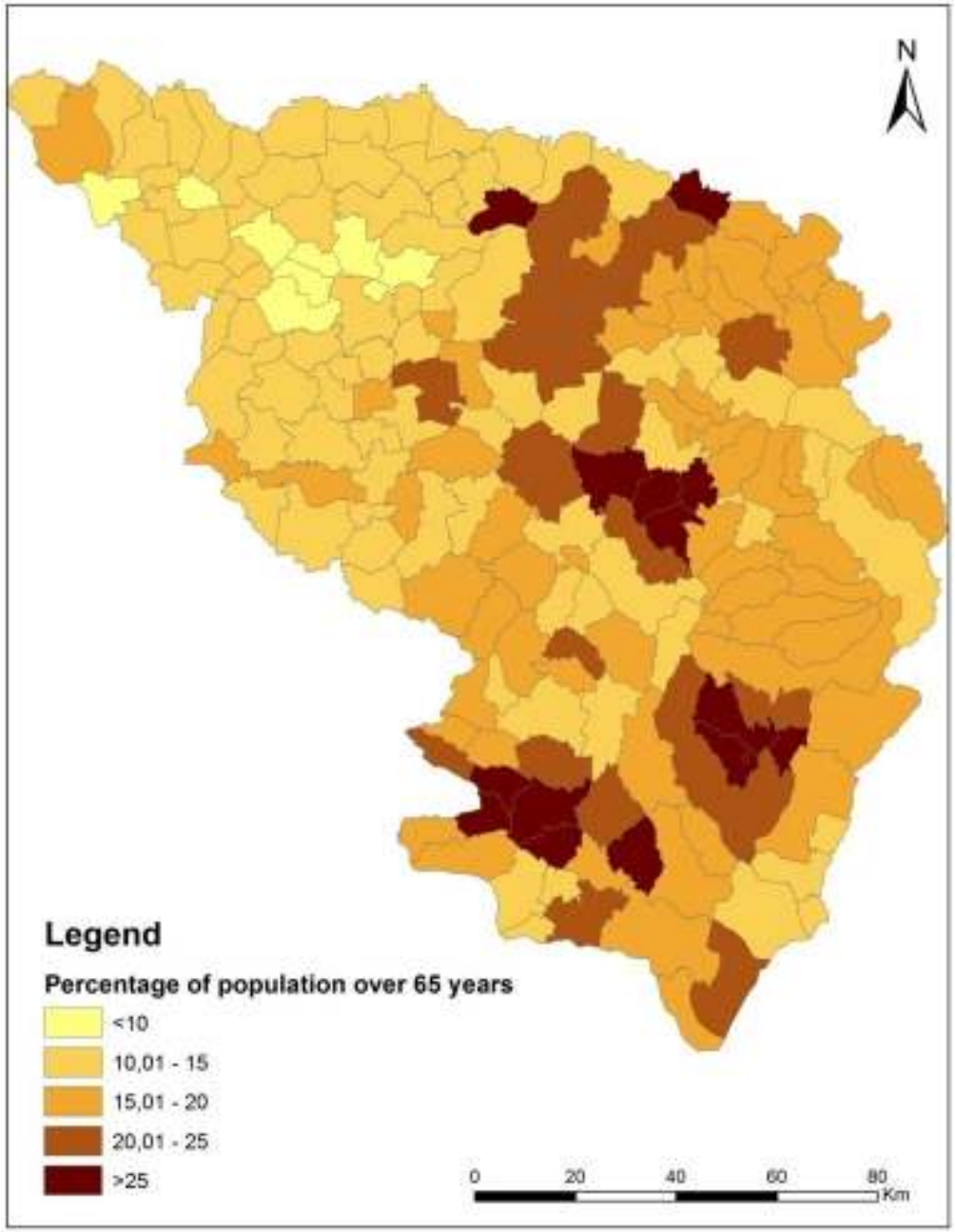
UNEMPLOYMENT RATE



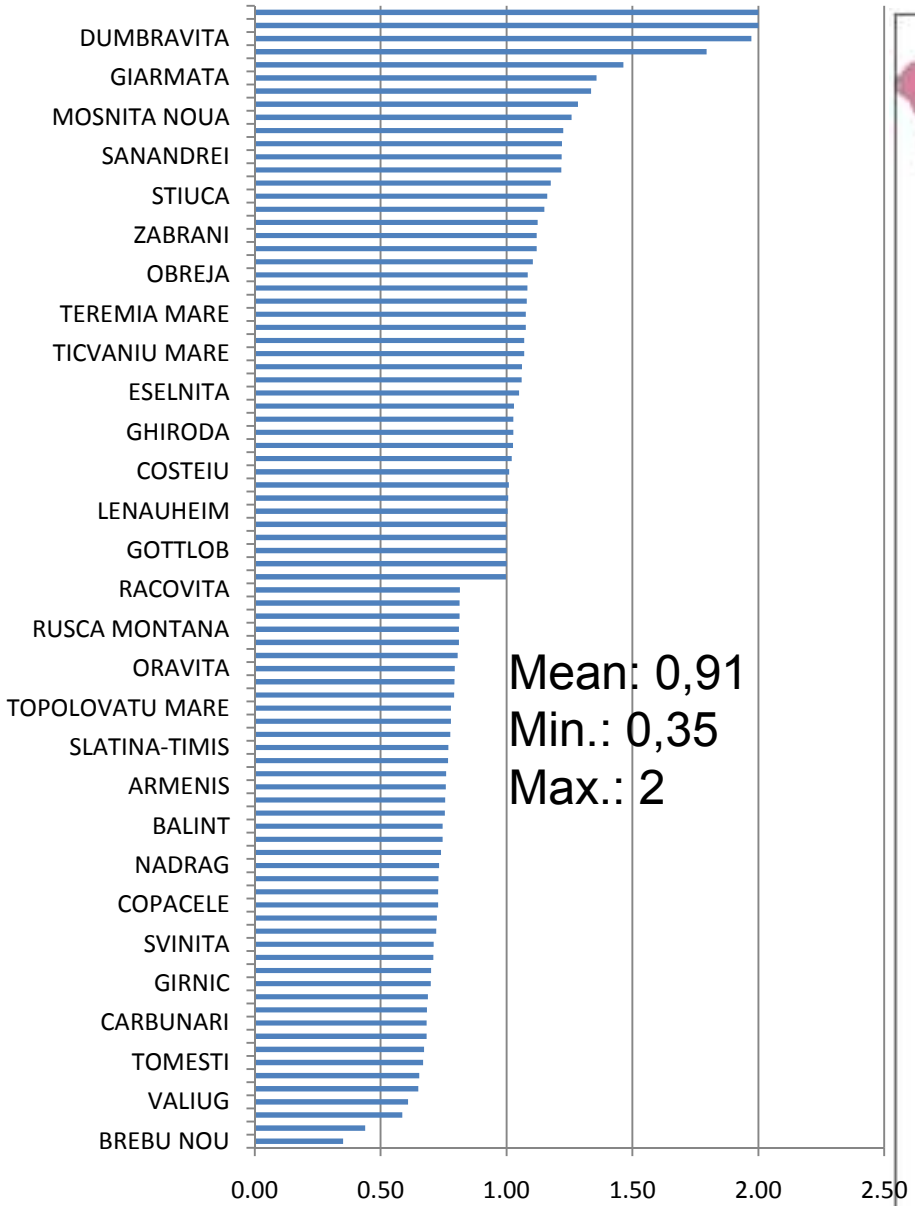


