

# Tisa Catchment Area Development

## TICAD Transnational Strategy

Annex: Strategic Scenarios Generated with the GIS Based Spatial Development Support System

Jointly for our common future

# TICAD

This document has been developed in the frame of the Tisa Catchment Area Development (TICAD) project. The TICAD project is co financed by the South East Europe Transnational Cooperation Programme of the European Union.

The strategic scenarios are prepared and analysed by the VÁTI Hungarian Nonprofit Limited Liability Company for Regional Development and Town Planning.

Contributions are made by:

Anna Sárdi  
Annamária Göncz  
Erzsébet Vajdovich Visy  
Ferenc Staub  
Vilja Vaszócsik

## Table of contents

|   |    |
|---|----|
| I. Introduction.....  | 4  |
| II. Baseline scenario .....   | 4  |
| III. Scenarios concerning the specific objectives of the TICAD Transnational Strategy .....   | 17 |
| III.1. Increasing economic competitiveness and diversification of economic activities.....    | 17 |
| III.2. Promoting transnational and local transport connections .....                          | 21 |
| III.3. Keeping young generation in the area .....   | 24 |
| III.4. Strengthening institutional cooperation in the field of spatial planning .....         | 27 |
| III.5. Limitation of impact of natural disasters by preventive measures.....                  | 36 |
| III.6. Enhancing and protecting natural resources and the natural and cultural heritage ..... | 42 |
| III.7. To promote land use which is suitable to the landscape characteristics.....            | 49 |

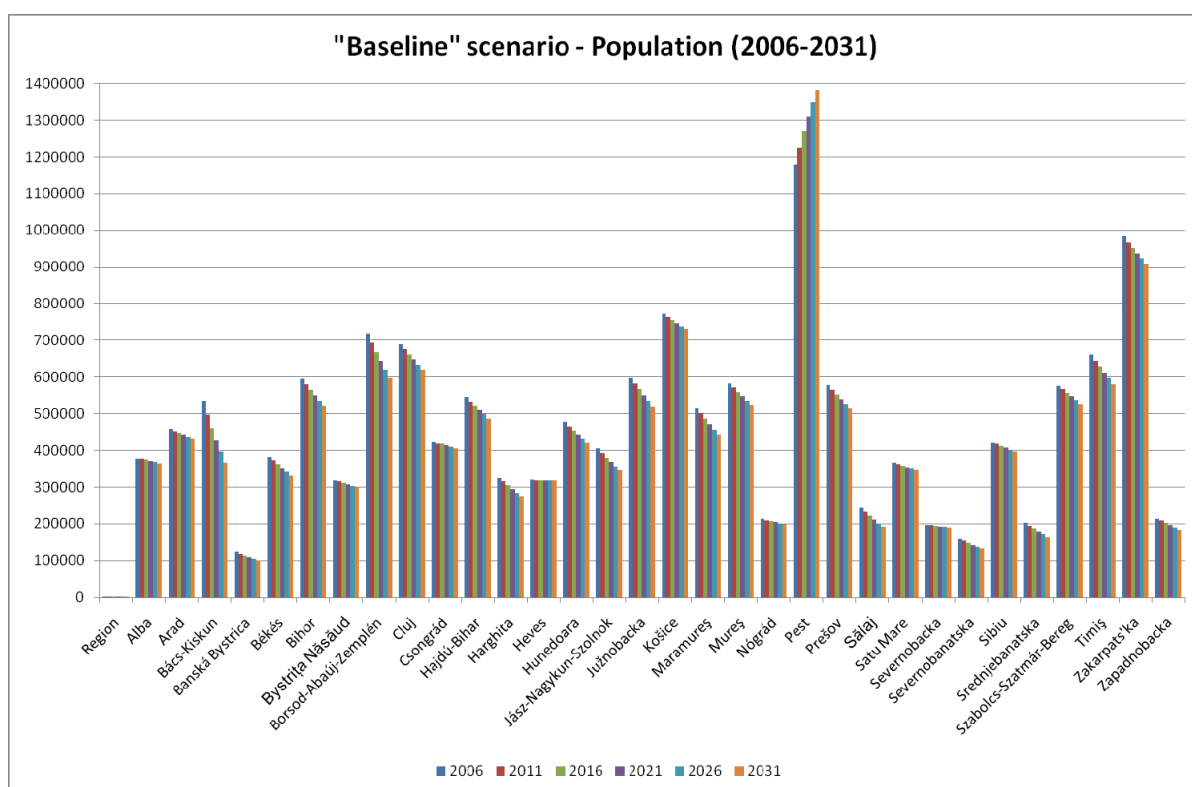
## I. Introduction

The Tool for Spatial Planning Support is an outcome of the TICAD SEE transnational project. This Tool facilitates the assessment of the territorial impacts of the various strategic measures. Scenarios have been worked out to highlight the consequences of the various developments and policy changes upon the number of population, industrial and commercial employment as well as on land use up to 2031.

## II. Baseline scenario

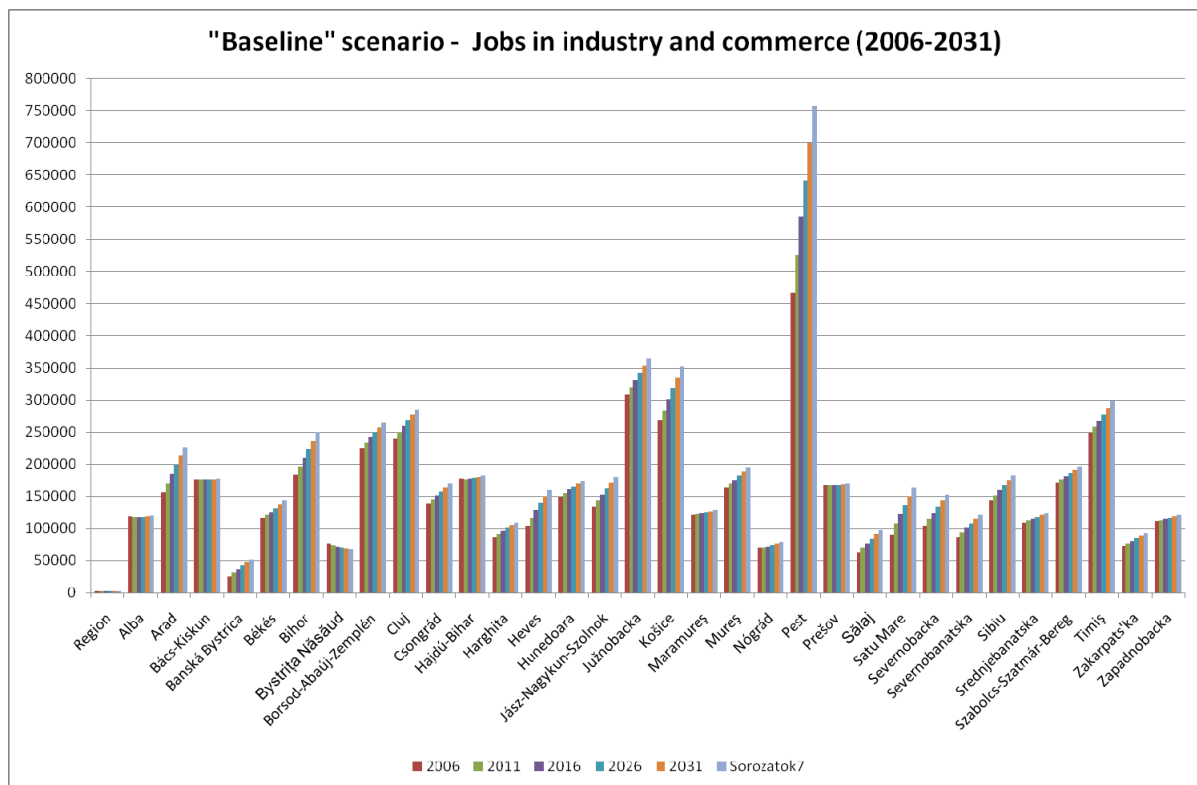
The *baseline scenario* highlights the assumption of the continuation of the ongoing or recent (2000 – 2006<sup>1</sup>) statistical processes in population and employment.

The number of population is likely to decrease greatly in the forthcoming 20 years. The exception is Pest county owing to the attraction of Budapest the capital city of Hungary. The greatest loss will be in counties Bács-Kiskun (nearly 165 thousand) and Borsod-Abaúj-Zemplén (nearly 120 thousand). The ongoing tendencies predict the decrease of population of Timiș and Južnobačka counties by 80 thousand. Less significant decrease (by 10 thousand) can be foreseen in counties Heves and Severnobačka.



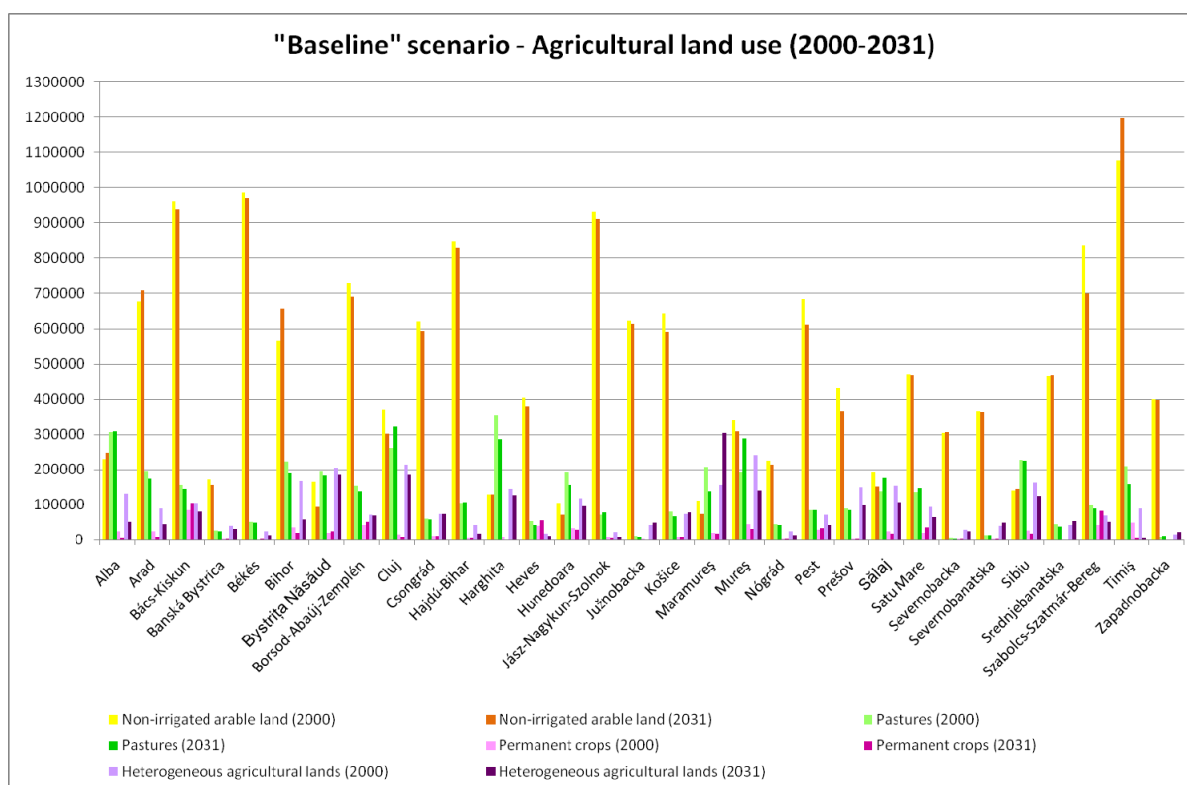
<sup>1</sup> In the absence of statistical data for Serbia and Ukraine 2000-2006 similar changes have been assumed.

Growth of employment can be expected in Industry and Trade during the forthcoming twenty years. The only exception is Bystrița Năsăud, where the decline of this figure is more likely. The trends indicate lesser growth in counties Alba, Bács-Kiskun, Prešov and Hajdú-Bihar, whereas considerable growth industrial employment is likely in counties of Hungary Heves and Pest (here again due to the vicinity of Budapest) in Slovakia county Košice, in Romania counties Bihor, Arad and Satu Mare as well as in Serbia in Južnobačka.



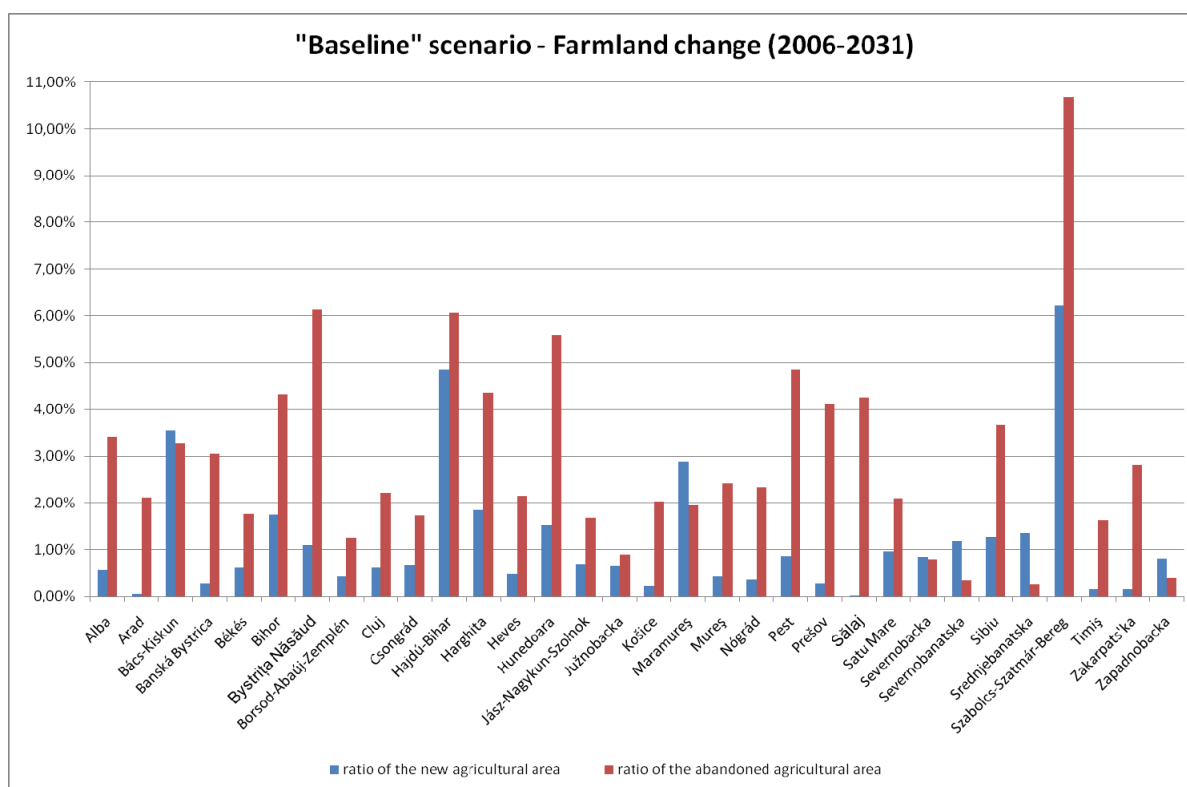
The changes of land use have been assessed by forecasting the differences between the Corine Landcover maps for 2000 and 2006 and the population and employment assessments.

The forecasts of the ongoing trends indicate the changes of farmland in the diagram below.

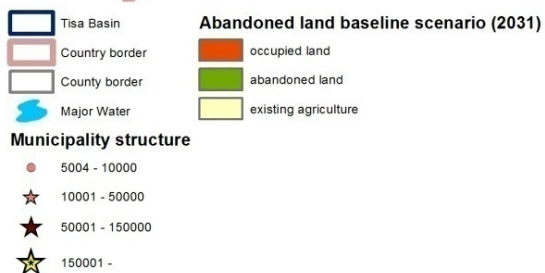


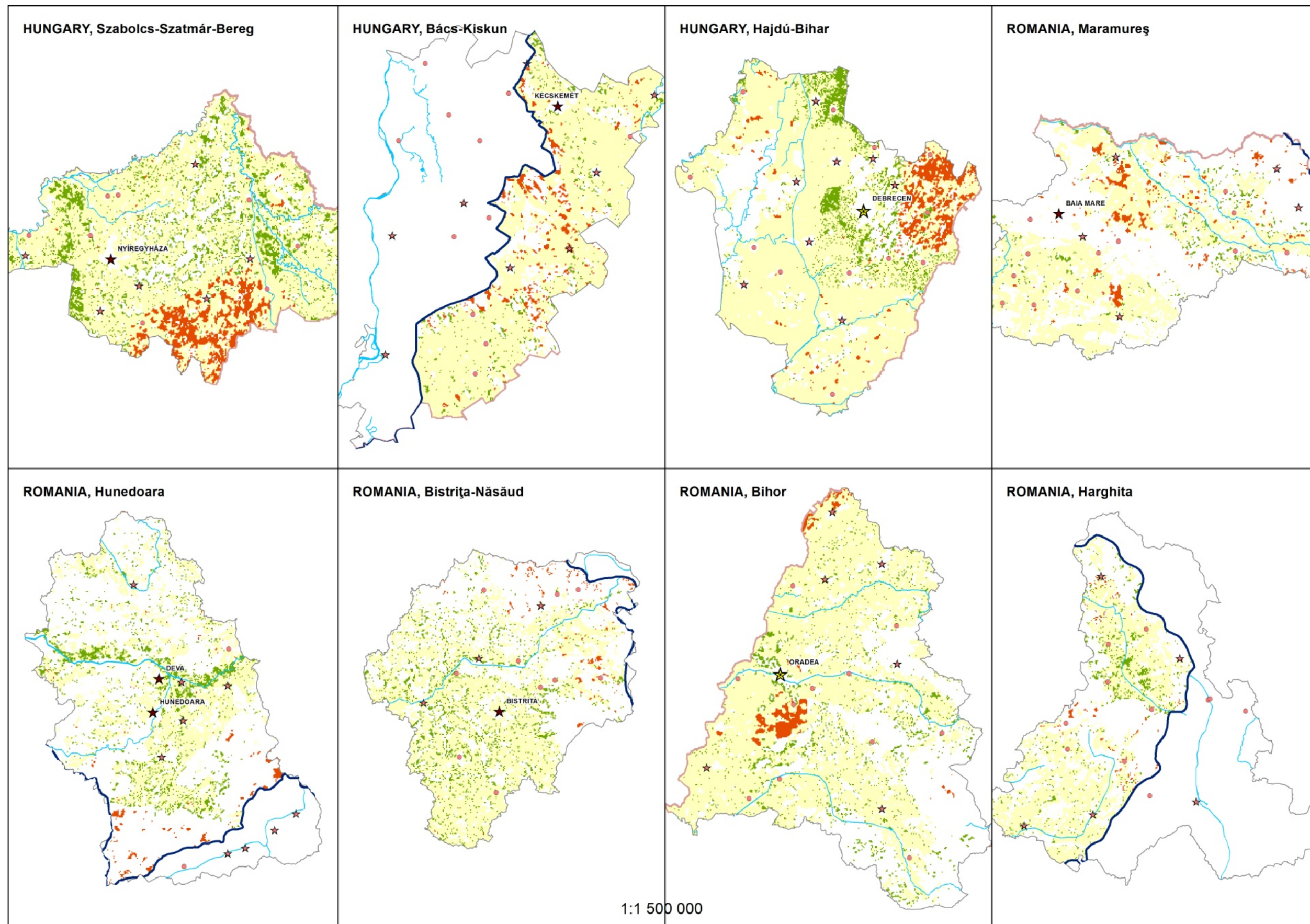
The arable land is likely to shrink by generally 4 % with the exception of some counties in Romania and two counties in Serbia. Considerable growth is expected in counties Timiș, Bihor and Arad. The largest decrease is expected in county Szabolcs-Szatmár-Bereg and significant decrease is also likely in Pest, Bystritsa Năsăud and Cluj.