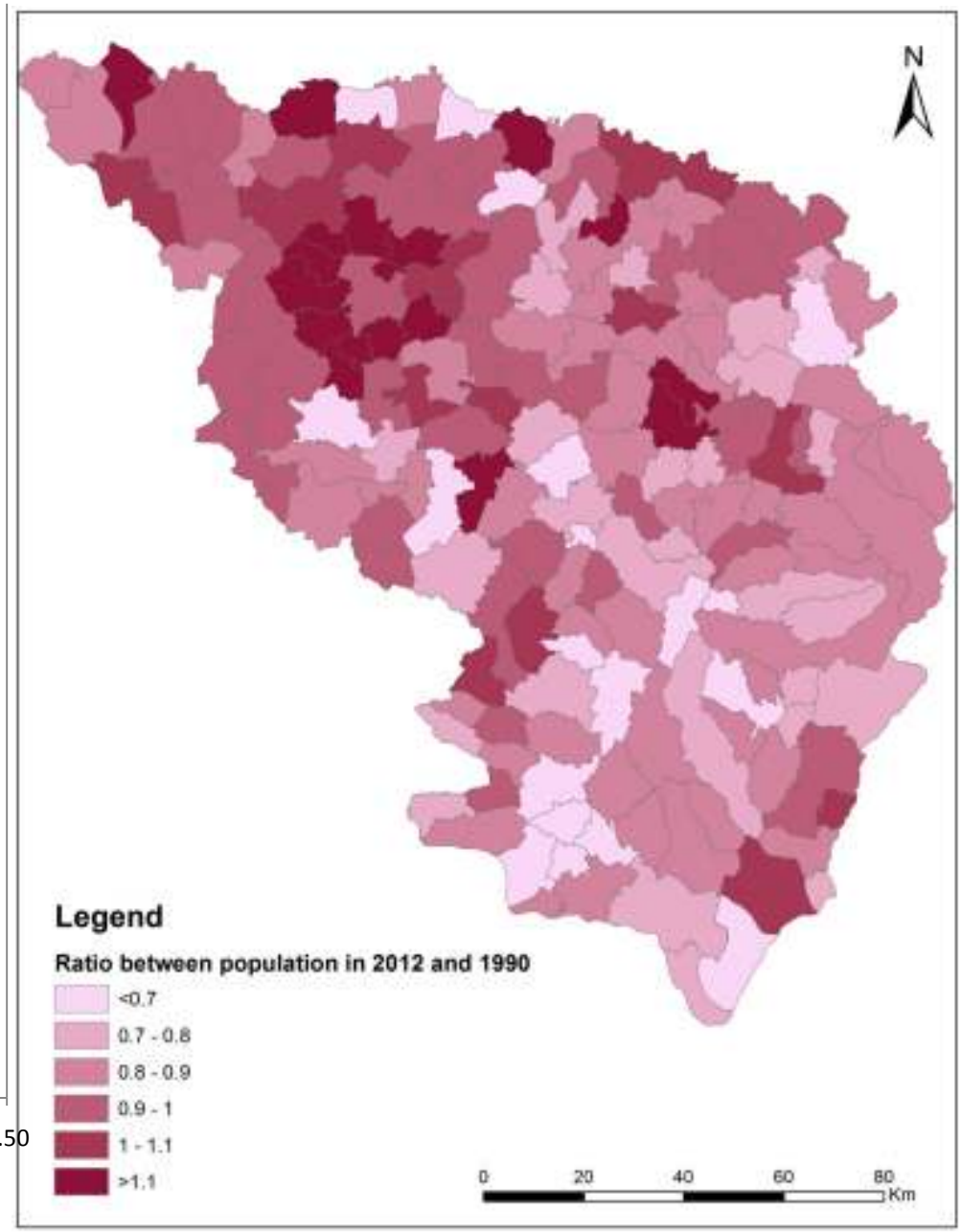
SHARE OF POPULATION OVER 65 YEARS



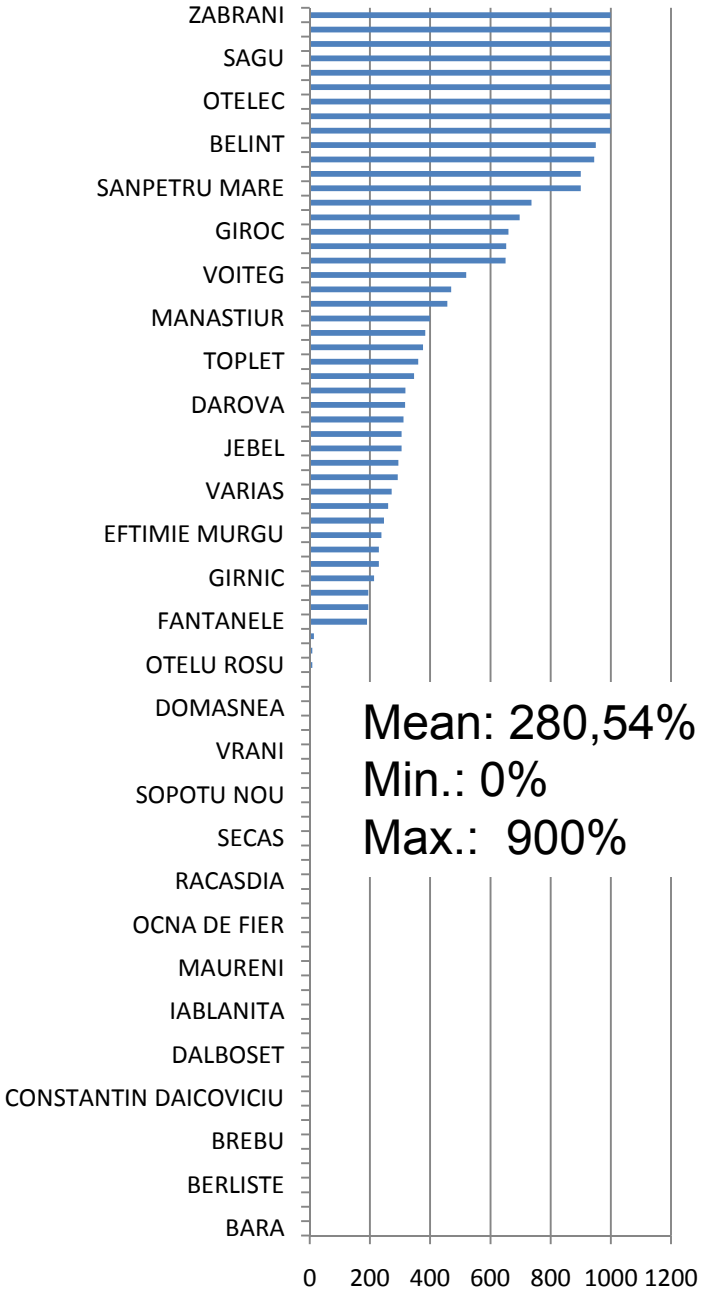