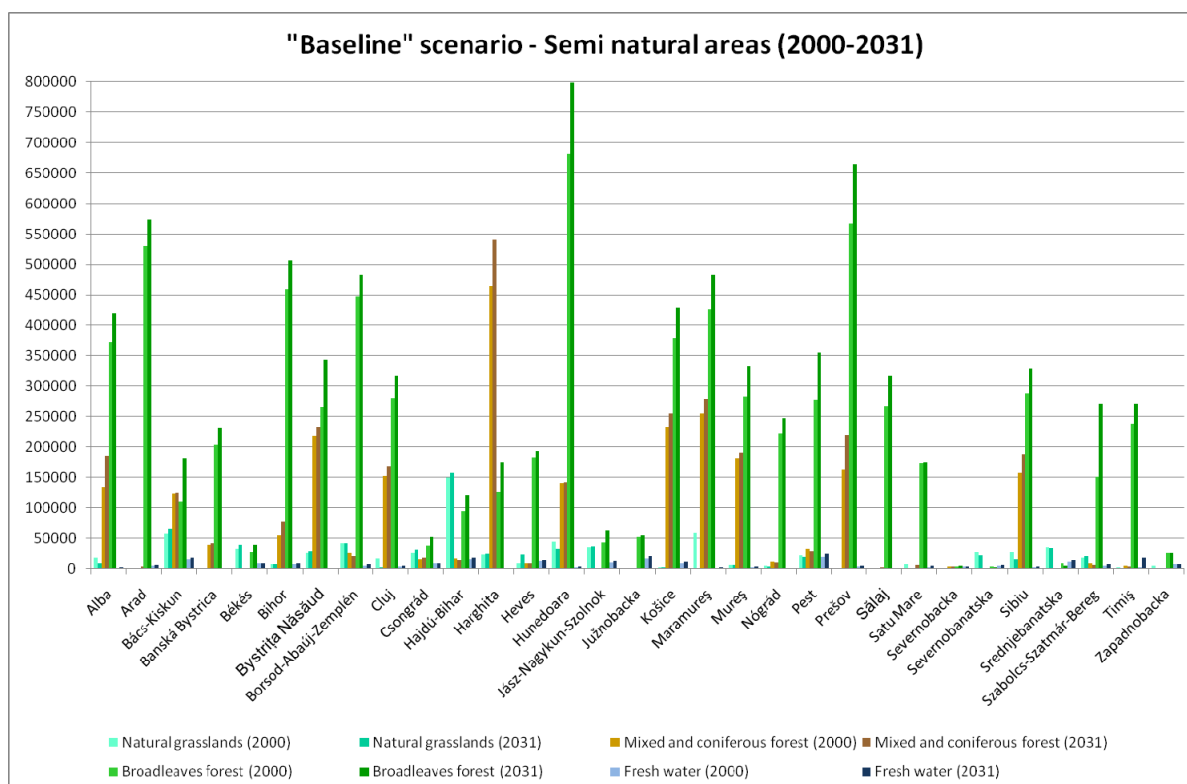
The decrease of pastures (4%) and plantations (7 %) and mixed farm uses (22 %) is very likely. Nevertheless, there are three or four counties, where the growth of one or the other farm uses may expand (pastures in Mureș, plantations in Szabolcs-Szatmár-Bereg and mixed farm uses in Maramureș).



## TICAD SCENARIO BUILDING ABANDONED LAND



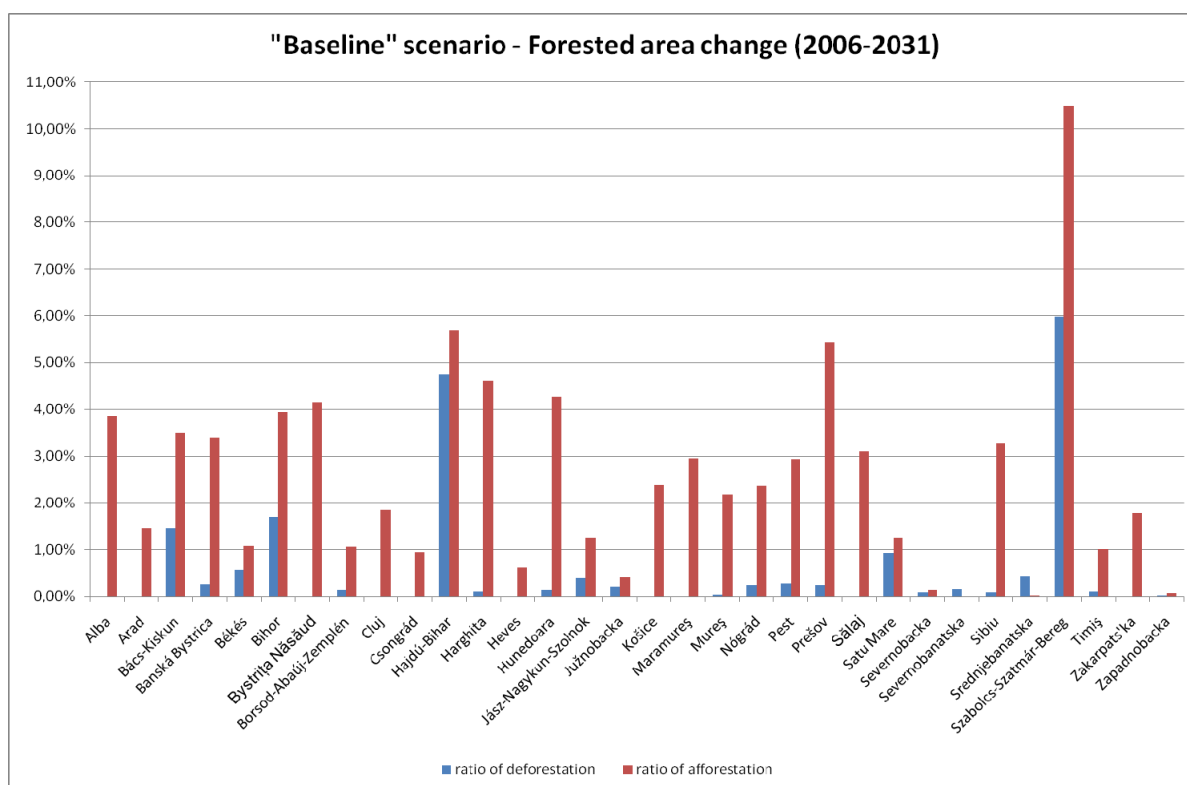




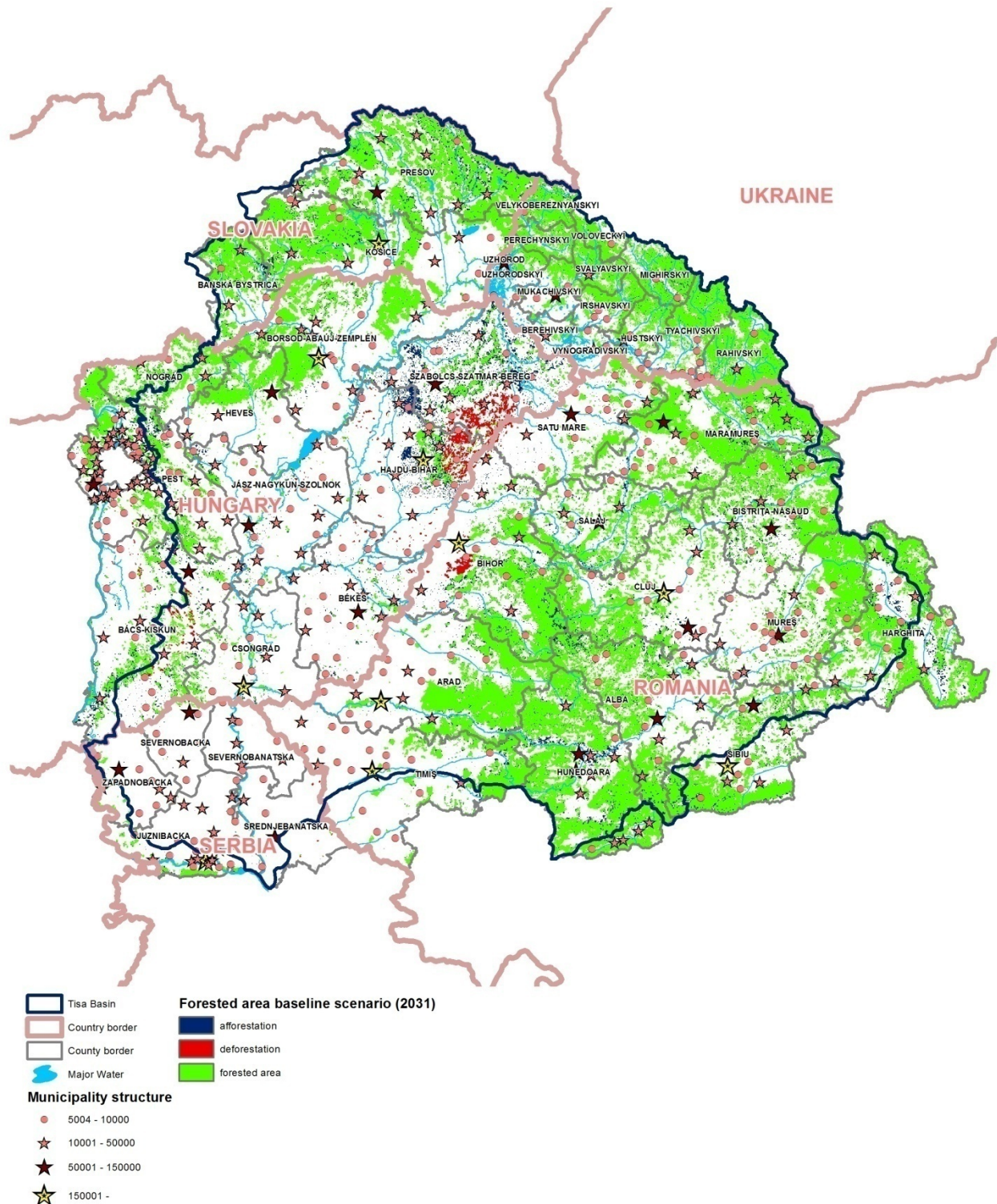
There is a general trend all over the area that more and more land is left uncultivated. The ongoing tendencies indicate the growth of semi-natural areas, with sub-classes at different rate.

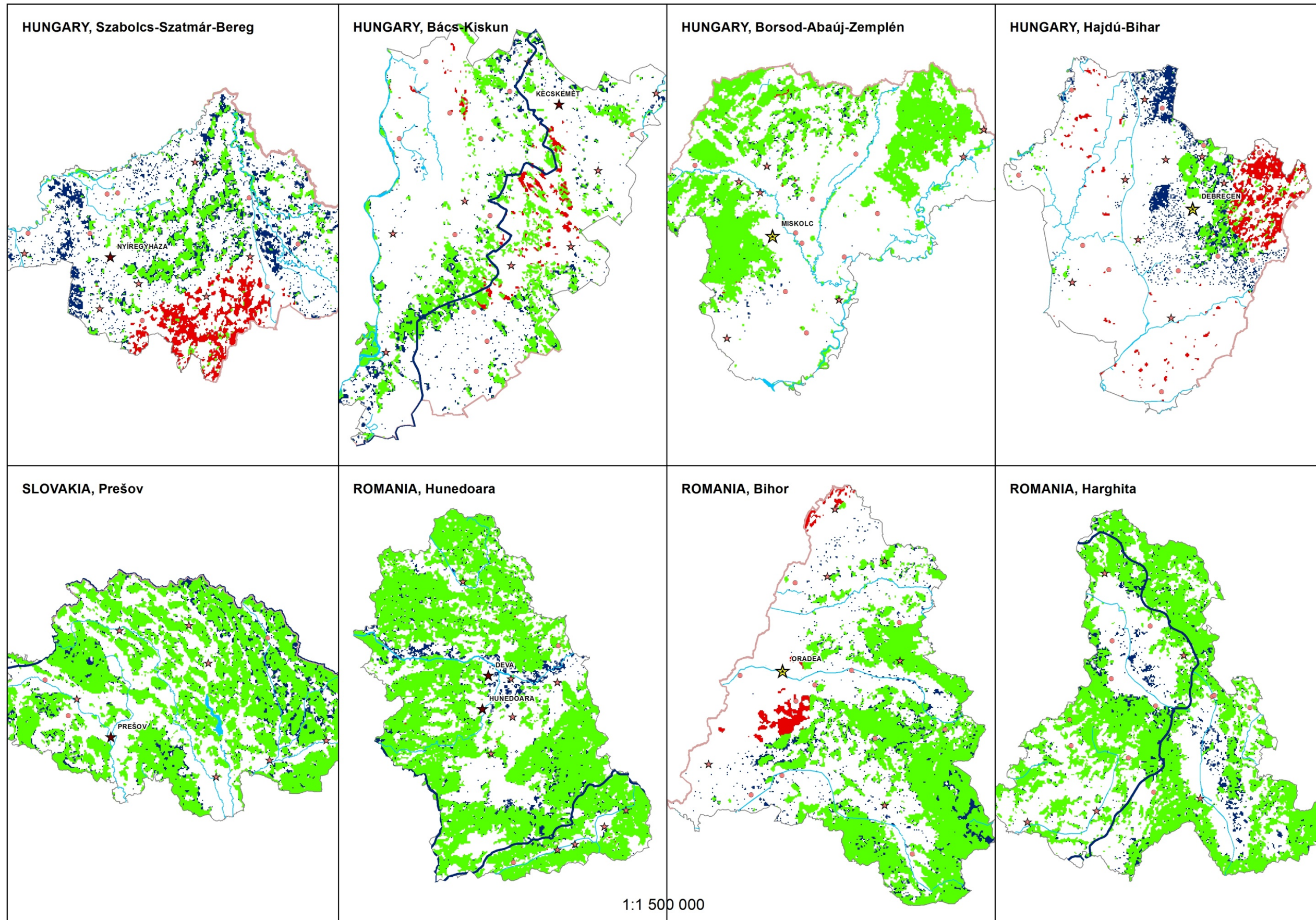
The size of natural grassland is likely to decrease in the Tisa catchment area by nearly 12 %. Large grasslands may completely disappear in several counties of Romania and Serbia. Growth may take place in some counties of Hungary, mainly in Heves, Bács-Kiskun and Hajdú-Bihar. Similar is the trend in counties Bihor, Harghita, Bystritsa Năsăud of Romania.

Woodland is likely to grow all over. The area of mixed and coniferous forests will grow by 13 %, the area of deciduous forests by 17 %. Only the Banat counties (Srednjobanatska, Severnobačanska) of Serbia are facing area decline.