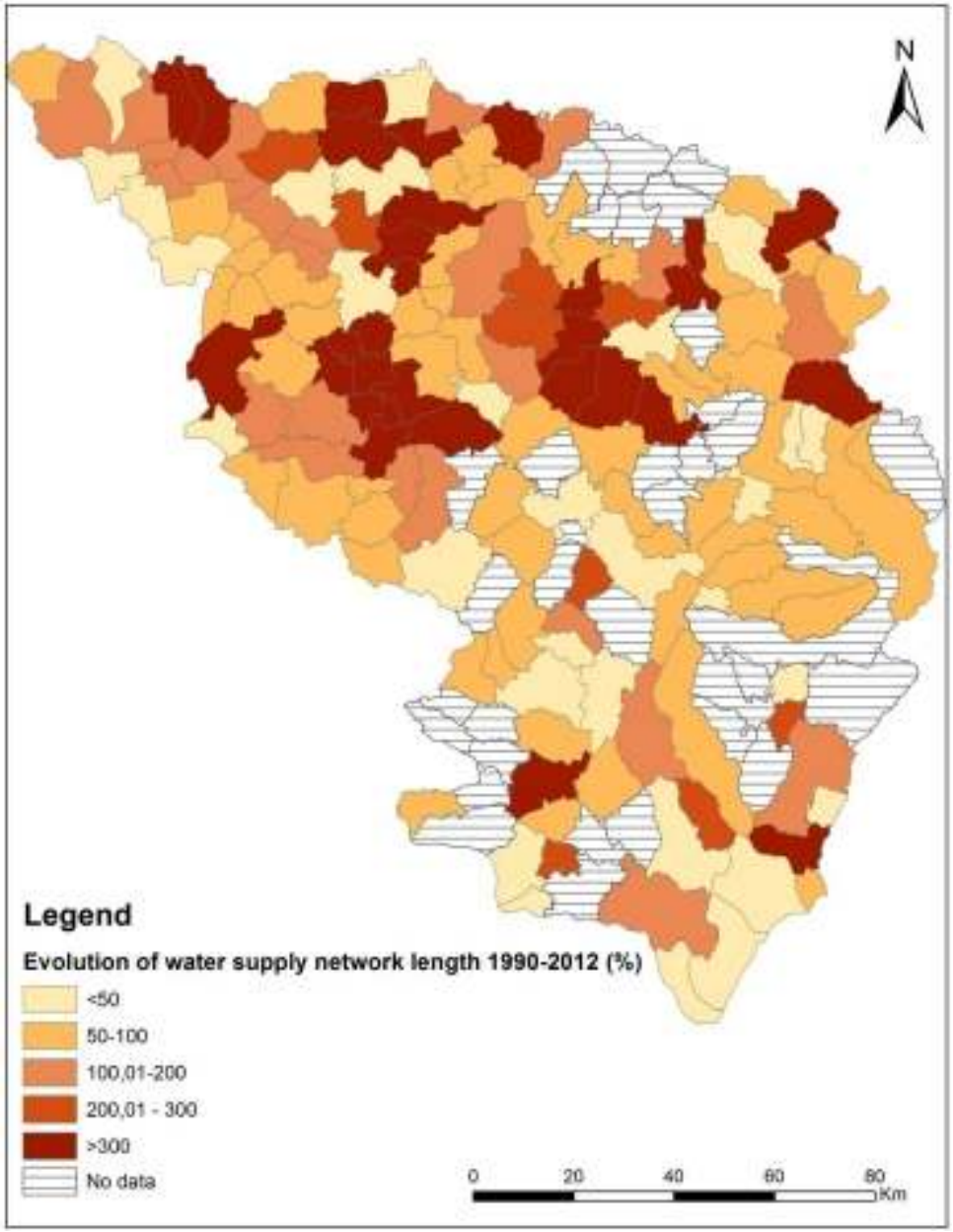
RATIO BETWEEN POPULATION IN 2012 AND 1990



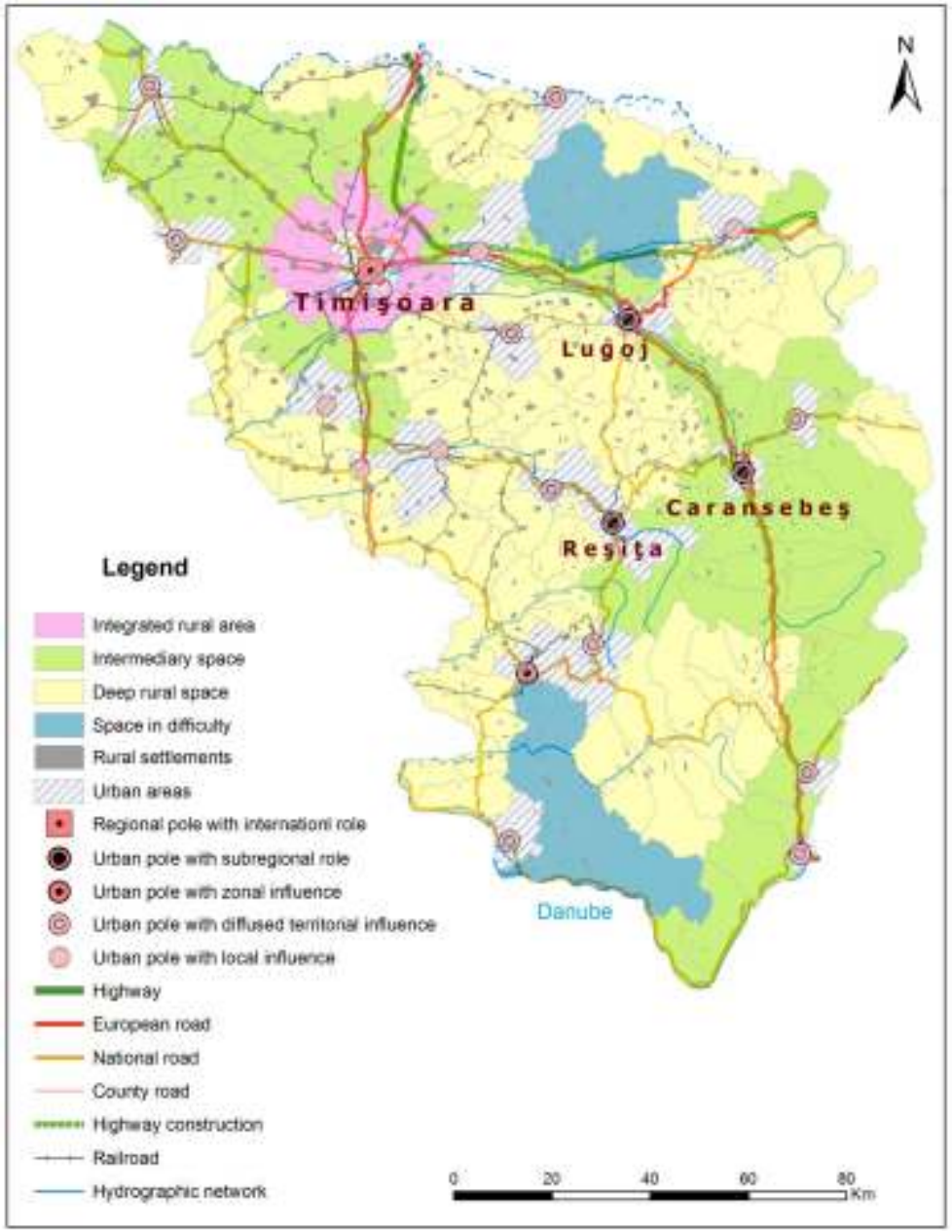


EVOLUTION OF WATER SUPPLY NETWORK LENGTH 1990-2012 (%)





Typology of rural areas



•**integrated rural areas**: demographic growth – counter urbanization,
-jobs in diverse economical sectors;

-**intermediary rural areas:**
- predominance of the agriculture; involution of the population;

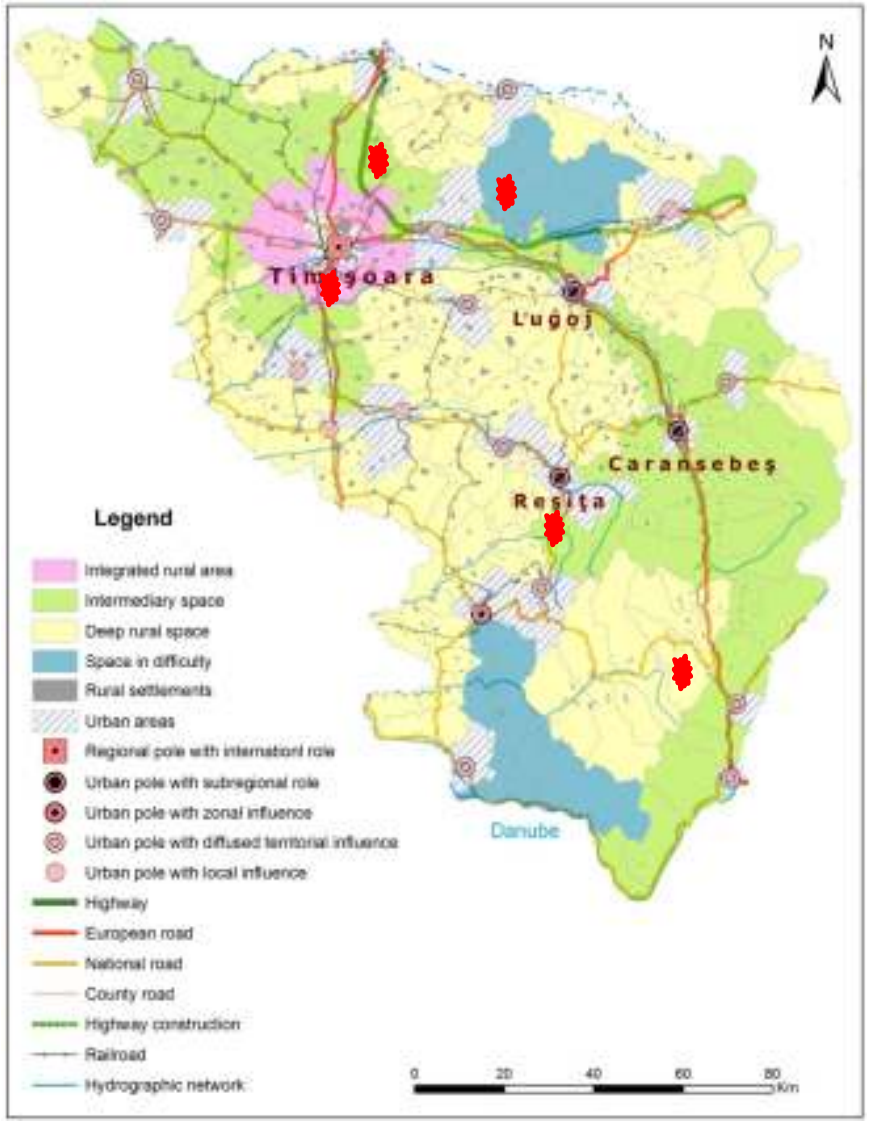
•**deep rual space**:
-big share of aged population;
-defficient accecibility to complex urban poles.

•**rural space in difficulty:**
-share of aged population over 40%;
- big unemployment rate;
-destructuration of social services;
-difficult accesibility.