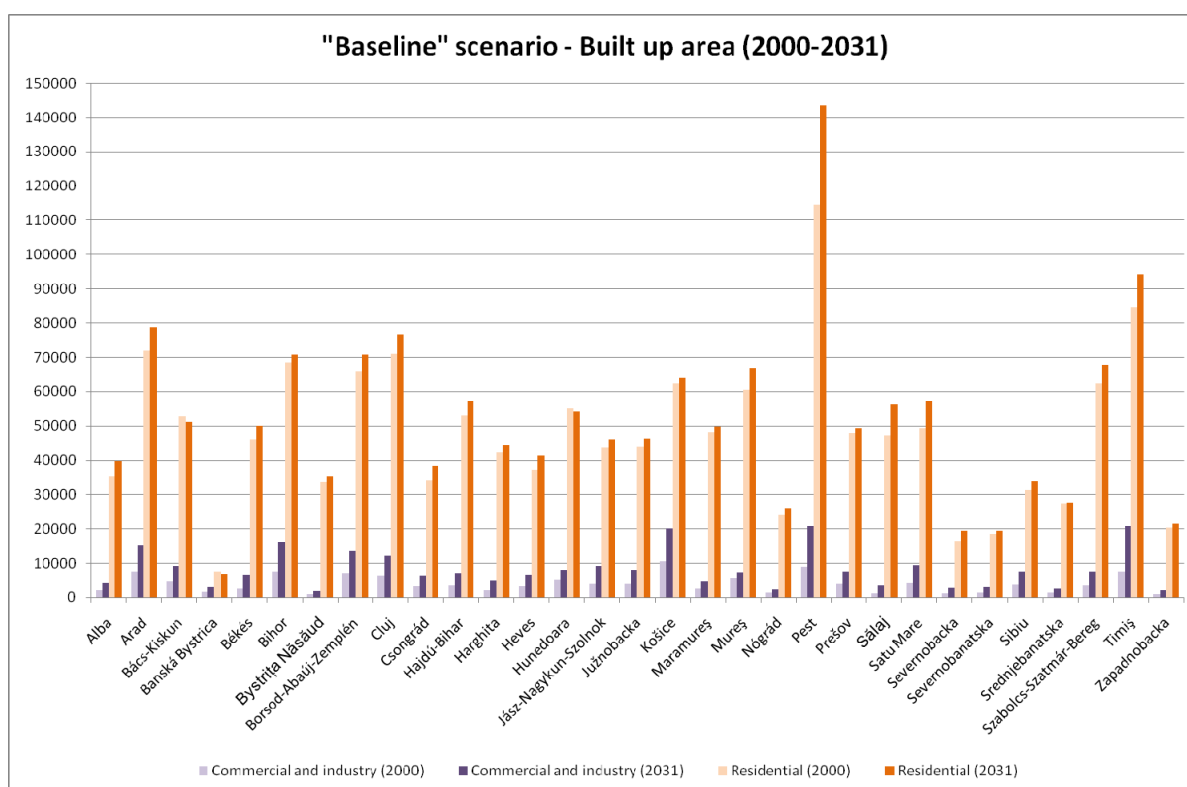


## TICAD SCENARIO BUILDING FORESTED AREA

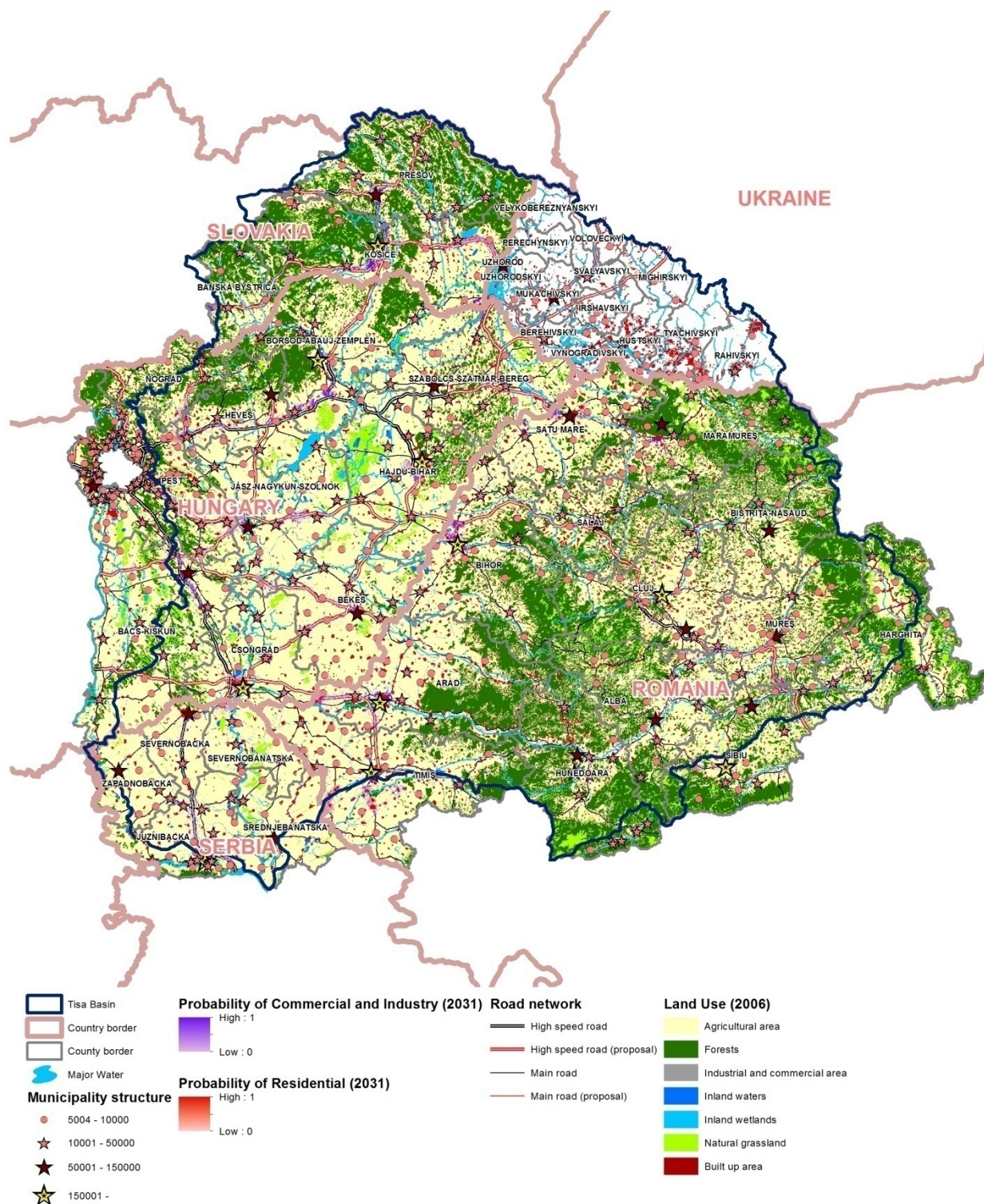


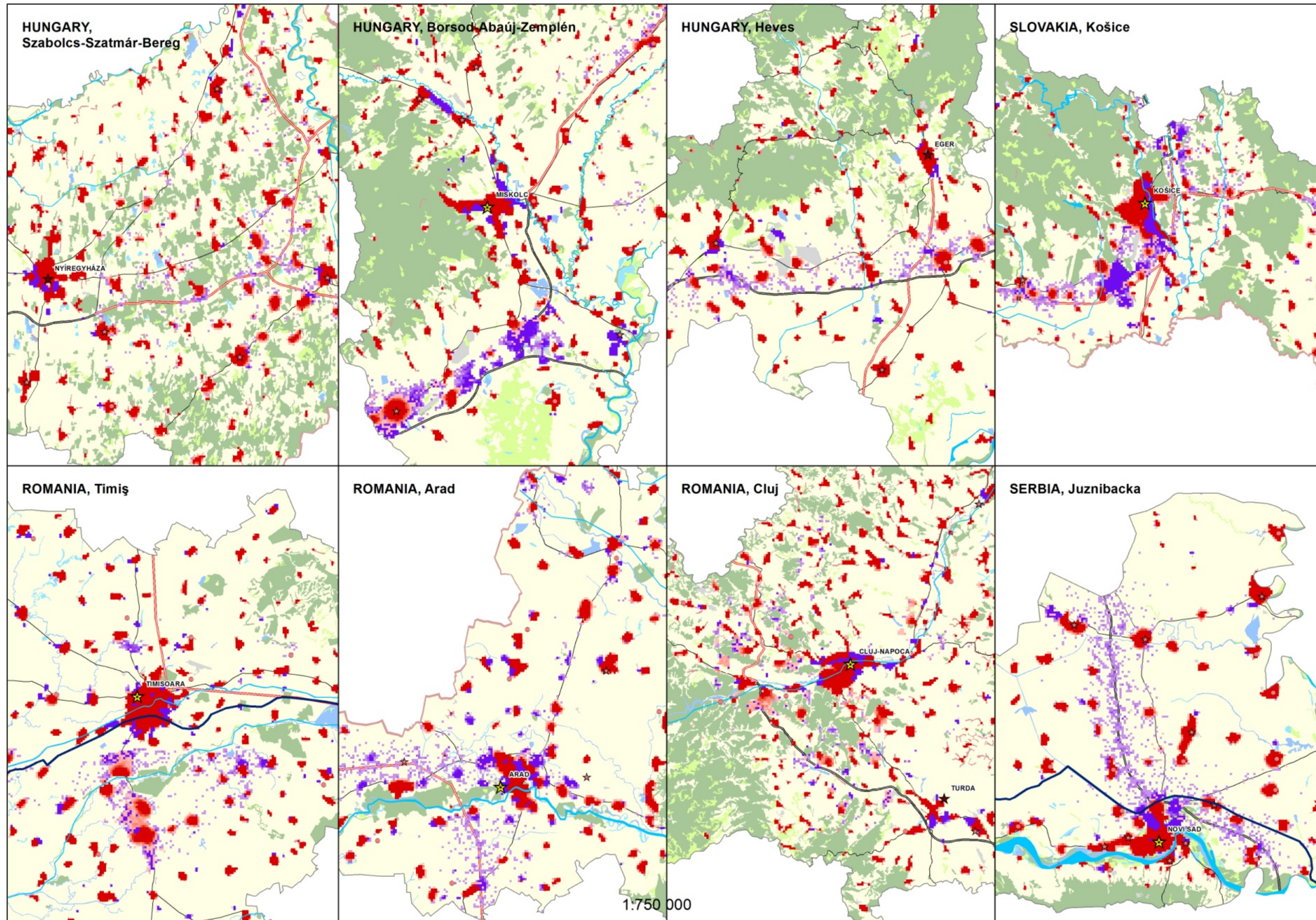


The growth of built up areas is a general tendency. The largest scale increase – occurring side by side with population change - is probable in counties Pest, Timiș, Arad, Mureș. Considerable growth of industrial areas is expected in counties Pest, Timiș and Košice. The map on the expansion and allocation of growth shows that the growth of built up areas is concentrated around the county centres and mainly around the primary centres. Furthermore, the growth of industrial areas tends to take place along the high-speed roads and motorway junctions too. These growth processes imply that there will be need for the expansion of public spaces and transport networks, include subsidiary and access roads. New forms of land use regulation must ensure the control of urban sprawl and agglomeration.



## TICAD SCENARIO BUILDING BUILT UP AREA





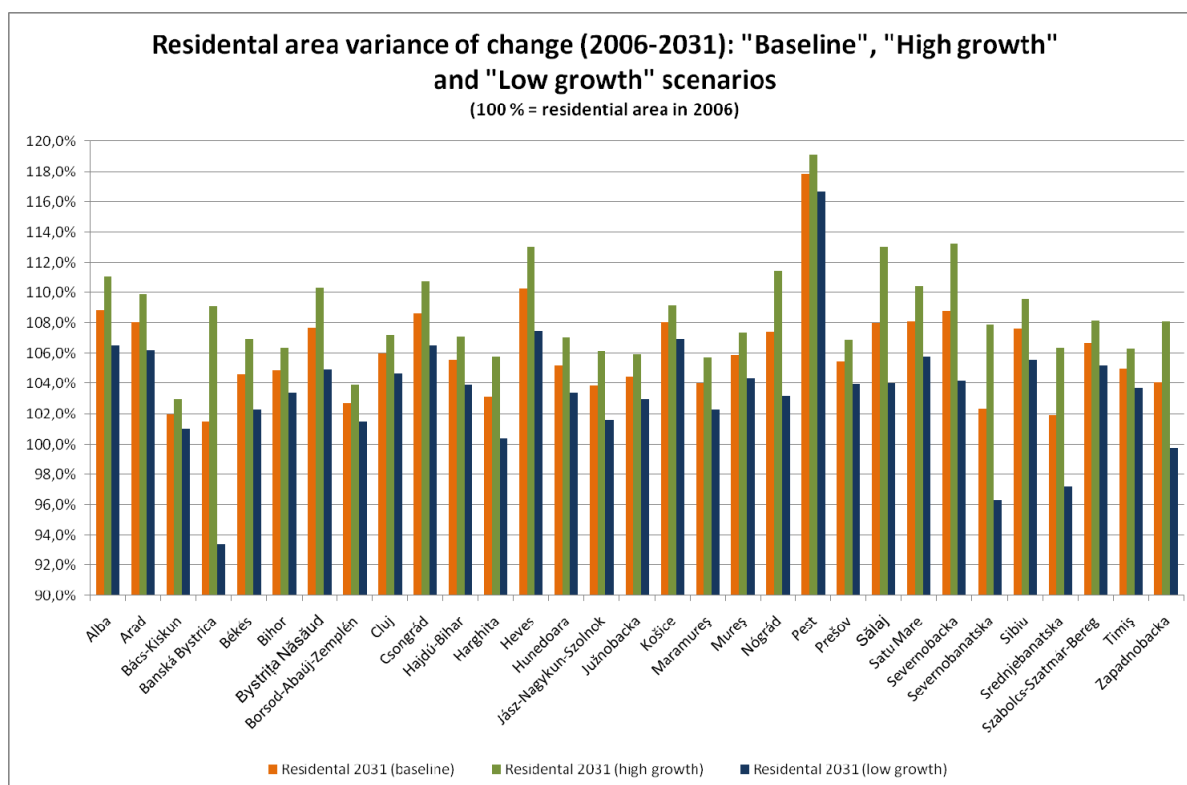
### III. Scenarios concerning the specific objectives of the TICAD Transnational Strategy

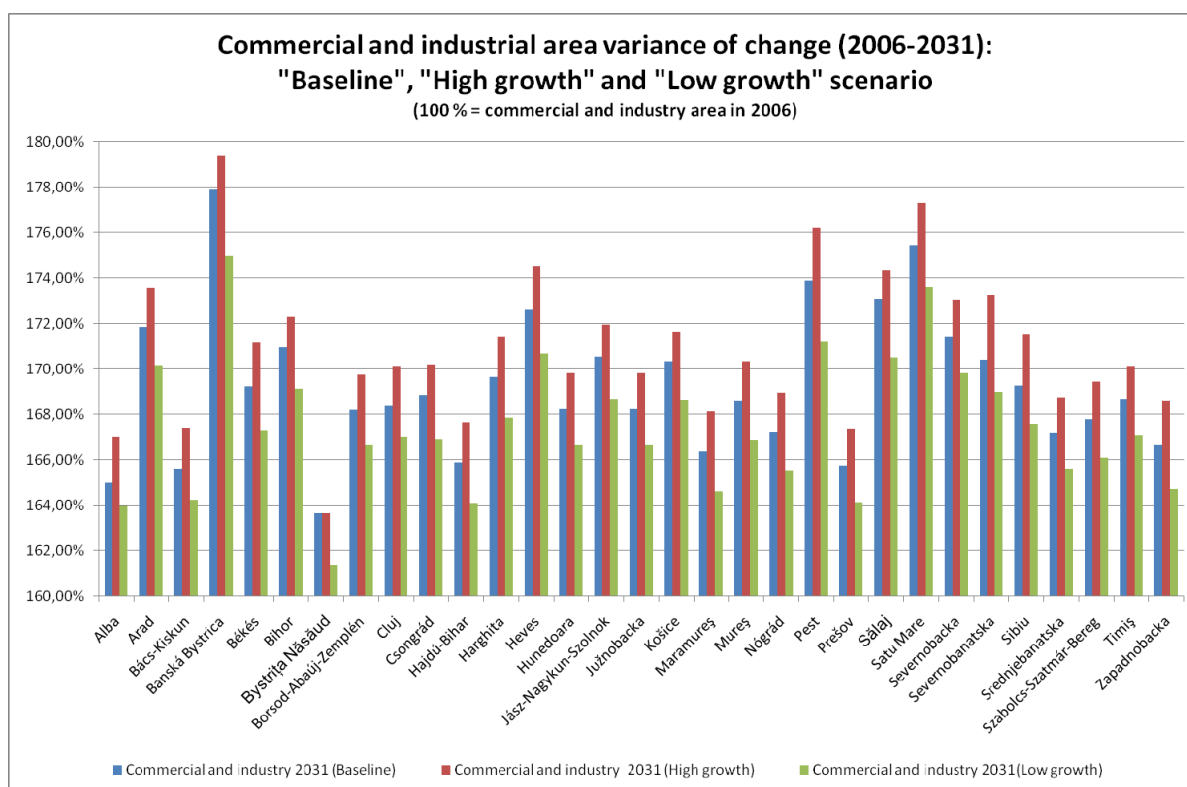
#### III.1. Increasing economic competitiveness and diversification of economic activities

Two scenarios have been conceived for modelling the measures of this specific objective.

In the *high growth scenario* it is assumed that population decline will be by 50 % less than in the *baseline scenario*. In the opposite, *low growth scenario* the assumption is that population decrease will be greater, 150 % of the one assumed in the baseline scenario.

The forecasts of the change of the residential area are therefore higher than the baseline figures in the *high growth scenario* and lower in the *low growth scenario* as shown in the diagram below. Similar is the variation of the growth rate of industrial and commercial areas, though growth of varying degree is expected all over.

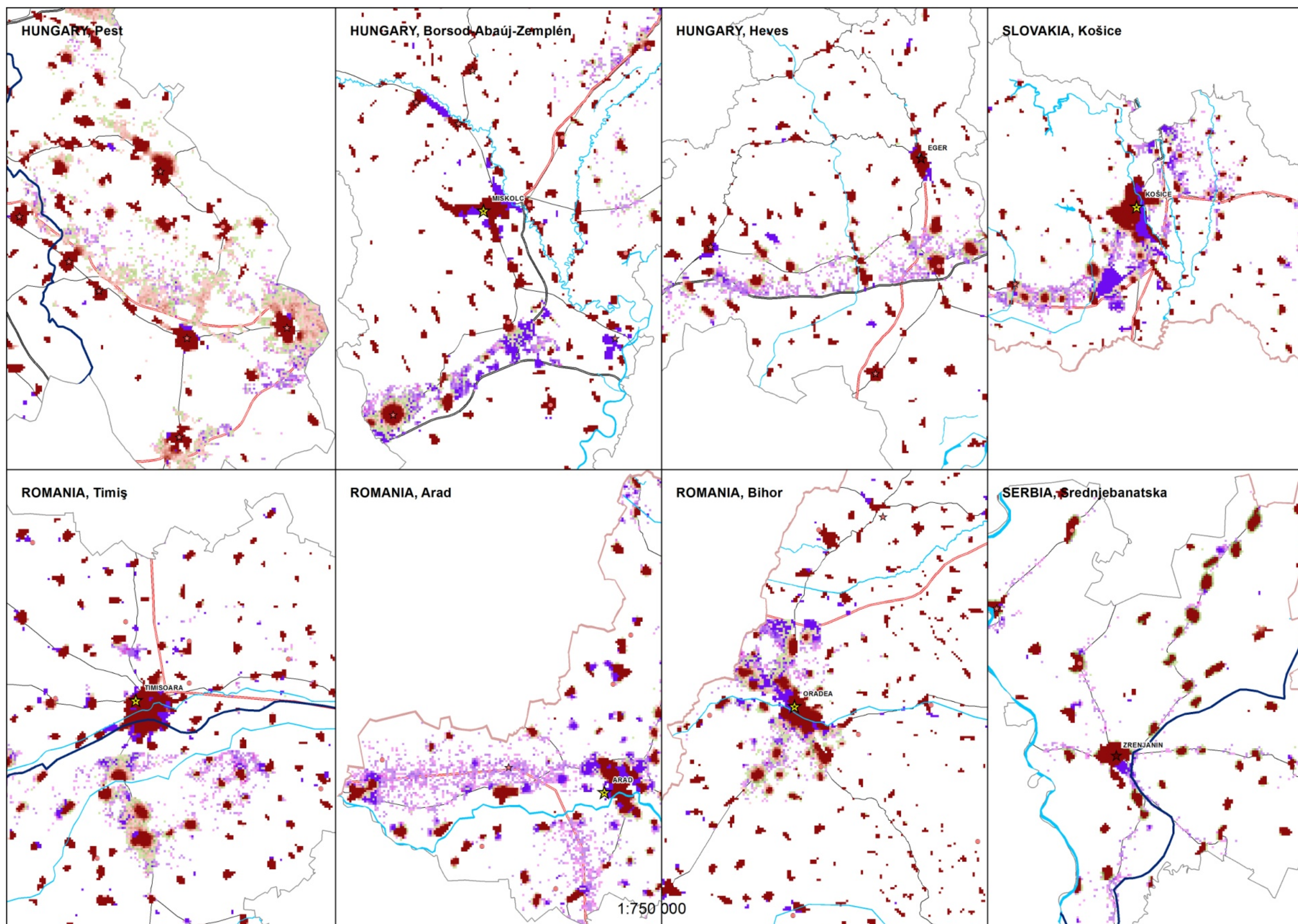




The map below shows the probable spatial distribution of built up areas as well as the different degrees of the increase in high growth and low growth scenarios.

## TICAD SCENARIO BUILDING PROBABLE GROWTH OF BUILT UP AREAS

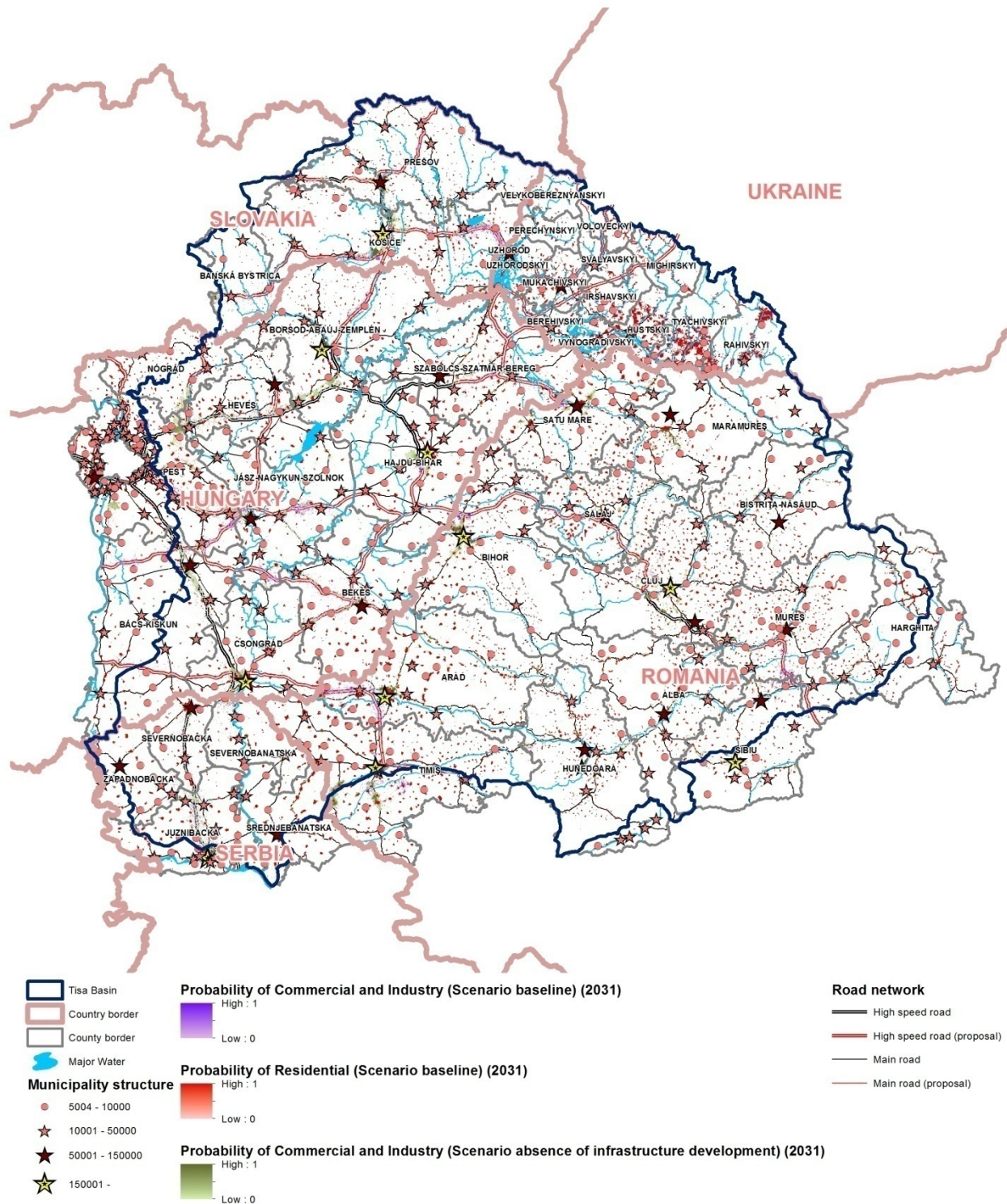


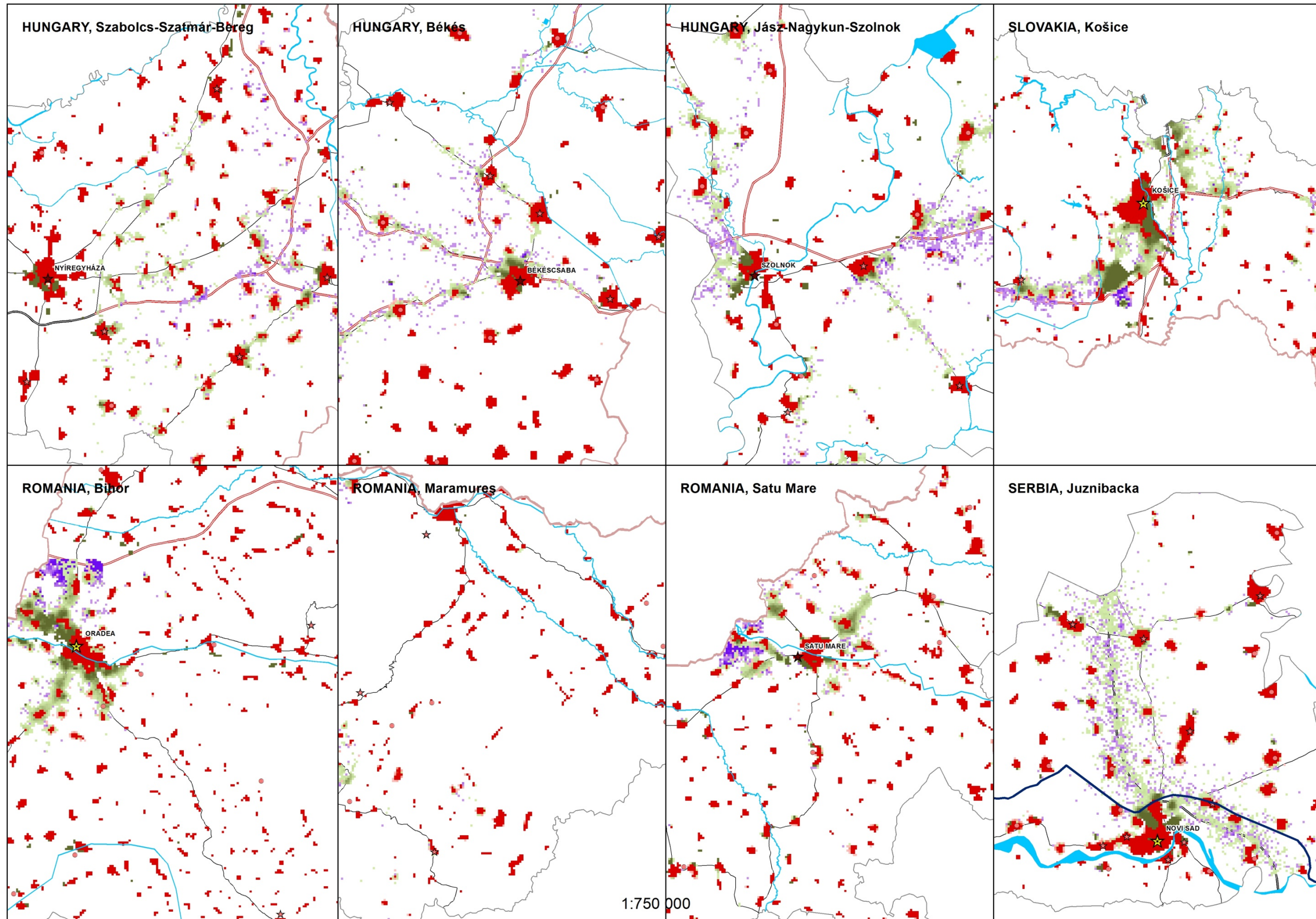


### **III.2. Promoting transnational and local transport connections**

In the Baseline scenario it is assumed that the new high speed roads (motorways) will be accomplished with EU support in accordance with the transnational plans and agreements. Another option is however, rising, that these new transport links will not be realised because of economic difficulties and changing priority. This option is taken into account in a scenario assessing the development and industrial areas in the absence of new transport connections. In this case, that is, in the *Scenario of absence of transport development*, of course the foreseen industrial development along the new main transport accesses will not come into being. The further implication is that the deprivation of the peripheral areas will be accentuated (counties Békés and Jász-Nagykun-Szolnok in Hungary, Sălaj, Mureş in Romania and eastern part of Košice in Slovakia).