resilience

vulerability

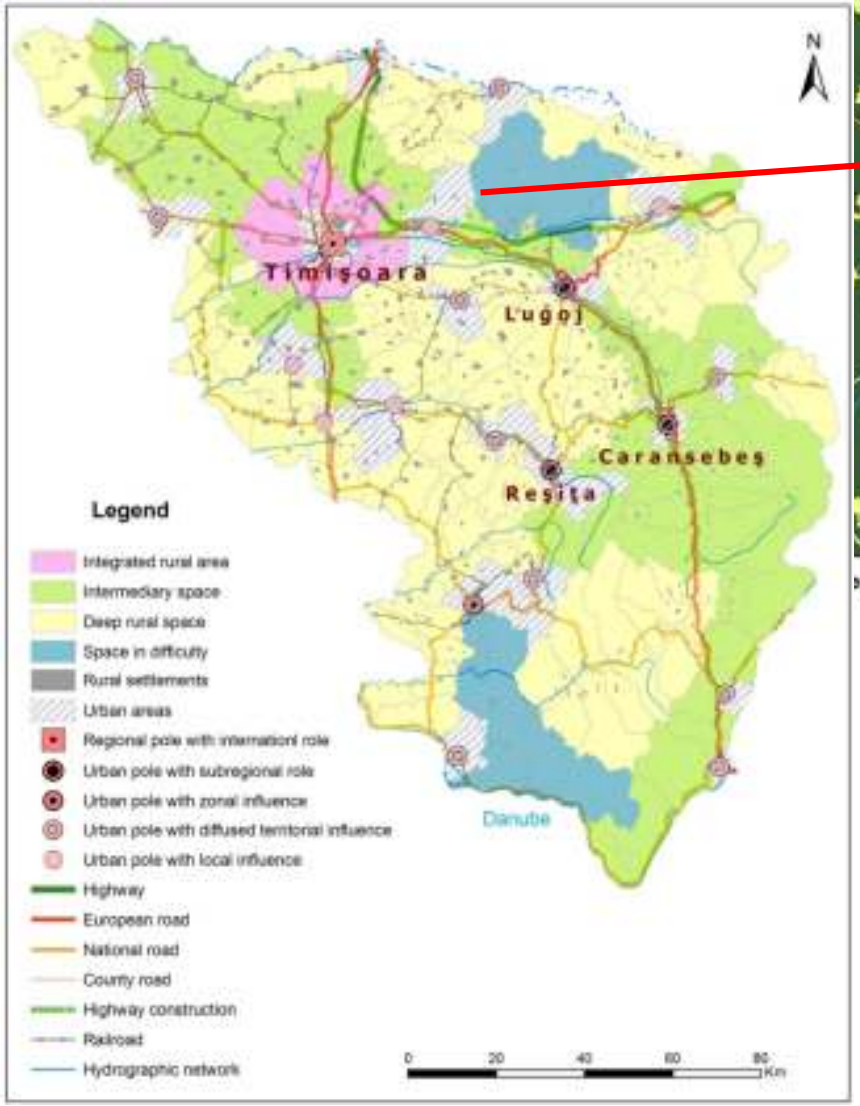
Study cases – identifying the drivers of resilience and or vulnerability

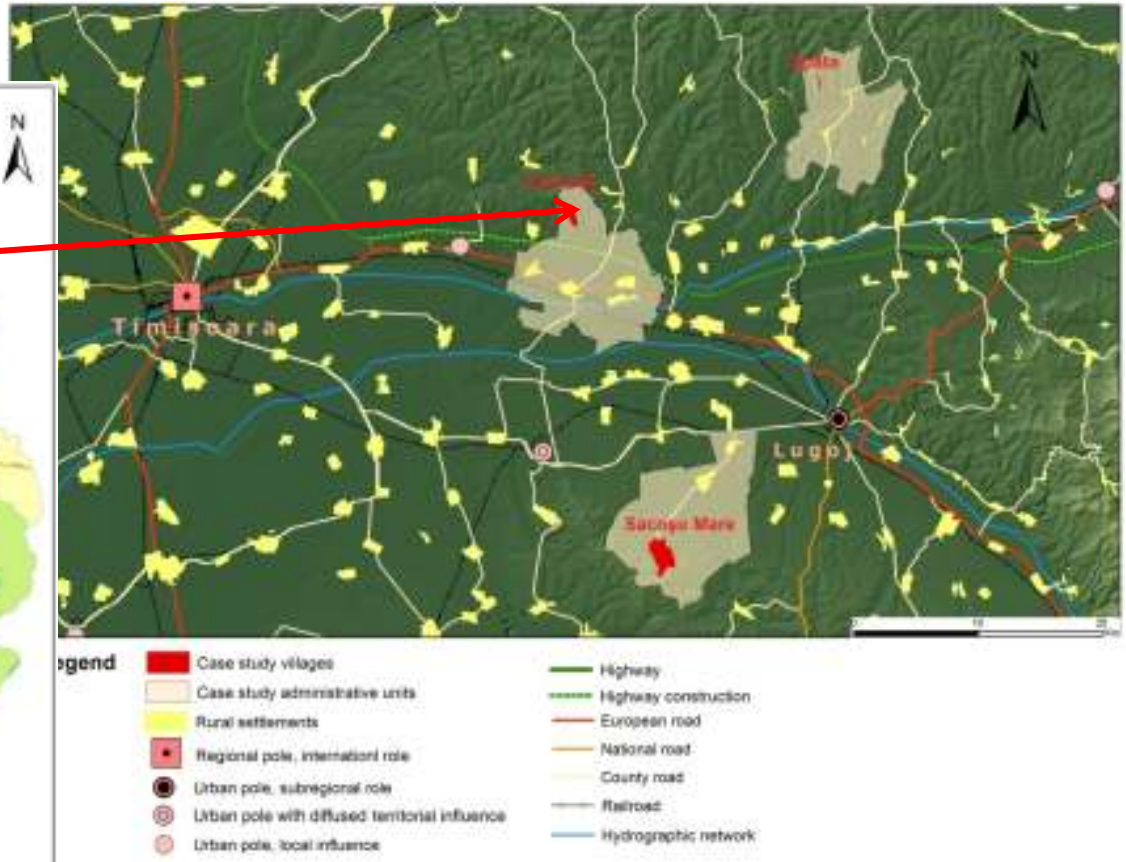


- approaching the resilience in terms of:
  - function;
  - structure;
  - identity;
  - feed-backs (Walker and Salt, 2006, cf. Wilson, 2012).

Study case 1 – rural space in difficulty

- Cralovăț





-233 inhabitants in 1992,103 inhabitants in 2014;
-68% of the population is over 65 years.

Study case 1 – rural space in difficulty

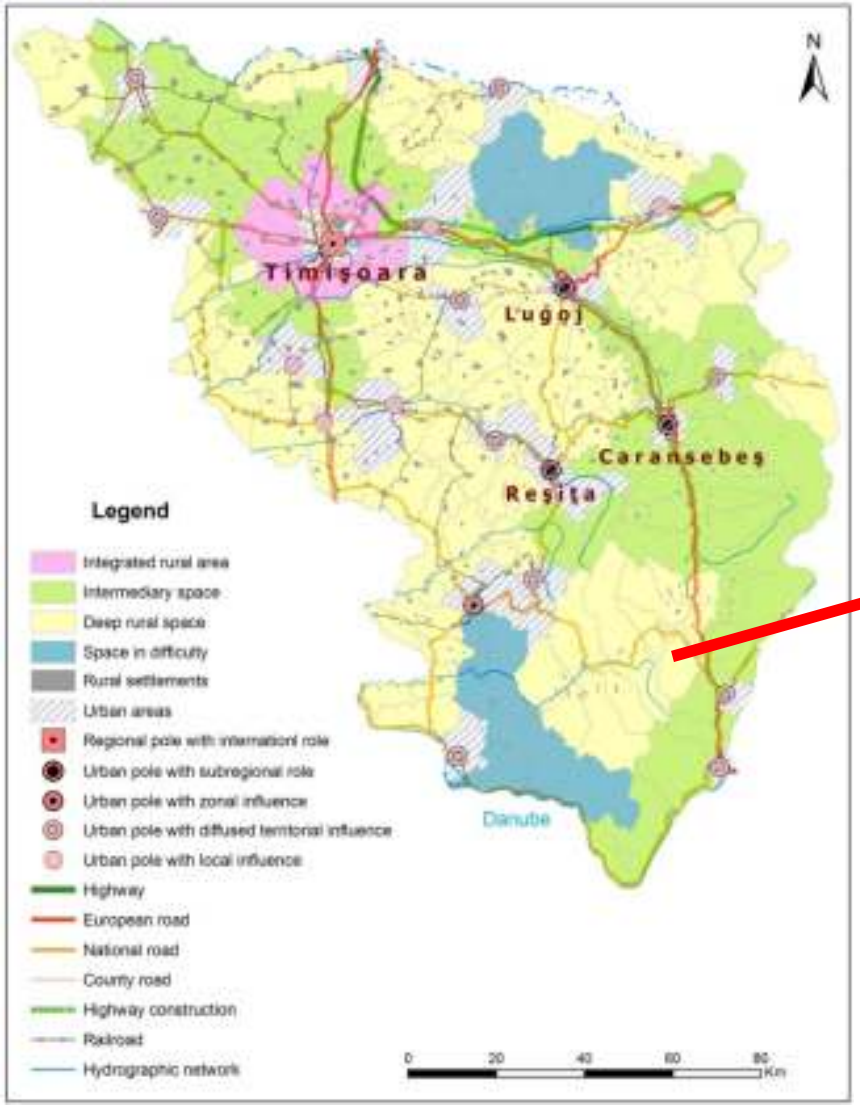
- Cralovăț

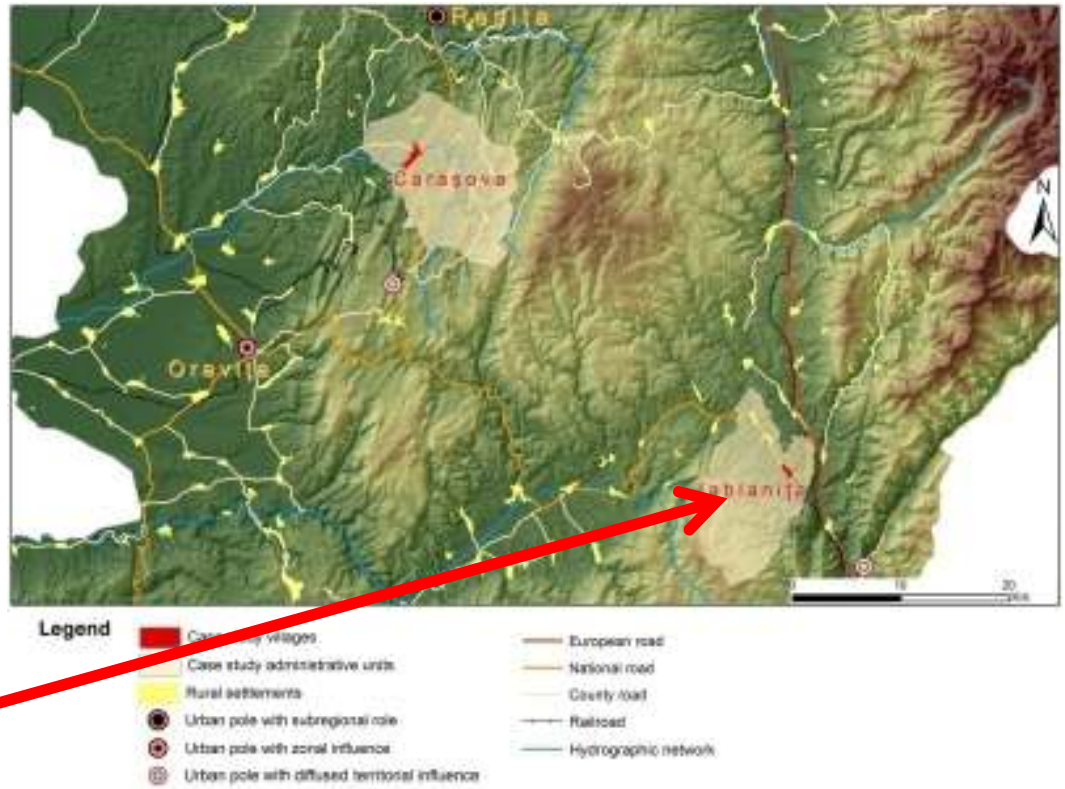
	before 1989	after 1989
function	active population occupied in industry in Timișoara aged population occupied in Cap and familial agriculture	subsistance agriculture
structure	rural habitat and agricultural landscape traditional houses	traditional houses 26% non occupied houses 15% week-end houses neglected orchards
identity	church traditional religious celebration	
feedbacks (at individual or local level)		2 local entrepreneurs in agriculture

Cralovăț - rural space in difficultiy

Study case 2 – profound rural space

- Iablanița





-location: 25 km from Băile Herculane, 60 km from Caransebes and 110 km – from Reșița;
-76% hills; 13% mountains; 11% river terraces;
- 52% forests; 44% agricultural surfaces (43% meadows; 35% pastures; 16% arable);