**TICAD  
SCENARIO BUILDING  
SCENARIO OF ABSENCE OF TRANSPORT DEVELOPMENT:  
PROBABLE GROWTH OF BUILT UP AREA**



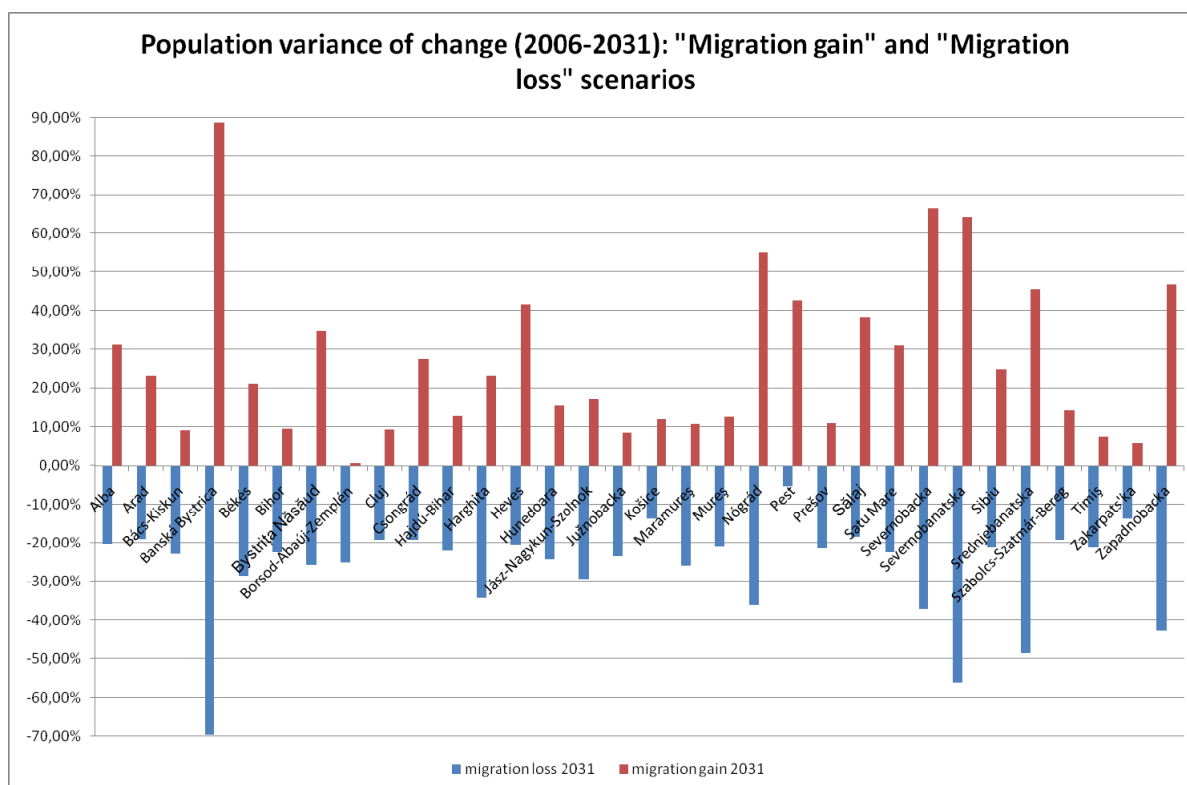


### III.3. Keeping young generation in the area

Two scenarios have been conceived again for modelling the impact of the implementation of this specific objective.

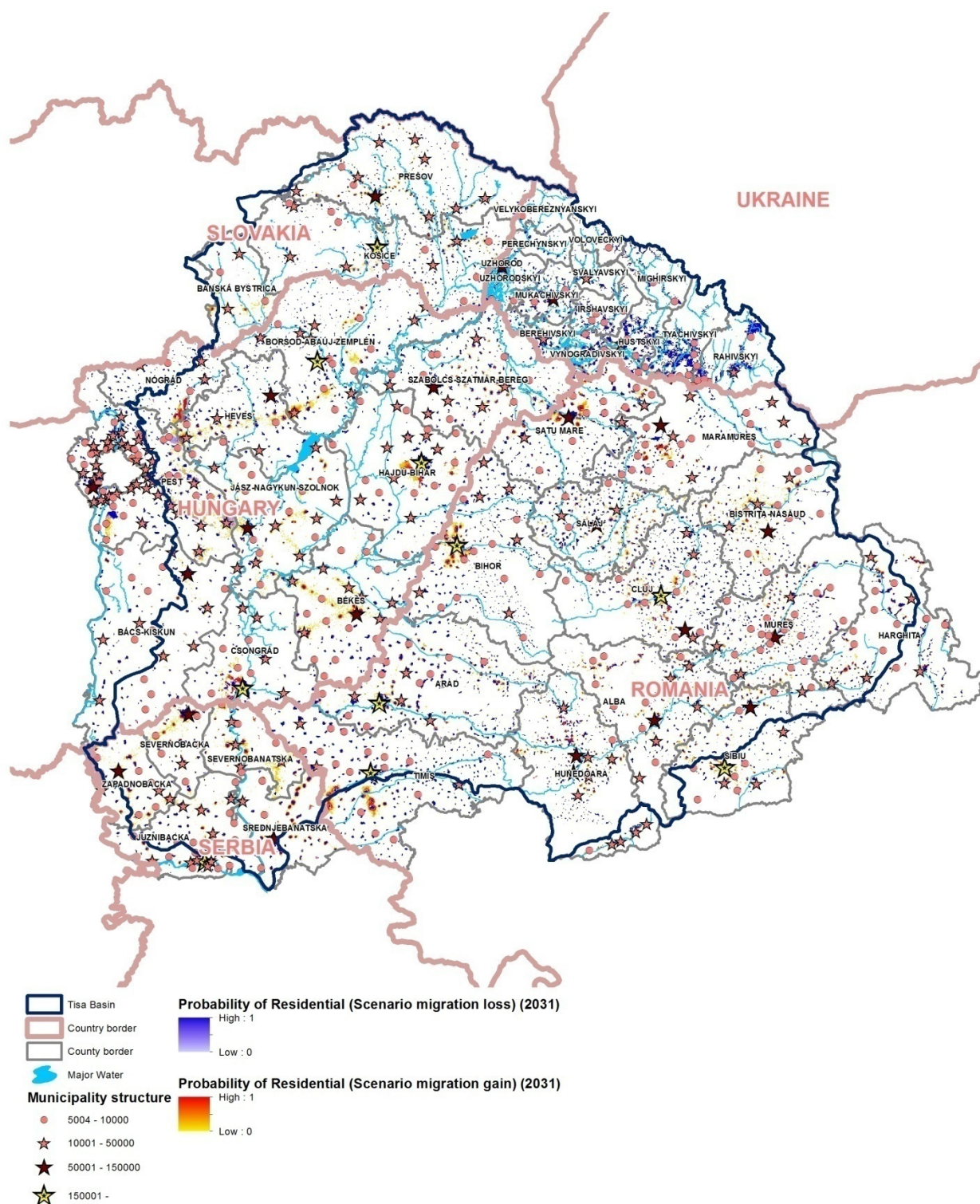
In the first scenario it is assumed that out-migration of population will continue, because the implementation of the proposed measures will fail. In this scenario the area will lose 3 million people by 2031. In this scenario the counties are identified, where the fall of the number of people is likely the greatest.

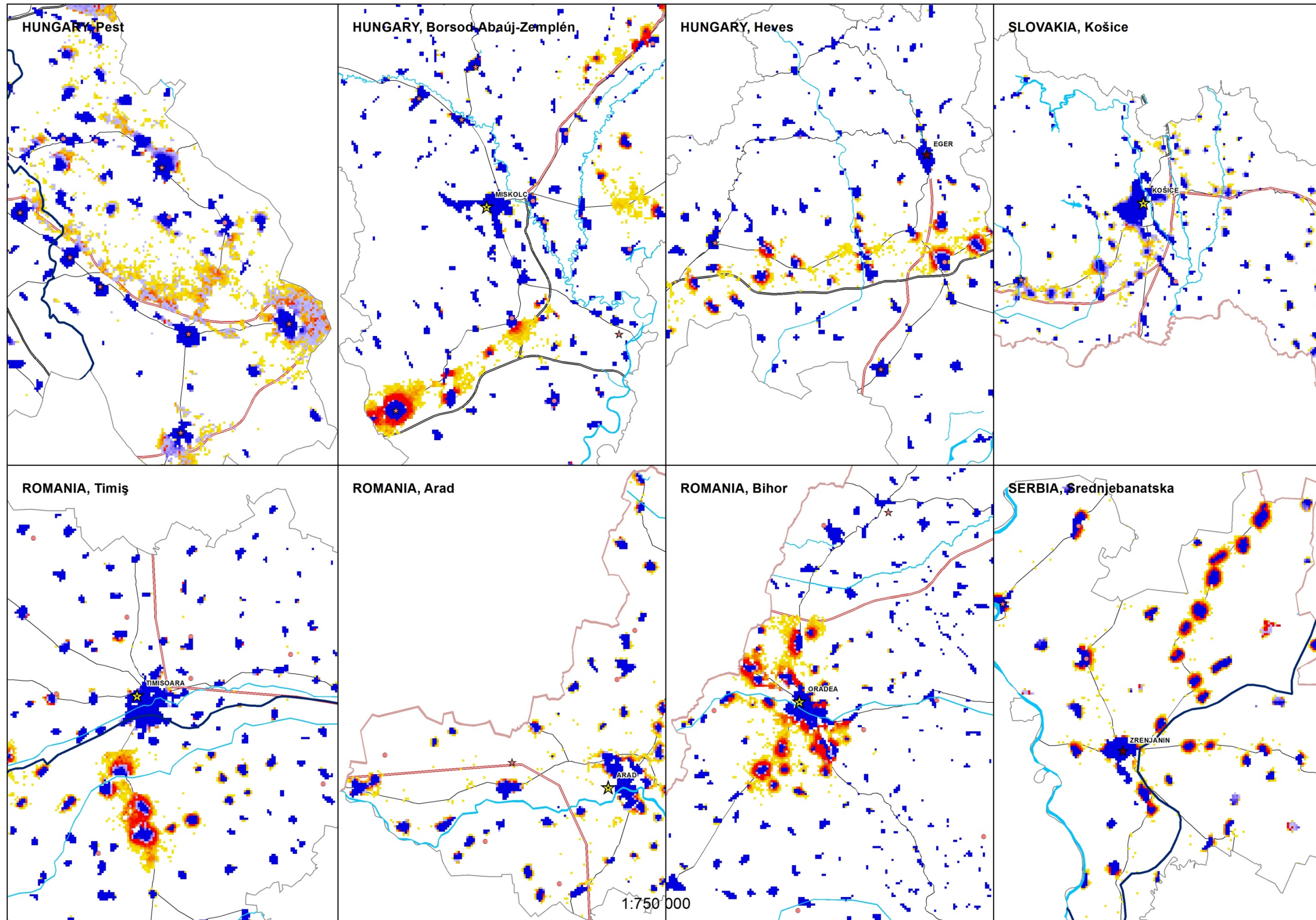
In the second scenario the assumption is that the TICAD area will gain 3 million people in the forthcoming 20 years. Those counties are identified, which may attract the greatest number of incoming migrants. The spatial implication is also shown by highlighting the pressure of population growth upon farming and semi-natural areas.



The scenarios show that with regard to population change the counties Banská Bystrica of Slovakia and the counties of Serbia (with the exception of Južnobačka) are the most vulnerable. The most attractive counties for in migration are Pest, Nógrád, Heves, Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg in Hungary, Alba, Sălaj and Satu Mare in Romania. Counties Jász-Nagykun-Szolnok and Nógrád of Hungary are among the losers.

**TICAD  
SCENARIO BUILDING  
IMPACT OF MIGRATION GAIN OR LOSS ON THE CHANGE OF RESIDENTIAL AREAS**





### **III.4. Strengthening institutional cooperation in the field of spatial planning**

For modelling the implications of cooperation in spatial planning two scenarios have been conceived. In the first scenario it is assumed that a *joint land use planning system* is developed and put in practice with unified land use regulation both for development area and protection areas. In the other scenario an extreme situation is assumed, with *no land-use regulation* at all. In the maps of this latter scenario those areas and assets are highlighted, which are at greatest risk in the absence of land-use regulation.

For *joint land-use regulation* the following zones have been designation with the following principles:

#### Nature protection areas

1. Areas under special protection: core sites of the ecological network, biological reserves and Ramsar sites.  
The zoning regulation includes the protection and enhancement of habitats and the prohibition of land use for agriculture and development. The Ramsar sites are wetlands and therefore forest use is restricted too.
2. Less strict are the regulations for the corridors and buffer zones of the ecological network. Preference is given to semi-natural habitats and uses (natural grassland and woodland), whereas agricultural use is restricted, and the relevant land use regulation is the responsibility of nature protection (management plan of nature protection areas). Building development is prohibited.
3. National parks, other sites under nature protection, areas of the Natura 2000 network. Preference is given to semi-natural uses (natural grassland, woodland). The agricultural use and building development are restricted, and the relevant land use regulation is the responsibility of nature protection (management plan of nature protection areas).

#### Protective areas of water resources

On the protective areas of water resources semi-natural uses are recommended, industrial uses are prohibited, other uses are restricted.

#### Flood-protection and ground water inundation areas

1. Flood protection areas: conditions of agricultural use are specified. Building development is prohibited. Forest use is permitted. Preference is given to grassland.
2. Areas under high risk of excess water: preference is given to grassland and woodland. Farm use and building development are prohibited.
3. Areas under moderate risk of excess water: semi-natural uses are recommended and supported. Agricultural uses are permitted under specific conditions. Building development is prohibited.
4. Flood risk areas: grassland and deciduous forests are given preference, farm-uses, coniferous forests are permitted, building developments are restricted.

#### Settlements with world heritage sites

All uses are permitted, industrial uses are under specific restrictions, mining and quarrying are prohibited.

#### Areas of specific land-use potential

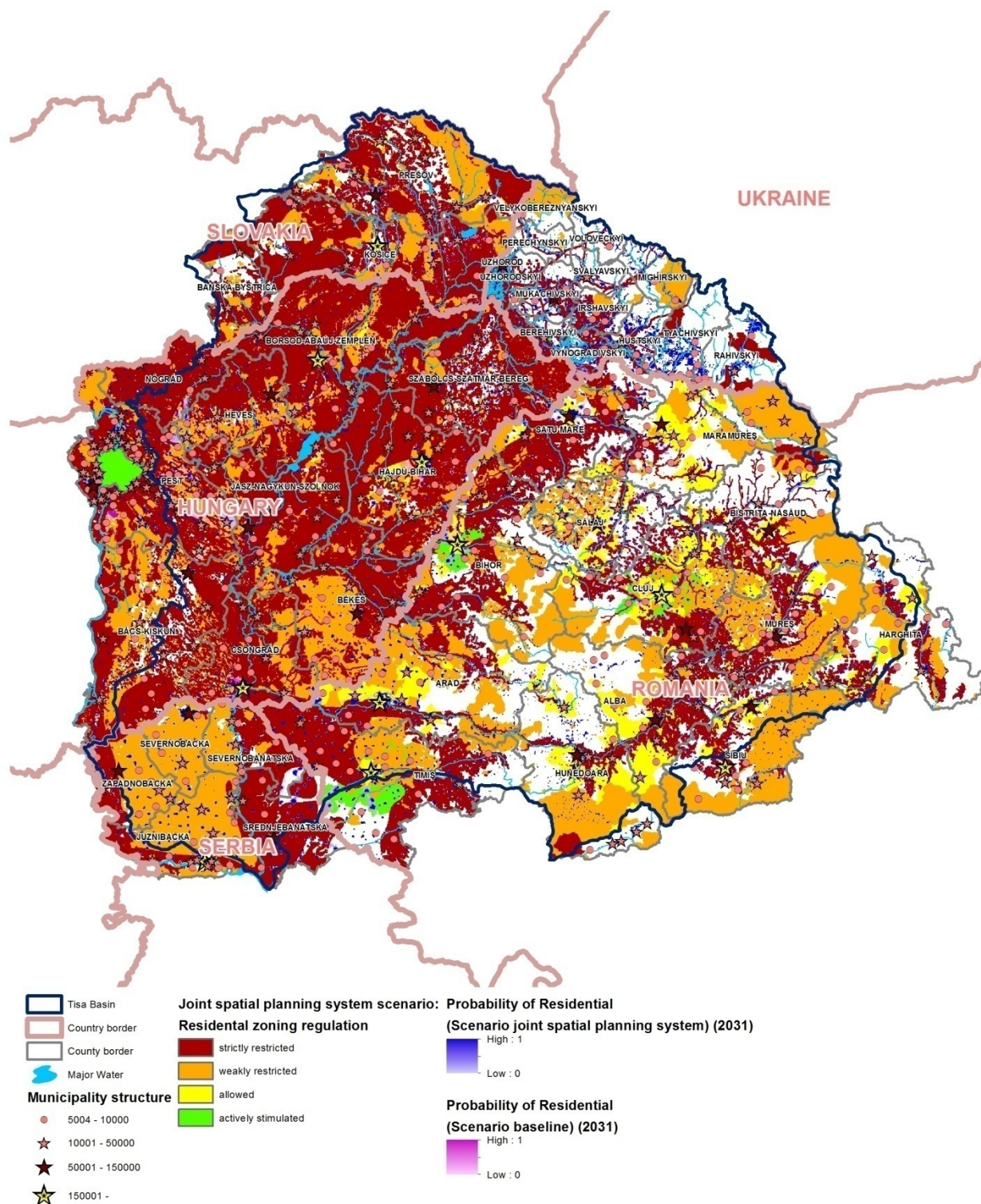
1. High quality forests: grassland is restricted. Woodland is given preference and support. No other use is permitted
2. Areas suitable for forestation: forest uses are given preference and support. Building development is prohibited. Other uses are permitted.
3. High quality arable land: cultivation is given preference, building development is prohibited, forest use is restricted, other uses are permitted.
4. Fair quality farmland: building development is restricted, farm use is given preference, other uses are permitted