-aged population: 26%

Study case 2 – profound rural space

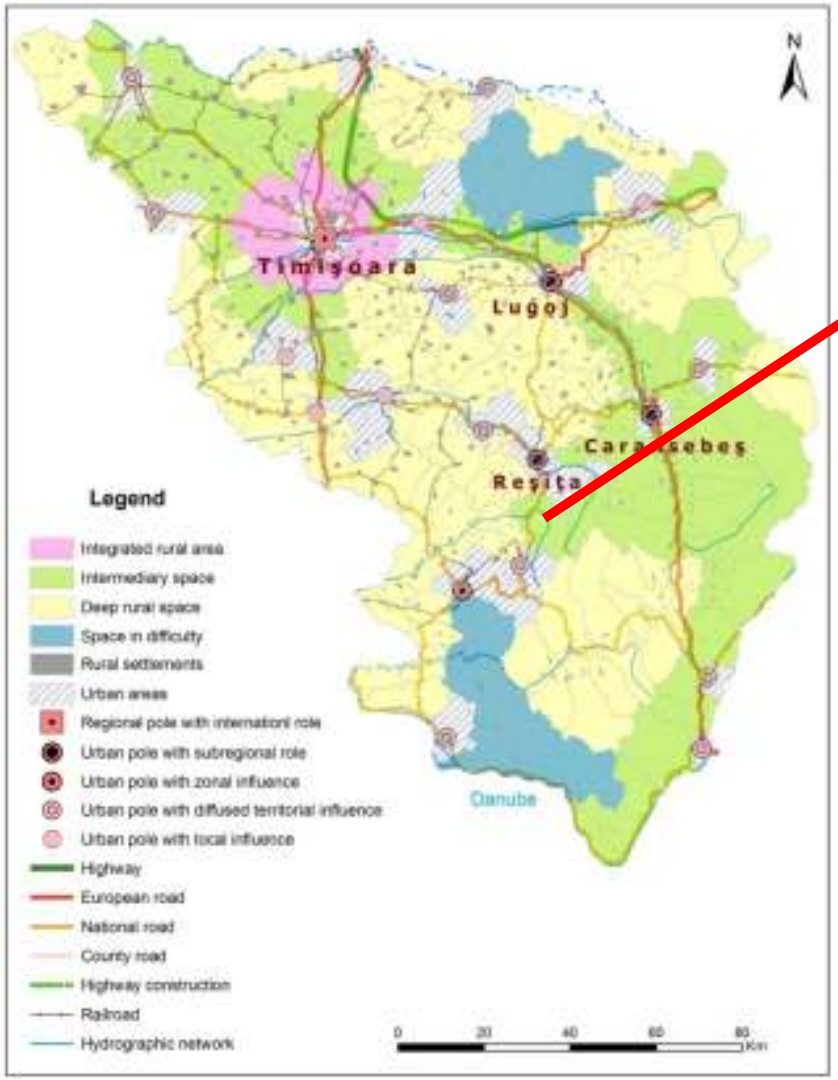
- Iablanița

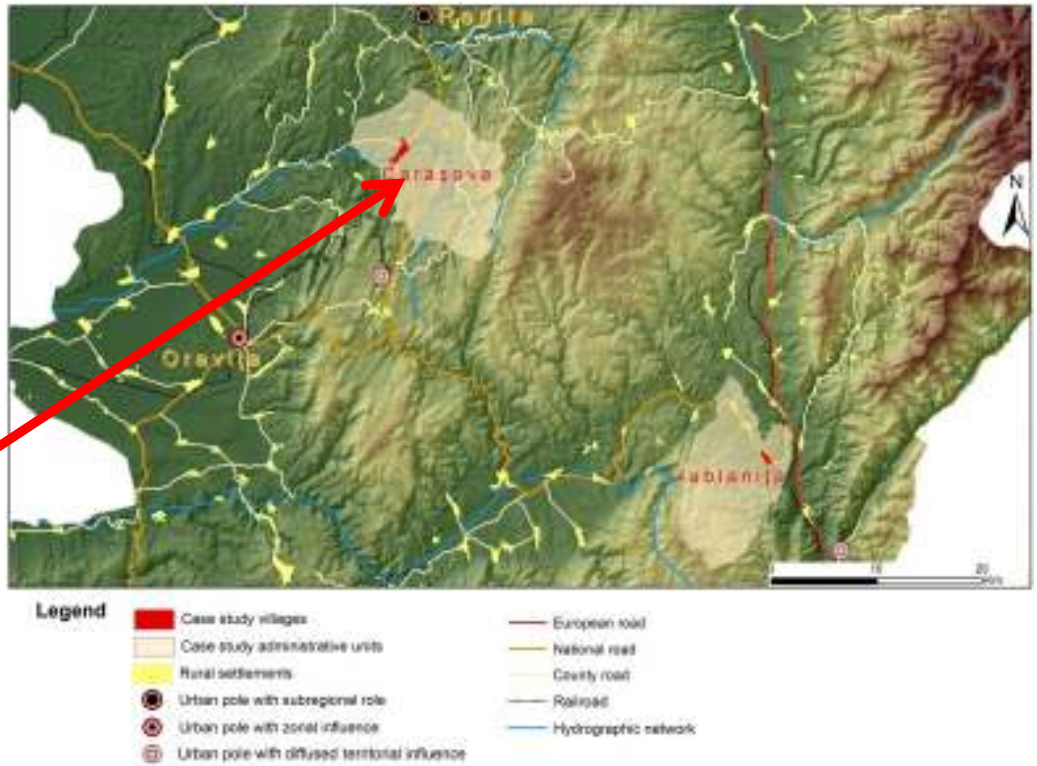
	before 1989	after 1989
function	men worked in minig	90 % subsistance agriculture modest diversification (processing of the wood, commerce)
structure	rural traditional habitat (with specific characteristics, related to XVIIIth century)	modest rate of renovation
identity	religion (week role)	stronger role of traditions related to religious festivities
feedbaks		few projects for the improvement of roads

Iablanița

Study case 3 – intermediary rural space

- Carașova





-- location: , in a carstic depression, in the proximity of county capital and of a national parc (mountain area);
- the non built area contain forests (50% of the surface), 25% pastures and 25% meadows.
-total population decresed with 16%;
- modest positive net migration (beetw. 9 – 20 pers./year;
-aged population: 16%;