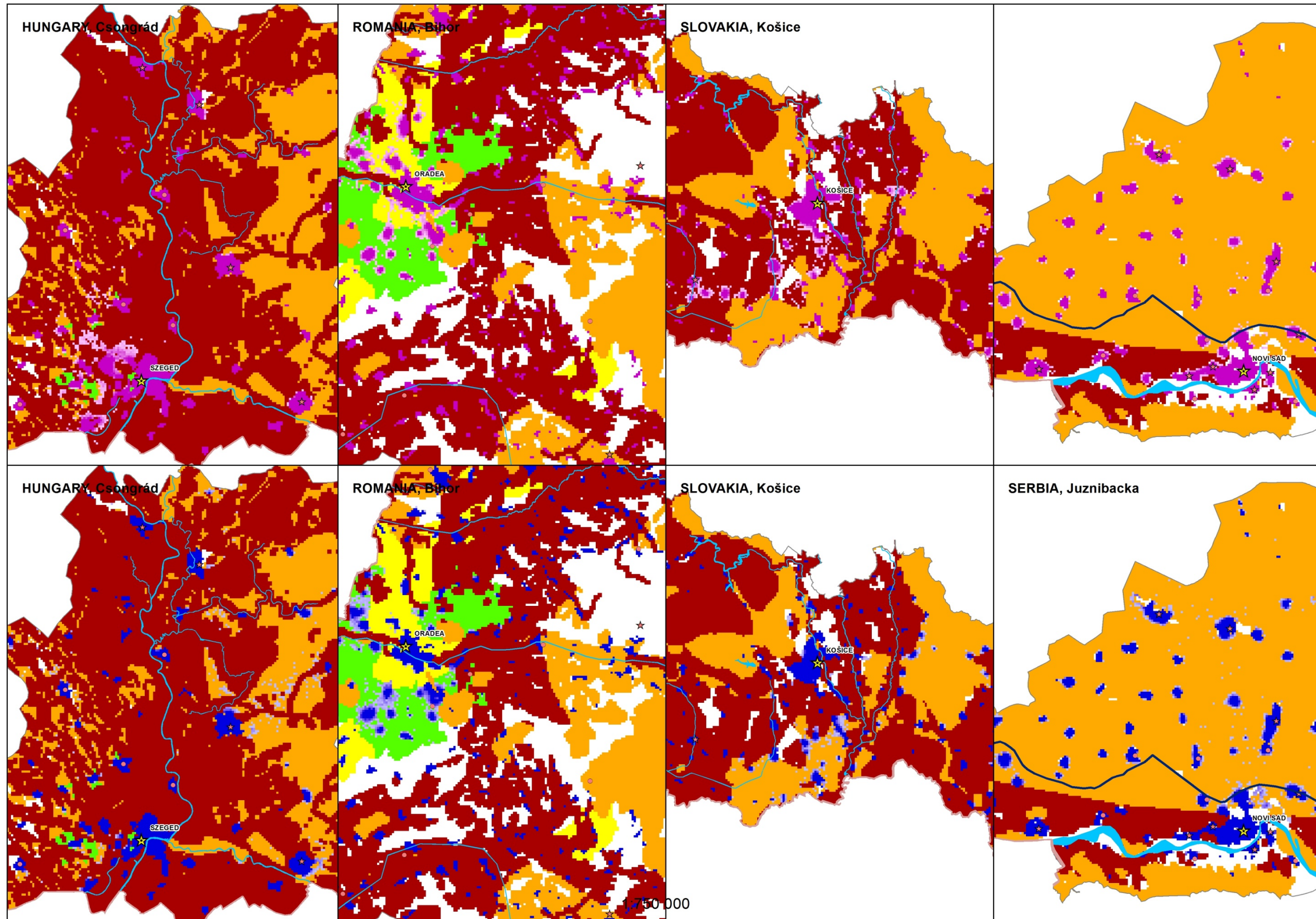
#### Areas designated for development

1. Special development areas, areas designated for urban growth, special economic zones: all uses are permitted, development is given preference and support
2. Zones designated for pipelines: development is restricted

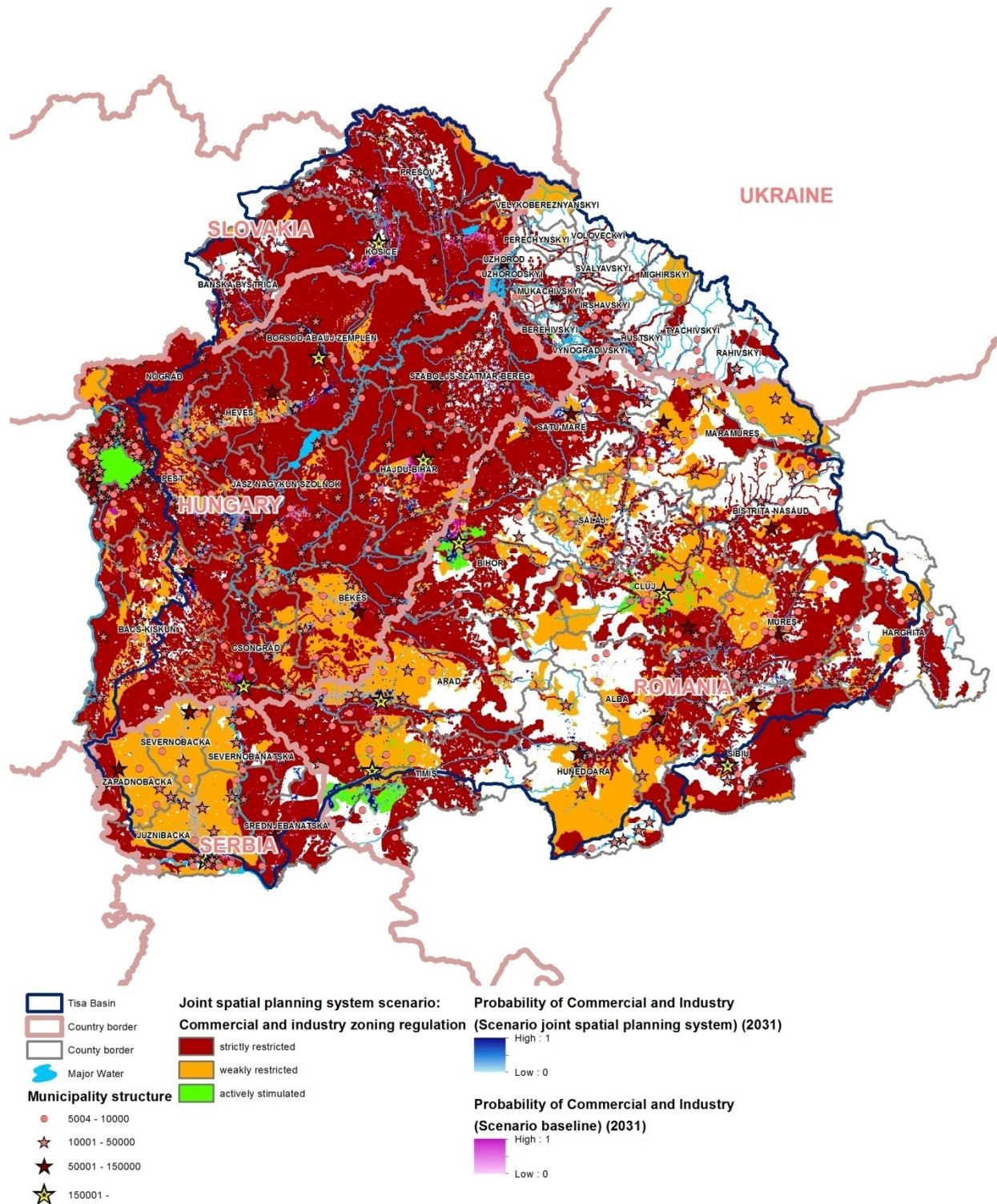
The maps indicate that the severity of regulations will not influence the rate of growth of built up (residential and commercial) areas, but will orientate their spatial allocation.

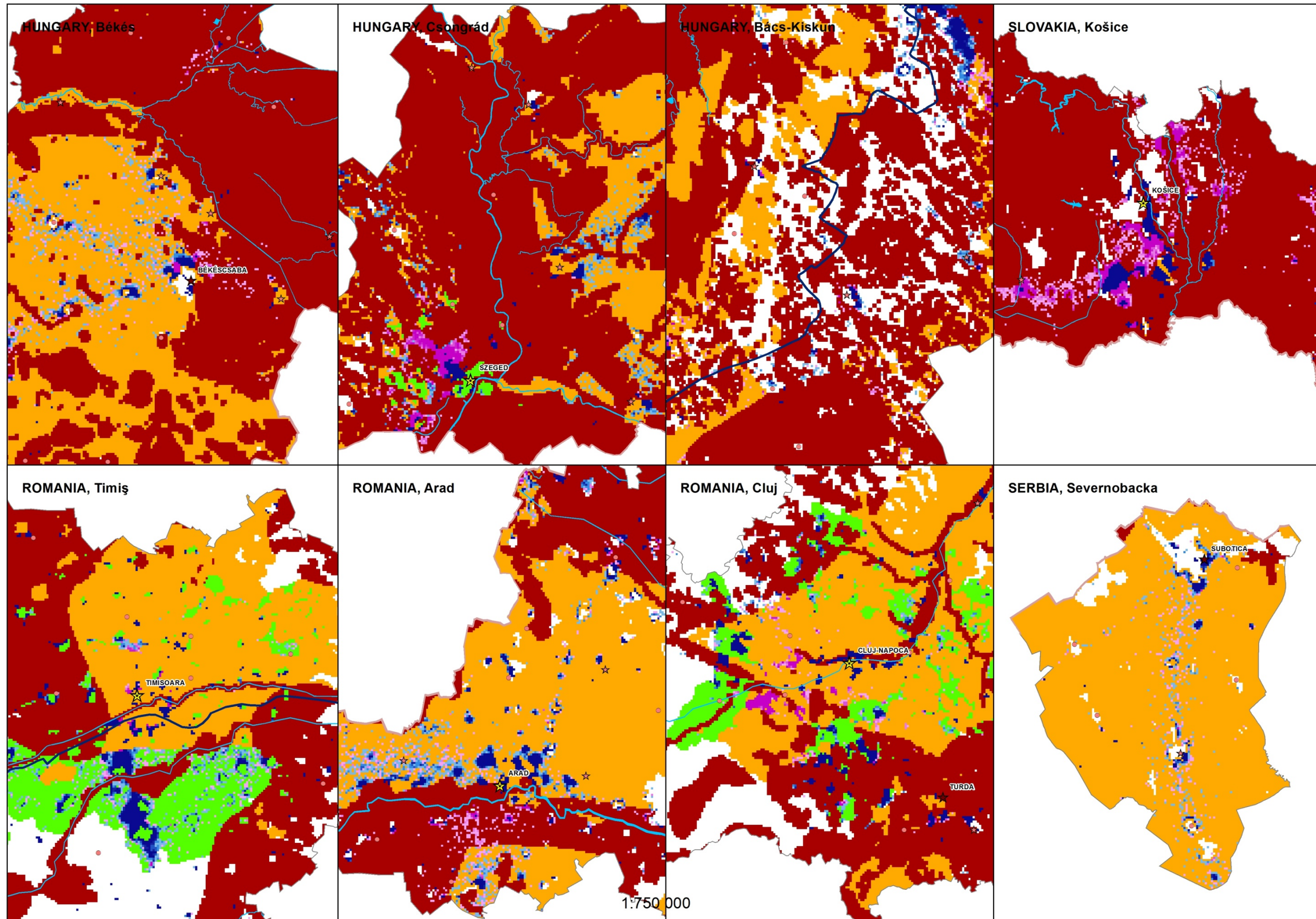
**TICAD  
SCENARIO BUILDING  
SCENARIO OF JOINT SPATIAL PLANNING SYSTEM:  
ZONING REGULATION AND PROBABLE GROWTH OF RESIDENTIAL AREAS**



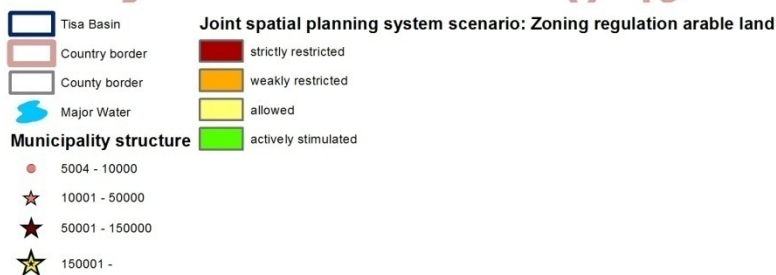
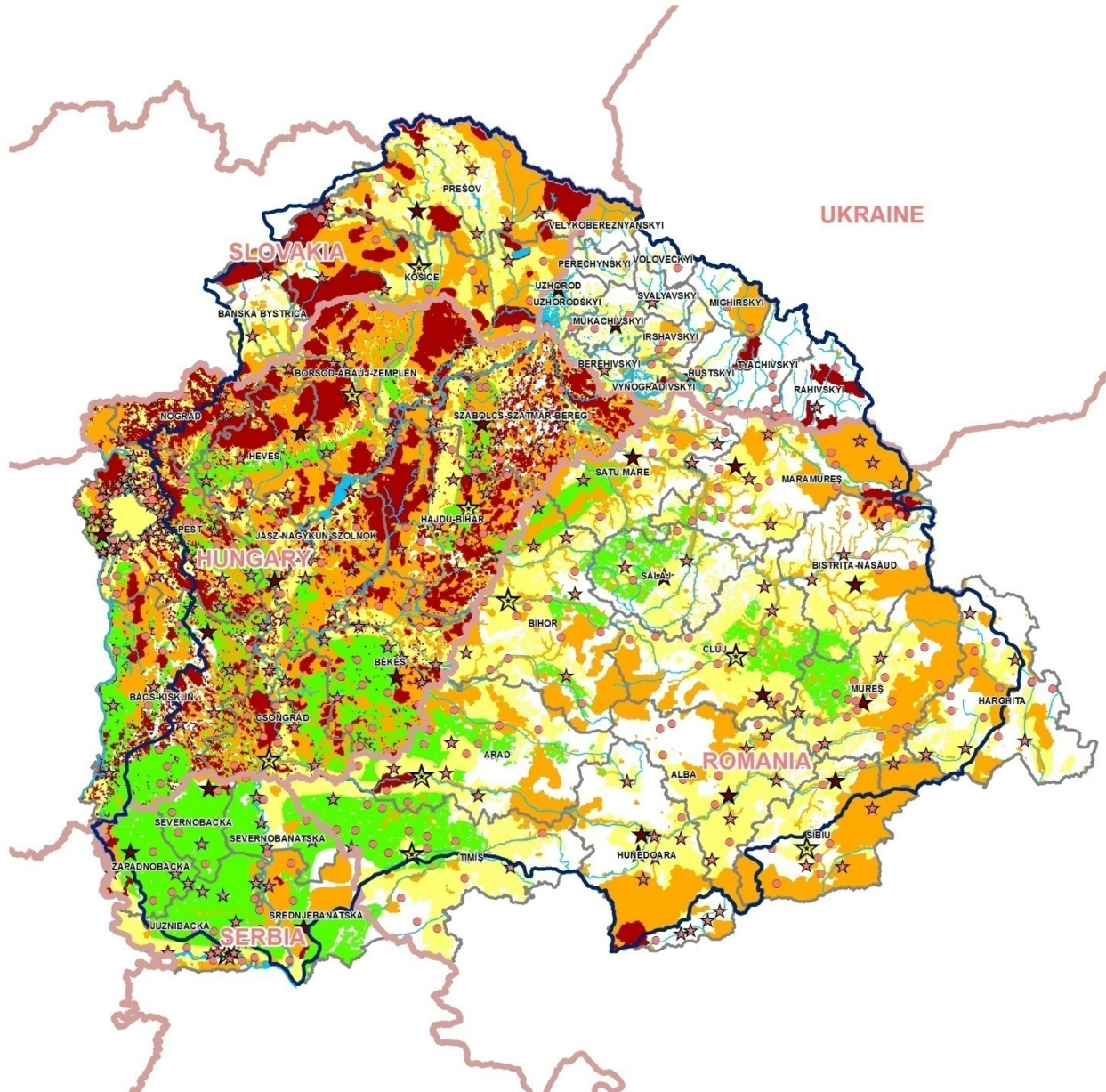


**TICAD  
SCENARIO BUILDING  
SCENARIO OF JOINT SPATIAL PLANNING SYSTEM:  
ZONING REGULATION AND PROBABLE OF COMMERCIAL AND INDUSTRY AREAS**

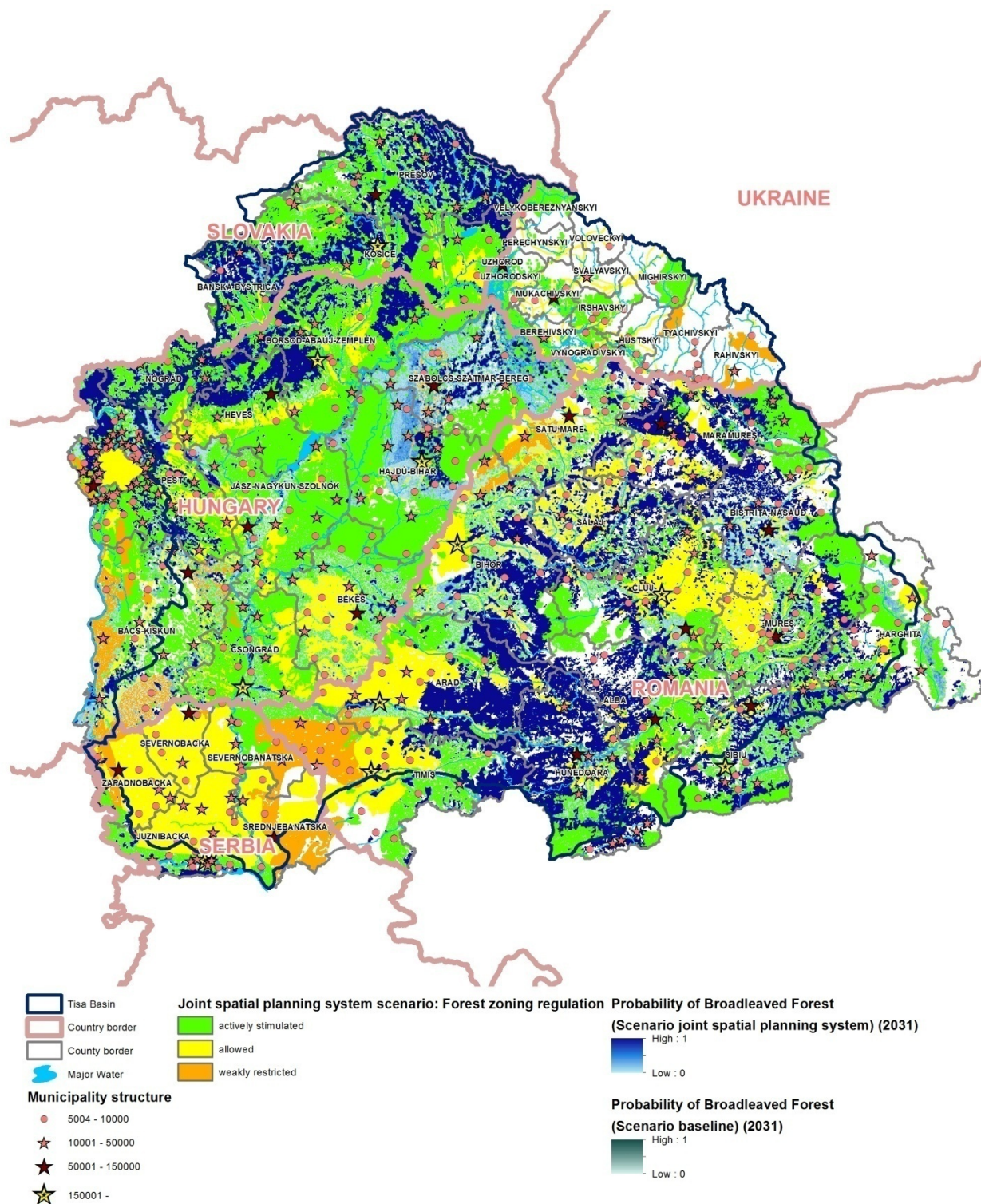


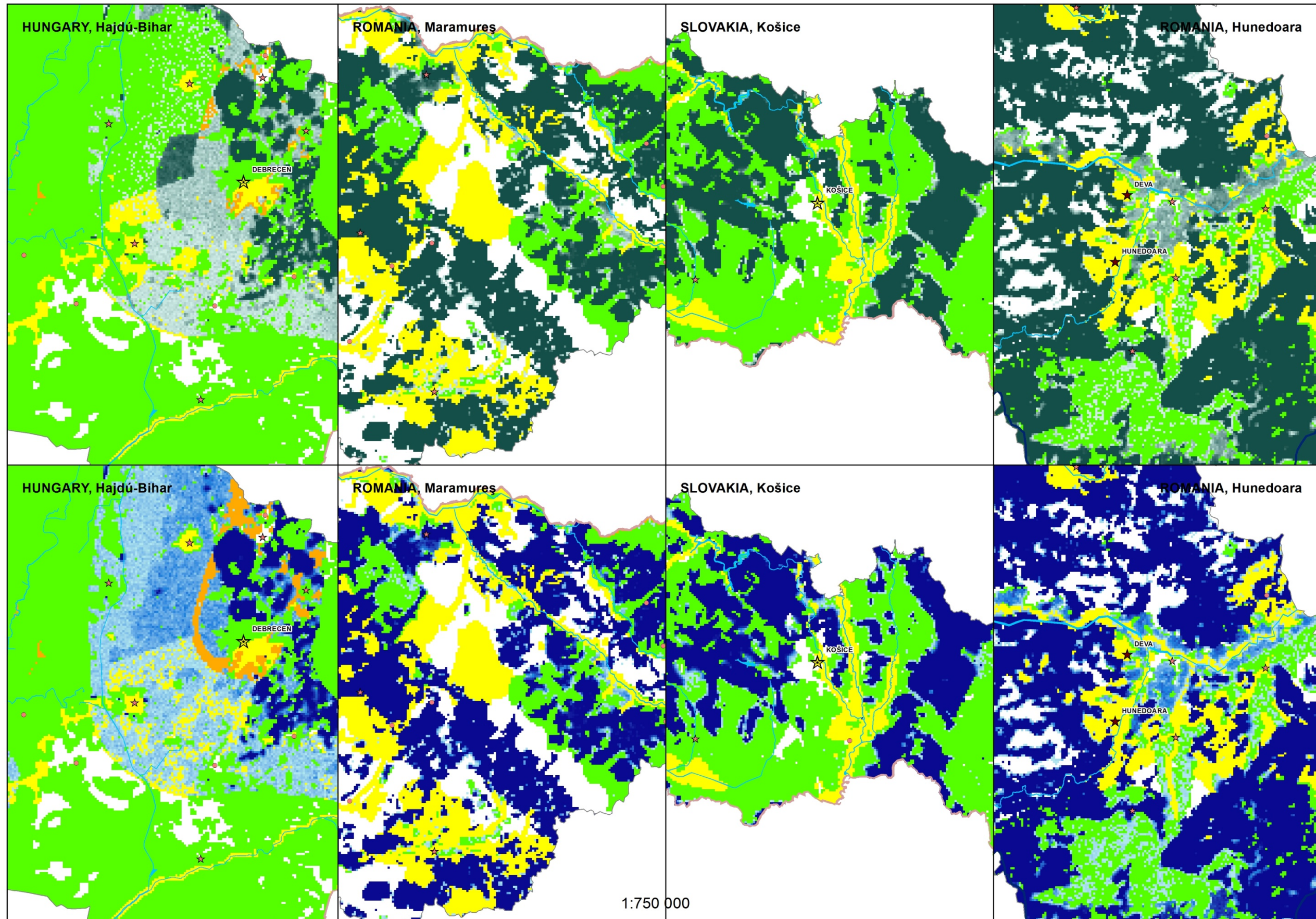


**TICAD  
SCENARIO BUILDING  
SCENARIO OF JOINT SPATIAL PLANING SYSTEM:  
ZONING REGULATION OF ARABEL LAND**



**TICAD  
SCENARIO BUILDING  
SCENARIO OF JOINT SPATIAL PLANNING SYSTEM:  
ZONING REGULATION AND PROBABLE GROWTH OF BROADLEAVED FOREST**



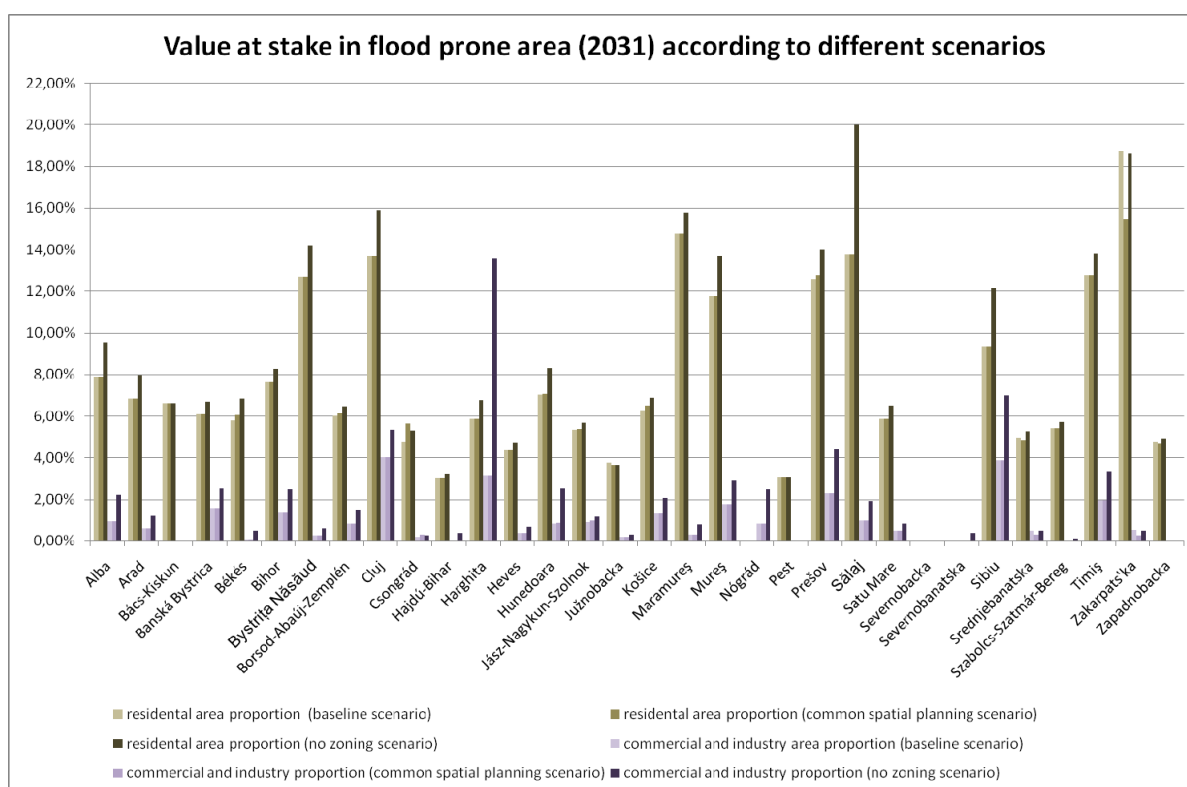


### III.5. Limitation of impact of natural disasters by preventive measures

In the TICAD strategy the measures for flood protection are in line with the European Flood Directive. Land use regulations are the suitable means for the mitigation of the impact of floods. The incidental flood damages can be reduced by means of strict planning regulation for the flood prone areas. The impact of such regulations have been assessed by means of a spatial indicators of the “value at stake in flood prone areas”.

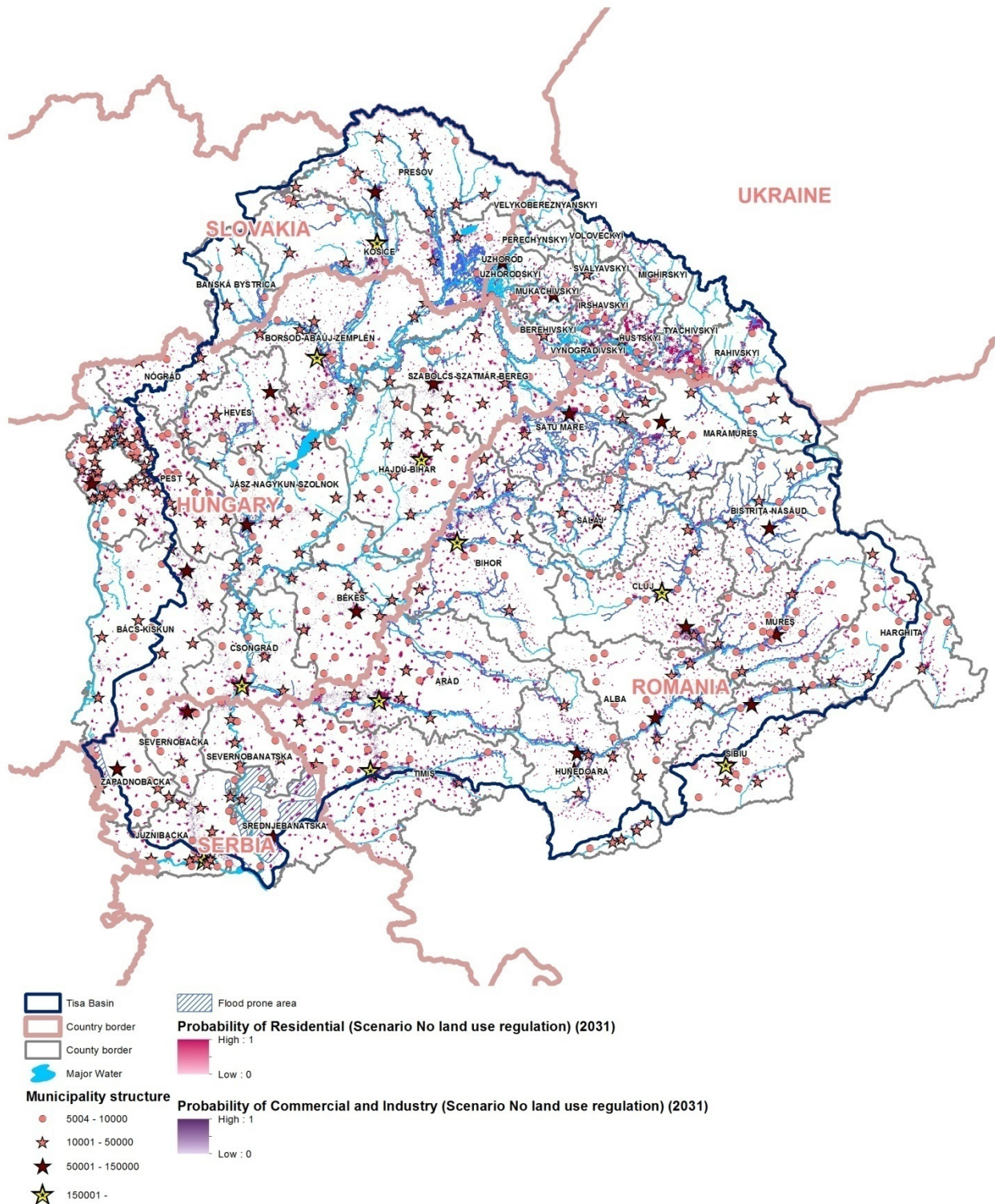
The values have been classified in the following:

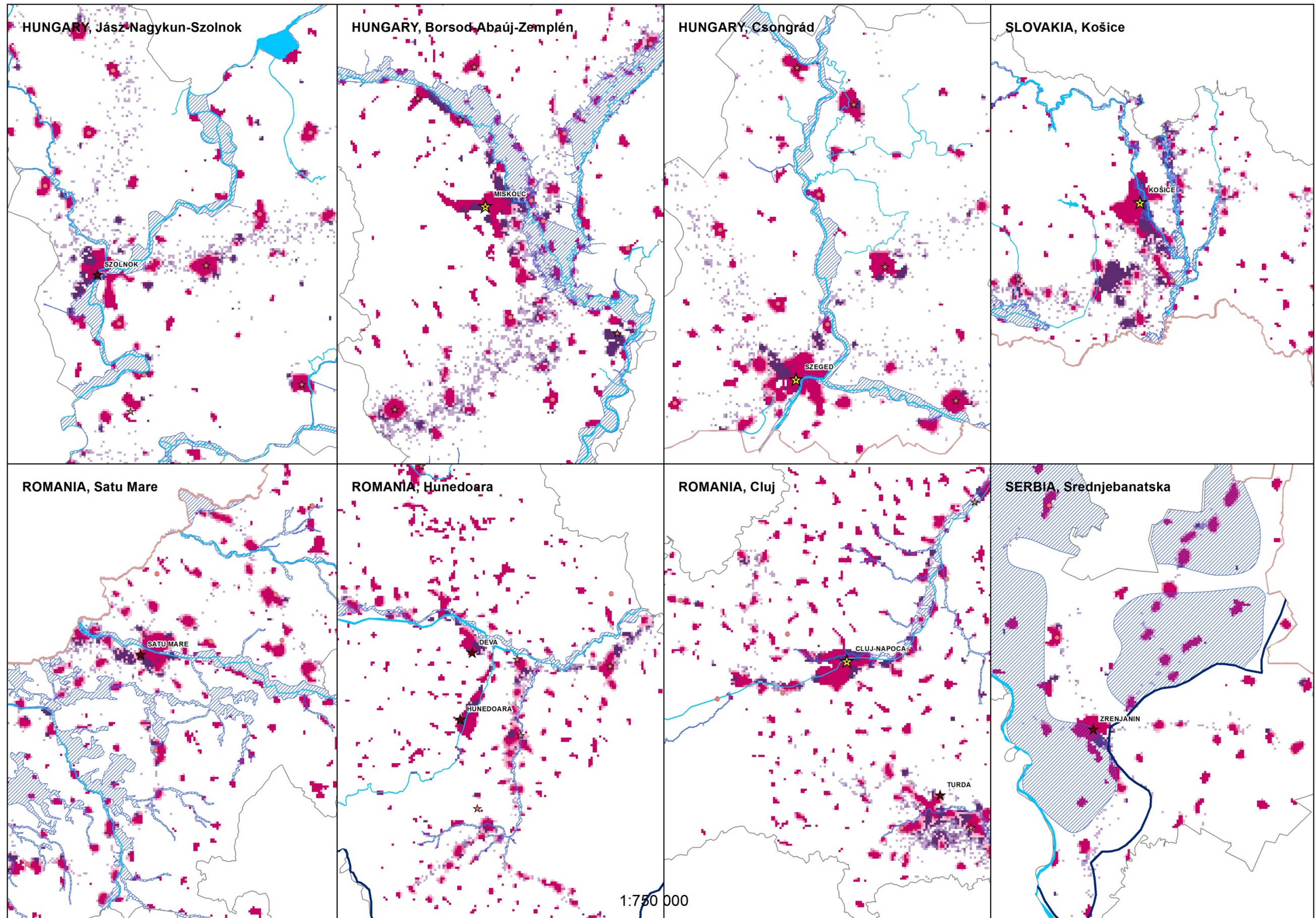
- over 15: airports, commercial and industrial uses
- 10-15: residential uses
- 0-5: agricultural uses such as arable land, pastures, permanent crops, heterogeneous agricultural area; as well as mines and dumpsites.



There is no major difference between the impacts in the case of the *baseline scenario* and the scenario of the *joint land use planning system*. The reason is that in most countries building development is already prohibited. The only exception is Ukraine, where the flood damages would be considerably reduced in the case of more strict land use regulations. The scenario assuming *no land use regulation* justifies the importance of strict regulations. Without them there would be a great increase in the number and rate of endangered valuable assets by 2031. Particularly great is the pressure on flood prone are developments in counties Sălaj, Hargita, Cluj, Mureş and Sibiu of Romania.

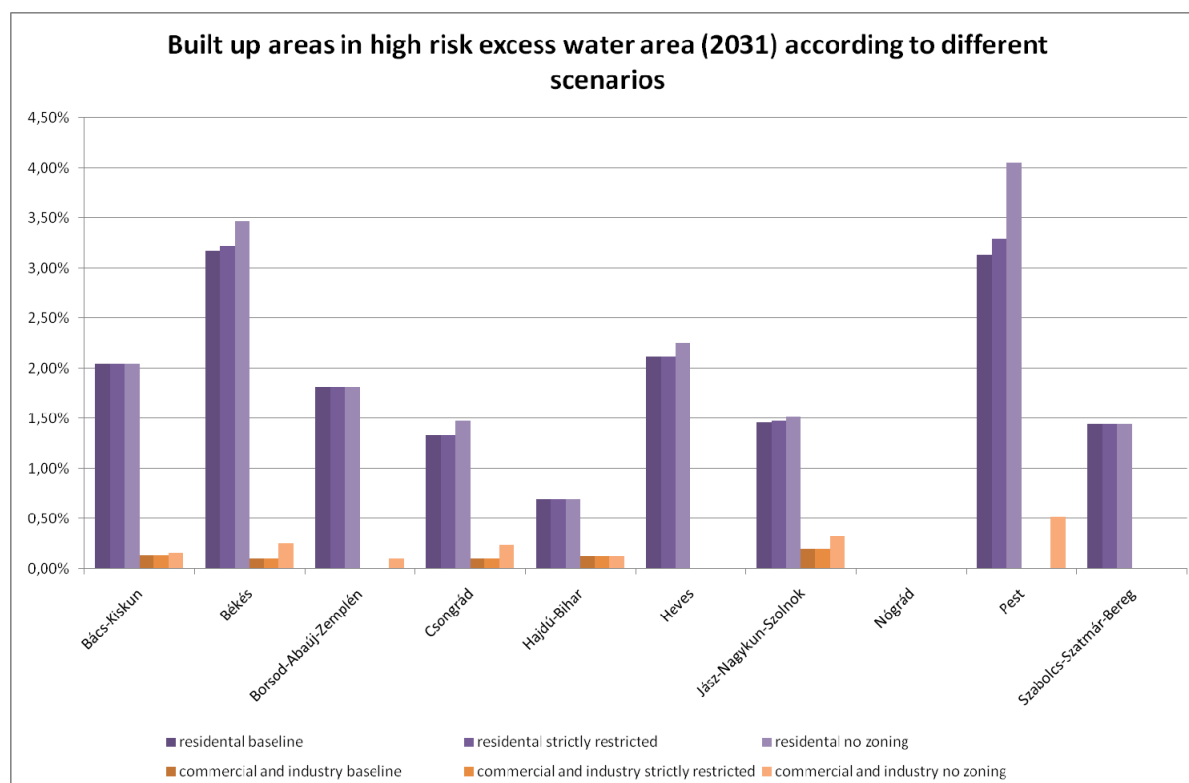
**TICAD  
SCENARIO BUILDING  
NO LAND USE REGULATION SCENARIO:  
PROBABLE GROWTH OF BUILT UP AREA IN FLOOD PRONE AREA**