Study case 3 – intermediary rural space

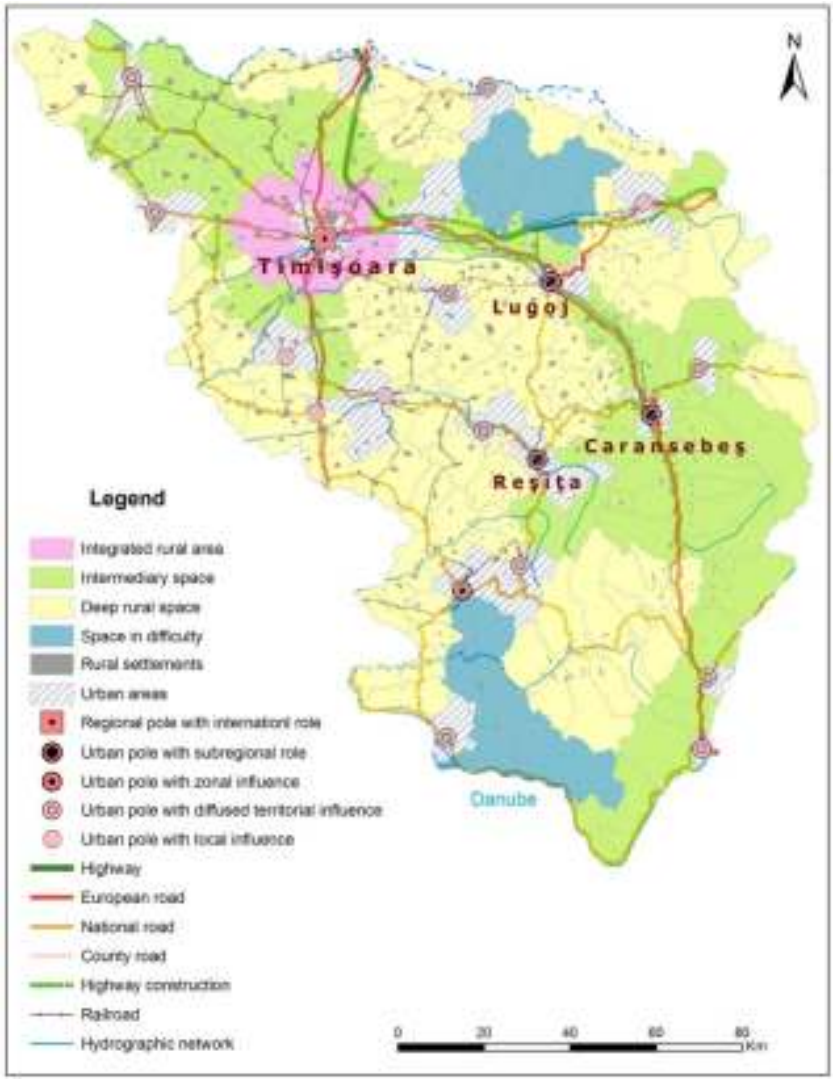
- Carașova

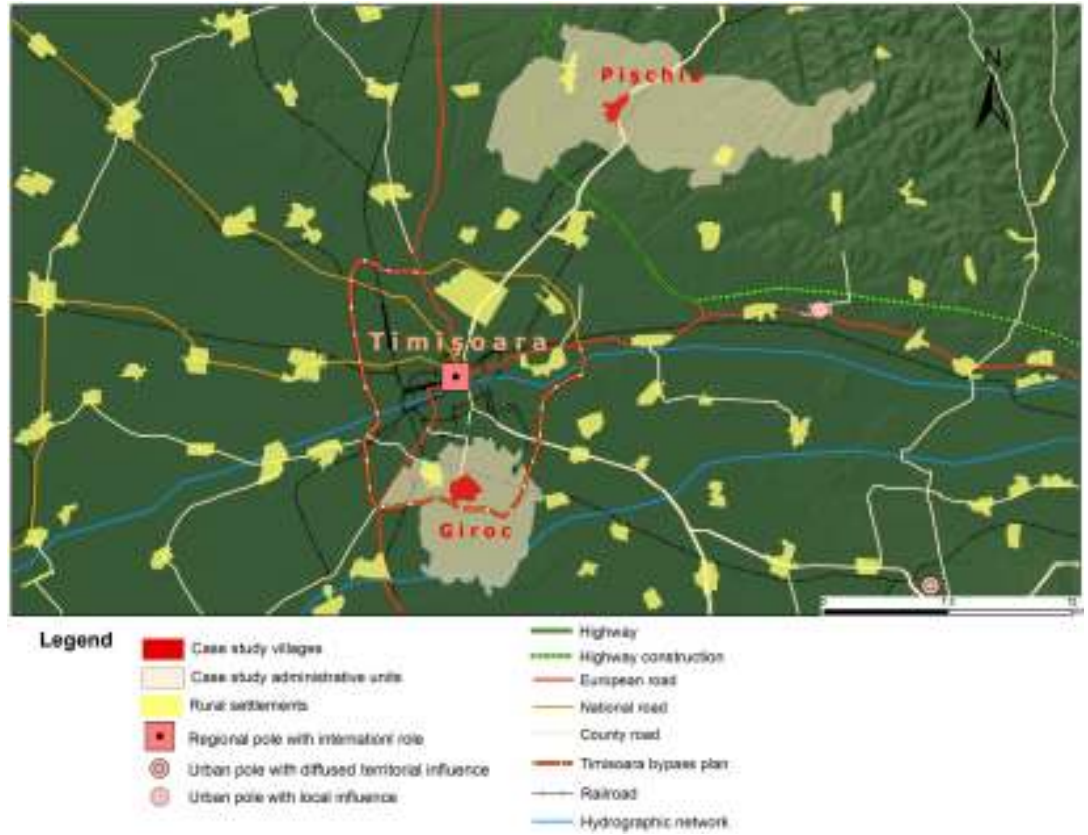
	before 1989	after 1989
function	active population occupied in industry in Reșița aged population occupied in agriculture (non CAP) other activities related to the forest	concentration of the active population on agriculture and forest activities partial modernisation of agricultural production diversification of economical sectors (transport, tourism, commerce)
structure	rural traditional habitat (permanent and seasonal) specific organization of the agricultural land	rehabilitation of houses 10% new houses (people from Reșița) modernisaton of
identity	1 h per week of Serbian langauge class	bilingv highschool political relations with Croatia
feedbaks		improvement of the quality of life (water supply network) rehabilitation of public buildings valorisation of ethnic identity entrepreneurial initiatives

Carasova

Study case 4 – integrated rural space

- Giroc





-3 km south from the regional pole;
-near the E 70 road (3 km), the river Timiș and the forest;
- 4170 inhabitants in 1990, 7484 inhabitants in 2012;
- the number of houses doubled (from 1607, in 1990, to 3299, in 2012).

Study case 5 – integrated rural space

- Giroc

function	residential and agricultural (CAP and familial)	residential, tertiary sector (commerce super markets, services for enterprises, transport services), industry (metal construction, paints and varnishes, meat processing
structure	rural habitat (non modernized)	+ 100% new buildings densification, modernization of public space and buildings
identity	few local festivities	folk dance ensemble choral, church choir, monuments local festivities at large scale
feedbacks		change of the destination of the land very active local authorities (numerous projects with European, national and private money)

BENVENUTI !
INCONTRO

Conclusions :

- great inertia of rural communities in terms of building their capacity of auto-organization;
- important role of the most important urban poles (with complex functinal profile) and of the major axes in enhancing pozitive trajectories;
- important impact of the withdral of heavy industry;
- important impact of the defficient accesibility (rugosity of the space).

Conclusions :
Factors of vulnerability and of resilience

vulnerability	resilience
• initial great dependence of a single external sector; • weak social capital; •lack of economic capital; • distance from the urban poles and from main axes – difficult accessibility.	• rent location – favorable location – in the proximity of important urban poles and important axes); • good social capital; •active local authorities; •delocalisation of urban activities; •counterurbanization.

Thank you for your attention.

© Assoc. Prof. PhD Cătălina ANCUȚA

catalina.ancuta@e-uvt.ro

Department of Geography
Faculty of Chemistry, Biology, Geography
West University of Timișoara