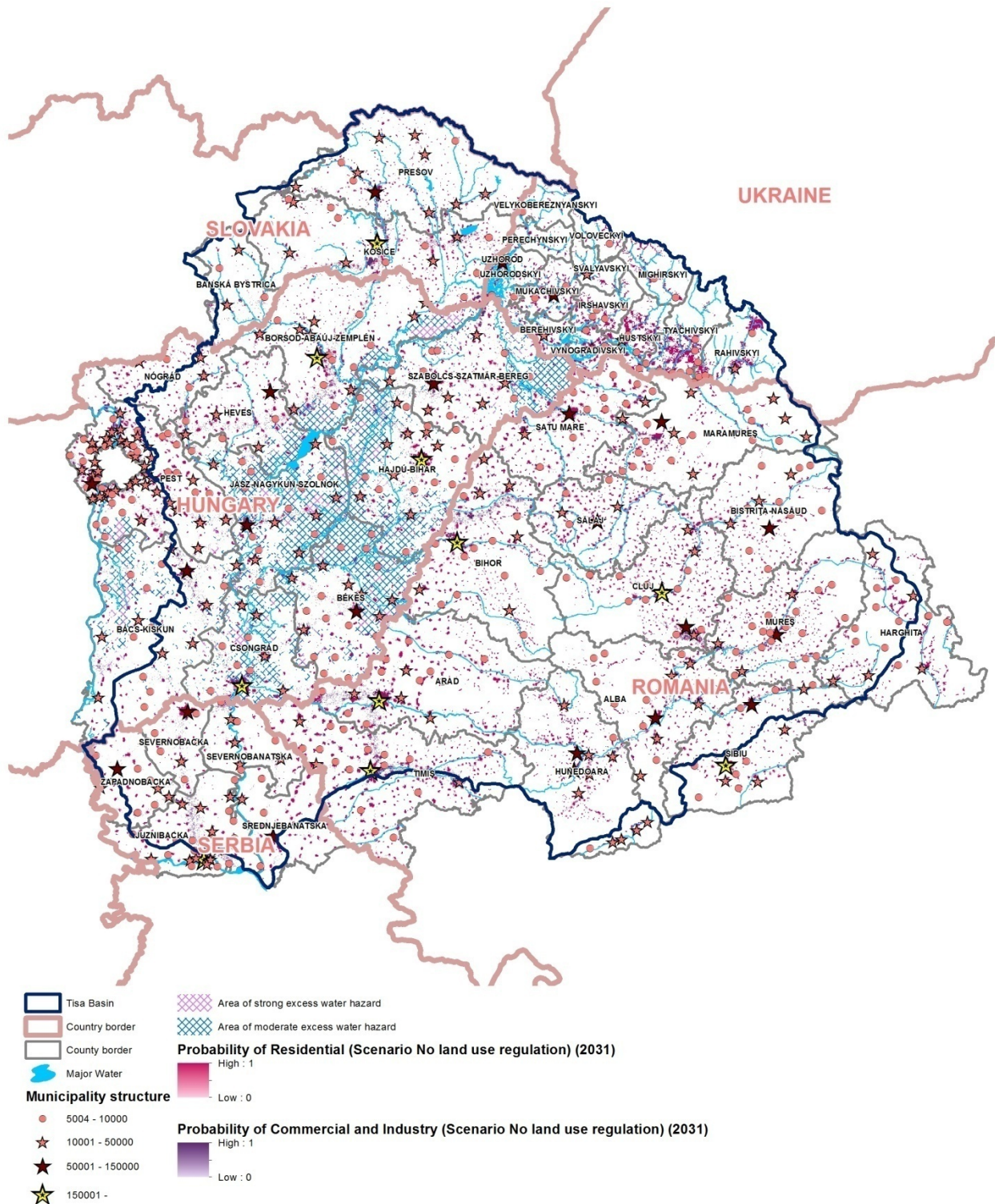


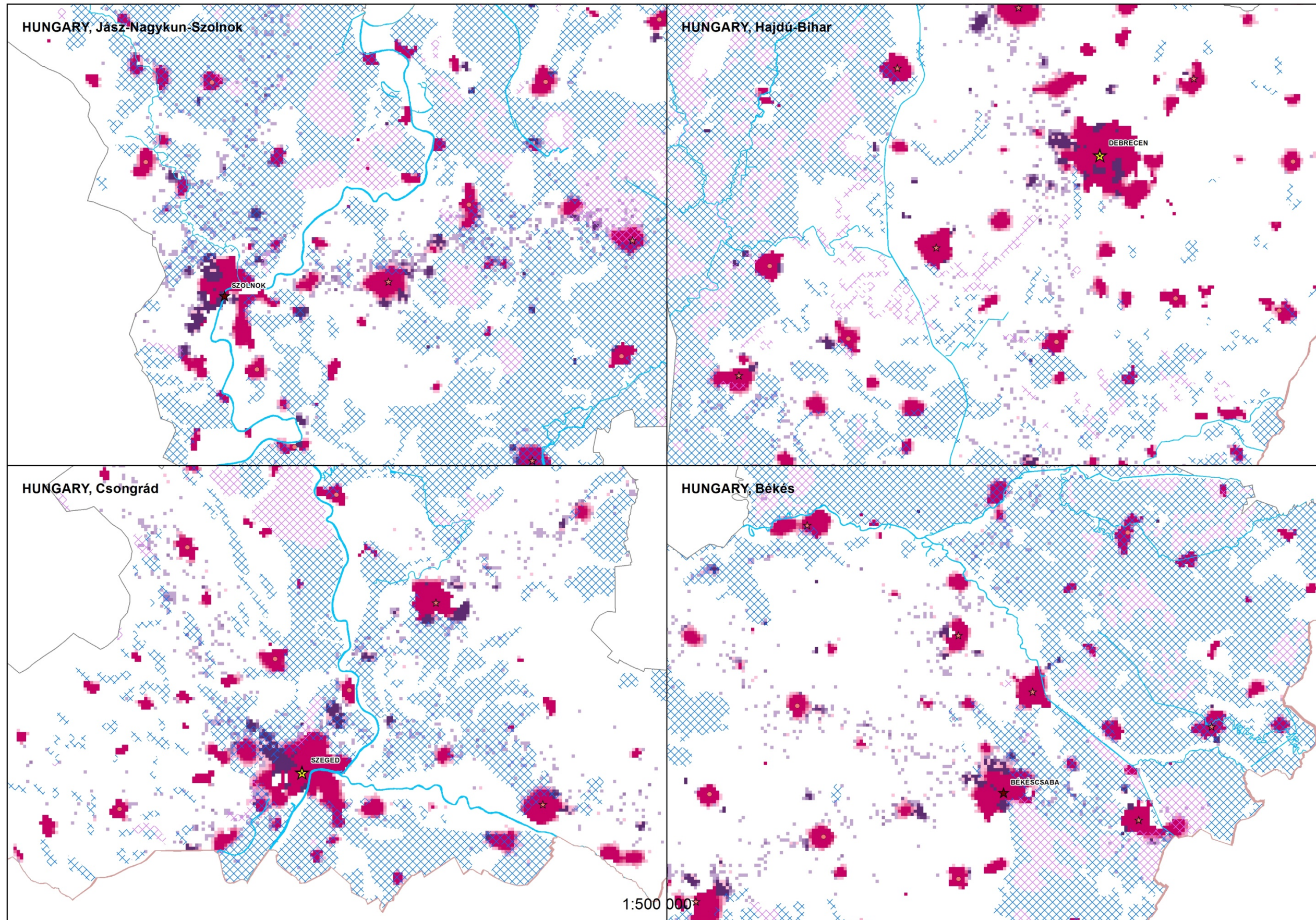
In Hungary, besides floods, excess ground waters are also causes of great dangers. In areas of high risk and moderate risk excess water severe regulations would prevent and mitigate the expected damages.

The absence or waiving of regulation may result particular difficulties in counties Pest, Békés, Heves, Csongrád and Jász-Nagykun-Szolnok of Hungary. The table below shows the implication of regulation upon the change of built up areas.



**TICAD  
SCENARIO BUILDING  
NO LAND USE REGULATION SCENARIO:  
PROBABLE GROWTH OF BUILT UP AREA IN EXCESS WATER HAZARD AREA**



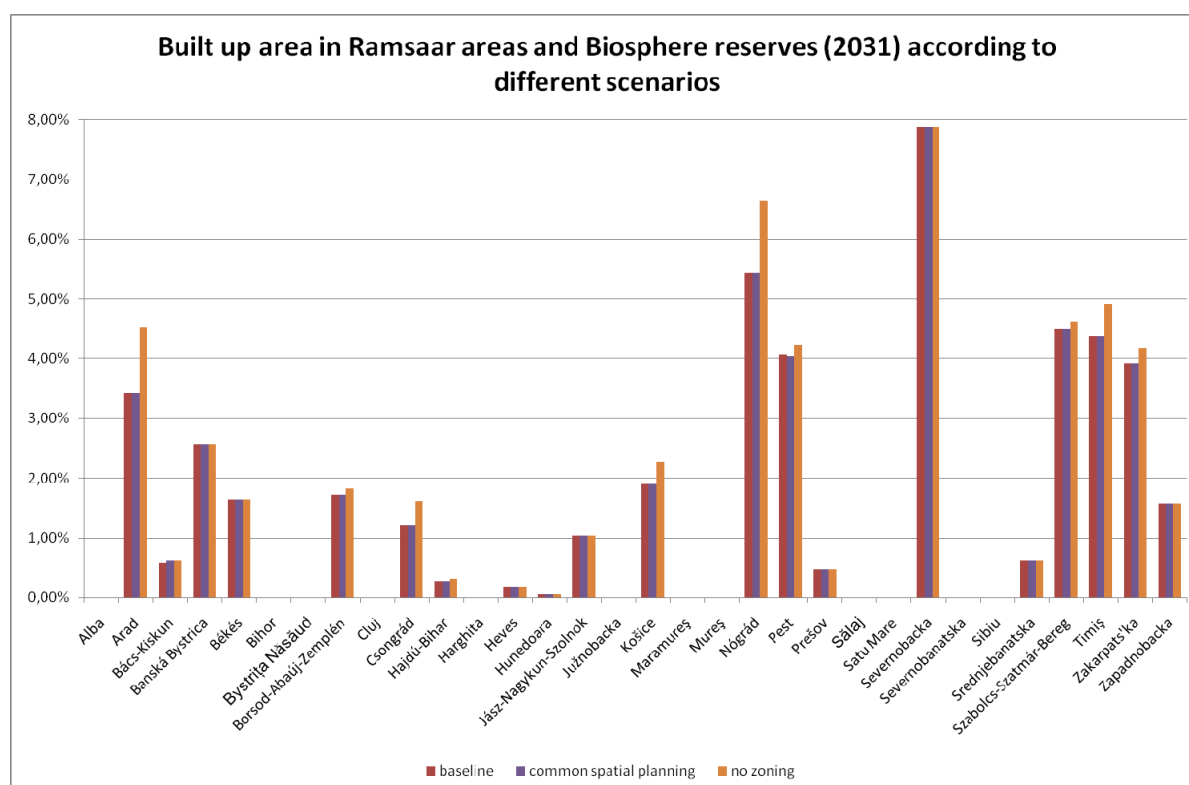


### III.6. Enhancing and protecting natural resources and the natural and cultural heritage

Three scenarios have been conceived and compared to analyse the vulnerability of nature conservation areas. The *baseline scenario* is on the continuation of the present land use system. In the scenario of the *joint land use planning system* represents the implementation of a coordinated and harmonized land use regulation all over the Tisza catchment area. The third scenario shows the consequences of the *waiving of land use regulations*.

The various nature conservation areas are under protection already in several countries.

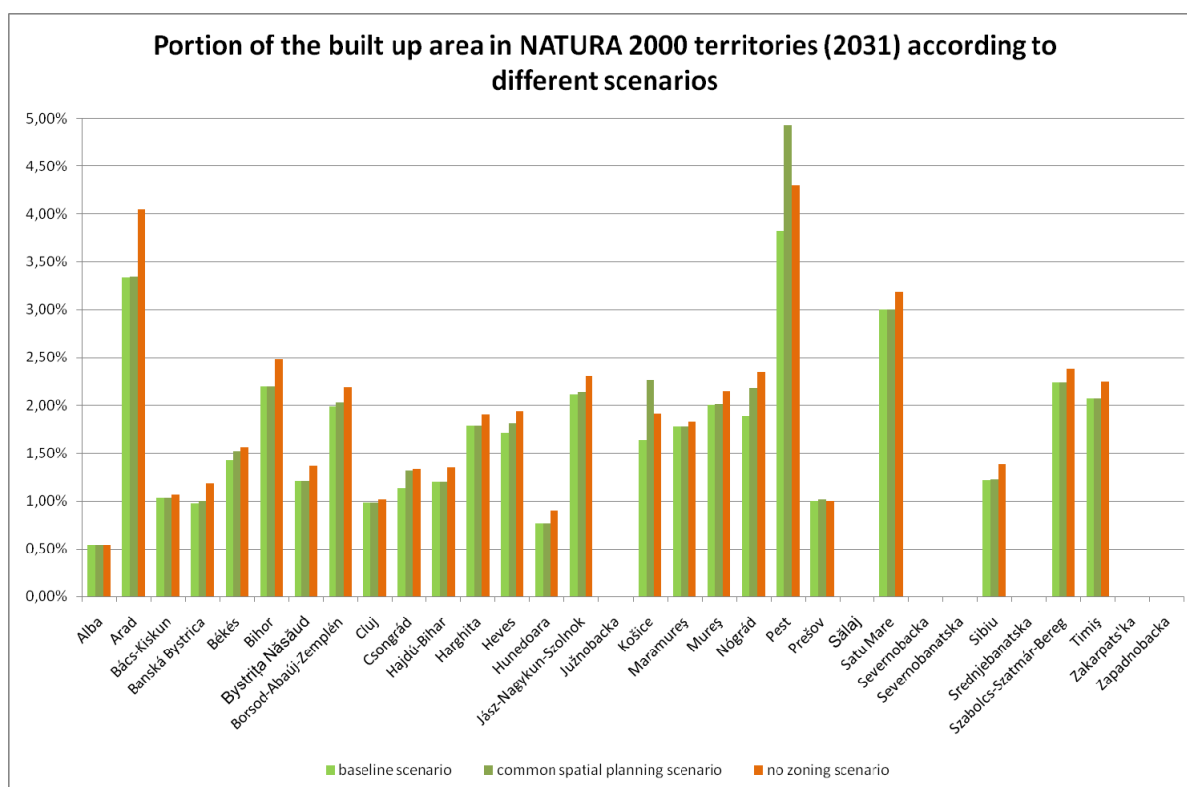
The most severe regulations are for the Ramsar sites and biosphere reserves, and building development is strictly prohibited everywhere. Therefore there is no difference in this respect between the impacts of the baseline scenario and the scenario of the joint land use planning system. Nevertheless, some growth of built up areas is forecast to the detriment of nature conservation areas. In the future these critical sites will be under growing pressure for relaxing nature protection. The authorities must be particularly careful and determined to protect these assets. The table and map below demonstrate the critical sites. They amount to a relatively small portion of protected areas, but are under international protection and very vulnerable, and therefore their special protection is essential.



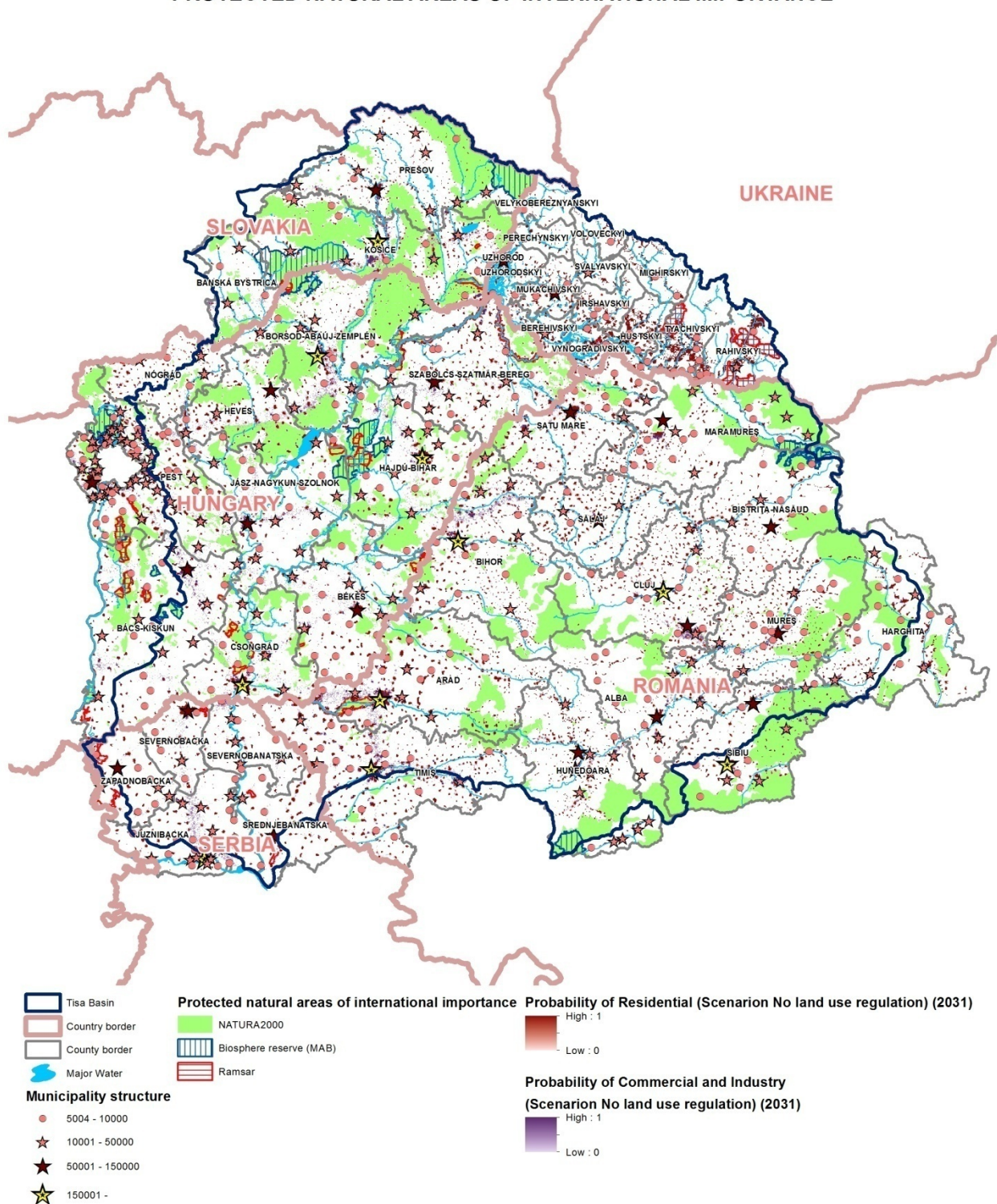
### Natura 2000 areas

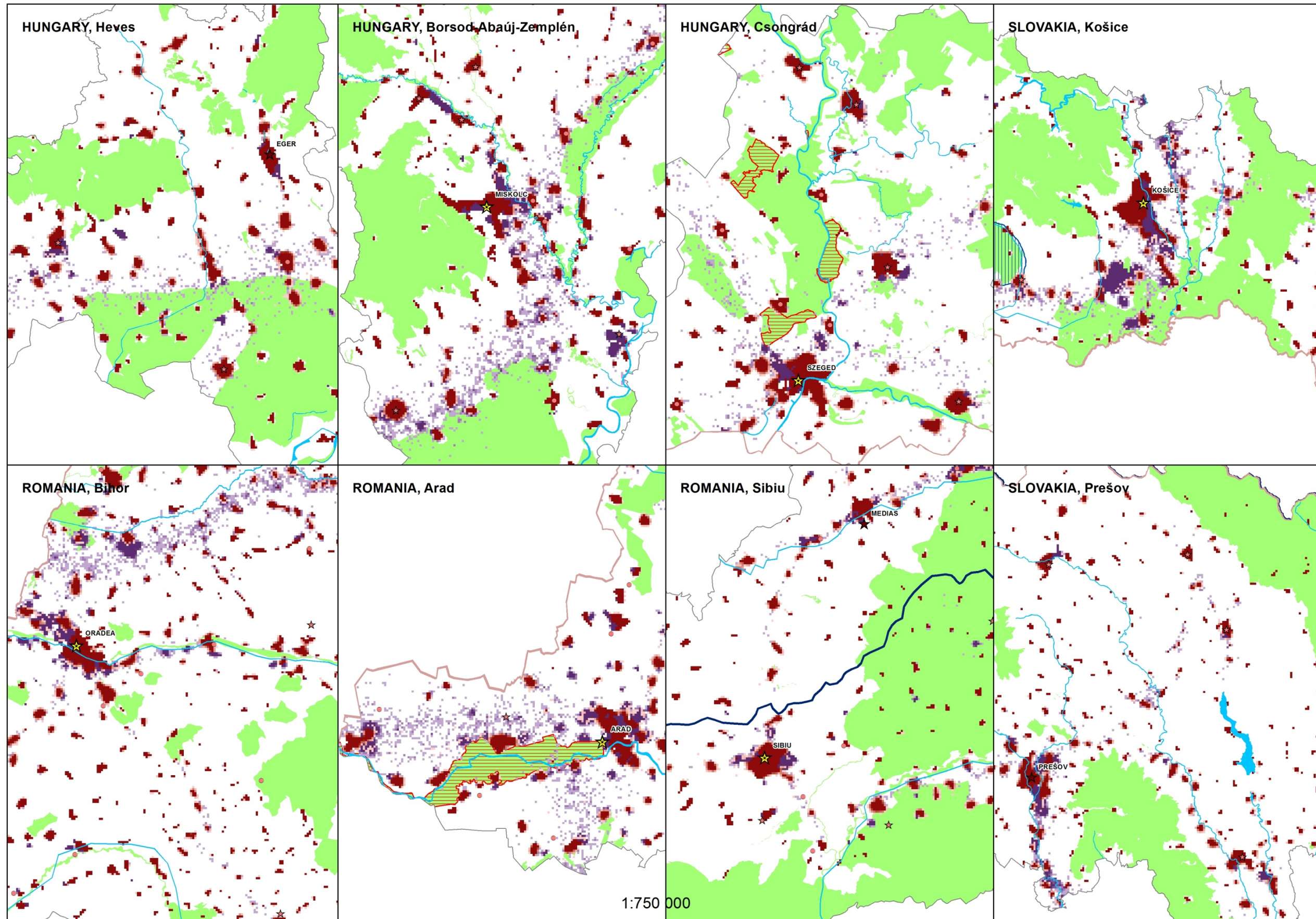
Natura 2000 is the network of protected areas of the European Union. They are designated in the EU Member States, but are not in Serbia and Ukraine. The current and proposed regulations are the same. Building development is restricted and land use planning is the responsibility of nature protection authority. The majority (95 %) of these areas will remain intact even without further regulation. However, in view of the diversity of Natura 2000 areas and their difference in value and sensitivity it is important to fortify the nature protection authorities to reduce the danger of loss of valuable sites. The table and map below show the potential risks of development in Natura 2000 areas.

The analysis indicates that in counties Pest (Hungary) and Košice (Slovakia), even in the case of a *joint land use planning system* built up areas may increase. This is due to the conflict with other, even stricter regulations. That is, considering all zones and zoning regulations, the future growth of residential and industrial areas is only feasible at the cost of Natura 2000 sites.

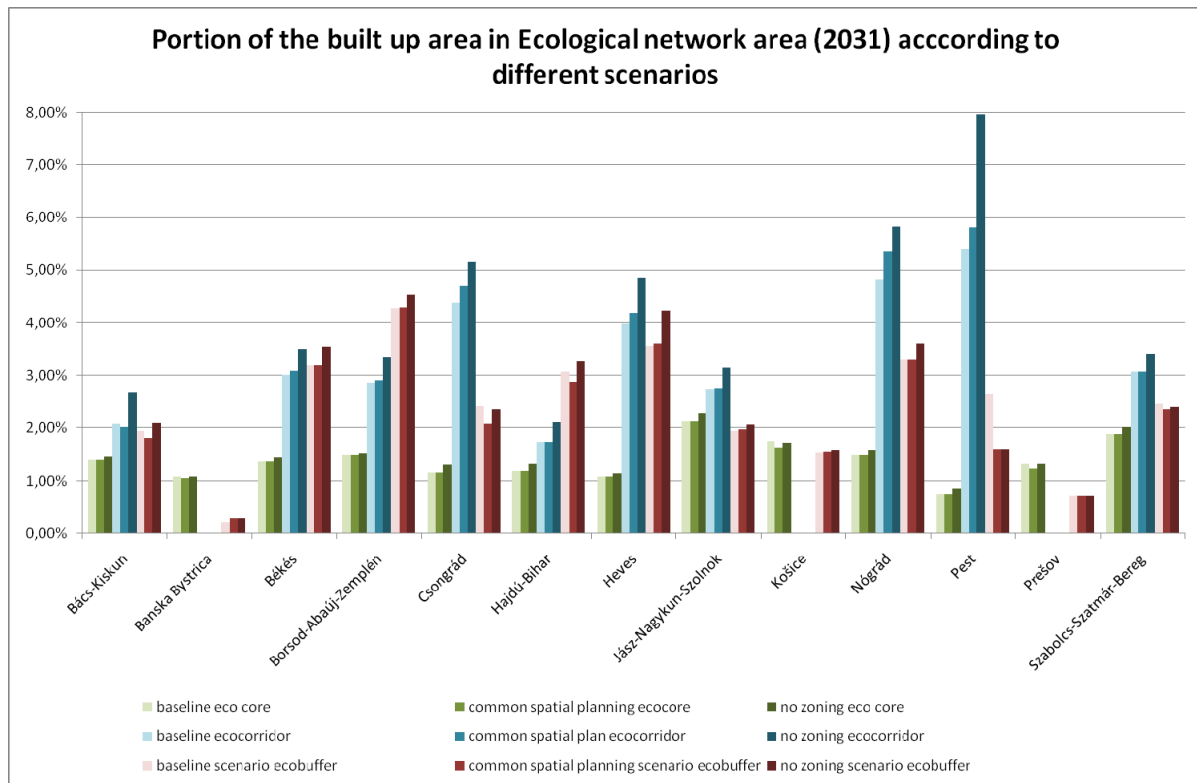


**TICAD  
SCENARIO BUILDING  
NO LAND USE REGULATION SCENARIO:  
PROBABLE GROWTH OF BUILT UP AREA IN  
PROTECTED NATURAL AREAS OF INTERNATIONAL IMPORTANCE**



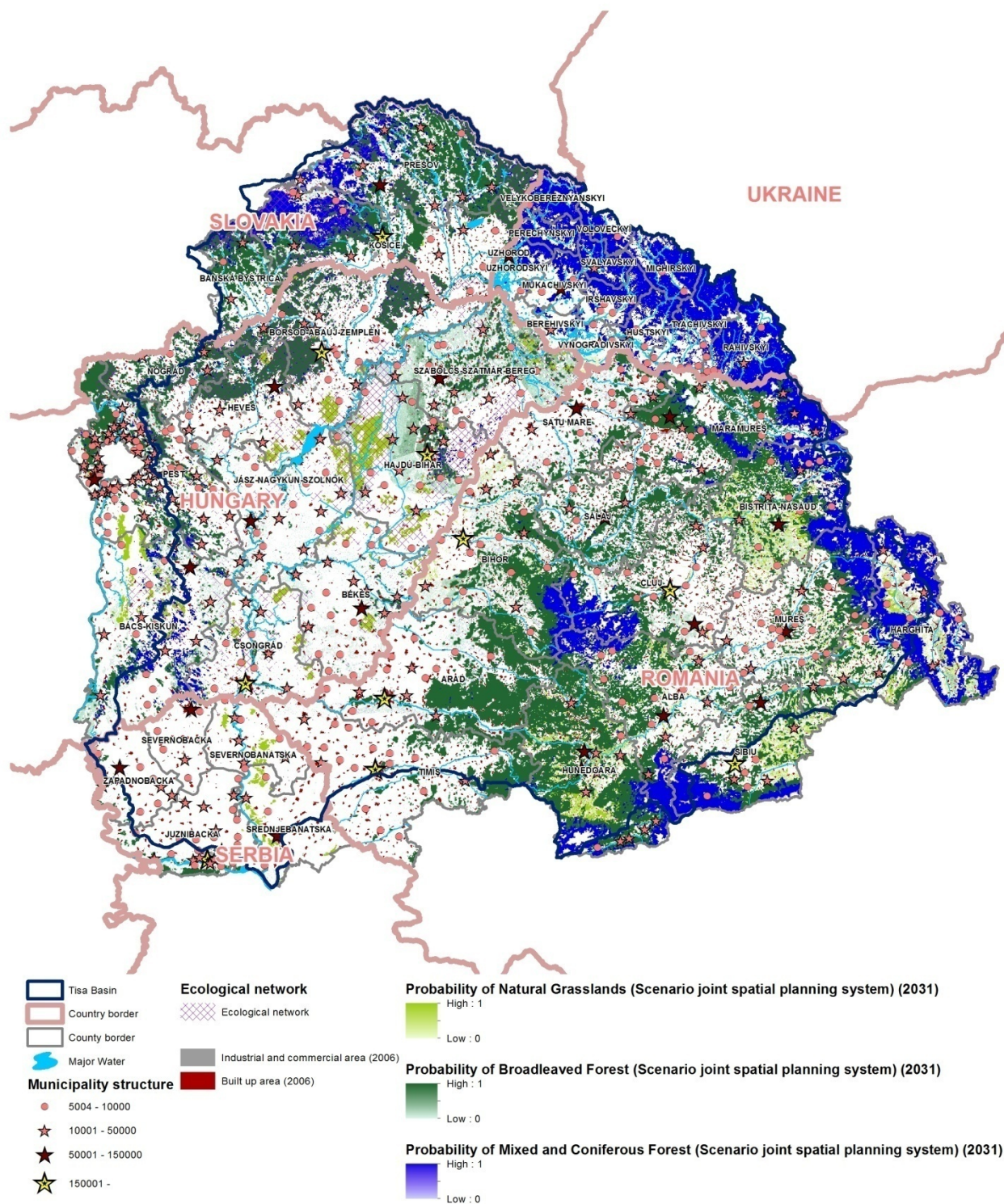


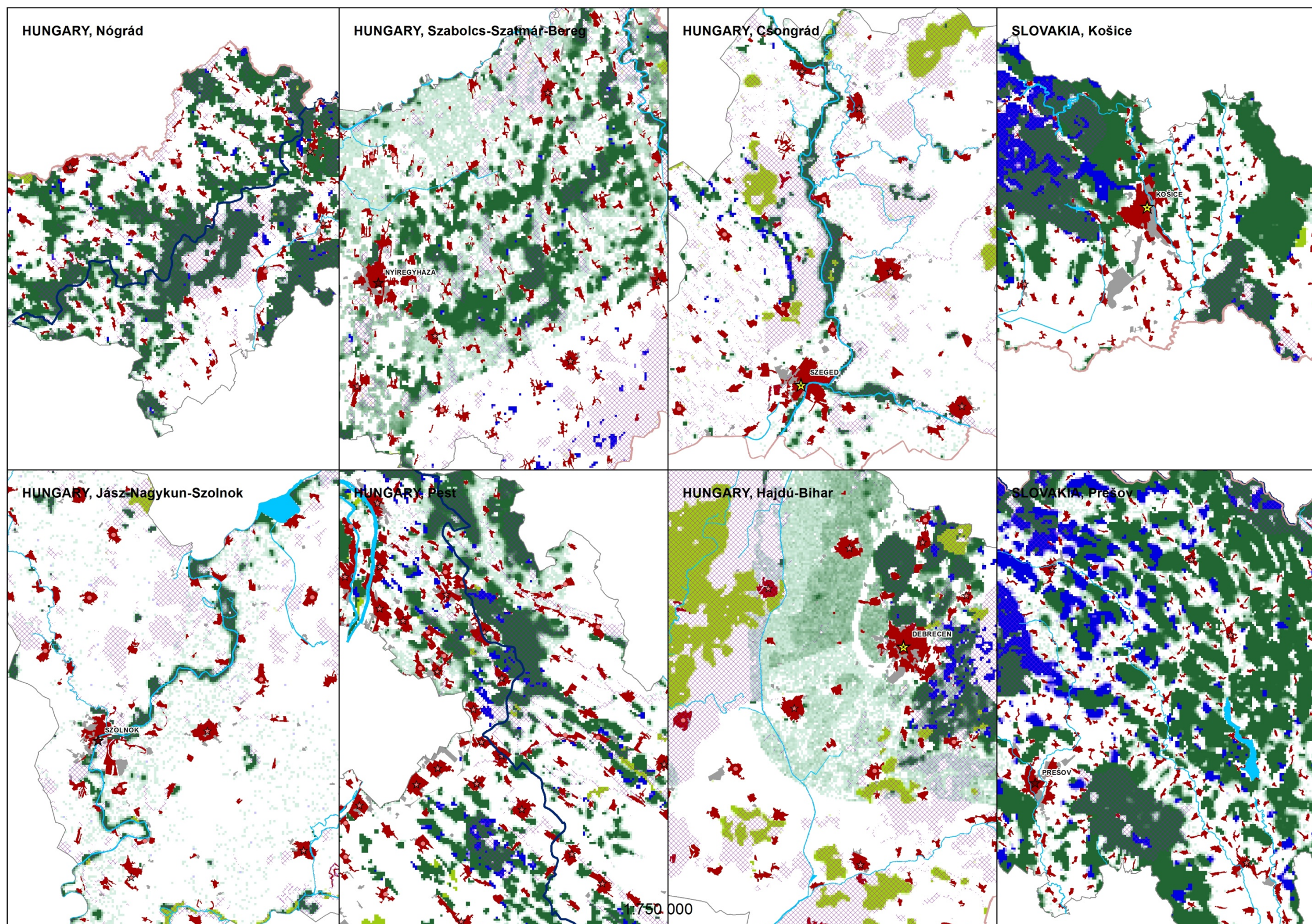
The network of ecological sites has been designated in Hungary and Slovakia only. These areas are also in danger of development in the future. The table and map below show the sites and areas, where development is probable in the forthcoming 20 years. It is therefore important to introduce and enforce coordinated regulations for the protection of the ecological network.



The other map shows the likelihood of survival and growth of semi-natural areas (woodland, grassland) of the ecological network.

**TICAD  
SCENARIO BUILDING  
SCENARIO OF JOINT SPATIAL PLANNING SYSTEM:  
PROBABLE GROWTH OF SEMI-NATURAL AREAS IN ECOLOGICAL NETWORK**



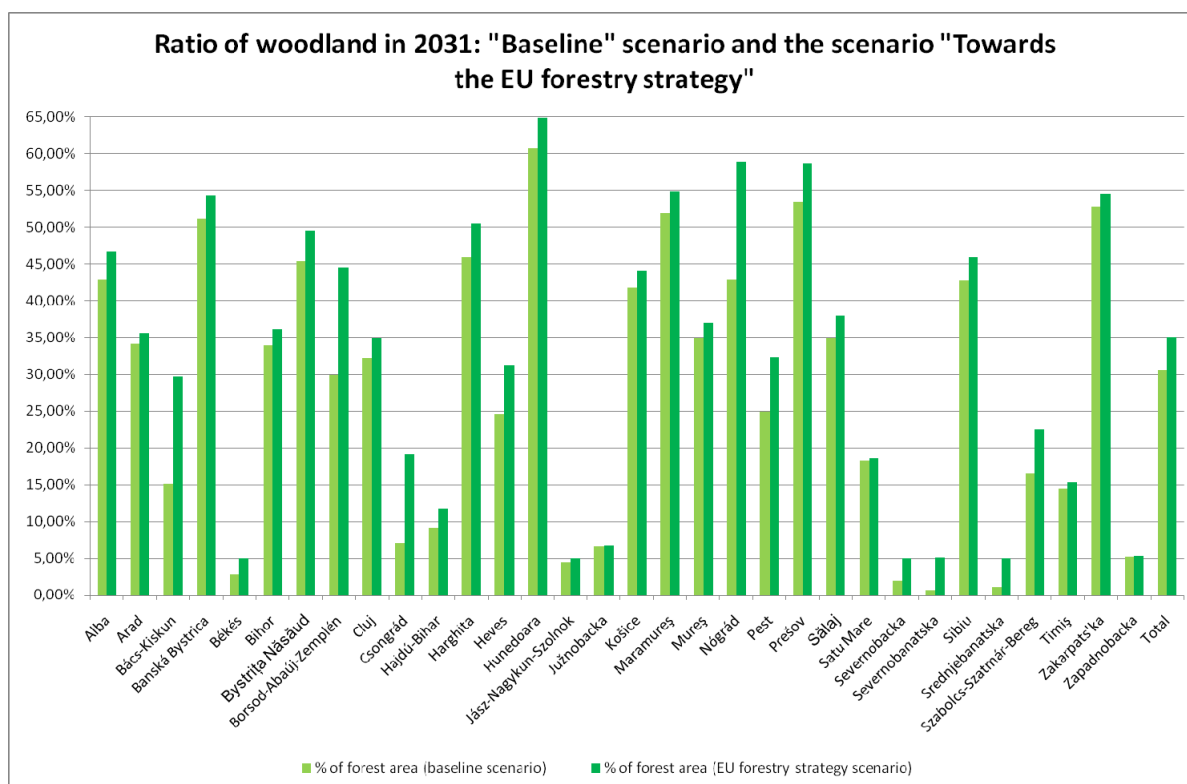


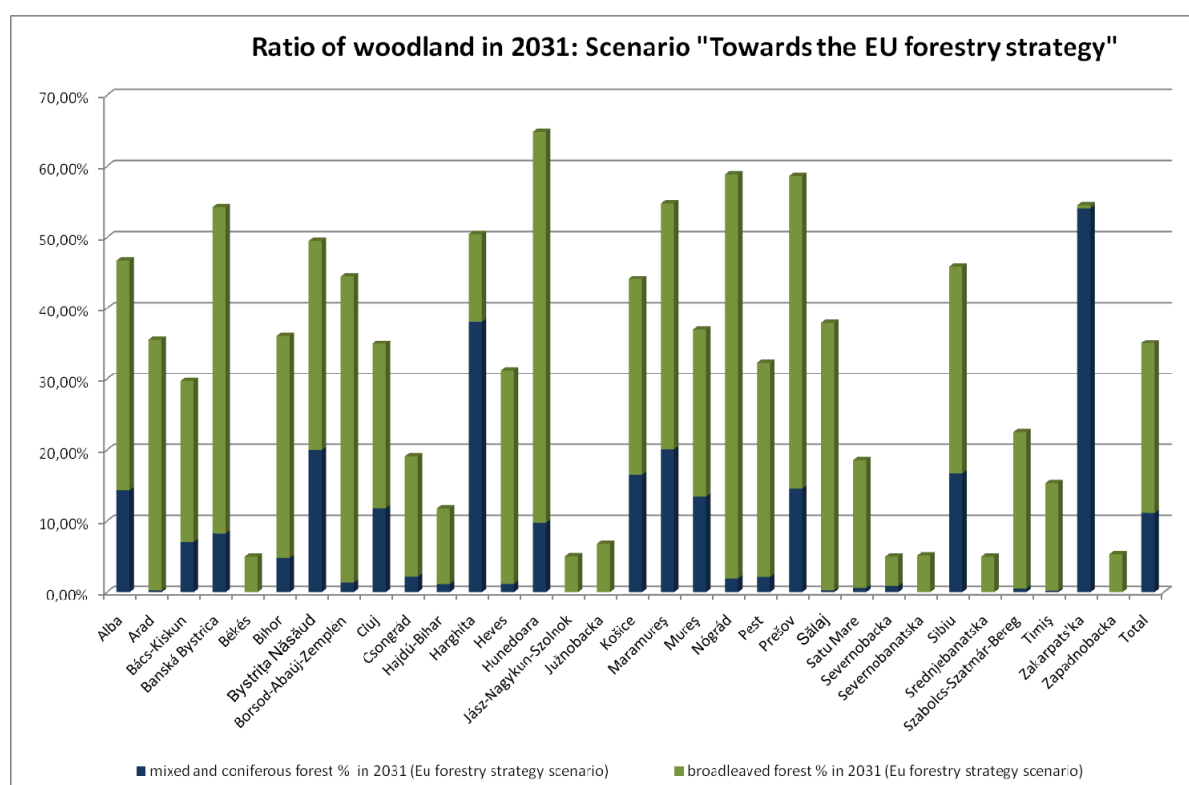
### III.7. To promote land use which is suitable to the landscape characteristics

The change of woodlands has been explored first of all for the analysis of land use adjusted to natural and geographical potentials. The reversal of the decrease of woodlands is a sensitive issue in this region. The forests have significant impact on the global water balance of the catchment area as well as on the mitigation of climate change impacts including the risks of flood and draught.

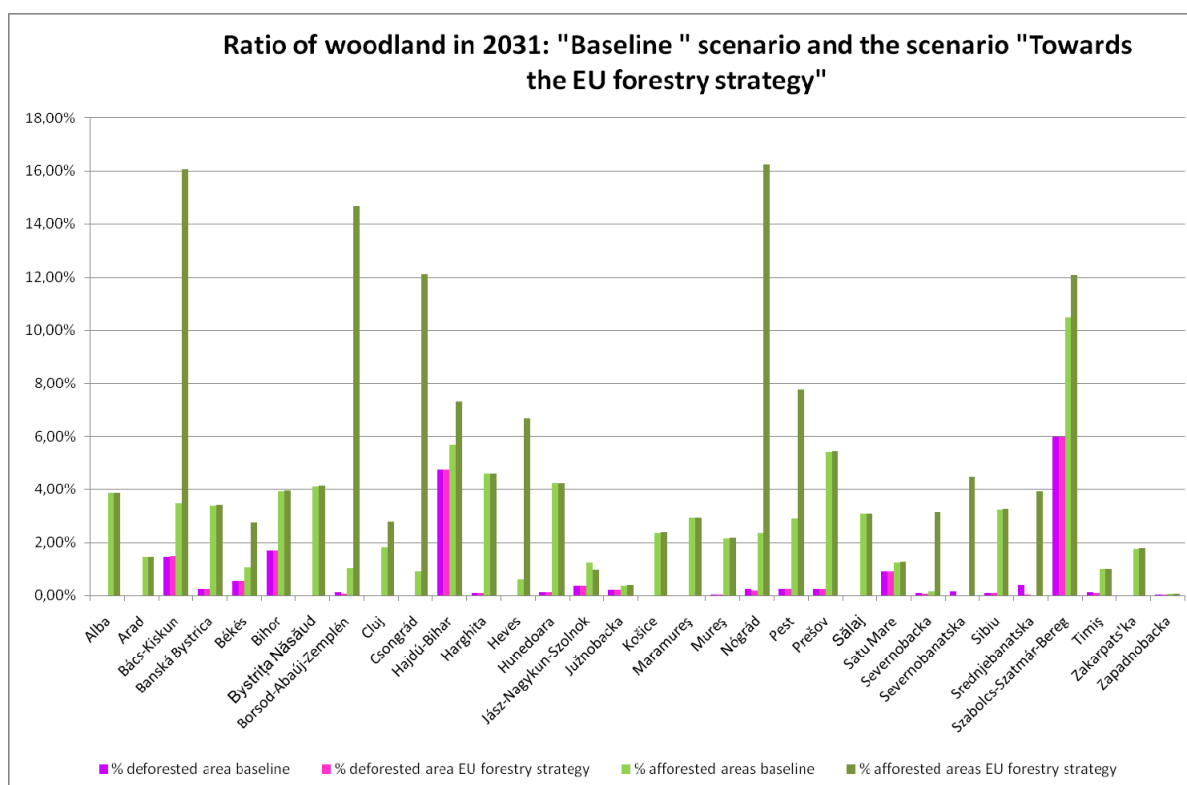
For the exploration of the issue of forest development a scenario has been developed on the basis of the document entitled „Communication of 10 march 2005 from the Commission to the Council and the European Parliament – Reporting on the EU forestry strategy”. According to this document in the European Union coverage of woodland is 35 %, while in the Tisza catchment area it is only around 30 %.

In contrast to the former, “roll on scenarios” exploring the impacts of policy measures, this is a “roll back” scenario setting an objective and exploring the paths towards its attainment. For the scenario the attainment of 35 % coverage has been set as an aim. For this purpose the need of forestation has been calculated for each county with regard to the natural characteristics. In plain areas minimum 5 % ratio, on mountains 45 % ratio of woodland has been proposed. For the attainment of these ratios the regulations of the joint planning system have been considered, assuming active stimulation of forestation in areas of high forest potential.





The impact of the implementation of the proposed forestation is shown by the table and map below. The scenario foresees minimum 5 % growth of woodland in the majority of counties of Hungary (except Békés and Jász-Nagykun-Szolnok) and in county Prešov of Slovakia. Furthermore, considerable growth of woodland is foreseen in three counties (Severnobacka, Srednjebanatska, Severnobanatska) of Serbia.



**TICAD  
SCENARIO BUILDING  
SCENARIO OF TOWARDS THE EU FORESTRY STRATEGY:  
CHANGE OF FORESTED AREA**

